



Metropolitan Sewer District of Buncombe County

French Broad Interceptor Emergency Repair

MSD Project No. 2021036

Construction Documents Project Manual

Issued for Bids

June 2022

HDR Project No. 10194380



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ADVERTISEMENT FOR BIDS

Sealed bids will be received by the Metropolitan Sewerage District (DISTRICT) of Buncombe County, North Carolina at the second floor conference room of the MSD W. H. Mull Building, 2028 Riverside Drive in Asheville, North Carolina, until **2:00 PM** (local time), **Thursday, July 21, 2022**, and shall be immediately opened publicly and read aloud for the project described as follows:

**French Broad Interceptor at Amboy Road
Sanitary Sewer Emergency Repair
Project No. 2021036**

generally consisting of the furnishing of all services, supplies, materials (**excluding the piping and fittings mentioned in the following**) and equipment and performing of all labor for the construction of approximately 1,040 LF of 60-inch FRP, 16 LF of 42-inch FRP, 5 LF of 36-inch DIP, and 18 LF of 24-inch DIP and fittings, including manholes and all related appurtenances. The DISTRICT has purchased the piping to avoid delays in manufacturing. The CONTRACTOR shall be responsible for arranging delivery and unloading all materials. MSD has purchased the following materials:

- 60-inch fiberglass-reinforced pipe (FRP)
- 42-inch FRP
- 36-inch ductile iron pipe (DIP)
- 24-inch DIP
- 24-inch and 36-inch DIP fittings

A pre-bid walk through meeting for the project is NOT mandatory, however, is highly recommended for CONTRACTORS. The on-site visit will be scheduled for Wednesday, July 6, 2022 at 2:00 PM at 125 Meadow Road Asheville, NC. This is an open gravel lot. Those wishing to attend the meeting must contact Darin Prosser by Friday, July 1, 2022 by 5:00 PM.

Complete plans, specifications and contract documents may be **examined** at the DISTRICT website: www.msdbc.org/adsforprojects.php

Copies of the complete plans, specifications and contract documents may be **obtained** from:

Attention: Denise Moore (*must be included when making request by mail*)
Metropolitan Sewerage District of Buncombe County
2028 Riverside Drive
Asheville, N.C. 28804
(828) 225-8277
E-mail address: denisem@msdbc.org

The plans, specifications, and contract documents on the DISTRICT'S website are provided as a courtesy to interested parties. **Contractors planning to submit a bid for DISTRICT projects must purchase an official set of plans and specifications in order to be a registered planholder.**

A non-refundable deposit of seventy-five dollars (\$75.00) is required. Orders for plans and specifications which are to be delivered by parcel post or other carriers will not be accepted for a period of five (5) days prior to bid date.

The Metropolitan Sewerage District of Buncombe County encourages qualified minority businesses to bid on or participate as a subcontractor in District Contracts. To learn more about the Minority Businesses in the Asheville area, access the *Office of Historically Underutilized Businesses* for the State of North Carolina at www.doa.state.nc.us/hub. Local minority vendors are listed on this site.

All bidders must have current North Carolina licenses for all work for the project.

Each bid shall be accompanied by a deposit with the Metropolitan Sewerage District of Buncombe County of cash, or a cashier's check, or a certified check on some bank or trust company insured by the Federal Deposit Insurance Corporation in an amount equal to not less than five percent (5%) of the bid amount. In lieu of making the cash deposit as above described, a satisfactory Bid Bond in the amount of 5% of the total bid, executed by a corporate surety licensed under the laws of North Carolina to execute such bonds, shall be submitted with each bid, conditioned that the surety will upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. This deposit shall be retained if the successful bidder fails to execute the contract within ten (10) days after the award of bid or fails to give satisfactory surety as required in North Carolina General Statute Section 143-129.

Each Bidder must be appropriately licensed as a Contractor as provided in Chapter 87 of the North Carolina General Statute. Each Bidder must comply with MSD's Guidelines for Recruitment and Selection of Minority Business.

The successful bidder will be required to furnish a Performance Bond and a Payment Bond in the amount of one hundred percent (100%) of the contract amount. Those bonds shall meet the requirements of North Carolina General Statute Section 143-129 and of Article 3 of Chapter 44A of the North Carolina General Statute.

No bid may be withdrawn after bids have been opened, except as provided in North Carolina General Statute Section 143-129.1.

The contract shall be awarded to the lowest responsive, responsible bidder, taking into consideration quality, performance and time of delivery. The DISTRICT reserves the right to reject any and all bids, including, without limitation, the right to reject any or all non-conforming, non-responsive, unbalanced or conditional bids, and to reject the bid of any bidder if the DISTRICT believes that it would not be in the best interest of the DISTRICT to make an award to that bidder. The DISTRICT also reserves the right to waive informalities.

**METROPOLITAN SEWERAGE DISTRICT OF
BUNCOMBE COUNTY, NORTH CAROLINA**

**BY: Thomas E. Hartye, P.E.
GENERAL MANAGER**



1. Purpose.

The Metropolitan Sewerage District of Buncombe County, North Carolina (MSD) is committed to environmental quality through ongoing continual improvement with conformance to the ISO14001 standard.

2. Scope.

MSD is committed to environmental awareness with all vendors and contractors who work for or on our behalf. We strive to outreach with our vendors and contractors to promote continual improvement and teambuilding.

3. MSD Environmental Policy

MSD is committed to ensuring environmental quality by:

- Monitoring our processes and operations for continual improvements.
Setting and reviewing environmental objectives and targets for pollution prevention.
Dedicating our organization to complying with applicable Federal, State and Local regulations.

4. Vendor / Contractor ISO14001 Environmental Conformance

- Knowledge of MSD ISO14001 Program and Environmental Policy
Compliance with applicable Federal, State, Local rules and regulations
If applicable, follow MSD standard operating procedures
Promote Pollution Prevention at all times
Recycle waste debris when possible
Be aware of Emergency Response Procedures

5. Pollution Prevention Strategies

Materials Management
Spill Prevention and Control
Equipment Maintenance and Cleaning
Earthwork

Use erosion control measures to minimize flow of silt off-site
Dewatering Operations
Saw Cutting / Concrete Waste Management
Painting

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ARTICLE I PREPARATION OF BIDS:

All Bids shall be prepared in accordance with the following requirements:

1. The Bid form furnished by the DISTRICT shall be used and shall not be altered.
2. Entries shall be typed or written in ink; signatures shall be written in ink.
3. The Bidder shall submit a unit or lump sum price for every item in the Bid form unless specific directions in the Invitation for Bids allow for partial Bids. The unit or lump sum bid prices for the various Contract Items shall be typed or written figures in ink, and shall be clearly legible.
4. A Total Bid shall be entered in the Bid form for every item on which a unit price has been submitted. The Total Bid for each item other than lump sum items shall be determined by multiplying each unit price bid by the quantity for that item, and shall be written in figures in the "Total Bid" column in the Bid form. In case of a discrepancy between the unit price bid for a Contract Item and the Total Bid for that item, the unit price bid shall govern. In the case of lump sum items, the price shall be written in figures in the "Total Bid" column in the Bid form.
5. The Total Contract Bid Price shall be written in figures in the proper place in the Bid form. The Total Contract Bid Price shall be determined by adding the Total Bid for each item.
6. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. The individual signing the Bid shall initial the change in ink.
7. The Bid shall be properly executed. In order to constitute proper execution, the Bid shall be executed in strict compliance with the following. No other forms of execution will be accepted.
 - a. If a Bid is by an individual, it shall show the name and address of the individual and shall be signed by the individual.
 - b. If the Bid is by a Corporation, it shall be executed in the name of the Corporation by the President or Vice-president. It shall be attested by the Secretary or Assistant Secretary. The seal of the Corporation shall be affixed. The Bid shall show the address of the principal office of the Corporation.
 - c. If the Bid is made by a Partnership, it shall be executed in the name of the Partnership by one of the general partners. The address of the Partnership shall also be shown.
 - d. If the Bid is a joint venture, it shall be executed by each of the joint venturers with an address for each joint venturer and the address for the joint venture itself.
8. The Bid shall not contain any unauthorized additions, deletions or conditional bids.
9. The Bidder shall not add any provisions reserving the right to accept or reject an award, or to enter into a Contract pursuant to an award.
10. The Bid shall not contain irregularities of any kind which, in the opinion of the DISTRICT, make the Bid incomplete, indefinite, or ambiguous as to its meaning.
11. Alternative Bids will not be considered unless specifically called for. Where numbered Alternate Bid Items are provided under any Contract, each Bidder must submit a bid price for each numbered Alternate Item.

12. All attachments, certifications or acknowledgements attached to the Bid shall be executed in the same manner as the Bid.

ARTICLE II FILING OF PROPOSALS:

Each Bid shall be made on the forms incorporated in these documents. Clear and legible duplicate copies of the blank bid document forms provided may be used for entry. One (1) copy of each of these bid document forms are to be used to prepare the Contractor's bid proposal. It is not necessary to submit the entire specifications documents on the bid date, only the forms specified below. The Contractor (bidder) is cautioned that all spaces on the Proposal must be fully completed, including all identified or voluntary alternates, if any, and that the Proposal must be properly signed with the name of the company, its authorized representatives, and shall be fully executed in all respects. If this is a Formal Contract, the Bid Security documents shall be fully executed and signed/sealed by the Bidder and the Security Company and shall be witnessed and notarized as required by NC Statutes. This includes the Power of Attorney, attached and properly executed by the Security Company. All documents submitted with the bid shall be original documents and clearly show the original signatures and seals.

Formal Bid Contracts (Bid Bond required):

Bids shall be submitted in a two (2) envelope system. The outer envelope shall bear the project name and project number, and shall be sealed and addressed to the Metropolitan Sewerage District of Buncombe County, North Carolina, 2028 Riverside Drive, Asheville, North Carolina 28804. The **name, address, and license number of the bidder**, as well as the type of contract, if applicable, shall also be shown on the outside (Single-Prime-General, or Separate-Prime-General, Plumbing, HVAC or Electrical). The outer envelope shall contain the following documents, fully executed and signed/sealed as required in these Instructions to Bidders:

1. Proposal Guaranty (Bid Security) and Power of Attorney
2. Certification of receipt of Addenda written on Contractor's letterhead
3. Non-Collusion Affidavit
4. A sealed smaller envelope containing the proposal and Schedule of Estimated Quantities and Bid Prices and marked on the outside "PROPOSAL". This envelope should also contain the project name and the name, address, and license number of the bidder. **Attached to the proposal shall be the appropriate MBE form(s).**

Informal Bid Contracts (Bid Bond not required):

Bids shall be submitted in a one (1) envelope system. The envelope shall bear the project name and project number, and shall be sealed and addressed to the Metropolitan Sewerage District of Buncombe County, North Carolina, 2028 Riverside Drive, Asheville, North Carolina 28804. The **name, address, and license number of the bidder**, as well as the type of contract, if applicable, shall also be shown on the outside (Single-Prime-General, or Separate-Prime-General, Plumbing, HVAC or Electrical). The envelope shall contain the following documents, fully executed and signed/sealed as required in these Instructions to Bidders:

1. Proposal Form with attached Schedule of Estimated Quantities and Bid Prices
2. Certification of receipt of Addenda written on Contractor's letterhead
3. Non-Collusion Affidavit

4. Appropriate MBE form(s)

ARTICLE III OPENING OF PROPOSALS:

Bids received prior to the advertised hour of opening will be securely kept, sealed. The officer whose duty it is to open them will decide when the specified time has arrived, and no Bid received thereafter will be considered; except that when a Bid arrives by mail after the time fixed for opening, but before the reading of all other Bids is completed, and it is shown to the satisfaction of the DISTRICT that the non-arrival on time was due solely to delay in the mail for which the bidder was not responsible, such Bid will be received and considered. Mailed Bids will be treated in every respect as though filed in person and will be subject to the same requirements. Bids received subsequent to the advertised hour of opening will be returned to the Bidder unopened.

The Bid opening will be open to all interested parties.

Bid tabulation forms will be prepared by the ENGINEER and will be provided to all interested parties attending the bid opening. Forms will contain the names of prospective bidders and blank spaces for recording the bidder's license number, bid security, base bid and alternates, if any. Spaces for unit prices will not be provided.

Approximately five (5) minutes prior to the designated time for receiving bids the ENGINEER or his representative will announce the "official time" that will be used in declaring the bidding closed.

At the time fixed for the opening of Bids, the ENGINEER will declare the bidding closed. After which, the ENGINEER will determine if at least three (3) bids (sealed envelopes) have been received for the contract. Should there not be at least three, the bids will not be opened. The bids will be returned to the bidders and they will be requested to submit a bid proposal with a re-advertisement.

Since this is a public bid opening, all bids will then be opened and read aloud to the assembled group, beginning with the General Contract bids. The following order will be observed for Formal Bid Contracts:

1. The outer envelopes of all bidders will be opened prior to reading any "Proposals". Prior to opening an outer envelope, the name of the bidder and license number as it appears on the envelope will be announced to the assembled group.
2. With the opening of the bidder's outer envelope, a preliminary determination will be made that bid security and other required certifications are enclosed with the bid.
3. If all of the required material is not with at least three (3) of the bids for a particular contract, the sealed envelopes marked "Proposal" will not be opened.
4. If it is determined that at least three (3) of the outer envelopes appear to be in order, the sealed envelopes containing the bid proposals shall be opened and the bids read aloud. After such determination, all remaining bids may be opened and read aloud without first making a preliminary determination as to the adequacy of bid security.

If this is an informal bid contract, the envelope will be opened and a determination will be made that all the required documents are enclosed and properly executed.

ARTICLE IV WITHDRAWAL OR REVISION OF BIDS:

A Bidder may, without prejudice to himself, withdraw a Bid after it has been delivered to the DISTRICT provided such withdrawal is made in accordance with N.C. General Statute Section 143-129.1.

Only those persons authorized to sign Bids shall be recognized as being qualified to withdraw a Bid.

ARTICLE V ADDENDA AND INTERPRETATIONS:

No interpretations of the meaning of the Plans, Specifications or other portions of the Contract Documents will be made orally.

Every request for interpretation of Plans, Specifications or any portion of the Contract Documents shall be in writing and must be addressed to the office of the DISTRICT, and to be given consideration must be received by the DISTRICT at least five (5) days prior to the date fixed for the opening of Bids. DISTRICT shall determine, in its sole discretion, whether or not a request for clarification or interpretation requires a formal Addendum. Written Addenda, if issued, will be sent by certified or registered mail with return receipt requested, or facsimile with confirmation, or by e-mailed PDF with confirmation, to all holders of Contract Documents at the respective addresses, facsimile numbers, or e-mail addresses furnished for such purposes not later than three (3) days prior to the day fixed for the opening of bids.

Failure of any Bidder to receive any such Addenda shall not relieve said Bidder from any obligation under his Bid as submitted. All Addenda so issued shall become part of the Contract Documents.

Prospective Bidders are cautioned concerning the use of a Post Office Box address as telegraphic Addenda cannot be sent to Post Office Boxes.

ARTICLE VI DISCREPANCY IN BIDS:

In the event there is a discrepancy in any Bid between the unit prices and the extended totals, the unit prices shall govern. Bids which do not contain a price for every numbered item contained in the applicable Bid form will not be accepted, unless otherwise specified.

ARTICLE VII QUALIFICATIONS OF BIDDERS:

The DISTRICT may make such investigation as he deems necessary to determine the qualifications of the Bidder to perform the work and the Bidder shall furnish to the DISTRICT all such information and data for this purpose as the DISTRICT may request. The DISTRICT reserves the right to reject any and all Bids if the evidence submitted by, or investigation of, such Bidder fails to satisfy the DISTRICT that such Bidder is properly qualified to carry out the obligations of the Contract, and to complete the work contemplated therein. Conditional bids will not be accepted.

The Bidder shall submit, with his Bid, a list of Subcontractors, Suppliers, etc., indicating projects recently completed of a similar nature along with names, addresses and phone numbers of their clients for reference of qualifications.

Bidders shall comply with all applicable laws regulating the practice of General Contracting as contained in Chapter 87 of the General Statutes of North Carolina.

All Bidders must be Utility or Unclassified Contractors licensed in the State of North Carolina to perform work of a nature as required by the Contract Documents.

ARTICLE VIII BID SECURITY:

For Formal Bid Contracts, each bid must be accompanied by a Bid Bond, cash, cashiers check or a certified check of the Bidder made payable to the DISTRICT in an amount not less than five percent (5%) of the amount of the Bid. Bid Bonds shall be issued by a corporate surety licensed under the laws of North Carolina to execute such bonds.

When the Bidder elects to submit a certified check or cashiers check as his Bid Bond, the check shall be drawn on a bank or trust company insured by the Federal Deposit Insurance Corporation.

Where alternate items are included in the Bid, the amount of bid security shall be not less than five percent (5%) of the base bid and all alternates combined.

Please note that while not required, it is helpful to use the Bid Bond form already provided in these contract documents. All language contained within this bond form is acceptable to the District. Non-MSD forms may contain unacceptable language and cause your bid to be rejected. Please also note that the use of "AIA" type bid bonds is not acceptable and will cause your bid to be rejected.

The security of the Bidders will be released upon the earlier to occur of (a) the expiration of five days after the Contract has been signed by the accepted Bidder and the DISTRICT; or (b) the expiration of sixty (60) days after the day the bids are opened, upon demand of any such bidders whose bid has not been accepted prior to such demand.

In the event that all Bids are rejected, the security of all Bidders whose security has not been previously returned will be returned at the time of such rejection.

ARTICLE IX RESPONSIBILITIES OF BIDDERS:

Each bidder shall, by careful examination, satisfy himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work or the cost thereof under the Contract.

The Bidder shall make his own determination as to the nature and extent of the utility facilities, including proposed adjustments, new facilities, or temporary work to be performed by the utility owner or his representative; and as to whether or not any utility work is planned by the DISTRICT in conjunction with the project construction. The Bidder shall consider in his Bid all the permanent and temporary utility facilities in their present or relocation positions, whether or not specifically shown on the Plans or covered in the project Special Conditions. It will be the Bidder's responsibility to anticipate any additional costs to him resulting from such utility work and to reflect these costs in his Bid for the various items in the Contract.

The failure or omission of any Bidder to thoroughly examine and familiarize himself with the Contract Documents or to receive or examine any form, instrument or document or visit the site and acquaint himself with the conditions there existing shall in no way relieve any Bidder from any obligation in respect to his bid.

No verbal agreement or conversation with any officer, agent or employee of the DISTRICT, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations therein.

ARTICLE X COLLUSIVE AGREEMENTS:

Each Bidder submitting a Bid to the DISTRICT for any portion of the work contemplated by the

documents on which bidding is based, shall execute and attach thereto an affidavit substantially in the form herein provided, to the effect that he has not entered into a collusive agreement with any person, firm or corporation in regard to any Bid submitted.

Before executing any Sub-contract, the successful Bidder shall submit the name of any proposed Sub-contractor for prior approval and an affidavit substantially as above.

ARTICLE XI TAXES

The Bidder shall include in his Bid the cost of all sales and use taxes and furnish to the DISTRICT at the end of each month and upon completion of his Contract, a statement setting forth all such taxes paid. This statement shall indicate the amount paid to each firm and be adequate for audit by the State Department of Revenue and must be accompanied by copies of invoices.

ARTICLE XII COMPARISON OF BIDS:

Bids will be compared on the basis of the totals of the approximated quantities comprising all items, at the unit and lump sum prices bid for these items. The resulting total Contract Bid Price will be compared which will include and cover the furnishing of all materials, and the performance of all labor necessary, and completing of all the work called for under the accompanying Contract, and in the manner set forth and described in the Contract Documents.

The lowest Bidder under each Contract will be that Bidder whose Bid totals the lowest number of dollars as determined above.

When numbered Alternate bid items are required, the lowest Bidder is the Bidder whose Base Bid and Bid for the Alternate or combination of Alternates selected by the DISTRICT results in the lowest total amount. The DISTRICT reserves the right to select any Alternate or combinations of Alternates.

Where estimated quantities are included in certain items of the Bid, they are for the purpose of comparing bids. While they are believed to be close approximations, they are not guaranteed, and settlement will be made from such items upon the basis of work as actually executed at the unit prices in the Bid as accepted.

ARTICLE XIII AWARD OF CONTRACT:

The contract shall be awarded to the lowest responsive, responsible bidder, taking into consideration quality, performance and time of delivery. The DISTRICT reserves the right to reject any and all bids, including, without limitation, the right to reject any or all non-conforming, non-responsive, unbalanced or conditional bids, and to reject the bid of any bidder if the DISTRICT believes that it would not be in the best interest of the DISTRICT to make an award to that bidder. The DISTRICT also reserves the right to waive informalities.

When Alternate Bid items are required in the Bid, the Contract will be awarded to that responsible Bidder whose Base Bid and Bid for the Alternate or combination of Alternates selected by the DISTRICT results in the lowest total amount.

These Bids are asked for in good faith, and awards will be made as soon as practicable, provided satisfactory Bids are received.

The DISTRICT may reject any bid not prepared and submitted in accordance with the provisions of the bid documents.

The right is reserved to waive informalities in bidding, to reject any or all Bids, or to accept a Bid

other than the lowest submitted if such action is deemed to be in the best interest of the DISTRICT.

ARTICLE XIV COMMENCEMENT OF WORK:

Upon execution and delivery of the Contract and the delivery of the required performance and payment bonds and insurance certificates and policies, the CONTRACTOR will be notified to proceed with the Work of the Contract. The work of the Contract shall be commenced within ten (10) days following such notification or as otherwise specified in the Notice to Proceed.

The CONTRACTOR shall notify the DISTRICT in writing, of his intention to enter upon the site of the work at least five (5) days in advance of such entrance.

ARTICLE XV DAMAGES FOR FAILURE TO EXECUTE CONTRACT:

If an accepted Bidder shall fail or refuse to sign and deliver this Contract and the required surety bonds and insurance documentation within ten (10) days after he has received Notice of Award of his Bid, the DISTRICT shall retain, as partial damages for such failure or refusal, the Bid security of such defaulting Bidder. In addition to such damages, the DISTRICT reserves the right to pursue any other remedies it may have against such defaulting Bidder.

ARTICLE XVI EQUAL EMPLOYMENT OPPORTUNITY

Attention of Bidders is particularly called to the requirements for insuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin.

ARTICLE XVII WAGES AND SALARIES

The Bidder and his Subcontractors shall be required to pay all employees the minimum prevailing wage and salary rates for the full length of the contract.

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ARTICLE 1--DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

Agreement - The written agreement between DISTRICT and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment - The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid - The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bonds - Bid, performance and payment bonds and other instruments of security.

Change Order - A document recommended by ENGINEER, which is signed by CONTRACTOR and DISTRICT and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), Bonds, these General Conditions, the Special Conditions, the Specifications and the Plans as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

Contract Price - the monies payable by DISTRICT to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.8.1 in the case of Unit Price Work).

Contract Time - The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

Contractor - The person, firm or corporation with whom the DISTRICT has entered into the Agreement.

Day - Consecutive 24 hour period including Saturday or Sunday.

Defective - An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by DISTRICT at Substantial Completion in accordance with paragraph 14.8 or 14.10).

District - The Metropolitan Sewerage District of Buncombe County, N.C., with whom the CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if not, it means that date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Engineer - The DISTRICT's representative who is in responsible charge of the Work.

Field Order - A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5; but which does not involve a change in the Contract Price or the Contract Time.

General Requirements - As stated in the Specifications and Requirements of the Agreement.

Inspector - The authorized representative of the ENGINEER assigned to make a detailed inspection of any or all portions of the work and materials.

Laws and Regulations; Laws or Regulations - Statutes of the U.S. Government, the State of North Carolina or other rules, regulations, ordinances or codes adopted by governmental authorities having appropriate jurisdiction.

Notice of Award -The written notice by DISTRICT to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, DISTRICT will sign and deliver the Agreement.

Notice to Proceed - A written notice given by DISTRICT to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

Partial Utilization - Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Plans - The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

Project - The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Regular Working Hours - Monday through Friday from 8:00 a.m. to 5:00 p.m.

Retainage - The amount of money retained by the DISTRICT until such time as the Work is complete and approved by the DISTRICT.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

Special Conditions - Part of the Contract Documents which amends or supplements the General Conditions and applies to the Work.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of

materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other subcontractor for the performance of a part of the Work at the site.

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman or vendor.

Unbalanced Bid - A bid which includes any unbalanced bid price.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials; electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work - Work to be paid for on the basis of unit prices.

Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes performing services, furnishing labor and material and incorporating materials and equipment into the construction, all as required by the Contract Documents.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by the ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment - A written amendment of the Contract Documents, signed by DISTRICT and CONTRACTOR on or after the Effective Date of the Agreement.

ARTICLE 2 --PRELIMINARY MATTERS

Delivery of Bonds:

2.1 When CONTRACTOR delivers the executed Agreements to DISTRICT, CONTRACTOR shall also deliver to DISTRICT such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2 The CONTRACTOR shall be required to post all bonds, acquire any insurance, and offer any warranties required in obtaining the permits demanded by the Work. The CONTRACTOR shall be responsible for all notifications and acceptances required by those permits.

2.3 DISTRICT shall furnish to CONTRACTOR up to five copies of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.4 The Contract Time will commence to run on the tenth day after the Effective Date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within ten days after the Effective Date of the Agreement.

Starting the Project:

2.5 CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

Before Starting Construction:

2.6 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to DISTRICT or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have been aware of such discrepancy.

2.7 CONTRACTOR shall, within thirty (30) days after receipt of Notice of Award, prepare and submit to the DISTRICT for approval a practicable construction schedule showing the order in which the CONTRACTOR proposes to carry out the work, the date on which he will start the prominent features and the contemplated dates for completing such prominent features. The schedule may be in any form, at the option of the CONTRACTOR, but shall maintain current with each submittal for progress payment, with at least the following information:

2.7.1 The various classes and area of work broken down into times projected for submittals, approvals and procurement; times for installation and erection; and times for testing and inspection.

2.7.2 Line by line breakdown.

2.7.3 The work completed and the work remaining to complete the project.

2.7.4 Any items of work which will delay the start or completion of other major items of work so as to delay completion of the whole project.

2.7.5 Material suppliers and subcontractors listings – as soon as possible, but in no case more than thirty (30) days after receipt of the Notice of Award, the CONTRACTOR shall supply the names and addresses of all major material suppliers and subcontractors to the DISTRICT.

2.7.6 Shop Drawings and Samples – CONTRACTOR shall submit shop drawings and samples accompanied by his standard transmittal form. Resubmissions, where required, shall be in accordance with the procedures established for the initial submittal.

2.7.7 A preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will sub-divide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.8 Before any Work at the site is started, CONTRACTOR shall deliver to DISTRICT, certificates and evidence of insurance requested by the DISTRICT which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 – 5.10, and DISTRICT shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which DISTRICT is required to purchase and maintain in accordance with paragraph .5.12.

Pre-construction Conference:

2.9 Within ten days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a pre-construction conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.7, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Regular Working Hours:

2.10 All construction activities requiring inspection shall be carried out during regular working hours during normal working days being from 8:00 a.m. - 5:00 p.m., Monday through Friday, except for: New Year's Day, Martin Luther King's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the Friday after, Christmas Day, and December 24 and 26 if they are not on a Saturday or Sunday. When holidays fall on weekends, other days will be observed as the holiday.

2.10.1 No inspections shall take place outside normal times without prior approval of the DISTRICT. Approval shall only be given in emergencies that affect the public health, safety and welfare.

2.10.2 All construction activities conducted outside normal times without prior approval of the DISTRICT shall subject the Work to uncovering for inspection. Said uncovering shall be at the CONTRACTOR'S expense.

Finalizing Schedules:

2.11 At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time; but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefore. The finalized schedule of Shop Drawing submission will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3--CONTRACT DOCUMENTS: INTENT, AMENDING, RE-USE

Intent:

3.1 The Contract Documents comprise the entire Agreement between DISTRICT and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the laws of North Carolina.

3.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a generally accepted trade meaning are used to describe Work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of Opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of DISTRICT, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.5

3.3 If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER. However, CONTRACTOR shall not be liable to DISTRICT or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have been aware of such conflict, error or Discrepancy.

Amending and Supplementing Contract Documents:

3.4 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.4.1 A formal Written Amendment;

3.4.2 A Change Order (pursuant to paragraph 10.4); or

3.4.3 A Work Directive Change (pursuant to paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5 In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.5.1 A Field Order (pursuant to paragraph 9.5);

3.5.2 ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27);
or

3.5.3 ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Re-use of Documents:

3.6 Neither CONTRACTOR nor any subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with DISTRICT shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not re-use any of them on extensions of the Project or any other project without written consent of DISTRICT and ENGINEER.

ARTICLE 4--AVAILABILITY OF LANDS, PHYSICAL CONDITIONS, REFERENCE POINTS

Availability of Lands:

4.1 DISTRICT shall provide access to the lands upon which the Work is to be performed, rights-of-way, easements and access to such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by DISTRICT, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in DISTRICT's furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefore as provided in Article 12. CONTRACTOR shall be responsible for all temporary construction facilities and space for storage of materials and equipment.

Physical Conditions:

4.2.1 Explorations and Reports: Reference is made to the Special Conditions for identification of those reports of explorations and tests of sub-surface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of technical data contained in such reports; but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence, CONTRACTOR shall have full responsibility with respect to sub-surface conditions at the site.

4.2.2 Existing Structures: Reference is made to the Special Conditions for identification of those drawings of physical conditions in or relating to existing surface and sub-surface structures (except

Underground Facilities referred to in paragraph 4.3), which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings; but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3 Report of Differing Conditions: If CONTRACTOR believes that:

4.2.3.1 Any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate; or

4.2.3.2 Any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents.

CONTRACTOR shall promptly, after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify ENGINEER in writing about the inaccuracy or difference.

4.2.4 ENGINEER's Review: ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto, and send a copy to CONTRACTOR, of ENGINEER's findings and conclusions.

4.2.5 Possible Documents Change: If ENGINEER concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change in the Contract Documents is required, a Work Directive change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6 Possible Price and Time Adjustment: In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If DISTRICT and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions -- Underground Facilities:

4.3.1 Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to ENGINEER by the owners of such Underground Facilities or by others.

4.3.1.1 DISTRICT and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2 CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2 Not Shown or Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which it may be necessary to modify the Contract Documents to reflect the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both; to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Article 11 and 12.

Reference Points:

4.4 DISTRICT shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of ENGINEER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5--BONDS AND INSURANCE

Performance and Other Bonds:

5.1 CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, and shall be as prescribed by North Carolina General Statute 44A or by the Contract Documents. All Bonds shall be in the Forms prescribed by North Carolina General Statutes Chapter 44A or by the Contract Documents and be executed by sureties licensed to do business in North Carolina. All Bonds signed by an agent must be accompanied by a copy of the documents authorizing the agent to execute such Bonds.

5.2 If the surety on any bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in North Carolina or it otherwise ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond acceptable to DISTRICT.

Insurance:

5.3 The CONTRACTOR shall provide adequate insurance to protect the CONTRACTOR, his Subcontractors, the DISTRICT, and the ENGINEER against damage claims which may arise out of or result from the execution of the work whether such execution be by the CONTRACTOR, by any Subcontractor, by

anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable with coverage and amounts not less than those set forth herewith. All Subcontractors under the CONTRACTOR, of whatever tier, shall provide the same insurance as that required of the CONTRACTOR in addition to that required of the CONTRACTOR.

5.4 The CONTRACTOR shall not commence work on the project until he has obtained all insurance required under this paragraph and such insurance has been accepted by the DISTRICT, nor shall the CONTRACTOR allow any Subcontractor to commence work until the insurance required of the Subcontractor has been obtained and accepted by the DISTRICT.

5.5 All insurance policies shall include a clause requiring that the policy shall not be canceled, modified, nor allowed to expire without 30 days written notice to DISTRICT.

5.6 The CONTRACTOR and Subcontractors shall furnish the DISTRICT a certificate or certificates of insurance issued by an insurance company duly licensed to engage in the business of insurance in North Carolina as evidence that the required insurance policies have been procured and are in force. Actual copies of the insurance policies shall be submitted to the DISTRICT within 10 days after submission of the certificates.

5.7 The CONTRACTOR and Subcontractors shall procure and maintain during the life of the contract the following Insurance:

5.7.1 General Liability and Property Damage Insurance in an amount not less than \$1,000,000 for all damages arising out of bodily injury, including death, sustained by any one person in any one accident, and subject to a \$2,000,000 aggregate limit, and not less than \$1,000,000 for all property damages sustained by any one person in any one occurrence, and subject to the same limit in aggregate. Added to the policy by endorsement shall be (1) Fellow Employee Insurance covering all employees; (2) Broad Form Comprehensive General Liability Insurance; and (3) Explosion (Blasting), Collapse, and Underground Hazard Insurance in the amounts shown above.

5.7.2 Excess General Liability and Property Damage Insurance, Automobile Liability and Employer Liability (Umbrella or Form Following Coverage Equal) in an amount not less than \$1,000,000 in aggregate to cover bodily injury, death, and property damage which shall apply as excess insurance over and above the General Liability, Property Damage, Automobile Liability and Employer Liability. Added to the policy by endorsement shall be (1) Fellow Employee Insurance covering all employees; (2) Broad Form Comprehensive General Liability Insurance; and (3) Explosion (Blasting), Collapse, and Underground Hazards Insurance in the amounts shown above.

5.7.3 Motor Vehicle Liability Insurance on all motor vehicles owned, leased, or otherwise used by the CONTRACTOR and all Subcontractors and employers non-ownership coverage for the CONTRACTOR and Subcontractors in an amount not less than \$1,000,000 each occurrence to include uninsured and underinsured motorist.

5.7.4 DISTRICT's Protective Liability and Property Damage Insurance to protect the DISTRICT or any of its employees, officers or agents, the ENGINEER, and such other engineer or engineers as may act under the contract, against claims arising from the operations of the CONTRACTOR or his Subcontractors. Such insurance shall be provided by endorsements to the General Liability and Property Damage Insurance, Excess General Liability and Property Damage Insurance, Motor Vehicle Liability Insurance, and Excess Motor Vehicle Liability Insurance policies (including all endorsements) or separate policies shall be provided. Coverage and amounts shall be the same as required of the CONTRACTOR.

5.7.5 Workers' Compensation Insurance as required by applicable Federal, State, or Territorial laws for all employees of the CONTRACTOR and employees of his Subcontractors in the event that the Subcontractors fail to provide such insurance. This insurance shall contain endorsements including (1) Broad Form All States Coverage, (2) United States Longshoremen's and Harbor Workers' Compensation Act, (3) Maritime or Jones Act coverage, when applicable, and (4) Voluntary Compensation Coverage, and shall specifically list the state where the work is performed.

5.7.6 Employers Liability Insurance on all employees of the CONTRACTOR and employees of his Subcontractors in the event that the Subcontractors fail to provide such insurance. This insurance shall provide coverage of at least the statutory minimum requirements.

5.7.7 "Special Form" Type Builders Risk Insurance as will protect the CONTRACTOR and the DISTRICT from loss or damage while the project is under construction and prior to full acceptance thereof by the DISTRICT. The policies shall be payable to the CONTRACTOR and the DISTRICT as their interest in the facility may be determined. This provision shall not release the CONTRACTOR of his obligation to complete, according to the plans and specifications, the project covered by the contract, and the CONTRACTOR and his surety shall be obligated to full performance of the CONTRACTOR's undertaking. The policy coverage shall include all materials and supplies at any location and/or in transit, including theft, at the time an insurable interest begins. The policy shall contain no exclusion pertaining to water damage or any other damage of a building not fully enclosed.

5.7.8 Railroad Protective Liability and Property Damage Liability Insurance if operations performed by the CONTRACTOR require work to be done under, over, or within fifty (50) feet of the center line of any track of any railroad company, unless a written waiver is obtained by the CONTRACTOR from the office of the railroad company's division superintendent having jurisdiction. The CONTRACTOR shall furnish to the railroad company an original insurance policy covering the operations which will be performed by the CONTRACTOR or any Subcontractor, naming the railroad as insured, on the form of Railroad Protective Policy as accepted by the Association of American Railroads and Mutual Insurance Rating Bureau. The amounts and limits of such insurance shall be as required by the division superintendent of the railroad company.

Contractor's Liability Insurance:

5.8 CONTRACTOR shall purchase and maintain in force comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and will provide protection from claims of injury to persons or property arising out of the Work. In addition, CONTRACTOR shall maintain in force and provide certificates of coverage for:

5.8.1 workers' or workmen's compensation insurance as required by the laws of North Carolina.

5.8.2 liability insurance as required by law for all vehicles and machinery operated by CONTRACTOR in connection with the Work.

The insurance required by this paragraph shall include the specific coverages and be written for not less than the limits of liability and coverages provided below or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days' prior written notice has been given to DISTRICT by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR

may be correcting, removing or replacing **defective** Work in accordance with paragraph 13.11. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish DISTRICT with evidence of continuation of such insurance at final payment and one year thereafter. Further, CONTRACTOR shall be responsible for verifying that any and all Subcontractors furnishing labor and/or materials in connection with the Work be properly insured.

Contractual Liability Insurance:

5.9 In accordance with North Carolina General Statutes Chapter 22B-1, "The CONTRACTOR, to the extent permitted by law, hereby agrees to indemnify and hold harmless the DISTRICT, its independent contractors, agents, and employees against liability for damages resulting from the sole negligence of the CONTRACTOR, its agents or employees. For the purposes of this paragraph, damages shall include the cost and expense of defending a claim, the amount of any judgment recovered, and the amount of damage to property or person.

5.10 The comprehensive general liability insurance required by paragraph 5.8 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

District's Liability Insurance:

5.11 DISTRICT shall be responsible for purchasing and maintaining DISTRICT's own liability insurance and, at DISTRICT's option, may purchase and maintain such insurance as will protect DISTRICT against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.12 CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be required by Laws and Regulations). The insurance shall include the interests of DISTRICT, CONTRACTOR, Subcontractors, and ENGINEER in the Work, all of whom shall be listed as insured or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If independent consultants are hired, they shall be required to purchase and maintain in force insurance appropriate for the Work. If not covered under the "all risk" insurance CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.13 DISTRICT shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by Laws and Regulations which will include the interest of DISTRICT, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER'S consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.14 All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by DISTRICT in accordance with paragraphs 5.12 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days' prior written notice has been given to CONTRACTOR by certified mail and will contain waiver provisions in accordance with paragraph 5.18.1

5.15 DISTRICT shall not be responsible for purchasing and maintaining any property insurance to protect the interest of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided. The risk of loss within the deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.16 If CONTRACTOR requests in writing that other special insurance be included in the property insurance policy, DISTRICT shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, DISTRICT shall in writing advise CONTRACTOR whether or not such other insurance has been procured by DISTRICT.

Waiver of Rights:

5.17.1 DISTRICT and CONTRACTOR waive all right against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraph 5.12 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractor, ENGINEER, ENGINEER's consultants and all other parties named as insured in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of DISTRICT, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insured. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by DISTRICT as trustee or otherwise payable under any policy so issued.

5.17.2 DISTRICT and CONTRACTOR intend that any policies provided in response to paragraph 5.12 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have not rights of recovery against any of the parties named as insured or additional insured, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER'S 's consultant DISTRICT will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

5.18 Any insured loss under the policies of insurance required by paragraph 5.12 will be adjusted with DISTRICT and made payable to DISTRICT as trustee for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.19 . DISTRICT shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the monies so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.19 DISTRICT as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to DISTRICT's exercise of this power. If such objection be made, DISTRICT as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, DISTRICT as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of such duties.

Acceptance of Insurance:

5.20 If DISTRICT has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3 – 5.10 on the basis of its not complying with the Contract Documents, DISTRICT shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to DISTRICT in accordance with paragraph 2.8. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by DISTRICT on the basis of their not complying with the Contract Documents, CONTRACTOR shall notify DISTRICT in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR in accordance with paragraph 2.8, DISTRICT and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by DISTRICT or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

Partial Utilization - Property Insurance:

5.21 If DISTRICT finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10, provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use or occupancy.

ARTICLE 6--CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 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 and procedures of construction; but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies with the Contract Documents.

6.2 CONTRACTOR shall keep on the Work site at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to DISTRICT and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit

overtime work or the performance of Work on Saturday, Sunday or any legal holiday without DISTRICT'S written consent.

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleansed and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6 CONTRACTOR shall submit to ENGINEER for acceptance adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.7.1 Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item, it is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named.

6.7.2 The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contact with DISTRICT for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of re-design and claims of other contractors affected by the resulting change, all of which shall be

considered by ENGINEER in evaluating the proposed substitute, ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.3 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.4 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing, DISTRICT may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse DISTRICT for the charges of ENGINEER and ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization whether initially or as a substitute, against whom ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2 If the General Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to DISTRICT in advance of the specified date prior to the Effective Date of the Agreement for acceptance by DISTRICT and if CONTRACTOR has submitted a list thereof in accordance with the General Conditions, ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of DISTRICT or ENGINEER to reject "defective" Work.

6.9 CONTRACTOR shall be fully responsible to DISTRICT for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between DISTRICT and any such Subcontractor, Supplier or other person or organization, nor

shall it create any obligation on the part of DISTRICT to pay or to see to the payment of any monies due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

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

6.11 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of DISTRICT and contains waiver provisions as required by paragraph 5.17. CONTRACTOR shall pay each Subcontractor a just share of any insurance monies received by CONTRACTOR on account of losses under policies issued pursuant to paragraph 5.15.

Patent Fees and Royalties:

6.12 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by DISTRICT in the Contract Documents. CONTRACTOR shall indemnify and hold harmless DISTRICT and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorney's fees and court and appeals costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13 CONTRACTOR shall obtain and pay for all permits and licenses necessary to do the work, which have not been obtained by DISTRICT. DISTRICT shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall post all bonds, provide all insurance, pay all governmental charges, pay all fees, provide all warranties required for the prosecution of the WORK which are applicable at the time of opening Bids, or if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of such utility owners for capital costs related thereto, and CONTRACTOR shall be responsible for all notifications and acceptances required of all permits.

Laws and Regulations:

6.14.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither DISTRICT nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2 If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If

CONTRACTOR performs any work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.15 CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the place of the Project which are applicable during the performance of the Work.

Use of Premises:

6.16 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against DISTRICT by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim. CONTRACTOR shall indemnify and hold DISTRICT and ENGINEER harmless from and against all claims for injury to persons or property including legal fees and other professional fees arising out of the Work.

6.17 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by DISTRICT. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19 CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER.

Safety and Protection:

6.20 CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1 all employees on the Work and other persons and organizations who may be affected thereby;

6.20.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

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

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for those acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of DISTRICT or ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to DISTRICT and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21 CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to DISTRICT.

Emergencies:

6.22 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or DISTRICT, is obligated to act to prevent threatened damage, injury or loss, CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.11) five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities,

dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.24 CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1 Before submission of each Shop Drawing or sample, CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26 ENGINEER will review and approve with reasonable promptness Shop Drawings and samples; but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where as specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. 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.

6.27 ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29 CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with DISTRICT. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and DISTRICT may otherwise agree in writing.

Indemnification:

6.30 CONTRACTOR shall indemnify and hold harmless DISTRICT and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and appeals costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) 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 and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified here under or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31 In any and all claims against DISTRICT or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32 The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7--OTHER WORK

Related Work at Site:

7.1 DISTRICT may perform other work related to the Project at the site by DISTRICT's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

7.2 CONTRACTOR shall afford each utility owner and other contractor who is a party to such a separate contract (or DISTRICT, if DISTRICT is performing the additional work with DISTRICT's employees) proper and safe access to the site for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility Districts and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said separate contacts between DISTRICT and such utility owners and other contractors.

7.3 If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner, CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure to so report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4 If DISTRICT contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime Contractors will be identified in the Special Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided in the Special Conditions. Unless otherwise provided in the Special Conditions, neither DISTRICT nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8--DISTRICT'S RESPONSIBILITIES

8.1 DISTRICT shall issue all communications to CONTRACTOR through ENGINEER.

8.2 In case of termination of the employment of ENGINEER, DISTRICT shall appoint an engineer, against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 DISTRICT shall furnish the data required of DISTRICT under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4 DISTRICT's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to DISTRICT's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Plans and Specifications.

8.5 DISTRICT's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.3 through 5.9.

8.6 DISTRICT is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7 DISTRICT's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8 In connection with DISTRICT's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with DISTRICT's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9 -- ENGINEER'S STATUS DURING CONSTRUCTION

DISTRICT's Representative:

9.1 ENGINEER will be DISTRICT's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as DISTRICT's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of DISTRICT and ENGINEER.

Visits to Site:

9.2 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for DISTRICT a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep DISTRICT informed of the progress of the Work and will endeavor to guard DISTRICT against defects and deficiencies in the Work.

Project Representation:

9.3 An inspector shall be assigned to the Project by the DISTRICT, to serve as ENGINEER's representative. The inspector shall conduct inspections of the Work, materials, and tests for compliance with the approved Plans and Specifications. Such inspections shall take place during normal times with the CONTRACTOR providing safe access to the work.

9.3.1 The inspector shall attend the preconstruction meeting.

9.3.2 The inspector shall report to the ENGINEER the progress and compliance status of the Work.

9.3.3 Non-compliance issues shall be reported to the CONTRACTOR and ENGINEER.

9.3.4 Failure to obtain compliance by reporting non-compliance issues shall result in a final decision being rendered by the ENGINEER.

9.3.5 Until compliance is obtained based on the final decision of the ENGINEER, no inspections of Work other than the correction work required by the final decision shall take place. All other Work placed during this period shall be rejected.

9.3.6 The CONTRACTOR shall notify the inspector one day in advance prior to covering the Work that requires inspection or testing. Failure to notify the inspector of the need for inspection shall result in rejection of the Work.

9.3.7 Failure of the inspector to inspect when notified does not relieve the CONTRACTOR from compliance with the requirements of the Plans and Specifications.

9.3.8 The inspector is not authorized to revoke, alter or waive any requirements of the Contract Documents. Any advice or recommendation given by the inspector shall not be construed as releasing any party from the requirements of the approved Plans and Specifications.

9.3.9 The CONTRACTOR shall notify the inspector two days in advance to request a final inspection of the Work.

Clarifications and Interpretations:

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on DISTRICT, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or 12.

Rejecting Defective Work:

9.6 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be "defective", and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.28 inclusive.

9.8 In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 & 12.

9.9 In connection with ENGINEER's responsibilities in respect of Applications for Payments, etc., see Article 14.

Determinations for Unit Prices:

9.10 ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise), ENGINEER's written decisions thereon will be final and binding upon DISTRICT and CONTRACTOR, unless, within ten days after the date of any such decision, CONTRACTOR delivers to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12 The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by DISTRICT or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13 Neither ENGINEER's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14 Whenever in the Contract documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents, (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to under take responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15 ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10--CHANGES IN THE WORK

10.1 Without invalidating the Agreement and without notice to any surety, DISTRICT may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written

Amendment, A Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents, except as otherwise specifically provided.

10.2 If DISTRICT and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as result of a Work Directive change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4 DISTRICT and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1 changes in the Work which are ordered by DISTRICT pursuant to paragraph 10.1, are required because of acceptance of "defective" Work under paragraph 13.13 or correcting "defective" Work under paragraph 13.14, or are agreed to by the parties;

10.4.2 changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3 changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations; but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5 If notice 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 Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR'S responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11--CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with

paragraph 9.11. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.8.1 through 11.8.3, inclusive).

11.3.2 By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.5.2.1).

11.3.3 On the basis of the Cost of the Work (determined as provided in paragraph 11.4) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.5 and 11.6).

Cost of the Work:

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by DISTRICT, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items:

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by DISTRICT and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by DISTRICT.

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

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by DISTRICT, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to DISTRICT who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

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

11.4.5 Supplemental costs including the following:

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

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

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by DISTRICT with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof-- all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4 Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

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

11.4.5.6 Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work, (except losses and damages within the deductible amounts of property insurance established by DISTRICT in accordance with paragraph 5.9) provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of DISTRICT. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.5.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts are established by DISTRICT in accordance with paragraph 5.14

Contractor's Fee:

11.5 The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.5.1 a mutually acceptable fixed fee; or if none can be agreed upon, fee will be determined according to procedure in the following paragraphs;

11.5.2 a fee based on the following percentages of the various portions of the Cost of the Work;

11.5.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen percent;

11.5.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

11.5.2.3 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, and 11.4.5;

11.5.2.4 the amount of credit to be allowed by CONTRACTOR to DISTRICT for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in Contractor's Fee by an amount equal to ten percent of the net decrease; and

11.5.2.5 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.5.2.1 through 11.5.2.4, inclusive.

11.6 Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.7 It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER, CONTRACTOR agrees that:

11.7.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.7.2 CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

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

Unit Price Work:

11.8.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work in an amount equal to the sum of the established unit prices for each separately identified item of Unit Price work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

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

11.8.3 Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

ARTICLE 12--CHANGE OF CONTRACT TIME

12.1 The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract time shall be based on written notice delivered by the party making the claim to the other party promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract time shall be determined by ENGINEER in accordance with paragraph 9.11 No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph..

12.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefore as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by DISTRICT or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God. Abnormal weather conditions will be determined based on daily and monthly data and departures from normal, as published by the National Climatic Data Center, Asheville, NC. Consideration will be given to localized weather events at the job site, and the time required to resume progress on the job.

12.3 All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and appeals costs) for delay by either party.

ARTICLE 13--WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to DISTRICT that all Work will be in accordance with the Contract Documents and will not be "defective". Prompt notice of all defects shall be given to CONTRACTOR. All "defective" Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 ENGINEER and other representatives of DISTRICT, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspection and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspections:

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4 If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with DISTRICT's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by DISTRICT (unless otherwise specified).

13.5 All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to DISTRICT and CONTRACTOR (or by ENGINEER if so specified).

13.6 If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR had given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.7 Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work:

13.8 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is "defective", CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and DISTRICT shall be entitled to an appropriate decrease in the Contract Price; and if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be "defective", CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 and 12.

DISTRICT May Stop the Work:

13.10 If the Work is "defective", or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, DISTRICT may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of DISTRICT to stop the Work shall not give rise to any duty on the part of DISTRICT to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all "defective" Work, whether or not fabricated, installed or completed, or if the Work has been rejected by ENGINEER, remove it from the site and replace it with "non-defective" Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

One Year Correction Period:

13.12 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provisions of the Contract Documents, any Work is found to be "defective", CONTRACTOR shall promptly, without cost to DISTRICT and in accordance with DISTRICT's written instructions, either correct such "defective" Work, or, if it has been rejected by DISTRICT, remove it from the site and replace it with "non-defective" Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, DISTRICT may have the "defective" Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

Acceptance of Defective Work:

13.13 If, instead of requiring correction or removal and replacement of "defective" Work, DISTRICT (and,

prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, DISTRICT may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to DISTRICT's evaluation of and determination to accept such "defective" Work (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and DISTRICT shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, DISTRICT may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to DISTRICT.

DISTRICT May Correct Defective Work:

13.14 If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct "defective" Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, DISTRICT may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph DISTRICT shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, DISTRICT may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which DISTRICT has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow DISTRICT, DISTRICT's representatives, agents and employees such access to the site as may be necessary to enable DISTRICT to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of DISTRICT in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and DISTRICT shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, DISTRICT may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and appeals costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's "defective" Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by DISTRICT of DISTRICT's rights and remedies hereunder.

ARTICLE 14--PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The schedule of values established as provided in paragraph 2.11 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed in accordance with these contract documents.

Application for Progress Payment:

14.2 At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and

signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that DISTRICT has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect DISTRICT's interest therein, all of which will be satisfactory to DISTRICT. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

Contractor's Warranty of Title:

14.3 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to DISTRICT no later than the time of payment, free and clear of all Liens.

Review of Applications for Progress Payment:

14.4 ENGINEER will, within ten days after receipt of each application for Payment, either indicate in writing a recommendation of payment and present the Application to DISTRICT, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and re-submit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by DISTRICT to CONTRACTOR.

14.5 ENGINEER'S recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the application for payment and the accompanying data and schedules that the work has progressed to the point indicated that to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by DISTRICT or DISTRICT to withhold payment to CONTRACTOR.

14.6 ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such recommendation to DISTRICT. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect DISTRICT from loss because:

14.7.1 the Work is "defective", or completed Work has been damaged requiring correction or replacement;

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order;

14.7.3 DISTRICT has been required to correct "defective" Work or complete Work in accordance with paragraph 13.14; or

14.7.4 of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

14.8 DISTRICT may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against DISTRICT on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling DISTRICT to a set-off against the amount recommended, but DISTRICT must give CONTRACTOR immediate written notice stating the reasons for such action.

Substantial Completion:

14.9 When CONTRACTOR considers the entire Work ready for its intended use, CONTRACTOR shall notify ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. If, after completion of items on tentative list ENGINEER considers the Work substantially complete, ENGINEER will within fourteen days execute and deliver to CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as the ENGINEER believes justified. At the time of delivery of the tentative certificate of Substantial Completion, ENGINEER will deliver to CONTRACTOR a written recommendation as to division of responsibilities pending final payment by DISTRICT to CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance, warranties, and any other incomplete items of the Work. Unless CONTRACTOR disagrees otherwise in writing and informs ENGINEER prior to ENGINEER'S issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on CONTRACTOR until final payment.

14.10 DISTRICT shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but DISTRICT shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.11 Use by DISTRICT of any finished part of the Work, which has specifically been identified in the Contract Documents, or which DISTRICT, ENGINEER and CONTRACTOR agree constitutes a separately

functioning and usable part of the Work that can be used by DISTRICT without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.11.1 DISTRICT may at any time request CONTRACTOR in writing to permit DISTRICT to use any such part of the Work which DISTRICT believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to DISTRICT and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify DISTRICT and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.9 and 14.10 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.11.2 DISTRICT may at any time request CONTRACTOR in writing to permit DISTRICT to take over operation of any such part of the Work although it is not substantially complete, and within a reasonable time thereafter CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to ENGINEER that such part of the Work is not ready for separate operation by DISTRICT, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between DISTRICT and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon CONTRACTOR at the time when DISTRICT takes over such operation. During such operation and prior to Substantial Completion of such part of the Work, DISTRICT shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.11.3 No occupancy or separate operation of part of the work will be accomplished prior to compliance with the requirements of paragraph 5.12 in respect of property insurance.

Final Inspection:

14.12 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or "defective" (punch list). CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.13 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents--all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions

of paragraph 14.17), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to DISTRICT) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by DISTRICT, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which DISTRICT or DISTRICT's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to DISTRICT to indemnify DISTRICT against any Lien.

Final Payment and Acceptance:

14.14 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation--all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment Thereupon, ENGINEER will give written notice to CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.17. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and re-submit the Application. Thirty days after presentation to DISTRICT of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by DISTRICT to CONTRACTOR.

14.15 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, DISTRICT shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by DISTRICT for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Contractor's Continuing Obligation:

14.16 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by DISTRICT to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by DISTRICT, nor any act of acceptance by DISTRICT, nor any failure to do so, nor any review and approval of a shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of "defective" WORK by DISTRICT will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.17).

Waiver of Claims:

14.17 The making and acceptance of final payment will constitute:

14.17.1 a waiver of all claims by DISTRICT against CONTRACTOR, except claims arising from unsettled Liens, from "defective" Work appearing after final inspection pursuant to paragraph 14.12 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by DISTRICT of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and

14.17.2 a waiver of all claims by CONTRACTOR against DISTRICT other than those previously made in writing and still unsettled.

ARTICLE 15--SUSPENSION OF WORK AND TERMINATION

DISTRICT May Suspend Work:

15.1 DISTRICT may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

DISTRICT May Terminate:

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2 if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3 if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5 if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.11

as revised from time to time);

15.2.7 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

DISTRICT may, after giving CONTRACTOR (and the surety, if there be one) seven days written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work, incorporate in the Work all materials and equipment stored at the site or for which DISTRICT has paid CONTRACTOR but which are stored elsewhere, and finish the Work as DISTRICT may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and appeals costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to DISTRICT. Such costs incurred by DISTRICT will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph DISTRICT shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by DISTRICT, the termination will not affect any rights or remedies of DISTRICT against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies due CONTRACTOR by DISTRICT will not release CONTRACTOR from liability.

15.4 Upon seven days written notice to CONTRACTOR, DISTRICT may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to direct, indirect and consequential costs (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and appeals costs).

CONTRACTOR May Stop Work or Terminate:

15.5 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by DISTRICT or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment, without good cause, within thirty days after it is submitted, or DISTRICT fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to DISTRICT and ENGINEER, terminate the Agreement and recover from DISTRICT payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or DISTRICT has failed to make any payment as aforesaid, CONTRACTOR may upon seven days written notice to DISTRICT and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with DISTRICT.

ARTICLE 16 - CONFLICT/APPEALS RESOLUTION

16.1 Claims, disputes and other matters in question between DISTRICT and CONTRACTOR arising out of or relating to the work may be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect, provided that both parties must agree, in writing, to arbitration. No request for arbitration shall be made when a matter has been referred to the ENGINEER pursuant to Paragraph 9.11 until the earlier of - the date on which the ENGINEER renders his opinion or the tenth (10) day after the parties have presented their evidence to the ENGINEER and no written decision has been rendered by that time, or by mutual agreement of the parties.

16.2 Notice of a request for arbitration shall be filed, in writing, signed by both parties with the American Arbitration Association. A copy shall be served on the DISTRICT and CONTRACTOR. Said request shall be made within a reasonable time after the claim, dispute or other matter in question has arisen. In no event shall the request for arbitration be made after the date and the applicable statute of limitations would bar institution of legal or equitable proceeding based on such claims, dispute or other matter in question.

16.3 The award rendered by an arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction.

16.4 Unless otherwise agreed in writing, the CONTRACTOR shall carry on the work and maintain progress during any arbitration proceedings, and the DISTRICT shall continue to make payments in accordance with the contract documents to the CONTRACTOR. No arbitration arising out of or relating to the work shall include, by consolidation or joinder on any other manner, an additional person not a party to the contract between the DISTRICT and the CONTRACTOR except by written consent of that person containing specific reference to the work and signed by the DISTRICT, the CONTRACTOR and the persons sought to be joined. Consent to arbitration involving an additional person or persons shall not constitute consent to arbitration of a dispute not described or with a person not named therein. This provision shall be specifically enforced by any court of competent jurisdiction.

16.5 Nothing herein shall prevent the DISTRICT or the CONTRACTOR from proceeding with litigation, provided, however, any litigation hereunder shall be brought in the General Court of Justice in the 28th Judicial District of North Carolina.

ARTICLE 17--MISCELLANEOUS

Giving Notice:

17.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

17.2.1 When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2 A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

17.3 Should DISTRICT or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to DISTRICT and ENGINEER thereunder, are in addition, 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 Documents, and 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. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

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4.3	NCDOT Right of Way Encroachment	

ARTICLE 1 - PROJECT DESCRIPTION

Scope of Work

- 1.1 The work to be performed shall consist of the construction of the **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, MSD Project No. 2021036** project for the Metropolitan Sewerage District of Buncombe County, North Carolina. The project shall generally consist of the furnishing of all services, supplies, materials (**except for the 24-inch DIP, 36-inch DIP, DI fittings, 42-inch and 60-inch FRP**) and equipment, and performing of all labor for the construction and installation of approximately 20 L.F. of 42-inch FRP, 1,040 L.F. of 60-inch FRP mainline sewer, and the 24-inch and 36-inch DIP reconnections of the existing force main, including manholes and all appurtenances related thereto.
- 1.2 The work shall be performed under unit price contract and shall consist of furnishing all materials (except mentioned above), supplies, and equipment; performing all labor and services incidental to or necessary for the complete construction of the project in accordance with the Plans and Specifications; and maintenance of each completed portion of the work until final acceptance of the entire project by the DISTRICT, unless otherwise approved by the ENGINEER.

ARTICLE 2 - PHYSICAL CONDITIONS/CONTRACT PLANS

- 2.1 **Physical Conditions.** The subsurface exploration and report are attached with these contract documents. See Appendix C.
- 2.2 **Contract Plans.** The work shall be performed in accordance with these specifications and contract plans, which are incorporated herein as part of the contract and which are identified by the following numbers and titles:

<u>Sheet No.</u>	<u>Description</u>
00G-00	Cover Sheet and Index
00G-01	Bypass Pumping Plan
01C-01	Existing Conditions
02C-01	Gravity Sewer Plan and Profile Sta 0+00 to Sta 4+00
02C-02	Gravity Sewer Plan and Profile Sta 4+00 to Sta 8+00
02C-03	Gravity Sewer Plan and Profile Sta 8+00 to Sta 10+39
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02C-05	Storm Plan and Profile
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03C-03	Erosion Control Notes
03C-04	Erosion Control Details 1
04C-01	Greenway Restoration Details 1
04C-02	Greenway Restoration Details 2

ARTICLE 3 - PROJECT COORDINATION

3.1 Intent of Plans and Specifications

The intent of the Plans and Specifications is to prescribe a complete work that the CONTRACTOR undertakes to do in full compliance with the Contract. The CONTRACTOR shall do all work as provided in the Plans, Special Conditions Detail Sheets, Specifications and other parts of the Contract and shall do such additional, extra, and incidental work as may be considered necessary to complete the work in a satisfactory and acceptable manner. Any work or material not shown on the Plans or described in the Specifications, but which may be fairly implied as included in any item of the Contract, shall be performed and/or furnished by the CONTRACTOR without additional charge therefore. The CONTRACTOR shall furnish all labor, materials, tools, equipment and incidentals necessary to the prosecution of the work.

3.2 Interpretation of Estimate

The quantities of the work and materials shown on the Proposal form or on the Plans are believed to approximately represent the work to be performed and materials to be furnished and are to be used for comparison of bids. Payment to the CONTRACTOR will be made only for the actual quantities of work performed or materials furnished in accordance with the Plans and Specifications and it is understood that the quantities may be increased or decreased as hereinafter provided without in any way invalidating the bid prices.

3.3 Time of Completion

The CONTRACTOR shall commence work to be performed on the project under this agreement on a date to be specified in a written Notice to Proceed from the DISTRICT and shall duly complete all work under this agreement within **one hundred eighty (180) consecutive calendar days** from said date. For each day in excess of the completion time limits specified above, the CONTRACTOR shall pay the DISTRICT the sum of Three Hundred Dollars (\$1,000.00) as liquidated damages reasonably estimated in advance to cover the losses incurred by the DISTRICT by reason of failure of said CONTRACTOR to complete the work within the time specified, such time being in the essence of this Contract and a material consideration thereof.

3.4 Pre-Construction Conference

Prior to starting any construction work on this project, a conference will be held in the Construction Office of the DISTRICT for the purpose of verifying general construction procedures, expediting the handling of shop drawings and schedules, and to establish a working understanding between the parties concerned on the project. Present at the conference shall be a responsible representative of the

CONTRACTOR and the CONTRACTOR's job superintendent. The time of the conference shall be as agreed upon by the CONTRACTOR and DISTRICT.

3.5 **Progress Meetings**

The CONTRACTOR and any subcontractors, material suppliers or vendors whose presence is necessary or requested shall attend meetings, referred to as Progress Meetings, when requested by the DISTRICT for the purpose of discussing the execution of the work. Each meeting will be held at the time and place designated by the DISTRICT. A schedule for monthly meetings will be agreed upon at the pre-construction conference. The ENGINEER will call for and schedule additional meetings if necessary. All decisions, instructions and interpretations made at these meetings shall be binding and conclusive on the CONTRACTOR and such decisions, instructions and interpretations shall be confirmed in writing by the DISTRICT.

The proceedings of these meetings will be recorded and the CONTRACTOR will be furnished with a reasonable number of copies for his use and for his distribution to the subcontractors' material suppliers and vendors involved.

- 3.6 Utility owners within the vicinity of the Project may include, but are not limited to, those listed below. The CONTRACTOR shall contact N.C. OneCall Center for utility locations within public rights of way and easements before digging, as required by NC State Statutes.

Call NC OneCall Center, Inc. (locators for Buncombe County) at “811”.

<u>Utility / Agency</u>	<u>Phone</u>
Asheville Dispatch City Road Closures	828-252-1122
Asheville Public Works Department Streets Division	828-232-4567 828-259-5852
	Chad Bandy 828-782-0546 Jerry Yates 828-778-8938 Rick Gath 828-777-4053
Storm Water	828-259-5973 Tony Chapman 828-777-5665 Amy Deyton 828-782-0755
Water Department	828-259-5975 Travis Mortier 828-778-0191 Jeremy Godfrey 828-778-0953 Michele Smith 828-777-3539

Asheville Transit Bus Lines		828-253-5691
AT&T Telephone Co.		877-737-2478
	Chip Lance	828-258-7058
	Jenny Stamey	828-251-8949
Black Mountain		828-669-8610
Public Works Director	Jamie Matthews	828-778-5525
Water Department		828-419-9300 x 1
Buncombe County Board of Education		
Transportation Department		828-232-4240
Buncombe Co. Emergency Services		828-250-6650
Fire, Police - NON EMERGENCIES ONLY		
County Road Closures		
Buncombe County Planning Director		828-250-4830
Charter Communications		800-955-0511
		Option 3
Dominion Gas		877-776-2427
	Richard Walsh	828-273-8446
Duke Energy	Guard House	828-687-5206
	Power Outages	800-827-5118
	David Martin	828-271-6264
ERC Fiber	Lewis Lance	828-350-2415
		866-372-7110
M.S.D. of Buncombe County		
Construction Director		828-225-8262
Sewer Maintenance Division		828-255-0061
Norfolk Southern RR		
	James Peck	828-808-0366
NCDOT Highway Division	Nick Dorato	828-298-2741
Weaverville Town Hall		828-645-7116
Public Works		828-645-0606 x 400

Woodfin

Street Department
Water District

828-253-4887
828-253-5551 x 8

ARTICLE 4 - SPECIAL REQUIREMENTS

4.1 Street Cut Permits and Project Access

NCDOT Roads

Work within NCDOT maintained roadways shall be performed under the NCDOT encroachment permit, which is obtained by the ENGINEER.

Other Municipalities

Work performed in other municipally-owned public roadways may require a street-cut permit. It shall be the CONTRACTOR's responsibility to obtain such permits prior to beginning work within said public right of way.

All costs associated with NCDOT Encroachments, street-cut permits, and their conditions/requirements shall be included within the various bid items, and no extra or separate payment will be made by the DISTRICT to the CONTRACTOR.

4.2 Maintenance of Traffic

Access to homes and businesses shall be maintained at all times to the properties along and abutting streets disturbed by construction, unless otherwise approved by the ENGINEER. On streets disturbed by construction, a minimum of one lane (with flagmen) shall be maintained at all times and further provided that adequate signing and control is provided as required by the AASHTO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS and NCDOT Guidelines.

All lane closures and traffic measures shall be coordinated with and meet the minimum requirements of each municipality. Flagmen shall be provided on each end of the closed section or at intermediate points where the closed section is in excess of 250' or where the line of sight is impaired.

4.3 NCDOT Controlled Access Encroachment

Copy is attached, the permit extension will be available upon approval.

The Contractor is urged to review the permit thoroughly and all special provisions therein.

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ARTICLE I: APPLICATION

The requirements of the Metropolitan Sewerage District (DISTRICT) Guidelines for Recruitment and Selection of Minority Businesses for Participation in Sewage Construction Contracts are hereby made a part of these contract documents. These requirements shall apply to all contractors regardless of ownership. A copy of the Metropolitan Sewerage District Guidelines for Recruitment and Selection of Minority Businesses for Participation in Sewage Construction Contracts is attached:

ARTICLE II: MINORITY BUSINESS ENTERPRISE GOALS

The goal for Minority Business Enterprise (MBE) participation on DISTRICT projects has been set at **Twelve (12)** percent.

The Bidder shall provide, with the bid, documented proof in the form of MBE Form 1, MBE UTILIZATION COMMITMENT, that these goals have been met or exceeded;

OR

If minority participation is less than Twelve (12) percent, provide with the bid, 1) the Checklist for Review of Good Faith Efforts, and 2) MBE Form 1 (MBE UTILIZATION COMMITMENT) identifying the amount of MBE participation.

NOTE: If the Bidder awards ALL subcontracts to MBE's, the Checklist for Review of Good Faith Efforts listed above will not be required; however, this shall be noted on MBE Form 1.

OR

If there is no minority participation, provide with the bid, MBE Form 2, CERTIFICATION REGARDING SUBCONTRACTING PRACTICES, and upon request, information sufficient for the DISTRICT to determine that the Bidder does not customarily subcontract work on this type of project.

Failure to provide this evidence may result in rejection of the bid and award to another responsible, responsive bidder.

NOTE REGARDING MBE FORM 3:

Bidders employing MBE's shall provide with the bid, or within 72 hours from the receipt of bids, a Letter of Intent (**MBE Form 3**), complete with a description of the scope of services and dollar value for each MBE firm proposed for use in this contract. Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to another responsible, responsive bidder. The DISTRICT reserves the right to waive any irregularities in MBE documentation if they can be resolved prior to award of the contract, and the DISTRICT finds it to be in its best interest to do so and award the contract.

ARTICLE III: SUBCONTRACTOR PAYMENT REQUIREMENTS

North Carolina General Statute 143-134.1 states that the percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the DISTRICT to the prime CONTRACTOR. Failure to comply with this provision shall be considered a breach of the contract, and the contract may be terminated in accordance with the termination provisions of the contract.

The CONTRACTOR shall provide an itemized statement of payments to each MBE subcontractor with each request for payment or before final payment is processed.

(THIS SPACE IS INTENTIONALLY BLANK)

ARTICLE IV: PROGRAM COMPLIANCE REQUIREMENTS

All written statements, certifications or intentions made by the Bidder shall become a part of the agreement between the CONTRACTOR and DISTRICT for performance of this contract. Failure to comply with any of these statements, certifications or intentions, or with the MBE Guidelines shall constitute a breach of the contract. A determination by the DISTRICT that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the DISTRICT whether to terminate the contract for breach.

In determining whether a CONTRACTOR has made good faith efforts to include minority participation, DISTRICT will evaluate all efforts made by the CONTRACTOR and will determine compliance. DISTRICT may take into account any or all of the following:

1. Whether the Bidder attended any pre-bid meetings scheduled by the DISTRICT;
2. Whether the Bidder advertised in general circulation, trade association, and minority-focused media concerning the subcontracting opportunities;
3. Whether the Bidder provided written notice to a minimum of three MBE's for each portion of the work subcontracted, that their interest in the contract was being solicited in sufficient time to allow the MBE's to participate effectively;
4. Whether the Bidder followed up initial solicitations of interest by contacting MBE's to determine with certainty whether the MBE's were interested;
5. Whether the Bidder selected portions of the work to be performed by MBE's in order to increase the likelihood of meeting MBE goals (including, where appropriate, breaking down contracts into economically feasible units to facilitate MBE participation);
6. Whether the Bidder provided interested MBE's with adequate information about the Plans, Specifications and requirements of the contract;
7. Whether the Bidder negotiated in good faith with interested MBE's and not rejecting MBE's as unqualified without sound reasons based upon a thorough investigation of their capabilities.

ARTICLE V - CHECKLIST FOR REVIEW OF GOOD FAITH EFFORTS

(Must be submitted with Bid under certain conditions – See Article II)

- 1. Have you attended any of the pre-bid conferences scheduled?
() Yes () No () None Scheduled

- 2. Have you advertised for at least three (3) consecutive days in general circulation, trade association, construction and minority focused media regarding subcontracting opportunities with your firm at least fifteen (15) days prior to bid opening on formal projects?
() Yes () No (Show how and attach proof)

- 3. Have you utilized the services of state and/or federal minority business assistance, minority contractors' group, available minority community organizations, , and other organizations that provide assistance in the recruitment and placement of minorities and women? () Yes () No (Show how and attach proof)

- 4. Have you provided interested MBE's with adequate and equal access to information about the plans, specifications and requirements of the contract and insurance or licenses?
() Yes () No

- 5. Did you provide written notice to all appropriate certified MBE's within the identified subcontracting / supplier / service categories that their interest in the contract was being solicited and in sufficient time to allow the MBE'S to participate? Additionally, did the solicitation contain a description and location of the project, the work for which the subcontractors' bids are being solicited, date, time and location where the subcontractors' bids are to be submitted, locations where bidding documents could be reviewed?
() Yes () No

- 6. Have you selected portions of the work to be performed by MBE's in order to increase the likelihood of meeting MBE's goals including breaking it into economically feasible units where appropriate?
() Yes () No

- 7. Have you designated someone in your firm to be the single contact for MBE's that may have questions, etc.? () Yes () No (Please indicate name of person and title)
_____.

- 8. Did you follow up initial solicitations of interest by contacting MBE's to determine with certainty whether they are interested in bidding? () Yes () No

- 9. Did you negotiate in good faith with interested MBE's, not rejecting MBE's as unqualified without sound reasons based on a thorough investigation of their capabilities?
() Yes () No (Show how)

COMPANY NAME OF BIDDER:

Signature

Title

ARTICLE VI: MBE FORM 1

(Must be submitted with Bid if any subcontractors are used.)

MBE UTILIZATION COMMITMENT

We, _____, do certify that on the

**French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

that we will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. MBE's will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. If the Bidder intends to subcontract, this form must be completed regardless of the amount or lack of participation attained.

<u>Name and Phone</u> <u>Number of Firm</u>	<u>Indicate</u> <u>MBE</u>	<u>Description</u> <u>of Work</u>	<u>% of Contract</u>
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The undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the **Metropolitan Sewerage District**. Failure to fulfill this commitment may constitute a breach of the contract.

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

Date: _____

(Name of Bidder)

By: _____
Title: _____

(Must be completed with Bid if MBE Form 1 is not submitted)

CERTIFICATION REGARDING SUBCONTRACTING PRACTICES

We, _____, hereby certify that it is our intent to perform
(Name of Bidder)

100% of the work required for the **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, Project No. 2021036.**

In making this certification, the Bidder states the following:

1. That the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this Project with his/her own current work forces; and
2. That, if requested, the Bidder agrees to submit the following information after bid and before the award of the contract:
 - * List of the scope of services involved in this project.
 - * List of previous projects of this type that Bidder has performed with his/her forces.
 - * Payrolls from the above-mentioned jobs which illustrate Bidder's employee's job classifications needed to perform the elements of the work on the Project or a breakdown of Bidder's entire work force which illustrates the number of employees in each job classification.
 - * Name and phone number of the Field Supervisors for these jobs.
 - * List of equipment Bidder owns that has been used on previous projects.
 - * Copies of lease agreements for equipment that was leased.

The Bidder agrees to provide any additional information requested for the statement contained in Paragraph Number 1 above.

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

Date: _____

(Name of Bidder)

By: _____
Title: _____

ARTICLE VIII: MBE FORM 3

**LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR
OR
PROVIDE MATERIALS OR SERVICES**

**SUBJECT: French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

TO: _____
(Name of Prime Bidder)

The undersigned intends to perform work in connection with the above project as a Minority Business Enterprise.

The MBE status of the undersigned **is / is not** (circle one) certified by the Office of Historically Underutilized Businesses for the State of North Carolina. The DISTRICT encourages all qualified MBE's to become certified by this office.

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project (specify in detail particular work items, materials or services to be performed or provided):

at the following price: _____.

You have projected the following commencement date for such work, and the undersigned is projecting completion of such work as follows:

<u>Items</u>	<u>Projected Commencement Date</u>	<u>Projected Completion Date</u>
--------------	--	--

Subcontracting at any tier must be reported and is subject to all MBE compliance requirements. This form shall be used for MBE subcontracting at any level.

Date: _____

Name of Minority Contractor

By: _____

Title: _____

ARTICLE IX: THE METROPOLITAN SEWERAGE DISTRICT
OF BUNCOMBE COUNTY, NORTH CAROLINA
GUIDELINES FOR RECRUITMENT AND SELECTION OF
MINORITY BUSINESSES FOR PARTICIPATION
IN SEWAGE CONSTRUCTION CONTRACTS

These guidelines establish goals for minority participation in single-prime and separate-prime sewage construction contracts. Legislation provides that public bodies shall have a verifiable percentage goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These guidelines are published to accomplish that end.

SECTION 1: INTENT AND APPLICATION OF GUIDELINES

It is the intent of these guidelines that The Metropolitan Sewerage District of Buncombe County, North Carolina, (DISTRICT) as awarding authority for sewage construction projects, and the contracts and subcontractors performing the construction contracts awarded, shall make a good faith effort to attain a verifiable goal of 12% participation by minority businesses in each construction project. Nothing contained in these guidelines shall be construed to require DISTRICT to award contracts to or to make purchases of materials or equipment from minority-business contractors who do not submit the lowest responsible responsive bid or bids.

These guidelines shall apply to all contracts for the erection, construction, alteration, or repair of any buildings or other construction projects when the entire cost of such work shall exceed \$100,000.00.

SECTION 2: DEFINITIONS

1. **Minority** - a person who is a citizen or lawful permanent resident of the United States and who is:
 - a. Black, that is, a person having origins in any of the black racial groups in Africa;
 - b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
 - c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia, and Asia, the Indian subcontinent, the Pacific Islands;
 - d. American Indian or Alaskan Native, that is, a person having origins in any of the original peoples of North America; or
 - e. Female.

2. Minority Business - Means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one (51%) of the stock is owned by one or more minority persons; and
 - b. Of which the management and daily business operations are controlled by one or more of the minority persons who owns it.
3. District - The Metropolitan Sewerage District of Buncombe County, North Carolina.
4. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.
5. Contract - A mutually binding legal relationship or any modification thereof obligating the Contractor to furnish labor, equipment, materials, or services for the erection, construction, alteration, or repair of any buildings or other construction projects and obligating the DISTRICT to pay for them.
6. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the DISTRICT to perform a Contract to which these guidelines apply.
7. Subcontractor - Any person, firm, partnership, corporation, association, or joint venture under contract with a CONTRACTOR for supplying materials or labor, equipment, materials or services. The subcontractor may or may not provide materials in his subcontract. Work subcontracted in an emergency and which could not have been anticipated is excluded as part of this program.
8. Verifiable goal - means:
 - a. For purposes of separate-prime contract system, that the DISTRICT has adopted written guidelines specifying the actions that will be taken to ensure a good faith effort in the recruitment and solicitation of minority businesses for participation in contracts awarded; and
 - b. For purposes of separate-prime contract system, that the DISTRICT has adopted written guidelines specifying the actions that the prime CONTRACTOR must take to ensure a good faith effort in the recruitment and solicitation of minority businesses for participation in contracts awarded; the required actions must be documented in writing by the CONTRACTOR to the DISTRICT.

SECTION 3: RESPONSIBILITIES

1. The State of North Carolina has an established program in which it lists certified minority and women businesses persons who may qualify as Minority or Woman-owned Business Enterprises (MBE/WBE). The State of North Carolina accepts certification through the *Office for Historically Underutilized Businesses* (www.doa.state.nc.us/hub). Current information on the program, certification and searching for minority vendors can be found at this website.

2. DISTRICT/The Metropolitan Sewerage District of Buncombe County, North Carolina.

Under the single-prime contract system and the separate-prime contract system, the DISTRICT shall:

- a. Fully explain the bidder's responsibilities and this program at the pre-bid conference, if scheduled, conducted by the representative of the DISTRICT. Said conference will be open to all known and anticipated prime contractors, subcontractors, material suppliers, and other bidders.

- b. Be responsible for reviewing the apparent low bidder's compliance with the items listed in the proposal that must be complied with, if the bid is to be considered responsive and responsible. The DISTRICT reserves the right to reject any and all bids and to waive informalities.

- c. Identify or determine the work areas of a contract where MBE's may have an interest in performing contract work.

3. Prime Contractor(s)

Under the single-prime contract system and the separate-prime contract system, the prime contractor(s) shall:

- a. Attend the scheduled pre-bid conference.

- b. Identify or determine those work areas of a subcontract where MBEs may have an interest in performing subcontract work.

- c. Notify certified MBE's of potential subcontracting opportunities listed in the proposal at least ten (10) days prior to the scheduled day of bid opening. The notification will include the following:
 - (1) A description of the work for which the sub-bid is being solicited.
 - (2) The date, time and location where sub-bids are to be submitted.
 - (3) The name of the individual within the company who will be available to answer questions about the project.

- (4) Where bid documents may be reviewed.
- (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

If there are more than three (3) certified MBE's in the area of the project, the CONTRACTOR(s) shall notify three (3), but may contact more, if the CONTRACTOR(s) so desires.

- d. During the bidding process, comply with the DISTRICT's requirements listed in the contract documents for minority participation.
- e. Submit with the bid a description of that portion of the work to be executed by MBE's expressed as a percentage of the total contract price.
- f. Upon being named the apparent low bidder, provide the necessary documentation as listed in the contract documents provided by the DISTRICT. Failure to comply with procedural requirements as defined in contract documents may render the bid as non-responsive and may result in rejection of the bid and award to the next lowest responsible and responsive bidder.
- g. During the construction of a project, if it becomes necessary to replace an MBE subcontractor, advise the DISTRICT.
- h. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit bids from MBE's.

4. MBE Responsibilities

While MBE's are not required to become certified in order to participate in this program, it is recommended that they become certified in the State of North Carolina by the N.C. Office for Historically Underutilized Businesses and should take advantage of the appropriate technical assistance that is made available. In addition, MBE's who are contacted by the DISTRICT or bidders should respond promptly whether or not they wish to submit a bid.

SECTION 4: DISPUTE PROCEDURES

It is the policy of the Metropolitan Sewerage District of Buncombe County, North Carolina, that disputes with another person that involve a person's rights, duties or privileges, should be settled through informal procedures. To that end, MBE disputes arising under these guidelines should be resolved, if possible, by informal proceedings arranged by the General Manager or his designee.

SECTION 5: EFFECTIVE DATE

These guidelines became effective on July 17, 2002. Copies of these guidelines may be obtained

from the MSD Construction Office, 2028 Riverside Drive, Asheville, North Carolina, 28804; telephone number (828) 254-9646.

SECTION 6: GUIDELINES AND COMPLIANCE DOCUMENTATION TO BE PART OF CONTRACT DOCUMENTS

These guidelines will be included in the contract to each construction bid package and provisions for documenting contractual compliance in providing for MBE participation in the construction program will be included in each construction bid package.

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State of North Carolina
County of Buncombe

_____, being first duly sworn, deposes and says that:

1) He/She is President of _____ Company/Corporation), that has submitted the attached bid for **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, Project No. 2021036.**

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

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

4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost element of the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Metropolitan Sewerage District of Buncombe County or any person interested in the proposed Contract; and

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

Signed: _____

Title: _____

Subscribed and sworn before me this the _____ day of _____, 2022.

Notary Public (Seal)

My Commission Expires: _____

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MP-1 **SCOPE**

This section covers methods of measurement and payment for items of work under this contract.

MP-2 **GENERAL**

The total bid price for each section of the contract 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, appurtenances and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the Bid Form shall be considered as incidental and all costs in connection therewith shall be included in the unit price(s) bid per linear foot of main line sewer.

MP-3 **ESTIMATED QUANTITIES**

All Estimated Quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only as a basis for estimating the probable cost of the work and 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 thereof.

MP-4 **MEASUREMENT DEFINITIONS**

MP-4.01 **Trench Excavation**

The width of excavation, including rock excavation, to be used in the determination of pay quantities shall be as shown in the Typical Trench Details, unless additional width is authorized by the DISTRICT. Trench excavation at manholes shall be based on a square measuring six feet plus nominal manhole inside diameter, unless additional excavation is authorized by the DISTRICT.

MP-4.02 **Sanitary Sewer Installation**

The unit prices for sewer pipe and related appurtenances shall include the following work, and no separate payment for these items will be made:

- (a) Site Preparation (including clearing and grubbing)
- (b) Removal and Storage of Topsoil

- (c) Common Excavation and Trench Backfilling and Compaction
- (d) Sheeting, Shoring and Bracing
- (e) Dewatering Excavated Areas
- (f) Waste Material Disposal
- (g) Air, Mandrel and Vacuum Testing
- (h) Connection of Existing Sewer Main or Service to new Manhole
- (i) Pipe embedment material (FRP- per detail, DIP - per detail)
- (j) Removal of existing sewer line
- (k) Removal and disposal of pavement
- (l) Verification of size and location of existing underground utilities
- (m) Pre-blast and post blast survey

MP-5 WORK ITEMS

MP-5.01 Mobilization

All work covered by this section will be paid for at the contract lump sum price for "Mobilization". The lump sum bid price shall not exceed 3% of the total project bid.

Partial payments for the item of "Mobilization" will be made with the first and second partial pay estimates paid on the contract, and will be made at the rate of 50% of the lump sum price for "Mobilization" on each of these partial pay estimates.

MP-5.02 Sanitary Sewer Line Installation

Method of Measurement

The quantity of Sanitary Sewer Pipe to be paid for will be the actual number of linear feet of sanitary sewer line by pipe type which has been properly incorporated into the completed and accepted work. Pipe length shall be measured by actual linear feet in place measured along the pipe center line with no deduction for wyes or tees. **Horizontal measurements through manholes shall be excluded.** Depth of cut shall be measured from original ground surface to pipe invert.

Basis of Payment

The quantity of Sanitary Sewer line will be paid for at the contract unit price for each type and size of pipe as shown in the Bid Schedule. Price and payment shall constitute full compensation for furnishing all equipment, tools, labor and materials to complete the work as specified, including site preparation, trench excavation, placement and compaction of backfill, landscaping, and all related items for complete installation. The stone embedment material is to be included in the price of the sewerline itself, including stone to the springline of PVC Pipe.

MP-5.03 Manhole Installation

Method of Measurement

The quantity of Manholes to be paid for will be the actual number of manholes, including frame and cover, complete with all appurtenances, installed and accepted. Manholes will be counted according to manhole type, either "Standard" or "Drop". Manholes with multiple drop connections shall be counted as one (1) drop manhole in the Bid Schedule.

Basis of Payment

The quantity of Manholes will be paid for at the contract unit price for each manhole, complete including but not limited to all foundation preparation, installation, backfill and compaction, concrete, pipe connections, boots, construction of invert, installation of frame and cover, landscaping and all related construction to complete the work as specified.

MP-5.07 Plug and Abandon Sewer Line

Method of Measurement

The quantity of Plug and Abandon Sewer Line shall be the actual number of plugs for lines 6 inches or greater, regardless of depth or existing pipe material, installed complete and accepted. Plugging lines less than 6 inches are considered incidental.

Basis of Payment

The quantity of Plug and Abandon Sewer Line shall be paid for at the contract unit price for each plug installed or each mainline bisected, complete including but not limited to excavation, preparation, installation of masonry plug, backfill, compaction, and all related construction.

MP-5.08 Abandon Manhole, Including Plugs

Method of Measurement

The quantity of Abandon Manhole Including Plugs shall be the actual number of existing manholes, outside of the excavated trench, which are abandoned and approved, except that water meter box manhole abandonment shall be considered incidental to sewer construction and no separate payment shall be made therefore.

Basis of Payment

The quantity of Abandon Manhole, Including Plugs shall be paid for at the contract unit price for each existing manhole, outside the excavated trench

area, which is abandoned per the specifications, including but not limited to removal and disposal of the frame and cover, installation of plugs in all main lines and service lines, placing fill material in manhole up to 3 feet from ground level, break-up and removal of top 3 feet of manhole, backfilling, compaction, and restoration of area, and all related construction.

MP-5.14 Select Backfill Material

Method of Measurement

The quantity of Select Backfill Material to be paid for shall be the actual cubic yards, to the nearest 1/10 cubic yard of approved select backfill material which has been properly incorporated, as per plans and specifications into the completed and accepted work. When existing trench materials are unsuitable for use as backfill material, or cannot be dewatered to an acceptable material on site, the ENGINEER will authorize payment for "Select Backfill Material". When authorized in writing by the ENGINEER, select backfill materials will be measured for payment. Basis of depth shall be as requested by the ENGINEER. Trench width shall be measured as described in Section **MP-4.01** "Trench Excavation".

Basis of Payment

The quantity of Select Backfill Material shall be paid for at the contract unit price for each cubic yard, complete including but not limited to providing select backfill material, including all excavation, hauling, furnishing, placing and compacting of backfill material, and all other related construction.

MP-5.15 Rock Excavation

Method of Measurement

The quantity of Rock Excavation to be paid for will be by cubic yard measured in place by the average end area method for rock excavation, based upon measurements made prior to and following excavation. Basis of cut shall be as shown on DISTRICT Standard Details, basis of depth shall be as determined by the ENGINEER. Trench width shall be measured as described under Section **MP-4.01** "Trench Excavation".

Basis of Payment

The quantity of rock removed shall be paid for at the Contract unit price per cubic yard for rock excavation. Such price and payment will be compensation for all work covered by this section including but not

limited to permits, drilling, explosives, loading of drill holes, blasting, removal and disposal of rock.

MP-5.18 Erosion Control

Method of Measurement

The quantity of Erosion Control methods and devices as listed in bid schedule or shown on Plans to be paid for shall be that quantity as listed, properly installed and accepted.

Basis of Payment

The quantity of the Erosion Control methods and devices as listed in bid schedule or shown on Plans shall be paid for at the contract unit price installed complete, including but not limited to installation, maintenance, removal and disposal of accumulated silt, and final removal of silt fence and restoration of surface. Payment of this item shall include upkeep and maintenance for duration of project.

MP-5.19 Gravel Construction Entrance

Method of Measurement

The quantity of Gravel Construction Entrance to be paid for shall be the actual square yard, by stone size and type, which has been properly placed, compacted, and incorporated into the completed and accepted work.

The quantities shall be computed from the approved trench width, the required thickness, and the actual horizontal length measured in place. Trench width shall be measured as described in Section **MP- 4.01** "Trench Excavation".

Basis of Payment

The quantity of Gravel Construction Entrance shall be paid for at the contract unit price per square yard installed, complete including but not limited to hauling, subgrade compaction, placing, compaction, shaping, and other related construction.

MP-5.31 Storm Manhole & RCP

Method of Measurement

The quantity of Storm Manhole to be paid for will be each. The Storm RCP will be the actual number of linear feet of RCP, by size and type, which has been properly incorporated into the completed and accepted work. The pipe

length shall be measured in the field along the pipe centerline.

Basis of Payment

Storm manhole and RCP will be paid for at the contract unit price for each manhole, and size and type of pipe shown in the Bid Schedule. Payment shall constitute full compensation for furnishing all equipment, tools, materials, excavation, labor, and other related construction necessary for a complete and acceptable installation.

MP-5.47 Bypass Pumping and Piping

Method of Measurement

The quantity of Bypass Pumping and Piping to be paid for will be lump sum.

Basis of Payment

The work shall include all planning and design, establishing and constructing suction and discharge locations, including any modifications at existing manholes required; furnishing and installing all pumps, valves and piping; maintaining and monitoring bypass system; traffic control, barricades, signs, etc.; testing of bypass system; providing all fuel; cleaning and removal of bypass system; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

MP-5.48 Connecting to Existing Sewerline

Method of Measurement

The quantity of connection to existing sewerline to be paid for will be lump sum for each connection provided in the Bid Schedule.

Basis of Payment

The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the existing pipe or manhole and new pipe including but not limited to dewatering existing pipe; removal and disposal of existing pipe and manholes; bracing, shoring, and sheeting; cutting into existing pipe; excavating, backfilling and compacting; piping and fittings required; concrete junction structure; pipe restraint; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

MP-5.49 Site Restoration

Method of Measurement

The quantity for site restoration to be paid for will be lump sum.

Basis of Payment

The work shall include furnishing and installing all materials, labor and equipment necessary including furnishing and placing gravel, asphalt and concrete to match existing size, type and color; furnishing and replacing hand rail, signs and light poles; replacing the underground electric utility; furnishing, planting and maintaining landscape trees and grass; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents. Unless specifically noted on the drawings, all existing site features and conditions must be restored to exact location and quality.

MP-5.50 Traffic Control

Method of Measurement

The quantity for traffic control to be paid for will be lump sum.

Basis of Payment

The work shall include all traffic control signs, cones, flagging, permitting, and any other work required to meet all project, NCDOT and City requirements; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents. Work includes that required for pedestrian traffic along the paths.

SCHEDULE OF ESTIMATED QUANTITIES AND BID PRICES***French Broad Interceptor at Amboy Road Emergency Repair, Project No. 2021036
METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY***

ITEM NO.	DESCRIPTION	QTY	UNITS	BID	TOTAL
MP-5.01	MOBILIZATION (3% MAX)	1	LS	\$	\$
MP-5.02a	60" FRP, ALL DEPTHS, INCLUDING BEDDING (INSTALL ONLY, PIPING SUPPLIED BY MSD)	1,044	LF	\$	\$
MP-5.02b	42" FRP, ALL DEPTHS, INCLUDING BEDDING (INSTALL ONLY, PIPING SUPPLIED BY MSD)	20	LF	\$	\$
MP-5.03a	10' DIAMETER MANHOLE WITH PROTECTIVE LINER, LOCK DOWN LID, AND CONNECT TO EXISTING 10" SEWERLINE, ALL DEPTHS	1	EA	\$	\$
MP-5.03b	T-TYPE MANHOLES CONCRETE OR FRP WITH LOCK DOWN LIDS (CONCRETE SHALL INCLUDE PROTECTIVE LINER), ALL DEPTHS	7	EA	\$	\$
MP-5.07a	PLUG AND ABANDON 54" RCP SEWERLINE	2	EA	\$	\$
MP-5.08	ABANDON MANHOLE, INCLUDING PLUGS	1	EA	\$	\$
MP-5.14	SELECT BACKFILL MATERIAL	2,000	CY	\$	\$
MP-5.15	ROCK EXCAVATION	500	CY	\$	\$
MP-5.18.1	SINGLE ROW SILT FENCE	100	LF	\$	\$
MP-5.18.1a	DOUBLE ROW SILT FENCE	1,200	LF	\$	\$
MP-5.18.2	INLET PROTECTION	7	EA	\$	\$
MP-5.18.3	COIR MATTING	600	SY	\$	\$
MP-5.18.1b	SILT FENCE ROCK OUTLET	5	EA	\$	\$
MP-5.19.1	GRAVEL CONSTRUCTION ENTRANCE	1	SY	\$	\$
MP-5.31a	STORM MANHOLE, ALL DEPTHS	2	EA	\$	\$
MP-5.31b	24" STORM RCP, ALL DEPTHS	16	LF	\$	\$
MP-5.47	BYPASS PUMPING AND PIPING	1	LS	\$	\$
MP-5.48.1	CONNECT TO EXISTING 54" SEWERLINE WITH JUNCTION BOX	1	LS	\$	\$
MP-5.48.2	CONNECT TO EXISTING 48" SEWER LINE	1	LS	\$	\$

SCHEDULE OF ESTIMATED QUANTITIES AND BID PRICES

***French Broad Interceptor at Amboy Road Emergency Repair, Project No. 2021036
METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY***

ITEM NO.	DESCRIPTION	QTY	UNITS	BID	TOTAL
MP-5.48.3	CONNECT TO EXISTING 24" FORCE MAIN (INSTALL ONLY, PIPING SUPPLIED BY MSD)	1	LS	\$	\$
MP-5.49	SITE RESTORATION, COMPLETE	1	LS	\$	\$
MP-5.50	TRAFFIC CONTROL PER CITY OF ASHEVILLE REQUIREMENTS	1	LS	\$	\$
	TOTAL BID PRICE				\$
TOTAL WRITTEN BID PRICE _____ _____ and _____ /100 dollars.					

Date: _____

To: Metropolitan Sewerage District

Buncombe County, North Carolina
of Bidder
Asheville, North Carolina

Individual or Firm Name

Ladies and/or Gentlemen:

In response to your request the undersigned Bidder submits the following proposal for constructing the proposed project described and specified in the attached documents titled:

**French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair
Project No. 2021036**

1. Bidder proposes and agrees, in event this proposal is accepted, to enter into a contract with the Metropolitan Sewerage District of Buncombe County, North Carolina (herein designated and referred to as the DISTRICT, in the form herein specified, to furnish all materials, equipment, machinery, tools, means of transportation, power and fuel and to perform all labor necessary for or incidental to the construction of the aforementioned improvements, all in complete accordance with the requirements of the attached contract documents and plans, to the entire satisfaction of the DISTRICT, at the unit and/or lump sum prices we have inserted opposite each item of work listed in the accompanying "Schedule of Estimated Quantities and Bid Prices" and/or bid sheet, which is an integral part of this proposal.

2. In submitting this proposal the Bidder understands and agrees that a contract may be awarded for the work as may appear to the interest of the DISTRICT; that the quantities as stated are approximate only and that no claim shall be made against the DISTRICT on account of any excess or deficiency, either absolute or relative, therein; that the estimated quantities will be used as a basis for canvassing and evaluating proposals and for determining the estimated amount of the contract, and that, within the limits of available funds, the DISTRICT reserves the right to increase or decrease the estimated quantities, stated above by such amounts as may be necessary to complete the work, provided, however, that the stated unit prices shall remain firm and unchanged.

3. Bidder hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into, that this proposal is made without connection with any other person, company or parties making a proposal, and that this proposal is in all respects fair and made in good faith without collusion or fraud.

4. Bidder further declares that he has examined the site of the work and the building and labor conditions and has informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the plans and specifications for the work and the other contract documents relating thereto and has read all Special Conditions furnished prior to the opening of bids; and that he has satisfied himself relative to the work to be performed.

5. Bidder further proposes and agrees, that, if awarded a contract for this project, he will commence work immediately on the date stated in a written notice from the DISTRICT to commence work; that he will furnish all materials, and perform all labor for the completion of the

contract and will complete same, including all accepted alternates thereto, within the time stated below, and that on his failure to complete the work within such time he will pay to the DISTRICT for each calendar day that the work, or any part thereof remains uncompleted beyond such specified time, the amount specified, this payment to be made as liquidated damages.

All WORK of the Agreement is to be completed within **one hundred eighty (180) consecutive calendar days** and the amount of liquidated damages shall be \$ 1,000.00 each calendar day until complete.

6. And the Bidder further declares that accompanying this proposal is a certified check or satisfactory bid bond in the sum of five percent (5%) of this proposal, and it is hereby agreed that in case of the withdrawal of this proposal without the consent of the DISTRICT within sixty (60) days after the bid opening, or that in case of failure on the part of the undersigned to execute the contract as aforesaid and to deliver same and the required security for the faithful performance of the contract, (executed in the form annexed hereto) to said DISTRICT within ten days from the date a notice of acceptance of this proposal is given to the undersigned personally, or by mail to the address as herein stated, then the undersigned Bidder will be deemed to have abandoned the contract, and thereupon the amount of such check or bond shall be absolutely due and payable thereunder to the DISTRICT.

7. The Bidder understands that the DISTRICT shall withhold a Five Percent (5%) retainage from progress payments until the Project is fifty percent (50%) complete. In accordance with NCGS 143-134.1 the DISTRICT will then retain this constant amount, while retaining no further retainage, until the project is one hundred percent (100%) complete. If the DISTRICT becomes dissatisfied with performance of the CONTRACTOR after reducing or holding the Five Percent (5%) retainage, the DISTRICT may reinstitute such retainage until the Project has been completed, or may withhold up to two and one-half (2.5) times the value of any incomplete Work.

Nothing in this section shall be deemed to preclude the DISTRICT from withholding full or partial payment for defective Work or Work that has not been fully completed in accordance with the Project Specifications and the Contract Documents, to the satisfaction of the ENGINEER.

A. Individual or Firm Name of Bidder _____

By: _____

Title: _____

State License No. _____ Type: _____ Limit: _____ Expir. Date: _____

Bidder's Address: _____

Note: If the Bidder is a corporation give the following information:

State in which it is incorporated _____

Address of Principal Office _____

The Bidder acknowledges receipt of the following addenda:

No.	Date
_____	_____
_____	_____

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BID BOND
(FORM)

Date of Execution
of this Bond: _____

Name and Address
of Principal (Bidder): _____

Name and Address
of Surety: _____

Name and Address
of Obligee: Metropolitan Sewerage District of Buncombe County, NC

2028 Riverside Drive - Asheville, NC 28804

Amount of Bond: Five Percent (5%) of attached bid dollars

Bid and Proposal
Dated: _____ for the **French Broad Interceptor at Amboy Road Sanitary
Sewer Emergency Repair, Project No. 2021036.**

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL above named and SURETY above names who is duly licensed to act as SURETY in the State of North Carolina, are held and firmly bound unto the METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, a body politic and corporate of the State of North Carolina, as Obligee, in the penal sum of FIVE PERCENT (5%) of the amount bid in the bid and proposal above described in lawful money of the United States of America, for the payment of which, well and truly to be made we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such, that if the Principal shall be awarded the contract for which the bid and proposal above described is submitted and shall execute the contract, give bond for the faithful performance of the contract, and give bond for the payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, within ten (10) days after the award of the same to the Principal above named, then this obligation shall be null and void; but if the Principal above names fails to so execute such contract and give performance bond and payment bond as required by Section 129 of Chapter 143 of the General Statutes of North Carolina, as amended, and Article 3 of Chapter 44-A of the General Statutes of North Carolina, as amended, the Surety shall, upon demand, forthwith pay to the OBLIGEE the amount of this bond set forth above.

IN WITNESS WHEREOF, the Principal above names and the Surety above names have executed this instrument under their several seals on the date set forth above.

WITNESS:

(Proprietorship or Partnership)

ATTEST: (Corporation)

BY: _____

TITLE: _____
(Corporate Secretary or Assistant Secretary only)

Principal (name of individual, individual and trade name, partnership, corporation or joint venture)

BY: _____

TITLE: _____
(owner, partner, office held in corporation, joint venture)

(Corporate Seal)

WITNESS:

Surety (name of Surety Company)

BY: _____

TITLE: Attorney-in-Fact
(Corporate Seal of Surety)

Address of Attorney-in-Fact)

NOTICE OF AWARD

TO:

**PROJECT: French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

The DISTRICT has considered the BID submitted by you for the above-described WORK in response to its Advertisement for Bid and Instruction to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of:

You are required by the Instruction to Bidders to execute the Agreement and furnish the required CONTRACTOR's Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date of receipt of this Notice by you.

If you fail to execute said agreement and to furnish said BONDS within ten (10) days from the date of your receipt of this NOTICE, said DISTRICT will be entitled to consider all your rights arising out of the BONDS. The DISTRICT will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the DISTRICT.

Dated this _____ day of _____, 2022.

**Metropolitan Sewerage District
of Buncombe County, North Carolina**

By: _____

W. Hunter Carson, P.E.

Title: **Director of Engineering**

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE OF AWARD** is hereby acknowledged by _____ this
the _____ day of _____, 2022.

By: _____

Title: _____

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THIS AGREEMENT, made and entered into this the _____ day of _____, 2022, by and between **THE METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, NORTH CAROLINA**, hereinafter referred to as the DISTRICT and _____ hereinafter referred to as the CONTRACTOR.

WITNESSETH:

That the parties hereto do mutually agree as follows:

1. The CONTRACTOR will furnish all materials, equipment, supplies, tools, power, fuel and services and perform all labor necessary for construction of the sanitary sewer replacement, and will construct same in strict conformity with the terms and conditions set forth in the following named documents which are hereto attached and made a part of this contract:

**French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

Notice to Contractors, Instructions to Bidders, Minority Business Enterprises, Non-Collusive Affidavit, Bid Proposal, Bid Bond, General Conditions, Special Conditions, Performance Bond, Labor and Materials Bond, Technical Specifications, Details and Contract Plans as enumerated and identified in the specifications.

2. The DISTRICT will pay to the CONTRACTOR, on faithful performance of his undertakings hereunder, in lawful money of the United States, the respective unit prices set forth in the aforementioned bid proposal for each unit of work performed or installed by the CONTRACTOR, the estimated sum total of all payments hereunder being: _____

3. The DISTRICT will make payments to the CONTRACTOR as specified in Paragraph 14.2 of the General Conditions. In accordance with NCGS 143-134.1 retainage shall be Five Percent (5%) until the project has been satisfactorily Fifty Percent (50%) completed and deemed to be on schedule for completion by the agreed completion date. The DISTRICT will then retain this constant amount, while retaining no further retainage, until the project is one-hundred percent (100%) complete.

Nothing in this section shall be deemed to preclude the DISTRICT from withholding full or partial payment for defective Work or Work that has not been fully completed in accordance with the Project Specifications and the Contract Documents, to the satisfaction of the ENGINEER. The DISTRICT may withhold up to two and one-half (2.5) times the value of any incomplete Work, in accordance with NCGS 143-134.1.

4. Within a period of 30 days after completion of the work and acceptance by the DISTRICT, the DISTRICT will make a final and complete payment in full to the CONTRACTOR on account of this contract; provided that, during said 30 day period, the CONTRACTOR has submitted to the DISTRICT satisfactory written evidence that all payrolls and other costs incurred by the CONTRACTOR in connection with the work have been paid in full and executed "Certificate of Completion" with all submittals; otherwise final payment will be made only after such evidence has been submitted.

5. The CONTRACTOR will commence the work on or as of the date set in a notice from the DISTRICT to proceed with the work, will prosecute same diligently and continuously until completed, and will complete same in conformity with the stated requirements within **one hundred eighty (180) consecutive calendar days**. Should the work or any separate part thereof be not completed by such time or date, then the CONTRACTOR will pay to the DISTRICT as fixed, agreed and liquidated damages the sum stipulated in the Proposal.

6. The CONTRACTOR shall be solely and completely responsible for safety at the job site in accordance with Paragraph 6.20 of the General Conditions.

7. As a condition of this contract, CONTRACTOR agrees and warrants and represents that it will comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. If CONTRACTOR utilizes a subcontractor to perform any part of the work included in the Contract, CONTRACTOR shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes.

IN WITNESS WHEREOF, the parties have executed this contract on the day and date first above written in three (3) original counterparts.

WITNESS: **M.S.D. OF BUNCOMBE COUNTY, N.C.** (SEAL)

_____ By _____
Thomas E. Hartye, P.E.
GENERAL MANAGER

WITNESS: **CONTRACTOR**
_____ By _____
(Proprietorship or Partnership) Title _____

**CERTIFICATE OF SECRETARY
OF CORPORATION:**

I, _____ certify that I am the Secretary of the Corporation named as Contractor herein; that _____, who signed this contract on behalf of the Contractor, was then _____ of said Corporation; that said contract was duly signed for and on behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

SECRETARY
(Corporate Seal)

W. Scott Powell, MSD Director of Finance

“This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act”

PERFORMANCE BOND

(Form)

Date of Execution
of this Bond:

Name and Address of
Principal (Contractor):

Name and Address
of Surety:

Name and Address of
Contracting Body:

**The Metropolitan Sewerage District of
Buncombe County, North Carolina
2028 Riverside Drive
Asheville, North Carolina 28804**

Amount of Bond:
Contract:

That certain contract by and between the Principal and the
Contracting Body above named dated _____ for the
**French Broad Interceptor at Amboy Road Sanitary Sewer Emergency
Repair, Project No. 2021036**

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, as identified and shown above and hereto attached:

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modification of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

THIS PERFORMANCE BOND is made and given pursuant to the requirements and provisions of Section 129 of Chapter 143 of the General Statutes of North Carolina and pursuant to Article 3 of Chapter 44-A of the General Statutes of North Carolina, and each and every provision set forth and contained in Article 3 of Chapter 44-A of the General Statutes of North Carolina is incorporated herein, made a part hereof, and deemed to be conclusively written into this Bond.

IN WITNESS WHEREOF, the principal and surety parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Principal (name of individual, individual
and trade name, partnership,
corporation or joint venture)

WITNESS:

(Proprietorship or Partnership)

BY: _____ (SEAL)

TITLE: _____
(owner, partner, office held in corporation,
joint venture)

ATTEST: (Corporation)

(Corporate Seal)

BY: _____

TITLE: _____
(Corporate Secretary or
Assistant Secretary only)

Surety (name of Surety Company)

WITNESS:

BY: _____
TITLE: Attorney-in-Fact
(Corporate Seal of Surety)

(Address of Attorney-in-Fact)

PAYMENT BOND

(Form)

Date of Execution
of this Bond:

Name and Address of
Principal (Contractor):

Name and Address
of Surety:

Name and Address of
Contracting Body:

**The Metropolitan Sewerage District of
Buncombe County, North Carolina
2028 Riverside Drive
Asheville, North Carolina 28804**

Amount of Bonds:

Contract:

That certain contract by and between the Principal and the Contracting Body
abovenamed dated _____ for the **French Broad Interceptor at
Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, as identified and shown above and hereto attached:

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications and extensions of time of said contract that may hereafter be made, notice of which modifications and extensions of time to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

THIS PAYMENT BOND is made and given pursuant to the requirements and provisions of Section 129 of Chapter 143 of the General Statutes of North Carolina and pursuant to Article 3 of Chapter 44-A of the General Statutes of North Carolina, and each and every provision set forth and contained in Article 3 of Chapter 44-A of the General Statutes of North Carolina is incorporated herein, made a part hereof, and deemed to be conclusively written into this Bond.

IN WITNESS WHEREOF, the principal and surety parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Principal (name of individual, individual
and trade name, partnership,
corporation or joint venture)

WITNESS:

(Proprietorship or Partnership)

BY: _____ (SEAL)

TITLE: _____
(owner, partner, office held in corporation,
joint venture)

ATTEST: (Corporation)

(Corporate Seal)

BY: _____

TITLE: _____
(Corporate Secretary or
Assistant Secretary only)

Surety (name of Surety Company)

WITNESS:

BY: _____

TITLE: Attorney-in-Fact
(Corporate Seal of Surety)

(Address of Attorney-in-Fact)

Section XV - Certificate of Insurance

DATE OF ISSUANCE

To the Metropolitan Sewerage District of Buncombe County, North Carolina. The subscribing insurance company certifies that insurance of the kinds and types and for limits of liability covering the work herein designated has been procured by and furnished on behalf of the insured contractor/vendor listed below:

NAME AND ADDRESS OF PRODUCER:	CERTIFICATE HOLDER: METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, NORTH CAROLINA 2028 RIVERSIDE DRIVE ASHEVILLE, NORTH CAROLINA 28804 TELEPHONE NO. (828) 254-9646
NAME AND ADDRESS OF INSURED:	COMPANIES AFFORDING COVERAGE
	COMPANY LETTER "A":
	COMPANY LETTER "B":
	COMPANY LETTER "C":
	COMPANY LETTER "D":
	COMPANY LETTER "E":

Description of Work & Location: **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, Project No. 2021036**

CO. LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS (IN THOUSANDS)
	GENERAL LIABILITY _ Commercial General Liability _ Claims Usage _ Occurrence _ Owner & Contractor Protective _ _____ _ _____				General Aggregate \$ 2,000 Products-Comp/Ops Aggregate \$ 1,000 Personal & Advertising Injury \$ 1,000 Each Occurrence \$ 1,000 Fire Damage (any one fire) \$ 50 Medical Expense (any one person) \$ 5
	AUTOMOBILE LIABILITY _ Any Auto _ All owned Autos _ Scheduled Autos _ Hired Autos _ Non-Owned Autos _ Garage Liability _ _____				Combine Single Limit \$ 1,000 Bodily Injury (per person) \$ Bodily Injury (per accident) \$ Property Damage \$
	EXCESS LIABILITY _ Umbrella Form _ Other Than Umbrella Form				Each Occurrence \$ 1,000 Aggregate \$ 1,000
	WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY (North Carolina) (Each Accident) \$ 100 (Disease-Policy Limit) \$ 500 (Disease-Each Employee) \$ 100
	OTHER				

UNDER GENERAL LIABILITY POLICY OR POLICIES:

Y N

1. Does property damage liability insurance shown include coverage for XC and U hazards? _____
2. Is occurrence basis coverage provided under property damage liability? _____
3. Does Personal Injury Liability Insurance include coverage for personal injury sustained by any person as a result of an offense directly or indirectly related to the employment of such person by the insured? _____
4. Is coverage provided for Contractual Liability (including indemnification provision) assumed by insured? _____
5. The Metropolitan Sewerage District of Buncombe County, North Carolina is named as additionally insured? _____
6. Is Broad Form Property Damage Coverage provided for this project? _____

CANCELLATION / EXPIRATION: The subscribing company hereby agrees that thirty (30) days written notice shall be given to the Metropolitan Sewerage District of Buncombe County, North Carolina before any policy referred to herein is changed or canceled. In addition, immediate notice shall be given by the subscribing company to the Metropolitan Sewerage District of Buncombe County, North Carolina if any policy is not renewed by the insured.

Name of Insurance Company Authorized to do Business in North Carolina _____ Address _____

Signature of Authorized Representative _____ Date of Signature _____

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NOTICE TO PROCEED

TO: _____ DATE: _____

FOR: **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair,
Project No. 2021036**

You are hereby notified to commence WORK in accordance with the Agreement dated _____ on or before _____, and you are to complete the WORK within **one hundred eighty (180) consecutive calendar days** thereafter.

The date of completion of ALL WORK is therefore _____.

**METROPOLITAN SEWERAGE DISTRICT
OF BUNCOMBE COUNTY, NORTH CAROLINA**

BY: _____
W. Hunter Carson, P.E.
TITLE: **Director of Engineering**

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE TO PROCEED** is hereby acknowledged by _____ this the _____ day of _____, 2022.

BY: _____

TITLE: _____

THE N.C. OneCall CENTER

THE N.C. OneCall CENTER is a corporation formed and funded by participating utility companies and municipalities in the interest of community and job safety and improved service through damage reduction to the utilities.

A ONE-CALL TOLL-FREE TELEPHONE NUMBER, 811 PROVIDES AN AVENUE TO ALL OF THE PARTICIPATING MEMBERS FROM ANY POINT WITHIN THE STATE OF NORTH CAROLINA.

Anyone proposing to excavate, dig, bore, tunnel, blast or disturb the earth in any manner in which buried utilities may be damaged is requested to call the toll-free number between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday, seventy-two (72) hours before starting the proposed work.

Within minutes of your telephone call, the participating members will be made aware of your plans and will be given pertinent information that has been provided by you about your planned work. You will be told the names of the participating members from whom you can expect a response -- if there are buried facilities in the path of your activity, the route of the utilities will be staked and/or marked at no expense to you. If there are not facilities in the area of the planned work, you will be called or notified by a representative of the participating company accordingly.

Should a non-participating utility operator be serving your area, we recommend that you call them on an individual basis. All utility operators, whether company or municipality, will be provided an opportunity to become a member of THE NORTH CAROLINA ONE CALL CENTER.

Naturally, knowing the route of the utilities, the excavator is expected to exercise caution and to avoid damage as the project progresses.

Damage prevention doesn't just happen -- It is a planned and orderly process through which each of us can participate -- **YES, WE CAN AND WE WILL DRAMATICALLY REDUCE DAMAGES TO THE UTILITIES IN THE STATE OF NORTH CAROLINA!! THANKS FOR YOUR HELP.**

BEFORE YOU DIG

IN THE INTEREST OF COMMUNITY AND JOB SAFETY AND IMPROVED SERVICE

CALL N.C. OneCall

811

The undersigned contractor, _____
and its surety, _____, indicated on the Performance and Payment Bonds
for the project identified as **French Broad Interceptor at Amboy Road Sanitary Sewer
Emergency Repair, Project No. 2021036**, do hereby consent on behalf of themselves, their
successors and assigns, to an increase in the amount of \$ _____ to the original
(revised) contract price in the amount of \$ _____, as set forth in the Change
Order Number _____ to said contract.

IN WITNESS WHEREOF, each party has caused this agreement to be executed by its duly
authorized official as of the ____ day of _____, 20____.

ATTEST:

By: _____

(Address)

ATTEST:

(Surety)

(Address)

(Attorney-in-Fact)

(Address)

**STATE OF NORTH CAROLINA
COUNTY OF BUNCOMBE**

I, _____, a Notary Public of the County and State aforesaid certify that _____, personally came before me this day and acknowledged that (he/she) is the Secretary of _____, a corporation, and that by authority duly given as the act of the corporation the foregoing instrument was signed in its name by its President and attested by (himself/herself) and its Secretary.

Witness my hand and notarial seal this the _____ day of _____, 20_____.

My Commission Expires

Notary Public

THE METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY

French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair
Project No. 2021036

Purchase Order No. _____

APPLICATION NO.: _____
DATE NOTICE TO PROCEED: _____
COMPLETION DATE: _____
DAYS REMAINING IN CONTRACT: _____
PERCENT COMPLETE: _____

CONTRACTOR: _____

ADDRESS: _____

ORIGINAL CONTRACT AMOUNT: \$ _____
APPROVED CHANGE ORDER AMOUNT: \$ _____
REVISED CONTRACT AMOUNT: \$ _____

TOTAL WORK COMPLETED TO DATE: \$ _____
TOTAL MATERIALS STORED ON SITE: \$ _____
TOTAL EARNED THIS APPLICATION: \$ _____
LESS RETAINAGE (%): \$ _____

SUBTOTAL \$ _____
LESS PREVIOUS PAYMENTS: \$ _____
CURRENT PAYMENT DUE: \$ _____

CONTRACTOR'S REPRESENTATIVE TITLE DATE

MSD APPROVAL:

INSPECTOR DATE

CONSTRUCTION DIRECTOR DATE

PROJECT ENGINEER DATE

HDR PROJECT ENGINEER DATE

AFFIDAVIT OF PAYMENT OF CLAIMS

BY: _____

This day _____, personally appeared before,
_____ a Notary Public in and for the County of
_____, State of _____ and being by me
first duly sworn, states that all subcontractors and suppliers of labor and materials have been paid
all sums due them as of _____(date), for work performed or materials
furnished in the performance of the contract between Metropolitan Sewerage District and
_____, Contractor, dated _____,
for the construction of the **French Broad Interceptor at Amboy Road Sanitary Sewer
Emergency Repair, Project No. 2021036** or arrangements have been made by the Contractor
satisfactory to such subcontractors and suppliers with respect to the payments of such sums as
may be due them by the Contractor.

(CONTRACTOR)

By: _____

Title: _____

SWORN TO AND SUBSCRIBED before me this the _____ day of _____,
20_____.

My Commission Expires

Notary Public

(SEAL)

STATE AND COUNTY SALES/USE TAX CERTIFICATION

I, _____, of _____
hereby certify that the firms cited have been paid the North Carolina Sales Tax and the Buncombe County
Tax, as shown on the materials purchased by us, and that these materials became a part of the **French
Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, Project No. 2021036**
in North Carolina, through _____ (date).

Please see attached...

Name of Firm: _____

Signature: _____

Title: _____

SWORN TO AND SUBSCRIBED before me, this the _____ day of _____, 20____.

My Commission Expires

Notary Public

(Seal)

**French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair
Project No. 2021036**

I, the undersigned, do hereby certify:

1. That _____ hereinafter referred to as CONTRACTOR, is a licensed Utility or Unclassified Contractor in the State of North Carolina.
2. That the sewer rehabilitation, replacement, improvements, and/ or extensions relative to the above referenced project have been installed and tested in strict accordance with the approved plans and specifications for the project under the supervision of the ENGINEER and DISTRICT'S representative.
3. That we guarantee the materials and installation of the sewer rehabilitation, replacement, improvements, and/ or extensions, including all appurtenances and the restoration of any disturbed areas for a period of (1) year and shall make repairs deemed necessary by DISTRICT, during the one year warranty period. Any repairs for defective work will be made at The CONTRACTOR's expense for all labor, materials, equipment, and supplies necessary for a complete and acceptable repair. Should any additional work, not performed under the original contract and not as a result of defective work or materials, be required, the DISTRICT will pay CONTRACTOR at the original contract unit prices without mobilization.
4. That we have submitted the record documents to the DISTRICT.
5. That we will reimburse DISTRICT for costs for emergency repairs made by its own forces during the one year warranty period. These costs will include, but not be limited to, materials, labor, equipment, damages and reimbursement collection costs.

<i>Name of Firm (Corporation/Company)</i>	<i>Signature of Authorized Representative</i>
<i>License Number</i>	<i>(Title)</i>
<i>Substantial Completion Date</i>	<i>Date signed</i>
<i>Warranty Period Ends (Date)</i>	

Corporation or Company Seal

State of _____

County of _____

Subscribed and sworn to before me this the _____ day of _____, 20_____.

My Commission Expires

Notary Public (Seal)

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**STATE OF NORTH CAROLINA
COUNTY OF BUNCOMBE**

FROM: _____

TO: **Metropolitan Sewerage District of Buncombe County, N.C.**

REFERENCE: Contract entered into the ____day of _____, 2022, between the Metropolitan Sewerage District, hereinafter called the DISTRICT and _____, hereinafter called the CONTRACTOR, for the **French Broad Interceptor at Amboy Road Sanitary Sewer Emergency Repair, Project No. 2021036.**

KNOW ALL MEN BY THESE PRESENTS:

1. The CONTRACTOR hereby certifies that there is due and payable under the contract and all change orders and modifications thereof the sum of \$-0- as final payment.
2. The CONTRACTOR further certifies that there are no outstanding or unsettled claims or items in addition to the amount set forth in paragraph one hereof which it claims are just and due and owing by the DISTRICT to the CONTRACTOR.
3. The CONTRACTOR further certifies that all work required under this contract, including work required under all change orders and modifications, has been performed in accordance with the terms thereof, and that there are no claims of laborers, materialmen, mechanics or subcontractors for unpaid monies or wages arising out of the performance of this contract.
4. The CONTRACTOR realizes that this final certificate and release is submitted for the purpose of inducing the DISTRICT to make final payment to CONTRACTOR under circumstances such that there are no outstanding or unsettled claims or items owed or asserted other than or in addition to the amount set forth in paragraph one above and under circumstances such that all work required under the contract identified above, including all change orders and modifications thereof, have been performed in accordance with the terms thereof and such that there are no claims of laborers, materialmen, mechanics, or subcontractors for unpaid monies or wages arising out of the performance of said contract, and CONTRACTOR does hereby agree to indemnify and hold the DISTRICT harmless of and from any and all loss, costs, damage claims, and expense of every kind, including attorney's fees, which DISTRICT shall or may suffer or incur or for which the DISTRICT or its property may become liable in connection with any such claims or items as may arise or may have arisen out of the performance of or failure to perform said contract. This obligation shall not be construed to negate, abridge or otherwise reduce any other right of the DISTRICT or obligation of the CONTRACTOR as would otherwise exist but shall be in addition thereto.

5. Except for the amount stated in paragraph one above, the CONTRACTOR has received from the DISTRICT all sums of money payable to CONTRACTOR under or pursuant to the aforementioned contract and change orders and modifications thereof.

6. That in consideration of the payment of the amount stated in paragraph one hereof, the CONTRACTOR does hereby release the DISTRICT from any and all claims, demands, rights, claims of lien, damages, suits or causes of action, both legal and equitable, which the CONTRACTOR has, might now have, or that subsequently may accrue to it, arising under, growing out of, or in any wise connected with the Contract above referred to and all change orders and modifications thereof.

IN WITNESS WHEREOF, the CONTRACTOR has caused this Final Certificate and Release to be executed by its duly authorized officers and its seal to be hereunto affixed, all by authority duly given, this _____ day of _____, 20____.

_____(SEAL)
Contractor Name

By: _____

Title: _____

ATTEST:

Secretary

STATE OF _____

COUNTY OF _____

I, a Notary Public of the State of _____, County of _____, do hereby certify that _____ personally appeared before me this day and, being first duly sworn on oath, deposed and said that he/she is _____ of _____ and that he/she has read the foregoing Final Certificate and Release and that the matters and things stated therein are, to the best of his knowledge and belief, true, and that by the authority duly given and as the act of the corporation the foregoing instrument was signed in its name by him as its _____, sealed with its corporate seal, and attested by its Secretary.

WITNESS my hand and Notarial Seal, this _____ day of _____, 20____.

My Commission Expires:

Notary Public

SECTION 01 13 00
PUBLIC IMPACT MITIGATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contractual requirements for the protection of the public and the reduction of impacts to the public.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Occupational Safety and Health Administration (OSHA).
 - 2. Governing Noise Control, Emissions Control, Fugitive Dust Control Bylaw, or similar regulation.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 GENERAL

- A. The Project is located in close proximity to residences, public parks, greenways, and roads. It is of prime importance that the Contractor implements all practical mitigation measures to reduce impact to the neighborhood during the execution of the Work.
- B. The Contractor shall cooperate with the Owner and Engineer, the various utility companies, suppliers, other contractors, property owners and local residents.
- C. The Contractor shall ensure that its staff, subcontractors and suppliers behave in a professional manner to other contractors, Owner and Engineer staff and the general public.

3.2 PUBLIC RELATIONS AND COOPERATION

- A. The Engineer has produced the following communications protocol which outlines the project team's roles and responsibilities. The Contractor shall follow this communications protocol. The Owner is the primary communicator with the public and the media. However, the Contractor will have a role with the public on site as defined below. The Contractor shall refer any media requests to Owner.
- B. For on-site communication with the public, the Contractor shall appoint a community liaison person to notify the affected residents and establishments during utility disruption, perceived or actual safety issues, parking and traffic changes, etc. This person shall be a member of the Contractor's crew who is onsite the majority of the time.
- C. The community liaison person shall work independently as necessary on time sensitive issues and with the Owner's Representative when time permits in such situations. The community liaison person shall promptly address concerns or negative impacts arising from execution of the Work.
- D. The Contractor, at the Engineer's reasonable request, shall change methods or timing or performing portions of the Work in order to reduce public impacts or address concerns of the public.

- E. The Contractor shall work with the Engineer to locate noisy, odorous or exhaust producing equipment or activities away from high impact areas.

3.3 PARTNERING

- A. The Contractor shall partner with the Owner and Engineer in addressing local residents' concerns regarding construction work. The Contractor's Project Manager or other senior employee and community liaison person shall attend public meetings organized by Owner with area residents.
- B. The Contractor shall be required to make and keep commitments to local residents regarding aspects of the construction work that impact local residents.
- C. The Contractor shall address Public Impact Mitigation as a standing agenda item for regular construction progress meetings.

3.4 ACCESS AND PUBLIC SAFETY

- A. The Contractor shall effectively warn and protect the public from any danger or harm related to the implementation of the work. This includes appropriate signage and fencing to restrict public access to the construction site.
- B. No material or equipment shall be stored where it may interfere with the free and safe passage of public traffic, or in such a manner that it may create a hazard to the public. At the end of each day's work, and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the all areas open for use by public traffic.

3.5 SITE CLEANLINESS

- A. The Work Site shall be kept in a clean and neat condition and shall not be unnecessarily encumbered with equipment, materials, or debris.
- B. The Contractor shall, at all times conduct the work in an orderly and tidy manner, and shall at suitable intervals, acceptable to the Engineer, remove from the Work Site any accumulation of rubbish or refuse matter. At no time shall any person employed by the Contractor, or by any sub-contractors, discard litter or garbage or recyclables on or adjacent to the Work Site, except into suitable containers provided by the Contractor for this purpose.
- C. The Contractor shall ensure that roads, sidewalks, and driveways impacted by the work are clean and swept at the end of the day, or as directed by the Engineer.
- D. The Contractor shall prevent spillage from vehicles on public or private roads along which excavated spoil, construction materials, or refuse, is hauled, through tarping or other means. Where any such spillage occurs, it shall be promptly cleaned up.
- E. The Contractor shall have appropriate equipment readily available for dust and mud control.
- F. If the Contractor fails to clean the Work Site to the satisfaction of the Engineer, the Owner may undertake the work and deduct the associated cost from payments due to the Contractor.

3.6 WORK HOURS AT THE WORK SITE

- A. Unless otherwise noted or agreed upon by the Engineer, the hours of work shall be from 7:00 am to 6:00 pm on any weekday. No work on Saturday or Sunday or an Owner holiday.
- B. The Contractor shall schedule noisy work, including, but not limited to, pile driving, jack hammering, vacuum trucks, between 8:00 am and 5:00 pm.
- C. Before and after the hours of work the Contractor shall avoid nuisance noise including offloading of equipment or materials, warming up of heavy equipment, car stereos, slamming tailgates, backup beepers, workers yelling or any other thing that will generate nuisance noise.

3.7 SEGREGATION OF THE WORK SITE

- A. The Contractor shall limit the Work, to within the temporary construction easement boundaries shown on the Contract Drawings.
- B. The Contractor shall provide unimpeded public access to the areas beyond the limits of the Work and prevent the public from entering all areas where Work is being performed.
- C. At the end of each working day, or if left unattended, any open excavation shall be securely fenced. Moduloc type construction fencing shall be used in urban areas.
- D. The Contractor shall protect the public through means such as fencing around equipment, or as otherwise directed by the Engineer.

3.8 PARKING

- A. The following parking, in order of preference, is available to the Contractor for worker parking throughout the Contract duration and as directed by the Engineer:
 - 1. Parking which the Contractor can create and maintain at the Work Site in compliance with all other requirements regarding vehicles on the Work Site;
- B. The Contractor shall coordinate and cooperate with the Engineer in the establishment and assignment of all work parking at the identified locations or any other location authorized by the Engineer, all at no extra cost to the Owner.
- C. Where necessary, the Contractor shall be responsible for moving employees between parking area(s) and Work Site.

3.9 NOISE

- A. The Contractor shall comply with the governing municipality's noise bylaw or the requirements below whichever is more stringent. Measurement of noise levels for the purpose of checking compliance with this requirement shall be done in accordance with the requirements of the applicable noise bylaw.
- B. At no time during specified working hours shall the noise generated by the work, exceed the applicable bylaw limits, or, where no bylaw limits apply, "continuous" noise levels shall not exceed 85 dBA at the nearest property line, where "continuous" noise level is the noise level exceeded for more than 3 minutes in any 15 minute period.
- C. The Contractor shall cooperate with the Engineer in choosing a location for stationary equipment to minimize noise to the public.
- D. The potential for noise impact to the commercial and residential properties adjacent to the Work Site and access roads has been predicted based upon anticipated construction activities and equipment. Noise monitoring may be conducted in the neighborhood by the Engineer throughout the project. If measurements indicate that the required noise levels are not being met, the Contractor shall identify and implement noise control measures necessary to comply with applicable bylaws and these contractual requirements.

3.10 EQUIPMENT NOISE LIMITS

- A. The work site shall be laid out to minimize the requirement for trucks and mobile equipment to back up. Back-up alarms shall be adjusted to be clearly audible above the ambient noise level, as required by OSHA but shall be no louder than necessary. Where after hours work is required and approved, OSHA approved alternatives to the use of back-up alarms may be required.
- B. The Engineer reserves the right to test any equipment on the Work Site at any time to determine if equipment noise emission exceeded the Contract limits. The Contractor shall make any equipment, with operator, available for testing, at or near its working location, at no additional cost.
- C. In the event that any equipment does not satisfy the Contract noise level limits, the equipment shall be replaced by a quieter machine or it shall be modified, for example, by providing better

exhaust silencing or reducing its governed engine speed, or building a sound enclosure and the alternate or modified machine may then be re-tested. The cost of any re-testing by the Engineer will be charged to the Contractor.

3.11 MAINTENANCE AND USE OF EQUIPMENT

- A. Regular maintenance of equipment shall be undertaken to reduce noise and emissions produced by that equipment. This includes, but not limited to, regular greasing of treads, chassis and pivot points, replacement of worn parts, brake checks, mechanical overhauls, attention to exhaust and emission control systems and any special acoustical fixtures.
- B. All equipment used on the Work Site shall be equipped with, and operated with, all applicable covers, hoods, shields, and guards in place and latched shut, and all exhaust and emission control systems in place and fully operational. Air-powered equipment such as rock drills and jackhammers shall be equipped with effective mufflers on the air exhausts. The manufacturer's recommendation shall be followed.
- C. Equipment, which is not in use, shall be shut down, and not left idling for periods longer than 15 minutes to reduce noise and negative impacts to air quality.
- D. Brakes on trucks shall be adjusted and maintained to avoid objectionable brake "squeal" or noise. Engine brakes shall not be used anywhere on the Work Site or on any access roads, except in an emergency.
- E. Operators of excavating equipment shall use minimum power consistent with reasonable operation of equipment, and shall avoid banging of buckets on truck bodies, or other objects.

END OF SECTION

SECTION 01 22 00
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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 unit and lump sum prices bid. All work not specifically set forth as a pay item in the Bid Form shall be considered subsidiary obligations of Contractor and all costs in connection therewith shall be included in the prices bid.

1.3 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. 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.

Except where otherwise specified, the unit or lump sum bid price bid 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.

1.4 MEASUREMENT AND PAYMENT

A. Mobilization:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
2. This work shall include all costs for bonds, insurance, permits, establishing field offices, moving construction equipment to the site, project management, and other necessary but "nonscheduled" work.
3. Mobilization shall not exceed 3% of Total Bid.

B. Construction Survey:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
2. This work shall include providing materials, labor, and appurtenances necessary to establish project survey control; perform construction surveying and staking required to construct the project; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

C. Traffic Control:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
 2. The work shall include all traffic control signs, cones, flagging, permitting, and any other work required to meet all project, NCDOT and City requirements; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- D. Erosion Control:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary including the cost of furnishing, installing, inspecting, maintaining all measures and devices shown on the drawings and in the specifications in accordance with the State and the sedimentation and erosion control plan; maintaining the sedimentation and erosion control measures and legally disposing collected sediment; removal of all erosion control measures/devices after completion of the project; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- E. Site Clearing:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
 2. Work shall include all removal, and proper disposal to a Contractor selected off site location, of all trees, brush, stumps, roots, and other debris within the limits of the easements; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- F. Bypass Pumping:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
 2. The work shall include all planning and design, establishing and constructing suction and discharge locations; furnishing and installing all pumps, valves and piping; maintaining and monitoring bypass system; traffic control, barricades, signs, etc.; testing of bypass system; providing all fuel; cleaning and removal of bypass system; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- G. Trench Dewatering:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the Contract Documents.
 2. The work shall include all planning and design, establishing and constructing dewatering and discharge locations; furnishing and installing all pumps, valves and piping; erosion and sediment control at discharge points; maintaining and monitoring dewatering system; providing all fuel; removal of dewatering system; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- H. 60-Inch Gravity Sewer Pipe:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.

2. The work shall include unloading and temporary storage, and installing all pipe and materials; exploratory excavation; trench excavation; bracing, shoring, and sheeting; trenching; dewatering as required; removal and disposal of existing pipe and manholes; pipe installation and jointing; constructing the specified bedding and backfilling; compacting; restoration of all ground surfaces; protection and adjusting of aboveground and underground utilities and service connections; legal disposal of spoil; testing; seeding; clean up; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- I. 54-Inch Gravity Sewer Connection:
 1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the existing gravity sewer pipe and new gravity sewer pipe including but not limited to dewatering existing pipe; removal and disposal of existing pipe and manholes; bracing, shoring, and sheeting; cutting into existing pipe; excavating, backfilling and compacting; piping and fittings required; concrete junction structure; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
 - J. 48-Inch Gravity Sewer Connection:
 1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the existing gravity sewer pipe and new gravity sewer pipe including but not limited to dewatering existing pipe; bracing, shoring, and sheeting; cutting into existing pipe; excavating, backfilling and compacting; piping and fittings required; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
 - K. 42-Inch Gravity Sewer Connection:
 1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the proposed manholes with a new 42-inch pipe including but not limited to excavating, backfilling and compacting; bracing, shoring, and sheeting; furnishing and installing all pipe, bedding and backfill required; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
 - L. 10-Inch Gravity Sewer Connection:
 1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the existing gravity sewer pipe and new gravity sewer manhole including but not limited to dewatering existing pipe; bracing, shoring, and sheeting; cutting into existing pipe; excavating, backfilling and compacting; piping and fittings required; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

- M. 24-Inch Force Main Connection:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary for a complete and operable connection between the existing force main sewer pipe and new gravity sewer manhole including but not limited to protection of existing pipe; excavating, backfilling and compacting; bracing, shoring, and sheeting; piping and fittings required; pipe and fitting restraint; all restoration; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- N. Gravity Sewer Manholes:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor, and equipment necessary for a complete and operable installation; concrete manhole with steps, top, footings, riser sections, vent pipe, frame and lid; excavation, bedding, backfill and compacting; bracing, shoring, and sheeting; protective liner system; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- O. Stormwater Pipe:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing, transporting, unloading and temporary storage, and installing all pipe and materials; exploratory excavation; trench excavation; bracing, shoring, and sheeting; trenching; dewatering as required; constructing the specified bedding and backfilling; compacting; restoration of all ground surfaces; protection and adjusting of aboveground and underground utilities and service connections; legal disposal of spoil; testing; seeding; clean up; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- P. Stormwater Manholes:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing, transporting, unloading and temporary storage, and installing all manhole sections and materials; exploratory excavation; excavation; bracing, shoring, and sheeting; dewatering as required; concrete manholes with steps, top, footings, riser sections, frame and lid; pipe and fitting installation and jointing; constructing the specified bedding and backfilling; compacting; restoration of all ground surfaces; protection and adjusting of aboveground and underground utilities and service connections; legal disposal of spoil; testing; seeding; clean up; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
- Q. Subgrade Stabilization Stone:
1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
 2. The work shall include furnishing and installing all materials, labor and equipment necessary including excavation and proper off-site disposal of unsuitable material; bracing, shoring, and sheeting; furnishing, installing and compacting stabilization stone wrapped in

geotextile fabric; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

3. Only locations and amounts approved by Owner in advance will be paid.

R. Imported Soil Backfill:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
2. The work shall include furnishing and installing all materials, labor and equipment necessary including excavation and proper off-site disposal of unsuitable material; bracing, shoring, and sheeting; furnishing, installing and compacting imported soil backfill; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
3. Only locations and amounts approved by Owner in advance will be paid.

S. Pipe Trench Filter Fabric:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
2. The work shall include furnishing and installing all materials, labor and equipment necessary to wrap the proposed trench bedding and backfill stone in fabric as shown on the drawing detail, including furnishing, installing and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
3. Only locations and amounts approved by Owner in advance will be paid.

T. Plug and Abandon Existing Sewer:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
2. The work shall include furnishing and installing all materials, labor, and equipment necessary to plug and abandoned the existing gravity sewer that will be replaced; excavations; cutting into existing pipe; installing temporary forms on inside and outside of pipe end; furnishing and placing concrete fill to construct plug; restoration of all disturbed areas; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.

U. Site Restoration:

1. Measurement for payment shall be per the bid form for the work described below. Payment will only be made for the actual quantity performed or installed that meets all requirements of the contract documents.
2. The work shall include furnishing and installing all materials, labor and equipment necessary including furnishing and placing gravel, asphalt and concrete to match existing size, type and color; furnishing and replacing hand rail, signs and light poles; replacing the underground electric utility; furnishing, planting and maintaining landscape trees and grass; and all other related and necessary materials, work, and equipment required, not included in other bid items, to provide a completed project in accordance with the Contract Documents.
3. Unless specifically noted on the drawings, all existing site features and conditions must be restored to exact location and quality.
- 4.

1.5 MATERIAL MANUFACTURER

- A. The Bidder shall identify where requested on the Bid Form type of materials and manufacturer of that type of material (identify only one) that were used by the Bidder as the basis for the Bid submitted.

END OF SECTION

SECTION 01 25 13
PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. The procedure for requesting substitution approval for a product which is specified by descriptive or performance criteria or defined by reference to one or more of the following:
 - a. Name of manufacturer.
 - b. Name of vendor.
 - c. Trade name.
 - d. Catalog number.
 - 2. This Section does not address substitutions for major equipment. See "Instructions to Bidders."
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of The Contract.
 - 2. Division 1 - General Requirements.
- C. Requests for Substitution - General:
 - 1. Base all bids on materials, equipment, and procedures specified.
 - 2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are capable of accomplishing the same tasks as the products specifically indicated.
 - 3. Other types of equipment and kinds of material may be acceptable.

1.2 QUALITY ASSURANCE

- A. In making request for substitution or in using an approved product, Contractor represents:
 - 1. He has investigated proposed product and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
 - 2. He will provide same guarantee for substitute item as for product specified.
 - 3. He will coordinate installation of accepted substitution into work, to include building modifications if necessary, making such changes as may be required for work to be complete in all respects.
 - 4. He waives all claims for additional costs related to substitution which subsequently arise.

1.3 DEFINITIONS

- A. Product: Manufactured material or equipment.

1.4 PROCEDURE FOR REQUESTING SUBSTITUTION

- A. See General Conditions.
- B. For all materials, equipment, and procedures specified, submit requests for substitution after award of Contract. Requests must be submitted in writing by the Contractor only.
- C. Transmittal Contents:
 - 1. Product identification:
 - a. Manufacturer's name.
 - b. Telephone number and representative contact name.
 - c. Specification section or drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.

2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
 - a. Size.
 - b. Composition or materials of construction.
 - c. Weight.
 - d. Electrical or mechanical requirements.
4. Product experience:
 - a. Location of past projects utilizing product.
 - b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
 - c. Available field data and reports associated with proposed product.
5. Data relating to changes in construction schedule.
6. Data relating to changes in cost.
7. Samples:
 - a. At request of Engineer.
 - b. Full size if requested by Engineer.
 - c. Held until substantial completion.
 - d. Engineer not responsible for loss or damage to samples.

1.5 APPROVAL OR REJECTION

- A. Written approval or rejection of substitution given by the Engineer.
- B. Engineer reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.
- C. In event substitution results in a change of Contract price or time, provisions in General Conditions will be applied for adjustment.
- D. Substitutions will be rejected if:
 1. Submittal is not through the Contractor with his stamp of approval.
 2. Requests are not made in accordance with this Section.
 3. In the Engineer's opinion, acceptance will require substantial revision of the original design.
 4. In the Engineer's opinion, substitution is not equal to original product specified or will not perform adequately the function for which it was intended.

END OF SECTION

SECTION 01 26 13
REQUESTS FOR INFORMATION (RFI)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Specification Section specifies administrative and procedural requirements for handling and processing Requests for Information (RFI).
- B. RFI is intended for requesting clarifications and interpretations of Contract Documents due to apparent inconsistencies, errors or omissions in Contract Documents, and due to unanticipated existing conditions.
- C. RFI is not intended for general communication, requesting substitutions, Contractor's proposed changes, resolution of nonconforming work, or coordination between contractors or for general questions not related to Contract Documents.
- D. RFI process is intended to be a cooperative effort between Engineer and Contractor to expedite responses to RFIs and maintain progress of Work without utilizing other lengthy procedures.

1.2 RFI SUBMITTAL PROCEDURE

- A. All RFIs shall be submitted on the form attached to this Specification Section, or on mutually agreeable forms to be provided at the preconstruction meeting, and shall include all backup information.
 - 1. Backup information shall include, but not be limited to Contractor verified field measurements, quantities, dimensions, installation requirements, materials, catalog number, and any other information that will assist the Owner in reviewing the RFI.
- B. Within ten (10) working days of receipt of RFI, Engineer will either return a response to the RFI or notify Contractor when a response will be issued.

1.3 COMMENCEMENT OF RFI-RELATED WORK

- A. No portion of the work requiring instruction from the Engineer shall begin until RFI has been reviewed by the Engineer and returned to Contractor with instruction or with notation indicating Engineer response is not necessary.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.1 REQUESTS FOR INFORMATION

- A. Review of Contract Documents and Field Conditions:
 - 1. Before starting each portion of Work, Contractor shall carefully study and compare various Drawings, Specifications and other Contract Documents, coordination drawings, Shop Drawings, prior correspondence or documentation relative to that portion of Work, as well as information furnished by Owner.
 - 2. Contractor and Subcontractors shall evaluate and take field measurements of conditions related to that portion of Work and shall observe any conditions at site affecting it.
 - 3. These obligations are for purpose of facilitating coordination and construction by Contractor.
 - 4. Any errors, inconsistencies or omissions discovered in Contract Documents shall be reported promptly to Engineer as a properly prepared and timely RFI.
- B. Contractor's and Subcontractor's Responsibilities:

1. When interpretation, clarification or explanation of portion of Construction Documents is needed by Contractor, Subcontractor, Vendor or Supplier, the request shall be processed through Contractor.
 - a. Review request for completeness, quality, proper referencing to Drawing or Specification Section and reason submitted.
 - b. If request is not acceptable, it shall be returned to submitter with comments regarding reason for being returned.
 - c. Make every attempt to validate, resolve or respond to RFI by thoroughly researching and reviewing Contract Documents and field conditions.
 - d. Respond to RFI accordingly if review of RFI discloses a response or is related to coordination of construction or other issue not related to Contract Documents.
 - e. If unable to respond to request, it shall be restated in clear, concise, correct, complete and easily understood manner, and rewritten if necessary, additional information included if necessary, and only then submitted to Engineer for response.
 2. Follow these procedures in developing an RFI:
 - a. List specific Contract Documents researched when seeking information being requested.
 - b. Reference all applicable Contract Drawings by sheet number, section, detail, etc., Specifications by section and paragraph number, and reference any other relevant documents.
 - c. The field titled "Regarding" on attached RFI form must be clear for future reference in reports or correspondence.
 - d. Clearly state request and provide Contract Document references and any additional information needed so request can be fully understood, including sketches, photos or other reference material.
 - e. Fully assess issues, suggest any reasonable solutions and include various factors, including potential costs, schedule impacts, if any, and recommendations which will aid in determining a solution or response.
 - 1) If a reasonable solution cannot be suggested, a statement to that effect should be so stated.
 - f. Indicate reason request is being submitted.
 - g. Any critical RFI's requiring a rapid response shall clearly indicate such with an explanation as to why RFI is critical.
 - h. Priority for responses shall be indicated when multiple RFI's are submitted within short period of time.
 3. Copies of responses to RFI's shall be distributed to all parties affected.
 4. A response to RFI shall not be considered a notice to proceed with a change that may revise the Contract Sum or Contract Time, unless authorized by Owner in writing.
 5. If response to RFI is determined incomplete, it shall be resubmitted with reason response is unacceptable and any necessary additional information within five (5) days of time of receipt of response to RFI.
- C. RFI Submittal Numbering:
1. RFI's shall be assigned unique numbers in sequential order (1, 2, 3, 4, etc.).
 2. A resubmitted RFI or a previously answered RFI requiring revising or further clarification shall be submitted using original RFI number proceeded by ".1" to indicate revision one of RFI (i.e.: RFI No. 34.1 for revision 1 to RFI No. 34).
 3. Engineer may return RFI without response for following reasons:
 - a. Request is unclear or incomplete.
 - b. Detailed information not provided.
 - c. Is related to construction means, methods or techniques.
 - d. Is related to health or safety measures.
 - e. Is due to Contractor's lack of adequate coordination.
 - f. Is for coordination between Subcontractors.
 - g. Is considered a "Substitution Request."
 - h. Is considered a "Contractor Proposed Change."

- i. Is due to non-conformance.
- j. Response is required by another party.

END OF SECTION



EXHIBIT A

Request for Information Form

Contractor's RFI No. _____

Engineer's RFI No. _____

Contract: _____

Contractor: _____

Owner: _____

Owner's Contract No. _____

Engineer **HDR Engineering, Inc. of the Carolinas**

Engineer's Contract No. _____

THIS REQUEST BY: _____ cc to: _____
(Name of the Contractor's Representative)

REFERENCE: DIVISION ____ SECTION _____ PLAN SHEET NO. _____

ATTACHMENTS _____

INTERPRETATION BY: _____ Date: _____, 20____
(Name of the Engineer's Representative)

ATTACHMENTS _____

The General Conditions specifies that once the Engineer provides a response to a Contractor's RFI, that determination shall be final and binding on the Contractor unless the Contractor delivers to the Owner written notice of a change in the work within a certain period of time of receipt of that determination. See the GCs for further clarification.

cc to: _____

SECTION 01 30 00
SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

- A. A preconstruction conference shall be held at MSD in Asheville, North Carolina after award of Contract. Engineer will notify the Contractor as to the date and time of the conference in advance of the proposed date. Contractor's Project Manager and Project Superintendent and Contractor's Subcontractor Representatives shall attend.

1.2 PROJECT SIGNS

- A. Signs permitted only upon approval of Owner.

1.3 DRAWINGS AND CONTRACT DOCUMENTS FOR CONTRACTOR USE

- A. Contractor shall pick up all "no-charge" documents within 10 days from date of Notice to Proceed. Up to 5 sets will be provided.
- B. Additional documents after "no-charge" documents will be furnished to Contractor at cost.

1.4 PROJECT PHOTOGRAPHS

- A. Contractor shall take photographs along the entire alignment before any construction activities begin. At minimum photographs shall be taken to clearly indicate condition of every driveway and roadway that will be crossed and condition to lawn areas and landscaping of every property being impacted.
- B. Contractor shall provide a complete digital set of color photographs to both the Owner and Engineer.
- C. Contractor shall notify Owner and Engineer 48 hours in advance of taking the photographs to allow them to be present.

1.5 TESTING

- A. Payment for Soil, Concrete and Other Testing:
 - 1. Soils and concrete testing: The Owner will pay for "Passing" soils and "Passing" concrete tests on the Project. Costs of corrective action, costs of "Failing" soils and concrete tests, and cost of testing associated with establishment of mix design are the sole responsibility of the Contractor.
 - 2. Other testing: Required testing, testing procedures, reports, certificates, and costs associated with all phases of securing required satisfactory test information which may be required by individual sections of Specifications or Drawings are the full responsibility of the Contractor.

1.6 ORDER OF CONSTRUCTION AND CONSTRUCTION SCHEDULE

- A. Construction operations will be scheduled to allow the Owner uninterrupted operation of existing adjacent facilities. Coordinate connections with existing work to ensure timely completion of interfaced items.
- B. At no time shall Contractor or his employees modify operation of the existing facilities or start construction modifications without approval of the Owner except in emergency to prevent or minimize damage.
- C. Within 10 days after award of Contract, submit for approval a critical path type schedule. Key PROJECT MILESTONES to be incorporated in Proposed Contract Schedule include but are not necessarily limited to the following for project:

1. Contract Notice to Proceed.
2. Mobilization: Contractor's option.
3. Erosion control device installation.
4. Shop drawings submittal completion.
5. Substantial Completion for Project.
6. Start-up and Training.
7. Substantial and satisfactory completion (Final completion) for all Work.

Account for schedule of Subcontracts. Include proper sequence of construction, various crafts, purchasing time, shop drawing approval, material delivery, equipment fabrication, startup, demonstration, and similar time-consuming factors. Show on schedule as a minimum, earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.

No Work will be scheduled on New Years' Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the following day, Christmas Day and the previous day. Unless the Contractor given Engineer's Field Representative a 72-hour notice, no Work will be scheduled or performed on Saturday or Sunday. This requirement will be waived for any emergency that threatens the safety of the public or puts the Project at risk.

Evaluate schedule no less than monthly. Update, correct, and rerun schedule and submit to Engineer in triplicate with pay application to show rescheduling necessary to reflect true job conditions. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate steps to implement to accomplish work in shortest schedule. Information shall be submitted to Engineer in writing with revised schedule.

- D. According to the North Carolina State Climate Office, the average number of days a year in which 0.10 inch or more of precipitation can be expected is 77. This equates to 55 work days (Monday through Friday). A time extension will not be considered unless more than 55 scheduled work-days per year receive more than 0.10 inch of precipitation. Precipitation occurring before the work-day has started or after the work day has ended will not counted.
- E. If Contractor does not take necessary action to accomplish work according to schedule, he may be ordered by Owner in writing to take necessary and timely action to improve work progress. Order may require increased work forces, extra equipment, extra shifts or other action as necessary. Should Contractor refuse or neglect to take such action authorized, under provisions of this contract, Owner may take necessary actions including, but not necessarily limited to, withholding of payment and termination of contract.
- F. Upon receipt of approved "Work Schedule," within 10 days, submit to Engineer an estimated payment schedule by each month of project duration. Include a composite curve to show estimated value of work complete and stored materials less specified retainage. Establish key dates when work will be 50, 80, 90, and 100 percent complete. During the course of work, update with new composite curves at key months or whenever variation is expected to be more than plus or minus 10 percent. Retain original or previous composite curves as dashed curves on all updates. Include a heavy plotted curve to show ACTUAL payment curve on all updates.
- G. Furnish 3-week look ahead schedule at each construction meeting.

1.7 PROJECT MEETINGS

- A. The Engineer will conduct construction meetings involving:
 1. Contractor's project manager.
 2. Contractor's project superintendent.
 3. Owner's designated representative(s).
 4. Engineer's designated representative(s).
 5. Contractor's subcontractors as appropriate to the work in progress.
- B. Meetings conducted may be called by Engineer at convenient times throughout the duration of the project.

- C. The Engineer will take meeting minutes and submit copies of meeting minutes to participants and designated recipients identified at the Preconstruction Conference. Corrections, additions or deletions to the minutes shall be noted and addressed at the following meeting.
- D. The Engineer will endeavor to schedule meetings for most convenient time frame.
- E. The Contractor shall have available at each meeting up-to-date record drawings.

1.8 VIDEO RECORDING EQUIPMENT (NOT REQUIRED)

1.9 SPECIAL CONSIDERATIONS

- A. Contractor shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the site.
- B. Maintain conditions of access road to site such that access is not hindered as the result of construction related deterioration.
- C. Store and stockpile materials in an orderly manner and protect against damage.
- D. Maintain in good repair temporary structures, fences, barricades, and other related items.
- E. Electrical Power and Lighting. The electrical power required during construction shall be provided by each Contractor as required by him. This service shall be installed by a qualified electrical contractor. Lighting shall be provided by each Contractor in all spaces at all times where necessary for good and proper workmanship, for inspection or for safety.
- F. Special Hazards. Each Contractor and his subcontractor's Public Liability and Property Damage Insurance shall provide adequate protection against the following special hazards:
 - 1. Blasting
 - 2. Excavation
 - 3. Flooding
- G. Safety. Each Contractor alone shall be solely and completely responsible for conditions of the job site in connection with his work, including safety of all persons and property, preparatory to and during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours.

The Construction Documents, and the construction hereby contemplated are to be governed, at all times, by applicable provisions of local and State laws, and regulations, and Federal laws, including but not limited to, the latest amendments of the following: Department of Labor, Bureau of Labor Standards Safety and Health Regulations for Construction, and Williams and Steiger Occupational Safety and Health Act of 1970, including rules and regulations pursuant thereto, applicable to the Work and performance of the Contract (OSHA).

The duty of the Engineer to conduct construction review of each Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

All explosives shall be stored in a secure manner and all storage places shall be marked clearly "DANGEROUS EXPLOSIVES", and shall be in the care of competent watchmen at all times.

- H. Inspections by Federal and State Agencies. Authorized representatives and agents of the State and Federal Government shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.
- I. Water. Water used on the project shall be fresh and of drinkable quality. Water obtained from nearby streams will not be acceptable for use on the project. The Contractor shall make arrangements to purchase fresh water for his drinking, normal use and use in testing, disinfecting and flushing lines from the Owner.

1.10 DATA AND MEASUREMENTS

- A. The data given in the specifications and shown on the Plans and Drawings is believed to be accurate but the accuracy is not guaranteed. The Contractor must take all levels, locations, measurements, and verify all dimensions of the job site prior to construction and must adapt his work into the exact construction. Scale measurements taken from prints are not considered for more than reference, larger scale drawings take precedence over smaller scale, and shop drawings take precedence over all others.

1.11 REFERENCE POINTS

- A. Contractor shall preserve and protect all reference points and pay for replacement of any destroyed reference points.

1.12 PROTECTION AND RESTORATION OF PUBLIC AND PRIVATE PROPERTY, INCLUDING EASEMENTS

- A. General. Carefully protect all public and private property affected by construction operations. Such restorations shall include clearing of rock and debris, seeding, sodding, and transplanting of lawns, hedges, or ornamental plantings and repair or replacement of driveways, driveway culverts, walks, or other private facilities.

Trees that are to be protected will be shown on the Plans or will be marked by the Owner prior to construction. Prior to any clearing, the Contractor shall schedule a meeting with a representative of the Owner, and the Engineer to discuss the work and agree on marking trees that can be protected.

Confirm the marking of trees with the Inspector at least seventy-two (72) hours prior to the start of any construction, to insure that all trees to be protected have been marked.

Take every precaution to protect trees from damage by boarding or wrapping of trunks, tying back limbs, etc. On all standing trees, marked or otherwise, any broken limbs shall be neatly removed, any scarred or barked areas shall be neatly repaired, any cut roots shall be trimmed and all painted with a tree paint approved by the ENGINEER.

- B. Repair of Lawn or "Kept" Areas. Any area stripped of vegetation shall not be left for more than fifteen (15) days without topsoiling and seeding. This includes stockpiled dirt, regardless of its location.

All areas disturbed by construction shall be regraded to original contours leaving the ground free from lumps, ridges and depressions which would cause standing water.

- C. All lawn or "kept" areas shall be reseeded.
- D. Properly care for all areas and supply sufficient water to ensure proper growth of grass.
- E. Replant all areas where grass is not established at intervals of ten (10) days, continuing until a good growth of grass is established.

Topsoil as defined in this section shall be original topsoil removed and stockpiled for this purpose.

1.13 SITE CONDITIONS

- A. The Contractor acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, water tables, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done on behalf of the

Owner on the site or any contiguous site, as well as from information presented by the drawings and specifications made a part of this Contract, or any other information made available to him prior to receipt of Bids. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner.

1.14 CLEANUP REQUIREMENTS

- A. Cleanup operations shall be conducted daily.
 - 1. Contractor shall keep the work areas free at all times from accumulations of waste materials and rubbish.
 - 2. Roadways shall be cleaned and swept at the end of each workday.
 - 3. Volatile waste shall be properly stored in covered metal containers and removed daily.
 - 4. Wastes shall not be buried or burned on the site or disposed into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the site and disposed in a manner complying with local ordinances and anti-pollution laws.
- B. Contractor shall make the necessary arrangements for proper off-site storage areas.
- C. Contractor shall keep all equipment and materials within construction easements or road rights-of-way and protect private property from damage due to construction.

1.15 HISTORICAL AND ARCHAEOLOGICAL

- A. If during the course of construction, evidence of deposits of historical or archaeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Owner. No further disturbance of the deposits shall ensue until the Contractor has been notified by the Owner that Contractor may proceed. Compensation to the Contractor, if any, for lost time or changes in construction resulting from the find, shall be determined in accordance with changed or extra work provisions of the Contract Documents.

1.16 CITY OF ASHEVILLE PERMITS

- A. Contractor shall submit for and obtain all required permits from the City of Asheville, including road closure and street cut permits. All Work and costs are the Contractor's responsibility.

1.17 NCDOT PERMIT

- A. An Appendix provides the approved NCDOT permit for this project. Contractor shall comply with all permit requirements. All costs to perform the work required shall be include in the appropriate bid items.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SECTION)

END OF SECTION

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SECTION 01 32 17
CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Specific requirements for the preparation, submittal, updating, and status reporting of the construction Progress Schedule.
- B. Related Specification Sections include, but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
- C. Review of the CPM Schedule:
 - 1. In so far as the Contractor is solely responsible for its means and methods and the CPM schedule represents in part its means and methods, the review of the CPM schedules (preliminary, baseline, updates, revisions, etc.) is for compliance with the requirements as defined in the contract documents.
 - 2. The review of the CPM schedule is not intended to be complete or exhaustive or check every activity and its relation to the work.
 - 3. The Engineer will provide comments on the CPM schedule compliance with those contract requirements and anomalies that might appear to the Engineer.
 - 4. If the Contractor fails to include contract requirements (e.g. specified cure times, commissioning periods) in the CPM schedule, or the Engineer fails to notify the Contractor of anomalies the Contractor is not relieved of the contract requirements.
 - 5. Acceptance of the CPM schedule does not imply that the Owner has approved or accepted the Contractor's means and methods or sequence for performing the work to construct the project.
 - 6. If the Contractor has questions or concerns about comments, the Contractor and Engineer shall meet to resolve those issues prior to issuance of future updates or revisions.

1.2 DEFINITIONS

- A. The following definitions shall apply to this Specification Section:
 - 1. EXECUTION OF THE CONTRACT: The date the contract is signed by the last party, either the Owner or the Contractor.
 - 2. WORKING DAYS: Monday through Friday except holidays as directed by the Owner.
 - 3. PRELIMINARY SCHEDULE: A schedule showing detailed activity for the first 90 days of the Project, and a general work plan for construction activity from the 91st day until the Contractual Completion Date.
 - 4. BASELINE SCHEDULE: The initial detailed Progress Schedule prepared by the Contractor defining its plan for constructing the Project in accordance with the Contract Documents.
 - 5. SCHEDULE UPDATE: The initially accepted Baseline Schedule, or subsequently approved Revised Baseline Schedules, updated each month to reflect actual start and finish dates of each schedule activity and the remaining duration of activities that began during the period.
 - 6. CURRENT SCHEDULE: The current schedule is either the Baseline Schedule or Revised Baseline Schedule including and incorporating Schedule Updates.
 - 7. REVISED BASELINE SCHEDULE: The initially accepted Baseline Schedule revised to reflect approved contract change orders and modifications.
 - 8. RECOVERY SCHEDULE:
 - a. A schedule indicating the Contractor's plan for recovering lost time.
 - b. A recovery schedule will be requested when the Contractor is forecasting at least 10 working days or more delays in meeting a contract milestone or the contract completion date.
 - 9. SHORT INTERVAL SCHEDULE:

- a. Schedule prepared by the Contractor reflecting the work planned for the coming weeks.
- b. This is also known as a Look-Ahead Schedule.

1.3 SUBMITTALS

A. Preliminary Schedule:

- 1. Submittal and review:
 - a. Submit within 10 days after Execution of the Contract or the effective date of the contract, whichever is earlier.
 - b. The Engineer will review and provide comments to the Contractor within ten (10) working days after receipt of the schedule.
 - c. The Contractor will review and modify the preliminary schedule and return the schedule within five (5) working days. If there are concerns about the comments provided, the Engineer and Contractor will meet to review and resolve those concerns.
- 2. Submittal package:
 - a. Provide a detailed plan for the first ninety (90) days of the project and summary activities of the work to achieve the project milestones.
 - b. CPM time-scaled network diagram:
 - 1) A printed logic diagram and PDF that include the following information:
 - a) Unique activity number/identifier; numeric, alpha or combination of numeric/alpha.
 - b) Activity description.
 - c) Activity duration.
 - d) Early start and early finish for each activity.
 - e) Late start and late finish for each activity.
 - f) Total float (TF) for each activity.
 - g) Predecessor activities.
 - h) Successor activities.
 - i) Bar showing the early start and completion dates of each activity.
 - 2) The activities will be sorted by area, trades, and subcontractors as agreed on with the Engineer.
 - 3) Print the CPM time-scaled network diagram on minimum sheet size of 11 IN x 17 IN.

B. Baseline Schedule:

- 1. Submittal and review:
 - a. Submit within 30 days after Execution of the Contract or the effective date of the contract, whichever is earlier.
 - b. The Engineer shall review the baseline schedule and provide comments to the Contractor within twenty (20) working days after receipt of the schedule.
 - c. After receiving comments, the Contractor and Engineer shall meet to review the comments within five (5) working days.
 - d. After the meeting, the Contractor will modify the schedule as agreed and resubmit the baseline schedule within 5 working days.
 - e. After the Engineer confirms that the Contractor has made the changes as agreed, the schedule will become the baseline schedule.
- 2. Submittal package:
 - a. CPM time-scaled network diagram:
 - 1) A printed logic diagram and PDF that include the following information:
 - a) Unique activity number/identifier; numeric, alpha or combination of numeric/alpha.
 - b) Activity description.
 - c) Activity duration.
 - d) Early start and early finish for each activity.
 - e) Late start and late finish for each activity.
 - f) Total float (TF) for each activity.
 - g) Predecessor activities.
 - h) Successor activities.

- i) Cost/budget to complete the work in the activity.
 - j) Resources needed to complete the activity.
 - k) Bar showing the early start and completion dates of each activity.
 - 2) The activities will be sorted by area, trades, and subcontractors as agreed on with the Engineer.
 - 3) Print the CPM time-scaled network diagram on minimum sheet size of 11 IN x 17 IN.
- C. Schedule Updates:
 - 1. Submittal and Review:
 - a. The Contractor shall provide a Schedule Update on the 4th of each month after the Baseline Schedule is completed.
 - b. The Engineer shall provide comments to the Contractor on the Schedule Update.
 - c. The Contractor shall incorporate the Engineer comments into the next Schedule Update.
 - 2. CPM time-scaled network diagram as described for the Baseline Schedule:
 - a. Do not change the description of an activity number.
 - 1) Any activity added to the schedule shall have a new unique activity number and description.
 - 2) If activities are deleted, the deleted activity number(s) will not be used again.
- D. Recovery Schedule:
 - 1. When the activities on the critical path or the completion milestones appear to be fifteen (15) working days beyond the contract time, the Engineer may request and the Contractor shall provide a Recovery Schedule demonstrating how the Contractor will recover the lost time so that the Work will be completed within the Contract Time.
 - 2. Provide the Recovery schedule within ten (10) working days after requested by the Engineer.
 - 3. Activities will be added, or the durations modified to reflect the changes to the work.
 - 4. The Engineer will review and provide comments to the Contractor on the Recovery Schedule within five (5) working days.
 - 5. Incorporate the Engineer comments into the Recovery Schedule.
 - 6. After acceptance by the Engineer, the Recovery Schedule use for future Schedule Updates.
 - 7. CPM time-scaled network diagram as described for the Baseline Schedule:
 - a. Do not change the description of an activity number.
 - 1) Any activity added to the schedule shall have a new activity number and description.
 - 2) If activities are deleted, the deleted activity number(s) will not be used again.
 - 8. Provide a narrative with an explanation of the changes in logic and/or activity durations.
- E. Short Interval Schedule:
 - 1. Provide a three-month schedule each month during the Contract Time. This schedule can be reviewed at each progress meeting.
 - a. Provide an accurate representation of the work performed the previous month and work planned for the current month and subsequent month.
 - 2. Provide in a tabular format with bars or other graphic representing work duration.
 - a. Reference activity ID numbers on the Baseline, Revised Baseline, or Updated Schedule, whichever is being currently used.
 - b. Note by color, highlight or underscore all activities on the critical path.
 - 3. Identify inspection hold points including special inspections needed before the Contractor can move forward with the work.
 - 4. Identify the day materials provided by the Owner or others needed on site.
 - 5. Identify utility tie-ins and traffic changes including road and/or lane closures.

1.4 GENERAL REQUIREMENTS

- A. Prepare and submit construction progress schedules as specified herein.
 - 1. Develop and maintain Baseline, Updates and Recovery schedules using Microsoft Project or equal as approved by the Engineer.
 - 2. Include the following information:
 - a. Construction start dates (Award date, Notice(s) to Proceed date).
 - b. Procurement activities.

- c. Preparation of key submittals for materials and equipment.
 - d. Engineers review and approval of key submittals.
 - e. Material and equipment fabrication lead times.
 - f. Material and equipment deliveries for Contractor, Owner and third parties.
 - g. Curing of Concrete after placement for all structures
 - h. Shutdowns.
 - i. Utility tie-ins.
 - j. Traffic changes and closures.
 - k. Inspections and hold points.
 - l. Testing of equipment and systems.
 - m. Commissioning.
 - n. Contract milestones:
 - 1) Intermediate milestones.
 - 2) Substantial Completion Date.
 - 3) Physical Completion Date.
3. The following CPM schedule outputs will be rejected without further review:
- a. Schedules indicating the start of the critical path at a date point or activity beyond the date of Notice to Proceed, or schedules indicating a discontinuous critical path from Notice to Proceed to Contract completion.
 - b. Schedules defining critical activities as those on a path or paths having some minimum value of float.
 - c. Schedules with multiple critical paths.
 - d. Schedules indicating a completion date beyond the contractual completion date.
- B. The number of activities shall be sufficient to assure adequate planning of the project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.
- 1. Work activities shall not exceed durations of 10 days or 2 weeks.
 - a. Procurement and fabrication activity durations may exceed 10 days or 2 weeks.
 - 2. Schedule activities shall include the following:
 - a. A clear and legible description.
 - b. At least one (1) predecessor and one (1) successor activity, except for project start and finish milestones.
- C. Early Completion Schedule:
- 1. Contractor may show early completion time on any schedule provided that the requirements of the contract are met.
 - 2. Contractor may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently or by completing activities earlier than planned.
 - 3. Any time between the Contractor's early completion and the Contract Time will be considered float.
- D. Plan working durations to incorporate the effects of normal weather impacts.
- E. Float:
- 1. The project owns the float, therefore neither the Owner nor the Contractor has exclusive use of the float; the float can be used by either party.
 - 2. Once float is used, liability for delay of the project completion date rests with the party actually causing delay to the project completion date.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

SECTION 01 33 00
SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mechanics and administration of the submittal process for:
 - a. Shop Drawings.
 - b. Samples.
 - c. Informational submittals.
 - 2. General content requirements for Shop Drawings.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Technical Specification Sections identifying required submittals.

1.2 DEFINITIONS

- A. Action Submittals:
 - 1. Action Submittals require an explicit, written approval or other appropriate action by Engineer before Contractor may release the associated item(s) for raw materials procurement, fabrication, production, and shipment.
 - 2. Unless otherwise indicated in the Contract Documents, Action Submittals include the following:
 - a. Shop Drawings.
 - b. Product data.
 - c. Samples.
 - d. Testing plans for quality control activities required by the Contract Documents.
 - e. Delegated Designs: Design drawings, design specifications, calculations, reports, and other instruments of service sealed and signed by design professional retained by Contractor, Subcontractor, or Supplier for a portion of the completed Work as part of the completed Project. Engineer's approval or other appropriate action on such delegated design Submittals will be only for the limited purposes set forth in the General Conditions.
- B. Informational Submittals:
 - 1. Informational Submittals are Submittals, other than Action Submittals, required by the Contract Documents. Explicit response from Engineer is not required when such Submittal is acceptable, and Engineer's acceptance thereof will be indicated in the Engineer's Submittals log. When Informational Submittal does not indicate full compliance with the Contract Documents, Engineer will indicate the non-compliance in a written response to Contractor.
 - 2. Representative types of informational submittal items include but are not limited to:
 - a. HVAC test and balance reports.
 - b. Installed equipment and systems performance test reports.
 - c. Manufacturer's installation certification letters.
 - d. Instrumentation and control commissioning reports.
 - e. Warranties.
 - f. Service agreements.
 - g. Construction photographs.
 - h. Survey data.
 - i. Work plans.

- j. Shop Drawings, product data, Samples, and testing plans, submitted as a requirement of for delegated designs, bearing the Submittal approval stamp of associated design professional retained by Contractor, Subcontractor, or Supplier.
- 3. For-Information-Only submittals upon which the Engineer is not expected to conduct review or take responsive action may be so identified in the Contract Documents.

1.3 SUBMITTAL SCHEDULE

- A. Schedule of Shop Drawings:
 - 1. Submitted and approved within 20 days of receipt of Notice to Proceed.
 - 2. Account for multiple transmittals under any specification section where partial submittals will be transmitted.
- B. Shop Drawings: Submittal and approval prior to 30 PCT completion of project.
- C. Informational Submittals:
 - 1. Reports and installation certifications submitted within seven days of conducting testing, installation, or examination.
 - 2. Submittals showing compliance with required qualifications submitted 20 days prior to any work beginning using the subject qualifications.
- D. The submittal schedule shall include the following columns as a minimum:

Submittal Section	Submittal Description	Planned Submittal Date	Submittal Need Date	Actual Submittal Date	Actual Return Date	Disposition

1.4 PREPARATION OF SUBMITTALS

- A. General:
 - 1. All submittals and all pages of all copies of a submittal shall be completely legible.
 - 2. Submittals which, in the Engineer’s sole opinion, are illegible will be returned without review.
 - 3. Minimize extraneous information for equipment and products not relevant to the submittal.
 - 4. Contractors or vendors written comments on the submittal drawings shall be in green.
- B. Shop Drawings, Product Data, and Samples:
 - 1. Scope of any submittal and letter of transmittal:
 - a. Limited to one Specification Section.
 - b. Submittals with more than one Specification section included will be rejected.
 - c. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified, in total, in a "Basic Requirements" Specification Section.
 - 2. Numbering letter of transmittal:
 - a. Include as prefix the Specification Section number followed by a series number, "-xx", beginning with "01" and increasing sequentially with each additional transmittal for that Specification Section.
 - b. If more than one submittal under any Specification Section, assign consecutive series numbers to subsequent transmittal letters.
 - 3. Describing transmittal contents:
 - a. Provide listing of each component or item in submittal capable of receiving an independent review action.
 - b. Identify for each item:
 - 1) Manufacturer and Manufacturer's Drawing or data number.
 - 2) Contract Document tag number(s).
 - 3) Unique page numbers for each page of each separate item.

- c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.
- 4. Contractor certification of review and approval:
 - a. Contractor's review and approval certification stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.
 - 1) Stamp may be either a wet ink stamp or electronically embedded.
 - 2) Clearly identify the person who reviewed the submittal and the date it was reviewed.
 - 3) Shop Drawing submittal stamp shall read "(Contractor's Name) has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval as stipulated in the General Conditions."
 - OR
 - b. Execute Exhibit AA, Contractor's Submittal Certification form, to indicate Contractor has reviewed and approved the submittal contents.
 - 1) Clearly identify the person who reviewed the submittal and the date it was reviewed."
 - c. Submittals containing multiple independent items shall be prepared with each item listed on the letter of transmittal or on an index sheet for all items listing the discrete page numbers for each page of each item, which shall be stamped with the Contractor's review and approval stamp.
 - 1) Each independent item shall have a cover sheet with the transmittal number and item number recorded.
 - a) Provide clear space of 3 IN SQ for Engineer stamping.
 - 2) Individual pages or sheets of independent items shall be numbered in a manner that permits the entire contents of a particular item to be readily recognized and associated with Contractor's certification.
- 5. Resubmittals:
 - a. Number with original Specification Section and series number with a suffix letter starting with "A" on a (new) duplicate transmittal form.
 - b. Do not increase the scope of any prior transmittal.
 - c. Provide cover letter indicating how each "B", "C", or "D" Action from previous submittal was addressed and where the correction is found in the resubmittal.
 - d. Account for all components of prior transmittal.
 - 1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.
 - a) Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.
 - 2) Indicate "Outstanding-To Be Resubmitted At a Later Date" for any prior "C" or "D" Action item not included in resubmittal.
 - a) Obtain Engineer's approval to exclude items.
- 6. Do not use red color for marks on transmittals.
 - a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
 - b. Engineer will use red marks or enclose marks in a cloud.
- 7. Transmittal contents:
 - a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Engineer.
 - b. Provide submittal information or marks defining specific equipment or materials utilized on the Project.
 - 1) Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
 - c. Identify equipment or material project use, tag number, Drawing detail reference, weight, and other Project specific information.
 - d. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.

- e. Do not modify the manufacturer's documentation or data except as specified herein.
 - f. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets not exceeding 11 x 17 IN pages.
 - 1) Indicate exact item or model and all options proposed by arrow and leader.
 - g. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the Specification Section.
 - 1) Arrange data and performance information in format similar to that provided in Contract Documents.
 - 2) Provide, at minimum, the detail specified in the Contract Documents.
 - h. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet. Any deviation from plans or specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.
8. Samples:
- a. Identification:
 - 1) Identify sample as to transmittal number, manufacturer, item, use, type, project designation, tag number, Specification Section or Drawing detail reference, color, range, texture, finish and other pertinent data.
 - 2) If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.
 - b. Include application specific brochures, and installation instructions.
 - c. Provide Contractor's review and approval certification stamp or Contractor's Submittal Certification form as indication of Contractor's checking and verification of dimensions and coordination with interrelated work.
 - d. Resubmit revised samples of rejected items.
- C. Informational Submittals:
- 1. Prepare in the format and detail specified in Specification requiring the informational submittal.

1.5 TRANSMITTAL OF SUBMITTALS

- A. Shop Drawings and Samples:
 - 1. Utilize attached Exhibit A to transmit all Shop Drawings and samples.
 - 2. All submittals must be from Contractor.
 - a. Submittals will not be received from or returned to subcontractors.
- B. Informational Submittals:
 - 1. Transmit under Contractor's standard letter of transmittal or letterhead.
- C. Electronic Transmission of Submittals:
 - 1. Transmittals shall be made electronically.
 - a. Use email.
 - b. Protocols and processes will be determined at the Pre-Construction Conference.
 - 2. Provide documents in Adobe Acrobat Portable Document Format (PDF), latest version.
 - 3. Do not password protect or lock the PDF document.
 - 4. Drawings or other graphics must be converted to PDF file format from the original drawing file format and made part of the PDF document.
 - a. Scanning of drawings is to be used only where actual file conversion is not possible and drawings must be scanned at a resolution of 300 DPI or greater.

- b. Required signatures may be applied prior to scanning for transmittal.
5. Electronic drawings shall be formatted to be at full-scale (or half-scale when printed to 11x17).
 - a. Do not reduce drawings by more than 50 PCT in size.
 - b. Reduced drawings shall be clearly marked "HALF-SIZE" and shall scale accurately at that size.
6. Rotate sheets that are normally viewed in landscape mode so that when the PDF file is opened the sheet is in the appropriate position for viewing.
7. Create bookmarks in the bookmarks panel for the cover, the Table of Contents, and each major section of the document.
8. Using Adobe Acrobat Standard or Adobe Acrobat Professional, set the PDF document properties, initial view as follows:
 - a. Select File → Properties → Initial View.
 - b. Select the Navigation tab: Bookmarks Panel and Page.
 - c. Select the Page layout: Single Page.
 - d. Select the Magnification: Fit Page.
 - e. Select Open to page: 1.
 - f. Set the file to open to the cover page with bookmarks to the left, and the first bookmark linked to the cover page.
9. Set the PDF file "Fast Web View" option to open the first several pages of the document while the rest of the document continues to load.
 - a. To do this:
 - 1) Select Edit → Preferences → Documents → Save Settings.
 - 2) Check the Save As optimizes for Fast Web View box.
10. File naming conventions:
 - a. File names shall use the convention (XXXXXX-YY-Z.PDF) where XXXXXX is the Specification Section number, YY is the Shop Drawing Root number and Z is an ID number used to designate the associated volume.
11. Labeling:
 - a. As a minimum, include the following labeling on all electronic media:
 - 1) Project Name.
 - 2) Equipment Name and Project Tag Number.
 - 3) Project Specification Section.
 - 4) Manufacturer Name.
 - 5) Vendor Name.
12. Binding:
 - a. Include labeled electronic media in a protective case.
 - 1) Bind protective case in three-ring binder, inserted at the front of the Final paper copy submittal.
 - 2) Protective case(s) to have means for securing electronic media to prevent loss (e.g., zip case, flap and strap, or equivalent).

1.6 ENGINEER'S REVIEW ACTION

- A. Shop Drawings and Samples:
 1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
 - a. A - FURNISH AS SUBMITTED.
 - b. B - FURNISH AS NOTED (BY ENGINEER).
 - c. C - REVISE AND RESUBMIT.
 - d. D - REJECTED.
 - e. E - ENGINEER'S REVIEW NOT REQUIRED.
 2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.

- a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned rejected.
3. In relying on the representation on the Contractor's review and approval stamp, Owner and Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
 - a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:
 - 1) Review and approval will be limited to the single item described on the transmittal letter.
 - 2) Other items identified in the submittal will:
 - a) Not be logged as received by the Engineer.
 - b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
 - c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
 - b. Engineer, at Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
 - 1) Unless Contractor notifies Engineer in writing that the Engineer's revision of the transmittal letter item list and descriptions was in error, Contractor's review and approval stamp will be deemed to have applied to the entire contents of the submittal package.
4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
 - a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
 - b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
 - a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
 - 1) One copy or the one transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
 - a) Correct and resubmit items so marked.
 - b. Items marked "A" or "B" will be fully distributed.
 - c. If a portion of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
 - 1) This is at the sole discretion of the Engineer.
 - 2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
 - 3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.
7. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been stamped by the professional as defined in the specifications and for limited purpose of checking conformance with given performance and design criteria. The Engineer is not responsible for checking the accuracy of the calculations and the calculations will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
8. Furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's

time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

9. Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" action in a prior submittal, will be returned with action "E. Engineer's Review Not Required."
10. Samples may be retained for comparison purposes.
 - a. Remove samples when directed.
 - b. Include in bid all costs of furnishing and removing samples.
11. Approved samples submitted or constructed, constitute criteria for judging completed work.
 - a. Finished work or items not equal to samples will be rejected.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

EXHIBIT A Shop Drawing Transmittal No.

(Spec Section) (Series)

Project Name:		Date Received:
Project Owner:		Checked By:
Contractor:	HDR Engineering, Inc.	Log Page:
Address:	Address:	HDR No.:
		Spec Section:
		Drawing/Detail No.:
Attn:	Attn:	1st. Sub ReSub.
Date Transmitted:	Previous Transmittal Date:	

Item No.	No. Copies	Description	Manufacturer	Mfr/Vendor Dwg or Data No.	Action Taken*

Remarks:

* The Action designated above is in accordance with the following legend:

<p>A - Furnish as Submitted</p> <p>B - Furnish as Noted</p> <p>C - Revise and Submit</p> <ol style="list-style-type: none"> 1. Not enough information for review. 2. No reproducibles submitted. 3. Copies illegible. 4. Not enough copies submitted. 5. Wrong sequence number. 6. Wrong resubmittal number. 7. Wrong spec. section. 8. Wrong form used. 9. See comments. <p>D - Rejected</p>	<p>E - Engineer's review not required</p> <ol style="list-style-type: none"> 1. Submittal not required. 2. Supplemental Information. Submittal retained for informational purposes only. 3. Information reviewed and approved on prior submittal. 4. See comments. <p>Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Any deviation from plans or specifications not depicted in the submittal or included but not clearly noted by the Contractor may not have been reviewed. Review by the Engineer shall not serve to relieve the Contractor of the contractual responsibility for any error or deviation from contract requirements.</p>
--	--

Comments:

	Date
By	

Distribution: Contractor | File | Field | Owner | Other

Contractor's Submittal Certification

Shop Drawing Transmittal No.:

Contract/Project Name:

Company Name:

has

- 1. reviewed and coordinated this Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- 2. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- 3. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- 4. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

This Submittal **does not** contain any variations from the requirements of the Contract Documents.

This Submittal **does** contain variations from the requirements of the Contract Documents. A separate description of said variations and a justification for them is provided in an attachment hereto identified as:

"Shop Drawing Transmittal No. _____ Variation and Justification Documentation"

Insert picture file or electronic signature of Authorized Representative

Authorized Representative

Date

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SECTION 01 35 05
ENVIRONMENTAL PROTECTION AND SPECIAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Addresses:
1. Minimizing the pollution of air, water, or land; control of noise, the disposal of solid waste materials, and protection of deposits of historical or archaeological interest.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SECTION)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.
- B. Land Protection:
1. Except for any work or storage area and access routes specifically assigned for the use of the Contractor, the land areas outside the limits of construction shall be preserved in their present condition. Contractor shall confine his construction activities to areas defined for work within the Contract Documents.
 2. Manage and control all borrow areas, work or storage areas, access routes and embankments to prevent sediment from entering nearby water or land adjacent to the work site.
 3. Restore all disturbed areas including borrow and haul areas and establish permanent type of locally adaptable vegetative cover.
 4. Unless earthwork is immediately paved or surfaced, protect all side slopes and backslopes immediately upon completion of final grading.
 5. Plan and execute earthwork in a manner to minimize duration of exposure of unprotected soils.
 6. Except for areas designated by the Contract Documents to be cleared and grubbed, the Contractor shall not deface, injure or destroy trees and vegetation, nor remove, cut, or disturb them without approval of the Engineer. Any damage caused by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense.
- C. Surface Water Protection:
1. Utilize, as necessary, erosion control methods to protect side and backslopes, minimize and the discharge of sediment to the surface water leaving the construction site as soon as rough grading is complete. These controls shall be maintained until the site is ready for final grading and landscaping or until they are no longer warranted and concurrence is received from the Engineer. Physically retard the rate and volume of runoff and runoff by:
 - a. Implementing structural practices such as diversion swales, terraces, straw bales, silt fences, berms, storm drain inlet protection, rock outlet protection, sediment traps and temporary basins.
 - b. Implementing vegetative practices such as temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffers, hydroseeding, anchored erosion control blankets, sodding, vegetated swales or a combination of these methods.
 - c. Providing Construction sites with graveled or rock access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads.

2. Discharges from the construction site shall not contain pollutants at concentrations that produce objectionable films, colors, turbidity, deposits or noxious odors in the receiving stream or waterway.
- D. Solid Waste Disposal:
1. Collect solid waste on a daily basis.
 2. Provide disposal of degradable solid waste to an approved solid waste disposal site.
 3. Provide disposal of nondegradable solid waste to an approved solid waste disposal site or in an alternate manner approved by Engineer and regulatory agencies.
 4. No building materials wastes or unused building materials shall be buried, dumped, or disposed on the site.
- E. Fuel and Chemical Handling:
1. Store and dispose chemical wastes in a manner approved by regulatory agencies.
 2. Take special measures to prevent chemicals, fuels, oils, greases, herbicides, and insecticides from entering drainage ways.
 3. Do not allow water used in onsite material processing, concrete curing, cleanup, and other waste waters to enter a drainage way(s) or stream.
 4. The Contractor shall provide containment around fueling and chemical storage areas to ensure that spills in these areas do not reach waters of the state.
- F. Control of Dust:
1. The control of dust shall mean that no construction activity shall take place without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne so that it remains visible beyond the limits of construction. Reasonable measures may include paving, frequent road cleaning, planting vegetative groundcover, application of water or application of chemical dust suppressants. The use of chemical agents such as calcium chloride must be approved by the Owner.
 2. Utilize methods and practices of construction to eliminate dust in full observance of agency regulations.
 3. The Engineer will determine the effectiveness of the dust control program and may request the Contractor to provide additional measures, at no additional cost to Owner.
- G. Burning:
1. Do not burn material on the site. If the Contractor elects to dispose waste materials by burning, make arrangements for an off-site burning area, avoid nuisance to adjacent properties, and conform to all agency regulations.
- H. Control of Noise:
1. Control noise by fitting equipment with appropriate mufflers.
- I. Completion of Work:
1. Upon completion of work, leave area in a clean, natural looking condition.
 2. Ensure all signs of temporary construction and activities incidental to construction of required permanent work are removed.
- J. Historical Protection:
1. If during the course of construction, evidence of deposits of historical or archaeological interests are found, cease work affecting find and notify Engineer. Do not disturb deposits until written notice from Engineer is given to proceed.
 2. The Contractor may request compensation for lost time or changes in construction to avoid the find based upon normal change order procedures.

END OF SECTION

SECTION 01 65 50
PRODUCT DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Scheduling of product delivery.
 - 2. Packaging of products for delivery.
 - 3. Protection of products against damage from:
 - a. Handling.
 - b. Exposure to elements or harsh environments.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1 - General Requirements.
- C. Payment:
 - 1. No payment will be made to Contractor for equipment or materials not properly stored and insured or without approved shop drawings.
 - a. Previous payments for items will be deducted from subsequent progress estimate(s) if proper storage procedures are not observed.

1.2 DELIVERY

- A. Scheduling:
 - 1. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.
- B. Packaging:
 - 1. Deliver products or equipment in manufacturer's original unbroken cartons or other containers designed and constructed to protect the contents from physical or environmental damage.
- C. Identification:
 - 1. Clearly and fully mark and identify as to manufacturer, item, and installation location.
- D. Protection and Handling:
 - 1. Provide manufacturer's instructions for storage and handling.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SECTION)

PART 3 - EXECUTION

3.1 PROTECTION, STORAGE AND HANDLING

- A. Manufacturer's Instruction:
 - 1. Protect all products or equipment in accordance with manufacturer's written directions.
 - a. Store products or equipment in location to avoid physical damage to items while in storage.
 - b. Handle products or equipment in accordance with manufacturer's recommendations and instructions.
 - 2. Protect equipment from exposure to elements and keep thoroughly dry.
 - 3. When space heaters are provided in equipment, connect and operate heaters during storage until equipment is placed in service.

4. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Repaint damaged painted surfaces to satisfaction of OWNER and ENGINEER.

3.2 FIELD QUALITY CONTROL

- A. Inspect Deliveries:
 1. Inspect all products or equipment delivered to the site prior to unloading. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on Project.
- B. Monitor Storage Area:
 1. Monitor storage area to ensure suitable temperature and moisture conditions are maintained.

END OF SECTION

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Description of procedures to be followed and related work required to accomplish an orderly transfer of Project deliverables from the Contractor to the Owner.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.

1.2 DEFINITIONS

- A. Punch List: The stated qualification accompanying either the Engineer's Certificate of Substantial Completion or the Certificate of Final Payment, or any list of construction items found to be deficient or incomplete through review of the Work by Engineer and communicated in writing to Contractor at any time during the Contract Period.
- B. Record Drawings: Drawings showing changes made during actual construction.

1.3 SUBMITTALS

- A. Substantial Completion:
 - 1. Contractor to notify Engineer that the Contractor considers the Work as a whole to be in Substantial Completion and request for a Substantial Completion inspection.
 - 2. Record Drawings.
 - 3. A list of Work not yet completed not to be considered for Substantial Completion.
- B. Final Completion:
 - 1. Contractor to notify Engineer that the Contractor considers the entire Work to have progressed to final completion and provide the following documents:
 - a. Submittals required for Substantial Completion, and;
 - b. Letter from all applicable DOTs approving work performed in DOT R/W.
 - c. Record Drawings;
 - d. "Contractor's Affidavit, Release, and Waiver of Claim."
 - e. Consent of Surety to Final Payment with Power of Attorney attached.
 - f. Sales Tax Certification.
 - g. Evidence of payments, if requested by Owner.
 - h. Final Payment Request.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SECTION)

PART 3 - EXECUTION

3.1 INSPECTION FOR FINAL ACCEPTANCE AND PAYMENT

- A. When the items of Work on the Punch List(s) have been completed, and Contractor considers the Work of the entire Project is complete, he shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in the presence of Owner's representative and are operational.

5. Work is completed and ready for final inspection.
- B. Engineer and Owner will make an inspection with the Contractor to verify the status of completion within 7 calendar days after receipt of such certification.
- C. Should Engineer consider that the Work is incomplete or defective:
 1. Engineer: Notify the Contractor in writing within 7 calendar days, listing the incomplete or defective work.
 2. Contractor: Remedy the stated deficiencies, and send a second written certification to Engineer that the Work is complete.
 3. Engineer will reinspect the Work.
- D. When Engineer finds the Work acceptable in accordance with the Contract Documents: Engineer requests Contractor to make closeout submittals.
- E. Reinspection costs incurred by the Engineer will be billed to the Owner and deducted by the Owner from the final payment to the Contractor.

3.2 FINAL APPLICATION FOR PAYMENT

- A. Complete demobilization and stabilization prior to submitting final application for payment.
- B. Submit final application for payment in accordance with procedures and requirements stated in the Conditions of the Contract.
- C. Engineer will review application and recommend final payment within 7 calendar days of receipt of application.

END OF SECTION

SECTION 01 74 13
CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Intermediate and final cleaning of Work not including special cleaning of closed systems specified elsewhere.
- B. Related Sections include but are not necessarily limited to:
 - 1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 1 - General Requirements.

1.2 STORAGE AND HANDLING

- A. Store cleaning products and cleaning wastes in containers specifically designed for those materials.

1.3 SCHEDULING

- A. Schedule cleaning operations so that dust and other contaminants disturbed by cleaning process will not fall on newly painted surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents:
 - 1. Compatible with surface being cleaned.
 - 2. New and uncontaminated.
 - 3. For Manufactured Surfaces: Material recommended by manufacturer.

PART 3 - EXECUTION

3.1 CLEANING - GENERAL

- A. Prevent accumulation of wastes that create hazardous conditions.
- B. Conduct cleaning and disposal operations to comply with laws and safety orders of governing authorities.
- C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or sewers.
- D. Dispose of degradable debris at an approved solid waste disposal site.
- E. Dispose of non-degradable debris at an approved solid waste disposal site or in an alternate manner approved by Engineer and regulatory agencies.
- F. Handle materials in a controlled manner with as few handlings as possible.
- G. On completion of work, leave area in a clean, natural looking condition. Remove all signs of temporary construction and activities incidental to construction of required permanent Work.
- H. Do not burn on-site.

3.2 EXTERIOR (SITE) CLEANING

- A. Cleaning During Construction:
 - 1. Construction debris:

- a. Confine in strategically located container(s):
 - 1) Cover to prevent blowing by wind.
 - 2) Haul from site minimum once a week.
- b. Remove from work area to container daily.
- 2. Vegetation:
 - a. Keep weeds and other vegetation trimmed to 3 IN maximum height.
- 3. Soils, sand, and gravel deposited on paved areas and walks:
 - a. Remove as required to prevent muddy or dusty conditions.
 - b. Do not flush into storm sewer system.
- B. Final Cleaning:
 - 1. Remove trash and debris containers from site:
 - a. Re-seed areas disturbed by location of trash and debris containers.
 - 2. Clean paved roadways.

3.3 FIELD QUALITY CONTROL

- A. Conduct an inspection with Engineer to verify condition of all work areas.

END OF SECTION

SECTION 31 10 00 SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Site clearing, tree protection, stripping topsoil and demolition.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 31 25 00 - Soil Erosion and Sediment Control.
 - 4. Section 32 91 13 - Topsoiling and Finished Grading.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing trees and other vegetation to remain against damage.
 - 1. Do not smother trees by stockpiling construction materials or excavated materials within drip line.
 - 2. Avoid foot or vehicular traffic or parking of vehicles within drip line.
 - 3. Provide temporary protection as required.
- B. Repair or replace trees and vegetation damaged by construction operations.
 - 1. Repair to be performed by a qualified tree surgeon/licensed arborist.
 - 2. Remove trees which cannot be repaired and restored to full-growth status.
 - 3. Replace with new trees of minimum 4 IN caliper or as required by local tree ordinance.
- C. Owner will obtain authority for removal and alteration work on adjoining property, as applicable.

3.2 SITE CLEARING

- A. Topsoil Removal:
 - 1. Strip topsoil to depths encountered or as specified within the soils report, 4 IN minimum.
 - a. Remove heavy growths of grass before stripping.
 - b. Stop topsoil stripping sufficient distance from such trees to prevent damage to main root system.
 - c. Separate from underlying subsoil or objectionable material.
 - 2. Stockpile topsoil where directed by Engineer and/or as shown on the plans.
 - a. Construct storage piles to freely drain surface water.
 - b. Seed or cover storage piles to prevent erosion.
 - c. Silt fence to be placed around perimeter of stockpile(s).
 - 3. Do not strip topsoil in wooded areas where no change in grade occurs.
 - 4. Borrow topsoil: Reasonably free of subsoil, objects over 2 IN DIA, weeds and roots.
- B. Clearing and Grubbing:
 - 1. Clear from within limits of construction all trees not marked to remain.
 - a. Include shrubs, brush, downed timber, rotten wood, heavy growth of grass and weeds, vines, rubbish, structures and debris.
 - 2. Grub (remove) from within limits of construction all stumps, roots, root mats, logs and debris encountered.

3. Mulching is not allowed.
- C. Disposal of Waste Materials:
1. Do not burn combustible materials on site.
 2. Remove all waste materials from site.
 3. Do not bury organic matter on site.

END OF SECTION

SECTION 31 23 19
DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Dewatering system.
 - 2. Surface water control system.
 - 3. Monitoring wells.
 - 4. System operation and maintenance.
 - 5. Water disposal.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 31 25 00 - Soil Erosion and Sediment Control.

1.2 QUALITY ASSURANCE

1.3 DEFINITIONS

- A. Dewatering:
 - 1. Lowering of groundwater table and intercepting horizontal water seepage to prevent groundwater from entering excavations, trenches and shafts.
 - 2. Disposing of removed water.
- B. Surface Water Control:
 - 1. Removal of surface water within open excavations.
- C. Foundations:
 - 1. Footings, base slabs, foundation walls, mat foundations, grade beams, piers and any other support placed directly on soil or rock.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Dewatering plan design data and Drawings including the following:
 - a. Proposed type of dewatering system with complete description of equipment and instrumentation to be used.
 - b. Arrangement, locations, and depths of system components.
 - c. Pipe sizes and capacities.
 - d. Filter types and sizes.
 - e. Water disposal method and location.
 - f. Surface water control devices.
 - g. System operation, monitoring, and maintenance procedures.
 - h. Method of monitoring water quality.
 - i. Signed and sealed by professional engineer.
 - 3. Product technical data including:
 - a. Dewatering pump data including the following:
 - 1) Size, capacity, and means of operation of engine and motor.
 - b. Pumping equipment for control of surface water within excavation.
- B. Site Information:
 - 1. Data in subsurface investigation reports was used for the basis of the design.

- a. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings.
- b. The Owner or Engineer will not be responsible for interpretations or conclusions drawn from this data by Contractor.
2. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
3. Site data provided is not contractual and shall be considered "for information only".

PART 2 - PRODUCTS

2.1 DEWATERING EQUIPMENT

- A. Select dewatering equipment to meet specified performance requirements.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Erosion Control:
 1. See Specification Section 31 25 00.
 2. Clean paved roadways daily of any spillage of dirt, rocks or debris from vehicles and equipment entering or leaving site.
 3. Conduct work to minimize erosion of site. Remove eroded material washed off site.
 - a. If necessary or requested by Engineer, construct stilling areas to settle and detain eroded material.
- B. Protect existing surface and subsurface features on-site and adjacent to site as follows:
 1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
 2. Protect and maintain benchmarks, monuments or other established reference points and property corners.
 - a. If disturbed or destroyed, replace at own expense to full satisfaction of Owner and controlling agency.
 3. Verify location of utilities.
 - a. Omission or inclusion of utility items does not constitute nonexistence or definite location.
 - b. Obtain and examine local utility records for location data.
 - c. Take necessary precautions to protect existing utilities from damage due to any construction activity.
 - 1) If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
 - 2) Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.
 - 3) Obtain Owner's approval prior to disconnecting any utility service.
 - d. Repair damages to utility items at own expense.
 - e. In case of damage, notify Engineer at once so required protective measures may be taken.
 4. Maintain free of damage, existing sidewalks, structures, and pavement, not indicated to be removed.
 - a. Protect new and existing structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - b. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.
 - c. All repairs to be made and paid for by Contractor.

5. Provide full access to public and private premises, fire hydrants, street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.

3.2 DEWATERING

- A. Based on the depth of the proposed sewer and the water level in the adjacent river, groundwater will likely be above the trench bottom.
- B. Where groundwater is or is expected to be encountered during excavation, install a dewatering system to prevent softening and disturbance of subgrade below foundations and fill material, to allow foundations and fill material to be placed in the dry, and to maintain a stable excavation side slope.
 1. Employ dewatering specialist for selecting and operating dewatering system.
 2. Groundwater shall be maintained at least 3 FT below the bottom of any excavation.
 3. Install groundwater monitoring wells as necessary.
 4. Keep dewatering system in operation until dead load of structure exceeds possible buoyant uplift force on structure.
- C. Furnish, install, construct, maintain and remove all required filtering basins, bags, etc. as required to properly filter sediment laden dewatering effluent before discharging to areas beyond construction site to meet all permit requirements.
- D. Dispose of groundwater to an area which will not interfere with construction operations or damage existing construction.
 1. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.
 2. Discharge water into filter bags.

3.3 SURFACE WATER CONTROL SYSTEMS

- A. Provide ditches, berms, and other devices to divert and drain surface water from excavation area as specified in Specification Section 31 25 00.
- B. Divert surface water and seepage water within excavation areas into sumps and pump water into filter bags in accordance with requirements of the agencies having jurisdiction.
- C. Control and remove unanticipated water seepage into excavation.

END OF SECTION

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SECTION 31 23 33
TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Excavation, trenching, backfilling and compacting for all underground utilities.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. ASTM International (ASTM):
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - c. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
 - d. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - e. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Owner may hire an independent soils laboratory to conduct in-place moisture-density tests for backfilling to assure that all work complies with this Specification Section.

1.3 SUBMITTALS

- A. Shop Drawings:
1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 2. Submit respective pipe or conduit manufacturer's data regarding bedding methods of installation and general recommendations.
- B. Informational Submittals:
1. Trench shield (trench box) certification if employed:
 - a. Specific to Project conditions.
 - b. Re-certified if members become distressed.
 - c. Certification by registered professional structural engineer, registered in the state where the Project is located.
 - d. Engineer is not responsible to, and will not, review and approve.
 2. Blasting Plan and all related inspections and test results

1.4 SITE CONDITIONS

- A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.
- B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by Owner to prevent serious interruption of travel.
- C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of Owner and controlling agency.
- D. Verify location of existing underground utilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Material:

1. Zone 1:
 - a. ASTM C33, No. 67 stone, defined below:

SIEVE SIZE	1 IN	3/4 IN	3/8 IN	No. 4	No. 20
Percent Passing by Weight	100	90-100	20-55	0-10	0

2. Zone 2:
 - a. Suitable Soil, where gravel or other materials are not required.
 - b. Free of rock, cobbles, roots, sod or other organic matter, and frozen material.
 - c. Maximum partial size: 1-IN
 - d. Moisture content at time of placement: 3 percent plus/minus of optimum moisture content as specified in accordance with ASTM D698.
 - e. Low volume change cohesive soil:
 - 1) ASTM D2487 classification: CL-ML or CL
 - 2) Liquid Limit: Less than 45
 - 3) Maximum plasticity index: 30
 - f. Granular Soil:
 - 1) ASTM D2487 classification: GW, GP, GM, GC, SW, SP, SM, or SC
3. Zone 3:
 - a. In grassed areas: 4-inches of topsoil.
 - b. In paved areas: Asphalt or concrete per project requirements.

B. Subgrade Stabilization Stone:

1. ASTM C33, No. 67 stone.

C. Bedding Materials:

1. ASTM C33, No. 67 stone.

D. Flowable fill:

1. Description: Flowable fill shall be a mixture of cement, fly ash, fine sand, water, and air having a consistency which will flow under a very low head.
2. Material characteristics:
 - a. The approximate quantities of each component per cubic yard of mixed material shall be as follows:
 - 1) Cement (Type I or II): 50 LBS.
 - 2) Fly ash: 200 LBS.
 - 3) Fine sand: 2,700 LBS.
 - 4) Water: 420 LBS.
 - 5) Air content: 10 percent.
 - b. Actual quantities shall be adjusted to provide a yield of 1 cubic yard with the materials used.
 - c. Approximate compressive strength should be 85 to 175 psi.
 - d. Fine sand shall be an evenly graded material having not less than 95 percent passing the No. 4 sieve and not more than 5 percent passing the No. 200 sieve.

E. Geotextile Filter Fabric:

1. Nonwoven type.
2. Equivalent opening size: 50-100 (U.S. Standard Sieve).
3. Permeability coefficient (cm/second): 0.07 minimum, 0.30 maximum.
4. Grab strength: 120 LBS minimum in either direction in accordance with ASTM D4632 requirements.
5. Mullen burst strength: 125 psi minimum in accordance with ASTM D3786 requirements.

PART 3 - EXECUTION

3.1 GENERAL

- A. Remove and dispose of unsuitable materials as directed by Geotechnical Engineer to site provided by Contractor.

3.2 EXCAVATION

- A. Remove rock, clay, silt, gravel, hard pan, loose shale, loose stone and all other material as required to excavate the trench. All excavation is unclassified. No additional payment will be made for removal of rock or any other material encountered during the excavation work.
- B. Groundwater Dewatering:
 - 1. Where groundwater is, or is expected to be, encountered during excavation, install a dewatering system to prevent softening and disturbance of subgrade to allow undercutting (if needed), subgrade stabilization, pipe, bedding and backfill material to be placed in the dry, and to maintain a stable trench wall or side slope.
 - 2. Groundwater shall be drawn down and maintained at least 3 FT below the bottom of any trench or manhole excavation prior to excavation.
 - 3. Review soils investigation report before beginning excavation and determine where groundwater is likely to be encountered during excavation.
 - a. Employ dewatering specialist for selecting and operating dewatering system.
 - 4. Keep dewatering system in operation until dead load of pipe, structure and backfill exceeds possible buoyant uplift force on pipe or structure.
 - 5. Dispose of groundwater to an area which will not interfere with construction operations or damage existing construction.
 - 6. Install groundwater monitoring wells as necessary.
 - 7. Shut off dewatering system at such a rate to prevent a quick upsurge of water that might weaken the subgrade.
 - 8. Cost of groundwater dewatering shall be included in the price of the pipe and structures.
- C. Trench Excavation:
 - 1. Excavate trenches by open cut method to depth shown on Drawings and necessary to accommodate work.
 - a. Support existing utility lines and yard piping where proposed work crosses at a lower elevation.
 - 1) Stabilize excavation to prevent undermining of existing utility and yard piping.
 - 2. Open Trenches:
 - a. No more than 100 LF at any one time.
 - 3. Any trench or portion of trench, which is opened and remains idle for seven (7) calendar days, or longer, as determined by the Owner, may be directed to be immediately refilled, without completion of work, at no additional cost to Owner.
 - a. Said trench may not be reopened until Owner is satisfied that work associated with trench will be prosecuted with dispatch.
 - 4. Observe following trenching criteria:
 - a. Trench size:
 - 1) Excavate width to accommodate free working space.
 - 2) Trench width at top of pipe or conduit shall per the drawing details.
 - 3) Cut trench walls vertically from bottom of trench to 1 FT above top of pipe, conduit, or utility service.
 - 4) Keep trenches free of surface water runoff.
 - a) Include cost in Bid.
 - b) No separate payment for surface water runoff pumping will be made.
- D. Flowable Fill:
 - 1. Flowable fill shall be:
 - a. Discharged from a mixer by any means acceptable to the Engineer into the area to be filled.

- b. Placed in 4 FT maximum lifts to the elevations indicated.
 - 1) Allow 12 HR set-up time before placing next lift or as approved by the Engineer.
 - 2) Contractor shall place flowable fill lifts in such a manner as to prevent flotation of the pipe.
- 2. Flowable fill shall not be placed on frozen ground.
- 3. Subgrade on which flowable fill is placed shall be free of disturbed or softened material and water.
- 4. Flowable fill batching, mixing, and placing may be started if weather conditions are favorable, and the air temperature is 34 DegF and rising.
- 5. At the time of placement, flowable fill must have a temperature of at least 40 DegF.
- 6. Mixing and placing shall stop when the air temperature is 38 DegF or less and falling.
- 7. Each filling stage shall be as continuous an operation as is practicable.
- 8. Contractor shall prevent traffic contact with flowable fill for at least 24 HRS after placement or until flowable fill is hard enough to prevent rutting by construction equipment.
- 9. Flowable fill shall not be placed until water has been controlled or groundwater level has been lowered in conformance with the requirements of the preceding Groundwater Dewatering paragraph in PART 3 of this Specification Section.

3.3 PREPARATION OF FOUNDATION FOR PIPE LAYING

- A. Rock Excavation:
 - 1. Excavate minimum of 6 IN below bottom exterior surface of the pipe or conduit.
 - 2. Backfill to grade with suitable earth or granular material per the trench detail.
 - 3. Form bell holes in trench bottom.
- B. Subgrade Stabilization:
 - 1. Stabilize the subgrade when directed by the Owner.
 - 2. Observe the following requirements when unstable trench bottom materials are encountered.
 - a. Notify Owner when unstable materials are encountered.
 - 1) Define by drawing station locations and limits.
 - b. Remove unstable trench bottom caused by Contractor failure to dewater, rainfall, or Contractor operations.
 - 1) Replace with subgrade stabilization with no additional compensation.
- C. Construct a continuous and uniform bedding prior to pipe installation.

3.4 USE OF EXPLOSIVES

- A. Description.
 - 1. This section applies to all types of blasting including production, controlled, cushion, trim, trench, and secondary blasting. Provide blasting plans, pre-blast construction surveys, blast monitoring, and post-blast reports or surveys.
 - 2. The Contractor shall obtain and pay for all necessary permits and furnish copies to the Engineer before explosives are transported to the site.
 - 3. Blasting shall be done only by skilled operators under the direction of a licensed foreman. Submit proof of all licenses and training certifications.
 - 4. The Contractor shall identify all property, structures, and persons which may be affected by blasting and shall take all safety precautions and protective measures to prevent damage or injury to same. All personal injury or damage to persons or property of any nature, whether in the project limits or appurtenant to it, shall be the responsibility of the Contractor.
 - 5. Comply with all the latest applicable Federal, State and local codes, laws and regulations, as well as professional society standards for the storage, transportation and use of explosives.
 - 6. The Contractor agrees by submission of a bid to indemnify and hold the Owner and Engineer, its officers, agents, employees, and the Engineer harmless from any and all liability claims, costs, and expenses including expenses of investigation and defending against same in regard thereto.
 - 7. Comply with requirements and restrictions for use around existing easements and rights-of-way. Obtain all required approvals.

8. Blasting shall only be permitted between 9:00 AM and 4:00 PM, Monday through Friday, unless otherwise approved by the Engineer and regulatory agencies having jurisdiction. Blasting will not be permitted on legal holidays.

B. Pre-Blasting

1. Submit the proposed blasting plan signed by the Blaster-in-Charge for all blasting for acceptance. Acceptance of this plan does not relieve the Contractor of responsibility and liability for blasting in accordance with the specifications. A blasting plan shall be prepared and submitted prior to any work or explosives being transported to the site. At minimum the plan shall detail the work methods, materials, drill patterns, equipment to be used for blasting and monitoring, monitoring locations, location and results of pre-blast surveys.
2. Pre-blast survey inspections of all structures within 300-feet (minimum) of the blast site shall be made more than 2 weeks prior to commencement of blasting. A qualified independent inspector shall perform the inspections for the purpose of detecting and documenting any visible or reasonable recognizable pre-existing defects or damages in structures. The cost of Pre-Blast Survey and independent inspector is the responsibility of the Contractor.
3. Waiver of inspections shall be in writing, signed by structure owners or persons with control or custody of the structures.
4. Complete inspection reports listing findings with photographs or waivers shall be signed by the inspector. One copy of inspection reports and waivers shall be submitted to the Engineer before blasting commences.
5. The Contractor shall give at least 5-day notices to all residence and businesses, and utility owners which may be affected by blasting.

C. Blasting

1. Blast Monitoring
 - a. The Contractor shall monitor blasts using seismographs capable of measuring air overpressure and vibration in the vertical, longitudinal and transverse directions. At a minimum, monitor vibration and air-overpressure at the closest utility or structure to each blast and the closest utility or structure in the direction of each blast in accordance with the accepted blasting plan. Within 48 hours of each day of blasting submit a post-blasting report to include the following for each blast monitoring location:
 - 1) Type, identification and specific location of seismograph.
 - 2) Distance and direction from blast.
 - 3) PPV in each direction and peak vector sum.
 - 4) Maximum air overpressure level.
2. Vibration and Air Overpressure Limits
 - a. Define "peak particle velocity" (PPV) as the maximum ground vibration velocity measured in any direction. Design blasts so the PPV at any utility or structure does not exceed the "Alternative Blasting Level Criteria" from Appendix B of the U.S. Bureau of Mines Report of Investigations 8507. Design blasts so the maximum air-overpressure at any structure does not exceed 133 dB (linear).
 - b. If the PPV or air overpressure limits are exceeded at any utility or structure in any direction from blasts, the Engineer may suspend blasting until the post-blast report is reviewed and a new or revised blasting plan is accepted.
3. Fly rock from blasting shall be contained within the project site and shall not represent a hazard to persons, vehicles, existing improvements, or vegetation.
4. The blasting site shall be cleaned of all debris at the end of each day.
5. No blasting shall be done within 100-feet of concrete which has been placed in less than 7 days, except by permission of the Engineer.

D. Post-Blasting Surveys

1. The independent inspector shall investigate each complaint of property damage and a written report shall be furnished to the Engineer within 30 days of receipt of the complaint. A qualified independent inspector shall perform the re-inspections for the purpose of detecting and documenting any visible or reasonable recognizable pre-existing defects or

damages in structures. The cost of Post-Blast Survey and independent inspector is the responsibility of the Contractor.

3.5 BACKFILLING METHODS

- A. Do not backfill until tests to be performed on system show system is in full compliance with specified requirements.
- B. Compacted Backfill:
 - 1. Furnish as indicated on the Drawings.
 - 2. Comply with the following:
 - a. Place backfill in lifts thicknesses capable of being compacted to densities specified.
 - b. Observe pipe manufacturer's recommendations regarding backfilling and compaction.
 - c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.
- C. Water flushing for consolidation is not permitted.

3.6 COMPACTION

- A. General:
 - 1. Place and assure bedding, backfill, and fill materials achieve an equal or higher degree of compaction than undisturbed materials adjacent to the work.
 - 2. In no case shall degree of compaction below minimum compactions specified be accepted.
- B. Compaction Requirements:
 - 1. Unless noted otherwise on Drawings or more stringently by other Specification Sections, comply with following minimum trench compaction criteria.
 - a. Zone 1:
 - 1) Material: No. 67 stone.
 - 2) Maximum of 12-inch lifts and tamped or vibrated prior to placement of the next lift.
 - 3) Compaction Density: 70 percent (minimum) relative density per ASTM D4253.
 - b. Zone 2:
 - 1) Material: Suitable soils.
 - 2) Compaction Density: 95 percent of maximum dry density by ASTM D698 at a moisture content within ± 3 percent of the optimum moisture content, below asphalt paved areas; and 90 percent of maximum dry density by ASTM 698 at a moisture content within ± 3 percent of the optimum moisture content, below non-paved areas.

3.7 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Owner may hire testing firm to perform in-place moisture-density tests.
 - 2. Costs of "Passing" tests paid by Owner.
 - 3. Cost associated with "Failing" tests shall be paid by Contractor.
 - 4. Assure Owner has immediate access for testing of all soils related work.
 - 5. Ensure excavations are safe, per OSHA requirements, for testing personnel.

END OF SECTION

SECTION 31 25 00
SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Soil erosion and sediment control.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. See Drawing details and notes.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to General Stripping Topsoil and Excavating:
 - 1. Install perimeter dikes and swales.
 - 2. Excavate and shape sediment basins and traps.
 - 3. Construct pipe spillways and install stone filter where required.
 - 4. Machine compact all berms, dikes and embankments for basins and traps.
 - 5. Install straw bales where indicated.
 - a. Provide two stakes per bale.
 - b. First stake angled toward previously installed bale to keep ends tight against each other.
- B. Construct sediment traps where indicated on Drawings during rough grading as grading progresses.
- C. Temporarily seed basin slopes and topsoil stockpiles.

3.2 DURING CONSTRUCTION PERIOD

- A. Maintain Basins, Dikes, Traps, Stone Filters, Straw Bales, etc.:
 - 1. Inspect regularly especially after rainstorms.
 - 2. Repair or replace damaged or missing items.
- B. After rough grading, sow temporary grass cover over all exposed earth areas not draining into sediment basin or trap.
- C. Construct inlets as soon as possible.
- D. Provide necessary swales and dikes to direct all water towards and into sediment basins and traps.
- E. Do not disturb existing vegetation (grass and trees).
- F. Excavate sediment out of basins and traps when capacity has been reduced by 50 PCT.
- G. Topsoil and Fine Grade Slopes and Swales, etc.: Seed and mulch as soon as areas become ready.

3.3 NEAR COMPLETION OF CONSTRUCTION

- A. Eliminate basins, dikes, traps, etc.
- B. Grade to finished or existing grades.
- C. Fine grade all remaining earth areas, then seed and mulch.

END OF SECTION

SECTION 31 50 00
EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Requirements for excavation support systems such as sheeting, shoring, and bracing of trenches, and open excavations greater than 4 feet in depth.
- B. Related Sections include but not necessarily limited to:
 - 1. Division 00 – Bidding Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 – General Requirements.
 - 3. Division 02 – Site Work.

1.2 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. It is a part of this section as specified and modified. In case of conflict between the requirements of this section and that of the listed documents, the requirements of this section shall prevail:
 - 1. Reference: Title.
 - 2. ASTM A36, Structural Steel.
 - 3. ASTM A328, Steel Sheet Piling.
 - 4. ASTM A572, Structural Steel.
 - 5. AWS D1.1, Structural Welding Code.
 - 6. OSHA, Occupational Safety and Health Act.
 - 7. IBC, International Building Code, with all State amendments.
- B. Support of excavation shall be designed, and shop drawings and calculations signed and stamped, by a Structural Engineer, licensed to practice in the State of North Carolina and experienced in the design of excavation support systems.
- C. The excavation support system shall be installed by a qualified contractor with at least 5 years' experience installing similar systems.

1.3 SYSTEM DESCRIPTION

- A. Where excavation support systems are necessary, they shall be furnished, placed, maintained and, except as shown or specified otherwise, removed by the Contractor. The Contractor shall be responsible for the design and selection of excavation support systems to construct the facilities shown on the Drawings and in conformance with OSHA and the design criteria as specified herein.
- B. Contractor shall be responsible for securing an independent geotechnical analysis for use in designing excavation support system.

1.4 SUBMITTALS

- A. Section 01 33 00: Shop Drawings, Product Data & Samples; Operation & Maintenance Manuals; and Miscellaneous Submittals.
- B. Prior to commencing excavation work, the Contractor shall submit its plans for excavation support systems to the Engineer for review. No excavations shall be started until the submittal review of the excavation support system is complete. Said review by the Engineer of the Contractor's design shall not be construed as a detailed analysis for adequacy of the support system, nor shall any provision of the above requirements be construed as relieving the Contractor of its overall responsibility and liability for the work. Information to be provided shall be made in accordance with these Contract Documents and shall include the following:

1. Design calculations and method of installation and removal of all sheeting, sheet piling, soldier piles, shoring and bracing. Calculation shall be made by North Carolina Licensed Engineer and shall comply with applicable requirements of the IBC and OSHA with respect to excavation and construction.
- C. The following shall be submitted in compliance with Section 01 33 00.
1. The proposed excavation support system for each construction component where excavation support systems will be used.
 2. Arrangement, size, and details for each excavation support system, supporting design calculations, and construction methods to be used for the installation of each system.
 3. Pile installation methods, sequence connection details, bracing preloading.
 4. Depths below the main excavation bottom elevation to which the support system will be installed.
 5. Elevations of ground surface, struts, and shores, as applicable.
 6. Permissible depth to which excavation may be carried before supports must be installed and preloaded.
 7. Full excavation depth load to be carried by various excavation support system members.
 8. Preloads as required.
 9. Proposed sequence of strut and shore removal as applicable and as related to backfilling operations.
 10. Dewatering.
 11. Predrilling, if required.
 12. Identification of areas where the excavation will be sloped.
 - a. Indicate the % slope for the excavation.
 - b. Detail means and methods to control groundwater seepage of the various soil interfaces.
 - c. Means and methods to protect the slope from erosion until the pipeline or structure is backfilled.
 13. Identification of means of ingress/egress to the excavated area to allow placement of forms, pouring concrete, setting equipment, etc. Indicate how this access may be changed during the course of completing the vertical construction.
- D. The above information shall be coordinated with other submittals for work specified elsewhere in which support of excavation is required.
- E. Contingency plan for alternative procedures to be implemented if the excavation support system is found to perform unfavorably or if obstructions are encountered.

1.5 DESIGN CRITERIA

- A. Shop drawings with supporting calculations for the various excavation support systems shall be prepared in accordance with the following criteria:
1. Design the excavation support system and all components to support the earth pressures, unrelieved hydrostatic pressures, utility loads, equipment, traffic, and construction loads including impact, and other surcharge loads in such manner as will allow the safe and expeditious construction of the permanent structures to minimize ground movement or settlement, and to prevent damage to or movement of adjacent structures, access drives, and utilities. Design for loads appropriate for conditions presented in the geotechnical reports.
 2. Design support members to resist the maximum loads expected to occur during the excavation and support removal stages.
 3. In running sand and silt, provide dewatering and positive means for securing timber lagging to the soldier piles to prevent shifting or falling off of the lagging, and positive means for preventing sloughing and containing material behind lagging.
 4. No portion of the excavation support system's vertical face will be permitted to penetrate the design lines as indicated on the Drawings for the permanent structures or pipeline to be constructed within the excavation.
 5. Vertical support capacity shall be provided for wall systems and internal bracing elements, for loads due to vertical force components of tieback anchors, the weight of the structural system themselves, and live load on any portion of the system.

1.6 PROJECT CONDITIONS

- A. Provisions shall be made for contingencies as follows:
 - 1. Provide contingency plan for alternative procedures to be implemented if unfavorable performance is evidenced.
 - 2. Keep on hand materials and equipment necessary to implement contingency plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel sheet piling shall be of appropriate weight and length.
- B. Fabricated connections, walers, and accessories, steel H-piles, WF shapes, and other structural steel shall conform to the requirements of ASTM A36 or ASTM A572 as noted.
- C. Wood Lagging: Untreated hardwood of sufficient thickness as required by design.
- D. Pile Driving Hammer: Vibratory and/or impact type hammer of sufficient size for installations capable of consistently delivering driving energy to the pile.

PART 3 - EXECUTION

3.1 GENERAL

- A. The construction excavation support systems such as sheeting, shoring, soldier piles and bracing shall not disturb the state of soil adjacent to the trench or excavation and below the excavation bottom. Sheeting, shoring, soldier piles and bracing shall be removed after placement and compaction of initial backfill, except as noted otherwise.
- B. Damage to existing utilities during installation of excavation support system shall be avoided. If damage occurs it shall be repaired at no cost to the Owner, and to the satisfaction of the utility owner.
- C. Water control measures shall be provided.
- D. Shoring shall extend below the planned bottom of excavation or measures shall be implemented to provide support and retention of the excavation below the shoring.

3.2 SOLDIER PILES

- A. Soldier piles shall be installed by necessary methods to tip elevation shown on approved shop drawings.
- B. Prebored holes shall be filled with a low strength grout mix designed by the Contractor.

3.3 SHEETING AND WOOD LAGGING

- A. Sheeting and wood lagging shall be installed in such a manner as to minimize the gap between the boards, unless specifically approved. As installation progresses, the voids between the excavation face and the lagging or sheeting shall be backfilled with sand or geotextile and sand rammed into place. Materials such as geotextile shall be used where necessary to allow drainage of groundwater without loss of soil or packing material.
- B. If unstable material is encountered, suitable measures shall be taken to retain it in place or to otherwise prevent soil displacement.
- C. Extend lagging down to final subgrade.
- D. A sufficient quantity of material shall be on hand for sheeting, shoring, bracing, and other operations for protection of work and for use in case of emergency.

3.4 STEEL SHEET PILING

- A. Steel sheet piling shall not impact adjacent utilities, and structures. Installation methods shall be adapted to existing subsurface conditions and for installation of sheet piling to the full depth of penetration required, and to proper alignment and plumbness, specified herein, without damage to the sheet piling or rupture of its interlocks.
- B. Steel sheet piling shall be installed in plumb position with each pile interlocked with adjoining piles for its entire length so as to form a continuous diaphragm throughout the length of each run of wall, bearing tightly against original ground. Install sheeting to depth required for design. Exercise care during installation so that interlocking members can be extracted without injury to adjacent ground. The installation equipment shall be suitable to the type and nature of the subsurface materials anticipated to be encountered.

3.5 OBSTRUCTIONS DURING DRIVING

- A. If driving obstructions are encountered, special provisions approved by the Engineer should be taken to prevent pile damage and achieve the Contractors design tip elevations. Obstructions may consist of a sudden increase in penetration resistance and lateral deviation in the horizontal position of the sheet pile resulting from hitting an obstruction such as a boulder.
- B. The Engineer shall be the sole judge as to whether an obstruction is encountered and will confer with the Contractor to select remedial course of action.

3.6 INTERNAL BRACING SUPPORT SYSTEM

- A. All bracing support members shall be installed and maintained in tight continuous contact with each other and with the surface being supported.
- B. Bracing members shall be preloaded as necessary in accordance with the design.
- C. Struts shall be provided with intermediate bracing as needed to enable them to carry their maximum design load without distortion or buckling. Provide diagonal bracing as necessary to maintain the stability of the system. Web stiffeners, plates, or angles shall be provided as needed to prevent rotation, crippling, or buckling of connectors at points of bearing between structural steel members. Allow for eccentricities resulting from field fabrication and assembly.

3.7 INSTRUMENTATION AND MONITORING

- A. Shoring Wall Monitoring:
 - 1. The Contractor shall establish horizontal control survey points (movement measurement points) on the tops of soldier piles or sheet piles at a spacing not greater than 20 feet horizontal spacing on all sides of the excavation shoring system.
 - 2. Perform at least two initial baseline surveys on different days of horizontal position of the shoring to an accuracy of 0.01 foot.
 - 3. On a weekly basis until backfilling is complete perform survey measurements and submit to the Engineer/Owner.

3.8 REMOVAL OF SUPPORT SYSTEMS

- A. Where removal is required wholly or in part, such removal shall be performed in a manner that will not disturb or damage adjacent new or existing construction or utilities. Fill all voids immediately with materials and procedures approved by the Engineer.
- B. Support systems for excavations that will have structures or pipes installed in future work shall remain in place.
- C. All damage to property resulting from removal shall be promptly repaired at no cost to the Owner. The Engineer shall be the sole judge as to the extent and determination of the materials and methods for repair.

END OF SECTION

SECTION 32 12 16
ASPHALTIC CONCRETE VEHICULAR PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphaltic concrete vehicular paving.
 - 2. Line painting.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. Federal Specifications (FS):
 - a. TT-P-1952F, Paint, Traffic and Airfield Marking, Waterborne.
 - 2. Construction standards: State of North Carolina, Department of Transportation, Standard Specifications for Roads and Structures, January 2018, as amended to date.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Asphalt design mix.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Asphaltic Concrete: Per NCDOT Standard Specifications.
- B. Line Paint:
 - 1. Per NCDOT Standard Specifications
 - 2. Match existing color and type

2.2 MIXES

- A. Comply with NCDOT Standard Specifications for Roads and Structures, Division 6 - Asphalt Pavements. Provide submittal of asphalt mix for Engineer's review.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Construct to line, grade and section as shown on Drawings and in accordance with referenced State Specifications.
- B. Install compacted layer of aggregate base course in accordance with Division 5 of the referenced State Specifications.
 - 1. See Drawings for required thickness.
- C. Tolerance of Finished Grade: +0.10 FT from required elevations.

3.2 LINE PAINTING:

- A. Thoroughly clean surfaces which are to receive paint.
- B. Dry completely before paint is applied.
- C. Do not paint until minimum of five days has elapsed from time surface is completed.
 - 1. A longer period may be required if directed by Engineer.
- D. Do not apply paint over wet surfaces, during wet or damp weather, or when temperature is below 40 DEGF.
- E. Lay out markings and striping in accordance with Drawings.
 - 1. Width of painted lines: 4 IN.

END OF SECTION

SECTION 32 91 13
TOPSOILING AND FINISHED GRADING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Topsoiling and finished grading.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 31 10 00 - Site Clearing.
 - 4. Section 31 25 00 - Soil Erosion and Sediment Control.
 - 5. Section 32 92 00 - Seeding, Sodding and Landscaping.
- C. Location of Work: All areas within limits of grading and all areas outside limits of grading which are disturbed in the course of the work.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Project Data: Test reports for furnished topsoil.

1.3 SITE CONDITIONS

- A. Verify amount of topsoil stockpiled and determine amount of additional topsoil, if necessary to complete work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. Original surface soil typical of the area.
 - 2. Existing topsoil stockpiled under Specification Section 31 10 00.
 - 3. Friable, loamy soil capable of supporting native plant growth.

2.2 TOLERANCES

- A. Finish Grading Tolerance: ± 0.1 FT from required elevations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Correct, adjust and/or repair rough graded areas.
 - 1. Cut off mounds and ridges.
 - 2. Fill gullies and depressions.
 - 3. Perform other necessary repairs.
 - 4. Bring all sub-grades to specified contours, even and properly compacted.
- B. Loosen surface to depth of 2 IN, minimum.
- C. Remove all stones and debris over 2 IN in any dimension.

3.2 ROUGH GRADE REVIEW

- A. Reviewed by Engineer in Specification Section 31 10 00.

3.3 PLACING TOPSOIL

- A. Do not place when subgrade is wet or frozen enough to cause clodding.
- B. Spread and lightly compact to a depth of 4 IN for all disturbed earth areas.
- C. If topsoil stockpiled is less than amount required for work, furnish additional topsoil at no cost to Owner.
- D. Provide finished surface free of stones, sticks, or other material 3/8 IN or more in any dimension.
- E. Provide finished surface smooth and true to required grades.
- F. Restore stockpile area to condition of rest of finished work.

3.4 ACCEPTANCE

- A. Upon completion of topsoiling, obtain Engineer's acceptance of grade and surface.
- B. Make test holes where directed to verify proper placement and thickness of topsoil.

END OF SECTION

SECTION 32 92 00
SEEDING, SODDING AND LANDSCAPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Seeding, sodding and landscape planting:
 - a. Soil preparation.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 32 91 13 - Topsoiling and Finished Grading.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Nursery and Landscape Association/American National Standards Institute (ANLA/ANSI):
 - a. Z60.1, American Standard for Nursery Stock.
 - 2. AOAC International (AOAC).
 - 3. ASTM International (ASTM):
 - a. D2028, Standard Specification for Cutback Asphalt (Rapid-Curing Type).
 - b. D5276, Standard Test Method for Drop Test of Loaded Containers by Free Fall.
- B. Quality Control:
 - 1. Fertilizer:
 - a. If Engineer determines fertilizer requires sampling and testing to verify quality, testing will be done at Contractor's expense, in accordance with current methods of the AOAC.
 - b. Upon completion of Project, a final check of total quantities of fertilizer used will be made against total area seeded.
 - c. If minimum rates of application have not been met, Contractor will be required to distribute additional quantities to make up minimum application specified.

1.3 SEQUENCING AND SCHEDULING

- A. Installation Schedule:
 - 1. Provide schedule showing when trees, shrubs, groundcovers and other plant materials are anticipated to be planted.
 - 2. Show schedule of when lawn type and other grass areas are anticipated to be planted.
 - 3. Indicate planting schedules in relation to schedule for irrigation system installation, finish grading and topsoiling.
 - 4. Indicate anticipated dates Engineer will be required to review installation for initial acceptance and final acceptance.
- B. Pre-installation Meeting:
 - 1. Meet with Engineer and other parties as necessary to discuss schedule and methods, unless otherwise indicated by Engineer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND SUPPLIERS

- A. Subject to compliance with the Contract Documents, the manufacturers and suppliers listed in the applicable Articles below are acceptable.

- B. Submit request for substitution in accordance with Specification Section 01 25 13.

2.2 MATERIALS

- A. Seed Quality:
 - 1. Fresh, clean, new-crop seed labeled in accordance with USDA Rules and Regulations under the Federal Seed Act in effect on date of bidding.
 - 2. Provide seed of species, proportions, and minimum percentages of purity, germination and maximum percentage of weed seed as specified.
- B. Seed Mixture:
 - 1. Per Drawings.
- C. Mulch:
 - 1. For seeded areas:
 - a. Clean, seed-free, threshed straw of oats, wheat, barley, rye, beans, peanuts, or other locally available mulch material which does not contain an excessive quantity of matured seeds of noxious weeds or other species that will grow or be detrimental to seeding, or provide a menace to surrounding land.
 - b. Do not use material which is fresh or excessively brittle, or which is decomposed and will smother or retard growth of grass.
- D. Fertilizer:
 - 1. Commercial fertilizer meeting applicable requirements of State and Federal law.
 - 2. Cyanic compound or hydrated lime not permitted in mixed fertilizers.
 - 3. For lawn-type seeding and sod: 5-10-5 analysis.
- E. Water:
 - 1. Water free from substances harmful to grass or sod growth.
 - 2. Provide water from source approved prior to use.

PART 3 - EXECUTION

3.1 SOIL PREPARATION

- A. General:
 - 1. Limit preparation to areas which will be planted soon after.
 - 2. Provide facilities to protect and safeguard all persons on or about premises.
 - 3. Protect existing trees designated to remain.
 - 4. Verify location and existence of all underground utilities.
 - a. Take necessary precaution to protect existing utilities from damage due to construction activity.
 - b. Repair all damages to utility items at sole expense.
 - 5. Provide facilities such as protective fences and/or watchmen to protect work from vandalism.
 - a. Contractor to be responsible for vandalism until acceptance of work in whole or in part.
- B. Preparation for Lawn-Type Seeding, Sprigging, Plugging or Sodding:
 - 1. Loosen surface to minimum depth of 4 IN.
 - 2. Remove stones over 1 IN in any dimension and sticks, roots, rubbish, and other extraneous matter.
 - 3. Prior to applying fertilizer, loosen areas to be seeded with a double disc or other suitable device if the soil has become hard or compacted.
 - 4. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.
 - 5. Distribute fertilizer uniformly over areas to be seeded:
 - a. For lawn-type seeding: 30 LBS per 1000 SF.
 - 6. Incorporate fertilizer into soil to a depth of at least 2 IN by disking, harrowing, or other approved methods.

7. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.
8. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture.
 - a. Roll and rake, remove ridges and fill depressions, as required to meet finish grades.
 - b. Limit fine grading to areas which can be planted soon after preparation.
9. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.2 INSTALLATION

A. Lawn-Type and Pasture Seeding:

1. Do not use seed which is wet, moldy, or otherwise damaged.
2. Employ satisfactory methods of sowing using mechanical power-driven drills or seeders, or mechanical hand seeders, or other approved equipment.
3. Distribute seed evenly over entire area at rate of application not less than 4 LBS (PLS) of seed per 1000 SF, 50 percent sown in one direction, remainder at right angles to first sowing.
4. Stop work when work extends beyond most favorable planting season for species designated, or when satisfactory results cannot be obtained because of drought, high winds excessive moisture, or other factors.
 - a. Resume work only when favorable conditions develop.
5. Lightly rake seed into soil followed by light rolling or cultipacking.
6. Immediately protect seeded areas against erosion by mulching.
 - a. Spread mulch in continuous blanket using 1-1/2 tons per acre to a depth of 4 or 5 straws.
7. Protect seeded slopes against erosion with erosion netting or other methods approved by Engineer.
 - a. Protect seeded areas against traffic or other use by erecting barricades and placing warning signs.
8. Immediately following spreading mulch, anchor mulch using a rolling coulter or a wheatland land packer having wheels with V-shaped edges to force mulch into soil surface, or apply evenly distributed emulsified asphalt at rate of 10-13 GAL/1000 SF.
 - a. SS-1 emulsion in accordance with ASTM D5276 or RC-1 cutback asphalt in accordance with ASTM D2028 are acceptable.
 - b. If mulch and asphalt are applied in one treatment, use SS-1 emulsion with penetration test range between 150-200.
 - c. Use appropriate shields to protect adjacent site improvements.

3.3 MAINTENANCE AND REPLACEMENT

A. General:

1. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance or for a specific time period as stated below, whichever is the longer.
2. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth.
3. Protection of new materials:
 - a. Provide barricades, coverings or other types of protection necessary to prevent damage to existing improvements indicated to remain.
 - b. Repair and pay for all damaged items.
4. Replace unacceptable materials with materials and methods identical to the original specifications unless otherwise approved by the Engineer.

B. Seeded or Sodded Lawns:

1. Maintain seeded lawns: 90 days, minimum, after installation and review of entire project area to be planted.
2. Maintenance period begins at completion of planting or installation of entire area to be seeded or sodded.

3. Engineer will review seeded or sodded lawn area after installation for initial acceptance.
4. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, and replanting as required to establish a smooth, uniform lawn, free of weeds and eroded or bare areas.
5. Lay out temporary lawn watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas.
 - a. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch.
6. Mow lawns as soon as there is enough top growth to cut with mower set at recommended height for principal species planted.
 - a. Repeat mowing as required to maintain height.
 - b. Do not delay mowing until grass blades bend over and become matted.
 - c. Do not mow when grass is wet.
 - d. Time initial and subsequent mowings as required to maintain a height of 1-1/2 to 2 IN.
 - e. Do not mow lower than 1-1/2 IN.
7. Remulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose.
 - a. Anchor as required to prevent displacement.
8. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.
9. Replant bare areas using same materials specified.
10. Engineer will review final acceptability of installed areas at end of maintenance period.
11. Maintain repaired areas until remainder of maintenance period or approved by Engineer, whichever is the longer period.

END OF SECTION

SECTION 33 01 33
TEMPORARY BYPASS PUMPING

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. This section describes the requirements for temporary bypass pumping sewage flows.
- B. CONTRACTOR shall provide labor, materials, and supervision to temporarily provide bypass pumping around the CONTRACTOR's work in accordance with the specific needs of the work.
- C. No interruption of sewage flow shall be permitted throughout the duration of the project.
- D. Bypass Operation: 24 hours per day during the period of Work. The bypassed flow shall be continuously monitored.

PART 2 - PRODUCTS

2.1 NOISE RESTRICTIONS

- A. Pumps and generators shall keep the noise level below 70 dBA at 30 feet.

2.2 CAPACITY

- A. Pumps and bypass lines shall be of adequate capacity and size to handle the required capacity. Bypass lines, fittings and all accessories shall withstand twice the maximum pressure required for bypassing.
 - 1. The estimated flow rates are provided on the Drawings.

PART 3 - EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall notify the ENGINEER 48 hours prior to bypassing or diverting flow in any of the pipelines or laterals.
- B. CONTRACTOR shall maintain on site, sufficient equipment and materials to ensure continuous and successful operation of the bypass systems. The CONTRACTOR shall maintain on site a sufficient number of valves, spare pumps, tees, elbows, connections, tools, sewer plugs, piping, fuel and/or back-up generator, and other parts or system hardware to ensure immediate repair or modification of any part of the system as necessary.
- C. Pipe used for bypass system shall be HDPE per AWWA C906 or approved equal.

3.2 PROTECTION

- A. The CONTRACTOR shall be responsible for all bypass flows. The CONTRACTOR shall continuously inspect the entire bypass pumping and piping system for leaks or spills. No bypassing to the ground surface, receiving waters, storm drains, or bypassing which results in soil or groundwater contamination or any potential health hazards shall be permitted. In the event of any sewage spill the CONTRACTOR shall notify OWNER immediately and be responsible for the prompt cleanup and disinfecting of the spill per local and state requirements. The CONTRACTOR shall compensate the OWNER for the cost of any fines levied as the result of a spill or unauthorized discharge.

3.3 FIELD QUALITY CONTROL

- A. Hydrostatic Pressure Test:

1. Prior to operation, test each section of discharge piping with maximum pressure equal to 2.0 times the maximum operating pressure of system or 50 psi, whichever is greater.
 2. The test shall run for a period of 2 hours.
 3. The CONTRACTOR shall fill the line with water.
 4. The line shall be sealed on the discharge end.
 5. The line may be put in service if after the 2-hour period the pressure has been maintained and there are no observable leaks.
 6. Notify ENGINEER 24 hours prior to testing.
- B. Inspection:
1. Operator shall inspect temporary bypass pumping and piping system at a minimum of every hour.
 2. Inspection log: Keep at each pumping location.

3.4 CLEAN-UP

- A. The bypass pumping system shall be cleaned and drained prior to being dismantled and moved to the next location.
- B. Disturbed Areas: Upon completion of bypass pumping operation, clean disturbed areas, restoring to original condition, including pavement restoration, at least equal to that which existing prior to start of Work.

3.5 SCHEDULING

- A. The bypassing system shall not be shut down between shifts, on holidays or weekends, or during work stoppages.
- B. The bypass system shall have a trained and qualified attendant to maintain the bypass pumping system from the start of bypass until the bypassing of the specific pipeline is no longer required.
1. A float and dialer monitoring system is acceptable. A redundant backup system must be installed and functional at all times. Contractor shall provide a response team from an alarm of less than 30 minutes.

END OF SECTION

SECTION 33 05 16
PRECAST CONCRETE MANHOLE STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precast concrete manhole structures and appurtenant items.
 - a. Sanitary sewer manholes and appurtenances.
 - b. Storm sewer manholes and appurtenances.
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. A48/A48M, Standard Specification for Gray Iron Castings.
 - b. C150/C150M, Standard Specification for Portland Cement.
 - c. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - d. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
 - e. C1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - 3. Fabrication and/or layout drawings:
 - a. Include detailed diagrams of manholes showing typical components and dimensions, reinforcements and other details.
 - b. Itemize, on separate schedule, sectional breakdown of each manhole structure with all components and refer to drawing identification number or notation.
 - c. Indicate knockout elevations for all piping entering each manhole.
 - 4. Buoyancy calculations:
 - a. Provide for each structure.
 - b. Assume full ground saturation.
 - c. Assume water level above grade is equal to 100-year flood elevations shown on the drawings.
 - d. Signed and sealed by a licensed professional engineer in North Carolina.
 - 5. Concrete Protective Lining System:
 - a. Manufacturer's standard specifications and guidelines to include installation requirements.
 - b. Installer's name and certification for the product proposed.
- B. Unless approved prior to submittal, submit all products from this Specification Section in one complete submittal package. Include all products and accessories together.

PART 2 - PRODUCTS

- A. Submit request for substitution in accordance with Specification Section 01 25 13.

2.2 MANHOLE STRUCTURE COMPONENTS

- A. Utility Structure Components:
 - 1. All completed structures shall be capable of withstanding HS-20 loading, unless otherwise noted.
 - 2. Components:
 - a. Reinforcement ASTM C478 or A615 Grade 60.
 - b. Minimum wall thickness as determined by precaster, unless otherwise specified.
 - c. Minimum base thickness: 12-inch for cast-in-place, 6-inch for precast.
 - 1) Verify floatation stability.
 - 3. Provide the following components for each structure as required:
 - a. Base (precast) with integral bottom section or (cast-in-place).
 - b. Precast bottom and barrel section(s).
 - c. Precast transition section and adjuster ring(s).
 - d. Precast top.
 - e. Pipe penetration seals.
 - f. Access Steps.
- B. Pressure Type Frames and Cover:
 - 1. Cast iron frame and covers: ASTM A48/A48M, Class 35B (minimum).
 - 2. Use only cast iron of best quality, free from imperfections and blow holes.
 - 3. Furnish frame and cover of heavy-duty construction.
 - 4. Machine all horizontal surfaces.
 - 5. Furnish unit to meet drawing details.
 - 6. Ensure minimum clear opening of 24 IN DIA.
 - 7. Provide solid cover, no vent holes, with continuous strip neoprene gasket.
 - 8. Attach frame to concrete manhole using neoprene gasket and four stainless steel anchor bolts.
- C. Pressure Type Frame and Cover:
 - 1. Provide covers meeting the requirements of the Nonpressure Type Frames and Cover paragraph above and as modified below.
- D. Joint Treatment:
 - 1. Joints of precast sections:
 - a. Resilient O-Ring Gaskets: ASTM C443
 - b. Butyl Rubber Flexible Joint Sealants: ASTM C990.
 - c. Install an external seal wrap on all joints.
- E. Sanitary Sewer Manhole Concrete:
 - 1. Provide all sanitary manholes constructed with Portland ASTM C150/C150M, Type I or II cement with a tricalcium aluminate content not to exceed 8 percent.
 - 2. Provide 3000 psi nonshrink grout.
- F. Protective Linings and Coatings:
 - 1. Install OBIC 1000 Polyurea on all interior walls, cones, and top sections in all new manholes per manufacture's standard specifications and guidelines.
- G. Pipe to Manhole Connection:
 - 1. Provide flexible pipe connector meeting ASTM C923.
- H. Steps:
 - 1. All manhole steps shall conform to current OSHA Standards and ASTM C478.

PART 3 - EXECUTION

3.1 MANHOLE CONSTRUCTION

- A. General:
 - 1. Make inverts with a semi-circular bottom conforming to the inside contour of the adjacent sewer sections.
 - 2. Shape inverts accurately and steel trowel finish.
 - a. For changes in direction of the sewer and entering branches into the manhole, make a circular curve in the manhole invert using as large a radius as manhole inside diameter will permit.
- B. Build each manhole to dimensions shown on plans and at such elevation that pipe sections built into wall of manhole will be true extensions of line of pipe.
- C. All manhole joints shall be sealed on the outside of the manhole with butyl adhesive tape (minimum 12 inches wide) meeting ASTM C877.
- D. Seal all pipe penetrations in manhole.
 - 1. Form pipe openings smooth and well-shaped.
 - 2. After installation, seal cracks with, nonshrink grout.
 - 3. After grout cures, wire brush smooth and apply two coats emulsified fibrated asphalt compound to minimum wet thickness of 1/8 IN to ensure complete seal.
- E. Set and adjust frame and cover to match finished pavement or finished grade elevation using precast adjuster rings.
- F. Vent Pipes: See Drawings for requirements.
- G. Install protective lining as specified.
 - 1. Prior to installation properly clean concrete surfaces per ASTM D4258.
 - 2. Prior to installation test pH of concrete surface per ASTM D4262 to verify pH is within manufacture's acceptable range. Adjust pH and retest as necessary.
 - 3. Prior to installation test moisture content of concrete per ASTM D4263 to verify moisture content is within manufacture's acceptable range. Adjust moisture content and retest as necessary.
 - 4. Install only when temperature and humidity are within manufacture's acceptable ranges.
 - 5. Installation must be performed by a certified applicator for the product being applied.
 - 6. Apply manufacture's recommended wet film thickness, minimum thickness shall be 125 mils.

3.2 FIELD QUALITY CONTROL

- A. Manhole Testing – General
 - 1. Perform testing using calibrated equipment.
 - 2. Notify the Engineer 48 hours prior to each test.
 - 3. Bear the cost of all testing and inspecting, locating and remedying of leaks and other defects and any necessary retesting and re-examination.
 - 4. Any visible leak in manhole regardless of size or test results shall be repaired.
- B. Vacuum Testing
 - 1. All new sewer manholes shall be tested.
 - 2. Vacuum test in accordance with ASTM C1244.
 - 3. Vacuum Test. Vacuum test the assembled manhole after completing pipe connections and sealing but before backfilling or placing frame and cover as follows:
 - 4. Plug pipes with suitably sized and rated pneumatic or mechanical pipeline plugs. Place plugs a minimum of 6 inches beyond the manhole wall and brace to prevent displacement of the plugs or pipes during testing.
 - 5. Position the vacuum tester head assembly to seal against the interior surface of the top of the cone section and inflate according to the manufacturer's recommendations.

6. Draw a vacuum of 10 inches of mercury, close the valve on the vacuum line, and shut off the vacuum pump.
7. Measure the time for the vacuum to drop to 9 inches of mercury. The manhole shall pass when the time (in seconds) to drop to 9 inches of "mercury meets or exceeds the following:

Depth ft	Diameter, in.						
	48	60	72	84	96	108	120
6	15	20	25	29	34	38	43
8	20	26	33	38	45	51	57
10	25	33	41	48	56	63	71
12	30	39	49	57	67	76	85
14	35	46	57	67	78	89	100
16	40	52	67	76	89	101	114
18	45	59	73	86	100	114	128
20	50	65	81	95	111	126	142
22	55	72	89	105	122	139	156
24	59	78	97	114	133	152	170
26	64	85	105	124	144	164	185
28	69	91	113	133	155	177	199
30	74	98	121	143	166	189	213

8. The Engineer shall be present during the entire testing process. Any repairs to manholes which fail the vacuum test must be made on the inside and outside of each manhole. The cost of vacuum testing shall be included in the unit price for manholes.
 9. If the manhole fails the test, remove the head assembly, coat the manhole interior with a soap and water solution, and repeat the vacuum test for approximately 30 seconds. Leaking areas will have soapy bubbles. Make the necessary repairs and repeat the test until the manhole passes.
- C. Test protective lining:
1. Test for continuity per ASTM D4787.
 2. Repair holes and discontinuities per manufacture's recommendations.
 3. Retest to verify repairs were successfully made.

END OF SECTION

SECTION 33 05 76
FIBERGLASS MANHOLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass-Fiber Reinforced Polyester Manholes.
- B. This specification was developed using a standard specification provided by Hobas Pipe USA. Submit request for approval of other manufactures.
- C. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 – Procurement and Contracting Requirements.
 - 2. Division 01 – General Requirements.
 - 3. Division 31 - Earthwork

1.2 QUALITY ASSURANCE

- A. Reference Standards
 - 1. ASTM D3262, Standard Specification for “Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe
 - 2. ASTM D3753, Standard Specification for Glass-Fiber-Reinforced Polyester Manholes
 - 3. ASTM D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
 - 4. ASTM D3681, Standard Test Method for Chemical Resistance of “Fiberglass” (Glass–Fiber–Reinforced Thermosetting-Resin) Pipe in a Deflected Condition
 - 5. ASTM D695, Standard Test Method for Compressive Properties of Rigid Plastics
 - 6. ASTM D638, Standard Test Method for Tensile Properties of Plastics

1.3 SUBMITTALS

- A. Shop Drawings
 - 1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - 3. Fabrication and/or layout drawings:
 - a. Include detailed diagrams of manholes showing typical components and dimensions, reinforcements and other details.
 - b. Itemize, on separate schedule, sectional breakdown of each manhole structure with all components and refer to drawing identification number or notation.
 - c. Indicate knockout elevations for all piping entering each manhole.
 - 4. Buoyancy calculations:
 - a. Provide for each structure.
 - b. Assume full ground saturation.
 - c. Assume water level above grade is equal to 100-year flood elevations shown on the drawings.
 - d. Signed and sealed by a licensed professional engineer in North Carolina.

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

- A. Dimensions: The manholes shall be a circular cylinder, reduced at the top to a circular manway not smaller than 22 ½” inside diameter. Manholes shall be produced in half-foot increments in lengths +/- 2”. Nominal inside diameters shall be 42”, 48”, 54”, 60”, 66”, 72” or larger diameters as agreed upon between purchaser and the manufacturer are covered by this section. Configuration may include reducer sections for larger diameter manholes (>60”).
- B. Manhole Top Configurations:
1. Cone Sections:
 - a. The manhole reducer must provide a bearing surface on which a standard ring and cover may be supplied and adjusted to grade. The reducer shall be concentric or eccentric and shall be joined to the barrel section at the factory with resin and glass fiber reinforcement, thus providing required monolithic design to prevent infiltration and/or exfiltration through the manhole.
 2. Flat Tops (by others):
 - a. Reinforced concrete flat tops with integral FWC coupling and PVC or FRP corrosion barrier can be used for larger diameters where full barrel access is required or where FRP cone is not practical.
 - b. Class: The manhole shall be manufactured in one class of load rating This class shall have a minimum HS-20-wheel load (16,000 pounds dynamic wheel load).
 - c. Connections and Stub outs:
 - 1) Inlet and outlets connections will be made of CCFRPM pipe material laminated to CCFRPM riser pipe and shipped with one spigot end (outlet) and one FWC coupling and (inlet) unless otherwise directed by the purchaser.
 - a) Identified PVC or FRP branch connections will be cored and attached to the manhole riser with fiberglass laminations at the design engineer’s flow line elevations, vertical and horizontal angles. All small diameters lateral stub-outs to be furnished as plain end (spigot).
 - b) Field connections of 4”-15” PVC lines can be accomplished with Insert-a-Tee connectors, Boot-type-connectors, or similar.
 - d. Manhole Bottom:
 - 1) Resin and glass reinforced manhole bottoms will be provided with a glass reinforced bottom section with integral FWC coupling for watertight attachment to FRP tee-base riser neck.
 - 2) Full bench and invert manholes will have a bench manufactured utilizing non-corrosive materials encapsulated in fiberglass minimum ¼” thick.
 - e. Marking and Identification: All manholes shall be marked with the following information:
 - 1) Manufacturer’s name
 - 2) Riser vertical height
 - 3) ASTM D3753 Designation
 - 4) Station number or manhole ID, per project plans.

2.2 MATERIALS

- A. Resin: The resin used shall be a commercial grade unsaturated polyester resin or vinyl ester resin. Resins shall be suitable for the service environment intended (i.e. domestic sanitary wastewater).
- B. Reinforcing Materials: The reinforcing material shall be commercial grade “E” type glass in the form of mat, chopped roving, roving fabric, or both, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
- C. Riser and Cones: Riser pipe shall be manufactured per ASTM D3262 with cone manufactured of similar materials.

1. Interior Surfacing Material: The inner surface of the riser pipe exposed to the environment shall have a resin rich non-reinforced layer (nominal 40 mils in thickness) to resist abrasion and crack resistance.
- D. Fillers and Additives: Fillers, when used, shall be inert to the environment and manhole construction. Additives, such as thixotropic agents, catalyst, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of the referenced ASTM standards.
- E. Exterior Surface:
1. Cones – Exterior surface shall be coated with suitable gel coat as an additional UV and water barrier. Gel coat shall be pigmented to resist ultraviolet. The exterior surface shall be relatively smooth with no sharp projections free of blisters, de-laminations or exposed fiberglass. Indentations or other shape imperfections that will not affect performance are allowed.
 2. Riser Sections and Tee-bases – Exterior will be constructed of a sand rich layer without reinforcing glass to provide UV resistance.

2.3 MANUFACTURE

- A. Manhole cylinders, manway reducers, and joints shall be produced from fiberglass reinforced polyester resin using a combination of centrifugal casting, continuous winding, or spray process.
1. Acceptable Manufacturer: Manufacturer shall have experience in the manufacture of fiberglass pipe and products for use in domestic or industrial sanitary sewer applications. Acceptable manufacturer shall have a quality control program that is currently ISO 9001 certified. The manufacturer shall be Hobas Pipe USA of Houston, TX. (1-800-856-7473) or approved equal.
 2. Tee-Base-Connection: Fiberglass manhole risers shall be joined to a pipe stub rising vertically from in-line tee fitting. Manhole risers shall be connected to the vertical pipe using an FWC pipe coupling cast into the bottom of the fiberglass riser. Pipe coupling shall seal to the tee-base using a flexible compression gasket compatible with the tee-base pipe material. Pipe coupling shall be permanently bonded into the base of the riser using fiberglass laminate. Pipe coupling shall be joined to the in-line tee fitting by placing the manhole riser on top of the tee outlet and applying downward pressure until the vertical pipe stub is inserted into the pipe coupling to the proper depth. See homing line mark on tee base branch (neck) for depth of penetration into FWC coupling.
 3. Diameter Transition: Individual fiberglass components of manhole shall be joined by fiberglass reinforced laminations or be fiberglass bonded.
 4. Diameter Transition: Manholes with riser diameters greater than 6-feet and larger shall be reduced to an inside diameter of 4'-5', using a reducer.
 5. Anti-Flotation Flange: Exterior of manhole riser shall incorporate a 3" minimum wide flange at its base. Upon joining of manhole riser to pipe tee, sufficient concrete shall be poured around tee and manhole riser to prevent buoyancy. Anti-flotation flange shall be encased with 6" of concrete (minimum), in addition to required tee base concrete encasement height.
 6. Height Adjustment: Fiberglass manholes shall be height adjustable using external grade rings or adjustment with an FWC coupling riser joint. Top riser sections can be cut for height adjustment and shall be rejoined with an FWC coupling.
 7. Ring and Cover Platform: Top of cone/reducer shall have a fiberglass support platform upon which grade rings may be installed to accept a typical cast iron ring and cover. Grade rings, ring and cover shall be placed over fiberglass neck (chimney) in a manner that evenly distribute loading onto grade rings only. No loading shall be placed onto fiberglass neck.

2.4 REQUIREMENTS

- A. Repairs: Any manhole repair is required to meet all requirements of this specification.
- B. Manhole Riser Lengths: Riser lengths shall be in whole or ½-foot increments +/- 2".

- C. Load Rating: The complete manhole riser shall have a minimum dynamic load rating of 16,000 lbf (71 172 N) when tested in accordance with ASTM D3753, 8.4. To establish this rating the complete manhole shall not leak, crack, or suffer other damage when load tested to 40,000 lbf (71 929 N) and shall not deflect vertically downward more than 0.25 in. (6.35 mm) at the point of load application when loaded to 24,000 lb. (106 757 N).
- D. Stiffness: The cylindrical portion of the manhole riser is to be tested in accordance with ASTM Method D2412. The riser cylinder shall have the minimum pipe-stiffness values shown in the table below, when tested in accordance with ASTM D3753, Section 8.5.
 - 1. 3'-6' 46psi
 - 2. 7'-12' 46psi
 - 3. 13'-20' 46psi
 - 4. 21'-25' 46psi
 - 5. 26'-35' 46psi
- E. Soundness: In order to determine soundness, an air or water test is to be applied to the manhole riser test sample. While holding the pressure between 3-5psi, the entire manhole riser must be inspected for leaks. Any leakage through the laminate is cause for failure of the test. Refer to ASTM D3753, Sec. 8.6. Manufacturer to provide documentation of previous test per ASTM D3753 Sec. 8.6.
- F. Chemical Resistance: Riser pipe shall meet the chemical testing outlined in ASTM D3262 when tested in accordance with ASTM D3681. Cones shall be manufactured with similar materials.

PART 3 - EXECUTION

3.1 MANHOLE CONSTRUCTION

- A. All tests shall be performed as specified in ASTM D3753, Section 8, Titled "Test Methods". See ASTM D3753, Section 8, Note 5, for test method D790 and test method D-695.
- B. Examinations: Each Manhole riser component part shall be examined for dimensional requirements, hardness, and workmanship.
- C. Composition Control: Controls on glass and resin content shall be maintained for all manufacturing processes and for each portion of the manhole riser fabrication. Records shall be maintained for these control checks. Proper glass content may be shown by glass usage checks or glass and resin application rate checks, in accordance with the material composition test in ASTM D375.

3.2 FIELD TESTING

- A. Vacuum test all manholes per Specification 33 05 16, Paragraphs 3.2.A and 3.2.B.

END OF SECTION

SECTION 40 05 00
PIPE AND PIPE FITTINGS: BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Utility piping systems, including
 - a. Gravity sewer
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 - Procurement and Contracting Requirements.
 - 2. Division 01 - General Requirements.
 - 3. Section 31 23 33 - Trenching, Backfilling, and Compacting for Utilities.
 - 4. Appendix B – Hobas Pipe Submittal

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Iron and Steel Institute (AISI).
 - 2. ASTM International (ASTM):
 - a. F1417, Standard Practice for Installation Acceptance of Plastic Non-Pressure Sewer Lines Using Low-Pressure Air.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe coating during handling using methods recommended by manufacturer.
 - 1. Use of bare cables, chains, hooks, metal bars or narrow skids in contact with coated pipe is not permitted.
- B. Prevent damage to pipe during transit.
 - 1. Repair abrasions, scars, and blemishes.
 - 2. If repair of satisfactory quality cannot be achieved, replace damaged material immediately.
- C. Storage:
 - 1. Each pipe should be redundantly chocked at each end to prevent movement.
 - 2. Vehicular traffic shall not be inconvenienced in placement of material within rights-of-way.
 - 3. Comply with North Carolina Department of Transportation and City of Asheville requirements for storage of pipe and equipment within road rights-of-way, and with Duke Energy within overhead power rights-of-way.

PART 2 - PRODUCTS

2.1 COMPONENTS AND ACCESSORIES

- A. Underground Warning Tape:
 - 1. Material: Polyethylene.
 - 2. Size:
 - a. 6-IN wide
 - b. Thickness: 3.5 mils
 - c. Letter height: 1 1/4 – IN (min)
 - 3. Color:
 - a. Potable Water – Blue
 - b. Sanitary Sewer – Green
 - 4. Continuous Message along tape:
 - a. Potable Water – “Caution – Water Main Buried Below.”
 - b. Sanitary Sewer – “Caution – Sewer Main Buried Below.”

5. Location: Half way between top of pipe and finished grade
- B. Sleeves:
1. Solid ductile iron mechanical joint sleeves (long pattern) shall be used for tie-ins between new mains and existing mains.
 2. Repair clamps or split sleeves will not be allowed.
- C. Unless noted otherwise, all hardware (bolts, nuts, etc.) used in buried applications shall be 304 stainless steel. Use 316 stainless steel if required for specific items.

PART 3 - EXECUTION

3.1 EXTERIOR BURIED PIPING INSTALLATION

- A. Laying Pipe In Trench:
1. Excavate and backfill trench in accordance with Specification Section 31 23 33.
 2. Clean each pipe length thoroughly and inspect for compliance to specifications.
 3. Grade trench bottom and excavate for pipe bell and lay pipe on trench bottom.
 4. Install gasket or joint material according to manufacturer's directions after joints have been thoroughly cleaned and examined.
 5. Except for first two (2) joints, before making final connections of joints, install two (2) full sections of pipe with earth tamped along side of pipe or final with bedding material placed.
 6. Lay pipe in only suitable weather with good trench conditions.
 - a. Never lay pipe in water except where approved by Engineer.
 7. Seal open end of line with watertight plug if pipe laying stopped.
 8. Remove water in trench before removal of plug.
- B. Lining Up Push-On Joint Piping:
1. Lay piping on route lines shown on Drawings.
 2. Deflect from straight alignments or grades by vertical or horizontal curves or offsets.
 3. Observe maximum deflection values stated in manufacturer's written literature.
 4. Provide special bends when specified or where required alignment exceeds allowable deflections stipulated.
 5. Install shorter lengths of pipe in such length and number that angular deflection of any joint, as represented by specified maximum deflection, is not exceeded.
- C. All gravity sewers shall be laid in upstream direction with the bell end laid upgrade.
- D. Install insulating components where dissimilar metals are joined together.
- E. Anchorage and Blocking:
1. Provide reaction blocking, anchors, joint harnesses, or other acceptable means for preventing movement of piping caused by forces in or on buried piping tees, wye branches, plugs, or bends.
 2. Place concrete blocking so that it extends from fitting into solid undisturbed earth wall.
 - a. Concrete blocks shall not cover pipe joints.
 3. Provide bearing area of concrete in accordance with drawing detail.
- F. Install underground hazard warning tape above pipe.

3.2 FIELD QUALITY CONTROL

- A. Pipe Testing – General:
1. Utilize pressures, media and pressure test durations as specified.
 2. Isolate equipment which may be damaged by the specified pressure test conditions.
 3. Perform pressure test using calibrated pressure gages and calibrated volumetric measuring equipment to determine leakage rates.
 - a. Select each gage so that the specified test pressure falls within the upper half of the gage's range.
 - b. Notify the Engineer 24 hrs prior to each test.

4. Completely assemble and test new piping systems prior to connection to existing pipe systems.
 5. Acknowledge satisfactory performance of tests and inspections in writing to Engineer prior to final acceptance.
 6. Bear the cost of all testing and inspecting, locating and remedying of leaks and any necessary retesting and re-examination.
 7. Any visible leak in pipe or manhole regardless of size or test results shall be repaired.
- B. Gravity Sewers: All pipe materials:
1. All gravity sewer pipe shall be tested for infiltration no sooner than 30 days after the completion of backfill or shutting off the dewatering system, whichever date is later.
 2. Test requirements:
 - a. All gravity sewer pipe shall be tested using one of the following methods:
 - 1) Low Pressure Air Test.
 - 2) Hydrostatic (Leakage) Test.
 - b. In addition to the testing required above all pipe installed where the groundwater is above the top of pipe, the following test is required:
 - 1) Infiltration test.
 3. Infiltration Test:
 - a. Maximum infiltration allowance is 100 gpd/inch diameter/mile.
 - b. Tests and allowances include service connections or stub lines extending from main or lateral sewer to curb or property line.
 - c. Install suitable measuring device at lower end.
 - d. Measure amount of water flowing through outlet over a specified period of time.
 4. Low Pressure Air Test
 - a. Comply with ASTM F1417.
 - b. Check pneumatic plugs for proper sealing.
 - c. Place plugs in line at each manhole and inflate 25 psig.
 - d. Introduce low pressure air into sealed line until air pressure reaches 4 psig greater than average back pressure of any groundwater that may be around the pipe. Use test gauge conforming to ANSI B40.1 with 0 to 15 psi scale and an accuracy of 1 percent of full range.
 - e. Allow two (2) minutes for air pressure to stabilize.
 - f. After stabilization period (3.5 psig minimum pressure in pipe) discontinue air supply to line segment.
 - g. Acceptable time for loss of one (1) psig of air pressure shall be:

Pipe Diameter, In.	Specification Time for Length (L) Shown, min:s							
	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

Pipe Diameter, In.	Specification Time for Length (L) Shown, min:s							
	100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
42	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07
48	91:10	136:45	182:21	227:55	273:31	319:06	364:42	410:17
54	115:24	173:05	230:47	288:29	346:11	403:53	461:34	519:16
60	142:28	213:41	284:55	356:09	427:23	498:37	569:50	641:04

- h. All air testing shall be witnessed by Engineer. The results of all air testing shall be recorded and signed by the Engineer.
 - i. Joint Testing – For Pipes 42-inch in diameter or greater.
 - 1) Contractor may use this test method to replace the Low Pressure Air Test.
 - 2) Regardless of pipe material, perform testing in accordance with ASTM C1103 Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
 - 3) The center cavity shall be pressurized with air to a minimum of 3.5 psig.
 - 4) After stabilizing for 15 seconds, turn off and disconnect air supply.
 - 5) Joint test passes if the pressure drop is less than 1.0 psig over a minimum time of 5.0 seconds.
 - 6) Repair and retest all joints that fail.
5. Hydrostatic (Leakage) Test:
- a. Plug lower end of section to be tested.
 - b. Fill line and manhole with water to specified level.
 - c. Let water stand until pipe has reached its maximum absorption and until all trapped air has had opportunity to escape. Allow 4 hours.
 - d. After pipe has achieved maximum absorption, refill manhole to original depth. After fifteen-minute intervals, record the difference in elevation of water surface and convert to gallons. Test for a minimum of 2 hours.
 - e. Maximum exfiltration allowance is 100 gpd/inch diameter/mile. This allowance is based on an elevation head of water in upper manhole which produces a minimum of 4 feet of head on invert of line at all locations. Limit total head on invert of pipe at lower end to 20 feet.
- C. Gravity Sewers: All flexible pipe, which includes DIP, PVC and Fiberglass Pipe:
- 1. All flexible pipe shall be tested for deflection. Testing shall meet one of the following requirements.
 - a. For pipe that does not need to be placed into service within 30 days of installation. Deflection test shall be performed no sooner than 30 days after the compaction of backfill or shutting off the dewatering system, whichever date is later. Deflection of pipe shall be limited to no more than 4 percent deflection.
 - b. For pipe that does need to be placed into service within 30 days of installation to reduce bypass pumping. Deflection test shall be performed no sooner than 48 hours after the compaction of backfill or shutting off the dewatering system, whichever date is later. Deflection of pipe shall be limited to no more than 3 percent deflection.
 - 2. Pull an approved mandrel by hand through each sewer section. Submit drawing on mandrel and size calculations supporting its size to properly test the deflection specified and the ID of the installed pipe.
 - a. For pipes 42-inch and larger, a stick deflection test maybe accepted if Contractor provides OSHA approved pipe entry requirements.
- D. The mandrel shall be constructed of metal or other rigid material and shall contain nine or more runners or legs. Engineer and Owner’s representative shall witness testing. Hydrostatic Pressure Testing (Bypass Pump Pressure Sewers):
- 1. Contractor shall provide the water required to pressure test the pipe and the water required for the other testing required for the other testing required at no cost. Contractor is

responsible for transporting the water from the source to the site. Comply with all metering and backflow prevention requirements.

2. Tests shall be conducted in accordance with AWWA C600 except where modified herein. The pipe shall be tested between each valved section. The pressure shall be measured at the point of testing.
3. After the pipe is laid, the joints completed, and all appurtenances permanently installed, the piping system or any valved sections of piping system shall be subjected for two hours to a hydrostatic pressure test equal to or greater than 1.5 times the working pressure. The following table provides the required test pressures.

Required Test Pressures	
Test Section	Test Pressure (psi)
All Bypass Pump Pipe	Two Times Working Pressure (50 psi minimum)

4. Air removal. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged, or left in place at the discretion of the Owner.
 5. Where any section of main is provided with concrete reaction blocking for fittings or hydrants, the hydrostatic pressure test shall not be made until at least five days after installation of the concrete reaction blocking, unless otherwise approved.
 6. Test Pressures shall:
 - a. Equal the test pressure specified at the highest point in the section tested.
 - b. Not exceed pipe or thrust restraint design pressures.
 - c. Not vary by more than +/- 5.0 p.s.i.
 - d. Not exceed twice the rated pressure of the valves if resilient – seated butterfly valves are used.
 7. Do not paint or insulate exposed piping until successful performance of pressure tests.
 8. Repair defective joints, welds, pieces of pipe, jointing material, valves or other defective areas, and repeat pressure testing until pipe system meets test criteria. Pay for any additional costs associated with retesting and repairs.
 9. Engineer and Owner’s representative shall witness hydrostatic pressure tests. The results will be signed by Engineer and Owner’s representative.
 10. No leakage is allowed in the bypass pipes.
- E. Cleaning and Video Assessment:
1. All gravity sewers shall be cleaned and televised prior to acceptance by the Owner to verify proper installation. The camera shall be a color, pan and tilt camera with bright lighting that produce a picture quality sufficient to perform a 360-degree visual assessment of the complete system. The camera should be advanced at a slow and uniform rate throughout the full length of the pipe, measuring the length from manhole to manhole with no lapses in coverage. The upstream and downstream manhole identifications as listed on the design plans shall be captured on the video screen along with the length, diameter, date, and project title. Labeled CD’s shall be provided for Owner’s assessment. The Owner shall not be responsible for purchasing additional software to view the CD’s.
- F. Final Inspection:
1. The Contractor is instructed to request a final inspection only after the work has been checked by the Contractor or his appointed agent. Upon final inspection, the Contractor will be notified in writing from the Engineer that the Contract has been satisfied and that the Owner has accepted the new facilities for maintenance. All leaks and defects observed shall be repaired, using methods approved by Engineer at the Contractor’s expense. The section

of defective line will be reinspected, after repair. The Contractor shall pay all costs for reinspection.

3.3 CLEANING

- A. Cleaning:
 - 1. Clean interior of piping systems thoroughly before installing.
 - 2. Maintain pipe in clean condition during installation.
 - 3. Before jointing piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
 - 4. Immediately prior to pressure testing, clean and remove grease, metal cuttings, dirt, or other foreign materials which may have entered the system.
 - 5. At completion of work and prior to Final Acceptance, thoroughly clean work installed under these Specifications.
 - a. Clean equipment, fixtures, pipe, valves, and fittings of grease, metal cuttings, and sludge which may have accumulated by operation of system, from testing, or from other causes.
 - b. Repair any stoppage or discoloration or other damage to parts of building, its finish, or furnishings, due to failure to properly clean piping system, without cost to Owner.

3.4 LOCATION OF BURIED OBSTACLES

- A. Furnish exact location and description of buried utilities encountered and thrust block placement.
- B. Reference items to definitive reference point locations such as found property corners, entrances to buildings, existing structure lines, fire hydrants and related fixed structures.
- C. Include such information as location, elevation, coverage, supports and additional pertinent information.
- D. Incorporate information on "As-Recorded" Drawings.

3.5 RELATION OF WATER MAINS TO SEWERS

- A. Crossings: Water mains crossing sewers shall be laid to provide a minimum vertical separation of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case whether the water main is either above or below the sewer line. Whenever possible, the water main shall be located above the sewer line. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer line and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing and each other. Where a new water main crosses an existing sewer line, one full length of a waterpipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main.
- B. Special Conditions: When it is impossible to obtain the distances specified above:
 - 1. Maximize the distances between the water main and sewer line and the joints of each.
 - 2. Use ductile iron pipe for the sewer line.
 - 3. Allow enough distance to make repairs to one of the lines without damaging the other.
- C. Force Mains: There shall be a least a 10 foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossing.
- D. Sewer Manholes: No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provide that ductile iron is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.

END OF SECTION



French Broad Interceptor Emergency Repair

APPENDIX A

NCDOT Permit



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

April 12, 2021

MSD of Buncombe County
C/O Vaughn & Melton Consulting Engineers
Mike Calhoun, PE
828-253-2796

COUNTY: **Buncombe – E132-011-21-00058**

SUBJECT: **RIGHT OF WAY ENCROACHMENT – SR 3556 (Amboy Road)**

Attached is an executed Encroachment Agreement relative to the proposed **installation of approximately 543 linear feet of 24-inch HDPE temporary sewer line and all related appurtenances per NCDOT standards and specifications**, as shown on the attached plans. The agreement is approved subject to the attached **Special Provisions**.

- **Manholes, valves, meters, and any other appurtenances shall be installed in areas that do not impede maintenance.**
- **Temporary sewer line shall be removed One-Calendar after approval date.**

All work is to be done in strict compliance with the Agreement, which requires that the North Carolina Department of Transportation be advised before work is started. Please call our District Office at (828) 298-2741 for this purpose.

When all work is completed, please advise this office by letter. Please send a copy to District Engineer, at P.O. Box 3279, Asheville, NC 28802.

Sincerely,

DocuSigned by:

A handwritten signature in black ink, appearing to read "Christopher D. Medlin".

6D92D71E27C94A3...

Christopher D. Medlin, P.E.
District Engineer

CDM/nkd
Attachments

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT

PRIMARY AND SECONDARY HIGHWAYS

-AND-

MSD of Buncombe County, NC

2028 Riverside Drive

Asheville, NC 28804

THIS AGREEMENT, made and entered into this _____ day of 4/12/2021 20 _____ by and between the Department
the _____ 15 _____ March _____ 21 _____
of Transportation, party of the first part; and Metropolitan Sewerage District of Buncombe County, North Carolina
_____ party of the second part,

running down the slope beside each abutment tying back into existing sewer line. Located along Amboy Rd. bridge over the French Broad River.

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as
Route(s) SR 3556 - Amboy Road, Buncombe Co. _____, located along the bridge over the French Broad river

with the construction and/or erection of: Installing a 24" temporary HDPE sewer line approximately 543' along the south gutter line
and running down the slopes beside each abutment tying back into an existing sewer line

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of
the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the
right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right
and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are
made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of
the first part's latest **POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY**, and such
revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures
may be obtained from the Division Engineer or State Utility Agent of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and
proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance
thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures
necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part
shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his
successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the
party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights,
flagmen and other warning devices for the protection of traffic in conformance with the latest **Manual on Uniform Traffic Control Devices
for Streets and Highways** and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained
from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and
claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the
Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during
construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water
impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations
of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances
and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any
installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to
remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the
first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the
Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this
agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless
evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part
agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed.
Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will
not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves
the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the
first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not
begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the
second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as
the "contractor"), agrees as follows:

- a. **Compliance with Regulations:** The contractor shall comply with the Regulations relative to nondiscrimination in Federally-
assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be
amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and
made a part of this contract.
- b. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the

grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

- c. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. **Information and Reports:** The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. **Incorporation of Provisions:** The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

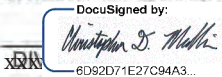
R/W (161) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.


ATTEST OR WITNESS:



DEPARTMENT OF TRANSPORTATION

BY:  District Engineer

MSD of Buncombe County, NC


Thomas E Hartye PE - General Manager
Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the Manager of Right of Way. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the existing and/or proposed encroachment.
4. Length, size and type of encroachment.
5. Method of installation.
6. Dimensions showing the distance from the encroachment to edge of pavement, shoulders, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
8. Drainage structures or bridges if affected by encroachment (show vertical and horizontal dimensions from encroachment to nearest part of structure).
9. Method of attachment to drainage structures or bridges.
10. Manhole design.
11. On underground utilities, the depth of bury under all traveled lanes, shoulders, ditches, sidewalks, etc.
12. Length, size and type of encasement where required.
13. On underground crossings, notation as to method of crossing - boring and jacking, open cut, etc.
14. Location of vents.

GENERAL REQUIREMENTS

1. Any attachment to a bridge or other drainage structure must be approved by the Head of Structure Design in Raleigh prior to submission of encroachment agreement to the Division Engineer.
2. All crossings should be as near as possible normal to the centerline of the highway.
3. Minimum vertical clearances of overhead wires and cables above all roadways must conform to clearances set out in the National Electric Safety Code.
4. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections.
5. All vents should be extended to the right of way line or as otherwise required by the Department.
6. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
7. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
8. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.

Pre-Construction

Contact Offices & Outside Agency issues/contacts/info

1. Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the encroachment agreement.
2. The Encroaching party or their contractor shall provide the following notices prior to construction activity within the NCDOT Right of Way:
 - a. Three (3) business days advance phone call at telephone (828) 298-2741 or email to nkdorato@ncdot.gov to the District Engineer's office
 - b. If the construction falls within the limits of an NCDOT managed construction project, five (5) business days advance phone call to the Resident Engineer, Mr. Joseph Lawrence at (828) 298-0080 or email to jrlawrenc@ncdot.gov.Failure to provide these notifications prior to beginning construction is subject to the Division Engineer's discretion to cease construction activity for this encroachment. NCDOT reserves the right to cease any construction or maintenance work associated with this installation by the encroaching party until the construction or maintenance meets the satisfaction of the Division Engineer or their representative.
3. Prior to beginning work, it is the requirement of the Encroaching Party to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.
4. It shall be the responsibility of the encroaching party to determine the location of utilities within the encroachment area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The encroaching party shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.
5. The encroaching party shall notify the appropriate municipal office prior to beginning any work within the municipality's limits of jurisdiction.
6. Excavation within 1000 feet of a signalized intersection will require notification by the encroaching party to the Division Traffic Engineer at telephone number (828) 250-3000 no less than one week prior to beginning work. All traffic signal or detection cables must be located prior to excavation. Cost to replace or repair NCDOT signs, signals, pavement markings or associated equipment and facilities shall be the responsibility of the encroaching party.
7. This agreement does not authorize installations within nor encroachment onto railroad rights of way. Permits for installations within railroad right of way must be obtained from the railroad and are the responsibility of the encroaching party.
8. At the option of the District Engineer, a preconstruction meeting including representatives of NCDOT, the encroaching party, contractors and municipality, if applicable, shall be required. A pre-construction conference held between a municipality (or other facility owner) and a contractor without the presence of NCDOT personnel with subsequent construction commencing may be subject

to NCDOT personnel ceasing any work on NCDOT right-of-way related to this encroachment until such meeting is held. Contact the District office to schedule.

9. At the discretion of the District Engineer, a NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W form (See corresponding attachment) with the scheduled pre-construction meeting and associated construction schedule details must be completed and submitted to the District Engineer's office a minimum of one week prior to construction.
10. At the discretion of the District Engineer, the encroaching party (not the utility contractor) shall make arrangements to have a qualified inspector, under the supervision of a Professional Engineer registered in North Carolina, on site at all times during construction. The registered Professional Engineer shall be required to submit a signed and PE sealed certification that the utility was installed in accordance with the encroachment agreement.

Legal & Right-of-Way Issues

11. This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the Division Engineer's office or their representative prior to construction or during construction if an issue arises during construction to warrant changes.
12. NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the encroaching party to verify the right of way.
13. Prior to the approval of any privately maintained facility within NCDOT right of way which the State of North Carolina is not the fee simple owner, written permission that each and every property owner affected by the installation shall be provided to NCDOT by the encroaching party. (See corresponding attachment.)
14. Encroaching party shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.
15. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with proof of dedication furnished to the District Engineer prior to beginning work.
16. No commercial advertising shall be allowed within NCDOT Right of Way.
17. The encroaching party shall obtain proper approval from all affected pole owners prior to attachment to any pole.
18. The installation within the Control of Access fence shall not adversely affect the design, construction, maintenance, stability, traffic safety or operation of the controlled access highway, and the utility must be serviced without access from the through-traffic roadways or ramps.

Bonds

19. A Performance and Indemnity Bond in the amount stated in the District Engineer's approval letter shall be posted with the District Engineer's Office by the Party of the Second Part prior to beginning any work within the NCDOT Right of Way. The bond shall be held for a minimum of one year after a satisfactory final inspection of the installation by NCDOT. The bond may be held for a period longer than one year after completion if, in the opinion of NCDOT, the size or complexity of the installation warrants a longer period.
20. The release of the bond is subject to a final inspection by NCDOT. Contact the District office to schedule a Final Inspection and to request release of the bond.

Work Zone Traffic

21. Traffic control shall be coordinated with the District Engineer and the Division Traffic Engineer, [Mr. Chris Medlin](#) at telephone (828) 298-2741, prior to construction.

22. WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to <https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx> or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

23. The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:
 - a. Manual on Uniform Traffic Control Devices (MUTCD) – North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).

- b. NCDOT Maintenance / Utility Traffic Control Guidelines – This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.
24. If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.
 25. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.
 26. Traffic shall be maintained at all times. All lanes of traffic are to be open during the hours of 7:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M. Monday through Friday, during any time of inclement weather, **or as directed by the District Engineer**. Any violation of these hours will result in ceasing any further construction by the Encroaching Party or their contractor.
 27. Nighttime and weekend operations will NOT be allowed unless written approval is received from the District Engineer. If nighttime or weekend work is allowed or required, all signs must be retro-reflective, and a work zone lighting plan must be submitted for approval prior to construction.
 28. Two-way traffic shall be maintained at all times unless designated by the District Engineer. Traffic shall not be rerouted or detoured without the prior written approval from the District Engineer. No utility work will be allowed on state holidays from 7:00 PM the night before through 9:00 AM the day prior to, following or during local events without prior approval from the District Engineer. If the construction is within 1000 feet of a school location or on a designated bus route, the construction shall be coordinated with the school start and end times to avoid traffic delays.
 29. Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.
 30. Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current *NCDOT Roadway Standard Drawings or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES*.
 31. At the discretion of the District Engineer, a traffic control plan shall be developed and submitted under the seal and signature of a Licensed North Carolina Professional Engineer prior to construction. The plan shall be specific to the site and adequately detailed. Issues such as the close proximity to intersections shall be addressed.
 32. Temporary and final pavement markings are the responsibility of the encroaching party. Final pavement markings and sign plans shall be submitted with the encroachment request to the Division Traffic Engineer prior to construction. Final pavement markings shall be thermoplastic unless otherwise directed by the Division Traffic Engineer or District Engineer.
 33. Any pavement markings that are damaged or obliterated shall be restored by the encroaching party at no expense to NCDOT.
 34. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act

Accessibility Guidelines. The encroaching party must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at <https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be>

Roadside Environmental

35. The encroaching party shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at (828) 225-2763.
36. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.
37. The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility encroachment agreements or any utility encroachments when land disturbance within NCDOT right of way exceeds 1 acre. The VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.
38. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest *NCDOT Standards Specifications for Roads and Structures* and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this encroachment shall be replaced with plants of like kind or similar shape.
39. No trees within NCDOT shall be cut without authorization from the Division Roadside Environmental Engineer. An inventory of trees measuring greater than 4 caliper inches (measured 6" above the ground) is required when trees within C/A right of way will be impacted by the encroachment installation. Mitigation is required and will be determined by the Division Roadside Environmental Engineer's Office.
40. Prior to installation, the Encroaching Party shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.
41. The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division

of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.

42. The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the Division Engineer or their agent.
43. The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.

STIP (or Division Managed) Projects

44. State Transportation Improvement Project (STIP) **** -XXXXXX** is scheduled for future construction. Any encroachment determined to be in conflict with the construction of this NCDOT project shall be removed and/or relocated at the encroaching party's expense.

Construction

General

45. An executed copy of the encroachment agreement, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.
46. The Encroaching Party and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this encroachment, the District Office shall be notified by the encroaching party immediately if any violations are cited.
47. Any REVISIONS marked in RED on the attached non-PE sealed plans shall be incorporated into and made part of the approved encroachment agreement.
48. All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the Division Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.
49. The encroaching party shall notify the Division Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the Division Engineer or their representative.
50. A minimum of 5 feet clearance is required for utility installations beneath or near drainage pipes, headwalls, and a minimum of two-foot clearance below the flowline of streams. If directional

drilling, a minimum ten-foot clearance distance is required from drainage structures and a minimum of 5 feet below flowline of streams.

51. At points where the utility is placed under existing storm drainage, the trench will be backfilled with excavatable flowable fill up to the outside diameter of the existing pipe.
52. Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Zone. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.
53. No access to the job site, parking or material storage shall be allowed along or from the **Control of Access Roadway**.
54. Guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the Division Engineer or their representative.
55. The resetting of the Control of Access fence shall be in accordance with the applicable NCDOT standard and as directed by the Division Engineer or their representative.
56. Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.
57. All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the Division Engineer or their representative.
58. Any utility markers, cabinets, pedestals, meter bases and services for meter reading required shall be as close to the Right of Way line as possible. If it is not feasible to install at or near Right of Way line, then written approval shall be obtained from NCDOT prior to installation.
59. Detection tape, where required by NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act, shall be buried in the trench approximately 1 foot above the installed facility. Where conduit is installed in the right of way and is not of ferrous material, locating tape or detection wire shall be installed with the conduit.
60. All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.
61. Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.
62. If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.
63. The encroaching party and their construction contractor must sign and submit the NCDOT *Workforce Safety Plan for Encroachment Activities: COVID-19* form to the District Engineer prior to construction.
64. The attached Duke Energy response to the NCDOT *COVID-19 Workforce Safety Plan* shall be applied for all employees on the job site unless otherwise directed by the District Engineer.

Engineering

65. All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: *ASTM Standards*, *Manual on Uniform Traffic Control Devices*, *NCDOT Utilities Accommodations Manual*, *NCDOT Standard Specifications for Roads and Structures*, *NCDOT Roadway Standard Drawings*, *NCDOT Asphalt Quality Management System* manual, **and the approved plans**.
66. Prior approval for any blasting must be obtained from the Division Engineer or their representative.
67. Regulator stations, metering stations, cathodic test stations, and anode beds are not permitted within NCDOT right of way. Header wires are permitted.
68. Non-Utility Communication and Data Transmission installations (ground mounted type or Small Cell pole-mounted type) must adhere to guidelines in the Utilities Accommodations Manual and, when located within municipal jurisdictions, are subject to review and approval by municipal ordinances and any additional municipal approval for proximity to historic districts and landmarks. All wiring and related telecommunications work shall conform to the latest regulations by the Federal Communications Commission.
69. All wiring and related electrical work shall conform to the latest edition of the National Electrical Safety Code.

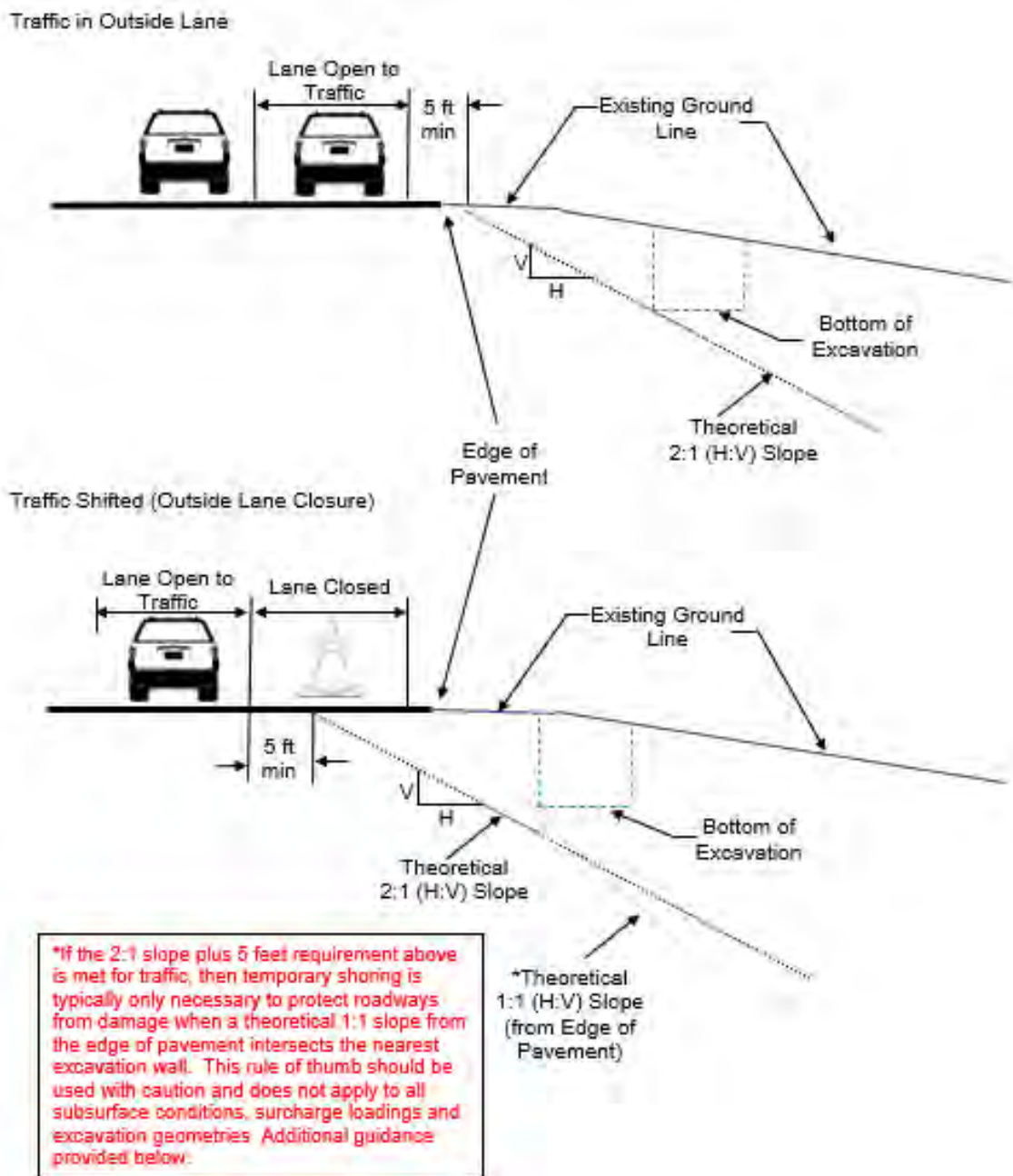
Location within R/W

70. All utility access points, such as manholes, vaults, handholes, splice boxes and junction boxes shall be located as close to the right of way line as possible and shall not be placed in the ditch line, side slopes of the ditches or in the pavement. All manholes, handholes, splice boxes, junction boxes and vaults and covers shall be flush with the ground when located within the vehicle clear zone. Slack loops for telecommunications in industry standard housing units shall be buried a minimum of 18 inches when buried or meet minimum NCDOT vertical and horizontal clearances when installed aerially.
71. Fire Hydrants shall be of the breakaway type. Hydrants shall be placed near the right of way line. In curb and gutter sections with written approval from the District, the hydrants may be placed at 6' behind the back of the curb or minimum 2' back of sidewalk.
72. Luminaire and/or utility poles and guy wires shall be set as close to the Right of Way line as practical and outside the Clear Zone in accordance with the latest version of the AASHTO Roadside Design Guide (See corresponding attachment) or made breakaway in accordance with the requirements of NCHRP Report 350. Any relocation of the utility poles from the original design due to Clear Zone requirements shall require a re-submittal for the utility design.
73. Luminaire and/or utility poles shall be set a minimum of 5'-6" behind face of any guardrail or otherwise sufficiently protected. However, standard placement may be reduced to 3'-6" behind face of guardrail when posts are spaced 3'-1 1/2", or where speed limit is less than 55 MPH.

74. Hot box (aka ASSE 1060) or Safe-T-Cover type enclosures covering utility main pipe joints, backflow preventers, valves, vent pipes, cross connections, pumps, grinders, irrigation assemblies, transformers, generators, and other similar large appurtenances shall be located outside sight distance triangles and off of the NCDOT Right-of-Way.
75. Sprinkler heads shall be located a minimum of 10 feet from the edge of pavement, edge of shoulder, or back of curb whichever is greater and shall be directed so that water does not spray or drain on the roadway surface, sidewalk, or passing vehicles at any time. Upon completion of the installation and prior to activation of the system, the Encroacher shall contact the District Engineer to schedule a test of the system to verify the spray pattern. Sprinkler systems shall not be operated during periods of high wind or freezing weather, or to the extent that the subgrade adjacent to the pavement structure becomes saturated. NCDOT reserves the right to require immediate termination and removal of any sprinkler system which in its judgement and opinion adversely affects safety, maintenance, or operation of the roadway.

Excavation

76. Excavation material shall not be placed on pavement.
77. It is the responsibility of the encroaching party or their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.
78. The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in [Type B or C soils as defined by OSHA Technical Manual](#). Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to <https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx> and see SP11 R002

- a. Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT *Utilities Accommodations Manual* for more information on requirements for shoring plans, design calculations, and subsurface investigation report.) **Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.**
 - b. All trench excavation inside the limits of the theoretical two-to-one slope plus 5 feet requirement, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.
 - c. The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest *NCDOT Standard Specifications for Roads and Structures*, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.
 - d. At the discretion of the Division Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The encroaching party shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the encroaching party (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the encroachment agreement and that the backfill material meets the Statewide Borrow Criteria.
 - e. The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.
79. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.

Directional bore

80. Boring equipment will be provided of a type and size to facilitate boring in the local geologic conditions and shall be able to facilitate the encroachment work.
81. When Horizontal Directional Drilling (HDD) is used, the following stipulations apply:
- a. Use drilling fluids as appropriate for the type soils but use of water alone is prohibited. Pump drilling fluids only while drilling or reaming. Directional boring using jetting with a

Bentonite (or equivalent material) slurry is recommended. Monitor flow rates to match the amount leaving the bore hole and do not increase pressure or flow to free stuck drill heads, reamers or piping. Open cutting to retrieve stuck drill heads is not allowed without prior permission from the District Engineer.

- b. The minimum depth shall adhere to the table below for transverse (under non-controlled access, partial controlled access, or limited controlled access roadway) installations and refers to maximum diameter of hole drilled and not the dimension of the carrier or encasement pipe.

<u>Diameter of Drilled Hole (Backream)</u>	<u>Minimum Depth of Cover</u>
2" to 6"	5 feet
>6" to 15"	12 times hole diameter (e.g. 6-inch hole means 6 feet minimum depth)
>15" to 36"	15 feet or greater

- c. Under fully controlled access roadway installations, the minimum depth for transverse crossings shall be 15 feet under any pavement (ramps or thru lanes)
- d. An overbore (backream diameter) shall not be more than 1.5 times the outside diameter of the pipe or encasement under any highway for pipes 12 inches in diameter or less. For pipes with outer diameter larger than 12 inches, the overbore may be no larger than outer diameter of pipe plus 6 inches. An overbore exceeding 1.5 times greater than the outside diameter of the pipe or encasement may be considered if the encroachment agreement includes a statement signed and sealed by a licensed North Carolina Professional Engineer indicating that an overbore in excess of 1.5 times the outside diameter of the pipe or encasement will appropriately arch and no damage will be done to the pavement or sub-grade.
- e. Directional boring is allowed beneath embankment material in naturally occurring soil.
- f. Any parallel installation utilizing the directional boring method shall be made at a minimum depth of three (3') feet (cover) below the ground surface and outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway.
- g. All directional bores shall maintain ten (10) feet minimum (clear) distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. Directional bores are not allowed beneath bridge footings, culvert wingwall footings, slope protection or retaining walls.
- h. The tip of the drill string shall have a cutter head.
- i. Detection wire shall be installed with non-ferrous material.
- j. HDPE pipe installed by directional boring shall not be connected to existing pipe or fittings for one (1) week from the time of installation to allow tensional stresses to relax.

Aerial clearances

82. Vertical clearance of overhead power and communication lines shall meet the National Electrical Safety Code requirements except the minimum vertical clearance shall be 18' for crossings over NCDOT roadways (24' over Fully Controlled Access roadways) and 16' for parallel installations.

83. In relation to the bridge, the utility line shall be located with minimum clearances as indicated on the attachment for NCDOT **Required Clearances for Aerial Installations by Encroachment Near Bridge Structures**.

Pavement Detail and Repair

84. The paving of this roadway shall be in accordance with the latest version of NCDOT Standard Specifications, Sections 610, 1012 and 1020. The Contractor shall follow all procedures of the Quality Management System (QMS) for asphalt pavement - Maintenance Version (see <https://connect.ncdot.gov/resources/Materials/MaterialsResources/2018%20QMS%20Asphalt%20Manual.pdf>). The Contractor must adhere to all testing requirements and quality control requirements specified. The Contractor shall contact the NCDOT Division QA Supervisor prior to producing plant mix and make the Supervisor aware that the mix is being produced for a future NCDOT road. Contact the District Engineer to determine the NCDOT Division QA Supervisor. Only NCDOT approved mix designs will be acceptable. A Quality Control Plan shall be submitted (as Directed by the District Engineer) to the District Engineer's Office prior to asphalt production utilizing form QMS-MV1. Failing mixes and/or densities are subject to penalties including monetary payments or removal and replacement. To minimize traffic queuing in construction areas, the possibility of traffic detours may be considered when working on high traffic routes even if traffic control is used. The District Engineer may require traffic detours.
85. When paving beyond utility installation is involved, a Roadway certification report sealed by a Professional Engineer shall be submitted to the District Engineer's office indicating the following:
- Pavement thickness by type
 - Pavement density, core and/or test locations
 - Base thickness
 - Base density
 - Subgrade density
- Test frequency and method shall be in conformance with the NCDOT *Materials and Tests Manual*. Test must be performed by a Certified Technician including name and Certification number on report.
86. "Potholing" pavement cores to expose existing utilities shall be made with an 18" diameter keyhole pavement core. Pavement core locations shall not be placed in the wheel path whenever possible. Vacuum excavation shall be utilized to expose underground utilities. Pavement cores shall be repaired within the same working day. The pavement core shall be retained and reused to fill the core hole.
- The excavation shall be backfilled and compacted with select material to the bottom of the existing pavement structure or as indicated by the District Engineer. The retained core shall be placed in the hole and secured with a waterproof, mechanical joint. If the pavement core is damaged and cannot be re-used, the core may be replaced with the surface mix, S9.5B. The asphalt patch shall match the thickness of the existing asphalt or four inches, whichever is greater. All materials must be listed on the NCDOT Approved Products List (APL) found at: <https://apps.ncdot.gov/vendor/approvedproducts/>.
87. The minimum pavement design for pavement repair shall be according to NCDOT Standard Drawing 654.01 (<https://connect.ncdot.gov/resources/Specifications/2018StandardRdwyDrawings/Division%2006%20Asphalt%20Bases%20and%20Pavements.pdf>) and shall include a mechanical overlay extent to be a minimum of 25 feet each side of the pavement repair area OR as directed by the District Engineer.
88. Pavement cuts shall be repaired the same day the cuts are made unless an asphalt patch cannot be accomplished the same day due to material availability or time restrictions. When the asphalt patch is not feasible, the following apply:

- a. The pavement cut shall be filled to the surface with ABC stone or Flowable Fill per NCDOT's Standards and Specifications.
 - b. Once the cut is filled, a minimum ¾-inch steel plate shall be placed and pinned to prevent moving. Plates shall be designed large enough to span a minimum of 1-foot on all sides on the pavement cut.
 - c. When flowable fill is used, it shall cure for 24 hours prior to any asphalt material placement. Flowable fill bleed water shall not be present during paving operations. Paving shall not cause damage (shoving, distortion, pumping, etc.) to the flowable fill.
 - d. Install and leave "BUMP" signs according to MUTCD until the steel plate has been removed. Once the flowable fill has cured, remove the steel plate, and mill/fill according to the directions of the District Engineer.
 - e. All pavement cuts must be sealed with NCDOT approved sealant to prevent future pavement separation or cracking.
89. Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform encroachment work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Encroaching Party.

Post Construction

Close out/ Inspection

90. The Encroaching party shall notify the District Engineer's office within 2 business days after construction is complete. The District Engineer may perform a construction inspection. Any deficiencies may be noted and reported to the encroaching party to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.
91. At the discretion of the District Engineer, a final inspection report may be provided to the encroaching party upon satisfactory completion of the work.
92. A written acknowledgement of the completed work by the District Engineer's office begins the one-year warranty period associated with the performance bond.
93. If the actual construction differs from the approved plans associated with this encroachment, a copy of "as-built" plans shall be submitted to the District Engineer's office in a PDF format and in a current ESRI GIS format within 4 weeks of construction.
94. The encroaching party shall provide the North Carolina Turnpike Authority (NCTA) with an electronic copy of coordinate correct as-built plans within two weeks of installation completion. Failure to provide the as-built plans may jeopardize future approvals within NCTA right of way.

95. A copy (in PDF format) of the completed ground water analysis shall be given to the District Engineer, including detailed drawings of the “as-built” wells showing location, depth and water level in well.

NCDOT Fiber Optic System

96. The relocation of any overhead or underground fiber optic components within NCDOT’s fiber optic system will be the responsibility of the developer when they are impacted by the development. This relocation shall be completed by a contractor that is qualified with the NCDOT to complete this work. Materials for this work must be approved by NCDOT prior to installation. When fiber splicing occurs, any splicing would need to be completed the same day to ensure that NCDOT retains communication with the traffic signal system, traffic cameras, overhead message signs, and dynamic trailblazing signs. At no time can the fiber be disconnected/cut and left. Once any cut has been made, the re-splicing should occur immediately. When splicing is necessary, fusion splices will be required and the OTDR report will need to be provided to the Department. No mechanical splices will be permitted. Where extra fiber is required, it will be the responsibility of the Developer to provide the extra fiber. NCDOT’s current splice enclosures/cans must be maintained and cannot be impacted by the Development. If they are impacted, they must be moved and replaced. Any costs associated with NCDOT’s fiber relocation will be the responsibility of the development. The Developer shall contact the Deputy Division Traffic Engineer at (828)298-0094 to coordinate any fiber optic relocations prior to construction.

ATTACHMENT FORM

NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W

Instructions for use:

This form must be completed in its entirety and submitted directly to the designated personnel in the District Engineer's office via email, fax or hand delivery a minimum of one week prior to construction for the encroachment. If the designated NCDOT personnel names are unknown by the person completing this form, please contact the District Engineer's office to determine that contact info.

Date: _____ Submitted by Name: _____

To: District Personnel Name: _____
District Personnel Email: _____
District Fax No.: _____

This notification is to inform you that we (encroaching party or their contractor) will begin construction work on the following project in a minimum of one week.

Encroachment number

(assigned by NCDOT) for the project: _____

Construction start date: _____

Approximate ending date: _____

Contact NCDOT inspector a minimum of 72 hrs. in advance to set-up Preconstruction meeting in the District Engineer's office or other location as directed by the District Engineer

Preconstruction meeting date & time: _____

Preconstruction meeting address: _____

Type of project: _____
[Examples: power, telecommunication, water, sewer, gas, petroleum, other (describe)]

Contact Info for this project:

Contractor Company Name: _____

Contractor Contact Name: _____

Contractor Phone Number: _____

Contractor Email: _____

NCDOT Utility Inspector Name: _____

NCDOT Utility Inspector Phone: _____

NCDOT Utility Inspector Email: _____

NCDOT Utility Project Manager Name: _____

NCDOT Utility Project Manager Phone: _____

NCDOT Utility Project Manager Email: _____



March 12, 2021

Mr. Nick Dorato

Div. 13 District II Engineer's Office

11 Old Charlotte Hwy.

Asheville NC, 28803

RE: Temporary encroachment along Amboy Rd. bridge over the French Broad River for MSD to install a temporary 24" sewer line. MSD Project No. 20201024

Dear Mr. Dorato,

We are submitting an application for a temporary encroachment along Amboy Rd in Buncombe Co. over the French Broad River bridge on behalf of MSD of Buncombe Co. The temporary encroachment is needed to complete repairs on the main sewer line in this area and a 24" HDPE temporary sewer line is needed to be laid the full length of the bridge along the south shoulder to bypass the construction project. The 24" pipe will be approx. 543' long and will also run beside both abutment slopes to tie back into the existing sewer line inside the sewer easement. The pipe will be attached to the rail by either chains or nylon straps. The project is scheduled for late summer or early fall and the temporary pipe will be in place for about 7-8 months. We have attached a letter of intent to install proper erosion control measures along with our application. Please let us know if you have any questions or if more information is needed.

Sincerely,

VAUGHN & MELTON CONSULTING ENGINEERS, INC.

Michael A Calhoun

Mike Calhoun, PE



CONTACT INFORMATION:

Ed Bradford, PE

Director of Engineering

MSD of Buncombe County, NC

(828) 254-9646

ebradford@msdbc.org

Mike Calhoun, PE

Vaughn & Melton Consulting Engineers

(828) 253-2796

macalhoun@vaughnmelton.com



Metropolitan Sewerage District

OF BUNCOMBE COUNTY, NORTH CAROLINA

March 9, 2021

Nick Dorato
District II Engineer's Office
11 Old Charlotte Hwy
Asheville, NC 28803

**RE: Temporary Encroachment along Amboy Road Bridge over French Broad River
Letter of Intent to Install Proper Erosion Control Measures**

Dear Mr. Dorato,

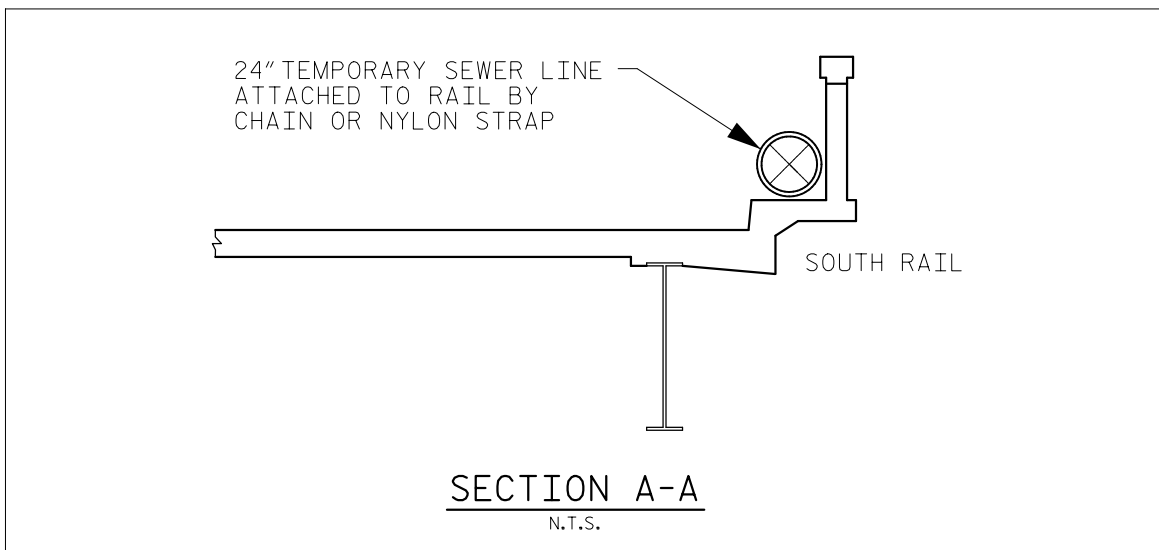
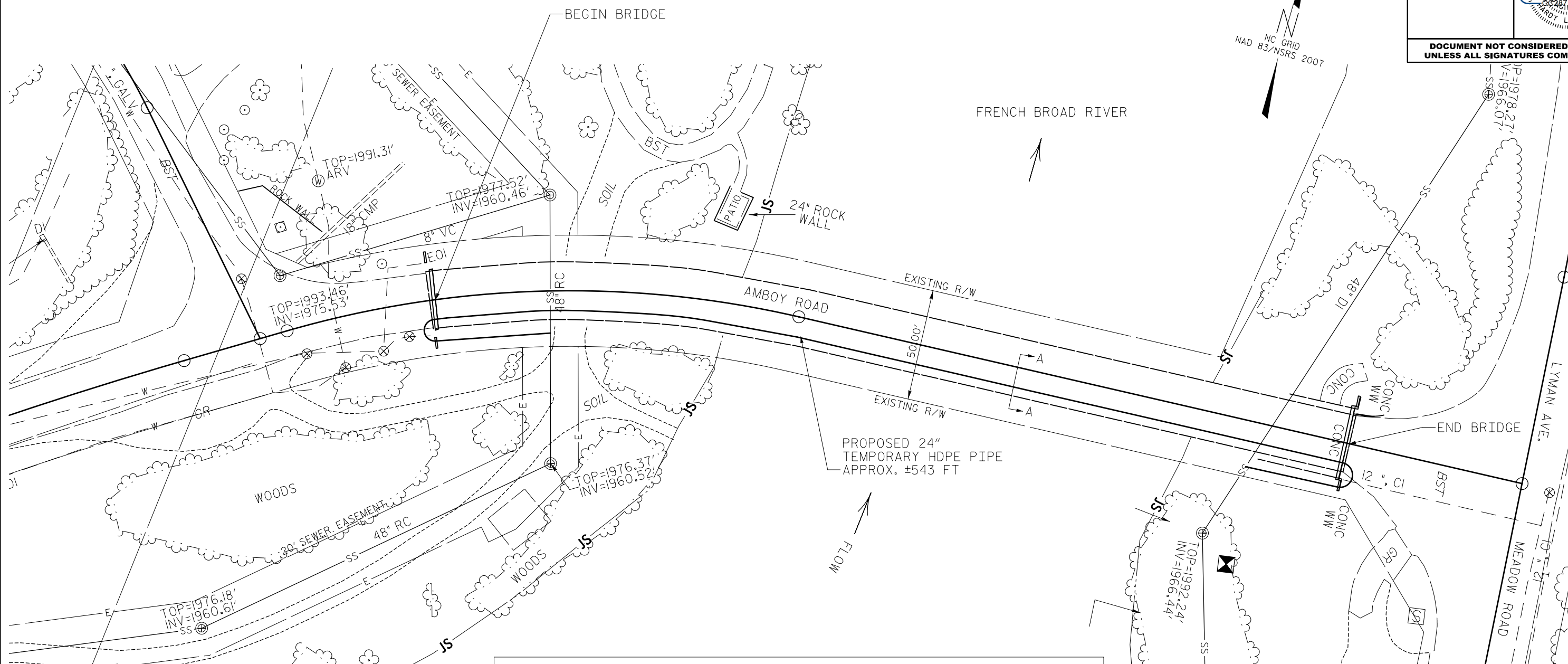
MSD of Buncombe Co. intends to install all proper erosion control measures needed per NCDOT Standards and Specifications along Amboy Rd. during the installation of the temporary sewer pipe and until its removal. The site disturbance on NCDOT ROW is less than 1 acre; therefore, no erosion control plan is needed for this portion of the project.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ed Bradford".

Ed Bradford, PE
Director of Engineering
MSD of Buncombe County, NC

~ *Protecting Our Natural Resources* ~



V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3590
 Bloom, NC 828-355-9933
 Tri-Cities, TN 423-467-8401
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
 Middleboro, KY 606-248-6600

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DRAWN BY: HL DATE: MAR 2021
 DESIGNED BY: JEB DATE: MAR 2021
 CHECKED BY: HLW DATE: MAR 2021

PLAN SHEET

**MSD TEMPORARY SEWER
LINE ENCROACHMENT
ON AMBOY ROAD BRIDGE
OVER FRENCH BROAD RIVER**

METROPOLITAN SEWERAGE DISTRICT
OF BUNCOMBE COUNTY NORTH CAROLINA

BUNCOMBE COUNTY

**LOCATION: TEMPORARY ENCROACHMENT ALONG AMBOY ROAD
BRIDGE OVER FRENCH BROAD RIVER**

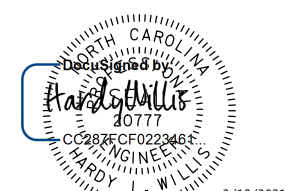
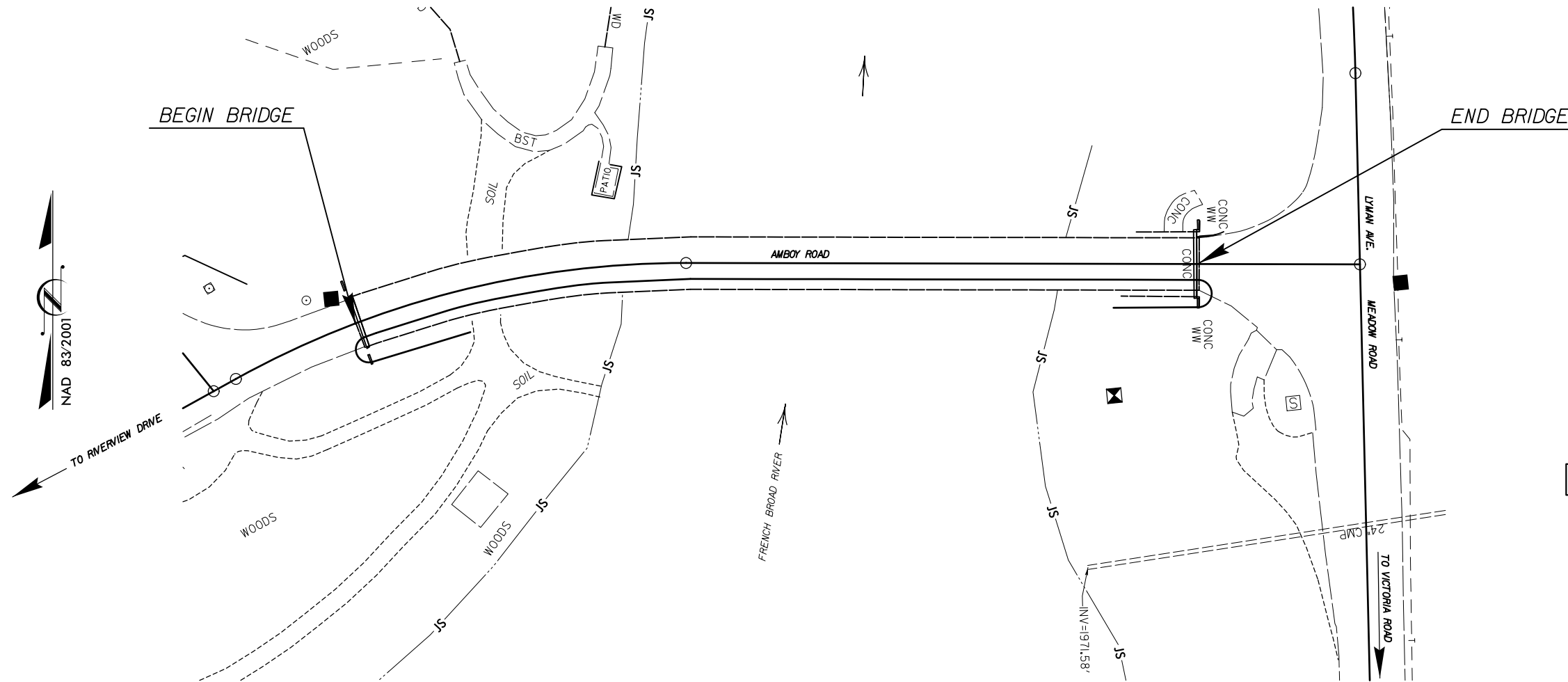
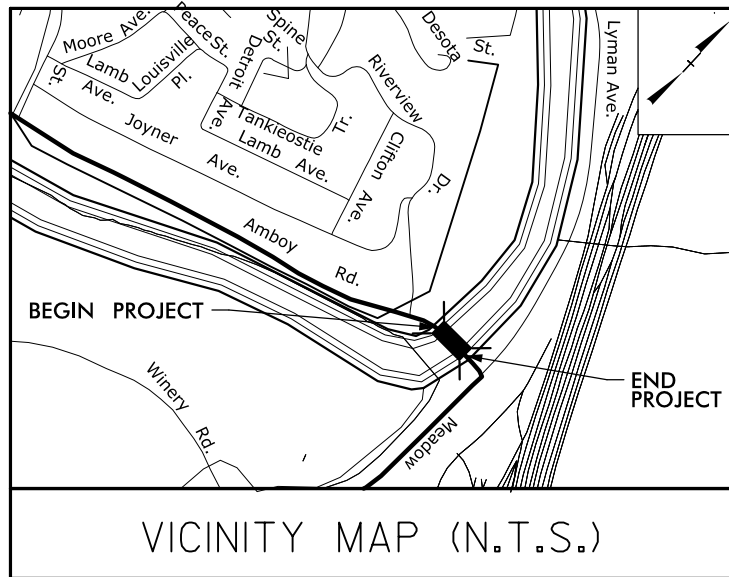
TYPE OF WORK: INSTALL 24" TEMPORARY BYPASS SEWER LINE

**REFERENCE PROJECT: MSD PROJECT NO. 20201024
TEMPORARY BYPASS ON 54"
LINE NEAR CARRIER BRIDGE**

CONTACT INFORMATION

Mike Calhoun, PE
Vaughn & Melton Consulting Engineers
(828)253-2796
macalhoun@vaughnmelton.com

Ed Bradford, PE
MSD of Buncombe Co., NC
(828)254-9646
ebradford@msdbc.org



**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-8403
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Middlesboro, KY 606-248-6600
Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
Atlanta, GA 770-627-3590

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TITLE SHEET

MSD TEMPORARY SEWER
LINE ENCROACHMENT
ON AMBOY ROAD BRIDGE
OVER FRENCH BROAD RIVER

DRAWN BY: HL DATE: MAR 2021
DESIGNED BY: JEB DATE: MAR 2021
CHECKED BY: HLW DATE: MAR 2021

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Temporary Encroachment for MSD Sewer Repair

Write a description for your map.

Legend

- Amboy Rd at Riverview Dr

Amboy Rd

24" temporary sewer line
running along full length
of south curb

Meadow Rd



Temporary Encroachment for MSD Sewer Repair

Write a description for your map.

Legend

- Amboy Rd at Riverview Dr



WORKFORCE SAFETY PLAN

FOR ENCROACHMENT ACTIVITIES: COVID-19

EFFORTS THE N.C. TRANSPORTATION INDUSTRY IS TAKING TO STOP THE SPREAD OF COVID-19

The North Carolina Department of Transportation (NCDOT) and their partners expect all parties involved in the delivery of transportation projects to abide by the guidelines issued from the Centers for Disease Control and Prevention (CDC) and the North Carolina Department of Health and Human Services (NCDHHS).

Response to COVID-19 is rapidly evolving; new information and guidelines may be issued from the CDC, NCDHHS, or other state or federal agencies. NCDOT and their partners should review the current CDC and NCDHHS guidance, including the resources listed at the end of this document, for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidance included in this document.

Though certain Americans with Disabilities Act (ADA) requirements have been relaxed in response to the pandemic, employers must still maintain all information about employee illness as a confidential medical record in compliance with the ADA. If an employee is suspected of having or tests positive for COVID-19, it is essential that management keep the identity of the employee and details related to the employee's health confidential.

Below are precautions required by NCDOT and from encroaching parties and their contractors performing construction within NCDOT Rights of Way. The term employee refers to any person on a job site within NCDOT right of way for the purpose of constructing or inspecting the work related to construction of a facility under an approved encroachment agreement and where that employee may or may not be under employment by or under contract to NCDOT.

EMPLOYEE WELLNESS

- If an employee has not yet reported to work and develops any COVID-19 symptoms (i.e. fever, coughing, or shortness of breath) — STAY HOME and immediately:
 - Call a health care provider
 - Self-Isolate
 - Communicate with your supervisor
 - Remain calm and follow all instructions from your health care provider
- Employees who appear to have acute respiratory illness symptoms (i.e. cough, shortness of breath) upon arrival to work, or become sick during the day, should be separated from others and sent home immediately. The potentially affected employees should immediately follow the steps outlined above, which includes immediately contacting a health care provider.
- Should an employee show symptoms of acute respiratory illness or be diagnosed with COVID-19, all other employees who have worked in close proximity to the affected employee during the last 14

days and all encroachment points of contact indicated at the end of this plan should be notified of potential exposure to the disease without identifying the affected employee.

- Consideration should be given to employees at “High Risk” of severe illness from COVID-19, who, per NCDHHS, include employees:
 - Over 65 years of age, **OR**
 - With underlying health conditions including heart disease, lung disease, or diabetes, **OR**
 - With weakened immune system
- “High Risk” Employees should be given the opportunity to discuss alternate work arrangements/duties with their employer or take leave according to their company policies.
- For guidance on confirmed positive tests for COVID-19, refer to the most recent version of the “COVID-19 Guidance for Employees on Encroachment Job Sites within NCDOT Right of Way” located on last page of this plan.

PERSONAL HYGIENE

- Clean hands often by washing with soap and water for 20 seconds. If soap and water are not available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains 60%-95% alcohol may be used.
- Avoid touching your eyes, nose, mouth, or other parts of your face.
- Do not breathe, cough, or sneeze on another person or into the open air. Employees should cover their noses and mouth with a tissue when coughing or sneezing (or an elbow or shoulder if no tissue is available).
- A facemask for covering nose and mouth is encouraged on the job site.
- Appropriate gloves are encouraged while performing functions of the job.

CLEANING/DISINFECTING

- Wash stations and/or hand sanitizer are encouraged on each project site.
- Appropriate cleaning staff should clean frequently touched surfaces and objects with disinfectants at a minimum of once per day.
 - Office/buildings: door knobs, light switches, phones, computers/keyboards, copy machines, elevator buttons, toilets, faucets, sinks, countertops, paper towel dispensers, desktops, handrails, folders, vending machines, counters, tables, cabinets/knobs, etc.
 - Shop Yard/Jobsite: vehicle/equipment door handles, keys, gear shifts, steering wheel/operator controls and levers, fuel pump dispensers, touch points on machinery, etc.
 - Electronic equipment: cell phones, computers, keyboards, etc.
- Appropriate cleaning staff should sanitize/disinfect facilities and work areas after persons suspected/confirmed to have COVID-19 have been in the facility or work area.

- It is recommended to close off access to areas used by the ill persons and wait as long as practical, 24 hours if possible, before beginning cleaning and disinfection to minimize potential for exposure to respiratory droplets. Open outside doors and windows to increase air circulation in the area if possible.
- Appropriate cleaning staff should clean and disinfect all areas used by the ill persons, focusing especially on frequently touched surfaces.

GENERAL

- Increase communication measures between all parties regarding schedule, daily activities, etc. to reduce/minimize worker exposure in accordance with but not limited to the requirements below.
- Minimize on-site personnel such as subcontractors, work crews, QC personnel, and inspection staff to those required for that day's activities. If work is postponed or cancelled, immediately notify appropriate parties.
- Practice "Social Distancing" whenever feasible. Social Distancing is designed to limit the spread of a disease by reducing the opportunities for close contact between people. All personnel have the responsibility to remind each other to stay 6 feet or more apart. Examples of Social Distancing include:
 - Reducing face-to-face exposure by using conference calls and video conferencing
 - If an in-person meeting is absolutely required and cannot be rescheduled or attended remotely, the meeting is limited to a maximum of 10 people while maintaining Social Distancing of 6 feet or more.
 - Avoiding unnecessary travel
- Do not congregate at lunch or breaks. Bringing your lunch is encouraged.
- No communal coolers or drink stations are allowed. Supervisors should confirm with employees prior to beginning work for appropriate hydration and nutrition availability to employees for the duration of the employee's shift and without direct contact with others on the job site.
- First line of communication should be by phone, rather than in-person.
- Do not shake hands.
- Do not share iPads, tablets, pens, or clipboards for signing or any other purpose. Take pictures as proof of attendance at meetings.
- Sharing of Personal Protective Equipment (PPE) is strictly prohibited.
- Vehicles, equipment, and tools
 - Limit the number of people riding in a vehicle together.
 - Wipe down and disinfect vehicles after each trip.
 - As much as possible, do not share tools or equipment. If a tool or piece of equipment must be shared, the parts of it that are touched should be sanitized between uses.

RETURN TO WORK

- The following criteria must be followed for an employee who is tested for Covid-19, or asked to self-quarantine by health officials, or has contact with another employee with a positive test result to return to work:
 - at least a 14-day quarantine; **OR**
 - release by a health care provider.
- In accordance with CDC guidance, the following criteria must be followed for an employee with a positive test result to return to work:
 - at least 14 days from positive test notification; **AND**
 - at least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); **AND**
 - at least 7 days have passed since symptoms first appeared.

NCDOT may require certification of fitness to work from a health care provider.

ADDITIONAL RESOURCES

NCDOT and their partners should review the CDC and NCDHHS resources listed below for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidelines included in this document.

- NCDHHS COVID-19 Resources:
 - <https://www.ncdhhs.gov/divisions/public-health/coronavirus-disease-2019-covid-19-response-north-carolina>
- NCOSHR Communicable Disease Emergency Policy
 - <https://oshr.nc.gov/policies-forms/workplace-wellness/communicable-disease-emergency>
- OSHA Guidance on Preparing Workplaces for COVID-19
 - <https://www.osha.gov/Publications/OSHA3990.pdf>
- CDC COVID-19 Resources:
 - <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

AGREEMENT

The encroaching party shall adhere to the requirements of this plan in order to continue work under their approved encroachment agreement. Violations to this plan could result in the violating entity not being allowed to continue work or all work ceasing as determined by the NCDOT District Engineer or Resident Engineer.

PROJECT POINTS OF CONTACT

NCDOT





Name: Nick Dorato
Phone #: 828-298-2741
nkdorato@ncdot.gov

Encroaching Party (Primary Contact)

Name: Ed Bradford - MSD
Phone #: 828-254-9646
ebradford@msdbc.org

**Primary Contractor to Encroaching Party
(Point of Contact)**

Name: _____
Phone #: _____

COVID-19 Guidance for Employees on Encroachment Job sites within NCDOT Right of Way				
Relationship to Confirmed POSITIVE Test		CONTACT GROUP		
		What YOU Should Do	What your CREW Should Do <i>Exposure within 6' and longer than 10 minutes</i>	What PROJECT SITE Personnel Should Do <i>No exposure within 6' and longer than 10 minutes</i>
Employee		<p>Notify your supervisor</p> <p>Self-quarantine for 14 days</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Directly exposed crew self-quarantine for 14 days</p> <p>Continue hygiene & disinfecting measures</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Site personnel without direct contact may continue onsite work or follow their company policy</p> <p>Continue hygiene & disinfecting measures</p>
<p>Direct Contact</p> <p><i>Interaction with an infected person within 6' and longer than 10 minutes</i></p>		<p>Self-quarantine for 14 days</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Crew may continue onsite work or follow their company policy</p> <p>Continue hygiene & disinfecting measures</p>	<p>Advise of POSITIVE test *</p> <p>Continue hygiene & disinfecting measures</p>
Secondary Contact		<p>You may continue onsite work or follow your company policy</p> <p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>
Two or more Persons Removed from Contact		<p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>
<p>*Notification Protocol</p> <p><i>(Comply with HIPAA & ADA confidentiality requirements)</i></p>	NCDOT employee / agent tests POSITIVE	<p>NCDOT District Engineer/Resident Engineer notifies Encroaching Party's primary point of contact and Contractor Point of Contact, CDC and, if Resident Engineer has oversight for the job site, FHWA any Consultant Firms working for NCDOT</p> <p>Encroaching party representative notifies other Contractors, Sub-Contractors and Suppliers with exposed Employees</p>		
	Encroaching Party or Contract crew member on job site tests POSITIVE	<p>Encroaching party representative or Contractor point of contact notifies appropriate NCDOT District Engineer or Resident Engineer and all other Contractors, Sub-Contractors and Suppliers with exposed Employees</p> <p>NCDOT notifies CDC, and as appropriate, FHWA and any Consultant Firms working for NCDOT</p>		



French Broad Interceptor Emergency Repair

APPENDIX B

Hobas Pipe Submittal



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PIPE SUBMITTAL

French Broad Interceptor at Amboy Rd.

Submitted to:
Buncombe County MSD

c/o
Buncombe County MSD

Project Location:
Asheville, NC

This submittal is approved for pipe production without technical modifications.

APPROVED BY (PRINT NAME): _____

REPRESENTING (PRINT OWNER'S NAME): _____

TITLE: _____

SIGNATURE: _____ DATE: _____

**NO PIPE OR FITTINGS WILL BE MANUFACTURED
WITHOUT A WRITTEN APPROVAL OF THIS SUBMITTAL**



CONTENTS

Certificates of Compliance	5
Pipe & Gasket Information	7-8
Installation Guidance	10-13
Handling, Cutting, Assembly, & Storage Guidance	14-29
Performance Calculations	31-35
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June 7, 2022

Darrin Prosser
Buncombe County MSD
2028 Riverside Dr.
Asheville, NC 28804
(828) 225 8280

Subject: French Broad Interceptor at Amboy Rd. – Pipe Submittal

The following and the attached constitute our pipe submittal for the above referenced project:

1. Product Data:

Application:	Sanitary Sewer
Product Description:	Glass-Fiber-Reinforced Thermosetting Polyester Mortar Pipe
Installation:	Direct Bury
Diameter (ϕ):	60" Nom.
Dimensions:	see next pages
Stiffness:	72 psi min.
Deflection:	5% allowable maximum long term
Joint Type:	FWC Coupling
Section Length:	20' Nominal (+2"/-4", 90% Typ.)
2. "Certification of Compliance" with ASTM D3262, per Section 1.
3. Pipe, Joint & Gasket Details, per Section 2.
4. Standard Transportation, Storage, Handling, Assembly, Installation, & Cutting Instructions, per Section 3.
5. Performance Calculations & Test Reports, per Section 4.

Please feel free to contact me if additional information is required.

Sincerely,

Jonathan Do

Jonathan Do
Engineering Associate
HOBAS Pipe USA



Section # 1

of:

HOBAS Pipe Submittal

for:

French Broad Interceptor at Amboy Rd.



June 7, 2021

Contractor: Buncombe County MSD
Project Name: French Broad Interceptor at Amboy Rd.

Certification of "COMPLIANCE WITH SPECIFICATIONS"

HOBAS PIPE USA certifies that the pipes and gasket material for use on the above referenced project will be in accordance with:

- ASTM D3262 (Standard Specification for Fiberglass Sewer Pipe)
- ASTM D3681 (Standard Test Method for Chemical Resistance of Fiberglass Pipe in a Deflected Condition)
- ASTM D4161 (Specification for Fiberglass Pipe Joints Using Flexible Elastomeric Seals)
- ASTM D3567 (Practice for Determining Dimensions of "Fiberglass" Pipe & Fittings)
- ASTM F477 (Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe)



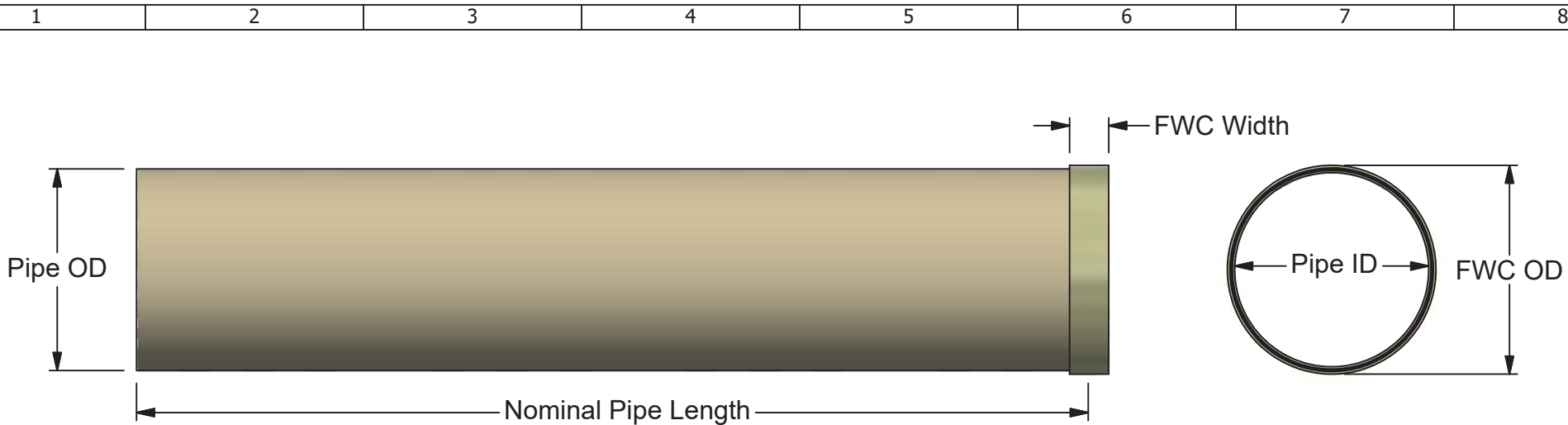
Section # 2

of:

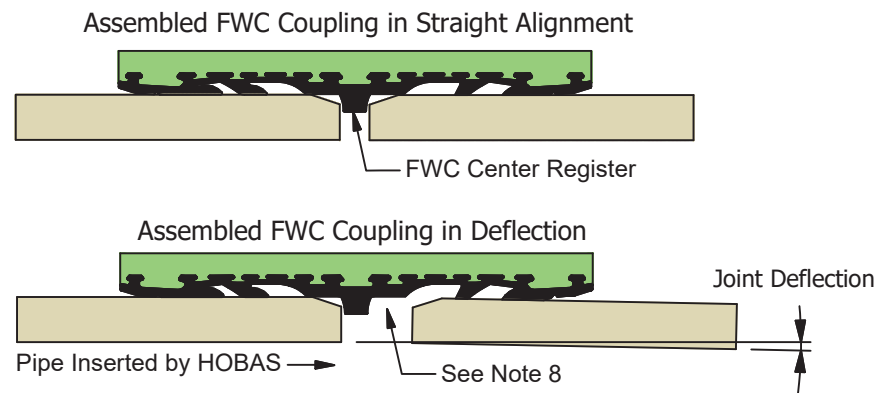
HOBAS Pipe Submittal

for:

French Broad Interceptor at Amboy Rd.



Standard Pipe Section		DN 60	SN 72 PN 25
Description	Value	Unit	
Pipe Outside Diameter (OD)	62.9	in	
FWC Coupling OD	65.2	in	
Max Service Pressure	25	psi	
FWC Weight	140	lbs	
FWC Width	11.4	in	
FWC Gasket Material	EPDM	-	
FWC Joining Force	10,500	lbs	
Max Allowable Joint Deflection	0.91	deg	



Applicable Standards & Test Methods		
ASTM D3262	ASTM D4161	ASTM D3681
ASTM D2412	ASTM D3839	ASTM D3567
ASTM F477		

Description:

60in FRPM Pipe

Project Name:	HOBAS Pipe USA 1413 E. Richey Road Houston, Texas 77073 281-821-2200 www.hobaspipe.com
Project Location:	
Contractor:	
Owner:	
Drawn By:	
Part No.	

- Notes:**
- HOBAS Pipe is an OD controlled product and can be field cut.
 - See cutting instructions for bevel dimensions & safety measures.
 - 24-hour deflection recommended max is 3%.
 - 30-day deflection recommended max is 4%.
 - Assembly can be bell into spigot or spigot into bell. Seal is symmetrical.
 - Do not push directly on FWC couplings.
 - See installation instructions for more information.
 - Maximum gap for all FWC's is 1-inch (pipe end to center register).
 - Nitrile Gaskets to be used in PPCA.



EPDM & Nitrile Compound Properties

	<u>Low-Head</u>	<u>High-Head</u>
Hardness, Shore A	40 – 60	40 – 60
Tensile Strength, min. (PSI)	1200	1500*
Ult. Tensile Elongation, min. (%)	325	400
Compression Set – 22 hr. (%), 25% original defl.		
*70 °C	25 %	20 %
Oven Aging (158 °F, 96 hr.)		
*Hardness, Shore A	+8 Max	+8 Max
*Tensile Strength	-15 % Max	-15 % Max
*Ult. Tensile Elongation	- 20 % Max	-20 % Max
Low Temperature Resistance (7 Days, -10 °C)		
*Hardness, Shore A	+15 Max	+15 Max
*Brittle Point	-55 °F	-55 °F
Ozone Resistance (72 hrs., 40 °C, 50 ppm)	No Cracks	No Cracks
Water Absorption (48 hrs., 70 °C)	Max. 5 % V	Max. 5 % V
Tear Strength, Die B (lb./in.)	Min. 200	Min. 200

**For EPDM and nitrile seals, tensile strength min. psi is 1500, per ASTM F477 Table 1.*



Section # 3

of:

HOBAS Pipe Submittal

for:

French Broad Interceptor at Amboy Rd.

A Direct Bury

A1 Trench Construction

A1.1 Trench width

The minimum trench width shall provide sufficient working room at the sides of the pipe to permit accurate placement and adequate compaction of the pipe zone backfill material. Suggested minimum trench dimensions are given in Figure 11.

A1.1.1 Wide trenches

There is no maximum limit on trench width, however, it is required that the pipe zone backfill material be placed and compacted as specified for the full width of the trench or a distance of two diameters on each side of the pipe, whichever is less.

A1.2 Supported trench

When a permanent or temporary trench shoring is used, minimum trench width shall be as per paragraph A1.1 and Figure 11. When using movable trench supports, care should be exercised not to disturb the pipe location, jointing or its embedment. Removal of any

trench protection below the top of the pipe and within two pipe diameters is not recommended after the pipe embedment has been compacted unless all voids created by sheeting removal are filled with properly densified embedment material and any loose soils at pipe zone elevation are properly compacted prior to loading the pipe with overburden. When possible, use movable trench supports on a shelf above the pipe with the pipe installed in a narrow, vertical wall subditch.

A1.3 Dewatering

Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water should be removed by pumps and suitable means such as well points or underdrain bedding. This system should be maintained in operation until the backfill has been placed to a sufficient height to prevent pipe flotation. Care should be taken that any underdrain is of proper gradation and thickness to prevent migration of material between the underdrain, pipe embedment and native soils in the trench, below and at the sides of the pipe.

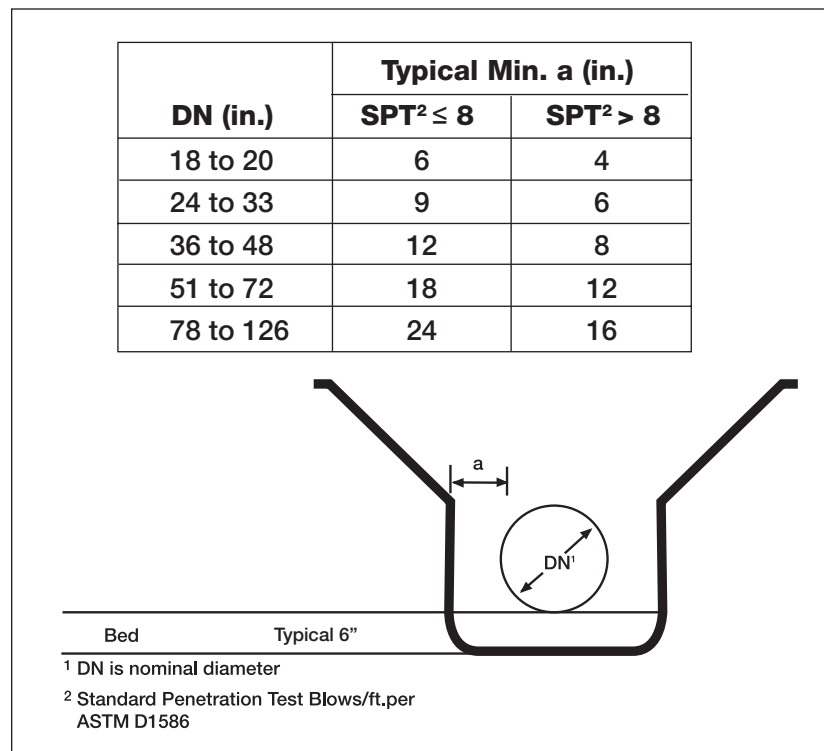
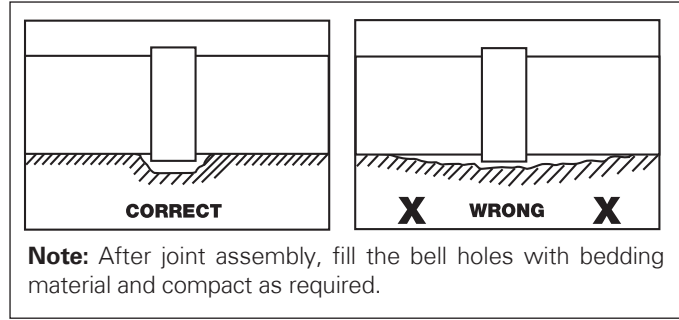


FIGURE 11 - Standard Trench Dimensions

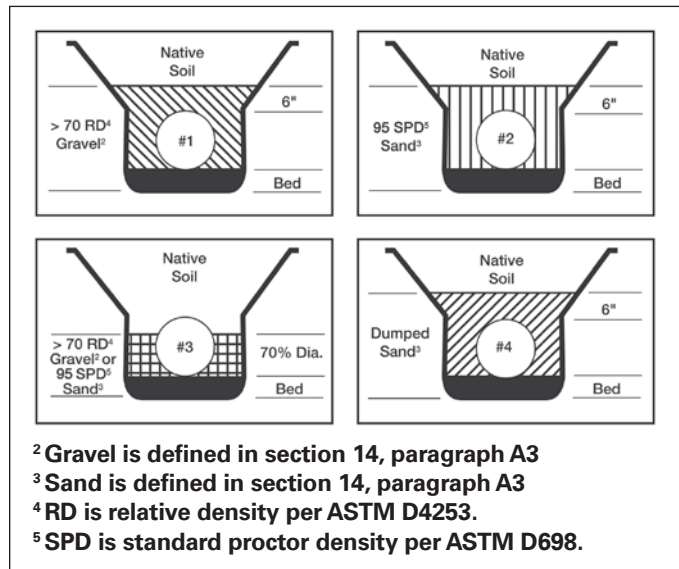
A1.4 Preparation of Trench Bottom

The trench bottom should be constructed to provide a firm, stable and uniform support for the full length of the pipe. Bell holes (Figure 12) should be provided at each joint to permit proper joint assembly and alignment. Any part of the trench bottom excavated below grade should be backfilled to grade and should be compacted as required to provide firm pipe support. When an unstable subgrade condition is encountered which will provide inadequate pipe support, additional trench depth should be excavated and refilled with suitable foundation material. In severe conditions special foundations may be required such as wood pile or sheeting capped by a concrete mat, wood sheeting with keyed-in plank foundation, or foundation material processed with cement or chemical stabilizers. A cushion of acceptable bedding material should always be provided between any special foundation and the pipe. Large rocks and debris should be removed to provide four inches of soil cushion below the pipe and accessories.



Note: After joint assembly, fill the bell holes with bedding material and compact as required.

FIGURE 12 - Bell Holes



- ² Gravel is defined in section 14, paragraph A3
- ³ Sand is defined in section 14, paragraph A3
- ⁴ RD is relative density per ASTM D4253.
- ⁵ SPD is standard proctor density per ASTM D698.

FIGURE 13 - Standard Embedment Conditions

A2 Standard Embedment Conditions

Four standard embedment conditions are given in Figure 13. Others may be acceptable. Please consult us for advice on options.

A3 Pipe Zone (Embedment) Backfill Materials

Most coarse grained soils as classified by ASTM D2487, Classification of Soils for Engineering Purposes, are acceptable bedding and pipe zone (embedment) backfill materials as given in the adjacent table.

Specification	Definition	Symbols
Gravel	Gravel or crushed rock	GW, GP GW-GC, GW-GM GP-GC, GP-GM
Sand	Sand or sand-gravel mixtures	SW, SP SW-SC, SW-SM SP-SC, SP-SM

Maximum grain size should typically not exceed 1 to 1½ times the pipe wall thickness or 1½ inches whichever is smaller.

Well graded materials that will minimize voids in the embedment materials should be used in cases where migration of fines in the trench wall material into the embedment can be anticipated. Alternatively, separate the open graded material from the non-cohesive soil with a filter fabric to prevent migration of the smaller grained soil into the open graded material. Such migration is undesirable since it would reduce the soil density near the pipe zone and thereby lessen the pipe support.

Embedment materials should contain no debris, foreign or frozen materials.

A4 Bedding

A firm, uniform bed should be prepared to fully support the pipe along its entire length (Figure 14). Bedding material should be as specified on Figure 13 and in paragraph A3. Bedding minimum depth should be equal to 25% of the nominal diameter or six inches, whichever is less (Figure 11).

A firm trench bottom must be provided (see paragraphs A1.3 and A1.4). Initially place and compact bedding to achieve ⅔ of the total bed thickness (normally four inches). Loosely place the remaining bedding material to achieve a uniform soft cushion in which to seat the pipe invert (bottom).

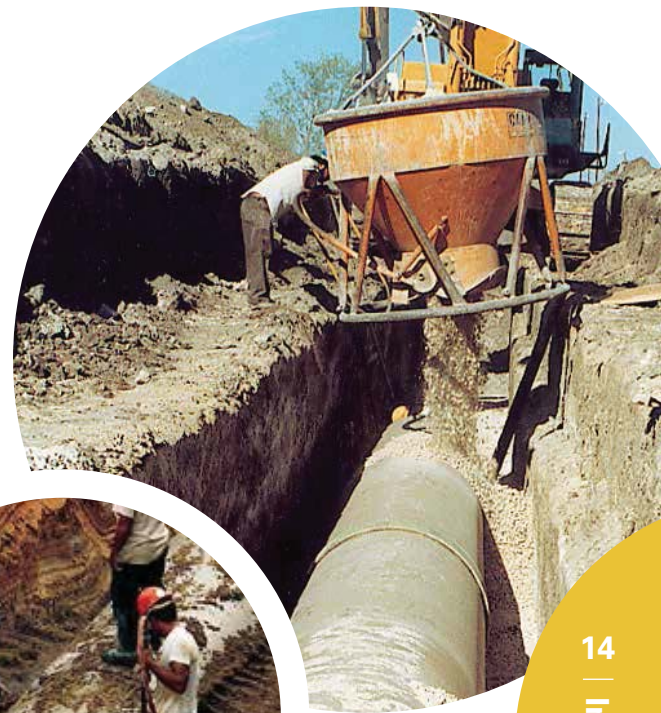
After joining pipes, assure that all bell holes are filled with the appropriate embedment materials and compacted as specified.

Note: Do not use blocking to adjust pipe grade.

A5 Haunching

A very important factor affecting pipe performance and deflection is the haunching material and its density. Material should be placed and consolidated under the pipe (Figure 15) while avoiding both vertical and lateral displacement of the pipe from proper grade and alignment.

Dumped crushed rock is an ideal pipe zone backfill material for HOBAS pipes.



Buried HOBAS pipes are routinely embedded in compacted sand.

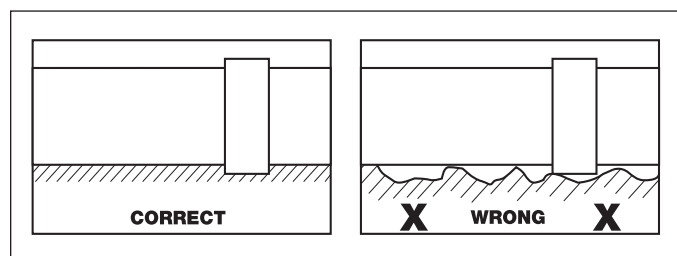


FIGURE 14 - Bedding

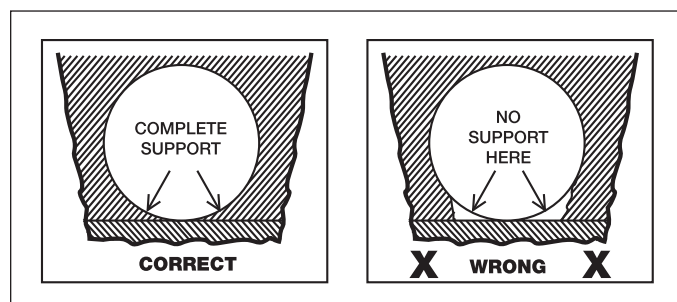


FIGURE 15 - Haunching

A6 Backfilling

Pipe zone (embedment) material shall be as specified on Figure 13 and in paragraph A3. (It must be the same as the bedding material to prevent potential migration.)

Place and compact the embedment material in lifts to achieve the depths and densities specified on Figure 13. Little or no tamping of the initial backfill directly over the top of the pipe should be done to avoid disturbing the embedded pipe.

Remaining backfill may be the native trench material provided clumps and boulders larger than three to four inches in size are not used until 12 inches of pipe cover has been achieved.

A6.1 Maximum Cover Depth

Maximum recommended cover depth is given in Figure 16.

NATIVE SOIL ^{2,5}	COVER DEPTH ¹ (ft.)	EMBEDMENT CONDITION ³			
		1	2	3	4
ROCK Stiff to V. Hard Cohesive ($Q_u \geq 1$ Tsf) Compact to V. Dense Granular (SPT $N \geq 8$ bpf)	10 & <	SN ⁴ 36			SN ⁴ 72
	>10 to 20	SN 46		SN 72	
	>20 to 30	SN 46	SN 72	ALTERNATE INSTALLATION ⁶	
	>30 to 40	SN 72	ALTERNATE INSTALLATION ⁶		
	>40 to 50	SN 90	ALTERNATE INSTALLATION ⁶		
	>50 to 60	SN 120	ALTERNATE INSTALLATION ⁶		
Medium Cohesive ($Q_u \geq 0.5$ Tsf) Loose Granular (SPT $N \geq 8$ bpf)	10 & <	SN 36	SN 46	SN 72	SN 72
	>10 to 20	SN 46	SN 72	ALTERNATE INSTALLATION ⁶	
	>20 to 30	SN 72	ALTERNATE INSTALLATION ⁶		
	>30 to 40	ALTERNATE INSTALLATION ⁶			
Soft Cohesive ($Q_u \geq 0.25$ Tsf) V. Loose Granular (SPT $N \geq 2$ to 3 bpf)	10 & <	SN 36	SN 46	SN 72	ALTERNATE INSTALLATION ⁶
	>10 to 20	SN 46	SN 72	ALTERNATE INSTALLATION ⁶	
	>20 to 30	SN 72	ALTERNATE INSTALLATION ⁶		
V. Soft Cohesive ($Q_u \geq 0.5$ Tsf) V. V. Loose Granular (SPT $N \sim 1$ bpf)	10 & <	SN 72	ALTERNATE INSTALLATION ⁶		
	>10 to 20	ALTERNATE INSTALLATION ⁶			

¹ Assuming typ. 1.5 x OD Trench Width (or as in Figure 11)

² Soils adjacent to pipe (pipe zone elevation)

³ Defined in Figure 13

⁴ For zero blow (weight of hammer) soils, use Alternate Installation & SN 72

⁵ SN is nominal stiffness in PSI

⁶ Alternate Installation per section 14, A8-Typ. SN 72 min.

STIFFNESS CLASS KEY

 SN 36	 SN 90
 SN 46	 SN 120
 SN 72	 Alternate Installation

FIGURE 16 - Maximum Cover Depth¹

A6.2 Minimum Cover for Traffic Load Application

Minimum recommended cover depth of compacted fill above the pipe crown prior to application of vehicle loads is given in the above chart. Installation in poor soils or at shallower cover depths is possible by using a surface bridging slab or pipe encasement in concrete or similar.

Embedment Condition ¹	Minimum Cover (ft) for HS20 Load ²		
	SN 18	SN 36 or 46	SN 72
1	4	3	2
2	5	4	3
3	-	5	4
4	-	-	5

¹ See Figure 13. ² Installation in poor soils or at shallower cover depths is possible with improved pipe support such as cement stabilized sand or concrete encasement.

A7 Pipe Deflection

Pipe initial vertical cross-section deflection measured within the first 24 hours after completion of all backfilling and removal of dewatering systems, if used, shall not exceed 3% of the original pipe diameter. (See Appendix G for minimum inside diameters.)

Pipe deflection after 30 days should typically not exceed 4% of the original pipe diameter. Maximum long-term pipe deflection is 5% of the original pipe diameter. (See Appendix G for minimum inside diameters.) Maximum long-term deflection for pipes with vinyl ester resin liner is 4%.

For very high stiffness pipes (approx. SN 120 and above), the maximum long-term deflection may be reduced and the 24 hour and 30 day deflection limits also decreased proportionally.

A8 Alternate Installations

Alternate installations, as indicated on Figure 16, include cement stabilized embedment, wide trenching, permanent sheeting, geo-fabrics or combinations of these systems. Installation design for these situations should be engineered to satisfy the specific conditions and circumstances that are present.



HOBAS®

TECHNICAL ADVICE SHEET

07-01-2021

HANDLING, UNLOADING, STORAGE, AND INSPECTION

General:

Care must be taken when unloading and handling HOBAS Pipes. Severe impact with the ground, forklift tips, or other objects can cause damage to the pipe.

Safety:

Use extreme caution while handling pipes to avoid dropping or rolling on an unsuspecting person.

Equipment and Materials:

Forklift	Cherry Picker
Crane	Nylon Strap
Front End Loader	Chock

Note: Do not use chains or wire cables to handle or move HOBAS Pipes

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473

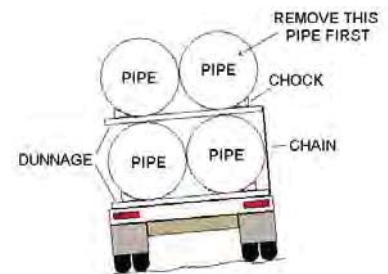


Handling

1. Severe impact with the ground or other objects can damage the pipe.
2. Never use chains or wire cables to handle HOBAS pipes. Use a fabric strap or carefully use a forklift.
3. Avoid letting the weight of the pipe rest on the coupling or bell end.
4. Avoid setting pipes on rocks or very uneven ground. A point load with a hard object can damage the pipe.
5. Be aware of the location of pipe ends while moving. An end or coupling can be easily damaged by an impact.

Unloading

1. After the shipping straps have been removed, use a cherry picker or crane with a nylon strap or a fork lift to remove the top pipes one at a time.
2. Take care that fork tips do not strike other pipes.
3. Pipe sections can be lifted with one support point (using a strap), although two support points may increase control.
4. A leaning or off-center load is extremely dangerous. When unloading, tie the ends of the pipe dunnage to the trailer to prevent them from flipping over. Remove the uphill pipe first. Be careful that the second pipe does not roll.
5. It is up to the installer to determine the best and safest method to unload special pieces (fittings, manholes, etc.). Use special caution to avoid damaging joint ends. Avoid picking up the special pieces by branches Use the main pipe.



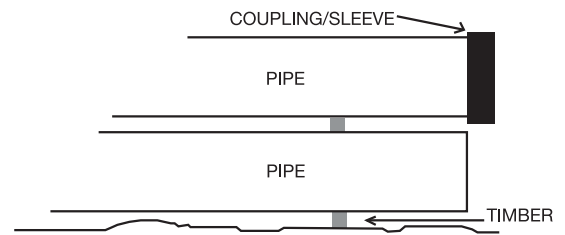
Storage

SHORTTERM -

If possible, lay pipe on flat level ground. Avoid setting pipe on rocks or other objects which would cause a point load.

LONGTERM -

1. For long term storage, it is best to store HOBAS pipe in the same arrangement as it arrived on the truck. To avoid damage or deformation to the bell ends, do not allow the couplings/sleeves to rest against each other.



2. Always use timbers and chocks between layers when stacking pipe.

3. It is advisable to re-inspect pipe after long term storage to assure no damage has occurred during storage or handling. If storing pipe for a prolonged period of time (over six months) contact HOBAS for further considerations.

4. Use the following chart to determine recommended stacking height of your pipe.

Diameter	# of pipes in stack
18-20	4
24-30	3
36-60	2
>60	1

ALONG DITCHLINE -

1. String the pipe as near as possible to the ditch to avoid excess handling.

2. String the pipe on the opposite side of the ditch from the excavated material.

3. Place pipe so that it will be protected from traffic and equipment during the construction process.

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Inspection Procedures

1. Make an overall inspection of the loaded truck. If the load is intact, ordinary inspection while unloading should be sufficient to see if the pipe has arrived undamaged.
2. If the load has shifted during transit, each pipe needs to be carefully inspected for damage. Internal inspection is necessary for any pipes that have exterior scrapes, gouges, or impact marks.
3. Check total quantities against the bill of lading.
4. Any damaged or missing items should be noted on the bill of lading. Have the carrier's representative sign your copy of the receipt. Make a prompt claim according to the carrier's instructions.
5. Do not dispose of any damaged material. The carrier will notify you of the procedure to follow.
6. Check the factory markings on the pipe to assure that you have the correct pipe. The pipes are marked as follows:

DIA XX PN XXX SN XX
CODE XXXXXXXXX

Where:

DIA = nominal diameter (in)
PN = pressure rating (psi)
(PN is left off gravity pipes)
SN = stiffness class (psi)
CODE = production code

7. If damage is found on a pipe, contact a HOBAS Field Technician to discuss the possibility of a repair.





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FWC COUPLING ASSEMBLY

General:

The HOBAS PIPE FWC coupling is a structural sleeve that provides a gasket-sealed, leak-free connection. Due to its flexibility, the FWC Coupling allows a few degrees of angular deflection to allow simple grade and line corrections or gradual radius curves. See chart under point 4 for details.

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Assembly:

1. Remove any dirt or mud buildup from the pipe spigot and the FWC gasket. Assure no stones, dirt buildup, or debris is under the FWC coupling gasket seal lips. Be careful not to damage the gasket during the cleaning process.
2. Apply lubricant on both the FWC coupling gasket and the spigot. Give special attention to the spigot bevel.
3. Most frequently the pipes are assembled by moving the bell end (coupling) over the previously installed spigot end. Place the pipe so that the coupling/bell end is in contact with the installed pipe spigot. Align the pipe sections carefully and push or pull the pipe until the coupling reaches the reference line on the pipe being joined. Be careful not to push the pipe past the center register of the coupling. If pushing directly on the spigot, protect the end with wood timbers.

The approximate joining forces for a properly aligned and lubricated coupling are shown below:

Nominal Pipe Size (in)	Average FWC Joining Force in "Straight" Alignment (lbs.)	Nominal Pipe Size (in), cont.	Average FWC Joining Force in "Straight" Alignment (lbs.), cont.	Nominal Pipe Size (in), cont.	Average FWC Joining Force in "Straight" Alignment (lbs.), cont.
18	3150	44	7700	72	12600
20	3500	45	7875	78	13650
24	4200	48	8400	84	14700
27	4725	51	8925	85	14875
28	4900	54	9450	90	15750
30	5250	57	9975	96	16800
33	5775	60	10500	104	18200
36	6300	63	11025	110	19250
41	7175	66	11550	120	21000
42	7350	69	12075	126	22000

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



4. If a small change in line direction is needed, simply move the unjoined end of the pipe to the desired position. Any angular deflection within the permissible limits (see chart below) should only be done after the pipe has been completely “homed” straight. If the deviation is large, make the correction over several joints. Do not allow more than a 1-inch gap between the center register of the coupling and the pipe end.

Pipe Diameter (in.)	Max. Angle (degrees)	Max. Offset @ 20 ft.	Max. Offset @ 10 ft.
18-20	3	12	6
24-33	2	8	4
36-42	1-1/2	6	3
44-60	1	4	2
63-78	3/4	3	1-1/2
84-126	1/2	2	1

***NOTE: Always join pipes in straight alignment and then offset to the desired angle.*

Caution: Do not apply joining force by pushing on the FWC coupling.





TECHNICAL ADVICE SHEET

07-01-2021

CUTTING HOBAS PIPE

General:

HOBAS fiberglass pipes have a smooth and uniform exterior surface. This allows the pipe to be cut anywhere along its length and joined using the FWC or closure coupling. Chamfering of the pipe ends is the only preparation needed.

Safety:

Cutting of HOBAS fiberglass pipes creates dust. The dust is not known to be harmful, but it can irritate unprotected body parts. It is advisable to wear a dust mask, eye protection, and gloves when cutting.

Equipment:

HOBAS pipes may be cut using a gasoline, air or electric powered disc cutter. A masonry (aluminum oxide typical), diamond tipped or other suitable abrasive cut-off saw blade could be used.

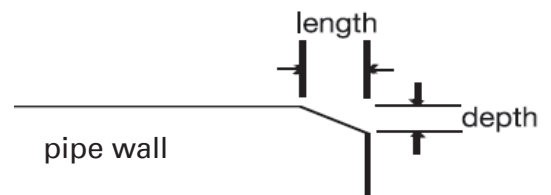
If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Cutting HOBAS Pipe

1. Mark the pipe circumferentially. Measure from a square end making sure that the cutting mark is at a right angle to the main pipe axis.
2. Provide support to either side of the cut and the pipe as a whole, so that no part will drop during cutting. If the pipe has to be rolled during the cutting process, ensure that at least one-quarter of the circumference is intact; otherwise damage may occur when moving pipes.
3. If cutting insitu, it may be necessary to cut a hatchbox out of the top of the pipe and complete the cut from the inside, if full circumferential access is not possible.
4. Carefully cut along the marked line. Before completing the cut, check again the cut piece will not drop as the cut is completed. If the pipe does drop, delamination of the pipe wall may occur. In that case, a re-cut or repair may be necessary.
5. Check the following:
 - a. The cut ends of the pipe are in good condition.
 - b. There is no damage to the pipe.
 - c. There is no delamination of the pipe wall.
6. Add the homing mark to the freshly cut pipe ends. (optional)
7. Mark all cut pieces of pipe with the pipe stiffness and pressure rating.
8. If a standard FWC coupling is to be used, then a slight chamfer (see chart below) should be made to the outside edge of the pipe. This is best done with an abrasive disc grinder.

Diameter Range	Depth (in.) Min. – Max.	Length (in.) Min. – Max.
18" – 27"	0.125 – 0.200	0.350 – 0.550
28" – 36"	0.150 – 0.250	0.400 – 0.700
41" – 57"	0.200 – 0.300	0.600 – 0.750
60" – 96"	0.325 – 0.425	0.900 – 1.200
104" – 126"	0.400 – 0.475	1.000 – 1.300



NOTE: This general cutting procedure is also appropriate for non-square cuts such as for miters, fittings, repairs, etc. Mark the pipe for the cut required and follow steps 2-5.



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TECHNICAL ADVICE SHEET

07-01-2021

LONG-TERM OUTDOOR STORAGE

General:

- Pipes, Joints & Fittings
- FWC Couplings with Nitrile Gaskets

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Pipes, Joints & Fittings

1. All resin rich surfaces (pipe interior, FWC coupling exterior, all laminations) exposed to the sun for extended time periods (typically 1 year plus) will perform and weather best, if protected from UV attack.
2. For pipes, this is most easily accomplished by storing them in a north-south orientation with the bell (or coupling) at the south end. Then cover the entire end and the coupling (or bell) with opaque poly sheet.
3. Check pipes vertical and horizontal diameter. Over an extended storage period, the pipes will typically assume a "permanent" set (new memory) of ~25% of any deformation. If this "deflection" is unacceptable, rotate the pipes 90 degrees every several months or ~ halfway through their anticipated storage time.

FWC Couplings with Nitrile Gaskets

1. Nitrile gaskets are sensitive to UV exposure. Any nitrile gaskets that will be exposed to sunlight for more than 30 days (1 month) should be protected from UV attack to avoid degradation.
2. For loose nitrile gaskets this is easily accomplished by storing them indoors until usage.
3. For FWC couplings cover the gasket or the end of the coupling with opaque poly sheet or other dense material to prevent sunlight exposure to the gasket.





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RIGID CONNECTIONS

General:

Rigid connections of pipes (such as to structures, to manholes or at the ends of encasements) create additional installation challenges to achieve buried success. The new issues caused by connections such as these include shearing at the interface, beam bending of the pipe, over rotation of joints, excessive joint pullout (draw) and differing support conditions across joint locations.

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Rigid Connections

It is frequently a common practice to incorporate a joint (or two joints) immediately adjacent to the “rigid” connection to minimize the effects of potential differential settlement between the manhole or structure (or encasement) and the attached (connected) pipe(s). At first thought, this appears to be a sound engineering approach. While this practice does aid in safely accommodating differential settlements (shearing) and minimizing of pipe beam bending, it increases the risk of excessive joint angular deflection, unacceptable joint draw and differential pipe deflection across joints with different support conditions (i.e. pipe on one side rigidly supported (concrete encased – likely zero deflection) and pipe on the opposite side elastically supported (soil and backfill – likely 2% +/- deflection)). The last item (differential pipe deflection across a joint), when of sufficient magnitude (typically over 0.5”), can result in joint leakage and / or damage.

Therefore, in many instances (particularly larger diameters and deep covers), the installation may be most successful by locating the first joint away from the rigid connection by a distance of at least 2 or 3 pipe diameters. Doing this will likely create a very similar pipe support condition across all joints, which usually results in nearly equal pipe deflections on both sides of the joint, thereby maximizing the joint performance. This procedure will, however, create a cantilever configuration for the first pipe exiting the rigid connection and does little to aid potential differential settlements. Having a cantilevered pipe also increases the risk of excessive pipe beam bending and shear at the interface, however, these potential risks can be greatly minimized by adequate bedding beneath the pipe to provide proper longitudinal support.

Regardless of joint proximity to rigid connections, a successful installation must achieve similar pipe deflections across joints and avoid significant differential settlements. Joints may be located anywhere when these items are well controlled. In our experience, it is generally easier to achieve good, uniform longitudinal support than to control buried deflections to very small amounts. Therefore, for larger diameters (>36” to 42” typically), we have found it’s best to locate joints away from the rigid connection interface. For smaller diameters (<24” to 30”), one may be most successful having a joint(s) in close proximity to the rigid connection interface.

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473





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TECHNICAL ADVICE SHEET

07-01-2021

BURIAL IN FINE GRAINED NON-COHESIVE SOILS

If in doubt, seek advice from: HOBAS Pipe USA | 800.856.7473



Burial in Fine Grained Non-cohesive Soils

Direct burial of flexible pipe in trenches consisting of fine grained non-cohesive soils with medium to low blow counts presents several challenges to achieving a quality installation. The higher the overburden load (deeper cover), the more important it is that the required installation be achieved.

In short, to achieve a quality installation (actually in all conditions), a “tight” pipe zone with a dense granular surround must be achieved to provide proper pipe support. This means no voids and no loose or sloughed native soils in the pipe zone or in the adjacent trench walls. In many native soils, such as rock, most clays or cemented non-cohesive, this result is easy to achieve since the trench walls typically remain intact when excavated. In non-cohesive soils, this is frequently not the case. When excavated, these soils tend to slough-in, greatly lowering their density and modulus. For the installation to be successful, the trench walls must be maintained in their original in situ condition or restored to that status, or better, during the enveloping of the pipe.

If an open graded pipe zone surround material is used such as a clean crushed rock, lateral migration of the native soils into the voids in the rock surround must be avoided to prevent a reduction in pipe side support. This phenomenon will only occur if there is a driver to move the fine grained native soils such as lateral ground water movement. If this is an issue, the materials must be separated by a filter fabric to prevent passage or a closed graded pipe zone surround used such as sand or a sand-rock mixture. Note that sand or sand-rock mixtures require compaction to achieve a proper density.

There are many construction procedures that can be used to achieve the foregoing requirements. We would be pleased to discuss the methods we’ve observed with any interested parties.



Very importantly, proof of a successful burial can be easily determined by quantifying the level of pipe deflection (slight ovaling). Long-term, the maximum allowable deflection for fiberglass pipes is typically 5%. Initially, a lower deflection limit is prudent, since the buried pipe will initially have less than the long-term load due to backfill soil friction along the trench walls. As this friction resistance is lost, more load settles onto the pipe. We typically recommend a maximum overnight deflection of 3%. A good check point at ~30 days is maximum 4%. The beauty of this behavior is the deflection of pipes (i.e. the installation quality) can be measured soon after burial is completed and as often as deemed necessary to verify that the chosen procedures are achieving the desired results. If deflections for recently buried pipes are verified quickly (typically the next day), the installation quality and consistency is immediately confirmed, eliminating the risk of a wide spread "problem" later during the project. This subject can be complex and because of the wide range of native conditions that may be encountered, it is not easily possible to address all of the eventualities that may arise. While this narrative presents the general requirements needed for successful burial, it is not a comprehensive, all-encompassing review. Further, while we are not geotech engineers or installation experts, we would be happy to discuss specific situations and relate our experience and any ideas or recommendations for success.





Section # 4

of:

HOBAS Pipe Submittal

for:

French Broad Interceptor at Amboy Rd.



Rene R. Garcia

3/29/22

HOBAS PIPE USA
1413 E. Richey Road
Houston, TX 77073
(800) 856-7473
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Hobas Pipe USA Buried Pipe Design Analysis

Summary of Project Information	
Job Name:	French Broad Interceptor at Amboy Road Sanitary Sewer Rehabilitation
Location:	Asheville, NC
Installation:	Direct Bury
Engineer:	HDR

Summary of Project Conditions	
Nominal diameter of pipe	60 in.
Minimum pipe stiffness	72 psi
Depth of burial of pipe (height of soil column)	17 ft. Maximum Depth for section
Depth of water table above pipe	21 ft.
Live load & type	HS-20 0.52 psi
Composite Constrained Soil Modulus, M_s	1854 psi

Summary of Design Analysis / Results			
	Actual	Allowable	
Deflection, as percent of diameter	1.19	5.0	Max
Wall Crushing, safety factor	23.91	5.0	Min
Ring Bending strain, calculated deflection, %	0.10	0.62	Max
Ring Bending Strain, maximum deflection, %	0.41	0.62	Max
Constrained Buckling, safety factor	9.39	2.5	Min



****Project Conditions and Assumptions****

Pipe Properties				
Nominal Pipe Diameter, D_n			60 in.	
Outside Diameter of Pipe Barrel, OD			62.9 in.	
Outside Diameter of Coupling, OD_2			65.2 in.	
Minimum Pipe Stiffness, PS			72 psi	
Minimum Total Wall Thickness, T_t			1.33 in.	
Minimum Liner Thickness, T_L			0.04 in.	
Ult Comp Strength, S_{ac}			10500 psi	
Hoop Flexural Modulus of Pipe, E_{hf}			1.90E+06 psi	
Depth of Bevel, B_{bv}			0.425 in.	
Installation Conditions				
Soil Weight, W_s			120 lb/ft ³	
Water Weight, W_w			62.4 lb/ft ³	
Soil Cover Depth, H_s			17 ft.	Maximum Depth for section
Live Load Load, L_L (at pipe depth)			0.52 psi	
Live Load Type			HS-20	
Water Table Depth, H_w			21 ft.	
Assumed @ Grade				
Embedment Material			Gravel or Crushed Rock	
Composite Constrained Soil Modulus, M_s			1,854 psi	
Native Soil Constrained Modulus, M_{sn}			1,500 psi	Boring B-3: N= 6 bpf min
Embedment Material Constrained Modulus, M_{sb}			3,053 psi	#57 Stone (Based on provided information)
Trench Width @ Pipe Springline, B_d			94 in	Recommend 1.5*OD
Soil Support Combining Factor, S_c			0.61	



Factors and Coefficients			
Bedding Coefficient, K_x	0.1		
(degree of support provided by soil)			
Pipe Shape Factor, D_r	3.8		
(relates pipe deflection to strain)			
Deflection Lag Factor, D_L	1		(Max load - full soil column used)
(to compensate for the load increase with time)			
Minimum Load / Safety Factors			
Maximum Recommended Deflection, %.....	5.0		
Minimum Wall Crushing Safety Factor.....	5.0		
Minimum Ring Bending Strain Safety Factor.....	1.5		
Minimum Pushing Capacity Safety Factor.....	3.0		
Minimum Constrained Buckling Safety Factor.....	2.5		
Pipe Geometry			
Outside Diameter, OD.....	62.9 in.		
Mean Diameter, D_m	61.61 in.		(O.D. - T_{str} = D_m)
Mean Radius, R_m	30.81 in.		(1/2 of D_m)
Total Wall Thickness, T_t	1.33 in.		
Liner Thickness, T_L	0.04 in.		
Structural Wall Thickness, T_{str}	1.29 in.		(T_{str} = T_t - T_L)
Nominal Interior Diameter, I.D.....	60.0 in.		



**** Analysis ****

Pipe Stiffness	(at 5% deflection)		per ASTM D2412-92
Hoop Flexural Modulus, E_{hf}		1.90E+06 psi	
Structural Thickness, T_{str}		1.29 in	
Mean Radius, R_m		30.805 in	
P.S.	=	$E_{hf} \times I / (.149 \times R_m^3)$	
		$I = T_{str}^3 / 12$	
	=	$E_{hf} \times T_{str}^3 / (.149 \times R_m^3 \times 12)$	
		$R_m(5\%) = R_m \times 1.025$	
	=	$E_{hf} \times T_{str}^3 / (.149 \times (1.025R_m)^3 \times 12)$	
	=	72 psi	

Loads			
Soil Weight, W_s		120 pcf	
Water Weight, W_w		62.4 pcf	
Soil Cover Height, H_s		17 ft.	
Water Table Height, H_w		21 ft.	
Soil Load, L_s	=	$W_s \times H_s / 144$	14.17 psi
Water Load, L_w	=	$W_w \times H_w / 144$	9.10 psi
Live Load, L_L	=	HS-20	0.52 psi
R_w	=	Water buoyancy factor	
R_w	=	$1.0 - (0.33H_w / H_s)$	0.59 [0 ≤ h_w ≤ h_s]
Total Load	=	$L_s(R_w) + L_w + L_L$	18.01 psi

Wall Crushing			
Compressive Strength, S_{ac}		10500 psi.	
Structural Thickness, T_{str}		1.29 in.	
Outside Diameter, OD		62.90 in.	
Total Load, T_L		18.01 psi	
Capacity	=	$S_{ac} \times T_{str}$	
	=	13545 lb/in	
Load	=	$(OD / 2) \times (Total Load)$	
	=	566.47 lb/in	
F of S	=	Capacity / Load	
	=	23.91 > 5 O.K.	

Deflection			
Deflection Lag Factor, D_L			1
Bedding Coefficient, K_x			0.1
Minimum Pipe Stiffness, PS			72.46 psi
Soil Load, L_s			14.17 psi
Live Load, L_L			0.52 psi
Composite Constrained Soil Modulus, M_s			1854 psi
Δ (Deflection)	=	$\frac{K_x(D_L \times L_s + L_L)}{0.149PS + 0.061M_s}$	
Δ	=	1.19 % < 5% OK	

Bending Strain (corresponding to calculated deflection)			
Pipe Shape Factor, D_f			3.8
Total Thickness, T_t			1.33 in.
Mean Diameter, D_m			61.61 in.
Calculated Deflection, Δ			1.19 %
e_b	=	$D_f(\Delta)(T_t/D_m)$	
	=	0.10 % < .62% OK	

Bending Strain (corresponding to max allowable deflection)			
Pipe Shape Factor, D_f			3.8
Total Thickness, T_t			1.33 in.
Mean Diameter, D_m			61.61 in.
Max Recommended Deflection, Defl			5.00 %
e_b	=	$D_f(Defl)(T_t/D_m)$	
	=	0.41 % < .62% OK	

Buckling			
Composite Constrained Soil Modulus, M_s			1,854 psi
Minimum Pipe Stiffness, PS			72 psi
R_h	=	$11.4/(11+(D_m)/(H_s)(12))$	
	=	1.009	
Critical Buckling	=	$(0.267)(PS)^{.33}(M_s)^{.67}(R_h)$	
Q_{cr}	=	169.13 psi	
Total Buckling	=	$R_w(\text{Soil Load})+(\text{Hydrostatic Load})+(\text{Live Load})$	
Q_t	=	18.01 psi	
F of S	=	Q_{cr} / Q_t	
	=	9.39 > 2.5 O.K.	

Since All Checks are O.K. The Design is Acceptable and Appropriate.



TEST REPORT

STIFFNESS, LEVEL A & LEVEL B by PARALLEL PLATE LOADING ASTM D2412



Sample Type (DN/PN/SN):
60/25/72

Sample Number:
220109200

Test Date:
1/14/2022 9:00 AM

TEST REASON
Lot test.

Glass Type:
Jushi 622-A

Resin Type (F/B/L):
P/I/P

Aggregate Type:
Mineral Tech/NF60

RING LENGTH (in.)
11.994
11.945
11.961
11.961
11.949
11.959
11.962

THICKNESS (in)		
TOTAL	STR	
1.459	0.048	1.415
1.487	0.051	
1.462	0.050	
1.453	0.047	
1.488	0.053	
1.458	0.070	
1.468	0.053	

PIPE STIFFNESS @ 5%		
Load, lbs	3,157	SN = 88.01
Length, in	11.962	
Defl, in.	2.999	

HOOP FLEXURAL MODULUS	
SN0% = (SN5%)(1.077) =	94.78
EHF = .2235 (SN0%)/(Ttotal / Dm) ³ =	1,554,125
EHF _{str} = EHF (Ttotal / Tstr) ³ =	1,736,016

O.D. (in)	62.915
I.D. (in)	59.979
5% Defl. (in)	2.999
Mean Dia. (in)	61.447

LEVEL A = (9)(72/SN)^(1/3) =

LEVEL B = (Level A)/(.6) =

Failure Point:

Comments:

Note: Max Load (at Failure):

8.42%	5.049 in.	No Damage.
14.03%	8.415 in.	No Damage.
23.67%	14.200 in.	One spring line, outerglass.
Sample Failed at 1.897% Strain.		
7,294		

17 May 2022

Kimberly Paggioli
HOBAS Pipe USA
1413 E. Richey Road
Houston, TX 77073

Project 151950.03 – Review of Test Data for Annual Reconfirmation of Long-Term Chemical Resistance of HOBAS CCFRPM Pipe per ASTM D3681

Dear Ms. Paggioli:

We submit herein our review of the test results submitted for reconfirmation of long-term chemical resistance in accordance with ASTM D3681 *Standard Test Method for Chemical Resistance of "Fiberglass" Pipe in a Deflected Condition*.

1. BACKGROUND

HOBAS Pipe USA produces centrifugally cast fiberglass-reinforced polymer mortar pipe (CCFRPM) manufactured according to ASTM D3262 *Standard Specification for Fiberglass Sewer Pipe*. Per Section 3.6.2, pipe produced to this standard requires annual sampling and testing for the control requirements of the chemical tests specified in ASTM D3681. This testing involves sampling and testing a minimum of six strain corrosion specimens to verify that the pipe produced is accurately represented by the strain corrosion regression line originally developed for this pipe. The original ASTM D3681 strain corrosion regression line, for which this data is compared, was prepared by Stork Southwestern Laboratories, and is presented in their "Complete Test Series" report dated 26 November 2003 (Stork Project HOB005-10-01-44426-1). The report includes time-to-failure test results for eighteen specimens tested to various hydrostatic pressures per ASTM D3681.

HOBAS has completed their strain corrosion testing for annual reconfirmation of their CCFRPM pipe. You have requested that Simpson Gumpertz & Heger Inc. (SGH) review the recent test results and evaluate the data for compliance with ASTM D3681 reconfirmation (Section 10).

2. TEST DATA PROVIDED

HOBAS Pipe has submitted reconfirmation test results for the six data points shown in Table 1. Test results included two sets of specimens, with each set containing three specimens tested at the same strain level. Strain levels were based on values targeted at obtaining predicted failure times between 10 to 200 hrs and greater than 1000 hrs. All testing was conducted by HOBAS Pipe USA at their Houston, Texas facility.

Table 1 – Reconfirmation Test Data for 2022

Specimen Number	Percent Strain (%)	Predicted Failure Time (hrs)	Actual Failure Time (hrs)
925	1.41	160	597
932	1.41	160	1110
933	1.41	160	1823
926	1.25	1685	2662
930	1.25	1685	1822
931	1.25	1685	1605

3. RECONFIRMATION OF STRAIN CORROSION REGRESSION LINE

We performed independent calculations for the original Stork Southwestern Laboratories regression line in accordance with ASTM D3681 and verified the results presented in Stork's 2003 test report. We also prepared an analysis for reconfirmation of the original strain corrosion regression line. Our analysis follows the method outlined in Section 10 of ASTM D3681. Our calculations for verification of the original regression line and for reconfirmation are appended to this letter report. Below we summarize our results.

In order to reconfirm the data set to the original regression line, the results must comply with all of the following criteria:

- **ASTM D3681 Section 10.3:** Two sets of three specimens each must be tested at strain levels corresponding to predicted failure times of 10 to 200 hours, and more than 1000 hours, with predicted failure times based on the original regression line.

Table 2 – Criteria for ASTM D3681 Section 10.3

Predicted Time to Failure (hrs)	Minimum Data Points Required	No. Data Points Provided	Average Time for Strain Level (hrs)	Criteria Satisfied?
10 to 200	3	3	1176.7	YES
>1000	3	3	2029.7	YES
Total	6	6	-	YES

- **ASTM D3681 Section 10.4.1:** The average time to failure for each strain level falls on or above the 95% lower confidence limit (LCL) of the original regression line.

Table 3 – Criteria for ASTM D3681 Section 10.4.1

Strain Level	Average Strain (%)	Average Time to Failure (hrs)	95% LCL on Strain for Original Regression Line (%)	Criteria Satisfied?
1	1.41	1176.7	1.229	YES
2	1.25	2029.7	1.192	YES

- **ASTM D3681 Section 10.4.2:** The earliest individual failure time at each strain level falls on or above the 95% lower prediction limit (LPL) of the original regression line.

Table 4 – Criteria for ASTM D3681 Section 10.4.2

Strain Level	Earliest Strain (%)	Earliest Time to Failure (hrs)	95% LPL on Strain for Original Regression Line (%)	Criteria Satisfied?
1	1.41	597	1.099	YES
2	1.25	1605	1.045	YES

- **ASTM D3681 Section 10.4.3:** The failure points are distributed about the originally determined regression line and no more than two-thirds of the individual failure points may fall below the original regression line.

Table 5 – Criteria for ASTM D3681 Section 10.4.3

No. Data Points Below Original Regression Line	Minimum No. Allowed	Criteria Satisfied?
1	4	YES

4. CONCLUSIONS

Our review shows that test data provided satisfies all criteria per ASTM D3681 Section 10 for annual reconfirmation of chemical testing. The original regression line developed by Stork may therefore be used as representative of this pipe.

Sincerely yours,



Matthew C. Richie
Senior Project Manager

Document1

Encls.



French Broad Interceptor Emergency Repair

APPENDIX C

Geotechnical Report



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GEOTECHNICAL DATA REPORT

NEW FORCE MAIN SEWER PIPELINE PROPOSED CARRIER BRIDGE PUMP STATION REPLACEMENT PROJECT ASHEVILLE, NORTH CAROLINA

Prepared for:

**Metropolitan Sewerage District
Mr. Darin Prosser, P.E.
2028 Riverside Drive
Asheville, North Carolina 28804**

Prepared by:

**Wood Environment & Infrastructure Solutions, Inc.
1308 Patton Avenue
Asheville, North Carolina 28806
North Carolina Engineering Firm License No. F-1253**

January 15, 2020

Wood Project No. 6252-13-0101.64



Wood Environment & Infrastructure Solutions, Inc.
1308-C Patton Avenue
Asheville, NC 28806
T: 828-252-8130
www.woodplc.com

January 15, 2020

Mr. Darin Prosser, P.E.
Project Manager
Metropolitan Sewerage District (MSD)
2028 Riverside Drive
Asheville, North Carolina 28804

Subject: **Geotechnical Data Report
New Force Main Sewer Pipeline
Proposed Carrier Bridge Pump Station Replacement Project
Asheville, North Carolina
Wood Project No. 6252-13-0101.64**

Dear Mr. Prosser:

Wood Environment & Infrastructure Solutions, Inc. (Wood) is pleased to provide this Geotechnical Data Report for the proposed new force main sewer pipeline to be constructed as a part of the proposed Carrier Bridge Pump Station Replacement Project to be located near the intersection of Amboy Road and Riverview Drive in Asheville, North Carolina (Figure 1). Our services were provided in general accordance with our Proposal for Geotechnical Exploration authorized by MSD through issuance of P.O. Number 61944 on November 8, 2019.

The purpose of our exploration was to determine general subsurface conditions and provide information for this requested geotechnical data report to be used by others in design of the proposed project.

PROJECT AND SITE INFORMATION

Project information was provided by you in emails and telephone conversations, a scope of work for geotechnical investigation and report requirements prepared by others, and site visits by Wood personnel. Based on the information provided, we understand that a replacement pump station and force main sewer pipeline are proposed for construction near the intersection of Riverview Drive and Amboy Road, adjacent to the French Broad River Park. The proposed pump station will be a cast-in-place concrete structure that is currently proposed to bear approximately 60 feet below the existing grade. The new pipeline is proposed to cross the French Broad River east of the pump station. We understand that there are two options for the pipeline to cross the French Broad River – it will be constructed utilizing a jack and bore tunnel beneath the river, south of the proposed pump station, or it will be suspended beneath a proposed pedestrian bridge to be located north of the French Broad River Park.



The provided project information included a boring location plan showing the requested locations for six soil test borings. Two borings for the proposed river crossing are within the French Broad River Park (B-2 and B-4) and two borings are located on the east side of the French Broad River, parallel to Lyman Street (B-1 and B-3). Two borings for the pump station were located northeast of the existing pump station (B-5 and B-6).

At the time of our field exploration, boring location B-1 was unable to be drilled due to access agreements between MSD and the current Owner. A separate geotechnical report will be provided at a later date for the proposed pump station, borings B-5 and B-6.

The areas containing borings B-2 and B-4, west of the French Broad River and within the French Broad River Park, is primarily grass covered and is relatively level. The existing ground surface in the area of Boring B-3 is primarily covered in root mat and is relatively flat with a slope to the west towards the French Broad River and Lyman Street to the east.

SITE GEOLOGY

The project site is located in the Blue Ridge Physiographic Province. The bedrock in this province is a complex mixture of igneous, sedimentary and metamorphic rock that has been repeatedly squeezed, fractured, faulted and distorted by past tectonic movements. The virgin soils encountered in this area are the residual product of in-place weathering of rock, which was similar to the rock presently underlying the site.

In areas not altered by erosion or disturbed by the activities of development, the typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. The less weathered soils exhibit relict features of the parent rock, including foliation patterns and joints.

The boundary between soil and rock is not sharply defined. This transitional zone, termed "partially weathered rock" (PWR), is normally found overlying the parent bedrock. Partially weathered rock is defined, for engineering purposes, as residual material with standard penetration resistance values in excess of 100 blows per foot. Fractures, joints, and the presence of less resistant rock types facilitate weathering. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

The upper soils along drainage features and in floodplain areas (such as at this site) are often water-deposited (alluvial) materials that have been eroded and washed down from adjacent higher ground.

SUBSURFACE EXPLORATION

Three soil test borings (B-2 through B-4), were performed at the approximate locations shown on the attached Site and Boring Location Plan (Figure 1). The borings were extended to auger refusal. Additionally, rock coring was performed within borings B-2 and B-3 below the auger refusal depths. Photographs of the rock cores obtained from these two borings are included in this report. The boring locations were located by Wood personnel near locations designated on the provided proposed boring location plan and approved by MSD in the field prior to drilling. Therefore, boring locations shown on Figure 1 should be considered approximate.

Soil sampling and Standard Penetration Testing were performed in general accordance with ASTM D 1586. At assigned intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D. split-spoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final 12 inches was recorded and is designated the "N-Value" or "penetration resistance".

Once auger refusal was encountered in the borings B-2 and B-3, rock coring was performed in general accordance with ASTM D 2113 to penetrate refusal materials and determine the continuity and condition of the refusal material. A 2 3/8-inch I.D. "HQ3" size wireline core barrel system was utilized with rock coring performed within borings B-2 and B-3 to depths of approximately 10 feet below auger refusal material. Rock core runs were performed in shorter two foot lengths due to the limits of the coring equipment available at the time of our field exploration.

Representative portions of the split spoon soil samples were sealed in glass jars and returned to our laboratory where they were visually classified by a geotechnical professional. The rock core samples were placed in a box and the rock core was returned to our laboratory where the percent core recovery and Rock Quality Designation (RQD) was measured and the core described (logged) by a geotechnical professional. The RQD denotes the percentage of intact and sound rock retrieved during coring and is a measure of the degree of natural fracturing. To calculate the RQD, all pieces of intact and sound rock core equal to or greater than 4-inches long are summed and divided by the total length of the core run.

The boreholes were backfilled with bentonite and grout after groundwater level observations were made upon the completion of drilling and as noted on the attached Soil Test Boring Records.

SUBSURFACE CONDITIONS

The following descriptions provide a general summary of the subsurface conditions encountered in borings B-2 through B-4. The attached Soil Test Boring Records represent our interpretation of the field boring/coring logs based on engineering examination of the field samples. The lines designating the interfaces between soil strata represent approximate boundaries and the transition between soil strata may be gradual. It should be noted that subsurface soil and rock conditions may vary between the boring locations.

Fill Soils

Beneath the surficial layers of topsoil/rootmat in the borings, fill soils were encountered in borings B-2 and B-3. Fill soil was encountered in boring B-2 to a depth of approximately 13 feet and to 17.5 feet in boring B-3. This fill was generally sampled as very loose to medium dense silty sand and medium dense sandy gravel. Within this sampled fill material, coal fragments, plastic debris, wood fragments asphaltic felt paper, asphalt fragments, concrete fragments and gravel were sampled.

Alluvial Soils

Beneath the layers of fill soil in borings B-2 and B-3, and the surficial ground surface layer in B-4, alluvial soils were encountered to the auger refusal depths of between 16.6 to 18 feet. This alluvial soil was sampled as very loose silty sand to very dense silty sand. The higher SPT N-value blow counts recorded were likely magnified by the gravel fragments and rounded cobbles contained in the alluvial soils. Thus, these higher N-values are not indicative of the consistency or relative density of the overall soil portions of the alluvium.

Approximately 7 inches of alluvial cobbles and boulders were encountered beneath the auger refusal depths in B-2 and B-3 during rock coring until competent, continuous bedrock was encountered.

Rock

Beneath the alluvial layers encountered during rock coring in borings B-2 and B-3, hard, slightly weathered, gneiss bedrock was first encountered at depths of 19.7 and 18.1 feet in respective borings B-2 and B-3 to coring termination depths of 29.3 and 27.5 feet, respectively. Fracturing within the rock cores was observed to be minimal, with most fractures observed being the result of mechanical breaks during coring. The attached Soil Test Boring Records provides a summary of the rock core runs, percent core recovery, and RQD measured. Photographs of these rock cores are also attached to this report.

Groundwater

Groundwater was encountered in each of the boreholes during our field exploration at depths of between 11 and 13.5 feet, approximately. However, groundwater levels may fluctuate seasonally or be locally perched just above the bedrock elevations. Levels will also vary with water levels within the adjacent French Broad River.

LABORATORY TESTING

Two jar samples, one each from borings B-3 and B-4, were tested for natural moisture content (ASTM D2216) and percent finer than #200 sieve (ASTM D1140). Selected pieces of rock core were tested in unconfined uniaxial compression in general accordance with ASTM D 7012 Method C. Two samples, one each from borings B-2 and B-3, representative of the different types of intact rock core samples observed within the rock cores obtained without readily visible fractures recovered, were initially selected for laboratory testing (designated as UC-1 and UC-2). The selected samples were then cut and trimmed to test sections of approximately 5.5 inches in length prior to compressive strength testing.

The laboratory tests were completed in general accordance with the applicable ASTMs. The results of the soil and rock laboratory tests are summarized in an attachment to this report.

GROUNDWATER CONTROL

Groundwater was encountered within our boreholes at the time of our field exploration between depths of approximately 10.3 to 13.5 feet. The contractor should be prepared to promptly remove any surface water or groundwater from the construction area. This has been done effectively on past jobs by means of gravity ditches and pumping from filtered sumps. Deeper excavations that may remain open for relatively longer periods of time, such as jack and bore pits to install larger underground sewer lines, may require additional measures to be installed by a specialty dewatering contractor to effectively remove and control groundwater in order to provide safe working conditions.

ESTIMATED SOIL PROPERTIES

Based on our experience and previously developed correlations for sandy silts and silty sands encountered within our soil test borings, the total unit weight, cohesion, effective internal friction angle and shear modulus values are recommended in the following table:

Table 1. Summary Table of Estimated Soil Properties

Material Description	Total Unit Weight (pcf)	Cohesion (psf)	Internal Angle of Friction (degrees)	Shear Modulus (tons/sf)*
Sandy Silt (ML)	120	100	24	100*
Silty Sand (SM)	120	0	28	100*
* Conservatively estimated based on published values shown in NAVFAC Design Manual 7.01 assuming a SPT N-value of 5 blows per foot, with a range of estimated values shown to be between approximately 100 to 2,000 tons/sf.				

The shear modulus values were conservatively estimated based on published correlations shown in NAVFAC DM 7.01 (Soil Mechanics) Chapter 2, Figure 5 which provides a graph to correlate SPT N-Values to shear modulus at very small strains.

Due to the soil overburden above the auger refusal depths encountered within our soil test borings consisting of fill and alluvial soils, which were highly variable with respect to debris (coal, concrete, asphalt, wood, plastic etc.) and gravel/cobble fragments sampled within them, it should be anticipated that the variation in the actual soil properties compared to the estimated ones provided will be greater than if they were undisturbed, weathered in-place residual soils.

QUALIFICATION OF REPORT

The recommendations provided in this report are based in part on project information provided to us and they only apply to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information is available, you should convey the correct or additional information to us and retain us to review our recommendations. We can then modify our recommendations, as necessary, for the proposed project.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter subsurface conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations for addressing the observed conditions/procedures. We recommend that Wood be retained to provide this service based upon our familiarity with the project, the subsurface conditions, and the intent of the recommendations and design.

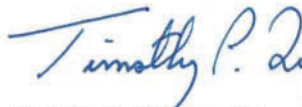
The assessment of site environmental conditions for the presence of pollutants in the soil, rock, or ground water of the site was beyond the scope of this exploration.


CLOSING


We thank you for the opportunity to provide our professional geotechnical services during this phase of your project and would be pleased to discuss our recommendations with you.

Sincerely,

Wood Environment & Infrastructure Solutions, Inc.






Timothy P. Quigley, P.E.
Senior Engineer
Registered, North Carolina 034969




Mel Y. Browning, P.E.
Principal Engineer
Registered, North Carolina 8696

- Attachments:
- Figure 1 – Site and Boring Location Plan
 - Key to Symbols and Descriptions
 - Soil Test Boring Records (3)
 - Photographs
 - Summary of Soil Laboratory Laboratory Test Results
 - Summary of Rock Core Compressive Strength Laboratory Test Results

ATTACHMENTS

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	Undisturbed Sample	Auger Cuttings																															
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.	Split Spoon Sample																															
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.		Rock Core																														
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.	Dilatometer		Pressure Meter																													
			GC	Clayey gravels, gravel - sand - clay mixtures.	Packer	No Recovery																														
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, well graded sands with gravel.	Water Table at time of drilling	Water Table after 24 hours																														
			SP	Poorly graded sands, poorly graded sands with gravel.	Caved Depth	WOH = Weight of Hammer																														
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands.	Monitoring Well Explanation  Cement  Bentonite  Sand Filter  Screen																															
			SC	Clayey sands.																																
			SILTS AND CLAYS (Liquid limit LESS than 50)	ML				Inorganic silts, sandy or clayey silts with low plasticity.	Correlation of Penetration Resistance with Relative Density and Consistency																											
				CL				Inorganic clays of low plasticity.																												
SILTS AND CLAYS (Liquid limit GREATER than 50)	OL	Organic silts and organic silty clays of low plasticity.	<table border="1"> <thead> <tr> <th colspan="2">SAND & GRAVEL</th> <th colspan="2">SILT & CLAY</th> </tr> <tr> <th>No. of Blows</th> <th>Relative Density</th> <th>No. of Blows</th> <th>Consistency</th> </tr> </thead> <tbody> <tr> <td>0 - 4</td> <td>Very Loose</td> <td>0 - 1</td> <td>Very Soft</td> </tr> <tr> <td>5 - 10</td> <td>Loose</td> <td>2 - 4</td> <td>Soft</td> </tr> <tr> <td>11 - 30</td> <td>Medium Dense</td> <td>5 - 8</td> <td>Firm</td> </tr> <tr> <td>31 - 50</td> <td>Dense</td> <td>9 - 15</td> <td>Stiff</td> </tr> <tr> <td>Over 50</td> <td>Very Dense</td> <td>16 - 30</td> <td>Very Stiff</td> </tr> <tr> <td></td> <td></td> <td>Over 30</td> <td>Hard</td> </tr> </tbody> </table>		SAND & GRAVEL		SILT & CLAY		No. of Blows	Relative Density	No. of Blows	Consistency	0 - 4	Very Loose	0 - 1	Very Soft	5 - 10	Loose	2 - 4	Soft	11 - 30	Medium Dense	5 - 8	Firm	31 - 50	Dense	9 - 15	Stiff	Over 50	Very Dense	16 - 30	Very Stiff			Over 30	Hard
	SAND & GRAVEL				SILT & CLAY																															
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Over 50	Very Dense	16 - 30	Very Stiff																																	
		Over 30	Hard																																	
MH	Inorganic silts, elastic silts.																																			
CH	Inorganic clays of high plasticity, fat clays																																			
OH	Organic clays of high plasticity, organic silts.																																			
CORED ROCK			RK	Rock																																

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

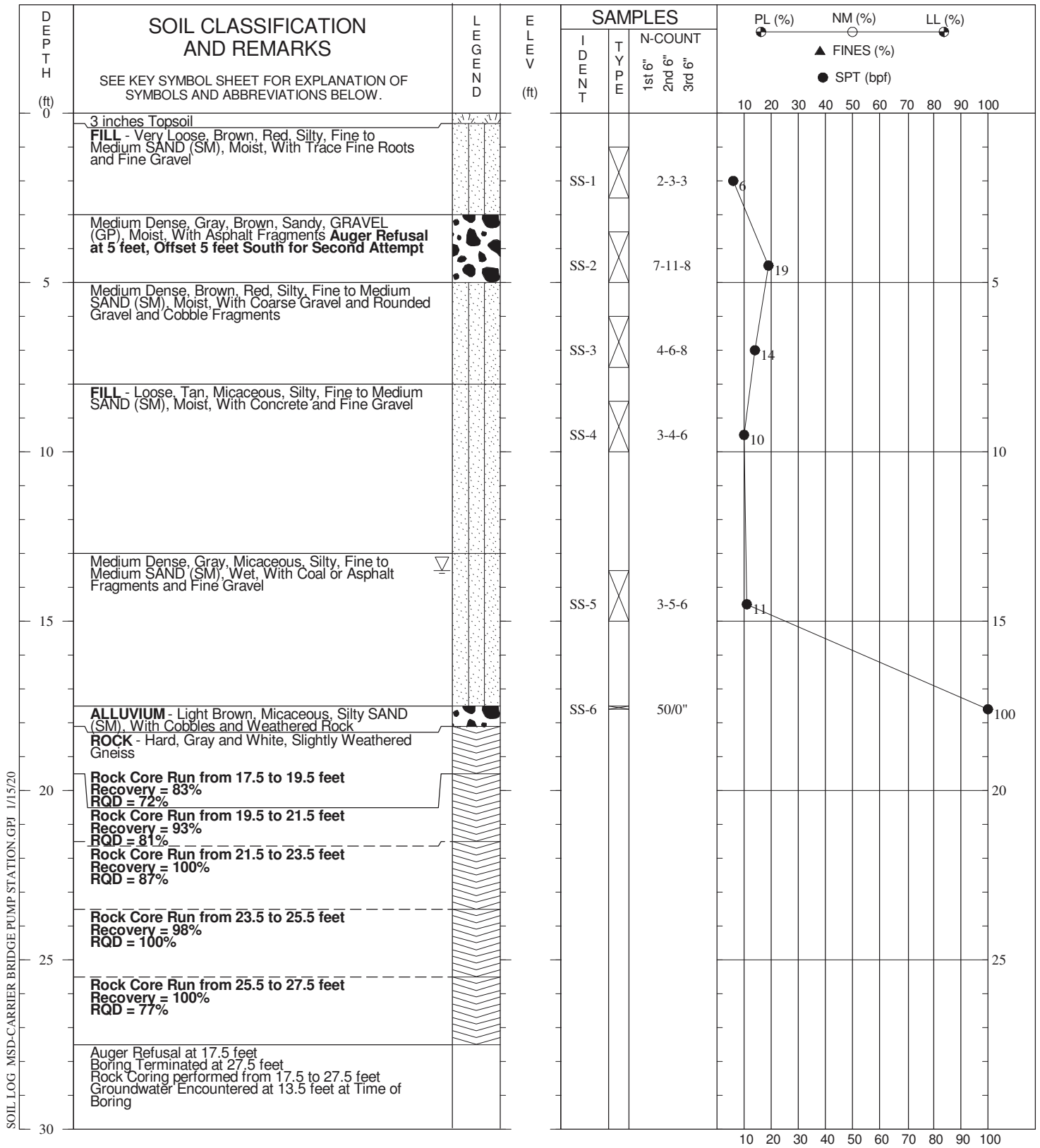
U.S. STANDARD SIEVE SIZE

Reference: "Classification of Soils for Engineering Purposes" (Unified Soil Classification System) ASTM D 2487, and/or "Description and Identification of Soils" (Visual-Manual Procedure), ASTM D 2488.

wood.

KEY TO SYMBOLS AND DESCRIPTIONS

Wood Environment & Infrastructure Solutions, Inc.



DRILLER: Tri-State
 EQUIPMENT: CME 550X Autohammer
 METHOD: 3.25 inch HSA
 HOLE DIA.: 0.5' Nominal
 REMARKS:

PREPARED BY: MNQ
 CHECKED BY: TPQ

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: MSD-Carrier Bridge Pump Station **BORING NO.:** B-3
LATITUDE:
LONGITUDE:
DRILLED: November 21, 2019
PROJ. NO.: 6252-13-0101.64 **PAGE 1 OF 1**

wood.

Rock Core Photographs



Rock core from 19.1 to 29.3 feet (going left to right and top to bottom) boring B-2



Rock core from 17.5 to 27.5 feet (going left to right and top to bottom) boring B-3



Wood Environment & Infrastructure Solutions, Inc.

1308 Patton Avenue
Asheville, North Carolina 28806

**MSD Carrier Bridge Pump Station Replacement Project - New Force Main Sewer Pipeline
Wood Project No. 6252-13-0101.64**

SUMMARY OF SOIL LABORATORY TEST RESULTS

Sample Location	Sample Depth, ft	Sample Type	Sample Description	USCS Classification	Natural Moisture Content (%)	Percent Passing No. 200 Sieve
B-3	8.5-10	Split Spoon	Fill: Tan, Micaceous, Silty, Fine to Medium Sand, with Concrete and Fine Gravel	SM	12.2	20.3
B-4	13.5-15	Split Spoon	Alluvium: Medium Dense, Brown, Micaceous, Sandy, Silt, with Fine Gravel and Rounded Cobble Fragments	ML	27.0	63.6

Laboratory testing was performed in general accordance with the following test methods:

Percent Passing No. 200 Sieve - ASTM D1140

Natural Moisture Content - ASTM D2216

Prepared By: Matt Land 1/3/2020
Reviewed By: Tim Quigley 1/10/2020



Wood Environment & Infrastructure Solutions, Inc.

1308 Patton Avenue
Asheville, North Carolina 28806

MSD Carrier Bridge Pump Station Replacement Project

New Force Main Sewer Pipeline

Wood Project No. 6252-13-0101.64

SUMMARY OF ROCK CORE COMPRESSIVE STRENGTH LABORATORY TEST RESULTS

Sample Location	Sample Depth, ft	Sample Type	Sample Description	Uniaxial Compressive Strength (psi)
B-2	21.3-21.9	Rock Core	Hard, Gray and White, Slightly Weathered Gneiss	9,960
B-3	25.8-26.5	Rock Core	Hard, Gray and White, Slightly Weathered Gneiss	6,510

Laboratory testing was performed in general accordance with ASTM D 7012
Rock core samples trimmed and approximately 5.5 inch long section of rock core tested within sample depth interval shown.

Prepared By: M. Land 1/14/2020
Reviewed By: T. Quigley 1/14/2020

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