

BRUNSWICK COUNTY

INVITATION TO BID

Southport Sewer Lift Station Replacement

DWI Project No. SRP-W-ARP-0105

ISSUE DATE: **June 16, 2025**

DUE DATE: **July 24, 2025**



BRUNSWICKCOUNTYNC.GOV/BID

Project Manual for:
Sewer Lift Station Replacement

DWI Project No. SRP-W-ARP-0105
WK Dickson Project No. 20250062.00.WK

BID DATE: July 24, 2025

Project Designers:



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ENGINEER'S SEAL HERE

**FINAL SPECIFICATIONS – FOR BIDDING
PURPOSES ONLY –
NOT RELEASED FOR CONSTRUCTION**

DOCUMENT 00 01 10
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W.K. DICKSON & CO., LLC
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City of Southport, North Carolina
WKD Project No.: 20220972.00.WL

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Date: 2024.05.22 09:11:29-04'00'

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Mark A. Ciarrocca, NC PE #17593.
This document shall not be
considered a certified document.



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CAPA Project No. 23057

INVITATION TO BID

Pursuant to North Carolina General Statutes § 143-129 et. seq. and 2 C.F.R. 200.320(b)(1), Brunswick County ("County" or "Owner") is soliciting sealed bids for the construction of: **Southport Sewer Lift Station Replacement, DWI Project No. SRP-W-ARP-0105**. Sealed bids must be received by 3:00 p.m. ET on July 24, 2025, in the Brunswick County Public Utilities Operations Center located at 250 Grey Water Road NE, Supply, NC 28462. Bids will be for the furnishing of all labor and materials, including all equipment required, as detailed in the technical specifications, construction drawings, and summary of work contained herein. Any changes to the specifications or summary of work or clarifications to the bidding documents will be made in the form of an addendum hereto and will be supplied to all known prospective bidders and posted on the County's website. Notwithstanding the foregoing, bidders will be responsible for ensuring that they have all addenda.

Each sealed bid must be made on the forms provided. Brunswick County will not be responsible for the failure of any mail or delivery service to deliver a bid by the aforementioned date and time. Regardless of the manner of submission, bids received after the aforementioned date and time, incomplete bids, or bids not submitted at the correct location or in the designated manner will not be accepted. Sealed bids will be opened publicly and read aloud on July 24, 2025, at 3:00 p.m. ET in the Brunswick County Public Utilities Operations Center located at 250 Grey Water Road NE, Supply, NC 28462. The contract shall be **Single Prime**.

A general description of the work includes, without limitation: Rehabilitation and replacement of facilities and equipment at three (3) lift stations located at Moore Street, Ninth Street, and Park Avenue in the City of Southport, NC.

Pre-Bid Meeting: An optional pre-bid meeting will be held for all interested bidders and vendors on July 1, 2025, at 10:00 a.m. ET at the Brunswick County Public Utilities Operations Center located at 250 Grey Water Road NE, Supply, NC 28462. Directions are as follows: From Wilmington, NC, follow US 17 toward Supply. Turn right onto Hwy 211 heading towards Bolton. In approximately one mile, turn right onto Grey Water Road (beside athletic park). Utilities Operations Center is on the right.

Site Visitation: Individual inspection of the proposed construction sites may be allowed only by approval of Brunswick County. Telephone or email **Robert Miller** at robert.miller@brunswickcountync.gov, (910) 253-1759 (Office) to schedule a visit.

Copies of the Contract Documents may be purchased for **\$22.00** by visiting www.wkdicksonplanroom.com. Payment must be by either credit card, check/money order made payable to *Duncan-Parnell*, or by Duncan-Parnell Account. Please note that only registered plan holders may bid as General Contractor. Registration on the Plan Room is free of charge. County will not be responsible for full or partial sets of Contract Documents, including any addendum, obtained from any other source.

No refund for any Contract Documents shall be made and no partial sets of the Contract Documents will be issued. The Contract Documents will be posted at the following locations:

- Carolinas A.G.C. Digital Plan Room online www.cagc.org on IBuild®
- Brunswick County Public Utilities Operations Center (8:00 a.m. – 4:30 p.m. business days)
- Brunswick County Website <https://www.brunswickcountync.gov/bid/>
- CDC News Office online www.cdcnews.com
- McGraw Hill Construction Dodge Digital Plan Room online www.construction.com
- Construction Market Data online www.cmdgroup.com
- Hispanic Contractors Association of the Carolinas online www.hcac.org

Brunswick County reserves the unqualified right to reject any and all bids. A 5% bid bond or deposit is required. Chapter 143, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. Pursuant to N.C.G.S. § 143-128.2, contractors are required to exhibit good faith efforts to solicit minority business subcontractors. In addition to the foregoing, contractors are required to comply with 2 C.F.R. § 200.321 to ensure that small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms are considered. Contractors must be properly licensed. Additional instructions to bidders are included in the Contract Documents.

Questions/Addenda: Questions or requests for further information regarding this Invitation to Bid shall be submitted in writing to the attention of Monroe Huckaby, PE, at mhuckaby@ardurra.com no later than 5:00 p.m. ET on July 3, 2025. A copy of all questions, further clarifications and answers will be made in the form of an Addendum to this Invitation to Bid and will be provided to all known bidders and posted on the County's website. Notwithstanding the foregoing, bidders will be responsible for ensuring that they have all addenda.

Bidders are expressly prohibited from contacting any Brunswick County official or employee regarding this Invitation to Bid, except in the manner noted in this section. A violation of this provision is grounds for the immediate disqualification of the bidder.

NOTICE TO BIDDERS

Sealed bids will be received until 3:00 p.m. ET on July 24, 2025, in the Brunswick County Public Utilities Operations Center located at 250 Grey Water Road NE in Supply, NC 28462 for the furnishing of labor, material, and equipment for the construction of: **Southport Sewer Lift Station Replacement, DWI Project No. SRP-W-ARP-0105**. Shortly thereafter, the bids will be opened publicly and read aloud.

Sealed bids may only be received by mail or hand delivery. Sealed bids shall be labeled with the project name, Contractor's name, address, and license number and must be marked "SEALED BID, DO NOT OPEN." Sealed Bids shall be sent to:

Alternate Shipping Service or Hand Delivery

Brunswick County Public Utilities
Utilities Operations Center
Attention: Robert Miller, PE
250 Grey Water Road NE
Supply, NC 28462
(910) 253-1759

US Post Office

Brunswick County Public Utilities
Attention: Robert Miller, PE
P. O. Box 249
Bolivia, NC 28422

Brunswick County will not be responsible for the failure of any mail or delivery service to deliver a bid. Regardless of the manner of submission, bids received after the aforementioned date and time, incomplete bids, or bids not submitted at the correct location or in the designated manner will not be accepted.

Project Description: Work on this project shall include, without limitation, rehabilitation and replacement of facilities and equipment at three (3) lift stations located at Moore Street, Ninth Street, and Park Avenue in the City of Southport, NC.

Bids will be received as **Single Prime**. All bids shall be lump sum, ***firm fixed-price*** with provisions for unit prices as indicated in the Form of Proposal. The project shall reach Substantial Completion within **330** consecutive days from Notice to Proceed and Final Completion within **360** consecutive days from Notice to Proceed. Funding for the project is provided by NCDEQ Clean Water State Reserve Fund and by Federal ARPA Funds, as more particularly set forth below.

Project Funding and Requirements

Brunswick County has received an award of federal funds from the State Reserve Program ("SRP") grant from the American Rescue Plan Act ("ARPA") (the "SRP-ARPA Funds") through the North Carolina Department of Environmental Quality ("DEQ") - Division of Water Infrastructure ("DWI") as approved under the State Water Infrastructure Authority ("SWIA").

Project Number SRP-W-ARP-0105 has been assigned to this Southport Sewer Lift Station Replacement Project by DEQ-DWI. The maximum amount of SRP-ARPA Funds from DEQ-DWI is \$2,800,000, which is expected to fund 100% of the minimum amount of the construction phase of the project, based on initial cost estimates received. The foregoing amounts are based on initial cost estimates, excluding proposed alternates, received from the Project Engineer to date.

In using such SRP-ARPA Funds, County must comply with the DEQ-DWI grant award terms and conditions, the ARPA award terms and conditions applicable to the use of SRP-ARPA Funds, regulations issued by the U.S. Department of the Treasury ("Treasury") governing the expenditure of monies distributed pursuant to ARPA (including, without limitation, the Interim Final Rule (86 Fed. Reg. 26,786 (May 17, 2021) and Final Rule (87 Fed. Reg. 4,338 (January 27, 2022))), and such other guidance as Treasury has issued or may issue governing the expenditure of monies distributed pursuant to ARPA (collectively, the "Regulatory Requirements"). Pursuant to the Regulatory Requirements, County must

also comply with the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, 2 C.F.R. Part 200, other than such provisions as Treasury has determined or may determine are applicable to the SRP-ARPA Funds.

Pursuant to the Regulatory Requirements, Brunswick County must comply with the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, 2 C.F.R. Part 200, other than such provisions as Treasury has determined or may determine are applicable to the SRP-ARPA Funds.

In accordance with the foregoing requirements, firms interested in being considered for this work must agree to strictly adhere to all terms and conditions contained herein, including, without limitation, the Regulatory Requirements incorporated by reference as if fully set forth herein, and in the Construction or Repair Agreement, as may be amended from time to time, as required by Treasury. Firms not agreeing to all terms and conditions are expressly prohibited from submitting a bid for consideration.

Liquidated Damages: There are liquidated damages associated with this project. Liquidated damages will be in the amount of One Thousand Eight Hundred Dollars and Zero Cents (**\$1,800.00**) per day for each calendar day beyond the Substantial Completion date set from the Notice to Proceed.

Site Visitation: Individual inspection of the proposed construction sites may be allowed only by approval of Brunswick County. Telephone or email at **Robert Miller**, robert.miller@brunswickcountync.gov, **(910) 253-1759 (Office)** to schedule a visit.

Pre-Bid Meeting: An optional pre-bid meeting will be held for all interested bidders and vendors on July 1, 2025, at 10:00 a.m. ET at the Brunswick County Public Utilities Operations Center located at 250 Grey Water Road NE, Supply, NC 28462. Directions are as follows: From Wilmington, NC, follow US 17 toward Supply. Turn right onto Hwy 211 heading towards Bolton. In approximately one mile, turn right onto Grey Water Road (beside athletic park). Utilities Operations Center is on the right.

The pre-bid meeting will address project specific questions, issues, and bidding procedures. Additional information and addenda will be supplied to all known prospective bidders and posted on the County's website. The bidder is responsible for ensuring that their contact information is correct and on file with the person designated below. All bidder questions and/or clarifications must be submitted in writing no later than July 3, 2025, at 5:00 p.m. ET. Bidder questions and/or clarifications received after this date and time will not receive a response. Bidder questions and/or clarifications will be answered in the form of an addendum and supplied to all known prospective bidders and posted on the County's website. Notwithstanding the foregoing, bidders are responsible for ensuring that they have all addenda.

Questions or requests for clarification shall be directed to:

Monroe Huckaby, PE
W.K. Dickson & Co., LLC
Email: mhuckaby@ardurra.com
Telephone: (919) 256-5659

Copies of the Contract Documents may be purchased for **\$22.00** by going to the Plan Room at www.wkdicksonplanroom.com. Payment must be by either credit card, check/money order made payable to *Duncan-Parnell*, or by Duncan-Parnell Account. Please note that only registered plan holders may bid as a General Contractor. Registration on the Plan Room is free of charge. County will not be responsible for full or partial sets of Contract Documents, including any Addendum, obtained from any other source.

No refund for any Contract Documents shall be made and no partial sets of the Contract Documents will be issued. The Contract Documents will be posted at the following locations:

- Carolinas A.G.C. Digital Plan Room online www.cagc.org on IBuild®
- Brunswick County Public Utilities Operations Center (8:00 a.m. – 4:30 p.m. business days)
- Brunswick County Website <https://www.brunswickcountync.gov/bid/>
- CDC News Office online www.cdcnews.com
- McGraw Hill Construction Dodge Digital Plan Room online www.construction.com
- Construction Market Data online www.cmdgroup.com
- Hispanic Contractors Association of the Carolinas online www.hcac.org

INSTRUCTIONS TO BIDDERS

Version Date – January 2019

For a proposal to be considered it must be in accordance with the following instructions:

1. PROPOSALS

Proposals must be made in accordance with the Form of Proposal provided, and all blank spaces for bids, alternates, and unit prices applicable to Bidder's Work shall be properly filled in. When requested alternates are not bid, the proposal may be considered incomplete. The Bidder agrees that a bid on the Form of Proposal detached from specifications will be considered and will have the same force and effect as if attached thereto. Faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates.

The proposal shall include the following:

- a. Form of Proposal
- b. Socioeconomic Contracting Affidavit

For items c. through e., see the enclosed "NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement – Instructions" (Instructions Pages 1 and 2)

- c. Good Faith Efforts Form (Good Faith Efforts Form, Pages 1 and 2)
- d. Table A: Prime Contractor and List of Selected Subcontractors
- e. Table B: Subcontract Solicitation List (if applicable/required).
If Table B is applicable/required, the Contractor shall submit documentation of efforts to solicit proposals from DBEs.
- f. Form of Bid Bond **or** cash deposit.

Any modifications to the Form of Proposal (including alternates and/or unit prices) may disqualify the bid and may cause the bid to be rejected.

The Bidder shall fill in the Form of Proposal as follows:

- a. If the documents are executed by a sole Owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- b. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- c. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- d. If the proposal is made by a joint venture, it shall be executed by each member of the joint venture in the above form for sole Owner, partnership or corporation, whichever form is applicable.
- e. All signatures shall be properly witnessed.

- f. If the Contractor's license of a Bidder is held by a person other than an Owner, partner or officer of a firm, then the licensee shall also sign and be a party to the proposal. The title "Licensee" shall appear under his/her signature.

Proposals shall be addressed as indicated in the Notice to Bidders and shall be delivered, enclosed in an opaque sealed envelope, marked "SEALED BID, DO NOT OPEN" and bearing the project name, name of the Bidder, address of the Bidder, and the Contractor's license number. Bidders shall clearly mark on the outside of the bid envelope which Contract(s) they are bidding.

Bidder shall identify on the bid the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts or an affidavit indicating Work under Contract will be self-performed, as required by NCGS 143-128.2(c) and NCGS 143-128.2(f). Failure to comply with these requirements is grounds for rejection of the bid. Upon notification of being the apparent low bidder, the apparent low Bidder and any other Bidder so requested, will within seventy-two (72) hours of the notification submit Table B: Subcontract Solicitation List (per item being subcontracted) that includes a description of the portion of Work to be executed by minority businesses, which is equal to or more than the applicable goal, and documents the Contractor's good faith efforts to meet the goal.

For projects bid in the single-prime alternative, the names and license numbers of major Subcontractors shall be listed on the proposal form.

It shall be the specific responsibility of the Bidder to deliver his bid to the proper official at the selected place and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including delivery by the United States Postal Service or other delivery service, shall disqualify the bid.

Modifications of previously deposited bids will be acceptable only if delivered in writing or by telegram or fax to the place of the bid opening prior to the time for opening bids. Telegraphic and fax modifications must be confirmed in writing within 72 hours after the opening of bids.

Unit prices quoted in the proposal shall include overhead and profit and shall be the full compensation for the Contractor's cost involved in the Work. See General Conditions, "Changes in the Work" Paragraph (C1).

2. EXAMINATION OF CONDITIONS AND CONTRACT DOCUMENTS

It is understood and mutually agreed that by submitting a bid the Bidder acknowledges that he has carefully examined all documents pertaining to the Work; the location, accessibility, and general character of the site of the Work and all existing buildings, structures, and utility facilities within and adjacent to the site; and has satisfied himself as to the nature of the Work; sequences or procedures of construction (if any); the condition of existing buildings and structures; the conformation of the ground; the character, quality, and quantity of the material to be encountered; the subsurface conditions (including type and depth of rock and soil layers); the character of the equipment, machinery, plant and any other facilities needed preliminary to and during prosecution of the Work; the general and local conditions; federal, state, and local laws and regulations; the construction hazards; and all other matters, including, but not limited to, the labor situation which can in any way affect the Work under the Contract; and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. It is further mutually agreed that by submitting a proposal the Bidder acknowledges that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications, and other Contract Documents for the construction of the Work and that he accepts all the terms, conditions, and stipulations contained therein; and that he is prepared to Work in cooperation with other Contractors performing Work on the site. Neither the Owner nor Designer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

Reference is made to Contract Documents for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the Work which have been relied upon by the Designer in preparing the documents. In no event shall these surveys and investigation reports be considered part of the Contract Documents. The Owner will make copies of all such surveys and reports available to the Bidder upon request. Neither the Owner nor the Designer assumes any responsibility for the accuracy or completeness of the information provided.

Each Bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the Work. Any on-site investigation shall be done at the convenience of the Owner. Reasonable requests for access to the site will be honored by the Owner. It is the responsibility of the Bidder to clean up and restore the site to its former condition upon completion of such explorations, investigations, tests, and studies. Such Work shall be done in a manner that in no way hinders or complicates normal operation and maintenance of existing facilities.

The Contractor performing excavation Work shall be responsible for locating underground utilities prior to excavation. The utility locations shown in the Plans are approximate and for information only. The Contractor may obtain the services of a commercial utilities locator and/or call the various utility companies who may have lines in the area.

3. AVAILABILITY OF LANDS FOR WORK

The lands upon which the Work is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage for materials and equipment to be incorporated into the Work are to be obtained and paid for by the Contractor. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by the Owner unless otherwise provided in the Contract Documents.

4. PRE-BID CONFERENCE

Prior to the date set for receiving bids, the Designer may arrange and conduct a Pre-Bid Conference for all prospective Bidders. The purpose of this conference is to review project requirements and to respond to questions from prospective Bidders and their Subcontractors or material suppliers related to the intent of bid documents. Attendance by prospective Bidders shall be as required by the "Notice to Bidders." Brunswick County strongly encourages attendance at the pre-bid meeting. It should be noted that attendance may help to fulfill necessary MBE requirements.

5. SUBSTITUTIONS

In accordance with the provisions of NCGS 133-3, material, product, or equipment substitutions proposed by the Bidders to those specified herein can only be considered during the bidding phase until ten (10) days prior to the receipt of bids when submitted to the Designer with sufficient data to confirm material, product, or equipment equality. Proposed substitutions submitted after this time will be considered only as potential change orders.

Submittals for proposed substitutions shall include the following information:

- a. Name, address, and telephone number of manufacturer and supplier as appropriate.
- b. Trade name, model, or catalog designation.
- c. Product data including performance and test data, drawings with dimensions, specifications, catalog cut-sheets, electrical requirements and schematic diagrams, materials of construction of all components, reference standards, and technical

descriptions of material, product, or equipment. Include color samples and samples of available finishes as appropriate.

- d. Detailed comparison with specified products including performance capabilities, warranties, maintenance schedule, and test results. Any deviations to the specified product requirements shall be noted.
- e. Other pertinent data including data requested by the Designer to confirm product equality. This may include examples of the substitutes in use on other projects along with performance records. The Contractor shall demonstrate that the Substitution will function equally or better than the specified product, taking into account the Owner's need of standardization and compatibility with other infrastructure components.
- f. Listing of spare parts to be included with Substitution.
- g. A comparison of the impact on the Contractor's schedule between using the proposed Substitution item and the specified product.
- h. If the equipment manufacturer or supplier fails to furnish all of the preceding information which has been deemed necessary by the Engineer to evaluate a proposed "or equal" equipment item or product for equivalency with the equipment items or products, the proposed "or equal" qualification package will be rejected by the Engineer. If the "or equal" qualification package is rejected by the Engineer, the Bidder shall furnish one of the named equipment items or products without change to the contract price.
- i. No proposed "or equal" equipment items or products shall be considered unless, in the opinion of the Engineer, it conforms to the Contract Documents in all respects, except for make and manufacturer and minor details.
- j. The Engineer shall be the sole authority for determining conformance of a proposed "or equal" equipment item or product with the Contract Documents. Under no circumstances shall the Engineer be required to prove that "or equal" equipment items or products are not equal to the named equipment items or products.
- k. Contractors shall include all costs associated with any redesign required with their bid.

If a proposed material, product, or equipment substitution is deemed adequate by the Designer, all Bidders of record will be notified by Addendum.

6. BULLETINS AND ADDENDA

Any addenda to specifications issued prior to the bid opening shall be considered covered in the Proposal and in closing a Contract they will become a part thereof. Addenda may include, but are not limited to, answers to questions, clarifications, and amendments of the Contract Documents. It shall be the Bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the Bidder find discrepancies, errors, conflicts, ambiguities, or omissions from the drawings or documents; conflicts between Bidder's observations and the Contract Documents; or should he be in doubt as to the meaning of the Contract Documents; he shall at once notify the Designer or Owner who will provide written instructions in the form of addenda. The Bidder shall submit all questions or requests for clarifications in writing (email or fax is acceptable) no later than ten (10) days prior to the bid date. The Notice to Bidders indicates the contact person for submittal of questions. Notification of addenda shall be issued by the Owner approximately

seven (7) days prior to the date set for receipt of bids. Neither the Owner nor the Designer will be responsible for any oral instructions.

In the event that discrepancies, errors, conflicts, ambiguities, or omissions are discovered by the Bidder and have not been resolved by the Designer or Owner prior to submitting the bid, the Bidder shall include in the bid the greater quantity or better quality of Work, or compliance with the more stringent requirement resulting in greater cost. Such greater cost shall be included in the bid.

All addenda shall be acknowledged by the Bidder(s) on the Form of Proposal.

7. BID SECURITY

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, or a bid bond in an amount equal to not less than five percent (5%) of the Bidder's maximum bid price, said deposit to be retained by the Owner as liquidated damages in event of failure of the successful Bidder to execute the Contract within ten (10) days after the award or to give satisfactory surety as required by law (NCGS 143-129).

Bid bond shall be conditioned that the surety will, upon demand, forthwith make payment to the obligee upon said bond if the Bidder fails to execute the Contract. The Owner may retain bid securities of any Bidder(s) who may have a reasonable chance of award of Contract until the 101st day after the bid opening. Other bid securities may be released sooner, at the discretion of the Owner. All bid securities (cash or certified checks) shall be returned to the Bidders within ten (10) days after award of Contract. Standard Form of Bid Bond is included in these specifications.

8. RECEIPT OF BIDS

Bids shall be received in accordance with requirements of the General Statutes of North Carolina and Brunswick County policy. Bid security shall be required as prescribed by statute. Prior to the deadline for receipt of bids, the Bidder will be permitted to change or withdraw his bid.

9. OPENING OF BIDS

Upon opening, all bids shall be read aloud. Once any bid is opened, there shall not be any withdrawal of bids by any Bidder and no bids may be returned by the Designer to any Bidder. After the bid opening, a Bidder may request that his bid be withdrawn from consideration without forfeiture of his bid security in accordance with the provisions of the NCGS 143-129.1. In accordance with NCGS 143-129.1, a request for withdrawal of a bid must be made in writing to the Owner within seventy-two (72) hours after the bid opening (excluding Saturdays, Sundays, Brunswick County holidays, and other days in which the Brunswick County government offices are closed). Except under the provisions of NCGS 143-129.1, all bids shall remain valid a minimum of ninety (90) days from the opening of bids. Approval of the proposal by the Brunswick County Board of Commissioner's at a public meeting or a signed "Notice of Award" shall constitute acceptance of the bidder's proposal. Should the successful Bidder default and fail to execute a Contract, the Contract may be awarded to the next lowest and responsible Bidder. The Owner reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

- a. If the Form of Proposal furnished to the Bidder is not used or is altered.
- b. If the Bidder fails to insert a price for all bid items, alternate and unit prices requested.
- c. If the Bidder adds any provisions reserving the right to accept or reject any award.
- d. If there are unauthorized additions or conditional bids, or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.

- e. If the Bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the Owner.
- f. If the unit prices contained in the bid schedule are unacceptable to the Owner.
- g. If the Bidder fails to comply with other instructions stated herein.
- h. If the Owner suspects the Bidders of collusion.
- i. If the Bidder does not submit all the required proposal forms.
- j. If the Bidder does not execute the complete Contract (with performance and payment bonds) within ten (10) days of receipt of the Notification of Award.

10. BID EVALUATION AND BIDDER QUALIFICATIONS

The award of the Contract will be made to the lowest responsive, responsible Bidder as soon as practical. The Owner may award on the basis of the base bid, unit prices, any alternates the Owner chooses, as well as meeting the requirements for consideration as a responsible Bidder. Discrepancies on the Bidder's proposal shall be resolved based on the Owner's inspection and interpretation of the proposal as a whole. In cases where it is not evident what portion of a proposal is errant, discrepancies shall be resolved as follows:

- Words shall take precedence over numerical symbols.
- Unit prices shall take precedence over the associated extended price (quantity multiplied by the unit price).
- The correct sum of any column of figures shall take precedence over the indicated sum.

Before awarding a Contract, the Owner may require the apparent low Bidder to qualify himself to be a responsible Bidder by furnishing any or all of the following data:

- a. The latest financial statement showing assets and liabilities of the company or other information satisfactory to the Owner.
- b. A listing of completed projects of similar size and type.
- c. Project references.
- d. Permanent name and address of place of business.
- e. The number of regular employees of the organization and length of time the organization has been in business under present name.
- f. The name and home office address of the surety proposed and the name and address of the responsible local claim agent.
- g. The names of members of the firms who hold appropriate trade licenses, together with license numbers and the corporate officer who will give his personal attention to the Work.
- h. Qualifications and references of the resident project superintendent.
- i. Other commitments scheduled within the project's projected timeframe.

- j. The Contractor shall perform Work amounting to at least fifty percent (50%) of the Contract using his own personnel and equipment (owned). No portion of the Contract shall be sublet, assigned, or otherwise disposed of without the expressed written consent of the Owner. If the Contractor fails to demonstrate to the Owner that he has the ability to perform the specified percentage of the Work with his own personnel and equipment, his bid may be considered nonresponsive.
- k. An experience statement with pertinent information as to similar projects and other evidence of the qualifications for each subcontractor, person, equipment manufacturer, or organization that will furnish labor or materials. If the Owner or Designer, after investigation, has reasonable objection to any such entity, he may request an acceptable substitute without any increase in the bid price. This does not remove any responsibilities for the substitute to comply with the Contract specifications.

Requested information shall be furnished to the Owner within five (5) days after bid opening. Failure or refusal to furnish any of the above information, if requested, shall constitute a basis for disqualification of any Bidder.

In determining the lowest responsible, responsive Bidder, the Owner shall take into consideration the Bidder's compliance with the requirements of NCGS 143-128.2(c) and County policy, the past performance of the Bidder on construction Contracts for the County with particular concern given to completion times, quality of Work, cooperation with other Contractors, and cooperation with the Designer and Owner. Failure of the low Bidder to furnish affidavit and/or documentation as required by NCGS 143-128.2(c) may constitute a basis for disqualification of the bid.

If the Owner determines that the apparent low Bidder is not the lowest responsible, responsive Bidder by virtue of the above information, said apparent low Bidder will be so notified and his bid security shall be returned to him.

11. CONTRACT, PERFORMANCE BOND, PAYMENT BOND, INSURANCE, E-VERIFY

The successful Bidder, within ten (10) days of receipt of the "Notice of Award," shall sign and deliver the required number of Contract counterparts, a performance bond in an amount equal to one hundred percent (100%) of the Contract Price, a payment bond in an amount equal to one hundred percent (100%) of the Contract Price, and all necessary certificates of insurance. Contractor shall comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Further, if Contractor utilizes a subcontractor, Contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes. An additional performance guarantee with the North Carolina Department of Transportation may be required for work performed in the right-of-way. In this event, the successful Bidder, within ten (10) days of receipt of the "Notice of Award," shall supply the Owner with a copy of the executed performance guarantee and evidence of acceptance by the NCDOT. See the Supplementary General Conditions and General Conditions sections "Terminology and Intent of Documents," "Execution of Documents," "Performance Bond and Payment Bond," and "Minimum Insurance Requirements".

12. PAYMENTS

Payments to the successful Bidders (Contractors) will be made on the basis of monthly estimates. See "Requests for Payment," General Conditions.

13. MINORITY BUSINESS ENTERPRISES

The Contractor is advised that NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement – Instructions are applicable to this project. Prime Contractors should ensure that small businesses, minority businesses, women’s business enterprises, veteran-owned businesses, and labor surplus area firms are considered. Such consideration includes: (1) these business types are included on solicitation lists; (2) these business types are solicited whenever they are deemed eligible as potential sources; (3) dividing procurement transactions into separate procurements to permit maximum participation by these business types; (4) establishing delivery schedules (for example, the percentage of an order to be delivered by a given date of each month) that encourage participation by these business types; (5) utilizing organizations such as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and (6) requiring a Contractor under a Federal award to apply this section to subcontracts.

For the purposes of this section, an entity shall qualify (1) as a “minority business” or “women’s business enterprise” if it is currently certified as a North Carolina “historically underutilized business” under Chapter 143, Section 128.4(a) of the North Carolina General Statutes, and (2) as a “small business” if it is independently owned and operated and is qualified under the Small Business Administration criteria and size standards at 13 C.F.R. Part 21.

GENERAL CONDITIONS OF THE CONTRACT

Version date – April 2020

This document is intended for use on Brunswick County capital construction projects and shall not be used on any project that is not reviewed and approved by Brunswick County. Extensive modification to the General Conditions by means of “Supplementary General Conditions” is strongly discouraged.

The use or reproduction of this document or any part thereof is authorized for and limited to use on projects of Brunswick County, North Carolina, and is distributed by, through, and at the discretion of Brunswick County, for that distinct and sole purpose.

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ARTICLE 1 – DEFINITIONS

Addenda shall mean written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

Approval means written or imprinted acknowledgement that materials, equipment, or methods of construction are acceptable for use in the Work.

Asbestos is any material that contains more than one percent (1%) asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

Bidding Documents shall mean the Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

Bidding Requirements shall mean the Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, MBE forms, and the Proposal form with any supplements.

Bonds shall mean performance and payment bonds and other instruments of security.

Change Order, as used herein, shall mean a written order to the Contractor subsequent to the signing of the contract authorizing a change in the contract (addition, deletion, or revision to Contract Price or Time of Completion). The change order shall be signed by the Contractor, Designer, and the Owner, and approved by the County Commissioners, in that order (see Article “Changes in the Work”).

Claim shall mean a demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Time of Completion, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

Clarification or Request for Information (RFI) is a request from the Contractor seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the Contractor’s interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.

Contract, as used herein, is the written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

Contract Documents consist of the Invitation to Bid; Notice to Bidders; Instructions to Bidders; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawings and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the accepted proposal; the contract; the performance bond; the payment bond; insurance certificates; MBE forms; power of attorney; Notice to Proceed; Written Directives; Work Change Directives; Change Orders; Certificates of Substantial Completion; Notice of Final Completion and Acceptance; and approval of County Commissioners. All of these items together form the contract. Approved shop drawings are **not** contract documents.

Contract Price shall mean the moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents.

Contractor, as referred to hereinafter, shall be deemed to be either of the several contracting parties called the “Party of the First Part” in either of the several contracts in connection with

the total project. Where, in special instances hereinafter, a particular Contractor is intended, an adjective precedes the word "Contractor," as "general," "heating," etc. For the purposes of a single prime contract, the term "Contractor" shall be deemed to be the single contracting entity identified as the "Party of the First Part" in the single Construction Contract. Any references or adjectives that name or infer multiple prime Contractors shall be interpreted to mean the single prime Contractor.

Day shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

Defective, when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it 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 the Designer's recommendation of final payment.

Designer(s) are those referred to within this contract, or their authorized representatives. The Designer(s), as referred to herein, shall mean architect and/or Engineer or other professional. They will be referred to hereinafter as if each were of the singular number, masculine gender. In instances where the Owner performs functions typically done by the Designer, references to the Designer may also refer to the Owner.

Drawings shall mean that part of the Contract Documents prepared or approved by Designer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

Effective Date of the Contract shall mean the date indicated in the Contract on which it becomes effective, but if no such date is indicated, it means the date on which the Contract is signed and delivered by the last of the two parties to sign and deliver.

"Equal to" or "Approved Equal" or "Or-Equal" shall mean materials, products, equipment, assemblies, or installation methods considered equal by the Owner in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents.

Hazardous Environmental Condition shall mean the presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

Hazardous Waste shall have the meaning provided in the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

Inspection shall mean examination or observation of Work completed or in progress to determine its compliance with contract documents.

Laws and Regulations; Laws or Regulations shall mean any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

Liens, as used herein, shall mean charges, security interests, or encumbrances upon Project funds, real property, or personal property.

Liquidated Damages, as stated in the contract documents, is an amount reasonably estimated in advance to cover the losses incurred by the Owner by reason of failure of the Contractor(s) to complete the Work within the time specified.

Milestone, as used herein, shall mean a principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

Notice of Award shall mean the Approval of the proposal by the Brunswick County Board of Commissioner's at a public meeting or a signed "Notice of Award" form stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, Owner will execute the Contract.

Notice to Proceed shall mean a written notice given by Owner to Contractor fixing the date on which the time of completion will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

Owner is Brunswick County or any entity or department thereof. Typically, references to Owner shall refer to the County department responsible for overseeing the Work. However, the context may indicate the specific entity of the County referred to. The "County Commissioners" refers to the specific board in its official duty that governs County affairs and, based on context, may also be synonymous with the term "Owner."

Partial Utilization is use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

PCBs are polychlorinated biphenyls.

Petroleum, including crude oil or any fraction thereof, which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

Project is the total construction Work to be performed under the contract documents by the several contractors.

Project Expediter, as used herein, is an entity stated in the contract documents, designated to effectively facilitate scheduling and coordination of work activities. See Articles "Construction Supervision" and "Schedule" for responsibilities of a Project Expediter. **For the purposes of a single prime contract, the single prime Contractor shall be designated as the Project Expediter.**

Project Manual shall mean the bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

Radioactive Material shall mean source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

Request for Payment shall mean the form acceptable to Designer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Routine Written Communications Between the Designer and the Contractor are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, hand delivery, or facsimile. Written directives are included in this definition. Such communications cannot be identified as a "request for information."

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

Shop Drawings are all drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

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

Specifications are that part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor, as the term is used herein, shall be understood to be one who has entered into a direct contract with a Contractor or another Subcontractor, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.

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

“Substitution” or “Substitute” shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified or deviating from the specific manufacturers listed in the Technical Specifications when “Only” the specific manufacturer is indicated as being acceptable. Substitutions shall, in the opinion of the bidder, improve competition and/or enhance the finished installation.

Supplementary Conditions are that part of the Contract Documents which amend or supplement these General Conditions.

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

Surety, as used herein, shall mean the bonding company or corporate body which is bound with and for the Contractor, and which engages to be responsible for the Contractor and his acceptable performance of the Work.

Time of completion, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article “Time of Completion, Delays, Extension of Time”).

Underground Facilities are all underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

Work, as used herein as a noun, is intended to be the completed construction including materials, labor, and workmanship of the appropriate Contractor as required by the contract documents.

Work Change Directive, as used herein, shall mean a written statement to Contractor issued on or after the Effective Date of the Contract and signed by Owner and recommended by Designer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Time of Completion but is evidence that the parties expect that the change ordered or documented by a Work Change Directive 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 Time of Completion.

Written Notice or Written Directive shall be defined as notice in writing delivered in person to the Contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization.

ARTICLE 2 – TERMINOLOGY AND INTENT OF DOCUMENTS

- A. The contract documents are complementary; what is called for by one is as binding as if called for by all. The intent of the contract documents is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the contract documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to the Owner.
- B. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, Instructions to Bidders, Notice to Bidders, Invitation to Bid, Instructions to Bidders, Supplementary General Conditions, Specifications, General Conditions, large-scale drawings, small-scale drawings.
- C. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.

D. Intent of Certain Terms or Adjectives

Whenever in the Contract Documents the terms “as allowed,” “as approved,” or terms of like effect or import are used, or the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Designer as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to Designer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of the Article “Designer’s Status” or any other provision of the Contract Documents.

E. Furnish, Install, Perform, Provide

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

2. "Install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. "Perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

ARTICLE 3 – EXECUTION OF DOCUMENTS

The Contractor shall execute each copy of the proposal, contract, performance bond and payment bond as follows:

- A. If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- B. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- C. If the documents are executed on the part of a limited liability company, they shall be executed by a Manager with authority to commit the company to the contract and the title of the office of such person shall appear after their signature.
- D. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- E. If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole owner, partnership, company, or corporation, whichever form is applicable to each particular member.
- F. All signatures shall be properly witnessed.
- G. If the Contractor's license is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
- H. The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
- I. Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in North Carolina. The title "Licensed Resident Agent" shall appear after the signature.
- J. The seal of the bonding company shall be impressed on each signature page of the bonds.
- K. The Contractor's signature on the performance bond and the payment bond shall correspond with that on the contract.

ARTICLE 4 – REVIEW OF CONTRACT DOCUMENTS AND CLARIFICATIONS

- A. **Contractor's Review of Contract Documents:** Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Designer any conflict, error, ambiguity, omission, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Designer before proceeding with any Work affected thereby; however, Contractor shall not be liable to Owner or Designer for failure to report any conflict, error, ambiguity, omission, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.
- B. In such cases where the nature of the Work requires clarification by the Designer, such clarification shall be furnished by the Designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- C. The Contractor(s) and the Designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject to addition or change in accordance with progress of the Work. The Designer shall furnish drawings or clarifications in accordance with that schedule. The Contractor shall not proceed with the Work without such detail drawings and/or written clarifications.
- D. Where needed specifications or details are omitted from the contract documents the Contractor shall promptly report such omissions to the Designer and wait for clarification before proceeding with the work. Brunswick County details and specifications, latest versions, will be used to determine work description, materials, construction methods, and method of measurement, unless directed otherwise by the Designer.

ARTICLE 5 – SITE DOCUMENTATION

The Contractor is required to provide detailed video or photo documentation of site conditions prior to mobilization. The extents of the project site shall be video/photo documented including, but not limited to: all access roads into and out of the site, haul roads, existing utilities, staging and stockpile areas, culverts, bridges, drainage features, adjacent driveways, adjacent structures, existing facilities, stream and floodplains adjacent and immediately downstream of the project area, and any other areas that might potentially be impacted by construction. Videos and photos shall have the dates and times taken digitally indicated.

ARTICLE 6 – REFERENCE TO STANDARDS, CODES, LAWS, AND REGULATIONS

- A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
- B. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Designer, or any of their Subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to Owner, Designer, or any of Designer's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

- C. If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall report it to Designer in writing at once. Contractor shall not proceed with the Work affected thereby (except in an emergency) until an amendment or supplement to the Contract Documents has been issued.
- D. The Contractor shall give all notices and comply with all laws, ordinances, codes, encroachment agreements, rules and regulations bearing on the conduct of the Work under this contract. Any necessary changes required after contract award shall be made by change order in accordance with Article “Changes in the Work.” If the Contractor performs any work knowing it to be contrary to such laws, ordinances, codes, encroachment agreements, rules and regulations, and without such notice to the Designer, he shall bear all cost arising therefrom. Additional requirements implemented after bidding will be subject to equitable negotiations.
- E. All work under this contract shall conform to the North Carolina State Building Code and other State, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the Contractor.

ARTICLE 7 – PERMITS

Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening Bids, or, if there are no Bids, on the Effective Date of the Contract. Contractor shall pay all charges of utility owners for connections to the Work.

ARTICLE 8 – COPIES OF DESIGN DRAWINGS AND SPECIFICATIONS

The Designer shall furnish free of charge to the Contractors copies of plans and specifications as follows:

- A. General Contractor and single-prime Contractor - Up to five (5) sets of general Contractor drawings and specifications. One of these sets shall be used by the Contractor to clearly and legibly record all work-in-place that is at variance with the contract documents.
- B. Each other Contractor - Up to five (5) sets of the appropriate drawings and specifications. One of these sets shall be used by the Contractor to clearly and legibly record all work-in-place that is at variance with the contract documents.
- C. Additional sets shall be furnished at cost, including mailing, to the Contractor upon request by the Contractor.

ARTICLE 9 – APPROVING SUBSTITUTES AND “OR EQUAL” ITEMS

- A. Products are generally specified by ASTM or other reference standard and/or by manufacturer’s name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the general style, type, character, function, appearance, and quality required. Equivalent products are acceptable and bidders are not

restricted to the specific brand, make, manufacturer or specific name unless the specification indicates that “only” the specific manufacturer is acceptable or the description contains words reading that no like, equivalent, or substitution is permitted. Other items of material or equipment or material or equipment of other Suppliers may be submitted to Designer for review under the circumstances described below and as outlined in the Instructions to Bidders Article “Substitutions”.

1. **“Or-Equal” Items:** In cases where the technical specification indicate a specific brand, if in the Designer’s and Owner’s discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Designer as an “or-equal” item, in which case review and approval of the proposed item may, in Designer’s discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph a proposed item of material or equipment will be considered functionally equal to an item so named if:

- a. in the exercise of reasonable judgment Designer determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;
- b. Contractor certifies that: (i) there is no increase in cost to the Owner; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. **Substitute Items**

- a. If in Designer’s and Owner’s discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under the paragraph above, it will be considered a proposed substitute item.
- b. Request for substitution of materials, items, or equipment shall be submitted to the Designer for approval or disapproval ten days prior to the opening of bids. Substitution submittals made after this point shall be reviewed at the discretion of the Designer.
- c. Contractor shall submit sufficient information as provided below and as stated in the Instructions to Bidders to allow Designer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Designer from anyone other than prime bidders.
- d. By making requests for substitutions, the Contractor:
 - i. Represents that he has personally investigated the proposed substitute product and determined that it is of equal or superior in all aspects to that specified;
 - ii. Represents that he will provide, at minimum, the same warranty for the substitute that he would for that specified.
 - iii. Certifies that the cost of data presented is complete and includes all related costs under this Contract but excludes costs under separate contracts, and excludes the Designers redesign costs, and waives all claims for additional costs related to the substitution which subsequently becomes apparent; and
 - iv. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

- B. **Preferred Brands:** In accordance with the provisions of NCGS 133-3 the Contract Documents may list one or more preferred brands to provide overall cost savings to the Owner and/or to maintain or improve the functioning of any process or system affected by the preferred item or items. The use of Preferred Brands on the project is at the sole discretion of the Owner. In the event that the Contractor's Proposal does not indicate an increased cost for the use of Preferred Brands, the Contractor shall use Preferred Brands on the project, unless notified otherwise in writing by the Owner. The Owner's preference of Preferred Brands for specific items shall be stated in the Contract Documents, typically on an Approved Products List in the Supplementary General Conditions, the Proposal Form, or in the Technical Specifications. A bid alternate may be used on the Proposal Form to determine the cost difference between Preferred Brands and other products meeting the performance specification. Where there is a cost differential between a Preferred Brand item and the other equivalent item, the Contractor shall provide a listing of the equivalent item type, manufacturer, model, item number, and cost savings compared to using a Preferred Brand item. When Preferred Brands are indicated in the Contract Documents for specific items, but the Owner chooses not to require the use of Preferred Brands for a specific item, the Contractor is advised that any product submitted for use on the project must still be approved in accordance with the section "Or-equal Items".
- C. **Substitute Construction Methods or Procedures:** If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Designer. Contractor shall submit sufficient information to allow Designer, in Designer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents.
- D. **Designer's Evaluation:** Designer will be allowed a reasonable time within which to evaluate each proposal or submittal. Designer will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed, or utilized until Designer's review is complete, which will be evidenced by either a Directive for a substitute or an approved Shop Drawing for an "or-equal." Designer will advise Contractor in writing of any negative determination.
- E. **Special Guarantee:** Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- F. **Contractor's Expense:** Contractor shall provide all data, including any required engineering, in support of any proposed substitute or "or-equal" at Contractor's expense.

ARTICLE 10 – SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- A. Within ten (10) consecutive calendar days after the notice to proceed, each prime Contractor shall submit a schedule for anticipated submittal of all shop drawings, product data, samples, and similar submittals to the Project Expediter and the Designer. This schedule shall indicate the items, relevant specification sections, other related submittal, data, and the date when these items will be furnished to the Designer.
- B. The Contractor shall review, approve and submit to the Designer all Shop or Setting Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Shop drawing submittals shall be made using the "Contractor Submittal" form and shall be made in accordance with the project schedule. Required Submittals shall bear the Contractor's stamp of approval and any exceptions to the Contract Documents shall be noted on the submittals. A minimum of three (3) copies of each submittal shall be submitted to the Designer to retain and the Contractor shall supply, at the request of the Designer, additional copies as needed. Submittals shall be presented to the Designer with reasonable promptness and time so as to cause no delay in the activities of the Owner or of separate Contractors.

- C. Shop drawing submittals shall be complete with respect to quantities, dimensions, drawings, specified performance, design criteria, and materials and shall be detailed sufficiently to enable the Designer to determine compliance with the contract documents.
- D. The Designer shall review required submittals promptly, noting desired corrections if any, and returning a copy of the annotated shop drawings to the Contractor not later than twenty (20) days from the date of receipt by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals. The Contractor shall not be entitled to any Time of Completion extension for review and approval of shop drawings by the Designer.
- E. Approval of shop drawings by the Designer shall not be construed as relieving the Contractor from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such lack of compliance or errors first have been called in writing to the attention of the Designer by the Contractor.
- F. The Owner may assess the Contractor the cost of shop drawing review for shop drawing submittals in excess of three for any one item.

ARTICLE 11 – REFERENCE POINTS AND CONSTRUCTION SURVEYING

- A. Engineering surveys shall be provided to establish reference points for construction which in Designer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without prior written approval. Contractor shall report to Designer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by a registered professional surveyor.
- B. The Contractor shall be responsible for all of the field horizontal layout and vertical control of the facilities. Construction Surveying shall include, but not be limited to, furnishing personnel, all surveying equipment, stakes, layout drawings, calculations, stakeout records, all materials necessary to perform the surveying work, staking clearing limits, staking centerlines, miscellaneous staking necessary for construction, locating reference points and benchmarks, and any other survey incidental to construction. Unless directed otherwise by the Designer, Survey personnel shall be under the direct supervision of a North Carolina Registered Professional Land Surveyor in conformance with NCGS 89C. Benchmarks and reference points shall be indicated by a metal monument cap set on a minimum 36" long #5 reinforcing bar with an adjacent carsonite witness stake and shall be permanently preserved.
- C. Upon completion of the stakeout and prior to beginning construction, the Contractor shall give the Designer a 48-hour notice in order to inspect the construction staking. The Designer's review of the Contractor's work in no way relieves the Contractor of responsibility for conformance with the contract documents. Failure by the Designer to point out unsatisfactory work, from lack of discovery or for any other reason, in no way prevents later rejection or corrections to the unsatisfactory work, when discovered, at no cost to the Owner. No claims will be allowed for losses suffered due to any necessary removal or repairs resulting from the unsatisfactory work. When requested by the Designer, the accuracy of the stakeout will be checked by the Contractor.
- D. When surveying is required that could not have been reasonably anticipated, the Contractor shall notify the Designer in writing prior to beginning such work and will proceed according to the General Conditions of the Contract for "Claims for Extra Cost."

ARTICLE 12 – RECORD DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

The Contractor shall maintain, in readable and secure condition at his job office, one complete set of the contract documents including record drawings, specifications, addenda, change orders, written directives, work change directives, and written interpretations and clarifications. Additionally, a copy of all shop drawings and the project manual shall be maintained at the job office. These materials shall be annotated to show changes made during construction. The Contractor shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such materials shall be made available for use by the Owner, Designer, or his authorized representative and shall be submitted to the Owner upon project completion and prior to final payment.

ARTICLE 13 – AS-BUILT DRAWINGS

Unless otherwise indicated in the Supplementary General Conditions, the Contractor is responsible for furnishing certified “As-Built” Drawings in the form of signed and sealed (professional surveyor or professional engineer) plans per the North Carolina Board of Engineers and Surveyors guidelines. Electronic copies (Acrobat PDF file format and either MicroStation or Autocad format) and two (2) sets of photographic mylars or vellums shall be furnished to the Owner prior to final payment. As-built drawings shall verify or adjust elevations, dimensions, locations, and materials incorporated into the completed work.

ARTICLE 14 – OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications (including electronic media) are instruments of service and remain the property of the Owner. The use of these instruments on work other than this contract without permission of the Owner is prohibited. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with Owner: (i) shall not 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 Designer or Designer’s Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes or for furnishing as-built drawings.

ARTICLE 15 – MATERIALS, EQUIPMENT, EMPLOYEES

- A. The Contractor shall, unless otherwise specified, supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of his work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied therefrom, all in accordance with the contract documents.
- B. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- C. Upon notice, the Contractor shall furnish evidence as to quality of materials.

- D. Each Contractor shall obtain written approval from the Designer for the use of products, materials, equipment, assemblies or installation methods claimed as equal to those specified. Such approvals must be obtained as soon after contract awards as possible and before any materials are ordered. Applications for approvals shall be made by the Contractor and not by Subcontractors or material Suppliers within thirty (30) days following award of contract. When the submittal schedule provided under Article "Shop Drawings, Submittals, Samples, Data" Paragraph (A) is approved, no further substitutions will be permitted except in unusual or extenuating circumstances. If no list is submitted, the Contractor shall supply materials specified.
- E. The Designer is the judge of equality for proposed substitution of products, materials or equipment.
- F. If at any time during the construction and completion of the Work covered by these contract documents, the conduct of any workman of the various crafts be adjudged a nuisance to the Owner or Designer, or if any workman be considered detrimental to the Work, the Contractor shall order such parties removed immediately from grounds.

ARTICLE 16 – EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.

ARTICLE 17 – EMPLOYMENT OF THE HANDICAPPED

The Contractor(s) agree not to discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices.

ARTICLE 18 – ROYALTIES, LICENSES, AND PATENTS

It is the intention of the contract documents that the Work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The Contractor shall protect and save harmless the Owner against suit on account of alleged or actual infringement. The Contractor shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 19 – USE OF PREMISES

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities.
- B. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- C. The Contractor(s) shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the Designer and shall not exceed those established limits in his operations.

- D. The Contractor(s) shall not load or permit any part of any structure or property to be loaded with a weight that will endanger its safety or that of subsurface facilities.
- E. The Contractor(s) shall enforce the Designer's instructions regarding signs, advertisements, fires and smoking.
- F. No firearms, any type of alcoholic beverages, or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 20 – SUBSURFACE AND PHYSICAL CONDITIONS

- A. The project manual may contain reports, explorations, tests, or drawings of subsurface conditions and subsurface structures at or contiguous to the site. Contractor may rely upon the general accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Project Manual. Except for such reliance on such “technical data,” Contractor may not rely upon or make any Claim against Owner, Designer, or any Designer's Consultants with respect to:

- 1. The completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. Other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

B. Differing Subsurface or Physical Conditions

- 1. **Notice:** If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:
 - a. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as indicated above is materially inaccurate; or
 - b. is of such a nature as to require a change in the Contract Documents; or
 - c. differs materially from that shown or indicated in the Contract Documents; or
 - d. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency), notify Owner and Designer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- C. **Designer's Review:** After receipt of written notice as required by above, Designer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Designer's findings and conclusions.

D. Possible Price and Times Adjustments

1. The Contract Price or the Time of Completion, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described above under "Differing Subsurface or Physical Conditions" and
 - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Unit Price Work.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Time of Completion if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Price and Time of Completion by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice within the time and as required by the section "Differing Subsurface of Physical Conditions."
3. NOTE ON TRENCHLESS EXCAVATION (Horizontal Directional Drill, Bore & Jack, etc.) – Encountering rock or other hardened material during the installation of pipe by trenchless excavation methods shall not be considered a "Differing Subsurface Condition or Physical Condition" and no adjustment to the Contract Price or Time of Completion shall be approved. The Contractor is hereby notified that rock and other hardened material is routinely encountered in and around Brunswick County, NC. Per the "Instructions To Bidders", the Contractor is required to satisfy himself as to the nature of subsurface conditions and the Owner recommends that the Contractor perform subsurface investigation prior to submitting a bid.
4. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Time of Completion, or both, a Claim may be made therefor as provided elsewhere in the General Conditions. However, Owner, Designer, and Designer's Consultants shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

ARTICLE 21 – UNDERGROUND FACILITIES

- A. **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 Owner or Designer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary General Conditions:

1. Owner and Designer shall not be responsible for the accuracy or completeness of any such information or data; and
2. the cost of all the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data,
 - b. locating all Underground Facilities shown or indicated in the Contract Documents and maintaining all utility markings (paintings, stakes, etc.) until the Owner provides written acceptance of the project.
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, prior to and during construction, and
 - d. the safety and protection of Underground Facilities and repairing any damage resulting from the Work inclusive of required relocations, and
 - e. the Contractor will be responsible for coordinating and obtaining approval for utility interruptions caused by the Work and for all costs associated with the repair and disruption of any underground utility facility.

B. Not Shown or Indicated

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency) identify the owner of such Underground Facility and give written notice to that owner and to Owner and Designer. Designer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Designer concludes that a change in the Contract Documents is required, a Work Change Directive or written directive, as applicable, will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Time of Completion, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Time of Completion, Owner or Contractor may make a Claim therefore as provided elsewhere in the General Conditions.

ARTICLE 22 – CUTTING, PATCHING, AND DIGGING

- A. The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the Designer may direct.
- B. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefore.

- C. No Contractor shall endanger any work of another Contractor by cutting, digging or other means. No Contractor shall cut or alter the Work of any other Contractor without the consent of the Designer and the affected Contractor(s).
- D. All areas within the project limits, limits of disturbance (LOD), and easement areas are subject to being cleared and grubbed of vegetative material and trees. Landscaped areas, vegetative plantings, ornamental trees, and trees in excess of 24" diameter (DBH) shall not be removed without prior authorization from the Engineer. The Contractor shall remove all trees or vegetation that, in the opinion of the Engineer, are necessary to facilitate the construction.

ARTICLE 23 – UTILITIES, STRUCTURES, SIGNS

- A. The Project Expediter shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer, and other utility services, which may be necessary and required for completion of the project. Any permanent meters installed shall be listed in the Project Expediter's name until his work is fully accepted by the Owner. As stipulated in the Supplementary General Conditions, the Owner may: (1) pay utilities cost directly, (2) have the Project Expediter to pay all utilities cost, (3) or reimburse the Project Expediter for the actual cost of utilities. The Owner or Project Expediter, as applicable, may recover actual costs of metered utilities from the responsible party should delays occur in project completion.
- B. Meters shall be relisted in the Owner's name on the day following completion and acceptance of the Project Expediter's work, and the Owner shall pay for services used after that date.
- C. The Owner shall be reimbursed for all metered utility charges after the meter is relisted in the Owner's name and prior to completion and acceptance of the Work of **all** contractors. Reimbursement shall be made by the Contractor whose work has not been completed and accepted. If the Work of two or more contractors has not been completed and accepted, reimbursement to the Owner shall be paid by the Contractors involved on the basis of assessments by the Designer.
- D. Prior to the operation of permanent systems, the Project Expediter will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- E. All contractors shall have any permanent building systems in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of buildings. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and electrical equipment rooms), and hardware are installed; and other openings have protection which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the Contractor(s) and the Designer. Use of the equipment in this manner shall in no way affect the warranty requirements of the Contractor(s).
- F. The Electrical Contractor shall have any building's permanent power wiring distribution system in sufficient readiness to provide power as required by the HVAC Contractor for temporary climatic control.
- G. The Electrical Contractor shall have any building's permanent lighting system ready at the time the general Contractor begins interior painting and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- H. Each prime Contractor shall be responsible for his permanently fixed service facilities and systems in use during progress of the Work. The following procedures shall be strictly adhered to:

1. Prior to acceptance of work by the Owner, each Contractor shall remove and replace any parts of the permanent building systems damaged through use during construction.
 2. Temporary filters shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the Owner's acceptance of the Work.
 3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing and site work operations are creating dust in excess of what would be considered normal if the building were occupied.
 4. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the Contractor whose system is utilized.
 5. The Electrical Contractor shall have all lamps in proper working condition at the time of final project acceptance.
- I. The Project Expediter shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
 - J. The Project Expediter shall, if required by the Supplementary General Conditions and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, unless otherwise directed by the Designer.
 - K. On multi-story construction projects, the Project Expediter shall provide temporary elevators, lifts, or other special equipment for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall be included in the Project Expediter's bid.
 - L. The Project Expediter will erect one sign on the project, unless otherwise directed by the Designer. The sign shall be of sound construction neatly lettered with black letters on white background in accordance with Brunswick County standard details. The sign shall bear the name of the project, and the names of prime Contractors on the project, and the name of the Designer and consultants. Directional signs may be erected on the Owner's property subject to approval of the Owner with respect to size, style, and location of such directional signs. Such signs may bear the name of the Contractor and a directional symbol. No other signs will be permitted except by permission of the Owner.

ARTICLE 24 – HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. The project manual may contain reports, explorations, tests, or drawings of known hazardous environmental conditions at or contiguous to the site. Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Project Manual. Except for such reliance on such "technical data," Contractor may not rely upon or make any Claim against Owner, Designer, or any Designer's Consultants with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.
- B. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- C. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency); and (iii) notify Owner and Designer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Designer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.
- D. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Time of Completion, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim as provided elsewhere in the General Conditions.
- E. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Time of Completion as a result of deleting such portion of the Work, then either party may make a Claim as provided elsewhere in the General Conditions. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article "Owners Right to Do Work."
- F. To the fullest extent permitted by Laws and Regulations and without limiting any other indemnity obligation set forth herein, Contractor shall indemnify and hold harmless Owner, Designer, Designer's Consultants, and the officers, directors, partners, employees, agents, other consultants, and Subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) should Contractor's, or anyone for whom Contractor is responsible, fault or negligence be the proximate cause of a Hazardous Environmental Condition. Nothing in this paragraph shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- G. The Owner has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the Work areas that are not to be disturbed and do not create an exposure hazard. Contractors are reminded of the requirements of instructions under Instructions to Bidders and General Conditions of the Contract, titled Examination of Conditions. Statute 130A, amended August 3, 1989,

established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina. The latest edition of *Guideline Criteria for Asbestos Abatement* available from the NC State Construction Office is to be incorporated in all asbestos abatement projects for the Capital Improvement Program.

ARTICLE 25 – PROTECTION OF WORK AND PROPERTY

- A. The Contractors shall be jointly responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the Owner or Designer, and by laws or ordinances governing such conditions. They shall be responsible for any damage to the Owner's property, or of that of others on the job, by them, their personnel, or their Subcontractors, and shall make good such damages. They shall be responsible for and pay for any damages caused to the Owner. All contractors shall have access to the project at all times.
- B. The Contractor shall provide cover and protect all portions of the structure when the Work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the Work on the building, whether set by him, or any of the Subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- C. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the Designer and Owner.
- D. The Contractor shall protect all trees and shrubs designated to remain in the vicinity of the operations by building substantial boxes around same. All ornamental trees and landscaping shall be protected, whether such protection is indicated or not within the Contract Documents. If ornamental trees and landscaping plantings are in the way of construction, the contractor shall remove, maintain, and reinstall at locations designated by the Designer. Any ornamental trees and landscaping plantings damaged or that die within the warranty period shall be replaced by the Contractor at the Contractor's expense. Where equipment must cross walks, landscaping areas, or ramps, the Contractor shall provide steel plates or minimum 3/4" plywood sheets for protection of these areas.
- E. The Contractor shall barricade all walks, roads, etc., and any areas directed by the Designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the Work shall be well barricaded and properly lighted at night.
- F. In the event of emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the Contractor is hereby authorized and is obligated to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the Contractor on account of such action shall be determined as provided for under Article "Changes in the Work," Paragraph (B).

ARTICLE 26 – SAFETY

- A. The Contractor shall be solely responsible for initiating, maintaining, providing, and supervising all necessary safety precautions, safety programs, and safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the Work. He shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. He shall protect against damage or injury resulting from falling materials and he shall maintain all protective devices and signs throughout the progress of the Work.

- B. The Contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.
- C. The Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with laws or regulations.
- D. The Contractor shall designate a qualified and experienced member of his organization as safety inspector, whose duties shall include accident prevention on the Work project. The name of the safety inspector shall be made known to the Designer at the time the Work is started.

ARTICLE 27 – TRAFFIC CONTROL

- A. The Contractor will be required to maintain traffic within the limits of the project, including all existing roadways that cross or intersect the project. To the extent dependent on the Contractor, the Contractor shall be responsible for maintaining in a safe, passable, and convenient condition all roads used by him during construction of the project. Traffic shall be maintained from the time the Contractor begins work on the project site until acceptance of the project, including any periods during which the Contractor's operations are suspended. The Contractor shall conduct his work in a safe manner that will create a minimum amount of inconvenience to traffic.
- B. The Contractor shall be responsible for determining, utilizing, and maintaining traffic control measures as outlined in the *Manual on Uniform Traffic Control Devices (MUTCD)*, latest version. Unless otherwise directed by the Designer, the Contractor is required to have an English copy of the *Manual on Uniform Traffic Control Devices (MUTCD)*, latest version, on the project site.
- C. During the progress of any work within road rights-of-way, mark all hazards with well-maintained signs, barricades, drums, or other warning or channelizing devices. At each location where work is started which creates a safety hazard, continue the Work until completed to the extent that the safety hazard is eliminated. If the Work is not completed in a continuous manner to the extent that the safety hazard is eliminated, the Designer will not allow any other work on the project to be performed until the existing safety hazard is eliminated. During the process of excavating in a travelway or in the clear zone of a travelway where traffic is to be later maintained, make provisions to backfill and repair any excavated or damaged pavement before allowing traffic to proceed over the affected lanes. If not otherwise specified, the clear zone is the immediate area within 30' of the outside edge of lane. In low speed areas (35 MPH or less) metal plates may be used to cover excavated areas. Continuous, safe vehicular access shall be maintained to all residences, businesses, schools, police stations, fire stations, hydrants, other emergency services, hospitals, and mailboxes. Operations shall be conducted in a manner that limits inconvenience to property owners. When work is not in progress, keep all personnel, equipment, machinery, tools, construction debris and supplies at least 40 feet away from active travel lanes. Personal vehicles shall not be parked adjacent to travelways in road rights-of-way.
- D. During lane closures, all equipment and personnel shall operate within the designated work area. Traffic control devices for lane closures shall be installed with the traffic flow, beginning with devices on the upstream side of traffic. Traffic control devices for lane closures shall be removed against the traffic flow, beginning with devices on the downstream side of traffic.

ARTICLE 28 – SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- A. Any land-disturbing activity performed by the Contractor(s) in connection with the project shall

comply with all erosion control measures set forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C). The Owner makes no representation as to the type and intensity of rainfall or storms that shall occur during the life of the project. Southeastern North Carolina is in an area susceptible to hurricanes, severe rainfall, and storm events; these events are not uncommon to the area. No additional compensation shall be made for compliance with the Sedimentation Pollution Control Act of 1973 and NCDEQ permits due to severe rainfall and storm events.

- B. Upon receipt of notice that a land-disturbing activity is in violation of said act, the Contractor(s) shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- C. The Contractor(s) shall be responsible for defending any legal actions instituted pursuant to NCGS 113A-64 against any party or persons described in this article.
- D. To the fullest extent permitted by law and without limiting any other indemnity obligation set forth herein, the Contractor(s) shall indemnify and hold harmless the Owner, the Designer and the agents, consultants and employees of the Owner and Designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, should Contractor's, or anyone for whom Contractor is responsible, fault or negligence be the proximate cause of a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article. Any claim, damage, civil penalty, loss or expense levied on or incurred by the Owner may be paid in a timely manner by the Owner and deducted from the monies owed to the Contractor(s).
- E. The Contractor shall comply with the following requirements:
 - 1. Equipment utilized during the construction activity on a site must be operated and maintained in such a manner as to prevent the potential or actual pollution of the surface or ground waters of the state. Fuels, lubricants, coolants, and hydraulic fluids, or any other petroleum products, shall not be discharged on to the ground or into surface waters. Spent fluids shall be disposed of in a manner so as not to enter the waters, surface or ground, of the state and in accordance with applicable state and federal disposal regulations. Any spilled fluids shall be cleaned up to the extent practicable and disposed of in a manner so as not to allow their entry into the waters, surface of ground, of the state.
 - 2. Herbicide, pesticide, and fertilizer usage during the construction activity shall be restricted to those materials approved by EPA and shall be in accordance with label restrictions.
 - 3. All wastes composed of building materials shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (North Carolina Administrative Code Section 15A NCAC 13B).
 - 4. All sedimentation and erosion control of facilities shall be inspected by the Contractor at least once every seven calendar days and within 24 hours after any storm event of greater than 0.1 inches of rain per 24-hour period or any day that has been claimed by the Contractor as a rain delay.
 - 5. The Contractor shall submit to the Owner a written report of weekly inspections. Visible sedimentation found off the site shall be recorded with a brief explanation as to the measures taken to prevent future releases as well as any measures taken to clean up the

sediment that has left the site. This record shall be made available to DEQ or authorized agent upon request.

6. The Contractor shall be fully responsible for growing and maintaining a vegetative cover on all areas of the site in accordance with DEQ Land Quality requirements.

ARTICLE 29 – INSPECTION OF THE WORK

- A. It is a condition of this contract that the Work shall be subject to inspection by the Designer, Owner, designated official representatives of the Owner, and those persons required by state law to test special work for official approval. The Contractor shall therefore provide safe access to the Work at all times for such inspections.
- B. All instructions to the Contractor will be made only by or through the Designer, Owner, or the Designer or Owner's designated project representative. Observations made by official representatives of the Owner shall be conveyed to the Designer for review and coordination when the Designer is acting as the construction administrator/inspector.
- C. Should any work be covered up or concealed prior to inspection and approval by the Designer, such work shall be uncovered or exposed for inspection, if so requested by the Designer in writing. Inspection of the Work will be made promptly upon notice from the Contractor. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition the Work that has been covered or concealed will be paid by the Contractor involved.
- D. Prompt notice of all defective work of which Owner or Designer has actual knowledge shall be given to the Contractor.
- E. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.
- F. The presence of the Designer, Owner, or Inspector at the work site shall in no way lessen the Contractor's responsibility for conformity with the contract documents. Should the Designer, Owner, or Inspector, prior to or during construction, fail to point out or reject materials or work that does not conform with plans and specifications, whether from lack of discovery or from any other reason, it shall in no way prevent later rejection or correction to the unsatisfactory materials or work when discovered. The Contractor shall have no claim for losses suffered due to any necessary removals or repairs resulting from the unsatisfactory work.
- G. The Contractor shall notify the Inspector a minimum of 24 hours in advance of the Contractor's intent not to work any given day, or in the event of weather conditions prohibiting execution of the work, by 9 a.m. the day of the abnormal weather.

ARTICLE 30 – TESTING

- A. Where special inspection or testing is required by virtue of any state laws, instructions of the Designer, specifications or codes, the Contractor shall give written notice a minimum of 48 hours in advance to the designated official representatives of the Owner, of the time set for such inspection or test. Such special tests or inspections will be made in the presence of the official representatives of the Owner, and it shall be the Contractor's responsibility to serve ample notice of such tests. The Contractor shall furnish the official representatives of the

Owner with all certificates of inspection or approval. Work performed without proper testing may be ordered for removal and replacement at no additional cost to the Owner.

- B. The Contractor shall employ and pay for the services of an independent testing firm to perform all inspections, tests, or approvals required by the contract documents including, but not limited to, mix designs, soil tests, compaction tests, concrete tests, foundation tests, piling testing and inspection, and all other required material tests. The Contractor shall provide the Owner with a schedule of values for all tests to be performed on the project. The values presented shall be all-inclusive; no separate payment shall be made for labor, materials, travel, meals, lodging, etcetera. Prior to any testing being performed, the Contractor must receive written approval from the Owner approving the selected testing firm.
- C. Testing shall be performed by licensed, professional personnel according to the standards referenced in the technical specifications, or in the absence thereof, according to applicable ASTM standards or other applicable industry standards. On a daily basis, personnel performing the tests shall provide the Contractor and Owner a list of all tests performed including, at a minimum, the date, time, location, temperature, project identifier, and tester's name.
- D. If a unit price line item for "Testing Allowance" is included in the proposal, the price will be adjusted in accordance with article "Unit Price Work." The established cost of work for the unit price line item "Testing Allowance" shall be 105% of the required testing performed and billed by the independent testing firm that is documented by actual invoices submitted to the Designer from the Contractor.
- E. Payment shall not be made for failing tests, tests performed in the absence of the owner's inspector (unless prior written authorization from the owner's inspector has been granted), tests unable to be verified by the daily test list, or any costs incurred due to poor scheduling.

ARTICLE 31 – CONSTRUCTION SUPERVISION

- A. Throughout the progress of the Work, each Contractor shall keep at the job site, a competent superintendent or supervisory staff satisfactory to the Designer. The superintendent shall not be changed without the consent of the Designer unless said superintendent ceases to be employed by the Contractor or ceases to be competent. The superintendent shall have authority to act on behalf of the Contractor, and instructions, directions or notices given to him shall be as binding as if given to the Contractor.
- B. The Contractor shall examine and study the contract documents and fully understand the project design, and shall provide constant, competent, and efficient supervision to the Work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the Designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- C. All Contractors shall be required to cooperate and consult with each other during the construction of the project. Prior to installation of work, all Contractors shall jointly prepare coordination drawings, showing locations of various ductworks, piping, motors, pumps, and other mechanical or electrical equipment, in relation to the structure, walls and ceilings. These drawings shall be submitted to the Designer through the Project Expediter for information only. Each Contractor shall lay out and execute his work to cause the least delay to other contractors. Each Contractor shall be financially responsible for any damage to other Contractor's work and for undue delay caused to other contractors on the project.
- D. The Contractor is required to attend monthly job site progress conferences as directed by the Designer. Home office representatives may be required at these meetings. Contractor representatives shall have authority to act on behalf of the Contractor. These meetings shall

be open to Subcontractors, material Suppliers and any others who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified Contract Time. Each Contractor shall be prepared to assess progress of the Work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The Designer or his authorized representative shall be the coordinator of the conferences and shall preside as chairman.

- E. The Designer shall designate a Project Expediter on projects involving two or more prime contracts and shall designate such in the Supplementary General Conditions. **For the purposes of a single prime contract, the single prime Contractor shall be designated as the Project Expediter.** The Project Expediter shall have the following responsibilities:
1. Prepare the project construction schedule and shall allow all prime Contractors (multi-prime contract) and Subcontractors (single-prime contract) performing general, plumbing, HVAC, and electrical work equal input into the preparation of the initial construction schedule.
 2. Maintain a project progress schedule for all contractors.
 3. Give adequate notice to all contractors to ensure efficient continuity of all phases of the Work.
 4. Notify the Designer of any changes in the project schedule.
 5. Recommend to the Designer whether payment to a Contractor or Subcontractor should be approved.

ARTICLE 32 – SCHEDULE

- A. It shall be the responsibility of the Project Expediter to cooperate with and obtain from all prime Contractors and Subcontractors on the job, their respective work activities and integrate these activities into a project construction schedule in form of a detailed bar chart or Critical Path Method (CPM), schedule. Each prime Contractor shall provide work activities within fourteen (14) days of request by the Project Expediter. A “work activity,” for scheduling purposes, shall be any component or contractual requirement of the project requiring at least one (1) day, but not more than fourteen (14) days, to complete or fulfill. The project construction schedule shall graphically show all salient features of the Work required to construct the project from start to finish and within the allotted time established in the contract. The time (in days) between the Contractor’s early completion and contractual completion dates is part of the project total float time; and shall be used as such, unless amended by a change order. On a multi-prime project, each prime Contractor shall review the proposed construction schedule and approve same in writing. The Project Expediter shall submit the proposed construction schedule to the Designer for comments. The complete Project construction schedule shall be of the type set forth in the Supplementary General Conditions or Subparagraph (a) or (b) below, as appropriate:

1. *For a project with total contracts of \$500,000 or less, a bar chart schedule will satisfy the above requirement. The schedule shall indicate the estimated starting and completion dates for each major element of the Work, as well as cost values associated with each element.*
2. *For a project with total contracts over \$500,000, a Critical Path Method (CPM) schedule shall be utilized to control the planning and scheduling of the Work. The CPM schedule shall be the responsibility of the Project Expediter and shall be paid for by the Project Expediter.*

- B. **Bar Chart Schedule:** Where a bar chart schedule is required, it shall be time-scaled in weekly increments, shall indicate the estimated starting and completion dates for each major element of the Work by trade and by area, level, or zone, and shall schedule dates for all salient features, including but not limited to the placing of orders for materials, submittal of shop drawings and other Submittals for approval, approval of shop drawings by designers, the manufacture and delivery of material, the testing and the installation of materials, supplies and equipment, and all Work activities to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all required inspections, reviews (punch lists), and correction of punch list items. Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.
- C. **CPM Schedule:** Where a CPM schedule is required, it shall be in time-scaled precedence format using the Project Expediter's logic and time estimates. The CPM schedule shall be drawn or plotted with activities grouped or zoned by Work area or subcontract as opposed to a random (or scattered) format. The CPM schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features of the Work to be performed by the Contractor including but not limited to the placing of orders for materials, submittal of shop drawings and other Submittals for approval, approval of shop drawings by designers, the manufacture and delivery of material, and the testing and the installation of materials, supplies and equipment. The Contractor shall allow sufficient time in his schedule for all required inspections, reviews (punch lists), and correction of punch list items. Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.
- D. The CPM schedule will identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, and clearly highlight all activities on the critical path. "Total float" and "free float" shall be indicated for all activities. Float time shall be considered for the exclusive use or benefit of the Owner. Extensions to the Contract Time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change. Extensions to the Contract Time shall only be granted for activities on the critical path. **The CPM schedule shall also show what part of the Contract Price is attributable to each activity on the schedule, the sum of which for all activities shall equal the total Contract Price.**
- E. **Early Completion of Project:** The Contractor may attempt to complete the project prior to the Contract Completion Date. However, such planned early completion shall be for the Contractor's convenience only and shall not create any additional rights of the Contractor or obligations of the Owner under this Contract, nor shall it change the Time for Completion or the Contract Completion Date. The Contractor shall not be required to pay liquidated damages to the Owner because of its failure to complete by its planned earlier date. Likewise, the Owner shall not pay the Contractor any additional compensation for early completion nor will the Owner owe the Contractor any compensation should the Owner, its officers, employees, or agents cause the Contractor not to complete earlier than the date required by the Contract Documents.
- F. The proposed project construction schedule shall be presented to the Designer no later than ten (10) days after the project start date for projects with a total Contract Price of \$500,000 or less and no later than thirty (30) days after the project start date for projects with a total Contract Price in excess of \$500,000. No Request for Payment will be processed until this schedule is **accepted** by the Owner.
- G. Acceptance of the schedule shall not impose on the Designer or Owner responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's responsibility thereof.

- H. The approved project construction schedule shall be distributed to all contractors and displayed at the job site by the Project Expediter.
- I. The several contractors shall be responsible for their work activities and shall notify the Project Expediter of any necessary changes or adjustments to their work. The Project Expediter shall maintain the project construction schedule, making monthly adjustments, updates, corrections, etc., that are necessary to finish the project within the Contract Time, keeping all contractors and the Designer fully informed. Copy of a bar chart schedule annotated to show the current progress shall be submitted by the Contractor(s) to the Designer, along with monthly request for payment. For project requiring CPM schedule, the Contractor shall submit a monthly report of the status of all activities. The bar chart schedule or monthly status report shall show the actual Work completed to date in comparison with the original Work scheduled for all activities. If any activities of the Work of several contractors are behind schedule, the Contractor must indicate in writing, what measures will be taken to bring each such activity back on schedule and to ensure that the Contract Completion Date is not exceeded. A plan of action and recovery schedule shall be developed and submitted to the Designer by the Project Expediter, when (1) the Contractor's monthly report indicates delays, that are in the opinion of the Designer or the Owner, of sufficient magnitude that the Contractor's ability to complete the Work by the scheduled completion is brought into question; (2) the updated construction schedule is thirty (30) days behind the planned or baseline schedule and no legitimate time extensions are in process; and (3) the Contractor desires to make changes in the logic (sequencing of work) or the planned duration of future activities of the CPM schedule which, in the opinion of the Designer or the Owner, are of a major nature. The plan of action, when required shall be submitted to the Owner for review within two (2) business days of the Contractor receiving the Owner's written demand. The recovery schedule, when required, shall be submitted to the Owner within five (5) calendar days of the Contractor's receiving the Owner's written demand. Failure to provide an updated construction schedule or a recovery schedule may be grounds for rejection of payment requests or withholding of funds as set forth in Article "Payments Withheld."
- J. The Project Expediter shall notify each Contractor of such events or time frames that are critical to the progress of the job. Such notice shall be timely and reasonable. Should the progress be delayed due to the Work of any of the several contractors, it shall be the duty of the Project Expediter to immediately notify the Contractor(s) responsible for such delay, the Designer, the Owner and other prime Contractors. The Designer shall determine the Contractor(s) who caused the delays and notify the bonding company of the responsible Contractor(s) of the delays; and shall make a recommendation to the Owner regarding further action.
- K. Designation as Project Expediter entails an additional project control responsibility and does not alter in any way the responsibility of the Contractor so designated, or the responsibility of the other contractors involved in the project.

ARTICLE 33 – WORKING HOURS

Except as otherwise required for the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise stated in the contract documents, all work at the site shall be performed during regular working hours, and Contractor will not permit the performance of work on Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to the Designer. The regular working hours shall be established by the Owner. In lieu of a directive by the Owner, working hours shall be 7:30 a.m. until 6 p.m., Monday through Friday, excluding holidays.

ARTICLE 34 – SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS

- A. Effective from January 1, 2002, NCGS Chapter 143, Article 8, was amended, to allow public

contracts to be bid in single-prime, dual (single-prime and separate-prime), construction manager at risk, and alternative contracting method as approved by the State Building Commission. The Owner reserves the right to prepare separate specifications, receive separate bids, and award separate contracts for such other major items of work as may be in the best interest of the County.

- B. All contractors shall cooperate with each other in the execution of their work, and shall plan their work in such manner as to avoid conflicting schedules or delay of the Work. See Articles “Construction Supervision” and “Schedule.”
- C. If any part of Contractor’s work depends upon the Work of another Contractor, defects which may affect that work shall be reported to the Designer in order that prompt inspection may be made and the defects corrected. Commencement of work by a Contractor where such condition exists will constitute acceptance of the other Contractor’s work as being satisfactory in all respects to receive the Work commenced, except as to defects which may later develop. The Designer shall be the judge as to the quality of work and shall settle all disputes on the matter between contractors.
- D. Any mechanical or electrical work such as sleeves, inserts, chases, openings, penetrations, etc., which is located in the Work of the general Contractor shall be built in by the general Contractor. The respective mechanical and electrical contractors shall set all sleeves, inserts and other devices that are to be incorporated into the structure in cooperation and under the supervision of the general Contractor. The responsibility for the exact location of such items shall be that of the mechanical and/or Electrical Contractor.
- E. The Designer and the Owner shall have access to the Work at all times. The Contractor shall provide facilities for such access so the Designer may perform his functions under the contract documents.
- F. Should a Contractor cause damage to the Work or property of another Contractor, he shall be directly responsible, and upon notice, shall promptly settle the claim or otherwise resolve the dispute.

ARTICLE 35 – SUBCONTRACTS AND SUBCONTRACTORS

- A. Within thirty (30) days after award of the contract, the Contractor shall submit to the Designer and to the Owner a list giving the names and addresses of Subcontractors and equipment and material Suppliers he proposes to use, together with the scope of their respective parts of the Work. The contractor shall not employ any subcontractor or other person or organization, either directly or indirectly, whether initially or as a substitute, against whom either the Designer or the Owner has an objection. The Designer shall act promptly in the approval of Subcontractors, and when approval of the list is given, no changes of Subcontractors will be permitted except for cause or reason considered justifiable by the Designer.
- B. The Prime Contractor shall not allow first-tier Subcontractors to sublet any portion of the sub-contracted work without written approval from the Designer. Circumvention of this requirement by a first-tier Subcontractor using the device of “hiring” the employees and/or “renting” the equipment of a second-tier subcontractor shall be a violation of the contract and shall subject the Prime Contractor to penalties associated with violation of the contract. The Designer may require the Prime Contractor to provide behavioral, financial, relationship, ownership, and other documentation to support claims that work is indeed being performed by an approved, first-tier subcontractor. Unless waived by the Designer, at least 75% of the equipment utilized by a first-tier subcontractor to perform the work shall be owned by the first-tier subcontractor and at least 75% of the subcontractor’s employees performing work on the project shall have been regular, continuous, full time employees of the company for at least six months prior to performing work on the project.

- C. The Designer will furnish to any Subcontractor, upon request, evidence regarding amounts of money paid to the Contractor on account of the Subcontractor's work.
- D. The Prime Contractor will furnish to the Designer, upon request, evidence regarding amounts of money paid and due to Subcontractors for their work.
- E. The Contractor is and remains fully responsible for his own acts or omissions as well as those of any Subcontractor or of any employee of either. The Contractor agrees that no contractual relationship exists between the Subcontractor and the Owner in regard to the contract, and that the Subcontractor acts on this work as an agent or employee of the Contractor.
- F. The Owner reserves the right to limit the amount of portions of work to be subcontracted. Pipe installation using trenchless technology (Horizontal Directional Drill, Bore & Jack, etc.) must be performed by the Prime Contractor or first-tier Subcontractor using their own equipment and permanent, full-time employees.

ARTICLE 36 – CONTRACTOR AND SUBCONTRACTOR RELATIONSHIPS

The Contractor agrees that the terms of these contract documents shall apply equally to each Subcontractor, regardless of tier, as to the Contractor, and the Contractor agrees to take such action as may be necessary to bind each Subcontractor to these terms. The Contractor further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to Contractor-Subcontractor relationships, and that payments to Subcontractors shall be made in accordance with the provisions of NCGS 143-134.1 titled *Interest on final payments due to prime Contractors: payments to Subcontractors*.

- A. The balance due prime Contractors shall be paid in full within forty-five (45) days after respective prime contracts of the project have been accepted by the Owner, certified by the architect, Engineer or Designer to be completed in accordance with terms of the plans and specifications, or occupied by the Owner and used for the purpose for which the project was constructed, whichever occurs first. Provided, however, that whenever the architect or consulting Designer in charge of the project determines that delay in completion of the project in accordance with terms of the plans and specifications is the fault of the Contractor, the project may be occupied and used for the purposes for which it was constructed without payment of any interest on amounts withheld past the 45 day limit. No payment shall be delayed because of the failure of another prime Contractor on such project to complete his contract. Should final payment to any prime Contractor beyond the date such contracts have been certified to be completed by the Designer or architect, accepted by the Owner, or occupied by the Owner and used for the purposes for which the project was constructed, be delayed by more than forty-five (45) days, said prime Contractor shall be paid interest, beginning on the 46th day, at the rate of one percent (1%) per month or fraction thereof unless a lower rate is agreed upon on such unpaid balance as may be due. In addition to the above final payment provisions, periodic payments due a prime Contractor during construction shall be paid in accordance with the payment provisions of the contract documents or said prime Contractor shall be paid interest on any such unpaid amount at the rate stipulated above for delayed final payments. Such interest shall begin on the date the payment is due and continue until the date on which payment is made. Such due date may be established by the terms of the contract. Where a conditional acceptance of a contract exists, and where the Owner is retaining a reasonable sum pending correction of such conditions, interest on such reasonable sum shall not apply.
- B. Within seven (7) days of receipt by the prime Contractor of each periodic or final payment, the prime Contractor shall pay the Subcontractor based on work completed or service provided under the subcontract. Should any periodic or final payment to the Subcontractor be delayed by more than seven (7) days after receipt of periodic or final payment by the prime Contractor, the prime Contractor shall pay the Subcontractor interest, beginning on the eighth day, at the rate of one percent (1%) per month or fraction thereof on such unpaid balance as may be due.

- C. 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 Owner to the prime Contractor. Any percentage of retainage on payments made by the prime Contractor to the Subcontractor that exceeds the percentage of retainage on payments made by the Owner to the prime Contractor shall be subject to interest to be paid by the prime Contractor to the Subcontractor at the rate of one percent (1%) per month or fraction thereof.
- D. Nothing in this section shall prevent the prime Contractor at the time of application and certification to the Owner from withholding application and certification to the Owner for payment to the Subcontractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of Subcontractor to make timely payments for labor, equipment and materials; damage to prime Contractor or another Subcontractor; reasonable evidence that subcontract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by Owner.

ARTICLE 37 – DESIGNER’S STATUS

- A. The Designer shall provide general administration of the performance of construction contracts, including liaison and necessary inspection of the Work to ensure compliance with plans and specifications. He is the agent of the Owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to stop work or to order work removed, or to order corrections of faulty work where such action may be necessary to assure successful completion of the Work.
- B. The Designer, when employed in a construction inspection/administration role, is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the Owner and the Contractor. The Designer shall issue written clarifications or interpretations of the requirements of the contract documents with reasonable promptness. The Designer may authorize minor variations in the Work that are different from the requirements of the contract documents which do not involve an adjustment of Contract Price or Time of Completion as long as such variation is compatible with the design concept of the project.
- C. The Designer will make periodic inspections of the project at intervals appropriate to the stage of construction. He will inspect the progress, the quality and the quantity of the Work. The Designer will not be required to make exhaustive or continuous inspections on the site to check the quality or quantity of the Work.
- D. The Designer and the Owner shall have access to the Work whenever it is in preparation and progress. The Contractor shall provide facilities for such access so the Designer may perform his functions under the contract documents.
- E. Based on the Designer’s inspections and evaluations of the project, the Designer shall issue interpretations, directives and decisions as may be necessary to administer the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract.
- F. The Designer will determine the actual quantities and classifications of unit price work performed by the Contractor.
- G. The Designer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to the performance of the Work.

ARTICLE 38 – CHANGES IN THE WORK

- A. The Owner may have changes made in the Work covered by the contract. These changes will not invalidate and will not relieve or release the Contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.
- B. Except in an emergency endangering life or property, **NO CHANGE SHALL BE MADE BY THE CONTRACTOR EXCEPT UPON RECEIPT OF APPROVED CHANGE ORDER OR WRITTEN WORK CHANGE DIRECTIVE FROM THE DESIGNER, COUNTERSIGNED BY THE OWNER AUTHORIZING SUCH CHANGE. NO CLAIM FOR ADJUSTMENTS OF THE CONTRACT PRICE SHALL BE VALID UNLESS THIS PROCEDURE IS FOLLOWED.**

A WORK CHANGE DIRECTIVE, TRANSMITTED BY FAX OR HAND DELIVERED, MAY BE USED WHERE THE CHANGE INVOLVED IMPACTS THE CRITICAL PATH

OF THE WORK. A FORMAL CHANGE ORDER SHALL BE ISSUED WITHIN THE TIME STATED ON THE WORK CHANGE DIRECTIVE.

In the event of emergency endangering life or property, the Contractor may be directed to proceed on a time and material basis whereupon the Contractor shall proceed and keep accurately on such form as may be required, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the Work the change order will be prepared as outlined under either Method “C 1.” or Method “C 2.” or both.

- C. In determining the values of changes, either additive or deductive, Contractors are restricted to the use of the following methods:
 - 1. Where the extra work involved is covered by unit prices quoted in the proposal, the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved. Unit prices shall include all direct and indirect present or future cost, all time and all overhead and profit for each unit.
 - 2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the Contract Price.
- D. Under Paragraph (B) and Methods (C 2.) above, the allowances for overhead and profit combined shall not exceed twenty percent (20%) of **net cost**. Under Method “C 1.” no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method (C 2.) and Paragraph (B) above, the Contractor shall include no less than five percent (5%) profit, but no allowances for overhead. Overhead shall include all conditions of the contract, “Extended General Conditions”, and all general requirements including, but not limited to, project management, scheduling, home office expense, job site overhead, layout, reproduction of drawings, document processing and coordination (shop drawings, change orders, RFI’s, etc.), supervision, small tools, temporary facilities, safety provisions, as built drawings, estimating, and general overhead.
- E. The term “net cost” as used herein shall mean the difference between all proper cost additions and deductions. The “cost” as used herein shall be limited to the following:
 - 1. The actual costs of materials and supplies incorporated or consumed as part of the project.
 - 2. The actual costs of labor expended on the project site.

3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of thirty (30) days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts. The total labor burden shall not exceed forty percent (40%) of the actual costs of labor.
 4. The actual costs of rental for equipment; machinery; temporary facilities; and tools, excluding hand tools, required for the project.
 5. The actual costs of premiums for bonds, insurance, permit fees, and sales or use taxes related to the project.
 6. Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the Owner.
- F. Should concealed conditions be encountered in the performance of the Work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods.

**ALL CHANGE ORDERS SHALL BE SUPPORTED BY A BREAKDOWN
SHOWING METHOD OF ARRIVING AT NET COST AS DEFINED ABOVE.**

- G. The Contractor may solicit a change using the "Change Proposal" form or may submit a "Change Proposal" form when the Designer requests costs for potential changes in the work. However, no work is to be performed until a properly executed change order or work change directive is provided to the Contractor. The Contractor shall provide the "Change Proposal" and supporting data in a form suitable to the Designer and Owner. The Designer shall verify correctness. Within fourteen (14) days after receipt of the "Change Proposal," the Designer shall respond, in writing, to the Contractor's proposal. If the Designer deems that the Proposal is in the best interest of the Owner, the Designer shall prepare a change order or work change directive and forward to the Contractor for his signature. Within seven (7) days after receipt of the change order or work change directive executed by the Contractor, the Designer shall certify the document by his signature, and forward the document and all supporting data to the Owner for the Owner's signature. The Owner's representative shall execute the document and, if necessary, forward to the County Commissioners for final approval. Upon approval by the Owner's representative and County Commissioners, one copy remains with the County Commissioners, and the remaining original is sent to the Designer for distribution to the Contractor(s). A copy is sent to the Surety. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or work change directives approved by all parties, then shall be substantiated in writing as outlined under normal procedure.
- H. At the time of signing a change order, the Contractor shall be required to certify as follows:
- "I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."
- I. A change order, when issued, shall be full compensation, or credit, for the Work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the Work.

- J. If, during the progress of the Work, the Owner requests a change order and the Contractor's terms are unacceptable, the Owner may require the Contractor to perform such work on a time and material basis in accordance with Paragraph (B) above. Without prejudice, nothing in this paragraph shall preclude the Owner from performing or to have performed that portion of the Work requested in the change order.
- K. If a unit price line item for "Change Order Allowance" or similar is included in the proposal, the price will be adjusted in accordance with article "Unit Price Work." The established cost of work for the unit price line item "Change Order Allowance" shall be one hundred percent (100%) of approved Change Orders, either additive or deductive.

ARTICLE 39 – UNIT PRICE WORK

- A. The project is "lump sum" and payment of the lump sum bid price shall be full compensation for all work indicated in the contract documents. Unit Price items included in the proposal shall be included as part of the lump sum bid. These items are indicated in the proposal and may have an associated quantity. 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. When indicated, 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 included in the lump sum bid that is performed by the Contractor will be made by the Designer. The Designer shall issue a change order, either additive or deductive, at the close of the project for any variation between the actual quantity and the estimated quantities of the unit price work indicated in the contract documents. No payment shall be made to the Contractor for re-stocking of materials.
- B. The quantities shown on the proposal form are for the base bid only unless the contract documents specifically indicate that the item(s), or any portion thereof, are part of an alternate bid element. It is the responsibility of the Contractor to apportion the cost of unit price items to the base bid and any alternates listed in the Proposal using information in the Contract Documents. In the event that the Owner selects an alternate that clearly increases or decreases the estimated quantity of a unit price item shown on the proposal form, after selection of the Contractor, the Contractor shall be provided an updated list of estimated unit price quantities reflective of the alternates chosen. This updated list shall be used in determining any variation between the actual quantities and the estimated quantities of the unit price work. An estimated unit price quantity shall be updated only in the event that the Contract Documents clearly indicate that the unit price item was indeed part of the Owner-selected alternate. The cost for all unit price items shall be included within either the base bid or an alternate, as applicable.
- C. In situations where a particular unit price item overruns, or the Contractor expects such overrun, of an estimated quantity by more than twenty-five percent (25%), the Contractor shall notify the Designer in writing and shall not install the overrun item in excess of twenty-five percent (25%) until the Contractor has received written authorization from the Designer. The aforesaid notification from the Contractor shall include any requests for modification of the unit price due to an actual quantity overrun greater than twenty-five percent (25%). The Engineer may solicit a reduction in the unit price due to a sufficient increase in the actual quantity installed of a unit price item. A reduction, regardless of the amount, of the actual installed quantity of a unit price item shall not warrant a change in the unit price.
- D. The Contractor is responsible for maintaining all documentation pertaining to the actual quantities of unit price items. This will be remitted to the Designer upon request. No payment shall be made for the quantity of unit price items that cannot be verified.
- E. There will be no measurement for lump sum bid items by this contract, as payment of the lump sum price shall include all equipment, labor, materials, and incidentals necessary to perform the Work required.

- F. Extensions to the Contract Time shall not entitle the Contractor to an increase to any unit price.

ARTICLE 40 – ALLOWANCE ITEMS

The Contract Price includes the allowance items indicated on the bid proposal. Allowances cover the costs for portions of the work that cannot be specified with sufficient particularity at the time of bid. The Contractor shall provide product recommendations and associated costs to the Owner for allowance items, but shall not incorporate into the work without consent from the Owner. The allowance items may be utilized and specified by the Owner in its sole and absolute discretion within a reasonable time prior to the date on which the Contractor shall be required to utilize such items. The amount shown for each allowance item shall include, and may be used by the Owner for, the cost of the material, equipment, or service for the allowance item. All other costs associated with installing an allowance item, including without limitation the cost of all labor, overhead, and profit, are otherwise included in the Contract Price and shall not be paid for with the amount allocated to each allowance item. The sole exception being additive Changes in the Work approved and designated by the Owner to be paid for out of a “Change Order Allowance”; the value of such Changes in the Work shall be determined according to the Article “Changes in the Work” section C. 2. The amount paid to the Contractor for an allowance item shall be adjusted based on the actual value attributable to the particular allowance item. The Designer shall issue a change order, either additive or deductive, at the close of the project for any variation between the actual value of an allowance item and the estimated value of the allowance item shown on the Form of Proposal. If an allowance item is not utilized by the Owner, the Contract Price shall be reduced by the amount allocated to the item and a reasonable amount for the unused labor and overhead and unearned profit associated therewith. Allowance items designated on the bid proposal may or may not be indicated on the project plans or specifications.

ARTICLE 41 – CLAIMS FOR EXTRA COST

- A. Should the Contractor consider that as a result of any instructions given in any form by the Designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the Designer within seven (7) days without delay, and shall not proceed with the Work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article “Changes in the Work,” Paragraph (B) and Articles “Protection of Work and Property” and “Safety.” No claims for extra compensation will be considered unless the claim is so made. The Designer shall render a written decision within seven (7) days of receipt of claim.
- B. **THE CONTRACTOR SHALL NOT ACT ON INSTRUCTIONS RECEIVED BY HIM FROM PERSONS OTHER THAN THE DESIGNER, AND ANY CLAIMS FOR EXTRA COMPENSATION OR EXTENSION OF TIME ON ACCOUNT OF SUCH INSTRUCTION WILL NOT BE HONORED.** The Designer will not be responsible for misunderstandings claimed by the Contractor of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.
- C. Should a claim for extra compensation by the Contractor be denied by the Designer or Owner, and cannot be resolved by the County Commissioners, the Contractor may request mediation in connection with “Rules Implementing Mediated Settlement Conferences in North Carolina Public Construction Projects” as outlined herein. If the Contractor is unable to resolve its claim as a result of mediation, the Contractor may institute a civil action for the sum he claims to be entitled to under the contract by filing a verified complaint and the issuance of a summons in the Superior Court of Brunswick County. The procedure shall be the same as in all civil actions except that all issues shall be tried by the judge, without a jury.

RULES IMPLEMENTING MEDIATED
SETTLEMENT CONFERENCES IN
NORTH CAROLINA CONSTRUCTION PROJECTS

Adopted
February 26, 2002

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RULE 1. INITIATING MEDIATED SETTLEMENT CONFERENCES

- A. Purpose of Mandatory Settlement Conferences. Pursuant to NCGS 143-128(g) 143-135.26 (11), these Rules are promulgated to implement a system of settlement events which are designated to focus the parties' attention on settlement rather than on claim preparation and to provide a structured opportunity for settlement negotiations to take place. Nothing herein

is intended to limit or prevent the parties from engaging in settlement procedures voluntarily at any time prior to or during commencement of the dispute resolution process.

B. Initiating the Dispute Resolution Process

1. Any party to a public construction contract governed by Article 8. Ch. 143 of the General Statutes and identified in NCGS 143-128(g) and who is a party to a dispute arising out of the construction process in which the amount in controversy is at least \$15,000 may submit a written request to the public owner for mediation of the dispute.
2. Prior to submission of a written request for mediation to the public owner, the parties requesting mediation,
 - a. If a prime Contractor, must have first submitted its claim to the Project Designer for review as set forth in Exhibit A. If the dispute is not resolved through the Project Designer's instructions, then the dispute becomes ripe for mediation in the Formal Dispute Resolution Process, and the party may submit his written request for mediation to the public owner.
 - b. If the party requesting mediation is a Subcontractor, it must first have submitted its claim for mediation to the prime Contractor with whom it has a contract. If the dispute is not resolved through the prime Contractor's involvement, then the dispute becomes ripe for mediation in the Formal Dispute Resolution Process, and the party may submit its written request for mediation to the public owner.
 - c. If the party requesting mediation is the Project Designer, then it must first submit its claim to the public owner to resolve. If the dispute is not resolved with the public owner's involvement, then the Project Designer's dispute is eligible for mediation in the Formal Dispute Resolution Process, and the Project Designer may submit its written request to the public owner for mediation.

RULE 2. SELECTION OF MEDIATOR

- A. Selection of Certified Mediator by Agreement of the Parties. The parties may select a mediator certified pursuant to the Rules by agreement within twenty-one (21) days of requesting mediation. The requesting party shall file with the State Construction Office (herein after referred to as "SCO) or public owner if not a non-state project a Notice of Selection of Mediator by Agreement within ten (10) days of the request; however, any party may file the notice. Such notice shall state the name, address and telephone number of the mediator selected; state the rate of compensation of the mediator; state that the mediator and the opposing counsel have agreed upon the selection and rate of compensation; and state that the mediator is certified pursuant to these Rules.
- B. Nomination and Public Owner Approval of a Non-Certified Mediator. The parties may select a mediator who does not meet the certification requirements of these Rules but who, in the opinion of the parties and the SCO or public owner, is otherwise qualified by training or experience to mediate the action.

If the parties select a non-certified mediator, the requesting party shall file with the SCO a Nomination of Non-Certified Mediator within ten (10) days of the request. Such nomination shall state the name, address and telephone number of the mediator; state the training, experience, or other qualifications of the mediator; state the rate of compensation of the mediator; and state that the mediator and opposing counsel have agreed upon the selection and rate of compensation.

The SCO shall rule on said nomination, shall approve or disapprove of the parties' nomination, and shall notify the parties of its decision.

- C. Appointment of Mediator by the SCO. If the parties cannot agree upon the selection of a mediator, either the party or party's attorney shall notify the SCO or public owner and request, on behalf of the parties, that the SCO or public owner appoint a mediator. The request for appointment must be filed within 10 days after request to mediate and shall state that the parties have had a full and frank discussion concerning the selection of a mediator and have been unable to agree. The request shall state whether any party prefers a certified attorney mediator, and if so, the SCO or public owner shall appoint a certified attorney mediator. If no preference is expressed, the SCO or public owner may appoint a certified attorney mediator or a certified non-attorney mediator.
- D. Mediator Information Directory. To assist the parties in the selection of a mediator by agreement, the parties are free to utilize the list of certified mediators maintained in any county participating in the Superior Court Mediation Settlement Conference Program.
- E. Disqualification of Mediator. Any party may request replacement of the mediator by the SCO or public owner for good cause. Nothing in this provision shall preclude mediators from disqualifying themselves.

RULE 3. THE MEDIATED SETTLEMENT CONFERENCE

- A. Where Conference is to be Held. Unless all parties and the mediator otherwise agree, the mediated settlement conference shall be held in the county where the project is located. The mediator shall be responsible for reserving a place and making arrangements for the conference and for giving timely notice of the time and location of the conference to all attorneys, unrepresented parties and other persons and entities required to attend.
- B. When Conference is to be Held. The deadline for completion of the mediation shall be not less than thirty (30) days nor more than sixty (60) days after the naming of the mediator.
- C. Request to Extend Deadline for Completion. A party, or the mediator, may request that the SCO or public owner to extend the deadline for completion of the conference. Such request shall state the reasons the extension is sought and shall be served by the moving party upon the other parties and the mediator. If any party does not consent to the request, said party shall promptly communicate its objection to the SCO or public owner.

The SCO or public owner may grant the request by setting a new deadline for completion of the conference.

- D. Recesses. The mediator may recess the conference at any time and may set times for reconvening. If the time for reconvening is set before the conference is recessed, no further notification is required for persons present at the conference.
- E. **The mediated settlement conference shall not be cause for the delay of the construction project which is the focus of the dispute.**

RULE 4. DUTIES OF PARTIES AND OTHER PARTICIPANTS IN FORMAL DISPUTE RESOLUTION PROCESS

A. Attendance

- 1. All parties to the dispute originally presented to the Designer or prime Contractor for initial resolution must attend the mediation. Failure of a party to a construction contract to attend the mediation will result in the public owner's withholding of monthly payment to that party until such party attends the mediation.
- 2. Attendance shall constitute physical attendance, not by telephone or other electronic means. Any attendee on behalf of a party must have authority from that party to bind it to any agreement reached as a result of the mediation.

3. Attorneys on behalf of parties may attend the mediation but are not required to do so.
 4. Sureties or insurance company representatives are not required to attend the mediation unless any monies paid or to be paid as a result of any agreement reached as a result of mediation require their presence or acquiescence. If such agreement or presence is required, then authorized representatives of the surety or insurance company must attend the mediation.
- B. **Finalizing Agreement.** If an agreement is reached in the conference, parties to the agreement shall reduce its terms to writing and sign it along with their counsel.
- C. **The mediation fee shall be paid in accordance with NCGS 143-128(g).**
- D. **Failure to compensate mediator.** Any party's failure to compensate the mediators in accordance with NCGS 143-128(g) shall subject that party to a withholding of said amount of money from the party's monthly payment by the public owner.

Should the public owner fail to compensate the mediator, it shall hereby be subject to a civil cause of action from the mediator for the 1/3 portion of the mediator's total fee as required by NCGS 143-128(g).

RULE 5. AUTHORITY AND DUTIES OF MEDIATORS

A. Authority of Mediator

1. **Control of Conference.** The mediator shall at all times be in control of the conference and the procedures to be followed.
2. **Private Consultation.** The mediator may communicate privately with any participant or counsel prior to and during the conference. The fact that private communications have occurred with a participant shall be disclosed to all other participants at the beginning of the conference.
3. **Scheduling the Conference.** The mediator shall make a good faith effort to schedule the conference at a time that is convenient with the participants, attorneys and mediator. In the absence of agreement, the mediator shall select the date for the conference.

B. Duties of Mediator

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

2. **Disclosure.** The mediator has a duty to be impartial and to advise all participants of any circumstance bearing on possible bias, prejudice, or partiality.
3. **Declaring Impasse.** It is the duty of the mediator to timely determine that an impasse exists and that the conference should end.
4. **Reporting Results of Conference.** The mediator shall report to the SCO or public owner within ten (10) days of the conference whether or not an agreement was reached by the parties. If an agreement was reached, the report shall state the nature of said agreement. The mediator's report shall inform the SCO or public owner of the absence of any party known to the mediator to have been absent from the mediated settlement conference without permission. The SCO or public owner may require the mediator to provide statistical data for evaluation of the mediated settlement conference program.
5. **Scheduling and Holding the Conference.** It is the duty of the mediator to schedule the conference and conduct it prior to the deadline of completion set by the Rules. Deadlines for completion of the conference shall be strictly observed by the mediator unless said time limit is changed by a written order from the SCO or public owner.

RULE 6. COMPENSATION OF THE MEDIATOR

- A. **By Agreement.** When the mediator is stipulated by the parties, compensation shall be as agreed upon between the parties and the mediator provided that the provision of NCGS 143-128(g) are observed.
- B. **By Appointment.** When the mediator is appointed by the SCO or public owner, the parties shall compensate the mediator for mediation services at the rate in accordance with the rate charged for Superior Court mediation. The parties shall also pay to the mediator a one-time per case administrative rate in accordance with the rate charged for Superior Court mediation, which is due upon appointment.

RULE 7. MEDIATOR CERTIFICATION

All mediators certified in the Formal Dispute Resolution Program shall be properly certified in accordance with the rules certifying mediators in Superior Court in North Carolina*. When selecting mediators, the parties may designate a preference for mediators with a background in construction law or public construction contracting. Such requirements, while preferred, are not mandatory under these Rules.

All mediators chosen must either demonstrate they are certified in accordance with the Rules Implementing Scheduled Mediated Settlement Conference in Superior Court or must gain the consent of the Owner to mediate any dispute in accordance with these Rules.

*Except when otherwise allowed by the SCO or public owner upon the request of the parties to the mediation.

RULE 8. RULE MAKING

These Rules are subject to amendment by rule making by the State Building Commission.

These Rules are mandated for State projects when the contracting state entity has not otherwise adopted its own dispute resolution provision. These rules are optional for all other projects subject to Article 8, Chapter 143 of the General Statutes

RULE 9. DEFINITIONS

When the phrase "SCO or public owner" is used in these Rules, "SCO" shall apply to state projects, "public owner" shall apply to non-state public projects.

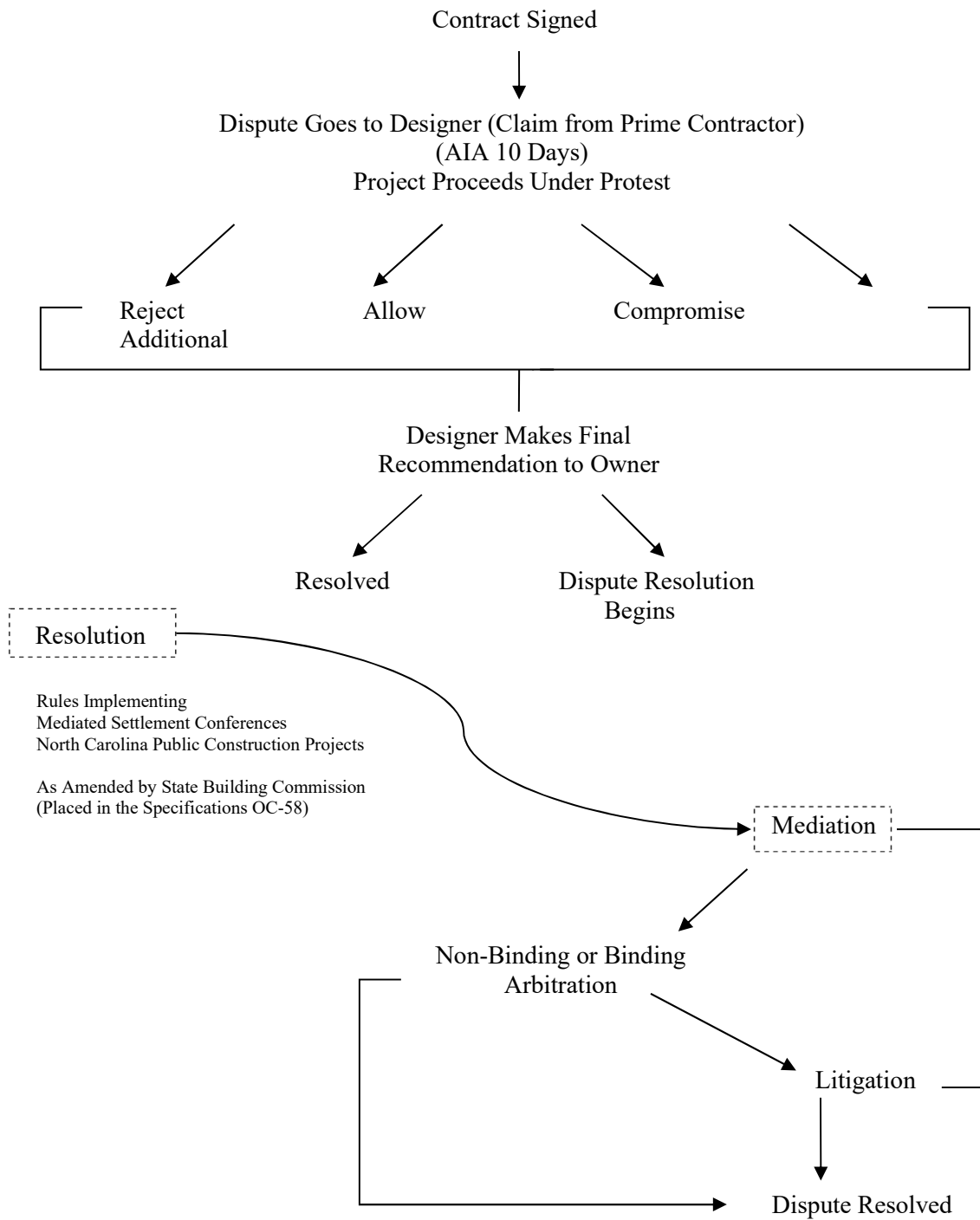
RULE 10. TIME LIMITS

On state contracts, any time limit provided for by these Rules may be waived or extended by the SCO for good cause shown.

On non-state contracts, any time limit provided for by these Rules may be waived or extended by the mediator it appoints for good cause shown. If the mediator has not yet been appointed, the Designer of record shall decide all waivers or extensions of time for good cause shown.

DISPUTE RESOLUTION

Non-State/Public Projects



ARTICLE 42 – MINOR CHANGES IN THE WORK

The Designer will have the authority to order minor changes in the Work not involving an adjustment in the contract sum or time of completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order and shall be binding on the Owner and the Contractor.

ARTICLE 43 – TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

The time of completion is stated in the Notice to Bidders and in the Form of Construction Contract. The Project Expediter, upon notice of award of contract, shall prepare a construction schedule to complete the project within the time of completion as required by the Article “Schedule.”

- A. The Contractors shall commence work to be performed under this agreement and the time of completion shall commence to run on the thirtieth day after the effective date of the contract, or if a Notice to Proceed is given, on the date specified in a written Notice to Proceed. The Contractor shall fully complete all work hereunder within the time of completion stated. A Notice to Proceed may be given at any time within thirty (30) days after the effective date of the contract.
- B. No work shall be performed until the Owner receives and accepts fully executed contracts, performance bonds, payment bonds, and certificates of insurance.
- C. For each calendar day in excess of the time of completion, the Contractor(s) shall pay the Owner the sum stated as liquidated damages (see Notice to Bidders) reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said Contractor(s) to complete the Work within the time specified, such time being in the essence of this contract and a material consideration thereof.
- D. The Designer shall be the judge as to the division of responsibility between the Contractor(s), based on the construction schedule, weekly reports and job records, and shall apportion the amount of liquidated damages to be paid by each of them, according to delay caused by any or all of them.
- E. If the Contractor is delayed in the progress of critical path activities by any act or negligence of the Owner or the Designer, or by any employee of either; by any separate Contractor employed by the Owner; by changes ordered in the Work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the Work is performed; by unavoidable casualties; by any causes beyond the Contractor’s control; or by any other causes which the Designer and Owner determine may justify the delay, then the Contract Time may be extended by change order for the time which the Designer and Owner may determine is reasonable. However, such delays **must** be on critical path activities that cause the anticipated project construction time to exceed the Time of Completion. Extensions to the Contract Time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change.
- F. Time extensions granted for a portion of the work shall not obligate the Owner to grant time extensions for portions of the work not affected by the delay. The Engineer may establish an extended Time of Completion for work affected by delays while still maintaining the overall Time of Completion for the work not affected by delays. Liquidated Damages may be assessed for any portion of the work not completed within any Time of Completion term set by the Engineer, though the daily Liquidated Damage rate may not exceed that indicated within the Contract Documents.
- G. Time extensions will not be granted for rain, wind, snow or other natural phenomena of **normal intensity** for the locality where work is performed. Based on National Oceanic and

Atmospheric Administration (NOAA) National Weather Service records between 1971 and 2000 for weather stations in the Brunswick County area (Wilmington, NC and Myrtle Beach, SC) the average annual days for precipitation equal to or exceeding 0.1 inch is 75. This is further broken down by month as follows:

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
7	6	6	5	6	7	9	8	6	4	5	6

For the purposes of determining time extensions based on weather, **normal intensity** weather conditions is defined on a monthly basis as noted in the chart above. For any given month, if the actual number of days in which precipitation exceeds 0.1 inch is greater than that listed in the chart; the Contractor may request a time extension for the difference. However, days in which the precipitation exceeds 0.1 inch but the Contractor is not mobilized to the site or actively working on site are excluded from the calculation. Actively working on-site is evidenced by onsite work operations the normally scheduled working day prior to and after the day of precipitation. Time extensions will not be given for days in which the precipitation is less than 0.1 inch. For the purpose of determining the extent of delay attributable to unusual weather phenomena, the Normal Intensity weather conditions shall be compared to NOAA National Weather Service data from the station nearest the project. In the event that a contract begins or ends in the middle of the month, the Normal Intensity days shall be prorated based on the number of contract days within the partial month. Time extensions for weather delays do not entitle the Contractor to “extended overhead” recovery.

- H. Request for extension of time shall be made in writing within thirty (30) days following cause of delay. In case of continuing cause for delay, the Contractor shall notify the Designer of the delay within thirty (30) days of the beginning of the delay and only one claim is necessary.
- I. The Contractor shall notify his surety in writing of extension of time granted.
- J. No claim shall be allowed on account of failure of the Designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article “Shop Drawings, Submittals, Samples, Data.”
- K. The Contractor shall carry on the Work and adhere to the schedule during all disputes or disagreements with the Owner or Designer. No work shall be delayed or postponed pending resolution of any disputes or disagreements unless agreed to by both the Owner and Contractor in writing.
- L. In no event shall the Owner or Designer be liable to Contractor, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from delays within the control of the Contractor or delays beyond the control of both the Owner and Contractor, including fires, floods, epidemics, abnormal weather conditions, acts of God, or acts of neglect by utility owners or other contractors performing other work.
- M. Time extensions granted to the Contractor shall cover all work delays for work items that may run concurrently. For example, if the Contractor is due a time extension for unusual weather phenomena and due a time extension for other delays to a critical path activity, the new project completion date shall be based on the longer of the individually approved time extensions. The time extension granted for multiple delays shall **not** be additive. The only exception to this is where the Contractor can demonstrate to the satisfaction of the Engineer that the individual work items cannot run concurrently.

ARTICLE 44 – PARTIAL UTILIZATION/SUBSTANTIAL COMPLETION

- A. The Owner may desire to occupy or utilize all or a portion of the project when the Work is substantially complete on all or a portion of the project.
- B. Prior to the final payment, the Owner may request the Contractor(s) in writing, through the Designer if applicable, to permit him to use a specified part of the project which he believes he may use without significant interference with construction of the other parts of the project. If the Contractor(s) agree, the Designer will schedule a substantial completion inspection, with the approval of the Owner, after which the Designer may issue a certificate of substantial completion on all or a portion of the project. The certificate shall include the following documentation:
 - 1. Date of substantial completion.
 - 2. Portion of project determined to be substantially complete.
 - 3. A tentative list of items to be completed or corrected before final payment.
- C. The Owner shall have the right to exclude the Contractor from any part of the project which the Designer has so certified to be substantially complete, but the Owner will allow the Contractor reasonable access to complete or correct work to bring it into compliance with the contract.
- D. Occupancy by the Owner under this article will in no way relieve the Contractor from his contractual requirement to complete the project within the specified time. The Contractor will not be relieved of liquidated damages because of use or occupancy by the Owner.

ARTICLE 45 – FINAL INSPECTION, ACCEPTANCE, AND PROJECT CLOSEOUT

- A. Upon written notification from the Contractor(s) that the project is complete and ready for inspection, the Designer shall make a preliminary final inspection to verify that the project is complete and ready for final inspection. Prior to final inspection, the Contractor(s) shall complete all items requiring corrective measures noted at the preliminary inspection. The Designer shall schedule a final inspection at a time and date acceptable to the Owner and Contractor(s).
- B. When contractors finish their work prior to completion by other contractors, these contracts shall be closed out through the final inspection, acceptance and final payment process on recommendation of the Designer and approval of the Owner.
- C. At the final inspection, the Designer shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the final inspection, the Designer and Owner shall make one of the following determinations:
 - 1. That the project is completed and accepted. The “Date of Final Acceptance” is coincident with the date of the final inspection.
 - 2. That the project is complete subject to the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of acceptance or the Owner may invoke the Article “Owner’s Right to Do Work.” The “Date of Final Acceptance” shall be no earlier than the date that the project representative certifies completion of the punch list items.

3. That the project is not complete. The contractor must establish another date for a final inspection when project is deemed incomplete.
- D. Within fourteen (14) days of acceptance as noted above or within fourteen (14) days after completion of punch list as noted above, the Designer shall certify the Work and issue applicable certificate(s) of compliance with the "Date of Final Acceptance" noted thereon.
- E. Any discrepancies listed or discovered after the date of final inspection and acceptance as noted above shall be handled in accordance with Article "Guarantee."
- F. The "Date of Final Acceptance" as indicated on the Certificate of Compliance will establish the following:
 1. The beginning of guarantees and warranties period.
 2. The date on which the Contractor's insurance coverage for public liability, property damage and builder's risk may be terminated.
 3. That no liquidated damages (if applicable) shall be assessed after this date.
 4. The termination date of utility cost to the Contractor.
- G. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents.
 1. observations by Designer;
 2. recommendation by Designer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any acceptance by Owner or any failure to do so;
 6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Designer;
 7. any inspection, test, or approval by others; or
 8. any correction of defective Work by Owner.
- H. Acceptance of the work, or any portion of the work, by the Owner does not relieve the Contractor from acquiring acceptance of the work from the North Carolina Department of Transportation or any other such regulatory agency having approval authority over any portion of the project. Furthermore, acceptance of the work or any portion of the work by the North Carolina Department of Transportation or any other such regulatory agency having approval authority does not obligate the Owner to grant acceptance of the work.

ARTICLE 46 – CORRECTION OF WORK BEFORE FINAL PAYMENT

- A. Any work, materials, fabricated items or other parts of the Work which have been condemned or declared not in accordance with the contract by the Designer shall be promptly removed from the Work site by the Contractor, and shall be immediately replaced by new work in

accordance with the contract at no additional cost to the Owner. Work or property of other contractors or the Owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the Contractor whose work is faulty.

- B. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the Designer, and shall make satisfactory progress until completed.
- C. Should the Contractor fail to proceed with the required corrections, then the Owner may complete the Work in accordance with the provisions of Article "Owner's Right to Do Work."

ARTICLE 47 – CORRECTION OF WORK AFTER FINAL PAYMENT

See Article "Performance Bond and Payment Bond," and Article "Guarantee." Neither the final certificate, final payment, occupancy of the premises by the Owner, nor any provision of the contract, nor any other act or instrument of the Owner, nor the Designer, shall relieve the Contractor from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. He shall correct or make good any defects due thereto and repair any damage resulting therefrom, which may appear during the guarantee period following final acceptance of the Work except as stated otherwise under Article "Guarantee." The Owner will report any defects as they may appear to the Contractor and establish a time limit for completion of corrections by the Contractor. The Owner will be the judge as to the responsibility for correction of defects.

ARTICLE 48 – ACCEPTANCE OF DEFECTIVE WORK

If instead of requiring correction or removal and replacement of defective or faulty Work, Owner prefers to accept it, Owner may do so. Contractor shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Designer'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 Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

ARTICLE 49 – OWNER'S RIGHT TO DO WORK

- A. If, during the progress of the Work or during the period of guarantee, the Contractor fails to prosecute the Work properly or to perform any provision of the contract, the Owner, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the Contractor from the Designer, may perform or have performed that portion of the Work. If the Work is deemed to be an emergency, the Owner may dispense with the fifteen day's written notice and proceed with the Work immediately. The cost of the Work may be deducted from any amounts due or to become due to the Contractor. Should the cost of such action of the Owner exceed the amount due or to become due the Contractor, then the Contractor or his surety, or both, shall be liable for and shall pay to the Owner the amount of said excess. The Contractor shall not be allowed an extension of Time of Completion (or milestones) because of any delay in the performance of the Work attributable to the exercise by the Owner of Owner's rights and remedies.
- B. In exercising the rights and remedies under this paragraph, Owner shall proceed expeditiously. In connection with such corrective and remedial action, Owner may exclude Contractor from

all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, 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 Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Designer and Designer's Consultants access to Site to enable Owner to exercise the rights and remedies under this paragraph.

- C. The Owner may have other work performed at the site by Owner's employees, contractors, or utility owners. Contractor shall afford each other Contractor who is a party to such other work proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs.

ARTICLE 50 – ANNULMENT OF CONTRACT

- A. If the Contractor fails to begin the Work under the contract within the time specified, or the progress of the Work is not maintained on schedule, or the Work is not completed within the time above specified, or fails to perform the Work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the Work unsuitably or shall discontinue the prosecution of the Work, or if the Contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or disregards laws, regulations, or direction of the Designer, or for any other cause whatsoever shall not carry on the Work in an acceptable manner, the Owner may give notice in writing, sent by certified mail, return receipt requested, to the Contractor and his surety of such delay, neglect or default, specifying the same, and if the Contractor within a period of fifteen (15) days after such notice shall not proceed in accordance therewith, then the Owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the Work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the Work to be done under this contract within fifteen (15) days after being so notified and notify the Owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the Owner shall have full power and authority, without violating the contract, to take the prosecution of the Work out of the hands of said Contractor, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the Work under contract, shall be deducted from any monies due or which may become due said Contractor and surety. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said Contractor, then the said Contractor and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of said excess.
- B. Upon fifteen (15) days' written notice to Contractor and Designer, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Contract. In such case, Contractor shall be paid (without duplication of any items):
 - 1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. for reasonable expenses directly attributable to termination.
- C. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

ARTICLE 51 – CONTRACTOR’S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- A. Should the Work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three (3) months, due to cause beyond the fault or control of the Contractor, or if the Owner, without cause, should fail or refuse to make payment based on a request for payment approved by the Designer within forty-five (45) days after receipt of same, then the Contractor, after fifteen (15) days’ written notice sent by certified mail, return receipt requested, to the Owner and the Designer, may suspend operations on the Work or terminate the contract.
- B. In the event that the contract is terminated due to cause beyond the fault or control of the Contractor, the Owner shall be liable to the Contractor for the cost of all materials delivered and work performed on this contract as determined according to the Article “Changes in the Work”. The Designer shall be the judge as to the correctness of such payment.

ARTICLE 52 – REQUESTS FOR PAYMENT

- A. Not later than the fifth day of the month, the Contractor shall submit to the Designer a request for payment for work done during the previous month. The request shall be in the form “Request for Payment” in the contract documents and shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
1. Total of contract including approved change orders.
 2. Value of work completed to date and properly stored on-site materials.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the Contractor’s work has been satisfactorily completed on schedule, with written consent of the surety, the owner shall not require any additional retainage. If the owner determines the contractor’s performance is unsatisfactory, the owner may reinstate retainage for each subsequent payment. There shall be no retainage on contracts with a bid amount less than \$100,000.
 4. Less previous payments.
 5. Current amount due.
- B. The Contractor, upon request of the Designer, shall substantiate the request with invoices of vouchers or payrolls or other evidence.

- C. The Contractor shall submit a fully completed “Periodic Payment Itemized Tax Statement” and “Periodic Payment Tax Certification” form with each Request for Payment.
- D. Prior to submitting the first request, the Contractor shall prepare for the Designer a schedule showing a breakdown of the Contract Price into values of the various parts of the Work, so arranged as to facilitate payments to Subcontractors in accordance with Article “Contractor and Subcontractor Relationships.” The Contractor(s) shall list the value of each Subcontractor and Supplier, identifying each minority business Subcontractor and Supplier as listed in Table A: Prime Contractor and List of Selected Subcontractors, if applicable.
- E. Payment for Mobilization in excess of 3% of the initial contract value shall be made with the Final Payment.
- F. Twenty percent (20%) of the payment for installed underground piping may be withheld until the installed piping has passed all necessary testing requirements and the required vegetative cover has been established, or at the discretion of the Owner, seeding and mulching has been performed. A separate line item for “Testing and Vegetative Cover over Piping” may be shown on the schedule that reflects a cost of at least 25% of the underground piping cost.
- G. When payment is made on account of stored materials and equipment, such materials must be stored on the Owner’s property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the Owner’s title to such materials and equipment. Responsibility for such stored materials and equipment shall remain with the Contractor regardless of ownership title. Such stored materials and equipment shall not be removed from the Owner’s property. Should the space for storage on-site be limited, the Contractor, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the Contractor desire to include any such materials or equipment in his Request for Payment, they must be stored in the name of the Owner in a commercial warehouse approved by the Designer and the Owner and located as close to the site as possible. The warehouse selected must be approved by the Contractor’s bonding and insurance companies; the material to be paid for shall be assigned to the Owner and shall be inspected by the Designer. Upon approval by the Designer of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the Contractor. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the Designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the Designer and the Owner prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the Owner absolute right to possession of the materials at any time. Bond, security and insurance protection shall continue to be the responsibility of the Contractor(s).
- H. Along with each request for payment, the Contractor shall submit evidence to the Designer showing that all record drawings are up to date.
- I. Along with each request for payment, the Contractor shall submit either a statement indicating that no claims for extension of time due to weather is to be made during the billing period OR shall make claims for extension of time for the billing period in accordance with the article “Time of Completion, Delays, Extension of Time.”

ARTICLE 53 – APPROVAL OF PAYMENTS AND FINAL PAYMENT

- A. Within ten (10) days from receipt of request for payment from the Contractor, the Designer shall issue and forward to the Owner the approved request for payment. This request for payment shall indicate the amount requested or as approved by the Designer. If the request is not approved by the Designer, he shall state in writing to the Contractor and the Owner his reasons for withholding payment. In the latter case, the Contractor may make the necessary corrections and resubmit the request for payment.

- B. No approval of a request for payment or payment made shall constitute an acceptance of the Work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the Owner except:
1. Claims arising from unsettled liens or claims against the Contractor.
 2. Faulty work or materials appearing after final payment.
 3. Failure of the Contractor to perform the Work in accordance with drawings and specifications, such failure appearing after payment.
 4. As conditioned in the performance bond and payment bond.
- C. The making and acceptance of final payment shall constitute a waiver of all claims by the Contractor except those claims previously made and remaining unsettled (Article "Claims for Extra Cost").
- D. Prior to submitting final request for payment to the Designer for approval, the Contractor shall fully comply with all requirements specified in Article "Final Inspection, Acceptance, and Project Closeout." These requirements include, but are not limited to the following:
1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, properly certified As-Built Drawings, Record Drawings, Certificates of Inspection or Approval from agencies having jurisdiction. (The Designer must approve the Manuals prior to delivery to the Owner).
 2. Transfer of required stock material and all keys in an organized manner.
 3. Record of Owner's training.
 4. Resolution of any final inspection discrepancies.
- E. The Contractor shall forward to the Designer, the final request for payment along with the following documents:
1. List of minority business Subcontractors and material Suppliers showing breakdown of contracts amount.
 2. Contractor's Affidavit of Release of Liens.
 3. "Final Tax Certification" form with all fully completed "Periodic Payment Itemized Tax Statement" and "Periodic Payment Tax Certification" forms corresponding to each Request for Payment.
 4. Affidavit of Contractor's payment to material Suppliers and Subcontractors. (See Article "Contractor's Affidavit").
 5. Consent of Surety to Final Payment.
 6. Certificates of state agencies required by state law.
 7. Record Drawings
 8. As-Built Drawings
- F. The Designer will not authorize final payment until the Work under contract has been certified by Designer, certificates of compliance issued, and the Contractor has complied with the

closeout requirements. The Designer shall forward the Contractor's final request for payment to the Owner along with respective certificate(s) of compliance required by law.

- G. After the request for final payment by the Contractor, all quantities of materials installed on the project shall be reviewed for accuracy and any errant or outdated quantity information supplied on previously submitted Pay Applications, or any other source, shall be rectified on the Final Pay Application to reflect the actual quantity of materials installed on the project.

ARTICLE 54 – PAYMENTS WITHHELD

- A. The Designer, with the approval of the Owner, may withhold payment for the following reasons:
 - 1. Faulty work not corrected.
 - 2. The unpaid balance on the contract is insufficient to complete the Work in the judgment of the Designer.
 - 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed.
 - 4. Missing or improperly completed documentation required by the contract documents.
- B. In addition to the reasons noted above, the Owner may authorize the withholding of payment for the following reasons:
 - 1. Claims filed against the Contractor or evidence that a claim will be filed.
 - 2. Evidence that Subcontractors have not been paid.
- C. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the Contractor without cause will make Owner liable for payment of interest to the Contractor as provided in NCGS 143-134.1.

ARTICLE 55 – ACCESS TO PERSONS AND RECORDS

The State Auditor and the using agency's internal auditors shall have access to persons and records as a result of all contracts or grants entered into by State agencies or political subdivisions in accordance with General Statute 147-64.7 and Session Law 2010-194, Section 21 (i.e., the State Auditors and internal auditors may audit the records of the contractor during the term of the contract to verify accounts and data affecting fees or performance).

ARTICLE 56 – TAXES

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the laws and regulations of the location of the project which are applicable during the performance of the Work. Specific guidelines include the following:
- B. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).
- C. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).

- D. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.
- E. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal and contract sum.

F. The Amount of County Sales and Use Tax Paid Per Contractor's Statements

1. Contractors shall give the Owner a signed statement containing the information listed in NCGS 105-164.14(e).
2. The Contractor shall submit a certified statement setting forth the project, date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered shall be listed. Sales receipts shall be included with the statement. The Contractor is hereby notified that the certified statement may be subject to audit.
3. In the event the Contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.
4. Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.
5. When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.
6. Such statement must also include the cost of any tangible personal property withdrawn from the Contractor's warehouse stock and the amount of county sales or use tax paid thereon by the Contractor.
7. Similar certified statements by his Subcontractors must be obtained by the general Contractor and furnished to the claimant.
8. Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the Work.
9. Contractor shall provide a completed "Final Tax Certification" form, including copies of all Periodic Payment Tax Certifications, with the application for final payment.

ARTICLE 57 – MINIMUM INSURANCE REQUIREMENTS

The Work under this contract shall not commence until the Contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the Owner. The Contractor shall provide and maintain, during the life of the contract, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the Contractor or by any Subcontractor, or by anyone directly or indirectly employed by either of them. The Contractor shall purchase and maintain property insurance during the life of this contract, upon the entire work at the site to the full insurable value thereof that shall include the interests of the Owner, the Contractor, the Subcontractors in the Work and shall insure against

the perils of fire, extended coverage, and vandalism and malicious mischief. If the Owner is damaged by failure of the Contractor to purchase or maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto; the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site when request for payment per articles so includes such portions. The Contractor shall ensure that all Subcontractors are insured to at least the same extent required of the Contractor. Unless modified by the "Notice to Bidders," the minimum insurance requirements are as outlined below.

A. Contractor's Liability Insurance

1. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - a. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - b. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - c. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - d. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (ii) by any other person for any other reason;
 - e. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - f. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.
2. The policies of insurance so required by this paragraph to be purchased and maintained shall:
 - a. with respect to insurance required by Paragraphs (A.1.c) through (A.1.f) inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) Owner, Designer, Designer's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and Subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 - b. include at least the specific coverages and be written for not less than the limits of liability provided in the paragraph below Notice to Bidders, or required by Laws or Regulations, whichever is greater;
 - c. include completed operations insurance;
 - d. include contractual liability insurance covering Contractor's indemnity obligations;

- e. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least thirty (30) days' prior written notice has been given to by certified mail/return receipt requested to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued;
- f. remain in effect at least until written project acceptance and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work; and
- g. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least three (3) years after final payment.

B. Property Insurance

1. Unless otherwise provided in the Notice to Bidders, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:
 - a. include the interests of Owner, Contractor, Subcontractors, Designer, Designer's consultants, and any other individuals or entities identified in the Notice to Bidders and the officers, directors, partners, employees, agents, and other consultants and Subcontractors of each and any of them, each of whom is deemed to have an insurable interest;
 - b. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Notice to Bidders;
 - c. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of Designers);
 - d. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in a Request for Payment recommended by Designer;
 - e. allow for partial utilization of the Work by Owner;
 - f. include testing and startup; and
 - g. be maintained in effect until final acceptance is made unless otherwise agreed to in writing by Owner, Contractor, and Designer with thirty (30) days' written notice to each other additional insured.
2. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty (30) days prior to written notice has been given to Owner and Contractor and to each other additional insured.
3. Owner shall not be responsible for purchasing and maintaining any property insurance to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors,

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.

4. If Contractor requests in writing that other special insurance be included in the property insurance policies, Owner 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, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

C. Deductible

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the Contractor.

D. Proof of Carriage

The Contractor shall furnish the Owner with satisfactory proof of carriage of the insurance required before written approval is granted by the Owner.

E. Limits of Liability

Worker's Compensation

1. State: Statutory
2. Applicable Federal (e.g., Longshoreman's): Statutory
3. Employer's Liability: \$500,000

Automobile Liability

1. Bodily Injury:
 \$1,000,000 Each Person
 \$1,000,000 Each Accident
 Property Damage
 \$1,000,000 Each Accident
or
2. Combined Single Limit (Bodily Injury and Property Damage)
 \$1,000,000 Each Accident

Employer's Other Liability

1. Gen. Aggregate (except Products- Completed Operations): \$2,000,000
2. Products - Completed Operations: \$2,000,000
3. Personal & Advertising Injury (per person/organization): \$1,000,000
4. Each Occurrence (Bodily Injury & Property Damages): \$1,000,000
5. Excess Liability
 - a. General Aggregate: \$2,000,000
 - b. Each Occurrence: \$2,000,000
6. Property damage liability insurance will provide Explosion, Collapse, and Underground coverage where applicable.
7. Pollution Liability: \$1,000,000 per occurrence
8. Professional Liability: \$1,000,000 per occurrence

F. Receipt and Application of Insurance Proceeds

1. Any insured loss under the policies of insurance will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause. Owner 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 moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

2. Owner as fiduciary 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 (15) days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If so such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

ARTICLE 58 – PERFORMANCE BOND AND PAYMENT BOND

- A. Each Contractor shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be at least equal to the full contract amount. Bonds shall be executed in the form bound with these specifications. The bonds shall be delivered with the executed contract. These bonds shall remain in effect at least through the warranty period, but in no case less than one year after the date of Owner acceptance of the project.
- B. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina and shall include a certified copy of such agent's authority to act.
- C. If the surety on any Bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located, Contractor shall within twenty (20) days thereafter substitute another Bond and surety.
- D. An additional performance guarantee with the North Carolina Department of Transportation may be required for work performed in the right-of-way. In this event, the Contractor, within ten (10) days of receipt of the "Notice of Award," shall supply the Owner with a copy of the executed performance guarantee and evidence of acceptance by the NCDOT. The Contractor shall perform all work within the right-of-way in accordance with the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" and the provisions of the Encroachment Agreement. Any necessary guarantees and agreements between the Contractor and NCDOT must be in place prior to the Contractor performing any construction activities within the NCDOT right-of-way. Failure of the Contractor to receive concurrence from the NCDOT allowing the Contractor to work within the right of way shall not be grounds for extension of the Contract Time.
- E. The Owner reserves the right to not release the Performance Bond until the NCDOT has approved the portion of the completed work within the NCDOT right-of-way stipulated in the project encroachment agreement.

ARTICLE 59 – CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the Contractor on account of the contract shall not become due until the Contractor has furnished to the Owner through the Designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work in connection with his contract have been satisfied, and that no claims or liens exist against the Contractor in connection with this contract. In the event that the Contractor cannot obtain similar affidavits from Subcontractors to protect the Contractor and the Owner from possible liens or claims against the Subcontractor, the Contractor shall state in his affidavit that no claims or

liens exist against any Subcontractor to the best of his (the Contractor's) knowledge, and if any appear afterward, the Contractor shall save the Owner harmless.

ARTICLE 60 – ASSIGNMENTS

The Contractor shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the Contractor under the contract may be assigned.

ARTICLE 61 – CLEANING UP

- A. The Contractors shall keep the project, buildings, and surrounding area reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the Designer or Project Expediter. The Project Expediter shall provide an on-site refuse container(s) for the use of all Contractors. Each Contractor shall remove their rubbish and debris from the building on a daily basis. Disposal of waste material, rubbish, and other debris shall conform to applicable laws and regulations. The Project Expediter shall broom clean the building as required to minimize dust and dirt accumulation.
- B. The Project Expediter shall provide and maintain suitable all-weather access to buildings.
- C. Before final inspection and acceptance of buildings, each Contractor shall clean his portion of the Work, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the Owner, with no cleaning required by the Owner.
- D. Prior to substantial completion of the Work, Contractor shall clean the site and make it ready for utilization by Owner. At the completion of the Work, Contractor shall remove from the site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the contract documents.
- E. All material including construction debris, etc., which is not to be used at the project site must be legally disposed of off the project site at the Contractor's expense. Survey stakes are not considered debris and shall be removed only at the direction of the Designer.
- F. All Contractors are responsible for maintaining streets, parking lots, walks and grounds connecting to the project area which shall be protected from deposits of mud, sand, stone, litter or debris of any form. All mud collected on vehicle wheels must be cleaned off by spraying each tire and the underside of vehicle before leaving the construction site. Should any mud or debris from the construction project collect on the streets, this shall be removed immediately.

ARTICLE 62 – GUARANTEE

- A. The Contractor warrants and guarantees to Owner, Designer, and Designer's consultants that all work shall be in accordance with the contract documents and will not be defective.
- B. All warranties and guarantees shall expressly run to the benefit of the Owner.
- C. The Contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the Work and shall replace such defective materials or workmanship without cost to the Owner.

- D. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The Contractor shall replace such defective equipment or materials, without cost to the Owner, within the manufacturer's warranty period.
- E. All warranties shall be construed under and in accordance with the State of North Carolina.
- F. All materials and equipment incorporated into the Work shall be good quality and new, unless specified otherwise.
- G. Additionally, the Owner may bring an action for latent defects caused by the negligence of the Contractor which is hidden or not readily apparent to the Owner at the time final acceptance in accordance with applicable law.
- H. Additional guarantees for roof, equipment, materials, and supplies may be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.
- I. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instruction of the applicable Supplier or manufacturer.
- J. If required by the Designer, the Contractor shall provide satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- K. Any defective materials or workmanship replaced or repaired during the initial warranty period shall extend the warranty period for a period of twelve (12) months following Owner acceptance of the replacement material or workmanship.

ARTICLE 63 – INDEMNIFICATION

- A. To the fullest extent permitted by Laws and Regulations and without limiting any other indemnity obligation set forth herein, Contractor shall indemnify and hold harmless Owner, Designer, Designer's Consultants, and the officers, directors, partners, employees, agents, and other consultants and Subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) (collectively, "Claims") should Contractor's, or anyone for whom Contractor is responsible, fault or negligence be the proximate cause of such Claims.
- B. In any and all Claims against Owner or Designer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work of anyone for whose acts any of them may be liable, the indemnification obligation above shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability acts, or other employee benefit acts.

ARTICLE 64 – CONTRACTOR EVALUATION

The Contractor's overall work performance on the project shall be fairly evaluated for determining qualifications to bid on future County capital improvement projects. In addition to final evaluation, interim evaluation may be prepared during the progress of the project. Evaluations shall be performed by the Owner and Designer. The Owner may request the Contractor's comments to evaluate the Designer.

SUPPLEMENTARY GENERAL CONDITIONS

Extensive modification to the General Conditions by means of “Supplementary General Conditions” is strongly discouraged. The Supplementary General Conditions contain changes and additions to the “Instructions to Bidders” and “General Conditions of the Contract.”

ARTICLE 13 – AS-BUILT DRAWINGS

- Remove “ARTICLE 13 – AS-BUILT DRAWINGS.”

ARTICLE 23 – UTILITIES, STRUCTURES, SIGNS

- The Project Expediter shall pay all utility costs on the project until final acceptance by the owner.
- The Project Expediter shall provide toilet facilities according to “ARTICLE 23 – UTILITIES, STRUCTURES, SIGNS.”

ARTICLE 32 – SCHEDULE

- Either a Bar Chart Schedule or a Critical Path Method (CPM) Schedule, as indicated in “ARTICLE 32 – SCHEDULE” shall be used regardless of the project Contract value.

ARTICLE 57 – MINIMUM INSURANCE REQUIREMENTS

- In accordance with A. 2. a., the Contractor shall include as additional insureds on insurance policies, the following:
 - Owner – Brunswick County
 - Designer – W.K. Dickson & Co., LLC

ARTICLE 58 – PERFORMANCE BOND AND PAYMENT BOND

- Item D. – Add the following sentence, “A separate performance guarantee shall not be required by the NCDOT. However, Brunswick County may not release the payment and performance bond until receiving concurrence from the NCDOT.”

PREFERRED BRANDS

The following Approved Products List (subject to supplementation by Brunswick County) details specific brands for certain items *preferred* by the Owner in order to provide an overall cost savings and/or to maintain or improve the functioning of processes or systems affected by specific items:

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
Submersible Solids-handling Sewer Pumps	• Myers • Barnes • Flygt • Fairbanks-Morse • ABS	Compatibility with control systems and mechanical systems.	Cost savings and improved process. Limits inventory, limits required staff training, facilitates repairs, and ensures compatibility with rail systems and control systems.
Grinder Pump Station Packages	• Barnes • Myers • Liberty	Compatibility with control systems, mechanical systems, and system pressures.	Cost savings and improved process. Limits inventory, limits required staff training, facilitates repairs, and ensures compatibility with rail systems and control systems.
Air Release Valves for Sewer	• ARI D-025 Combination Air Release/ Vacuum Valve	Compatible with existing piping layout and space constraints.	Cost savings and improved process. Limits inventory, limits required staff training, and facilitates repairs.
High Service Water System Pumps	• Aurora	Same-day shipping from within United States, compatibility with existing control systems, mechanical systems, system pressures, and space constraints.	Cost savings and improved process. Reduces down-time for critical system components, limits inventory, limits required staff training, facilitates repairs, and facilitates pump interchangeability.
Fire Hydrants	• Mueller "Centurion" • American Darling "MK-73" • Clow "Medallion"	Compatible with existing piping layout and space constraints. Immediately repairable with stocked inventory.	Cost savings and improved process. Limits inventory, limits required staff training, and facilitates repairs.
Water Meters (potable water)	• Sensus • Elster	Compatible with billing software, Sensus RadioRead AMI software, and Sensus Protocol. Compatible with	Cost savings and improved process. Limits inventory, limits required staff training, facilitates repairs, and

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		existing piping layout and space constraints.	ensures compatibility with Sensus AMI system.
Meter Boxes (1" meter & Smaller)	- Ford - McDonald	Compatible with existing piping layout and space constraints (Sensus Remotely Read Meters).	Cost savings and improved process. Limits inventory and facilitates repairs.
Isolation Valves (type as required for application)	- Mueller - American Flow Control - Clow - M & H - Spears -True Union	Compatible with existing piping layout and space constraints. Immediately repairable with stocked inventory.	Cost savings and improved process. Limits inventory, limits required staff training, and facilitates repairs.
Programmable Logic Controllers (PLC)	- Square D Schneider Electric, M340 series - Square D Schneider Electric Momentum series	The PLC's shall communicate over Modbus TCP/IP (Ethernet) network, programmed in Function Block (no ladder logic accepted), programmed in Unity Pro XL v12.0 or higher.	Compatibility with electrical and control wiring and spacing within existing enclosures. Limit Purchase of Programming Software. Limit Staff Training. System compatibility.
Operator Interface Terminal (Touchscreen)	C-more HMI EA7-T8CL-R, EA7-T10CL-R, EA7-T12CL-R, EA7-T15CL-R	Shall have color touch screen with at least 640 x 480 resolution and Modbus TCP/IP Ethernet to communicate with Brunswick County existing PLC's.	Compatibility with component sizes. Limit Purchase of Programming Software. Limits staff training. System compatibility. Cost savings due to minimizing inventory.
Variable Frequency Drives (<75 HP)	- Square D Schneider Electric, Process Drive series - ABB - Siemens	The graphic display terminal shall provide 8 lines of 240 by 160 pixels (in English) to control, adjust, and configure AC Drive. All electrical values, bar charts, configuration parameters, I/O assignments, application and activity functions, faults, local control, adjustment storage, self-test, and diagnostics shall be accessible through the terminal	Compatibility with size of existing MCC enclosures and existing electrical and control wiring. Ease of replacement and limited downtime. Limits staff training. Cost savings due to minimizing inventory.
Variable Frequency Drives (75 HP & larger)	Square D Schneider		

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
	Electric, Process Drive series • ABB	interface. Complete word parameter display messaging, conformal coating, user programmable I/O. The VFD shall be able to be connected to Ethernet and other networks, with connection to communication bus as an option. Logic input assignments shall consist of forward, reverse, jog, plus/minus speed (2 inputs required), set point memory, preset speeds (up to 8 inputs), auto/manual control, controlled stop, terminal or keypad control, output contactor (2 inputs required), motor switching, and fault reset. There shall be at least one software assignable analog output with interference filtering. The analog outputs can be selected and assigned in the software. The analog output assignments shall be proportional to the following motor characteristics: frequency, current, power torque, voltage, and thermal state. The AC Drive shall be designed to operate in an ambient temperature of at least -10 to + 40 °C (+14 to 104 °F). Type 3R shall be designed to operate from -10 to +50 °C (+14 to 122 °F).	
Solid State reduced voltage starters	• Square D • Schneider Electric Altistart 22 and 48 series • ABB • Siemens	The soft starter shall be able to be connected to Ethernet and other networks, with connection to communication bus as an option. Conformal coating, user programmable	Compatibility with size of existing MCC enclosures and existing electrical and control wiring. Ease of replacement and limited

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		I/O. Microprocessor shall control the operation of the shorting contactor. The shorting contactor shall close, shorting the SCRs after the acceleration ramp is complete and motor current is below 130% of motor FLA, and open on a stop command to allow a deceleration ramp. Overload protection integral to the soft starter shall continue to protect the motor when shorting is engaged. The shorting contactor can be contained within the soft starter frame. The soft start shall be designed to operate in an ambient temperature: - UL Type 1 and Type 12 at 14 F to 104 F (-10 C to 40 C); - UL Type 1, Type 12, and Type 3R at 14 F to 122 F (-10 C to 50 C).	downtime. Limits staff training. Cost savings due to minimizing inventory.
MCC, NEMA starters, Panel boards and Switch boards, Heavy Duty rated disconnects.	Square D Schneider Electric	<u>MCC:</u> Square D MCC series 6 or newer will ensure compatibility with MCC bucket and motor starter components throughout the Utility system. <u>Motor starters:</u> Shall be Square D - Class 8536 Type S. Coil operating voltage: 120 volts, 60 Hz. Contact inspection and replacement shall be possible without disturbing line or load wiring. Overload relay control circuit contact shall be replaceable. Thermal units shall be required for starter to operate. Solid State: Trip current rating will be established by selection of	Compatibility with existing MCC's, panel boards, disconnects, switchboards and starters throughout County. Ease of replacement, compatible sizing and wiring compatibility on existing equipment. Limits staff training. Cost savings due to minimizing inventory.

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		overload relay and shall be adjustable (3 to 1 current range). The overload shall be self-powered, provide phase loss and phase unbalance protection, have a permanent tamper guard, and be ambient insensitive. It will also be available in Trip Class 10 or 20 and have a mechanical test function. <u>Panel boards and Switch boards:</u> Square D type: Power Pact P- and R-frame (100-1200A), NF, NQ [or approved equal]. Circuit breaker trip system shall be a MICROLOGIC electronic trip unit. All trip units shall be removable to allow for field upgrades. Trip Units shall incorporate "True RMS Sensing" and shall have LED long-time pickup indications. MICROLOGIC trip unit functions shall consist of adjustable long-time pickup and delay, [optional short-time pickup and delay], instantaneous [optional neutral protection and optional ground-fault pickup and delay]. Trip units shall be capable of communicating on MODBUS[®] TCP/IP networks without software interfaces (black boxes).] Disconnect switches: Square D, Heavy duty type, HP rated. Enclosure: ANSI/NEMA ICS 6, Type [1] [3R] [4] [4X] [12] [], [as indicated] [as required	

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		to meet conditions of installation].	
Flow meters (Ultrasonic, approved applications only)	GE DF868 Dynasonics Ultra TFX	Ethernet network capable, transit time flow meter with keypad, 4-20mA output and 10/100 base-T (Ethernet/IP), 110VAC- 60Hz; Submersible transducer set for use with cable length (50' or 100' suggested).	Compatibility with existing flow meters with size and wiring. Limits staff training. Cost savings due to minimizing inventory.
Flow meters (Traditional-Magnetic, full pipe water & wastewater)	- Krohne - Siemens	Submergence IP68 rated. Nema 4X enclosure, UV resistant digital display, 120V 60Hz line power, 4-20mA output, relay and pulse outputs. HART communication protocol	Compatibility with electrical and control wiring and component spacing. Limits staff training. Cost savings due to minimizing inventory.
Flow meters (Magnetic, partially filled pipe wastewater)	Krohne Tidalflex	Submergence IP68 rated with stainless steel housing on the IP68. Nema 4X enclosure, UV resistant digital display, 120V, 60Hz, line power, 4-20mA output, IFC300 PF with modular I/O, (2) analog outputs – one for flow and one for level. HART communication protocol	Compatibility with electrical and control wiring and component spacing. Limits staff training. Necessary to accurately read partially filled pipes. Cost savings due to minimizing inventory.
Flow transmitter (wastewater flumes)	Sitrans Siemens LUT440	Flow transmitter shall be capable of providing highly accurate open channel flow measurement. Nema 4X enclosure, UV resistant digital display, 120V 60Hz line power, 4-20mA output, relay and pulse outputs. HART communication protocol. Accuracy +-1mm within 3 meters. External temperature measurement.	Compatibility with electrical and control wiring and component spacing. Limits staff training. Cost savings due to minimizing inventory.
Dissolved oxygen analyzer	HACH SC200 controller AC, LDO Probe	HACH SC200 controller AC, LDO Probe with 10M cable, sensor cap including 3 calibration bags, LDO Pole mount kit 1 ½"	Compatibility with electrical and control wiring and component spacing. Limits staff

APPROVED PRODUCTS LISTBrunswick County, NC

<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		PVC SCH 80, DO float, 45-degree elbow PVC SCH 80. Capable of monitoring an additional sensor input to controller. 2- Isolated 4-20mA outputs shall be provided for two measured processes.	training. Cost savings due to minimizing inventory.
Automatic Transfer Switch (Open transition)	• ASCO 300 series including options 11BE,14AA, 14BA, & 18RX • Cummins Power Command OTPC	Automatic transfer switches shall include 3 phase sensing, user programmable exercise timer, user programmable transfer delay time, user programmable return from utility time, user programmable engine start time. The automatic transfer switch shall include dry contacts for remote monitoring of Utility voltage and of the switch position (emergency and normal). Outside applications require a stainless steel Nema 4x rated enclosure. Indoor applications are required to be Nema 12 rated enclosure. Automatic transfer switch shall include a 2-wire start contact for generator control.	Compatibility with electrical and control wiring and component spacing. Limits staff training. Low cost of spare parts. Cost savings due to minimizing inventory.
Automatic Transfer Switch (Closed transition)	• ASCO 4000/7000 series	Automatic transfer switches shall include 3 phase sensing, user programmable exercise timer, user programmable transfer delay time, user programmable return from utility time, user programmable engine start time. The automatic transfer switch shall include dry contacts for remote monitoring of Utility voltage and of the switch position (emergency and normal). Outside	Compatibility with electrical and control wiring and component spacing. Limits staff training. Low cost of spare parts.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		applications require a stainless steel Nema 4x rated enclosure. Indoor applications are required to be Nema 12 rated enclosure. Automatic transfer switch shall include a 2-wire start contact for generator control.	
Ultrasonic Level Transmitter	Siemens LUT 400 series	NEMA 4X enclosure, 100-230 VAC, 50/60 Hz., backlit multi-field LCD display, two (2) discrete inputs, one (1) 4-20 mA input, six (6) SPDT relays, two (2) isolated 4-20mA analog output, and built-in Modbus RTU via RS-485, with quick-start manual and complete manuals on CD-ROM. Siemens XPS series transducer.	Compatibility with electrical and control wiring and component spacing. Limits staff training. Cost savings due to minimizing inventory.
Submersible level Transducer (Sewer)	Dwyer PBLT-2	High-quality, designed for wastewater applications, 316-SS construction for excellent chemical compatibility. Large-diameter, 316-SS diaphragm seal is non-clogging and resists damage from floating solids. Unit must measure the height of liquid above the position in the tank referenced to atmospheric pressure—applications including wastewater, slurries, sludge pits, storage tanks and reservoirs. Must incorporate lightning and surge protection. A ventilation tube in the cable automatically compensates for changes in atmospheric pressure above the tank. A maintenance-free filter protects the vent, so particulates or water cannot enter the transmitter.	Compatibility with electrical and control wiring and component spacing. Short lead time on reorder. Cost savings due to minimizing inventory.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
		Transmitter must have a 1/2" NPT(M) conduit connection. Transmitter wetted materials: 316 SS, 316L SS, Buna-N Cable wetted materials: polyurethane. Accuracy: $\pm 0.25\%$ of full scale. Power: 13 to 30 VDC. Output: 4-20 mA, 2-wire. Cable length ordered specific to site, typically 100ft minimum. No splices allowed from transducer to PLC)	
Pressure Transmitter (sewer)	WIKA IS-20 with diaphragm seal; Part # 52358038	WIKA model IS-20, Range: 0 – 200psi, Output 4 – 20mA, 2-wire supply, 10-30 VDC, pressure connection: G1/2B flush with original; electrical connection: vented cable NEMA 6, IP68, zero span, cable length 100', include diaphragm seal Type L990.36, (1/2) inch NPT connections	Compatibility with electrical and control wiring and component spacing. Short lead time on reorder. Cost savings due to minimizing inventory.
Pressure Transmitter (system pressure water tanks only)	WIKA	WIKA S-10 pressure transmitter. Part # 50360213. Range 0-200psi, 4-20mA output, 10-30VDC. Body housing shall be 316 Stainless Steel including a 1/2 NPT process connection.	Compatibility with electrical and control wiring and component spacing. Short lead time on reorder. Cost savings due to minimizing inventory.
Pressure Transmitter (potable water booster pumping stations, etc.)	- Rosemount Smart 3051 series - Siemens Sitrans (Smart)	Transmitters capable of reading and connecting to various processes (including but not limited to: temperature, water, sewer, sludge etc.) Adjustable backlit digital display, 15-36VDC powered, 4-20mA output, aluminum enclosure, stainless steel process connection, HART communication.	Compatibility with electrical and control wiring and component spacing. Limits staff training. Cost savings due to minimizing inventory.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
Diesel Generator	- Cummins (ONAN) - Caterpillar - Detroit MTU)	Generator Enclosure must be constructed of 1/8" gauge marine grade aluminum. The enclosure sound rating shall not exceed 75 dBA at 25 feet. Enclosure hardware and fasteners shall be made of 304 Stainless Steel. The generator alternator shall have the PMG excitation option included and shall be a 4-pole revolving field type with 12 reconnectable leads. The generator shall provide a dry contact for remote monitoring of the "engine running" status. The generator fuel base tank shall be sized to meet a minimum of 48 hour run time at 100% load. The generator controller shall be a digital type including indication status of all available alarms and conditions and shall have the ability to communicate over Ethernet TCP/IP (optional).	Compatibility with electrical and control wiring and component spacing. Limits staff training. Local repair/service and stock availability.
Batteries	AGM type	The generator battery shall be of the absorbed glass mat (AGM) type and shall have a CCA that meets the engine manufactures requirements.	Stock availability and reliability. Cost of ownership reduced with fewer callouts and failures. Longer life batteries than traditional batteries.
Radios	MDS iNET-II 900	MDS Radio shall be high speed capable of 1Mbps and have a Range of at least 30 miles line of sight. Shall have Ethernet and Serial interfaces to connect to serial devices and the County Existing IP Network.	Compatibility with electrical and control wiring and component spacing. Proven in high temperature environments. Limits purchase of programming software.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
			Limits staff training. Cost savings due to minimizing inventory.
Plug Valves	• Dezurik • Milliken	Compatible with existing piping layout and space constraints. Immediately repairable with stocked inventory.	Cost savings and improved process. Limits inventory, limits staff training, and facilitates repairs.
Altitude Control Valves	• Bermad • Ross • Cal-Val	Compatible with existing piping layout and space constraints. Immediately repairable with stocked inventory.	Cost savings and improved process. Limits inventory, limits required staff training, and facilitates repairs
Oxidation Ditch Treatment Process (Biodenipho)	• Kruger/Veolia	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing process, limits required staff training due to familiarity with existing equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Secondary Clarifiers (wastewater)	• Clear Stream Environmental, Inc. as provided by Kruger/Veolia •	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment and existing treatment process, limits required staff training. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
			single point of contact/responsibility for equipment/warranty support.
Tertiary Filters	Kruger/Veolia	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment and existing treatment process, limits required staff training. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
U.V. Disinfection System	Trojan/U.V. 3000+	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment and existing treatment process, limits required staff training. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Rotary Drum Thickening System	KD Maskinfabrik A/S as provided	Standardization and compatibility with existing process, control systems, and mechanical systems.	Critical to performance of sludge digestion system downstream (FUCHS ATAD). Unit

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
	by Kruger/Veolia		responsibility integrated with that of sludge digestion system. Limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Post-ATAD Holding/Aeration System	FUCHS Enprotec GmbH as provided by Kruger/Veolia	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Valve Actuator	- Beck - EIM/Bettis - Auma	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
			Allows for consistency in treatment, performance and technical/maintenance support.
Return Activated Sludge (RAS), Waste Activated Sludge (WAS) Pumps	• Cornell • Hydromatic • Layne	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support.
Autothermal Thermophilic Aerobic Digestion (ATAD) Sludge Digestion System	• FUCHS as provided by Kruger/Veolia	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Flocculating Clarifiers	• SuperPulsators® by Suez	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Allows for consistency in treatment, performance

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
			and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Gravity Filters with Central Regulating Unit	Greenleaf® by Suez	Standardization and compatibility with existing process, control systems, and mechanical systems.	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.
Chemical Metering Pumps (Diaphragm Type)	Dia-series by Neptune	Standardization and compatibility with existing process, control systems, and mechanical systems	Compatibility with existing equipment, limits required staff training due to familiarity with equipment and process. Reduces needed inventory for R&M. Allows for consistency in treatment, performance and technical/maintenance support. Provides for a single point of contact/responsibility for equipment/warranty support.

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<u>ITEM</u>	<u>PREFERRED BRANDS</u>	<u>PERFORMANCE STANDARD</u>	<u>JUSTIFICATION</u>
Vertical Turbine Pumps (backwash feed, LPRO feed)	• Aurora • Fairbanks • Flowserve	Compatibility with existing control systems, mechanical systems, system pressures, and space constraints.	Provides consistent and reliable performance in critical treatment processes.

Davis-Bacon Instructions for SRF Projects

To be included in the Contract Documents:

- The entire contents of 29 CFR 5.5
- The appropriate wage determination (usually Heavy). This determination must be the most current and have been in effect at least 10 days prior to bid opening. If a wage determination for the project location is not available, then the Statewide wage determination may be used. If it takes longer than 90 days to execute contracts and the wage determination changes, then the new wage rates must be incorporated into the contract. Wage Determinations can be found at:
https://beta.sam.gov/search?index=wd&is_active=true&date_filter_index=0&date_rad_selection=date&wdType=dbra&page=1

During Construction:

- Post the Davis-Bacon Poster
<https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/fedprojc.pdf>
- Post the appropriate wage rates. These should be the ones included in the specifications and any new classifications approved by the Department of Labor.
- Weekly payrolls are to be maintained onsite for all subject contractors and subcontractors. Number them for each week of the construction period including weeks that do not have payroll. Form WH 347 is suggested. Do not submit these to the State SRF office, submit them to the municipality for review. Link to Form WH 347 -
<https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf>
- The municipality will conduct interviews with employees when there are irregularities concerning wages being paid. Use Standard Form 1445.
- For additional wage classification approvals, complete form SF 1444 found at this link:
https://www.nps.gov/dscw/upload/sf1444-classificationrateauthorizationrequest_7-14-06.pdf
Email this form to: whd-cbaconformance_incoming@dol.gov

The entire contents of this package is:

- 1) These Instructions
- 2) 29 CFR 5.5
- 3) Davis-Bacon Poster
- 4) Payroll form WH 347

29 CFR §5.5 Contract provisions and related matters.

(a) The Agency head shall cause or require the contracting officer to insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in §5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, *Provided*, That such modifications are first approved by the Department of Labor):

(1) *Minimum wages.* (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in §5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH- 1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) *Withholding.* The (write in name of Federal Agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of

the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) *Payrolls and basic records.* (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) *Apprentices and trainees*—(i) *Apprentices*. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job

site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) *Trainees*. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) *Equal employment opportunity*. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements*. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) *Subcontracts*. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts.

The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) *Certification of eligibility.* (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(a) *Contract Work Hours and Safety Standards Act.* The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by §5.5(a) or §4.6 of part 4 of this title. As used in this paragraph, the terms *laborers* and *mechanics* include watchmen and guards.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (1) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, the contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated

damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$32 or the current amount statutorily required by 29 C.F.R. § 5.5(b)(2) as may be amended from time to time, for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

(3) Withholding for unpaid wages and liquidated damages.

- (i) *Withholding Process.* The recipient or subrecipient may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section, any other federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2 thereof). The necessary funds may be withheld from the Contractor under this Agreement, any other federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.
- (ii) *Priority to withheld funds.* The Department of Labor has priority to funds withheld or to be withheld in accordance with this section, over claims to those funds by:
 - (A) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
 - (B) A contracting agency for its procurement costs;
 - (C) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
 - (D) A contractor's assignee(s);
 - (E) A contractor's successor(s); or
 - (F) A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section. In the event of any violations of these clauses, the prime contractor, and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief,

including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

(5) *Anti-retaliation*. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- (i) Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- (ii) Filing any complaint, initiating, or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- (iii) Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- (iv) Informing any other person about their rights under CWHSSA or this part.

Further Compliance with the Contract Work Hours and Safety Standards Act, as applicable:

(1) The contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

(2) Records to be maintained under this provision shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Department of Homeland Security, the Department of Labor, or any other authorized representatives of the federal government, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

"General Decision Number: NC20250078 01/03/2025

Superseded General Decision Number: NC20240078

State: North Carolina

Construction Type: Heavy

Counties: Brunswick, New Hanover and Pender Counties in North Carolina.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
0 01/03/2025

SUNC2011-059 08/26/2011

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 13.98 **	0.69
ELECTRICIAN.....	\$ 15.41 **	3.13
LABORER: Common or General.....	\$ 9.21 **	0.00
LABORER: Pipelayer.....	\$ 12.87 **	2.21
OPERATOR:		
Backhoe/Excavator/Trackhoe.....	\$ 14.71 **	0.00
OPERATOR: Bulldozer.....	\$ 14.63 **	0.00
OPERATOR: Loader.....	\$ 15.13 **	2.79
TRUCK DRIVER.....	\$ 13.12 **	1.89

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date,

6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7).

Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION"

EMPLOYEE RIGHTS UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



For additional information:
1-866-4-USWAGE
(1-866-487-9243) TTY: 1-877-889-5627



WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Rev. Dec. 2008

OMB No.: 1235-0008
Expires: 01/31/2015

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐		ADDRESS	PROJECT OR CONTRACT NO.
PAYROLL NO.		FOR WEEK ENDING	PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT OR ST	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS						(9) NET WAGES PAID FOR WEEK
														FICA	WITH- HOLDING TAX			OTHER	TOTAL DEDUCTIONS	
				HOURS WORKED EACH DAY																
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(i) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210

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(1) That I pay or supervise the payment of the persons employed by

_____ : that during the payroll period commencing on the

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

weekly wages earned by any person and that no deductions have been made either directly or indirectly

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

[illegible]

Figure 1. A schematic diagram of the experimental design. The subjects were divided into two groups: the control group and the experimental group. The control group received a standard 12-week training program, while the experimental group received a modified 12-week training program. The modified program included a 4-week pre-training period followed by an 8-week training period. The subjects were then divided into two subgroups: the control subgroup and the experimental subgroup. The control subgroup received a standard 12-week training program, while the experimental subgroup received a modified 12-week training program. The subjects were then divided into two subgroups: the control subgroup and the experimental subgroup. The control subgroup received a standard 12-week training program, while the experimental subgroup received a modified 12-week training program.

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

American Iron and Steel (AIS)

Guidance for Clean Water and Drinking Water State Revolving Fund (SRF) Projects in North Carolina

This State guidance summarizes the requirements under Subsection 436(a)(2) of the Consolidated Appropriations Act of 2014 P.L. 113-76 that SRF recipients only use iron and steel products produced in the United States. The Environmental Protection Agency (EPA) has provided full guidance on the requirements at the following website:

http://water.epa.gov/grants_funding/aisrequirement.cfm.

Recipients of SRF awards must submit the executed *Certification for SRF Projects* and a list of any products that may potentially require a waiver from EPA, with their Bid Information Package. The recipient will not receive any funds if the State has not received these items.

Manufacturers can use the template "*Compliance Certification*" to document that materials are "produced in the United States."

Outline of American Iron and Steel Section

1. Certification Statement for SRF Projects.
2. Waiver Instructions.
 - a. National Waiver.
 - b. Project Specific Waiver.
3. Materials covered by AIS.
4. Template *Compliance Certification* for Materials Covered by AIS:
 - a. Step Certification Products Letter Template: Step Certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A Step Certification is a process by which each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin.
 - b. Non-Step Certification Product Letter Template
5. Template for *De Minimis National Waiver List* to be used by Contractor.

American Iron and Steel (AIS)

Certification Statement for State Revolving Fund (SRF) Projects

Funding recipients of SRF awards must submit this executed form signed by both authorized representatives of the contractor and funding recipient. Provide a list of any products that may potentially require a waiver from EPA with the Bid Information package to the State SRF Program to receive funding.

The _____ (Funding Recipient) certifies that their contractors performing construction, alteration, maintenance and repair of the public treatment works under project number _____ will comply with subsection 436 (a)(2) of the Consolidated Appropriations Act of 2014 P.L. 113-76 and only use iron and steel products produced in the United States.

Contractor

Owner

(print) _____

(print) _____

(sign and date) _____

(sign and date) _____

American Iron and Steel (AIS)

National Waivers and Project Specific Waiver Instructions

A. National Waivers:

- 1) Approved EPA national waivers can be found at this website:

<https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-approved-national-waivers-0>.

- i. The De Minimis National Waiver Pursuant to Section 436 of P.L. 113-76, Consolidated Appropriations Act (CAA) (April 15, 2014) for iron and steel components is approved. An example table is included in this document for use in documenting materials utilized for the project on de minimis list.
 - a. De Minimis National Waiver applies to incidental components. Visit EPA National Waiver website for de minimis Waiver for description of incidental components within a water infrastructure project.
 - b. Note that no single de minimis item can be more than 1% of the total material cost of the project and the total of all de minimis items must not exceed 5% of the **total material cost of the project**.

B. Project Specific Waiver Instructions:

- 1) Project specific waiver requests are provided for in subsection 436(b) of the Act. It states they will be granted if the Administrator of the EPA finds that:
 - i. Applying subsection 436(a)(2) would be inconsistent with the public interest;
 - ii. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
 - iii. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.
- 2) If a project-specific waiver is required during the construction phase, submit waiver requests to the Division of Water Infrastructure (DWI) designated inspector identified in the Plans and Specifications Funding Approval Letter issued for the funded SRF project. The DWI inspector will

forward the waiver to the designated EPA representative at the following email addresses for a final determination:

- i. For Clean Water SRF (CWSRF) funded projects cwsrfwaiver@epa.gov
- ii. For Drinking Water SRF (DWSRF) funded projects dwsrfwaiver@epa.gov
- iii. NOTE: SRF project numbers to be issued by the Division of Water Infrastructure starting with Fall 2023-approved projects are:
 1. SRF-W-XX-#### for CWSRF
 2. SRF-D-XX-#### for DWSRF
6. The current format CS#####-## for CWSRF and WIF-#### for DWSRF will eventually phase out for projects approved in Spring 2023 and before.
- 3) A checklist of items for a complete waiver application package can be found in the EPA guidance document for AIS at:
 7. <https://www.epa.gov/cwsrf/ais-waiver-request-checklist-assistance-recipients>
- 4) Once DWI Inspector submits the waiver to EPA on behalf of the funding recipient, EPA will perform the following actions with the waiver:
 - i. Conduct product research to determine availability in the United States.
 - ii. Conduct a mandatory 15-day public comment period.
 - iii. After public comment, the waiver is sent to the Office of General Council (OGC) for review and concurrence.
 - iv. After OGC review, the waiver is approved by EPA leadership and posted to the EPA waiver website.
- 5) Once the waiver is received from EPA, the funding recipient will need to maintain the waiver for three years after project closeout.

American Iron and Steel (AIS)

Materials Covered by AIS

1. Lined and unlined pipes and fittings, manhole covers, municipal castings (detailed below).
2. Hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel (detailed below).
3. Reinforced precast concrete and construction materials (detailed below).
4. Products must be composed of greater than 50% iron and steel measured by cost and permanently incorporated into the project to be subject to the provision.
5. NOTE: Mechanical and electrical components, equipment and systems are not subject to AIS.

<u>Municipal Castings</u>	<u>Structural Steel</u>	<u>Construction Material</u>
Access Hatches Ballast Screen Benches Bollards Cast Bases Cast Iron Hinged Hatches Cast Iron Riser Rings Catch Basin Inlet Cleanout/Monument Boxes Construction Covers and Frames Curb and Corner Guards Curb Openings Detectable Warning Plates Downspout Shoes Drainage Grates, Frames and Inlets Inlets Junction Boxes Lampposts Manhole Covers, Rings, Frames and Risers Meter Boxes Service Boxes Steel Hinged Hatches Steel Riser Rings Trash Receptacles Tree Grates Tree Guards Trench Grates Valve Boxes, Covers and Risers	Wide Flange shapes I-beams Channels Angles Tees Zees H-piles Sheet piling Tie Plates Cross Ties (note: at least one dimension must be 3 inches or greater to be subject)	Wire Rod Bar Angles Concrete Reinforcing Bar Wire Wire Cloth Wire Rope and Cables Tubing Framing Joists Trusses Fasteners Welding Rods Decking Grating Railings Stairs Access Ramps Fire Escapes Ladders Wall Panels Dome Structures Roofing Ductwork Surface Drains Cable Hanging Systems Manhole Steps Fencing and Fence Tubing Guardrails Doors Stationary Screens

American Iron and Steel (AIS)
Template Compliance Certification for Materials Covered By AIS
(Step Certification Template Letter)

Company Name:

Company Address:

SUBJECT: American Iron and Steel Certification for Project: (include name and/or NC Division of Water Infrastructure SRF project number here)

I _____, certify that the following products were produced at the following location or steps in the production of the listed products, occurred at the following location:

Location:

<u>Product</u>	<u>Step in production (Final production, melting, bending, etc.)</u>
----------------	--

1)

2)

3)

Continue with list of products)

Therefore, these materials for the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

(signature and title of company representative)

(date)

American Iron and Steel (AIS)
Template Compliance Certification for Materials Covered By AIS
(Non-Step Certification Template Letter)

Company Name:

Company Address:

SUBJECT: American Iron and Steel Certification for Project: (include name and/or NC Division of Water Infrastructure SRF project number here)

I _____, certify that the following products were produced at the following location or steps in the production of the listed products, occurred at the following location:

Location:

Product

1)

2)

3)

Continue with list of products)

Therefore, these materials for the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

(signature and title of company representative)

(date)

American Iron and Steel (AIS)
Template *De Minimis* National Waiver* List
(to be used by Contractor)

<u>Item</u>	<u>Cost</u>

Total De Minimis Cost: _____

Total Material Cost for Project: _____

De Minimis Cost Is _____ **% of total material costs.**

*NOTE: The De Minimis National Waiver Pursuant to Section 436 of P.L. 113-76, Consolidated Appropriations Act (CAA) (April 15, 2014) requires the following limits for ***incidental material components***:

1. All products included in the project under the de minimis waiver must total less than 5% of the total materials cost of the project.
2. Any single product cannot be more than 1% of the total materials cost of the project.

FORM OF PROPOSAL

To: **BRUNSWICK COUNTY**

From: *Bidder*

Address

Tele./Fax

Date of Bid

The undersigned, as 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 bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. By signing this proposal, the bidder affirms they are not listed and will not utilize a subcontractor or vendor listed on the Final Divestment List created by the State Treasurer pursuant to NCGS 143-6A-4, Iran Divestment Act Certification. The Bidder further declares that he has examined the site of the work and the Contract Documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees if this proposal is accepted to Contract with **Brunswick County** in the form of Contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, supplies, labor, etc. necessary to complete the construction of: Rehabilitation and replacement of facilities and equipment at three (3) lift stations located at Moore Street, Ninth Street, and Park Avenue in the City of Southport, NC.

Southport Sewer Lift Station Replacement DWI Project No. SRP-W-ARP-0105

in full in complete accordance with the plans, specifications, and Contract Documents, to the full and entire satisfaction of **Brunswick County** and their representatives with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the Contract Documents, for the **firm fixed-price** sum of:

SINGLE PRIME CONTRACT:

Base Bid:

Rehabilitation and replacement of facilities and equipment of three (3) lift stations located at Moore Street, Ninth Street, and Park Avenue in the City of Southport to include, without limitation, the following:

- Installation of new polymer concrete wet wells with flood-proof access hatch, new submersible pumps, pump control panels, generator replacement or reconfiguration, and associated electrical improvements, stainless steel pump discharge piping, polymer concrete valve vaults, ductile iron valves and fittings, restrained PVC C900 force mains and connection to existing force mains, PVC C900 gravity sewer extension including polymer and precast concrete manholes, new decorative site fencing, installation/extension of gravel access driveways, converting to natural gas generators and natural gas service connections, and relocation of existing water meters and backflow preventers.
- Demolition of existing wet wells and concrete slab on grade, removal of suction lift pumps and related piping, fiberglass pump enclosure, existing pump control panels and existing wiring, abandonment of gravity sewer and force main, and removal of existing site fencing.
- Base bid includes all work covered in the Contract documents including lump sum, unit price item, allowance items, and testing allowance.

_____ Dollars(\$)
(alpha) *(numeric)*

General Subcontractor:

_____ Lic _____

Plumbing Subcontractor:

_____ Lic _____

Mechanical Subcontractor:

_____ Lic _____

Electrical Subcontractor:

_____ Lic _____

When the project is a Building, NCGS 143-128(d) requires all Single Prime Bidders to identify their Subcontractors for the above subdivisions of work. A Contractor whose bid is accepted shall not substitute any person as Subcontractor in the place of the Subcontractor listed in the original bid, except in accordance with NCGS 143-128(d).

Under separate Prime Contracts, the Contractor shall act as Project Expediter for all Prime Contracts. See Supplementary General Conditions.

ALTERNATES:

Should any of the alternates as described in the Contract Documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

GENERAL CONTRACT:

Alternate No. G-1 *The use of products meeting the performance technical specification instead of products on the Approved Products List in the Supplementary General Conditions (or if omitted, the Approved Products List effective at time of bid). Where there is a cost differential between a Preferred Brand item and the other equivalent item, list the equivalent item type, manufacturer, model, item number, and item cost deduction.*

<u>Item Type</u>	<u>Manufacturer/Model/Item Number</u>	<u>Item Cost Deduction</u>

(Deduct) Dollars(\$)

Alternate No. G-2 *(Brief Description)*

(Add) (Deduct) Dollars(\$)

PLUMBING CONTRACT:

Alternate No. P-1 *(Brief Description)*

(Add) (Deduct) Dollars(\$)

HVAC CONTRACT:

Alternate No. H-1 *(Brief Description)*

(Add) (Deduct) Dollars(\$)

ELECTRICAL CONTRACT:

Alternate No. E-1 *(Brief Description)*

(Add) (Deduct) Dollars (\$)

TRENCHLESS PIPE INSTALLATION SUBCONTRACTORS:

Horizontal Directional Drill Subcontractor:

See the General Conditions Article 20 D 3 and Article 35 D.

ATTACHED DOCUMENTS:

The following documents are attached to and made a condition of this Bid:

- Form of Bid Bond or Bid Security
- Socioeconomic Contracting Affidavit
- NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement
- Good Faith Efforts Form
- Table A – Prime Contractor and List of Selected Subcontractors
- Table B – Subcontractor Solicitation List (if required)

UNIT PRICES

Unit prices quoted and accepted shall apply throughout the life of the Contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the scope of the work all in accordance with the Contract Documents. Bidder acknowledges that quantities are approximate only and are given as the basis for comparison of Bids. The Owner may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient. An increase or decrease in the quantity of any item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for in the General Conditions. The quantities shown on the proposal form are for the base bid only unless the contract documents specifically indicate that the item(s), or any portion thereof, are part of an alternate bid element. It is the responsibility of the Contractor to apportion the cost of unit price items to the base bid and any alternates listed in the Proposal using information in the Contract Documents. In the event that the Owner selects an alternate that clearly increases or decreases the estimated quantity of a unit price item shown on the proposal form, after selection of the Contractor, the Contractor shall be provided an updated list of estimated unit price quantities reflective of the alternates chosen. This updated list shall be used in determining any variation between the actual quantities and the estimated quantities of the unit price work. An estimated unit price quantity shall be updated only in the event that the Contract Documents clearly indicate that the unit price item was indeed part of the Owner-selected alternate. The cost for all unit price items shall be included within either the base bid or an alternate, as applicable.

The bidder further proposes and agrees hereby to commence work under this Contract on a date to be specified in a written order of the Designer and shall fully complete all work thereunder within the time specified in the Notice to Bidders. Applicable liquidated damages amount is also stated in the Notice to Bidders (see General Conditions "Time of Completion, Delays, Extension of Time".)

Unit Price Items

Item No.	Description	Unit	Base Bid Quantity	Bid Unit Price
GENERAL WORK				
1	Rehabilitation of Moore Street Pump Station	LS	1	
2	Rehabilitation of Park Avenue Pump Station	LS	1	
3	Rehabilitation of Ninth Street Pump Station	LS	1	
4	Undercut of Unsuitable Soil and Replacement	CY	50	
5	Replacement of Undercut Soil with #57 Stone	CY	50	
6	SCADA Integrator Programming Allowance	EA	1	\$50,000
7	Construction Material Testing (CMT) Allowance (GC Article 30)	EA	1	\$7,000

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said Contract, provide performance and payment bonds, and certificates of insurance within ten (10) consecutive calendar days after being given written notice of the award of Contract, the certified check, cash, or bid bond accompanying this bid shall be paid into the funds of the Owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash, or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

(Name of Firm or Corporation Making Bid)

WITNESS:

By: _____
Signature

(Proprietorship, Partnership, or LLC)

Name: _____
Print or Type

Title: _____
(Owner/Co-Partner/President/Vice President/Manager)

Address: _____

ATTEST:

By: _____

License No. _____

Title: _____
(Corp. Sec. or Asst. Sec. only)

Federal I.D. No. _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5 _____ Addendum No. 7 _____

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 8 _____

FORM OF BID BOND

BIDDER (Name and Address):

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

OWNER:

Brunswick County
P. O. Box 249
Bolivia, NC 28422

BID

BID DUE DATE: _____

PROJECT (Brief Description Including Location):

BOND

BOND NUMBER: _____

DATE: (Not Later than Bid Due Date). _____

PENAL SUM: _____

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms of the Contract Documents, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative. THE CONDITION OF THE ABOVE OBLIGATION is such, that if the Bidder shall be awarded the Contract for which the bid is submitted and shall execute the Contract and give bond for the faithful performance thereof within ten (10)days after the award of same to the Bidder, then this obligation shall be null and void; but if the Bidder fails to so execute such Contract and give performance bond as required by NCGS 143-129, the surety shall, upon demand, forthwith pay to the Owner the penal sum amount set forth above. Provided further, that the bid may be withdrawn as provided by NCGS 143-129.1

BIDDER

SURETY

_____(Seal)
Bidder's Name and Corporate Seal

_____(Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: (1) Above addresses are to be used for giving required notice.

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

SOCIOECONOMIC CONTRACTING AFFIDAVIT

Affidavit of _____
(Name of Bidder)
_____ Project.
(Name of Project)

The Bidder hereby certifies that it understands and agrees that all references to MBE, WBE, DBE, and/or any combination thereof in the NC Division of Water Infrastructure Compliance Supplement and its accompanying forms and affidavits shall be inclusive of small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms.

The Bidder hereby further certifies that, when possible, it has taken steps to ensure that small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms have been considered for the above-named Project, in accordance with 2 C.F.R. § 200.321.

Such consideration includes, without limitation:

- (1) Including the aforementioned business types on solicitation lists;
- (2) Soliciting the aforementioned business types whenever they are deemed eligible as potential sources;
- (3) Dividing procurement transactions into separate procurements to permit maximum participation by the aforementioned business types;
- (4) Establishing delivery schedules (for example, the percentage of an order to be delivered by a given date of each month) that encourage participation by the aforementioned business types;
- (5) Utilizing organizations such as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
- (6) Applying the same consideration to all subcontracts and subcontractors.

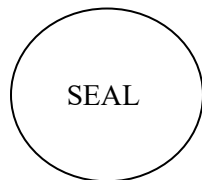
The Bidder hereby agrees to provide any additional information or documentation if requested by the Owner in support of the statements and certifications contained herein.

The Bidder hereby certifies that he or she has read this Affidavit in its entirety, understands its contents, and is authorized to bind the Bidder to the certifications contained herein.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____
Subscribed and sworn to before me this _____ day of _____ 20__.

Notary Public _____

My commission expires _____

NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement Instructions

(This package combines the various aspects of State of NC HUB program requirements and Federal DBE requirements into a single compliance supplement in order to eliminate redundancy and ambiguity)

Item	What to do with it
Good Faith Efforts Form	Provided by all bidders to be responsive Only low bidder's form is submitted to the State
Table A (Summary of firms on job)	Provided by all bidders to be responsive Only low bidder's form is submitted to the State
Table B (per item being subbed)	Provided by low bidder if SRF project or SRP/SEL* that obtains less than 10% M/WBE utilization (see page 2)
Provide documentation of anything you did that is mentioned later in this supplement	- Proof of trade paper advertisement - Printouts of DBE sources used - Solicitation emails and/or letters

NOTES on this Compliance Supplement

Verifiable Goals

- **EPA MBE/WBE participation goals:** MBE 10.9%
WBE 10.4%

These are goals that the State reports against and are not quotas. *The good faith efforts must be adhered to and all forms provided regardless of what percentage utilization is achieved.*

- **State of NC MBE/WBE participation goal:** 10% (combined)

Table B is not required for SRP and SEL projects if you achieve 10% utilization.

DBE (MBE or WBE) Certification

In order for a firm to count towards the goals, a firm must be properly certified. Table A and Table B both provide spaces to note who certified the firm. The North Carolina Department of Administration and North Carolina Department of Transportation are the most common certifications we see listed. Division of Water Infrastructure staff verify all certifications listed.

For SRF projects, please note the EPA's six Good Faith Efforts found in 40 CFR 33

Filling out the Good Faith Efforts Form and providing Table B (if subcontracting is achieved) constitutes compliance with EPA's six good faith efforts.

- (1) Ensure MBE/WBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and local Government recipients, this will include placing MBE/WBEs on solicitation lists and soliciting them whenever they are potential sources.
- (2) Make information of forthcoming opportunities available to MBE/WBEs and arrange time for contracts and establish delivery schedules, where requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
- (3) Consider in the contracting process whether firms competing for large contracts could subcontract with MBE/WBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities in order to increase opportunities for participation by MBE/WBEs in the competitive process.
- (4) Encourage contracting with a consortium of MBE/WBEs when a contract is too large for one of these firms to handle individually.
- (5) Use the services and assistance of the SBA and the MBDA.
- (6) If the prime contractor awards subcontracts, require the prime contractor to take the steps in subparagraphs (1)-(5) of this section.

Pertinent State of North Carolina Administrative Code Regarding M/WBE Compliance. The provisions in this Compliance Supplement constitute compliance with the Rules below.

Owner Requirements	01 NCAC 30I .0306
Contractor Requirements	01 NCAC 30I .0308

Resources

Some sources for identifying MBE/WBE (DBE) firms

- <https://www.ips.state.nc.us/vendor/SearchVendor.aspx> (NCDOA)
- <https://www.ebs.nc.gov/VendorDirectory/default.html> (NCDOT)
- http://dsbs.sba.gov/dsbs/search/dsp_dsbs.cfm (US SBA)

Some sources for finding minority trade papers for potential solicitation advertisements and Federal advertising options

- <http://web.sba.gov/subnet/> (US SBA Subnet advertising website)
- <https://www.mbd.gov/> (US Dept. of Commerce)
- <https://ncadmin.nc.gov/businesses/hub> (NC HUB Office)

Good Faith Efforts Form

Attempts to provide subcontracting opportunities for MBE/WBE firms.

Per 01 NCAC 30I .0101, 50 points must be claimed below by the bidder.

(This is identical to State of NC Affidavit A)

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

Results of Good Faith Efforts Undertaken (you must check one box below)

- ☐ No subcontractors are being used for this contracted work. Fill out Table A listing only the Prime Contractor. (This statement takes the place of State of NC Affidavit B)
- ☐ Subcontractors are being used. Fill out Table A and B for each trade. **Each Table B lists 3.**
- ☐ Subcontractors are being used. If any Table B has fewer than 3 solicitations you must also advertise in an M/WBE trade paper and indicate what source of M/WBE firms you used (*must list at least one*). Some possible papers and sources of M/WBE firms are listed in the Instructions of this Supplement.

Name of the TradePaper: _____

Submit proof of advertisement with package

M/WBE Sources: Source: _____ Source: _____

Submit printouts from M/WBE source(s)

Certification Statement and Affidavit of Contractor.

The below affidavit constitutes compliance with 01NCAC 30I .0308(7)(a) and (b) and takes the place of State of North Carolina Affidavits C and D.

I have read the information in this compliance supplement and all information provided to the State in this package is accurate and true to the extent of my knowledge including the calculated percentages and the good faith efforts presented herein.

Prime Contractor Company Name (Print)

Prime Contractor Representative (Sign & Date)

State of _____, County of _____

Seal

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

Notary Public _____

My Commission Expires _____

Certification of Project Owner/Funding Applicant

Funding Applicant (City, Town, etc.)

Applicant Authorized Representative (Sign & Date)

Division of Water Infrastructure Project Number

Table A: Prime Contractor and list of selected subcontractors

List Prime and ALL of the selected subcontractors (both DBE's and non-DBE's) being used on the project. Each Trade listed on this sheet should have a completed Table B: Subcontract Solicitation List showing the DBE firms contacted and given opportunities to bid.

Company Name (list prime first then subs)	Company Address and Phone	Trade (Above) and Price (Below)	MBE or WBE and certifying agency, <u>if applicable</u>	(State use only) Listed in EPLS as Debarred?
		\$		
		\$		
		\$		
		\$		

- Calculate M/WBE utilization as a percent (00.00%) of the prime contract. Limited to 100% even if the Prime is a DBE.

MBE and WBE subs total	\$	
Prime Contract Price	\$	

_____%

Note: Table A substitutes for both the State of NC "Identification of Minority Participation" form and EPA Form 6100-4.

Table B: Subcontract Solicitation List

Table B is required if:

- 1) Project is Federally funded (SRF) OR;
- 2) Project is a State Reserve Project or State Emergency Loan (SRP or SEL) and Utilization % on Table A is less than 10%
- 3)

Trade: _____ (enter the trade being solicited, paving, hauling etc.)

List the firm being used on the project first. If three MBE or WBE firms are not listed, additional information must be provided showing advertisements and/or sources used to identify MBE/WBE subs.

Use as many of these sheets as are necessary to cover every trade being subbed out.

Company Name	Company Address and Phone	MBE or WBE and certifying agency if applicable.	How was this firm contacted (email, letter, phone) and what was the result of the solicitation?*

*Must submit copies of emails or letters. If phone calls were made, this sheet can serve as documentation of calls.

MBE/WBE (DBE) – Change or Add a Subcontractor Form

According to EPA guidance on 40 CFR 33.302

If a DBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the six good faith efforts described in §33.301 if soliciting a replacement subcontractor.

Please provide the information below **if the subcontracted work in question was included in previously submitted good faith efforts documentation:**

Prime Contractor:

Subcontracted work:

Previous Subcontractor:

Reason this firm did not complete the work:

New subcontractor and DBE status:

☐ MBE

☐ WBE

☐ N/A

If this is a new trade being subcontracted, or was not documented in the original Project Bid Information submittal to the State then good faith efforts to solicit a DBE firm must be documented. As the original DBE instructions indicate, please provide a Table B from those original instructions, showing all the DBE firms contacted to perform this work. If three (3) firms are not listed on Table B, then additionally you must submit proof of an advertisement in a minority trade paper and evidence that there were not three reasonably available firms in the work area. The EPA provides in 33.301(a) that good faith efforts are to be carried out "...to the fullest extent practicable...". If solicitations were not carried out due to being impracticable, please attach this explanation to this form.

Please follow the steps below for new subcontracted work:

Indicate the new trade being subcontracted:

Indicate the firm being used and DBE status:

☐ MBE

☐ WBE

☐ N/A

Attach Table B

(For State Use) Is this sub debarred?

☐ Yes

☐ No

Project Owner/Applicant:

Project Number:

Signature of Prime Contractor's Representative

NOTICE OF AWARD

Dated _____, 20 ____

To: _____
(BIDDER)

Address: _____

Owner: **BRUNSWICK COUNTY**

Owner's Contract No. N/A

Project: _____

(Insert Name of Contract as it Appears in the Construction Documents)

You are hereby notified that your bid dated _____, 20 ____ for the above described project has been considered and has been accepted by the Owner.

The amount of your Contract is: _____
_____ Dollars (\$_____)

Enclosed with this Notice of Award are the following:

Form of Performance Bond, Form of Payment Bond, and Certificate of Insurance.

You must comply with the following conditions precedent within twelve (12) days of the date of this Notice of Award, that is by:
_____, 20_____.

1. You must execute the contract by electronic signature. A DocuSign email with an electronic form of construction contract has been/will be sent to you for electronic signature.
2. You must deliver to the Owner 2 each of the fully executed Performance Bond, Payment Bond, and Form of Insurance. Each of the Documents must bear your signature.
3. List other condition precedents:

None

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

Failure to comply with these conditions within the time specified will entitle Owner to consider your bid in default, to annul this Notice of Award and to declare your Bid Security forfeited.

After you have satisfactorily complied with the above conditions, Owner will return to you a fully signed copy of the Contract.

BRUNSWICK COUNTY

(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

Name: _____ Steve Stone

County Manager
(TITLE)

ACCEPTANCE OF AWARD

(CONTRACTOR)

By: _____
(AUTHORIZED SIGNATURE)

Name: _____

(TITLE)

(DATE)

COPY to ENGINEER
(Use Certified Mail, Return Receipt Requested)

Name:
Address:

NORTH CAROLINA

**CONSTRUCTION OR REPAIR AGREEMENT
[ARPA Funding]**

BRUNSWICK COUNTY

THIS CONSTRUCTION OR REPAIR AGREEMENT (hereinafter referred to as the “Agreement” or “Contract”) is made and entered into by and between Brunswick County, a body politic and corporate of the State of North Carolina, (hereinafter referred to as the “County” or the “Owner”), party of the first part, and {Vendor Name}, (hereinafter referred to as the “Contractor”), party of the second part.

WHEREAS, County has received or will receive an award of federal funds from the State Reserve Program (“SRP”) grant from the American Rescue Plan Act (“ARPA”) (the “SRP-ARPA Funds”) through the North Carolina Department of Environmental Quality (“DEQ”) - Division of Water Infrastructure (“DWI”) as approved under the State Water Infrastructure Authority (“SWIA”); and

WHEREAS, Project Number SRP-W-ARP-0105 has been assigned to the Southport Sewer Lift Station Replacement Project (the “Project”) by DEQ-DWI, which is the basis for this Agreement; and

WHEREAS, the anticipated maximum amount of SRP-ARPA Funds from DEQ-DWI is \$2,800,000, which is expected to fund 100% of the minimum amount of the construction phase of the Project, based on initial cost estimates, excluding proposed alternates, received; and

WHEREAS, in using such SRP-ARPA Funds, County must comply with the DEQ-DWI grant award terms and conditions, the ARPA award terms and conditions applicable to the use of SRP-ARPA Funds, regulations issued by the U.S. Department of the Treasury (“Treasury”) governing the expenditure of monies distributed pursuant to ARPA (including, without limitation, the Interim Final Rule (86 Fed. Reg. 26,786 (May 17, 2021) and Final Rule (87 Fed. Reg. 4,338 (January 27, 2022))), and such other guidance as Treasury has issued or may issue governing the expenditure of monies distributed pursuant to ARPA (collectively, the “Regulatory Requirements”); and

WHEREAS, pursuant to the Regulatory Requirements, County must comply with the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, 2 C.F.R. Part 200, other than such provisions as Treasury has determined or may determine are applicable to the SRP-ARPA Funds; and

WHEREAS, pursuant to 2 C.F.R. § 200.327, County must include within this Agreement applicable provisions described in Appendix II to 2 C.F.R. Part 200, each of which is contained herein; and

WHEREAS, County shall not enter into this Agreement or make any distributions of funds to Provider using the SRP-ARPA absent Provider’s agreement and adherence to each term and condition contained herein.

NOW THEREFORE, the Contractor and the County do mutually agree as follows:

1. DEFINITIONS

Unless otherwise defined herein, capitalized terms shall have the meanings ascribed to them below:

- (1) “Administering Agency” shall have the meaning specified in 41 C.F.R. § 60-1.3.
- (2) “Applicant” shall have the meaning specified in 41 C.F.R. § 60-1.3, which is provided here for ease of reference: (“An applicant for Federal assistance involving a construction contract, or other participant in a program involving a construction contract as determined by regulation of an Administering Agency. The term also includes such persons after they become recipients of such Federal assistance.”).
- (3) “Construction Work” shall have the meaning specified in 41 C.F.R. § 60-1.3, which is provided here for ease of reference: (“[T]he construction, rehabilitation, alteration, conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction.”).
- (4) “Federally Assisted Construction Contract” shall have the meaning specified in 41 C.F.R. § 60-1.3, which is provided here for ease of reference: (“[A]ny agreement or modification thereof between any applicant and a person for construction work which is paid for in whole or in part with funds obtained from the Government or borrowed on the credit of the Government pursuant to any federal program involving a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any federal program involving such grant, contract, loan, insurance, or guarantee, or any application or modification thereof approved by the government of the United States of America for a grant, contract, loan, insurance, or guarantee under which the applicant itself participates in the construction work.”).
- (5) “Laborer” or “Mechanic” shall have the meaning specified in 29 C.F.R. § 5.2(m), which is provided here for ease of reference: (“The term *laborer* or *mechanic* includes at least those workers whose duties are manual or physical in nature (including those workers who use tools or who are performing the work of a trade), as distinguished from mental or managerial. The term *laborer* or *mechanic* includes apprentices, trainees, helpers, and, in the case of contracts subject to the Contract Work Hours and Safety Standards Act, watchmen or guards. The term does not apply to workers whose duties are primarily administrative, executive, or clerical, rather than manual. Persons employed in a bona fide executive, administrative, or professional capacity as defined in part 541 of [Title 40 of the United States Code] are not deemed to be laborers or mechanics. Working foremen who devote more than 20 percent of their time during a workweek to mechanic or laborer duties, and who do not meet the criteria of [Title 40 of the United States Code], are laborers and mechanics for the time so spent.”).
- (6) “Subcontract” shall mean any agreement entered into by a Subcontractor to furnish supplies or services for the performance of this Agreement or a Subcontract. It includes, but is not limited to, purchase orders and changes and modifications to purchase orders.

(7) “Subcontractor” shall mean an entity that receives a Subcontract.

(8) “Tier” shall have the meaning indicated in 2 C.F.R. Part 180 and illustrated in 2 C.F.R. Part 180, Appendix II.

2. PROJECT

The Contractor shall furnish and deliver all materials and perform all work in the manner and form as provided by enumerated plans, specifications and documents, including, without limitation and as applicable: the Invitation to Bid; Notice to Bidders; Instructions to Bidders; General Conditions of the Contract; Supplementary General Conditions; Specifications; Addenda; Accepted Proposal; Notice to Proceed; Performance Bond; Payment Bond; MBE forms; Power of Attorney; Workers’ Compensation, Public Liability, Property Damage and Builder’s Risk Insurance Certificates; Approval by the Board of Commissioners; Tax Statement and Certification; Notice of Substantial Completion; Notice of Final Completion and Acceptance; and Drawings (collectively, the “Bid Documents”) titled:

Project: Southport Lift Station Replacement Project

Consisting of the following sheets **{Sheet Labels}**

dated **{Sheet Date or Dates}**

And the following addenda:

Addendum No. <u>{Addendum No. 1}</u>	Dated: <u>{Date of Addendum No. 1}</u>
Addendum No. <u>{Addendum No. 2}</u>	Dated: <u>{Date of Addendum No. 2}</u>
Addendum No. <u>{Addendum No. 3}</u>	Dated: <u>{Date of Addendum No. 3}</u>
Addendum No. <u>{Addendum No. 4}</u>	Dated: <u>{Date of Addendum No. 4}</u>
Addendum No. <u>{Addendum No. 5}</u>	Dated: <u>{Date of Addendum No. 5}</u>
Addendum No. <u>{Addendum No. 6}</u>	Dated: <u>{Date of Addendum No. 6}</u>

The Bid Documents are incorporated by reference and made an integral part of this Agreement. To the extent the terms of such documents conflict with the terms of this Agreement, the terms of this Agreement shall prevail.

3. TERM OF AGREEMENT; TIME OF COMPLETION; LIQUIDATED DAMAGES

- i. *Term.* Pursuant to Sections 602(c)(1) and 603(c)(1) of ARPA, all Fiscal Recovery Funds must be obligated or costs incurred for the use of such funds between March 3, 2021, and December 31, 2024, and all Fiscal Recovery Funds must be fully expended by December 31, 2026 (hereinafter referred to as the “Period of Performance”). A cost shall be considered to have been incurred if a contract, agreement, or obligation with respect to such cost has been entered into by December 31, 2024. The term of this Agreement begins one (1) business day after approval by the Brunswick County Board of Commissioners (the “Effective Date”) and continues in effect until Final Completion of the Project, as more particularly set forth in the Bid Documents, or the expiration of

the Period of Performance, whichever occurs first, unless the Agreement is sooner annulled or terminated as provided for herein or in the Brunswick County General Conditions of the Contract or Supplementary General Conditions, as applicable.

- ii. *Time of Completion.* Notwithstanding the foregoing, the duration of the Project is expected to be **{Project Duration Number of Days - Alpha} ({Project Duration Number of Days - Numeric})** consecutive calendar days from issuance of a Notice to Proceed by Brunswick County (the "Time of Completion"), unless extended as provided for in the Brunswick County General Conditions of the Contract or Supplementary General Conditions, as applicable. In no event may the term of this Agreement or the Time of Completion extend beyond the expiration of the Period of Performance. **No work may commence under this Agreement until the Agreement has been fully executed by both parties and the County issues a Notice to Proceed.**
- iii. *Liquidated Damages.* There are Liquidated Damages, as defined in the General Conditions of the Contract, associated with this Project. Liquidated Damages shall be in the amount of **One Thousand Eight Hundred and No/100 Dollars (\$1,800.00)** per day for each calendar day beyond the Time of Completion.

4. TERMINATION

This Agreement may be annulled or terminated as set forth herein or in the General Conditions of the Contract or Supplementary General Conditions, as applicable.

5. BRUNSWICK COUNTY GENERAL/SUPPLEMENTARY CONDITIONS OF THE CONTRACT

This Agreement, in addition to any construction documents prepared hereunder, shall be subject to the Brunswick County, North Carolina General Conditions of the Contract (for construction contracts) and any Supplementary General Conditions, as applicable, unless the County directs otherwise. In the event of a conflict between the General Conditions of the Contract, the Supplementary General Conditions, and this Agreement, this Agreement shall govern in all respects.

6. NONAPPROPRIATION

If the Board of County Commissioners does not appropriate the funding needed by the County to make payments under this Agreement for a given fiscal year, the County will not be obligated to pay amounts due beyond the end of the last fiscal year for which funds were appropriated. In such event, the County will promptly notify the Contractor of the non-appropriation, and this Agreement will be terminated at the end of the last fiscal year for which funds were appropriated. No act or omission by the County which is attributable to non-appropriation of funds shall constitute a breach of or default under this Agreement.

7. COMPENSATION

The County agrees to pay the Contractor the total amount of **{Contract Amount - Alpha} Dollars (\$ {Contract Amount - Numeric})** for the Project. Payment shall be subject to additions and deductions as provided in the specifications or Bid Documents. The County shall make monthly progress payments to the Contractor on the basis of a duly certified and approved estimate

of work performed during a given calendar month, less five percent (5%) of the amount of such estimate which is to be retained by the County until all work has been performed strictly in accordance with this Agreement and such work has been accepted by the County. The County shall not require further retainage after fifty percent (50%) of the work has been satisfactorily completed on schedule as more fully set forth in the General Conditions of the Contract or any Supplementary General Conditions, as applicable, included with the Bid Documents. The County shall make full and final payment to the Contractor within thirty (30) days after completion of the Project and acceptance of such work by the County and upon the Contractor's submittal of satisfactory evidence that all payrolls, material bills and other costs incurred in connection with the Project have been paid in full. Notwithstanding the foregoing, the County will not pay late fees on any charges under this Agreement. If the County disputes any portion of the charges, the County shall inform the Contractor in writing of the disputed charges.

8. INDEPENDENT CONTRACTOR

Both the County and the Contractor agree that the Contractor shall act as an independent contractor and shall not represent itself as an agent or employee of the County for any purpose in the performance of its duties under this Agreement. The Contractor represents that it has or will secure, at its own expense, all personnel required in performing the work under this Agreement. Accordingly, the Contractor shall be responsible for payment of all federal, state, and local taxes arising out of its activities in accordance with this Agreement, including, without limitation, federal and state income tax, social security tax, unemployment insurance taxes and any other taxes or business license fees as required. The Contractor shall not be entitled to participate in any plans, arrangements, or distributions by the County pertaining to or in connection with any pension, stock, bonus, profit sharing or other benefit extended to County employees.

In the event the Internal Revenue Service should determine that the Contractor is, according to Internal Revenue Service guidelines, an employee subject to withholding and social security contributions, then the Contractor hereby acknowledges that all payments hereunder are gross payments, and the Contractor is responsible for all income taxes and social security payments thereon.

9. CONTRACTOR REPRESENTATIONS

- (1) The Contractor is a duly organized entity or corporation qualified to do business and in good standing under the laws of the State of North Carolina;
- (2) The Contractor has all requisite corporate power and authority to execute, deliver and perform its obligations under this Agreement;
- (3) No approval, authorization, or consent of any governmental or regulatory authority is required to be obtained or made by it in order for the Contractor to enter into and perform its obligations under this Agreement;
- (4) The Contractor shall not violate any agreement with any third party by entering into or performing the work under this Agreement;
- (5) The Contractor will perform all work in conformity with the specifications and requirements of this Agreement;

- (6) Unless otherwise agreed by the parties, the Contractor agrees that all materials will be new and of good quality;
- (7) The work provided by the Contractor under this Agreement will not violate, infringe, or misappropriate any patent, copyright, trademark, or trade secret rights of any third party, or any other third-party rights (including without limitation non-compete agreements);
- (8) The Contractor will perform the work in a professional and workmanlike manner exercising reasonable care and diligence and will ensure that it adheres to the highest generally accepted standards in the industry when performing said work;
- (9) The Contractor acknowledges that if any specific licenses, certifications, or related credentials are required in its performance of the work, it will ensure that such credentials remain current and active and not in a state of suspension or revocation; and
- (10) The Contractor shall ensure that whenever its employees or agents are on County property, they will strictly abide by all instructions and directions issued by the County with respect to rules, regulations, policies, and security procedures applicable to work on the County's premises. Such rules, regulations, policies, and security procedures shall include, but not be limited to: (i) not possessing any controlled substances; (ii) smoking only in designated smoking areas, if any; and (iii) not possessing weapons, except for weapons possessed by law enforcement officials.

10. NON-ENDORSEMENT AND PUBLICITY

The County is not endorsing the Contractor or its work, and the Contractor is not permitted to reference this Agreement or the County in any manner without the prior written consent of the County. Notwithstanding the foregoing, the parties agree that the Contractor may list the County as a reference in response to requests for proposals and may identify the County as a customer in presentations to potential customers.

11. NON-EXCLUSIVITY

The Contractor acknowledges that the County is not obligated to contract solely with the Contractor for the work covered under this Agreement.

12. DIVESTMENT FROM COMPANIES THAT BOYCOTT ISRAEL

The Contractor hereby certifies that it has not been designated by the North Carolina State Treasurer as a company engaged in the boycott of Israel pursuant to N.C.G.S. § 147-86.80 *et seq.*

13. COMPLIANCE WITH FEDERAL LAWS, REGULATIONS, AND EXECUTIVE ORDERS

This is an acknowledgment that federal financial assistance may be used to fund all or a portion of the Agreement. The Contractor will comply with all applicable federal laws, regulations, executive orders, policies, procedures, and directives.

14. BYRD ANTI-LOBBYING AMENDMENT, 31 U.S.C. § 1352 (AS AMENDED)

- (1) The Contractor certifies to the County, and the Contractor shall cause each Tier below it to certify to the Tier directly above such Tier, that it has not used and will not use federally appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant, or any other award covered by 31 U.S.C. § 1352. The Contractor shall, and shall cause each Tier below it, to disclose any lobbying with non-federally appropriated funds that takes place in connection with obtaining any federal award. Such disclosures (to be set forth on Standard Form-LLL, contained in 31 C.F.R. Part 21, Appendix B) shall be forwarded from Tier to Tier up to the County, which will, in turn, forward the certification(s) to Treasury. The Contractor shall cause the language of this section to be included in all Subcontracts. This certification is a material representation of fact upon which the County has relied when entering into this Agreement, and all liability arising from an erroneous representation shall be borne solely by the Contractor.
- (2) Contractors that bid or apply for a contract exceeding \$100,000 (including this Agreement, if applicable) also must file the required certification with the County.
- (3) The Contractor also shall cause any Subcontractor with a Subcontract (at any Tier) exceeding \$100,000 to file with the Tier above it the required certification.

15. PROCUREMENT OF RECOVERED MATERIALS

- (1) The provisions of this section shall apply if: (1) this Agreement involves the purchase of an item designated by the Environmental Protection Agency (“EPA”) in 40 C.F.R. Part 247 that exceeds \$10,000, or (2) the total value of such designated items acquired during the County’s preceding fiscal year exceeded \$10,000.
- (2) In the performance of this Agreement, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items, as set forth in 40 C.F.R. Part 247, that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, unless the product cannot be acquired –
 - i. Competitively within a timeframe providing for compliance with the Agreement performance schedule;
 - ii. Meeting Agreement performance requirements; or
 - iii. At a reasonable price.
- (3) The Contractor shall establish an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines. Information about this requirement, along with the list of EPA-designated items, is available on EPA’s website and in 40 C.F.R. Part 247.
- (4) The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and

Recovery Act of 1976, as amended (42 U.S.C. 6962). This shall include, without limitation, procuring solid waste management services in a manner that maximizes energy and resource recovery.

- (5) The Contractor should, to the greatest extent practicable and consistent with law, purchase, acquire, or use products and services that can be reused, refurbished, or recycled; contain recycled content, are biobased, or are energy and water efficient; and are sustainable. This may include purchasing compostable items and other products and services that reduce the use of single-use plastic products. See Executive Order 14057, section 101, Policy.

16. PROHIBITION ON CONTRACTING FOR COVERED TELECOMMUNICATIONS EQUIPMENT OR SERVICES

- (1) *Definitions.* Unless otherwise defined in this Agreement, capitalized terms used in this section shall have the meanings ascribed to them below:

- i. *Backhaul* means intermediate links between the core network, or backbone network, and the small subnetworks at the edge of the network (e.g., connecting cell phones/towers to the core telephone network). Backhaul can be wireless (e.g., microwave) or wired (e.g., fiber optic, coaxial cable, Ethernet).
- ii. *Covered Foreign Country* means the People's Republic of China.
- iii. *Covered Telecommunications Equipment or Services* means (a) telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities); (b) for the purpose of public safety, security of federal government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities); (c) telecommunications or video surveillance services provided by such entities or using such equipment; or (d) telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a Covered Foreign Country.
- iv. *Critical Technology* means (1) defense articles or defense services included on the United States Munitions List set forth in the International Traffic in Arms Regulations under subchapter M of chapter I of title 22, Code of Federal Regulations; (2) items included on the Commerce Control List set forth in Supplement No. 1 to part 774 of the Export Administration Regulations under subchapter C of chapter VII of title 15, Code of Federal Regulations and controlled (a) pursuant to multilateral regimes, including for reasons relating to national security, chemical and biological weapons proliferation, nuclear nonproliferation, or missile technology, or (b) for reasons relating to regional stability or surreptitious listening; (3) specially designed and prepared nuclear equipment, parts and components, materials, software, and technology covered by part 810 of title 10,

Code of Federal Regulations (relating to assistance to foreign atomic energy activities); (4) nuclear facilities, equipment, and material covered by part 110 of title 10, Code of Federal Regulations (relating to export and import of nuclear equipment and material); (5) select agents and toxins covered by part 331 of title 7, Code of Federal Regulations; part 121 of title 9 of such Code; or part 73 of title 42 of such Code; or (6) emerging and foundational technologies controlled pursuant to section 1758 of the Export Control Reform Act of 2018 (50 U.S.C. § 4817).

- v. *Interconnection Arrangements* means arrangements governing the physical connection of two or more networks to allow the use of another's network to hand off traffic where it is ultimately delivered (e.g., connection of a customer of telephone provider A to a customer of telephone company B) or sharing data and other information resources.
- vi. *Roaming* means cellular communications services (e.g., voice, video, data) received from a visited network when unable to connect to the facilities of the home network either because signal coverage is too weak or because traffic is too high.
- vii. *Substantial or Essential Component* means any component necessary for the proper function or performance of a piece of equipment, system, or service.
- viii. *Telecommunications Equipment or Services* means telecommunications or video surveillance equipment or services, such as, but not limited to, mobile phones, land lines, internet, video surveillance, and cloud services.

(2) *Prohibitions.*

- i. Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after August 13, 2020, from obligating or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.
- ii. Unless an exception in paragraph (3) of this section applies, the Contractor and its Subcontractors may not use grant, cooperative agreement, loan, or loan guarantee funds (including, without limitation, Fiscal Recovery Funds) received from a federal government to:
 - a. Procure or obtain any equipment, system, or service that uses Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system, or as Critical Technology of any system;
 - b. Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system, or as Critical Technology of any system;
 - c. Enter into, extend, or renew contracts with entities that use Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system, or as Critical Technology as part of any system;
or

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

(3) *Exceptions.*

- i. This clause does not prohibit the Contractor from providing:
 - a. A service that connects to the facilities of a third-party, such as Backhaul, Roaming, or Interconnection Arrangements; or
 - b. Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.
- ii. By necessary implication and regulation, the prohibitions also do not apply to:
 - a. Covered Telecommunications Equipment or Services that:
 - 1. *Are not used* as a Substantial or Essential Component of any system;
and
 - 2. *Are not used* as Critical Technology of any system.
 - b. Other telecommunications equipment or services that are not considered Covered Telecommunications Equipment or Services.

(4) *Reporting requirement.*

- i. In the event the Contractor identifies Covered Telecommunications Equipment or Services used as a Substantial or Essential Component of any system, or as Critical Technology as part of any system, during its performance under this Agreement, or the Contractor is notified of such by a Subcontractor at any Tier or by any other source, the Contractor shall report the information in paragraph ii. of this section to the County, unless procedures for reporting the information are established elsewhere in this Agreement.
- ii. The Contractor shall report the following information pursuant to paragraph (4)i. of this section:
 - a. Within one (1) business day from the date of such identification or notification: The contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

- b. Within ten (10) business days of submitting the information in paragraph (4)ii.a. of this section: Any further available information about mitigation actions undertaken or recommended. In addition, the Contractor shall describe the efforts it undertook to prevent use or submission of Covered Telecommunications Equipment or Services, and any additional efforts that will be incorporated to prevent future use or submission of Covered Telecommunications Equipment or Services.

(5) *Subcontracts*. The Contractor shall insert the substance of this clause, including this paragraph (5), in all Subcontracts and other contractual instruments.

17. DOMESTIC PREFERENCE FOR PROCUREMENTS

As appropriate, and to the extent consistent with law, the Contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to, iron, aluminum, steel, cement, and other manufactured products. The Contractor shall further cause any Subcontractor to include the requirements of this section in any Subcontracts.

For purposes of this clause:

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

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

18. BUILD AMERICA, BUY AMERICA ACT

Contractor and its subcontractors who apply or bid for an award for an infrastructure project subject to the domestic preference requirement in the Build America, Buy America Act ("BABAA") shall file a required certification to the County with each bid or offer for an infrastructure project, unless a domestic preference requirement is waived by the federal government. Contractor and its subcontractors certify that no federal financial assistance funding for infrastructure projects will be provided unless all the iron, steel, manufactured projects, and construction materials used in the project are produced in the United States. BABAA, Pub. L. No. 117-58, §§ 70901-52. Contractor and its subcontractors shall also disclose any use of federal financial assistance for infrastructure projects that does not ensure compliance with BABAA domestic preference requirements. Such disclosures shall be forwarded to the County who, in turn, will forward the disclosures to applicable federal agency. Subrecipients will forward disclosures to the pass-through entity, who will, in turn, forward the disclosures to the applicable federal agency.

19. ACCESS TO RECORDS

- (1) The Contractor agrees to provide the County, the Department of the Treasury, the Treasury Office of Inspector General, the Government Accountability Office, and the Comptroller General of the United States, or any other authorized representatives of

these entities, access to any books, documents, papers, and records (electronic or otherwise) of the Contractor which are directly pertinent to this Agreement for the purposes of making audits, examinations, excerpts, transcriptions, or other investigations.

- (2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
- (3) The Contractor agrees to retain all records covered by this section through December 31, 2031, or such longer period as is necessary for the resolution of any litigation, claim, negotiation, audit, or other inquiry involving this Agreement.
- (4) The Contractor agrees to provide authorized representatives of the federal government access to construction or other work sites pertaining to the work being completed under this Agreement.
- (5) In compliance with Section 1225 of the Disaster Recovery Act of 2018, the County and the Contractor acknowledge and agree that no language in this Agreement is intended to prohibit audits or internal reviews by authorized representatives of the federal government.

20. LICENSE AND DELIVERY OF WORKS SUBJECT TO COPYRIGHT

If the Contractor or its subcontractors produce copyrightable subject matter for the County under this Agreement, the Contractor and its subcontractors shall comply with the obligations set forth in 2 C.F.R. § 200.315(b) and (d). If applicable, the Contractor grants to the County a paid-up, royalty-free, nonexclusive, irrevocable, worldwide license in data first produced in the performance of this Agreement to reproduce, publish, or otherwise use, including prepare derivative works, distribute copies to the public, and perform publicly and display publicly such data. For data required by the Agreement but not first produced in the performance of this Agreement, the Contractor will identify such data and grant to the County, or acquire on its behalf, a license of the same scope as for data first produced in the performance of this Agreement. Data, as used herein, shall include any work subject to copyright under 17 U.S.C. § 102, for example, any written reports or literary works, software and/or source code, music, choreography, pictures or images, graphics, sculptures, videos, motion pictures or other audiovisual works, sound and/or video recordings, and architectural works. Upon or before the termination or expiration of this Agreement, the Contractor will deliver to the County data first produced in the performance of this Agreement and data required by the Agreement but not first produced in the performance of this Agreement in formats acceptable to the County.

21. RIGHTS TO INVENTIONS

- (1) The federal government reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use for “Government purposes,” any subject data or copyright described below. “Government purposes” means use only for the direct purposes of the federal government. Without the

copyright owner's consent, the government may not extend its federal license to any other party.

- i. Any subject data developed under this Agreement, whether or not a copyright has been obtained, and
 - ii. Any rights of copyright purchased by the Contractor using federal assistance funded in whole or in part by the Department of the Treasury.
- (2) Unless Treasury determines otherwise, a Contractor performing experimental, developmental, or research work required as part of this Agreement agrees to permit Treasury to make available to the public either (1) Treasury's license in the copyright to any subject data developed in the course of the Agreement, or (2) a copy of the subject data first produced under the Agreement for which a copyright has not been obtained. If the experimental, developmental, or research work which is the subject of this Agreement is not completed for any reason whatsoever, all data developed under the Agreement shall become subject data as defined herein and shall be delivered as the federal government may direct.
- (3) Unless prohibited by North Carolina law, upon request by the federal government, the Contractor agrees to indemnify, save, and hold harmless the federal government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Contractor of proprietary rights, copyrights, or right of privacy arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under the Agreement. The Contractor shall be required to indemnify the federal government for any such liability arising out of the wrongful act of any employee, official, or agent of the Contractor.
- (4) Nothing contained in this clause shall imply a license to the federal government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the federal government under any patent.
- (5) Data developed by the Contractor and financed entirely without using federal assistance provided by the federal government that has been incorporated into work required by the underlying Agreement is exempt from the requirements herein, provided that the Contractor identifies that data in writing at the time of delivery of the work. The Contractor agrees to include these requirements in each Subcontract for experimental, developmental, or research work financed in whole or in part with federal assistance.
- (6) For the purposes of this section, "subject data" means "recorded information, whether or not copyrighted, . . . that is delivered or specified to be delivered as required by the contract." Examples of "subject data" include, but are not limited to, "computer software, standards, specifications, engineering drawings and associated lists, process sheets, manuals, technical reports, catalog item identifications, and related information, but do not include financial reports, cost analyses or other similar information used for performance or administration of the contract."

22. CONFLICTS OF INTEREST; GIFTS AND FAVORS

- (1) The Contractor understands that: (1) the County will use Fiscal Recovery Funds to pay for the cost of this Agreement, in whole or in part, and (2) the expenditure of Fiscal Recovery Funds is governed by the County's Conflict of Interest Policy, Regulatory Requirements (including, without limitation, 2 C.F.R. § 200.318(c)(1)), and North Carolina law (including, without limitation, G.S. 14-234(a)(1) and -234.3(a)).
- (2) The Contractor certifies to the County that as of the date hereof, to the best of its knowledge after reasonable inquiry, no employee, officer, or agent of the County involved in the selection, award, or administration of this Agreement (each a "Covered Individual"); no member of a Covered Individual's immediate family; no partner of a Covered Individual; and no organization (including the Contractor) which employs or is about to employ a Covered Individual has a financial or other interest in, or has received a tangible personal benefit from, the Contractor. Should the Contractor obtain knowledge of any such interest or any tangible personal benefit described in the preceding sentence after the date hereof, the Contractor shall promptly disclose the same to the County in writing.
- (3) The Contractor certifies to the County that it has not provided, nor offered to provide, any gratuities, favors, or anything of value to an officer, employee, or agent of the County. Should the Contractor obtain knowledge of the provision, or offer of any provision, of any gratuity, favor, or anything of value to an officer, employee, or agent described in the preceding sentence after the date hereof, the Contractor shall promptly disclose the same to the County in writing.

23. ASSURANCES OF COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

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

24. OTHER NON-DISCRIMINATION STATUTES

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

- (1) The Fair Housing Act, Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§ 3601 *et seq.*), which prohibits discrimination in housing on the basis of race, color, religion, national origin, sex, familial status, or disability;

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

25. MISCELLANEOUS

- (1) *Increasing Seat Belt Use in the United States*. Pursuant to Executive Order 13043, 62 Fed. Reg. 19,216 (Apr. 18, 1997), the County encourages the Contractor to adopt and enforce on-the-job seat belt policies and programs for its employees when operating company-owned, rented, or personally owned vehicles.
- (2) *Reducing Text Messaging While Driving*. Pursuant to Executive Order 13513, 74 Fed. Reg. 51,225 (Oct. 6, 2009), the County encourages the Contractor to adopt and enforce policies that ban text messaging while driving.

26. SUSPENSION AND DEBARMENT

- (1) Due to its receipt of Fiscal Recovery Funds, the County is a participant in a nonprocurement transaction (defined at 2 C.F.R. § 180.970) that is a covered transaction pursuant to 2 C.F.R. § 180.210 and 31 C.F.R. § 19.210. Therefore, this Agreement is a lower-Tier covered transaction for purposes of 2 C.F.R. Part 180 and 31 C.F.R. Part 19 if: (1) the amount of this Agreement is greater than or equal to \$25,000 (2 C.F.R. § 180.220(b)(1); 31 C.F.R. § 19.220(b)(1)); (2) the Agreement requires the consent of an official of the Department of the Treasury (2 C.F.R. § 180.220(b)(2); 31 C.F.R. § 19.220(b)(2)); or (3) this Agreement is for federally required audit services (2 C.F.R. § 180.220(b)(3); 31 C.F.R. § 19.220(b)(3)).
- (2) If this Agreement is a covered transaction as set forth above, the Contractor hereby certifies as of the date hereof that the Contractor, the Contractor's principals (defined at 2 C.F.R. § 180.995), and the affiliates (defined at 2 C.F.R. § 180.905) of both the Contractor and the Contractor's principals are not excluded (defined at 2 C.F.R. § 180.935) and are not disqualified (defined at 2 C.F.R. § 180.935). If any of the foregoing persons are excluded or disqualified and the Secretary of the Treasury has not granted an exception pursuant to 31 C.F.R. § 19.120(a), (1) this Agreement shall be void, (2) the County shall not make any payments of federal financial assistance to the Contractor, and (3) the County shall have no obligations to the Contractor under this Agreement.
- (3) The Contractor must comply with 2 C.F.R. Part 180, Subpart C and 31 C.F.R. Part 19 and must include a requirement to comply with these regulations in any lower-Tier

covered transaction into which it enters. This certification is a material representation of fact relied upon by the County, and all liability arising from an erroneous representation shall be borne solely by the Contractor.

- (4) If it is later determined that the Contractor did not comply with 2 C.F.R. Part 180, Subpart C and 31 C.F.R. Part 19, in addition to remedies available to the County, the federal government may pursue available remedies, including but not limited to suspension and/or debarment.

27. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this Agreement.

28. NO OBLIGATION BY FEDERAL GOVERNMENT

The federal government is not a party to this Agreement and is not subject to any obligations or liabilities to the non-federal entity, the Contractor, or any other party pertaining to any matter resulting from the Agreement.

29. SOCIOECONOMIC CONTRACTING

The Contractor is encouraged to take all necessary steps identified in 2 C.F.R. § 200.321(b)(1)-(5) to ensure small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms are considered when possible.

30. WORKERS' COMPENSATION

To the extent required by law, the Contractor shall comply with the North Carolina Workers' Compensation Act and shall provide for the payment of workers' compensation to its employees in the manner and to the extent required by such Act. In the event the Contractor is excluded from the requirements of such Act and does not voluntarily carry workers' compensation coverage, the Contractor shall carry or cause its employees to carry adequate medical/accident insurance to cover any injuries sustained by its employees or agents while fulfilling the Contractor's obligations under this Agreement. The Contractor agrees to furnish the County proof of compliance with said Act or adequate medical/accident insurance coverage upon request.

31. REMEDIES

- (1) *Right to Cover.* If the Contractor fails to commence work on the Project within the time specified, fails to meet any completion date or resolution time specified, fails to perform the work with sufficient workmen, equipment and materials, discontinues the prosecution of the work, performs the work unsuitably, or if the Contractor is otherwise in default under this Agreement, the County may take any of the following actions with or without terminating this Agreement, and in addition to, and without limiting, any other remedies it may have:
 - i. Require the surety to promptly take over and complete the Project in the manner and within the timeframe specified.

- ii. If the surety fails to promptly take over and complete the Project in the manner specified and within fifteen (15) days of being notified by the County to do so, the County may employ such means as it may deem advisable and appropriate to perform itself or obtain the work from a third party until the matter is resolved and the Contractor is again able to resume performance under this Agreement.
 - iii. Deduct any and all expenses incurred by the County in obtaining or performing the work from any money then due or to become due the Contractor and, should the County's cost of obtaining or performing the work exceed the amount due the Contractor, collect the amount due from the Contractor and surety.
- (2) *Right to Withhold Payment.* The County reserves the right to withhold any portion, or all, of a scheduled payment if the Contractor fails to perform under this Agreement until such breach has been fully cured.
- (3) *Setoff.* Each party shall be entitled to set off and deduct from any amounts owed to the other party pursuant to this Agreement all damages and expenses incurred or reasonably anticipated as a result of the other party's breach of this Agreement.
- (4) *Other Remedies.* Upon breach of this Agreement, each party may seek all legal and equitable remedies to which it is entitled. The remedies set forth herein shall be deemed cumulative and not exclusive and may be exercised successively or concurrently in addition to any other available remedy.
- (5) *No Suspension.* In the event that the County disputes in good faith an allegation of breach by the Contractor, notwithstanding anything to the contrary in this Agreement, the Contractor agrees that it will not terminate this Agreement or suspend or limit any work or warranties, unless: (i) the parties agree in writing; or (ii) an order of a court of competent jurisdiction determines otherwise; provided, however, this dispute period shall be limited to ninety (90) days.

32. TAXES

The Contractor shall be responsible for paying all taxes, fees, assessments, and premiums of any kind payable on its employees and operations. The Contractor shall substantiate, on demand by the County, that all taxes and other charges are being properly paid.

33. EQUAL EMPLOYMENT OPPORTUNITY

If this is a Federally Assisted Construction Contract exceeding \$10,000, during the performance of this Agreement, the Contractor agrees as follows:

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for

training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (1) The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.
- (4) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The Contractor will furnish to the Administering Agency, as defined in 41 C.F.R. § 60-1.3, and the Secretary of Labor all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Administering Agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Agreement or with any of the said rules, regulations, or orders, this Agreement may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further federal government contracts or Construction Work in accordance with procedures authorized in Executive Order 11246 of September 24, 1965. Such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (8) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every Subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965,

so that such provisions will be binding upon each Subcontractor or vendor. The Contractor will take such action with respect to any Subcontract or purchase order as the Administering Agency may direct as a means of enforcing such provisions, including sanctions for noncompliance.

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

The County further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted Construction Work: *Provided*, that if the County so participating is a state or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under this Agreement.

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

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

34. COMPLIANCE WITH THE COPELAND "ANTI-KICKBACK" ACT

- (1) *Contractor*. The Contractor and any Subcontractor performing work under this Agreement shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. Part 3, as may be applicable, which are incorporated by reference into this Agreement. The County shall report all suspected or reported violations to Treasury.
- (2) *Subcontracts*. The Contractor or Subcontractor shall insert in any Subcontracts the clause above and such other clauses as Treasury may by appropriate instructions require, and also a clause requiring the Subcontractors to include these clauses in any

lower Tier Subcontracts. The prime contractor shall be responsible for the compliance by any Subcontractor or lower Tier Subcontractor with all of these contract clauses.

- (3) *Breach*. A breach of the Agreement clauses above may be grounds for termination of the Agreement, and for debarment as a contractor and Subcontractor as provided in 29 C.F.R. § 5.12.

35. COMPLIANCE WITH THE DAVIS-BACON ACT

If applicable, the Contractor shall comply with the provisions of 40 U.S.C. §§ 3141-3144 and 3146-3148, as amended, which are set forth below.

Davis-Bacon Act

“(a) The Agency head shall cause or require the contracting officer to insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, Provided, That such modifications are first approved by the Department of Labor):

(1) Minimum wages.

- (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records

accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)

(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all

workers performing work in the classification under this contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
 - (iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- (2) *Withholding.* The federal agency or loan or grant recipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
- (3) *Payrolls and basic records.*
- (i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics

affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)

(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid

the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

- (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.
- (D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.
- (iii) The Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees -

- (i) *Apprentices.* Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in

excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) *Trainees.* Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) *Equal employment opportunity.* The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment

opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

- (5) *Compliance with Copeland Act requirements.* The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
- (6) *Subcontracts.* The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
- (10) *Certification of eligibility.*
 - (i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001."

36. COMPLIANCE WITH THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Compliance with the Contract Work Hours and Safety Standards Act:

- (1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or

she is employed on such work to work in excess of forty (40) hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek.

- (3) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (1) of this section the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, the Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$32 or the current amount statutorily required by 29 C.F.R. § 5.5(b)(2) as may be amended from time to time, for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty (40) hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

- (3) *Withholding for unpaid wages and liquidated damages.*

(i) *Withholding Process.* The recipient or subrecipient may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section, any other federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2 thereof). The necessary funds may be withheld from the Contractor under this Agreement, any other federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the Contractor liability for which the funds were withheld.

(ii) *Priority to withheld funds.* The Department of Labor has priority to funds withheld or to be withheld in accordance with this section, over claims to those funds by:

- (A) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (B) A contracting agency for its procurement costs;
- (C) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (D) A contractor's assignee(s);

(E) A contractor's successor(s); or

(F) A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

(4) *Subcontracts.* The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section. In the event of any violations of these clauses, the prime contractor, and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

(5) *Anti-retaliation.* It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

(i) Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

(ii) Filing any complaint, initiating, or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

(iii) Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

(iv) Informing any other person about their rights under CWHSSA or this part.

Further Compliance with the Contract Work Hours and Safety Standards Act, as applicable:

(1) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid.

(2) Records to be maintained under this provision shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Department of Homeland Security, the Department of Labor, or any other authorized representatives of the federal government, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

36. CREATING GOOD JOBS

Pursuant to Information Bulletin No. 520, as applicable, the Contractor will comply with all applicable federal labor and employment laws. To maximize cost efficiency and quality of work, the Contractor commits to strong labor standards and protections for the project workforce by creating an effective plan for ensuring high-quality jobs and complying with federal labor and employment laws. The Contractor acknowledges applicable minimum wage, overtime, prevailing wage, and health and safety requirements, and will incorporate Good Jobs Principles wherever appropriate and to the greatest extent practicable.

37. CLEAN AIR ACT

- (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 *et seq.*
- (2) The Contractor agrees to report each violation to the County and understands and agrees that the County will, in turn, report each violation as required to Treasury and the appropriate Environmental Protection Agency Regional Office.
- (3) The Contractor agrees to include these requirements in each Subcontract exceeding \$150,000 financed in whole or in part with federal assistance provided by Treasury.

38. FEDERAL WATER POLLUTION CONTROL ACT

- (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq.*
- (2) The Contractor agrees to report each violation to the County and understands and agrees that the County will, in turn, report each violation as required to Treasury and the appropriate Environmental Protection Agency Regional Office.
- (3) The Contractor agrees to include these requirements in each Subcontract exceeding \$150,000 financed in whole or in part with federal assistance provided by Treasury.

37. BUY CLEAN

The County encourages the use of environmentally friendly construction practices in the performance of this Agreement. In particular, the County encourages that the performance of this Agreement include considering the use of low-carbon materials which have substantially lower levels of embodied greenhouse-gas emissions associated with all relevant stages of production, use, and disposal, as compared to estimated industry averages of similar materials or products as demonstrated by their environmental product declaration.

39. COMPLIANCE WITH E-VERIFY PROGRAM

Pursuant to N.C.G.S. § 143-133.3, the Contractor understands that it is a requirement of this Agreement that the Contractor and its Subcontractors must comply with the provisions of Article 2 of Chapter 64 of the North Carolina General Statutes. In doing so, the Contractor agrees that, unless it is exempt by law, it shall verify the work authorization of its employees utilizing the

federal E-Verify program and standards as promulgated and operated by the United States Department of Homeland Security, and the Contractor shall require its Subcontractors to do the same. Upon request, the Contractor agrees to provide the County with an affidavit of compliance or exemption.

40. CONFIDENTIAL INFORMATION

For purposes of this Agreement, the party disclosing Confidential Information is the “Discloser,” and the party receiving Confidential Information is the “Recipient.” “Confidential Information” shall mean any nonpublic information concerning the parties’ respective businesses including, but not limited to, all tangible, intangible, visual, electronic, present or future information such as: (a) trade secrets; (b) financial information, including pricing; (c) technical information, including research, development, procedures, algorithms, data, designs and know-how; (d) business information, including operations, planning, marketing interests and products; and (e) the terms of any agreement between the parties and the discussions, negotiations and proposals related thereto. Confidential Information disclosed to the other party must be clearly identified. Written Confidential Information must be clearly marked in a conspicuous place with an appropriate legend identifying the information as “Confidential.” Confidential Information that is not written must be identified as confidential at the time of disclosure and confirmed in writing delivered to Recipient within fifteen (15) days of disclosure.

The restrictions regarding the use and disclosure of Confidential Information do not apply to information that is:

- (1) in the public domain through no fault of the Recipient;
- (2) within the legitimate possession of the Recipient, with no confidentiality obligations to a third party;
- (3) lawfully received from a third party having rights in the information without restriction, and without notice of any restriction against its further disclosure;
- (4) independently developed by the Recipient without breaching this Agreement or by parties who have not had, either directly or indirectly, access to or knowledge of the Confidential Information;
- (5) disclosed with the prior written consent of the Discloser; or
- (6) required to be disclosed by law, regulation or court or governmental order, specifically including requests pursuant to the Public Records Laws of North Carolina contained in Chapter 132 of the North Carolina General Statutes. In the event Recipient receives such a request, it shall notify Discloser and Discloser shall have the opportunity to defend against production of such records at Discloser’s sole expense.

41. NO ASSIGNMENT WITHOUT CONSENT

Neither party shall assign this Agreement (or assign any right or delegate any obligation contained herein whether such assignment is of service, of payment or otherwise) without the prior written consent of the other party hereto. Any such assignment without the prior written consent of the other party hereto shall be void. An assignee shall acquire no rights, and the County shall not recognize any assignment in violation of this provision.

42. GOVERNING LAW AND VENUE

This Agreement shall be governed by applicable federal law and by the laws of the State of North Carolina without regard for its choice of law provisions. All actions relating in any way to this Agreement shall be brought in the General Court of Justice of the State of North Carolina in Brunswick County or in the Federal District Court for the Eastern District of North Carolina, Wilmington division.

43. DISPUTE RESOLUTION

Should a dispute arise as to the terms of this Agreement, both parties agree that neither may initiate binding arbitration. The parties may agree to non-binding mediation, as more fully set forth in the General Conditions of the Contract.

44. GOVERNMENTAL IMMUNITY

The County, to the extent applicable, does not waive its governmental immunity by entering into this Agreement and fully retains all immunities and defenses provided by law with regard to any action based on this Agreement.

45. NON-WAIVER

Failure by the County at any time to require the performance by the Contractor of any of the provisions of this Agreement shall in no way affect the County's right hereunder to enforce the same, nor shall any waiver by the County of any breach be held to be a waiver of any succeeding breach or a waiver of this Section.

46. ENTIRE AGREEMENT

This Agreement constitutes the entire agreement between the parties with respect to the subject matter herein. There are no other representations, understandings, or agreements between the parties with respect to such subject matter. This Agreement supersedes all prior agreements, negotiations, representations, and proposals, written or oral, related specifically to the Project herein.

47. HEADINGS

The headings in this Agreement are for convenience of reference only and shall not define or limit any of the terms or provisions hereof.

48. SEVERABILITY

The invalidity of one or more of the phrases, sentences, clauses, or sections contained in this Agreement shall not affect the validity of the remaining portion of the Agreement so long as the material purposes of this Agreement can be determined and effectuated. If a provision of this Agreement is held to be unenforceable, then both parties shall be relieved of all obligations arising under such provision, but only to the extent that such provision is unenforceable, and this Agreement shall be deemed amended by modifying such provision to the extent necessary to make it enforceable while preserving its intent.

49. AMENDMENTS

Amendments or changes to this Agreement shall not be valid unless in writing and signed by authorized agents of both the Contractor and the County.

50. NOTICES

(1) *Delivery of Notices.* Unless otherwise specified in the General Conditions of the Contract or any Supplementary General Conditions, as applicable, any notice, consent or other communication required or contemplated by this Agreement shall be in writing, and shall be delivered in person, by U.S. mail, by overnight courier, by electronic mail or by facsimile to the intended recipient at the address set forth below.

(2) *Effective Date of Notices.* Any notice shall be effective upon the date of receipt by the intended recipient; provided that any notice which is sent by facsimile or electronic mail shall also be simultaneously sent by mail deposited with the U.S. Postal Service or by overnight courier.

(3) *Notice Address.*

- a. Communications that relate to any breach, default, termination, amendment, or waiver of any provision of this Agreement shall be sent to:

For the County: Brunswick County Attorney
P.O. Box 249
Bolivia, NC 28422

With a copy to: {County Contact for Notices}
{County Contact Title}
{Contact Address}
{Contact City}, {Contact State} {Contact Zip}

- b. Communications that relate to any delay in performance, prevention of performance, modification or extension of this Agreement shall be sent to:

For the County: {County Contact for Notices}
{County Contact Title}
{Contact Address}
{Contact City}, {Contact State} {Contact Zip}

c. All communications to the Contractor shall be sent to:

For the Contractor: {Vendor Name}
{Vendor Address}
{Vendor City}, {Vendor State or Territory} {Vendor Zip}

51. SIGNATURES

This Agreement, together with any amendments or modifications, may be executed in one or more counterparts, each of which shall be deemed an original and all of which shall be considered one and the same agreement. This Agreement may also be executed electronically. By signing electronically, the parties indicate their intent to comply with the Electronic Commerce in Government Act (N.C.G.S § 66-58.1 *et seq.*) and the Uniform Electronic Transactions Act (N.C.G.S § 66-311 *et seq.*). Delivery of an executed counterpart of this Agreement by either electronic means or by facsimile shall be as effective as a manually executed counterpart.

ATTEST:

BRUNSWICK COUNTY

Clerk to the Board /
Deputy Clerk to the Board

By: _____
Chairman, Board of Commissioners

Date: _____

[SEAL]

{VENDOR NAME}

By: _____

Printed Name: _____

Title: _____

Date: _____

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

Aaron C. Smith, Finance Director
Brunswick County, North Carolina

Date: _____

APPROVED AS TO FORM

Bryan W. Batton, County Attorney /
Ryan S. King, Assistant County Attorney

Date: _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal:
(Contractor) _____

Name of Surety: _____

Name of Contracting
Body: Brunswick County

Amount of Bond: _____

Project: _____

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, identified as 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 modifications of said 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.

IN WITNESS WHEREOF, the above-bounden 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.

Executed in 2 counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. Only)

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

(Name and Address – Surety Agency)

(Surety Company Name and N.C.

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp.
Pres. Or Vice Pres. Only)

(Surety Company)

By: _____

Title: _____
(Attorney-in-Fact)

(Surety Corporate Seal)

FORM OF PAYMENT BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal:
(Contractor) _____

Name of Surety: _____

Name of Contracting
Body: Brunswick County

Amount of Bond: _____

Project: _____

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 identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said Contract, and any and all duly authorized modifications of said 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.

IN WITNESS WHEREOF, the above-bounden 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.

Executed in 2 counterparts.

Do not submit with bid

Do not submit with bid

Do not submit with bid

Do not submit with bid

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

Title: _____
(Corp. Sec. or Asst. Sec. Only)

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

(Name and Address – Surety Agency)

(Surety Company Name and N.C.
Regional or Branch Office Address)

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp.
Pres. Or Vice Pres. Only)

(Surety Company)

By: _____

Title: _____
(Attorney-in-Fact)

(Surety Corporate Seal)

BRUNSWICK COUNTY MINIMUM INSURANCE COVERAGE REQUIREMENTS

At contractor's expense, contractor shall procure and maintain the following recommended lines of insurance according to the scope of work. The County may choose to elect higher or lower coverages according to the work performed. Contractors must be insured by a licensed agent in North Carolina and rated A-VII or better by A.M. Best.

A. COMMERCIAL GENERAL LIABILITY Covering all operations involved in this Agreement.

\$2,000,000	General Aggregate
\$2,000,000	Products/Completed Operations Aggregate
\$1,000,000	Each Occurrence
\$1,000,000	Personal and Advertising Injury Limit
\$ 5,000	Medical Expense Limit

B. WORKERS' COMPENSATION

Statutory limits covering all employees, including Employer's Liability with limits of:

\$500,000 Each Accident
\$500,000 Disease - Each Employee
\$500,000 Disease - Policy Limit

C. COMMERCIAL AUTOMOBILE LIABILITY

\$1,000,000 Combined Single Limit – Any Auto

D. PROFESSIONAL LIABILITY

\$1,000,000 Per Occurrence

E. POLLUTION LIABILITY INSURANCE

\$1,000,000 Per Occurrence

When a contractor is required to bind pollution/environmental coverage, the contractor must provide evidence of continuation or renewal of liability insurance for a period of three (3) years following termination of the agreement.

ADDITIONAL INSURANCE AND INDEMNIFICATION REQUIREMENTS

- A. Contractor agrees to defend, indemnify, and hold harmless Brunswick County, its officers, employees, and agents from and against any and all losses, penalties, damages, settlements, costs, charges, professional fees, or other expenses or liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this Agreement and/or the performance hereof that are due in part or in the entirety of Contractor, its employees or agents. Contractor further agrees to investigate, handle, respond to, defend, and dispose of same at its sole expense and agrees to bear all other costs and expenses related thereto.

The Contractor's General Liability policy shall be endorsed, specifically or generally, to include the following as Additional Insured: BRUNSWICK COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED UNDER CONTRACTOR'S GENERAL LIABILITY INSURANCE.

Before commencement of any work or event, Contractor shall provide a Certificate of Insurance in satisfactory form as evidence of the insurances required above.

- B. Contractor shall have no right of recovery or subrogation against Brunswick County (including its officers, agents, and employees), it being the intention of the parties that the insurance policies so affected shall protect both parties and be primary coverage for any and all losses covered by the above-described insurance.
- C. Brunswick County shall have no liability with respect to Contractor's personal property whether insured or not insured. Any deductible or self-insured retention is the sole responsibility of Contractor.
- D. All certificates of insurance must provide that the policy or policies shall not be changed or cancelled without at least thirty (30) days prior written notice.
- E. The Certificate of Insurance should note in the Description of Operations the following: Department: _____
Contract #: _____
- F. Insurance procured by Contractor shall not reduce nor limit Contractor's contractual obligation to indemnify, hold harmless and defend Brunswick County for claims made or suits brought which result from or are in connection with the performance of this Agreement.
- G. In the event Contractor receives Notice of Cancellation of Insurance required pursuant to this Agreement, Contractor shall immediately cease performance of all services and shall provide Notice to Brunswick County's Legal/Risk Management personnel within twenty-four (24) hours.
- H. Certificate Holder shall be listed as follows:
ATTENTION: Brunswick County Risk Manager
30 Government Center Dr. NE
P. O. Box 249
Bolivia, NC 28422
- I. If Contractor is authorized to assign or subcontract any of its rights or duties hereunder and in fact does so, Contractor shall ensure that the assignee or subcontractor satisfies all requirements of this Agreement, including, but not limited to, maintenance of the required insurances coverage and provision of certificate(s) of insurance and additional insured endorsement(s), in proper form prior to commencement of services.

CERTIFICATE OF INSURANCE (Workmen's Compensation and Liability)

This certificate of insurance neither affirmatively nor negatively amends, extends, or alters the coverage afforded by the policy(ies) listed on this certificate.

Project _____ Location _____

Owner Brunswick County Address P. O. Box 249; Bolivia, NC 28422

Contractor (Insured) _____ Address _____

The undersigned hereby certifies that the following policies, subject to their terms, conditions, and exclusions have been issued by the named companies to the above insured and are presently in full force and effect:

A. WORKMEN'S COMPENSATION:

Policy No. _____ Expiration Date _____

Insurance Co. _____ Address _____

COVERAGE: Statutory Workmen's Compensation. Employers Liability Limit \$ _____ Each Accident.

Locations Covered: _____

B. COMPREHENSIVE GENERAL LIABILITY & PROPERTY DAMAGE:

Policy No. _____ Expiration Date _____

Insurance Co. _____ Address _____

LIMITS:

Bodily Injury, including Personal Injury.

\$ _____ Each Person

\$ _____ Each Occurrence

\$ _____ Aggregate

Property Damage \$ _____ Each Occurrence

\$ _____ Aggregate

Other _____

COVERAGE PROVIDED (Check Applicable Squares):

	Yes	No	Property Damage Liability Includes:	Yes	No
Premises Operations	☐	☐	Damage Due to Blasting (explosion)	☐	☐
Subcontractor Operations	☐	☐	Damage Due to Collapse	☐	☐
Personal Injury	☐	☐	Damage to Underground Facilities	☐	☐
Completed Operations	☐	☐	Broad Form Property Damage:	☐	☐
Contractual Liability (Per Spec)	☐	☐	Operations of Contractor	☐	☐
Other _____	☐	☐	Contractual	☐	☐

C. COMPREHENSIVE AUTOMOBILE LIABILITY & PROPERTY DAMAGE:

Policy No. _____ Expiration Date _____

Insurance Co. _____ Address _____

LIMITS:

Bodily Injury

\$ _____ Each Person

\$ _____ Each Occurrence

\$ _____ Aggregate

Property Damage \$ _____ Each Occurrence

\$ _____ Aggregate

Other _____

COVERAGE PROVIDED - for operation of all owned, non-owned, and hired vehicles.

D. UMBRELLA EXCESS LIABILITY:

Policy No. _____ Expiration Date _____

Insurance Co. _____ Address _____

LIMITS: Single Limit Bodily Injury and Property Damage \$ _____ Each Occurrence.

COVERAGE PROVIDED - applies in excess of the coverages listed above for Employer's Liability, Comprehensive General, Automotive, and Property Damage Coverage.

The undersigned further certifies that in the event of cancellation or any material change in any of the above policies, thirty (30) days prior written notice of such cancellation or change shall be delivered by registered or certified mail to the above Owner.

BRUNSWICK COUNTY, ITS OFFICERS, AGENTS AND EMPLOYEES ARE INCLUDED AS ADDITIONAL INSURED UNDER CONTRACTOR'S GENERAL LIABILITY INSURANCE

Name of Agency _____

Address _____

Date _____

By _____

NOTICE TO PROCEED

Dated _____, 20 ____

To: _____
(CONTRACTOR)

Address: _____

Owner: **BRUNSWICK COUNTY**

Owner's Contract No. N/A

Project: _____

(Insert Name of Contract as it Appears in the Construction Documents)

You are notified that the Contract times under the above Contract will commence to run on:
_____.

By that date, you are to start performing your obligations under the Contract Documents. Your Contract completion date is therefore:_____.

The Contract provides for the assessment of liquidated damages for each consecutive calendar day that the work remains incomplete after the above established completion date.

Before you may start any Work at the site, you must deliver the required certificates of insurance to the Owner.

Also, before you may start any Work at the site, you must: (add other requirements)

ACCEPTANCE OF NOTICE TO PROCEED

Receipt of this Notice to Proceed is hereby acknowledged and accepted.

(CONTRACTOR)

By: _____
(AUTHORIZED SIGNATURE)

Name: _____

(TITLE)

Brunswick County
(OWNER)

By: _____
(AUTHORIZED SIGNATURE)

Name: _____

(TITLE)

***Minority Business Enterprise (MBE) Documentation for Contract Payments
Brunswick County***

Project Name: _____

Period: From _____ **to** _____.
(1st day of month to last day of month)

Designer: _____

Contractor: _____

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

MBE FIRM NAME	* INDICATE TYPE OF MBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

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

Date: _____

Approved/Certified By: _____
(Contractor) Name

Title

Signature

CONTRACTOR TO SUBMIT WITH EACH REQUEST FOR PAYMENT & REQUEST FOR FINAL PAYMENT

Project:

Date:

Brunswick County

Contractor Submittal

Submittal #: _____

ATTENTION:

TO (Designer):

ADDRESS:

ATTENTION:

FROM (Contractor):

ADDRESS:

WE ARE SENDING YOU:

Attached



First Submittal



Re-submittal # _____



Shop Drawings



O&M Manuals



Specifications



Samples



Or-Equal Item Substitution Item



Other _____

MANUFACTURER	COPIES	SPEC. SECTION #	SCHEDULED SUBMITTAL DATE	DESCRIPTION

THESE ARE TRANSMITTED AS CHECKED BELOW:



For approval



For your use



As Requested



For review and comment

“I certify that I have reviewed the Contract Documents and that the information herein submitted meets the requirements outlined in the Contract Documents except as specifically stated on this submittal form.”

(Affix Contractor's Stamp of Approval Above)

REMARKS (Include any exceptions to the Contract Documents):

COPY TO:

SIGNED:

Project:
Date:
Brunswick County

Request for Information (RFI)

RFI #: _____

ATTENTION: _____

TO (Designer): _____

ADDRESS: _____

ATTENTION:	
FROM (Contractor):	
ADDRESS:	

ATTACHED TO THIS RFI FORM, WE ARE SENDING YOU:

 First Submittal

 Re-submittal # _____

 Annotated Shop Drawings

□ Annotated Specifications

 Samples

Sketches

Other _____

☐ Other _____

AFFECTED DRAWINGS:

AFFECTED SPECIFICATIONS:

REQUEST (Describe specific issue and include supporting material - annotated drawings, specifications):

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

COPY TO: _____

SIGNED: _____

(Contractor)

***Directive/Written Notice/Correspondence/Order/Minor Change in the Work
Brunswick County***

Date:_____ **Time:**_____ **a.m./p.m.** **Project Name:**_____

Designer:_____ **Contractor:**_____

Designer Rep:_____ **Contractor Rep:**_____

In accord with the Article “Construction Supervision” of the General Conditions, the Contractor, by signing below, 1) acknowledges receipt of this correspondence, and 2) acknowledges that, unless noted otherwise under Contractor’s comments, he/she agrees that the correspondence contained herein does **not** constitute a “Change In The Work” or an “Extra Cost” (as defined in the General Conditions) that would require additional compensation or an extension of the Contract time.

Contractor’s Comments:

(The Contractor is directed to the General Conditions when making “Claims for Extra Cost.” If the Contractor views instructions from the Designer as requiring additional compensation or an extension of the Contract time, the contractor shall not proceed with the work affected until further advised.)

Signature/Date:_____ **Print Name:**_____

Representing:_____ **Position:** _____

*Work Change Directive
Brunswick County*

Date:_____Time:_____a.m./p.m. Project Name:_____
Designer:_____Contractor:_____
Designer Rep:_____Contractor Rep:_____

Directive:

Reason for Change:

The preceding directive requires the following actions by the Contractor before
(Date):

CONTRACTOR:

The total lump sum cost for the change noted above shall not exceed \$_____.

OR

The estimated quantities, maximum unit prices, and maximum extended prices for each item are as follows:

<u>Item</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Extended Price</u>
-------------	---------------------------	-------------------	-----------------------

The total change to the Time of Completion shall be an i n c r e a s e /decrease of_____days.

DESIGNER:

The work change noted above is in the best interests of the owner. The price and Contract Time adjustment have been evaluated and are reasonable. The changes will be affected by a final adjusting change order at the close of the project **or** by_____ (date), whichever is sooner.

OWNER:

The Owner agrees to the change as being in the Owner's best interest.

SIGNATURES:

Contractor

Date

Designer

Date

Owner

Date

Original Designer

Yellow Contractor

Pink Owner

***Change Proposal
Brunswick County***

Date:_____ **Project Name:**_____
Designer:_____ **Contractor:**_____
Designer Rep:_____ **Contractor Rep:**_____

The Contractor recommends the following change to the project with associated changes to the Time of Completion and/or total project cost:

This change will: ADD SUBTRACT NOT CHANGE (circle as appropriate) the total project cost by \$_____.

The total change to the Time of Completion shall be an: INCREASE DECREASE (circle as appropriate) of _____ days.

A breakdown of the proposed work is attached. No work shall be commenced until authorized by the Owner. All work shall be in accordance with the terms, stipulations, and conditions of the Contract Documents.

SIGNATURES:

Contractor

Date

Designer's Action: ☐ Recommend ☐ Do Not Recommend
 ☐ Recommend with the following changes

Designer

Date

BRUNSWICK COUNTY
CHANGE ORDER NO.

FOR BC USE ONLY

- ☐ OR Owner Request
- ☐ CR Contractor Request
- ☐ DR Designer Request
- ☐ CC Concealed Condition
- ☐ DE Design Error
- ☐ DO Design Omission
- ☐ SC Schedule Change
- ☐ OT Other

PROJECT:
ORIG. TIME OF COMP.
ORIG. DATE OF COMP.

CAUSE CODE:

Under the terms of the Contract and without invalidating the original provisions thereof, the following change(s) in work is(are) authorized for the change in Contract amount herein set forth: (Description of change order with detailed breakdown attached)

The Time of Completion including previous orders is _ calendar days and shall be (increased) (decreased) (unchanged) by calendar days by this change order for a revised Contract date of completion of _____. (Detailed analysis supporting the requirements for a change in duration is attached)

CONTRACT COST SUMMARY					TOTALS
1. Original Contract Amount					\$
2. Amount of Previous Orders	ADD	\$0	Deduct	\$0	
3. Amount of This Order:	ADD	\$0	Deduct	\$0	
4. Total additions lines 2 & 3			Minus Total Deducts:	\$0	\$
(Line 4 shall show the net amount to be added or [deducted] from the original Contract amount.)					
5. Revised Contract Total Amount					\$

I certify that my Bonding Company will be notified forthwith that my Contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety.

_____	By:	_____	_____
(Contractor)			(Date)
_____	By:	_____	_____
(Designer)			(Date)
_____	By:	_____	_____
(Owner)			(Date)
_____	By:	_____	_____
(County Commissioners)		Chairman	(Date)

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

Approved as to Form

Brunswick County Finance Officer

Brunswick County Attorney

DISTRIBUTION: 1 original to Owner 1 original to Contractor

DESIGNER'S REQUEST FOR AUTHORIZATION TO CHANGE

DATE:

REQUEST NO.:

PROJECT NAME:

OWNER:

CONTRACTOR:

DESIGNER:

CONTRACT FOR:

REASON FOR CHANGE:

SUMMARY REVIEW OF CONTRACTOR'S ESTIMATE FOR TIME AND COST: (Attach Contractor's detailed cost breakdown of labor and materials)

DESIGNER SUMMARY:

1. Schedule items affected by this change:
2. Can Contractor mitigate the change without requiring a Contract time extension?
3. Will the change require a Contract time extension for other Contractors? Which?
4. Are additional costs indicated by reason of the time extension If so they must be included in 5 & 6 Below.

	<u>CONTRACTOR'S ESTIMATE</u>	<u>DESIGNER'S ESTIMATE</u>
5. Estimated cost of change:	_____	_____
6. Estimated time extension field cost (if any):	_____	_____

DESIGNER RECOMMENDATION AND CERTIFICATION:

I certify that I have reviewed all aspects of this change order and have determined that it is in the best interest of the Owner to have the work accomplished. I have also determined that the cost and time allotment are fair and equitable, and I recommend acceptance by the Owner.

Approved by: _____ Date: _____

Title: _____

**Request for Payment
Brunswick County**

Project Name: _____

Period: From _____ **to** _____
(1st day of month to last day of month)

Designer: _____

Contractor: _____

Contract Value as Awarded: \$ _____

Time of Completion as Awarded: _____ days

Date of Completion as Awarded: _____

CHANGE ORDERS: Amount Days

#1 \$ _____

#2 \$ _____

#3 \$ _____

#4 \$ _____

Total Change Orders: \$ _____

Adjusted Contract Value: \$ _____

PREVIOUS PAYMENTS AUTHORIZED

Req.	Payment Authorized	Req.	Payment Authorized
#1	_____	#9	_____
#2	_____	#10	_____
#3	_____	#11	_____
#4	_____	#12	_____
#5	_____	#13	_____
#6	_____	#14	_____
#7	_____	#15	_____
#8	_____	#16	_____

The undersigned Contractor certifies that 1) all previous progress payments received from Owner on account of work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; 2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such liens, security interests, or encumbrances); 3) all Work covered by this Request for Payment is in accordance with the Contract Documents and is not defective; and 4) that, to the best of his knowledge, the estimate is correct, due, and unpaid.

Certified By: _____
Contractor Date

Reviewed By: _____
Resident Project Representative Date

Reviewed By: _____
Designer Date

Approved By: _____
Brunswick County Date

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

Total Value of Completed Work	\$	_____
5% Retained	-	\$ _____
95% of Material on Hand	+	\$ _____
Liquidated Damages _____ Days _____/Days	-	\$ _____
Net Total	=	\$ _____
Previous Payments	-	\$ _____
Total Due This Payment	=	\$ _____

To Be Completed by Designer:

Record Drawings are complete & Up to Date:	YES - NO
Monthly Rain Day Record Submitted:	YES - NO
Erosion Control Documentation Submitted:	YES - NO
MBE Document. for Contract Payments Submitted:	YES - NO
Updated Schedule Submitted:	YES - NO
Tax Statement & Certification Submitted:	YES - NO
Status Report Submitted:	YES - NO

Aaron Smith, Finance Officer
Brunswick County, North Carolina

***Rain Day Record
Brunswick County***

Project Name: _____ **Period: From** _____ **to** _____.
(1st Day of month to last day of month)

Designer: _____ **Contractor:** _____

Designer Rep: _____ **Contractor Rep:** _____

The Contractor shall submit this form with each pay request. Extension of the Time of Completion shall be made in accordance with the Article "Time of Completion, Delays, Extension of Time" in the General Conditions. Rain days noted on this form shall be used as a means of determining the validity of requests for extensions to the Time of Completion but shall not be construed to mean that all days herein itemized shall lead to an extension of the Time of Completion. Time extensions shall not be granted for rain, wind, snow, or other natural phenomena of normal intensity.

☐ "During the normal work days of this period, no delays were incurred due to rain or wet conditions at the site."

OR

☐ "During the normal work days of this period, no substantial work could be performed on the project due to rain or wet conditions during the following days":

_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____

_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____
_____, 20____

SIGNATURES:

Contractor

Date

Inspector Comments (Note agreement/disagreement): _____

Resident Inspector

Date

BRUNSWICK COUNTY
PERIODIC PAYMENT TAX CERTIFICATION
COUNTY SALES AND USE TAX

CONTRACTOR: _____

Page _____ of _____

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
CONTRACTOR							
SUBCONTRACTOR(S)*							
COUNTY TOTAL							

* Attach subcontractor(s) report(s)

NOTE: Totals above must balance with Detail Sheet(s)

I certify that the above figures include only tax paid on supplies, materials, fixtures, and equipment that actually became a part of or annexed to the constructed facilities. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20____

Signed

Notary Public

My Commission Expires: _____

Print or Type Name of Above

Seal

NOTE:

This certified statement may be subject to audit

BRUNSWICK COUNTY
PERIODIC PAYMENT ITEMIZED TAX STATEMENT
COUNTY SALES AND USE TAX

CONTRACTOR: _____

Page_____of_____

SUBCONTRACTOR _____

FOR PERIOD: _____

PROJECT: _____

[illegible]

* If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.

**BRUNSWICK COUNTY FINAL
TAX CERTIFICATION
COUNTY SALES AND USE TAX**

CONTRACTOR: _____

Page _____ of _____

PROJECT: _____

DATE: _____

PERIODIC PAYMENT NUMBER AND PERIOD END DATE	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
#							
#							
#							
#							
#							
#							
#							
#							
#							
#							
#							
#							
COUNTY TOTAL							

NOTE: Attach each Periodic Payment Tax Certification Sheet. (Totals above must balance with Periodic Payment Tax Certifications).

I certify that the above figures include only tax paid on supplies, materials, fixtures, and equipment that actually became a part of or annexed to the constructed facilities. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 20____

Signed

Notary Public

My Commission Expires: _____

Seal

Print or Type Name of Above

NOTE: This certified statement may be subject to audit

***Certificate of Substantial Completion
Brunswick County***

Date:_____ **Project Name:**_____.

Designer:_____ **Contractor:**_____.

This Certificate of Substantial Completion Applies to:

☐ All work under the Contract Documents: ☐ The following specific portions:

Date of Substantial Completion

The Work performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared.

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance, and warranties shall be provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Responsibilities:

Contractor's Responsibilities:

The following documents are attached to and made part of this certificate:

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

Engineer	Date
Contractor	Date
Owner	Date

Contractor's Affidavit of Release of Liens
Brunswick County

State of _____

County of _____

_____, _____
(Name) (Title)

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

1. The undersigned is authorized to execute this Affidavit, Release, and Waiver of Claim on behalf of the Contractor and has personal knowledge of all facts set forth herein;
2. This Affidavit, Release, and Waiver of Claim is made concerning the construction of the following project _____;
3. All payrolls, material bills, sales tax, social security, state and federal unemployment insurance, and all other liabilities and taxes owed by the Contractor and arising in any manner from the above-described Project have been paid in full;
4. No claim or lien exists in favor of any supplier of materials or labor or in favor of any Subcontractor furnishing materials or labor on the above-described Project;
5. Notwithstanding the foregoing, if the Owner or property of the Owner is subjected to any claim or lien which arises in any manner from the failure of the Contractor to pay any liability described above, the Contractor will indemnify and hold the Owner harmless for any amount which the Owner is required to pay to discharge such lien or settle such claim and further will pay the Owner's expenses, costs, and attorney fees incurred in connection therewith;
6. All claims, suits, and proceedings of every name, description, or nature as arising out of the Project against the Owner, its officers, employees, and agents have been settled;
7. The Contractor releases and waives any and all claims of every type and description which the Contractor may have against the Owner arising in any manner from the construction of the above-described Project.

Title _____

Sworn to and subscribed before me this the _____ Date _____

_____ day of _____, 20____.

Notary Public

My Commission expires: _____

Technical Specification 001

DEFINITIONS AND TERMS

1.0 General

- a) The intent of this specification is to explain and define certain terms and phrases that appear in the Brunswick County Engineering Design Manual, Technical Specifications, and Standard Details for Water and Sewer Systems (hereinafter "Design Manual").
- b) For a Brunswick County Capital Improvement Program (CIP) project, Article 1 of the Brunswick County General Conditions of the Contract (hereinafter "General Conditions") shall be the official definition of terms. This technical specification is intended to be a guide to language in the Design Manual and therefore complimentary to Article 1 of the General Conditions, and in the case of any conflict between this specification and Article 1 of the General Conditions, this specification shall be subordinate to Article 1 of the General Conditions.

2.0 Interpretation of Certain Terms and Words

- a) Except as specifically defined herein all words used in these Technical Specifications have their customary dictionary definitions. For the purposes of these Technical Specifications certain words or terms used herein are hereby defined as follows:
- b) Words used in the present tense include the future tense. Words used in the singular include the plural and words used in the plural include the singular. Words used in the masculine include the feminine also.
- c) The word "shall" is always mandatory
- d) The word "may" is permissive
- e) The word "lot" includes the word "plat" or "parcel"
- f) The word "person" includes a firm, association, organization, partnership, trust company, limited liability company, or corporation as well as an individual.

3.0 Definitions

AASHTO:	American Association of State Highway and Transportation Officials.
AHJ:	Authority Having Jurisdiction.
ANSI:	The latest edition of Standards published by the

ASTM:	American National Standards Institute. The latest edition of Standards published by the American Society of Testing and Materials.
AWWA:	American Water Works Association.
Cleanout:	An access point for a gravity sewer service lateral to be used for inspection and maintenance purposes by County staff or licensed plumbers.
Clearing & Grubbing:	The removal and disposal of all trees, root mat, roots, logs, shrubs, grass, weeds, fallen timber and any other litter or surface debris such as, but not limited to, fences, steps, walls, chimneys, column footings, other footings, foundation slabs, basements, other foundation components, sign, junked vehicles, and other rubble and debris, which occur within areas designated as Easements, Limits of Disturbance, or clearing limits, as shows on the Contract Drawings. The more expansive limits shown on the drawings shall define the area to be cleared and grubbed unless otherwise note as an undisturbed area. All areas cleared and grubbed shall be left in a condition to meet the requirements of Brunswick County Technical Specification TS 025: Landscaping. The word clearing shall be interchangeable with clearing and grubbing.
Contractor:	A person or business entity legally licensed by the State of North Carolina Licensing Board for General Contractors; to perform installation, repairs, and connections to County water and sewer systems. The license holder must also have the Underground Utilities designation in addition to a General Contractor license.
County:	Brunswick County.
Customer:	Any person, firm, association, business, or governmental agency that receives water and / or sewer service from Brunswick County Public Utilities.
Density:	The number of habitable structures per acre, or number of bedrooms per development, used to calculate water and waste water flow rates.
Design Manual:	This <u>Brunswick County Engineering Design</u>

Manual, Technical Specifications, and Standard Details for Water and Sewer Systems.

Developer:	Any person, firm, corporation, or other legal entity improving property for commercial, industrial, or residential purposes.
Drawings:	All plans, profiles, maps, or other drawings that show the location, character, dimensions, and details of the work produced by an Engineer.
Design Work:	Work produced by a Professional Engineer for a developer or the County related to the installation of water, sewer, or stormwater infrastructure.
DWQ:	Division of Water Quality (a division of NCDEQ).
Easement:	Legal rights conveyed by a Grantor to a Grantee to any person, firm, corporation or public entity for the use of a strip or parcel of land for a specified purpose; fee simple land ownership rights do not convey with an easement.
EJCDC:	Engineers Joint Contract Documents Committee.
Engineer:	A person registered as a Professional Engineer by the North Carolina Board of Registration for Engineers and Land Surveyors (the Board) in one of the approved fields of licensure by the Board and qualified to design and permit water transmission and distribution, sewer collection, pump stations, water treatment, wastewater treatment, stormwater, streets, curb and guttering, or other required design elements and procedures.
FDC:	Fire Department Connection; a device on the size of a building, or possibly some distance remote from the building, that is connected to the sprinkler system for the purposes of allowing the Fire Department to boost the sprinkler system pressure via external means – usually by use of a fire department pumper truck.
Feet of Head:	A unit of pressure measurement; a column of water 2.31 feet tall = 1.0 PSIG.
Governing Authority:	The Board of Commissioners of Brunswick County, North Carolina.

Lot:	A piece, parcel, tract, or plat of land intended as a unit for the transfer of ownership for development.
NCDEQ:	North Carolina Department of Environmental Quality.
NCDOT:	North Carolina Department of Transportation.
NEC:	National Electrical Code – NFPA 70.
NEMA:	National Electrical Manufacturers Association.
NFPA 110:	National Fire Protection Association; Standard for Emergency and Standby Power Systems.
NSF:	National Sanitation Foundation.
Owner:	Brunswick County, or County.
Planning Commission:	The Brunswick County Planning Board.
Plat:	A map or drawing upon which a plan of subdivision or development is presented for review and approval.
PSIG:	Pounds per Square Inch, Gage – a unit of pressure measurement.
Public Right-of- Way (or ROW):	Public rights-of-way are considered to mean public street rights-of-way or any other public right-of-way.
Public Utility Easement, or (PUE):	Permanent easements and associated rights in the name of the County as the Guarantee and that are a matter of public record by virtue of being recorded at the County Register of Deeds office; usually obtained for the installation and maintenance of water mains, sewer mains, water and/or sewer pump stations, water storage tanks, etc.
Pump Station:	A structure or pumping facility used to facilitate the transmission of water or wastewater through the use of pumps and a transmission and/or distribution system.
Private Easement:	Easement rights negotiated between two private parties; the County is not a party to a Private Easement.

PWSS:	Public Water Supply Systems (a division of NCDEQ).
SCADA:	Supervisory Control and Data Acquisition; a means of remotely monitoring water, sewer, and pump station infrastructure.
Service Box:	A water meter box or a low pressure sewer box on a customer's property.
Service Lateral:	The connection between a County water and/or sewer main and the service box on the customer's property.
Sewer Main:	Any pipe or conduit that is part of the County's sewer transmission and/or distribution system and is used to transport sewer flow from more than one user connection to a waste water treatment facility.
Shop Submittals:	Technical information submitted to the Engineer and / or the County for review and approval of materials to be used in the construction of water and sewer systems.
Standard Details:	The water, sewer, and pump station detail drawings prepared by the County Engineering and Public Utilities departments and are posted on the County website for use by the design community.
Subdivision:	The division of a tract of land into two or more lots for the purpose, whether immediate or future, of sale or development. This includes all division of land involving a new street or a change in the arrangement of streets and includes any re-subdivision of land. Subdivision shall also refer to uses of land not ordinarily considered a subdivision such as mobile home parks, multifamily parcels, townhouses, and planned unit developments.
Surveyor:	A person registered as a Land Surveyor by the North Carolina Board of Registration for Engineers and Land Surveyors and qualified to practice land surveying.
Temporary Construction Easement:	Temporary Construction Easements that are

obtained from a private or public landowner for temporary impacts due to utility infrastructure construction; TCEs are not recorded at the County Register of Deeds and the TCE dissolves at the end of the construction project.

User Connection:

The point of connection of a customer's plumbing to the County's service box.

Water Main:

Any pipe or conduit that is part of the County's water transmission and/or distribution system and is used to transport water flow to more than one user connection from a water treatment facility.

Technical Specification 002

EXISTING UNDERGROUND UTILITY LINES AND STRUCTURES

1.0 General

- a) Every landowner, developer, or contractor who contracts to perform excavation, demolition, or installation activities within a site or on a project located in Brunswick County is responsible to ascertain the location and type of all underground utility lines or structures that may be located within the limits of the project work area.
- b) Some of these underground utilities or structures may have been designated on the plans, however, the exact location may vary and others may not be designated. The contractor is fully responsible for verification of the exact location of all underground utility lines or structures within the work limits, whether shown on the plans or not, and for providing necessary protection and/or repair if damaged.
- c) For a Brunswick County Capital Improvement Program (CIP) project Article 21 of the Brunswick County General Conditions of the Contract is also a part of this specification and is fully incorporated herein. Where a conflict may exist between this technical specification and Article 21 of the General Conditions, this specification shall be subordinate to Article 21 of the General Condition of the Contract.

2.0 Underground Damage Prevention Act

- a) The contractor is directed to comply fully with the applicable provisions of Senate Bill 168 "Underground Damage Prevention Act" as passed by the General Assembly of the State of North Carolina.
- b) Listing of Utility Companies: The following utility companies may have facilities within the work limits and it is required that the contractor establish coordination and utilities location with each prior to initiating work. There may be others not mentioned here and it is the contractor's responsibility to ensure that the proper notification has been made to all utilities owners with infrastructure within the proposed project work area:
 - 1) Brunswick County Public Utilities
250 Grey Water Road NE
Field Operations Center
Supply, North Carolina 28462
910.253.2860

- 2) ATMC
640 Whiteville Road NW
Post Office Box 3198
Shallotte, North Carolina 28459
910.755.1706
- 3) Brunswick EMC
Post Office Box 826
Shallotte, North Carolina 28459
910.754.4391
800.842.5871
- 4) Progress Energy Carolinas, Inc.
8645 Trade Street
Leland, North Carolina 28451
910.383.4042
- 5) Piedmont Natural Gas
Corporate Office
4720 Piedmont Row Drive
Charlotte, North Carolina 28210
704.364.3120
Natural Gas Emergencies: 800.752.7504 or 911
- 6) The contractor shall call the North Carolina One Call Center at:

811 or 1-800-632-4949
www.nc811.org

for locates on underground utilities.

3.0 Existing Underground Utility line or Structure Location and Marking by Owners

- a) The contractor shall make a documented request to the North Carolina One Call Center, and/or individual utility owners, in order to locate their facilities within the project work limits at least 48 hours in advance of the day excavation or demolition work is scheduled to begin. Location assistance requested from the owner should include the actual horizontal location, type number, size and depth of all lines. Some, but not all, cooperative actions the contractor should take either on or off the job site are as follows:
- b) The contractor shall ascertain if the utility owner desires to have his representative present during the work.
- c) The contractor shall comply with all standard regulations and take all precautions required by the owner of the facility.
- d) All costs associated with locating and marking existing utilities or the utilities representatives shall be the responsibility of the contractor.

- e) The contractor shall inform all equipment operators, either those employed by him or those employed by his subcontractors, of information obtained from the utility owners prior to initiation of work.
- f) The contractor shall immediately notify utility owner of any leaks or breaks, dents, gouges, grooves or other damages to such line coating or cathodic protection created or discovered by him in the course of the work.
- g) The contractor must immediately alert the occupants of the adjacent premises of any emergencies that he may create or discover at the work site.

4.0 Location and Protection of Utility Lines

- a) The location of all utilities shall be made with locating equipment well in advance of actual work. The located facility shall be plainly marked by coded paint designations on the paved areas or by coded stakes or flags along the unpaved areas. All marked locations are to be made at least 500 feet in advance of all trench excavation and the location and utility protection provided by the contractor must be to the satisfaction of the engineer and the County. Furthermore, the contractor shall uncover any utility and obtain the utility elevation as required by the engineer. All damages to existing utility facilities in the work area during trenching and installation of facilities for this contract are the responsibility of the contractor and he shall repair or replace damaged lines to the satisfaction of the utility owner.

5.0 Protection of Existing Utilities and Facilities

- a) In the conduct of his operations, the contractor shall take special precautions to protect equipment, structures, utility lines, roadways, subsurfaces, submerged, and overhead facilities against damage. In the event the facilities are disturbed, damaged, or injured as a result of the contractor's operation then the contractor shall immediately notify the utility owner and the County, and in conjunction with the owner determine the proper method of replacing, repairing, or restoring the affected facilities to the conditions which existed prior to the contractor's operations.
- b) The contractor shall, at his own expense, replace, repair or restore the affected facilities or areas to their original condition or shall reimburse the owner of said facilities for such expenses as the said owner may accrue in performing the work.

6.0 Connections to Existing Facilities

- a) Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials and labor required for a successful connection shall be on hand at the time of undertaking the connections. Work shall proceed continuously (around the clock) if necessary to complete connections in the minimum time. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

- b) Brunswick County Engineering and Utilities Departments do not allow tapping operations to existing mains on Fridays or on the day before a scheduled County holiday.
- c) A County Engineering and /or Public Utilities department inspector must be present during all wet tap operations on existing mains, and the contractor shall retrieve the coupon removed from the main and deliver same to County staff for verification of successful coupon removal.
- d) The contractor shall comply with all NCDOT requirements for work within public rights- of-way during normal working hours and also in advance of weekends and holidays.

Technical Specification 003

FIELD ENGINEERING

1.0 General

- a) The intent of this specification is to briefly describe the responsibilities of the Engineer and the utility contractor with regards to field engineering for a water and / or sewer project permitted in the County's name as public infrastructure.
- b) For a Brunswick County Capital Improvement Program (CIP) project Article 11 of the Brunswick County General Conditions of the Contract is also a part of this specification and is fully incorporated herein. Where a conflict may exist between this technical specification and Article 11 of the General Conditions, this specification shall be subordinate to Article 11 of the General Condition of the Contract.

2.0 Construction Layout

- a) It shall be the Engineer's responsibility to:
 - 1) Perform all required field surveying and engineering in order to produce accurate plans for the project.
 - 2) For projects that involve public sewer, the engineer shall field locate all wells within the construction project limits and within the radius of any wellhead protection zone required by the North Carolina Department of Environmental Quality / Public Water Supply Section, and to show the location of these wells and wellhead protection radii on the engineered drawings submitted to Brunswick County Engineering for plan review and approval. They shall also be shown on the asbuilt drawings.
 - 3) Establish all required horizontal and vertical control required for the project work area for the contractor by utilizing permanent and temporary benchmarks and showing these benchmarks on the engineered plans.
- b) It shall be the utility contractor's responsibility to:
 - 1) Utilize the provided bench marks for vertical and horizontal control as indicated on the plans. It shall be the responsibility of the utility contractor to perform all of the field horizontal and vertical control of the facilities, and to maintain or replace these points and to provide such supplemental and additional finished lines, offsets, grades, and other measurements as may be required to ensure control and completion of the work, including staking the work limits of any utility easement and/or rights-of-way.

- 2) All permanent and temporary benchmarks used during construction layout shall be noted on the record drawings and asbuilt drawings.

3.0 Asbuilt Drawings

- a) It shall be the utility contractor's responsibility to:
 - 1) Maintain a marked up set of the construction drawings that accurately reflects all changes made to the work as approved by the Engineer and/or Brunswick County staff.
 - 2) Provide the record drawings to the Engineer at the end of the project so that accurate asbuilt drawings can be produced by the Engineer.
- b) It shall be the Engineer's responsibility to:
 - 1) Provide asbuilt drawings to Brunswick County at the end of the project in accordance with:
 - a) The Brunswick County Construction Checklist, and
 - b) Brunswick County Technical Specification TS 010: As-Built Drawings.

Technical Specification 004

SPECIAL PROJECT PROCEDURES

1.0 General

- a) It is the intent of this specification to provide general information on special project procedures and County policy on making taps on mains, water for flushing and pressure testing, etc.
- b) For a Brunswick County Capital Improvement Program (CIP) project, this specification shall be subordinate to the County Construction Documents Project Manual for that CIP project as if fully incorporated herein.
- c) Any areas covered in this specification but not covered in the County Construction Documents Project Manual for a CIP project shall be fully in force for either a developer installed project or a County CIP project. An example of this would be the County policy for not allowing a new tap on a main on Fridays or the day before a scheduled County holiday.
- d) Contact Brunswick County Engineering and/or Public Utilities staff with any questions about special project procedures.

2.0 Excavation and Trenching Plan

- a) Prior to initiating any excavation or trenching operations the utility contractor shall prepare a detailed excavation and trenching plan for the safety of his employees. This plan shall indicate the intended procedures to be used by the contractor to comply with all OSHA requirements. Such plan should further identify a competent person that will work with each crew. A copy of said plan shall be available for review at the job site at all times.

3.0 Removal of Pipe

- a) Any pipeline placed outside of public rights-of-way and/or utility easements as shown on the approved plans will be removed and reinstalled at the correct location at the contractor's expense.

4.0 Water for Flushing and Pressure Testing

- a) The utility contractor shall coordinate with Brunswick County staff prior to operating any County water system valve, or obtaining County water for any purpose.

5.0 Taps on Existing County Mains

- a) Brunswick County staff must be present at all wet taps to existing County water and sewer mains. No new connections will be conducted on Fridays or the day before a scheduled County holiday. Taps will not be allowed later than 1pm. The contractor shall deliver the coupon removed from the main to County staff.

6.0 Project Videotape

- a) For all County capital improvement program (CIP) projects the utility contractor shall provide a preconstruction project videotape on a DVD to County Engineering or Public Utilities. The playback speed and quality of recording must be acceptable to the County. For all projects the utility contractor shall comply with all NCDOT requirements for a project videotape in accordance with all project conditions in the issued right-of-way Encroachment Agreement.

7.0 Drainage

- a) The utility contractor shall maintain drainage ways to a condition at least equal to preconstruction conditions. Positive drainage shall be provided at all times.

8.0 Traffic Signs

- a) Street signs and markers which are temporarily removed shall be protected and reinstalled within the same workday in which they are taken down.

9.0 Other Contractors and Subcontractors

- a) The utility contractor is responsible for coordinating work with that of other contractors working within the same area, and also for the scheduling and oversight of any subcontractors working for the prime contractor. On County capital improvement projects no more than 50% of the project can be subcontracted in accordance with the Contract Documents.

10.0 Temporary Storage Areas

- a) The utility contractor is responsible for obtaining and maintaining storage areas for materials and equipment. For County capital improvement projects (CIP) any agreements made with private property owners shall be documented in writing and a copy of the agreement provided to County Engineering and / or Public Utilities. Maintenance shall include grass cutting, positive drainage, regular clean-ups, final clean-up, and restoration.

11.0 Notification to Residents

- a) The utility contractor shall notify local residents of construction activity at least seven days prior to beginning work in the project area.

12.0 Clean-up and Restoration

- a) Clean-up and restoration shall be performed at the earliest possible time. Within seven (7) days of completion of backfilling, clean-up shall be complete for all backfilled construction areas. Within thirty (30) days of completion of backfilling, final restoration shall be complete. If final clean up and restoration of the areas are not completed within thirty (30) days, a stop work order may be given and efforts will be made to restore those areas. No claim for extra time will be allowed as a result of stop work orders for clean up and restoration.

13.0 Pavement Restoration

- a) Minimum thickness for restoration pavement shall be equal to the originally disturbed pavement (or thicker if so specified elsewhere). Minimum thickness for restoration of aggregate base course shall be equal to the originally disturbed aggregate base course (or thicker if so specified elsewhere).

14.0 Repair of Existing Dirt and Gravel Roads

- a) The utility contractor is responsible to repair and re-grade all dirt and gravel roads that have been disturbed by construction operations in the project area. Each road shall be re-graded as required prior to final completion and acceptance of the project by the County.

15.0 Contractor Work Force

- a) For County Capital Improvement Program (CIP) projects, the contractor shall not bid with the intent to, nor will be permitted to, subcontract more than fifty (50) percent of the total dollar value of the total contract as determined from the breakdown of unit prices contained in the proposal. This provision will be interpreted to mean that the on-site labor and materials associated with the construction of those items of work which total at least fifty (50) percent of the total dollar value of the total contract must be provided by the contractor's own personnel and equipment (owned and rented).

16.0 Permits and Pre-Construction Conference

- a) The utility contractor shall not begin work on the project before the Pre-Construction Conference (Pre-Con) conducted by County staff. This required meeting will not be scheduled until all applicable water, sewer, stormwater, NCDOT encroachment, or other required permits have been issued by the appropriate regulatory agencies. The utility contractor is responsible for understanding and obeying all local, state, and federal government laws and ordinances pertaining to the project work.
- b) For work in the public ROW where a NCDOT encroachment permit is required the contractor will, if NCDOT does not attend the scheduled Pre-Construction Conference at County Engineering, schedule a separate meeting with NCDOT as required prior to commencement of any work activities in the public right-of-way.

17.0 Private Property Encroachments

- a) The utility contractor is forbidden to work off the right-of-way or public utility easement without written permission of the adjoining property owner. If it comes to the attention of the County or Engineer that the contractor has so encroached, it will be cause for suspension of work until such written permission is obtained. In the case of permanent easements, the contractor is to ascertain that such easements have been acquired and recorded prior to commencing construction. The contractor is advised to confirm with County staff that any temporary construction easements shown on the approved plans have been obtained from the affected property owner prior to accessing that private parcel. County staff will assist the utility contractor with confirming properly recorded public utility easements and temporary construction easements if so requested.

Technical Specification 005

PROJECT MEETINGS

1.0 Preconstruction Conference

- a) A Pre-Construction Conference (Pre-Con) with Brunswick County Engineering is required prior to beginning any installation of new water, sewer, or pump station utilities that are permitted in the County's name. These meetings are held in the Engineering Department and require a minimum of forty-eight (48) hours notification to schedule. Required attendees are the Engineer, utility contractor's project manager, utility contractor's field superintendent, and the Engineering Inspector assigned to the project.
- b) On occasion the Pre-Con may be allowed, at the County's discretion, to be held at the project site depending upon the nature of the work. These onsite meetings will be scheduled with the Engineering Inspector that is assigned to the project.
- c) If the NCDOT does not, or cannot, attend the scheduled Pre-Construction Conference at County Engineering, then it is the responsibility of the utility contractor, in accordance with the special provisions of the right-of-way encroachment permit, to schedule the required NCDOT pre-construction conference prior to beginning any work in the public ROW. The County Engineering Inspector must be in attendance as this NCDOT Pre-Construction meeting.
- d) The required Pre-Con for County capital improvement projects (CIP) will not be scheduled prior to the utility contractor providing the digital DVD, of good viewable quality, to County Engineering in advance of requesting the Pre-Con so that it can be determined if the video quality is acceptable.

2.0 Monthly Progress Meetings – CIP projects

- a) For County Capital Improvement Program (CIP) projects the County requires a regularly scheduled monthly progress meeting in order to discuss project progress, updated project schedule, material issues, public complaints, and all other issues that need resolution and that may affect project completion within the Contract Time. Article 31 of the Brunswick County General Conditions of the Contract covers the required monthly progress meetings and is considered incorporated in this specification as if fully contained herein.
- b) Required attendees at these meetings are the utility contractor, Engineer, County staff, municipal officials if applicable, and any subcontractors to the prime contractor. Minutes will be taken at these meetings and disseminated to all attendees.

Technical Specification 006

PROJECT SCHEDULE

1.0 Preparation

- a) For a County Capital Improvement Program (CIP) project the utility contractor shall comply fully Article 32 of the Brunswick County General Conditions of the Contract.
- b) The basic requirements of Article 32 of the General Conditions are:
 - 1) The Project Expediter provide a project construction schedule in the form of a either a detailed bar chart or Critical Path Method (CPM).
 - 2) This schedule shall be submitted to the Engineer / Designer for review, comments, and approval.
 - 3) The proposed project schedule shall be presented to the Engineer / Designer no later than ten (10) days after the project start date for projects with a total Contract Price of \$500,000 or less.
 - 4) The proposed project schedule shall be presented to the Engineer / Designer no later than thirty (30) days after the project start date for projects with a total Contract Price in excess of \$500,000.
 - 5) No Request for Payment will be processed until schedule is **accepted** by the County.
- c) Each activity in the progress or work schedule shall be identified and a time for the performance of such activity indicated. Each activity shall be preceded by all work that must be accomplished prior to that activity. All abbreviations, codes and/or symbols used shall be described on the schedule. The critical path shall be identified. The submittal shall be reviewed, and comments shall be addressed by the utility contractor prior to County approval. The approved schedule shall be the baseline for all schedule adjustments under the Contract.
- d) If requested by the County, in accordance with Article 32 of the General Conditions, the schedule will accurately reflect the cost associated with each scheduled activity. The schedule will include all testing, inspection, and certification activities.

2.0 Additional Project Schedule Information

- a) Refer to Article 32 of the General Conditions of the Contract.
- b) Direct any questions to County Engineering and / or Public Utilities staff.

Technical Specification 007

PROJECT SUBMITTALS

1.0 General

- a) The intent of this specification is to provide guidance to the utility contractor on the project submittal process.
- b) For Brunswick County Capital Improvement Program (CIP) projects, Article 10 of the Brunswick County General Conditions of the Contract provides guidance on the project submittal process, and the utility contractor shall comply with the General Conditions for the submittal process. Article 10 of the General Conditions of the Contract is fully incorporated herein by reference.

2.0 Submittals

- a) Submittals are defined as shop drawings, diagrams, illustrations, schedules, performance charts, technical specification sheets, sewer pump curves, brochures, and other data prepared and submitted for review and approval by the utility contractor for the project.

3.0 Submittal Procedures

- a) All submittals shall be delivered to the Engineer by the utility contractor. The Engineer will review the submittals and certify they meet or exceed County requirements. The number of required copies to be submitted will be determined by the Engineer with a minimum of three (3) – one set will be retained by the Engineer and the remaining two sets will be given back to the utility contractor and the County after review and approval by the Engineer.

4.0 Shop Drawings

- a) Shop drawings shall show the principal dimensions, weight, structural and operating features, performance characteristics, wiring diagrams, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, or when the material dimensions are of particular importance or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct.
- b) When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted for review in place of shop and working drawings. In such case, the requirements shall be as specified for shop and working drawings, insofar as possible.

- c) The utility contractor shall be responsible for the prompt submission of all shop and working drawings in accordance with the project schedule to prevent delay to the commencement of work due to the absence of such drawings.
- d) No material shall be purchased or fabricated until the required shop drawings and associated submittals have been submitted, reviewed, and approved by the Engineer.

5.0 Developer Installed Infrastructure

- a) The developer's Engineer shall be responsible for ensuring the contractor utilizes materials that meet the County's technical specifications and standard details for water and sewer infrastructure that is permitted in the County's name.
- b) County staff reserves the right to reject any material deemed unfit or not meeting County standards.

5.0 Certifications and Tests

- a) Two copies of certifications and reports of tests, when required under the various sections of the Contract Documents, shall be submitted to the Engineer.
- b) The utility contractor shall provide the originals of all bacteriological testing results for water mains to the County.

Technical Specification 008

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.0 General

- a) This specification details the utility contractor's responsibilities for providing temporary facilities and necessary controls required for the successful completion of a utility infrastructure project.
- b) For Brunswick County Capital Improvement Program (CIP) projects the Brunswick County General Conditions of the Contract provide guidance on construction facilities and temporary controls, and the utility contractor shall fully comply with the General Conditions. The Brunswick County General Conditions of the Contract is fully incorporated herein by reference and is considered a part of this specification.
- c) Contact County staff with any questions concerning Construction Facilities and Temporary Controls.

2.0 Consent for Utilization of Private Property

- a) The utility contractor is responsible for obtaining written consent from the proper parties prior to entering or utilizing any private property for any project involving Brunswick County. A copy of the agreement between the contractor and the property owner must be provided to County staff prior to commencing any work on the project that involves the utilization of any privately owned property.

3.0 Work Zones, Traffic Interference, and Street Protection

- a) The utility contractor is solely responsible for all work zone setup and maintenance and personnel safety on the project work site.
- b) The utility contractor shall not close or obstruct any portion of a public street or road or any private right-of-way without obtaining permits or permissions from the proper authorities or owners. The utility contractor shall, twenty-four (24) hours in advance of closing any street, if approved, notify the NCDOT, police, sheriff, and fire departments. He shall cooperate with all appropriate authorities in the establishment of alternate routes and, at his own expense, shall provide adequate, plainly-marked detour signs.
- c) If any public street or road or private right-of-way is rendered unsafe by the utility contractor's operations then he shall immediately make any repairs or provide such temporary access as may be needed for the traveling public that is acceptable to the appropriate authority.

- d) Streets, roads, private ways and walks not closed shall be maintained passable by the utility contractor at his expense, and the utility contractor shall assume full responsibility for the adequacy and safety of any and all provisions made.
- e) Traffic shall be maintained in accordance with the North Carolina Department of Transportation traffic maintenance procedures. For work within the public rights-of-way the issued NCDOT encroachment permit shall be on the job site at all times work is ongoing and shall be accessible for inspection if requested by NCDOT and / or County staff.
- f) For the proper control of traffic, the contractor shall provide work zones in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) or any other applicable guidance documents published by NCDOT.

4.0 Traffic Safety

- a) The utility contractor shall furnish, erect and maintain all barricades, warning signs, and markings for hazards necessary to protect the public and the work, especially when excavating adjacent to existing roadways. When used during periods of darkness, such barricades, warning signs and hazard markings shall be suitably illuminated. Flagmen, if required, shall be provided to facilitate safe movement between construction operations and normal traffic flow. For vehicular and pedestrian traffic, the contractor shall furnish, erect and maintain barricades, warning signs, lights and other traffic control devices in conformity with the Manual of Uniform Traffic Control Devices for Streets and Highways and all NCDOT requirements.
- b) The utility contractor is responsible for obtaining permission from the North Carolina Department of Transportation for road closures, detours, and for any work within, or on, public streets and rights-of-way.

5.0 Roadways and Haul Roads

- a) In general, the utility contractor shall confine his equipment and hauling where practical to existing public rights-of-way or easements acquired by the County. If existing pavement is damaged by the contractor's hauling operations, it shall be repaired to its original condition at the contractor's expense, including full width overlay if determined needed by the County, Engineer, and/or NCDOT (if a public street or road). Existing roads shall be kept clean and free from all dirt, mud, or construction debris.

6.0 Safety Precautions

- a) Until final acceptance of the work, the utility contractor shall continuously maintain adequate protection of the work and work in progress from damage. He shall adequately protect adjacent private and public property as provided by law and these Specifications.

- b) The utility contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of federal, state and local safety laws and building codes to prevent accidents or injury; to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times as required by the conditions and progress of the work, all necessary safeguards and barricades for the protection of employees performing the work and provide for the safety of others near the work site.

7.0 Accident Reporting and Risk Assumption

- a) The utility contractor shall assume all risks of loss or damage of any kind to any vehicles, machinery, equipment, materials or supplies which it shall provide in doing the work.
- b) The utility contractor is responsible for adequate reporting, to the County and all applicable authorities, all serious accidents related to any work involving the County either on County CIP projects or developer installed infrastructure permitted in the name of Brunswick County.
- c) If a claim is made or suit is filed by anyone against the utility contractor, or any subcontractor to the utility contractor, on account of any accident, the utility contractor shall promptly report the facts in writing to the County giving full details of the claim.

8.0 Operational Hours

- a) The utility contractor shall limit his work activities to daylight hours between 7:30 a.m. until 6:00 p.m., Monday through Friday, excluding holidays.
- b) The utility contractor shall also comply with all conditions contained within an approved NCDOT encroachment permit with regards to working hours in the public rights-of-way and ceasing work within the rights-of-way in advance of a recognized holiday.

9.0 Noise Control

- a) Every possible measure or method shall be employed by the utility contractor to minimize the effects of noise from equipment and pumps to include mufflers, baffles, etc. Special effort shall be made to exercise noise abatement between sunset and sunrise.

10.0 Provision for Temporary Sanitary Facilities

- a) The utility contractor shall provide, maintain, and remove, when no longer required, an adequate number of temporary, prefabricated, chemical-type toilets with proper enclosures for the use of workmen during construction.

11.0 Dust Control

- a) The utility contractor shall conduct operations and maintain the work area in such a way as to minimize the creation and dispersion of dust. Water dispensing equipment may be required to reduce dust.

12.0 Temporary Water

- a) The utility contractor shall make all necessary arrangements for all water required during the entire construction period for pressure testing, flushing, dust control, and other requirements. Water needed for flushing and pressure testing may be provided at the discretion of the County.
- b) The utility contractor is responsible for coordinating with the County regarding the need for temporary construction water. System valves on the existing County water system shall not be operated by the utility contractor without the permission of County staff.
- c) Hydrant meters are available from Public Utilities – all applicable rates and fees apply and must be paid by the utility contractor for the use of a hydrant meter. All hydrant meters must have an approved backflow prevention device attached to the hydrant meter to prevent cross contamination of the County's water distribution system. Contact Public Utilities for additional information on the use of hydrant meters for temporary water.

Technical Specification 009

SEDIMENTATION AND EROSION CONTROL

1.0 General

- a) The intent of this specification is to provide guidance on all measures necessary for effective erosion and sedimentation control within the construction limits of the project, and for prevention of sediment laden runoff leaving the construction limits or entering ditches, streams or water impoundments.

2.0 Utility Contractor's responsibility

- a) The utility contractor agrees to meet all of the conditions of the NCDEQ issued Sedimentation and Erosion Control Permit for land disturbing activities, and shall be responsible for prevention of damage to properties outside of the construction limits from siltation due to construction of the project.
- b) The utility contractor shall assume all responsibilities to the affected property owners for correction of damages which may occur. The utility contractor further agrees to assume all responsibilities for fines or damages assessed against the County by any regulatory agency or individual due to lack of proper erosion and sediment control during construction.
- c) The County reserves the right to withhold all submitted pay requests if erosion and sedimentation measures are not satisfactory. The County also reserves the right to withhold a portion of the Contractor's pay requests sufficient to pay any and all assessed fines as required.

3.0 Construction Sequence

- a) While the use of erosion and sedimentation control devices is especially important on areas of steep topography, easily erodible soils, and sites in close proximity to water courses throughout the construction period, the control measures shall be installed prior to the commencement of land clearing and shall be fully maintained and periodically inspected until final restoration and stabilization is completed. Unrestored cleared areas shall be kept to a minimum. Disturbed areas ahead of construction shall only be accomplished on those segments for the shortest practical distance as required for continual progress.
- b) Final restoration shall not be delayed until completion of the project but will be carried out in phases as the work proceeds. Under no circumstances will any areas be left unrestored for more than thirty (30) thirty calendar days without some form of stabilization until final restoration is complete.

4.0 Sedimentation Control Measures

- a) Sediment control devices or measures which may be required to prevent sedimentation of streams, water courses, or drainage structures are:

Earth berms and/or diversion and intercept ditches

Sediment traps

Filter berms

Filter inlets

Silt fences - not to be placed in streams or ditches perpendicular to flow

Check dams gravel filter

Gravel construction exits

5.0 Erosion Control Measures

- a) Erosion control measures which may be required are:

Earth slope protection

Diagonal water breaks diversion berms

Diversion channels

Preservation of existing vegetation

Storm inlet protection

Stream crossings

Energy dissipaters

Matting of re-seeded areas

6.0 Detail Drawing and Additional Measures

- a) Sedimentation and erosion control details are shown in the plans for installation at locations designated or as otherwise required by the regulating agency or by direction of Brunswick County or Engineer as work proceeds. If significant sedimentation is occurring as a result of activity on the construction site, despite the application and maintenance of prescribed protective measures, the utility contractor shall be required to take additional protective measures.

7.0 Stream Protection

- a) Where construction activities are necessary in close proximity to streams and other waterways, they shall be performed in a manner that does not contribute to degradation of or blockage of the stream-flow. In order to prevent possible degradation or blockages, the utility contractor shall be required to:
- 1) Keep all construction debris, excavated materials, brush, rocks, refuse, and topsoil as far from these waterways as possible. Restrict machinery operation or stream crossings in waterways to the extent necessary for construction of utilities crossings.
 - 2) If construction work areas are necessary in a waterway, they shall be protected as indicated on the approved plans.

- 3) If temporary roadways are essential for the construction activities, they shall be constructed of soils which are not highly erodible materials and must not span more than half way across the water course or wetland area at any one time unless otherwise approved by the Engineer.

These temporary roadways shall be entirely removed as soon as their requirement is met. **Work in these areas shall follow the requirements of the Corp of Engineers or CAMA permit or plans as applicable.**

8.0 Construction Access

- a) The travel of equipment to and from the construction areas shall be minimized not only to protect areas that will not be denuded, but also to prevent the spreading of sediment within and outside of the construction areas. Therefore, special construction equipment travel corridors will be established for this use and instructions shall be issued for their use. Use of these corridors shall be fully enforced. Other non-essential traffic will be restricted or discouraged. Indiscriminate and convenience traffic shall not be allowed.

9.0 Stockpile, Laydown, and Borrow Areas

- a) The utility contractor shall be responsible for selecting, obtaining, and maintaining all required stockpile, laydown, or borrow areas needed for the project. He is also required to design and incorporate all necessary sediment and erosion controls measures necessary to prevent erosion and runoff of sediment to adjacent areas.
- b) For County capital improvement (CIP) projects it is required that a fully executed copy of any and all agreements between the contractor and private property owners be provided to the County for the project file. The County is not, and shall not be, a party to any private agreements that the contractor enters into with a private property owner for stockpile, laydown, and borrow areas.
- c) The utility contractor is responsible for obtaining all necessary permits or approvals for these areas outside the construction limits.

10.0 Disposal of Excess Water from Excavations

- a) The utility contractor shall practice proper management of any excess water pumped from excavations to minimize the production and spreading of sediment. Pumped water shall be discharged onto stabilized surfaces and allowed to filter through existing vegetation if possible; otherwise, additional control measures may be necessary. If ditches are required to remove pumped water from construction excavations, they shall be given the same consideration as any other man-made waterway and shall be stabilized so as to not degrade and produce sediment.
- b) The utility contractor is responsible for understanding and complying with all conditions contained within a NCDOT encroachment permit for work in the

public rights-of-way concerning the pumping of excess water from excavations and the use of drainage ditches in the rights-of-way.

11.0 Excavation and Backfill

- a) Excavations shall be closely controlled and all the material removed from them shall be selectively stockpiled in areas where a minimum of sediment will be generated and where other damage will not result from the piled material.
- b) Drainageways shall be protected at all times and the placement of material in drainageways for convenience shall not be allowed.
- c) Backfilling operations shall be performed in such a manner that remaining trees are not damaged. Temporary repaving shall be placed promptly after backfill operations are completed in improved areas.

12.0 Dust Control

- a) The utility contractor shall control dust throughout the project duration, within the project area, and at all other areas affected by the construction of the project. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance or condition endangering the value, utility or appearance of any property.
- b) The utility contractor will not be directly compensated for any dust control measures necessary, as this work will be considered incidental to the work covered by the various contract items.

13.0 Removal of Sediment and Erosion Control Devices and Final Grading and Seeding

- a) After the construction phase is complete permanent vegetation of the areas that have been disturbed shall be re-established as rapidly as possible. If the completion of the construction activities do not coincide with a season in which permanent vegetation can be generated, an interim or temporary program is required. Once disturbed areas have been stabilized adequately, the utility contractor shall dismantle and remove sediment and erosion control devices used during construction and dress up and seed these areas.

Technical Specification 010

AS-BUILT (RECORD) DRAWINGS

1.0 General

- a) It is the intent of this specification to provide information to the design engineer and utility contractor concerning requirements for acceptable record drawings for all projects with infrastructure permitted in the county's name.
- b) Accurate as built drawings are an important closeout component of a project and are required for:
 - Signing water, sewer, and pump station state permit certifications
 - Issuance of Substantial Completion and Final Acceptance
 - Updating the county water and sewer GIS utility map

Water and / or sewer certifications submitted by the design engineer of record will not be processed without approved as built record drawings that conform to this specification regardless of who prepares the record drawings.

2.0 Record Drawings

- a) The utility contractor is responsible for employing the design engineer and/or a surveyor licensed in the State of North Carolina to provide accurate record drawings upon completion of construction. The record drawings must be sealed, signed, and dated by the engineer or land surveyor.
- b) The record drawings shall be provided to the county as: One set of paper drawings and a CD or USB drive containing both **georeferenced** AutoCAD (Version 2007 or later) and Adobe PDF format files. The PDF files must be of **each individual plan sheet of the record drawings**.
- c) Record drawings shall conform to this as built technical specification and will also accurately identify the location of all properties, rights-of-way, and easements utilized for the installation of all installed facilities. Record drawings will utilize offsets and benchmarks as necessary to identify the location of all facilities correctly and accurately within the properties, rights-of-way, or easements, and will also indicate any and all encroachments which exist. All aboveground structures such as manholes, fire hydrants, valve boxes, meter boxes, electrical services, pump stations, air release valves, etc., will also be clearly identified.
- d) Horizontal control shall be per the State Plane Coordinate System (NAD 83).
- e) Vertical control shall be per NAVD 88.

AS-BUILT (RECORD) DRAWING CHECK LIST

Plan sheet size: 24" x 36" (Arch D) with engineer's seal and / or surveyor's seal as applicable

Each sheet of the record drawings, including the required Brunswick County Cover Sheet, shall have the NCDEQ PWSS water permit number and / or the NCDEQ DWQ sewer permit number for the project on the sheet.

Drawings shall be prepared at a scale of 1" = 50' (horizontal) and 1" = 5' (vertical)

Indexed Brunswick County Cover Sheet with: Location of plan-profile sheets by sheet number, name of project and/or subdivision, owner's name, address, phone number, engineer's name, address, phone number, surveyor's name, address, phone number, date, north arrow, scale, site map of project site shown as an inset (minimum size 3" x 3")

Total linear feet of mains shown on cover sheet as:

Water Mains _____ Force mains _____ Gravity sewer mains _____

Gravity sewer shall be shown in both plan and profile view with all manhole inverts accurately field located and labeled in profile view and a manhole name and/or number assigned to each manhole. Manhole rim and invert elevations shall be accurately located and shown. If applicable clearly indicate and label all five (5) foot diameter manholes. All sewer mains and manholes shall have stationing numbers for ease of reference.

Plans shall show individual services for gravity sewer cleanouts, water meter boxes, and low-pressure sewer services and shall be accurately located and shown on the plans as follows:

Gravity sewer cleanout – open circle

Water meter service – open box

Low pressure sewer – open oval

Clearly indicate all gravity sewer service laterals and indicate their size (4 inch or 6 inch)

Gravity sewer cleanouts shall be located by measuring from the nearest downstream manhole along the sewer main upstream to a point which lies on a line that is perpendicular to the sewer main and connects said point and the cleanout – for example, 150 / 15R (150' from downstream manhole and 15' over to the right side of main)

Water taps and meters larger than the standard one (1) inch lateral with (¾) inch meter shall be clearly identified with the size of the service lateral and water meter

Drawings shall indicate water and sewer phases and their relationship to other subdivision phases (if applicable)

Use complete and accurate material descriptions, for example, pipe material (PVC, DIP, HDPE, Fusible PVC, etc.), pipe diameter, DR # of pipe, pressure class of any DIP, length, slope (for gravity sewer), AWWA and / or NSF

Show station or distance to beginning and end of all changes in pipe material and pipe deflections

Show all existing and required vertical and horizontal separations between sewer mains and water mains and between water mains / sewer mains and stormwater pipes

Show existing grade elevations and proposed finish grade elevations

Show all water supply wells within a one hundred (100) foot radius of any gravity sewer main or pressure force main

If any vented manholes were used [eg, rims less than (2) feet above 100-year flood elevation] then show the vented manhole and vent and indicate a watertight ring and cover

Show location and size of all air release valves, gate valves, plug valves, butterfly valves, fire hydrants, post flushing hydrants, temporary blow offs, tees, crosses, cleanouts, etc., along all water mains and sewer force mains

Show lot numbers, lot lines, easement lines, rights-of-way lines, and street names

For horizontal directional drills and jack-and-bores the drilling logs are to be incorporated with the record drawings

Technical Specification 011

DEWATERING

1.0 General Dewatering Requirements for Utility Work

- a) All ground water which may be found in the trenches and any water which may get into them from any cause whatsoever shall be pumped or bailed out so that the trench shall be dry during all pipe laying periods.
- b) All water pumped from the trenches shall be disposed of in compliance with the applicable local regulations of the appropriate governing body, and in accordance with all issued permits for the project.
- c) If dewatering operations cause a turbidity problem due to suspended sands or silts in the water it shall be the utility contractor's responsibility to utilize adequate methods to prevent unacceptable turbidity discharges, such as the use of a filtration sock or other methods.
- d) Any damage to property, or notices of violation from NCDEQ, shall be the utility contractor's responsibility to correct to the satisfaction of the Engineer at no cost to Brunswick County. All fines imposed by NCDEQ shall be paid by the utility contractor.
- e) The contractor shall be required to well point, pump, or provide other measures necessary to keep the trench dry during pipe laying operations.
- f) The use of large amounts of crushed stone is not an approved dewatering method.
- g) Dewatering operations shall be maintained until all backfilling and compaction is completed or as directed by the Engineer or County staff.
- h) No water shall be permitted to reach any poured concrete until it has sufficiently hydrated to a minimum strength such that water will not affect the cured concrete strength.
- i) The contractor shall provide and place all necessary flumes or other channels of adequate size to carry temporarily all streams, brooks, stormwater or other water which may flow along or across the lines of the pipe line. All flumes or channels thus utilized shall be tight so as to prevent leakage into the trenches.

Technical Specification 012

TRENCH BOXES, SHEETING, AND SHORING

1.0 Sheeting and Shoring

- a) Trench boxes, sheeting, shoring, and bracing shall be utilized as needed by the utility contractor during the installation of utility infrastructure in order to protect human life, prevent accidents, maintain trench integrity during pipeline laying operations, prevent damage to buildings or other structures along the line of construction, and to ensure a quality installation.
- b) The contractor is responsible for all aspects of using trench boxes, sheeting, and shoring during the project. Care must be taken not to damage in any way water mains, water service pipes, drain pipes, sanitary or stormwater sewers, sewer service pipes, gas mains, oil mains, electric conduits or other structures encountered on the line of the work during trench excavation.
- c) Special conditions of an NCDOT Encroachment Permit may require the use of sheeting and shoring while working in the DOT rights-of-way. The Engineer is responsible for the design and approval of any sheeting and shoring required by NCDOT.
- d) Only shoring authorized by the Engineer and approved by the Engineer shall be left in place. For shoring left in the public right-of-way the utility contractor must also obtain NCDOT approval.
- e) Whenever timber or other sheeting is driven to a depth below the elevation of the top of the pipe, that portion of the sheeting below the elevation of the top of the pipe shall not be disturbed or removed. Whenever timber or other sheeting is driven for the protection of trench walls in water-bearing soil, no portion of such sheeting below a level of 4 feet over the top of the pipe shall be removed.

Technical Specification 013

EXCAVATING, GRADING, TRENCHING, & BACKFILLING

1.0 General

- a) The utility contractor shall furnish all labor, equipment, and materials for all excavation, grading, trenching, and backfilling associated with the installation of water, sewer, pump stations, drainage structures, curb and gutter, streets, sidewalks, driveways, slopes, storm drainage, and other associated infrastructure within the limits of the project work area. All work done shall be in accordance with the approved plans and specifications.

2.0 Existing Conditions and Utility Locations

- a) It is the utility contractor's responsibility to perform all site inspections to familiarize himself with the scope of work involved and the existing conditions at the project site.
- b) The contractor is responsible for locating all existing underground utilities in the area of work. If utilities are to remain in place then the contractor shall provide adequate means of protection during earthwork, excavating, trenching, and backfilling operations.
- c) Should unlocated, or incorrectly located, piping or other utilities be encountered during excavation the utility owner shall be notified immediately. The utility contractor shall cooperate with the County and other respective utility companies to protect and keep respective services and facilities in operation. The contractor shall also repair any damaged utilities to the satisfaction of the utility owner.
- d) Barricade all open excavations occurring as part of this work and post with warning signs and /or lights. Continuously operate all warning lights as recommended by the Authority Having Jurisdiction (AHJ). The utility contractor shall also protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3.0 Technical Standards

- a) ASTM C33 ---- Standard specification for concrete aggregates
- b) ASTM D2487 - Classification of soils for engineering purposes.

4.0 Soil Classifications

- a) Use soils free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, organic matter, refuse, frozen materials, rocks and lumps greater than 4 inches in diameter and other deleterious matter.

- b) For the purpose of this specification, soils to be used as fill material are grouped into five classes according to soil properties and characteristics:

Class I: Angular, 1/4 to 1-1/2 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, and crushed stone, crushed gravel, and crushed shells

Class II: Coarse sands and gravels with maximum practical size of 1-1/2 inch, including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class.

Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class.

Class IV: Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. **These materials are not recommended for bedding, haunching, or initial backfill.**

Class V: This class includes the organic soil, OL, OH, PT as well as soils containing frozen earth, debris, rocks, larger than 40 mm (1-1/2 in.) in diameter, and other foreign materials. **These materials are not recommended for bedding, haunching, or initial backfill.**

5.0 Trench Excavation, Pipe Bedding, Backfilling, and Compaction for Utility Systems

- a) Trenching of utilities as a method of installation is not allowed in Brunswick County
- b) Trench Excavation
- 1) Excavation shall be accomplished in accordance with the grades and lines as established by the Engineer or Surveyor and as required by the work to be performed. Excavation shall include the removal and replacement of all asphalt, concrete, curb, rock, earth, fences, trees (as applicable), shrubs, and other materials. The contractor will exercise care to prevent undercutting lower than the required subgrade. All materials from excavation, considered as suitable by this specification, shall be used as fill wherever required, and the contractor shall arrange his work so that this usage of excavated materials will be possible. Unsuitable and surplus materials from the excavation, if any, shall be disposed of by the contractor at his expense. All areas of the site shall be graded and maintained at all times to prevent surface runoff from draining into the excavations and to prevent ponding of water therein.
 - 2) Excavated materials not required for topsoil, fill or backfill shall be removed from the site of the work by the contractor, but none shall be

deposited on private property without written consent of the property owner. For County capital improvement projects any agreements between the contractor and private property owners must be provided to the County also.

- 3) All excavations shall be in compliance with all current OSHA requirements and it is the utility contractor's responsibility to ensure that the project work is in compliance with all OSHA requirements.
- 4) All piping shall be installed at a minimum depth of 36 inches unless otherwise approved by Brunswick County. Installations shallower than 36 inches, if approved, will require the use of ductile iron pipe.
- 5) Trenches for piping shall be excavated true to line and grade as shown on the approved plans.
- 6) Trench widths at and below the top of the pipe shall be the minimum necessary for proper installation. Trench banks above the top of the pipe shall be as vertical as practicable. Overdepth excavation shall be backfilled with Class I material and compacted.
- 7) The utility contractor shall provide, at his expense and as directed by the Engineer, especially bedding material or concrete encasement as may be necessary due to over-width excavation.
- 8) Trench depth to the lines and grades shown on the drawings. Where elevations are not shown, trench to a depth sufficient to provide at least 36 inches of cover above the top of pipe, unless otherwise specified. Grade all trenches to provide a constant slope free of sags and high spots. Recesses shall be excavated where required to accommodate bells and joints.
- 9) Keep trenches free of water. Include cost of dewatering in unit price bid for pipe. No separate payment for dewatering will be made by the County.
- 10) Properly brace sheet and support trench walls as soil conditions require and in strict conformance with the approved plans, all pertinent laws, and OSHA regulations. Provide adequate bracing and shoring to protect adjacent improvements. Contractor shall provide certification for all premanufactured trench bracing devices prior to any excavation activities.

c) Pipe Bedding

- 1) Gravity Sewer Mains – Refer to Brunswick County gravity sewer pipe bedding Standard Detail:

Class A bedding: For gravity mains less than twenty (20) feet deep undercut trench bottom six (6) inches minimum below pipe and fill with size #57 stone up to and including the springline of the pipe.

Class B bedding: For gravity mains greater than twenty (20) feet deep undercut trench bottom six (6) inches minimum below pipe and fill with size #57 stone to six (6) inches above the pipe.

- 2) Pressure Mains, Water or Sewer- it is not necessary to bed pressure mains unless unusually wet or mucky field conditions are encountered. Pressure mains shall be installed in properly excavated trenches on the native soil of the trench. If wet or mucky field conditions are encountered then size #57 stone shall be used to provide a firm bedding but only at the direction of the Engineer or County staff.
 - 3) Service Pipe – bedding is not required on water and sewer service laterals unless unusual conditions are encountered in the field. In these cases the Contractor shall bed the service pipe per direction from the Engineer or County staff.
- d) Initial and Final backfilling
- 1) After properly installing the pipe and bedding, if required, trench backfill shall progress as rapidly as pipe laying will permit.
 - 2) Backfill materials shall be of suitable material and be capable of being compacted to a minimum of ninety-eight (98) percent ASTM D698 (Standard Proctor) maximum density at optimum moisture content.
 - 3) Initial and Final backfill shall be of the Type 1 or Type II material as follows:
 - a) Type 1 Material: Excavated material from the trench or materials from other sources which are free from large clods, roots or stones larger than 1 inch may be used as initial backfill in trenches (see Pipe Trench Detail).
 - b) Type 2 Material: Excavated material from the trench or materials from other sources which are free from large clods, roots or stones larger than 8 inches may be used as final backfill in trenches but shall not be used in the final twelve (12) inches of fill (see Pipe Trench Detail).
 - 4) Backfill around the pipe by placing in layers no more than six (6) inches in depth. Backfill shall be compacted with light tamps for the full width of the trench to provide adequate support for the bottom and sides of the pipe. Backfill shall be carried up evenly on both sides of the trench excavation. Particular care is required in backfilling gravity sewer pipe to prevent excessive pipe deflection.
- e) Compaction
- 1) When existing plans and grades require the use of fill to reach the required elevation, the contractor shall deposit suitable material from previously

excavated areas or use borrow material. Such material shall be free from debris, roots, trash, stones, or other harmful substances, and shall be spread in successive layers of loose material not more than six (6) inches in depth.

- 2) Each layer shall be spread uniformly by motor grader or other approved device and rolled with an approved tamping or three-wheeled power roller until thoroughly compacted to a minimum of ninety-eight (98) percent ASTM D698 (Standard Proctor) maximum density at optimum moisture content. Rolling with rubber tired vehicles or track type equipment will not be allowed.

6.0 Crushed Stone

- a) Crushed stone shall be size # 57 washed stone only

7.0 Concrete

- a) Concrete placed for cradles, thrust blocks, or encasement shall be 3,000 psi minimum strength at twenty-eight (28) days hydration.

8.0 Foundation

- a) Foundation shall be required in wet, yielding and mucky locations. Foundation shall be constructed by removal of wet, yielding or mucky material and its replacement with sufficient Class I material to correct the instability. Foundation shall only be installed with the approval of the Engineer or Brunswick County staff. Undercutting and filling with stone will not be allowed or paid for in order to control water in the excavation trench.

9.0 Undercutting

- a) Undercutting, unless authorized by the Engineer, shall be replaced and compacted at the contractor's expense. If the material, after excavation to subgrade, is found to be soft, spongy or unfit for use as subgrade, such unsuitable material shall be removed to a depth as directed by the Engineer and the subgrade shall be brought to proper elevation by filling with suitable material from the excavation or from an approved borrow site.

10.0 Borrow Material

- a) The Contractor will supply all borrow material necessary and will provide all labor and equipment necessary to dig and haul such borrow material. Any and all borrow material utilized shall be of suitable quality and meet the requirements of this technical specification.

11.0 Excess Water Control

- a) Grade and maintain all areas of the site to preclude surface runoff into excavations and prevent any water accumulation in the excavation.

- b) Excavations should be kept free of surface water and/or groundwater. Provide and maintain at all times the necessary means and devices to prevent water from entering the excavations and for removing all water entering the excavations during pipe laying operations. Dewatering shall continue until structure is backfilled and compacted.
- c) Include cost of dewatering in the unit cost for pipe. Separate payment will not be made for dewatering operations by Brunswick County.

12.0 Contaminated Soils – Excavation, Removal, and Remediation

- a) In the event that contaminated soils are suspected or encountered the contractor shall stop digging in the suspect area and immediately notify both the Engineer and Brunswick County staff.
- b) It shall be the utility contractor's responsibility to hire a soils testing firm to examine the suspect area for type and density of contamination. Should testing confirm the presence of contaminated soils, the following steps shall be taken:
 - 1) Excavate contaminated material in a manner consistent with all jurisdictional regulations.
 - 2) Immediately remove contaminated material from the site. Contaminated materials may not be stockpiled for any amount of time.
 - 3) Material is to be disposed of at a permitted facility. Tickets must be produced to the Engineer and County staff accounting for every cubic yard of material removed.
 - 4) Per direction of the Engineer and / or Brunswick County, the pipe material shall be changed to pressure class 350 DIP with Nitrile gaskets.
 - 5) The trench is to be bedded and backfilled with select fill per Brunswick County specifications herein.

13.0 Field Quality Control

- a) Field inspection, sampling and testing will be performed as required at either the direction of the Engineer or Brunswick County
- b) If required, an independent soils engineering and testing laboratory shall perform sufficient tests and inspection procedures, to the satisfaction of the Engineer and the County, both in the field and lab to ensure that the provisions of this specification are met. The testing shall be paid by the utility contractor. The testing lab shall be approved by the Engineer and / or Brunswick County.

Technical Specification 016

CONCRETE CURBS, GUTTERS, DRIVEWAYS, SIDEWALKS AND CATCH BASINS

1.0 General

- a) It shall be the contractor's responsibility to furnish all plant, labor, equipment and materials, and for performing all related activities necessary for the construction and/or replacement of concrete curbs, gutters, sidewalks and driveways, and other related concrete structures shown on the contract drawing or as removed by the contractor during utility installation.

2.0 Materials

- a) All concrete used shall be a minimum 3,000 psi standard strength mixture at twenty-eight (28) days hydration.
- b) Reinforcement: Reinforcing will generally not be required unless the project plans call for reinforcing of a structure. In these situations reinforcement shall conform to the approved plans and specifications by the Engineer or will be reinforced at the direction of Brunswick County staff.

3.0 Alignment and Grade

- a) Alignment and grades for replacement structures shall conform to the adjacent structures unless otherwise specified by the Engineer and/or Brunswick County. Alignment and grades for new concrete structures shall conform to the plans and details designated on the drawings. Alignments and grades are the responsibility of the contractor utilizing industry standard approved methods or as directed by the Engineer. In the event any of the concrete structures placed are damaged from any cause or prove defective in any way, or is out of alignment or grade, the contractor shall remove such sections and replace at his own expense.

4.0 Excavation and Subgrade Preparations

- a) Excavation and subgrade preparation for all concrete structures shall be in strict compliance with the approved plans, Brunswick County Technical Specification 013 - Excavation, Grading, Trenching, and Backfilling, or as directed by the Engineer.

5.0 Replacement Sections

- a) Replacement concrete structures shall conform to the dimensions and shape of the existing remaining structures except as otherwise stated herein. New structures shall conform to the design and dimensions shown in the approved plans or as directed by the Engineer and / or County staff.

6.0 Sidewalks and Driveways

- a) All sidewalks shall be constructed or reconstructed to a minimum uniform thickness of four (4) inches and to the width of the sections being replaced or, for new sidewalks, to the width designated on the approved plans. All driveways shall be constructed to a minimum uniform thickness of six (6) inches including that section which crosses sidewalk areas, unless otherwise directed by the Engineer and / or County staff. The driveway flared section at the road shall conform to the exact dimensions and shape of that which was removed.

7.0 Construction Forms

- a) Concrete Curb and Gutter Forms: Wooden or steel forms, satisfactory to the Engineer, shall be used for the construction of curb and gutter. They shall be set true to alignment and grade as required by the Engineer and substantially braced. Metal templates, not more than three-sixteenth (3/16") inch in thickness, and manufactured in accordance with the curb and gutter section, shall be set in the places provided in the forms not more than ten (10') feet apart. The forms and templates shall be thoroughly cleaned and oiled after each operation. Templates shall be adjusted under the supervision of the Engineer so as to prevent short sections (less than 5 feet).
- b) When back and front forms have been set to exact grade and secured, the dividing plates shall be inserted and trued up. With these forms as templates, fine grading to exact subgrade elevation shall be completed by hand. Face forms shall then be set. The contractor shall use every effort to observe any possible misalignments in grades and shall call such to the attention of the Engineer promptly.
- c) Sidewalks and Driveways Forms: Forms shall be of wood or metal, straight and free from warp, and of sufficient strength to resist springing during the process of depositing and consolidation of the concrete. The width of the forms for sidewalk and driveways shall be equal to the full depth of the sidewalk or driveway. Forms shall be securely staked and braced true to the line and grade set by the Engineer in the approved plans. Suitable metal or wooden division plates shall be provided to completely separate adjacent slabs during construction. Forms shall be clean and well oiled before being set. Sidewalks shall be marked in sections with a proper lining tool to form squares the size of which will depend upon the width of the walks. The edges of driveways will be worked with an edging tool and will be sectioned into squares or marked as directed by the Engineer.
- d) Driveway construction joints shall not be spaced less than five (5) feet apart. In no case shall the next expansion joint on the remaining drive be closer than 5 feet from the new construction joint.

8.0 Construction

- a) Concrete shall not be placed in any forms until the forms and subgrade have been properly established per the approved plans.

b) Concrete Curb and Gutter Construction:

- 1) The forms for curb and gutter shall be placed in accordance with the proper alignment and grade as directed by the Engineer in the approved plans, and all attachments, templates, stakes, bracings, etc., shall be securely set in place prior to depositing of concrete.
- 2) Careful check will be made of all forms prior to pouring and the contractor shall obtain a visual inspection and approval of all forms prior to pouring concrete therein.
- 3) When sufficient concrete has been placed in the forms, it shall be well spaded along areas in contact with the forms in order to eliminate all honeycombing and floated to the proper alignment and grade, after which it shall be towed smooth and very lightly brushed. Templates shall be removed by stages, but not entirely until the concrete has become thoroughly hard. After removal of the templates, there must be a clear division throughout between these sections. Edging tools will be used to form an edge along the back and front form and at each template.
- 4) All concrete pours shall terminate at a template. If pouring is to be resumed within one hour or less, any excess concrete that exists after the template has been reached may be spread in the bottom two (2) inches of the gutter form adjoining the completed curb.
- 5) At catch basins, there will be a short section of gutter only, the curbing being replaced by the casting. The catch basin casting shall be parallel with, and on the grade of the back form of the curb and gutter section. The gutter area shall be so shaped and sloped as to increase in slope toward the curbing to an extent that when opposite the catch basin casting, it will provide a minimum of eight (8") inch clear opening below the casting top. This warped section at, and adjacent to, each catch basin shall have the exact same finish texture as that of the other curbing present and shall be poured at the same time where possible. A double ply of 30-pound building felt shall be inserted on all sides of catch basin casting covers that come in contact with any concrete. No felt shall be placed against catch basin leg castings.
- 6) The use of excessive grout (mud) continuously along the curb and gutter section will not be tolerated. The use of "mules" shall be limited to obtaining the desired finish - they should not be allowed to alter the section of the curb. No floating and little toweling should be necessary against the curb face in order to obtain a true and proper section. Such section should be obtained with the curb face form board, the alignment of which must be extremely good.
- 7) The curb and gutter at street corners shall be constructed on a thirty-five (35) foot radius unless otherwise instructed. At driveways the curb and gutter shall be constructed on a four and one-half (4 ½) foot radius unless otherwise directed by the Engineer.

c) Sidewalks and Driveway Construction:

- 1) After the forms have been set, the contractor shall inspect the form for proper line and grade and shall check the subgrade for proper compaction before allowing any concrete to be placed.
- 2) All materials incorporated in this concrete shall conform to the provisions as set out hereinbefore and shall be mixed and deposited in accordance with the requirements of these specifications.
- 3) When sufficient concrete has been deposited in the forms it shall be well "spaded" along all areas in contact with the forms in order to eliminate all "honeycombing".
- 4) Sidewalks shall be "scored" (1" deep) in sections six feet or less in width. If sidewalk is greater than six feet in width scoring shall be as directed by the Engineer. All "scores" shall be straight and rounded at the surface with the proper edging tool, or as directed by the Engineer.
- 5) Expansion joints shall be installed for every 30 linear feet of sidewalk, against all structures, pavement and curbs, and at such other places as shown on the plans and details, or as directed by the Engineer.
- 6) All concrete pours shall terminate at a template.
- 7) If pouring is to be resumed within one hour or less, any excess concrete that exists after the template has been reached may be spread in the bottom two (2) inches of the adjoining sidewalk section.
- 8) All driveways shall be re-constructed to previous widths, depths, and also with equal radii or angles at the street.

Technical Specification 017

ASPHALT PAVING

1.0 General

- a) Brunswick County does not own and maintain any paved streets, roads, or parking lots other than those that may be found on County owned property. Streets in private subdivisions are designed by an Engineer working for a developer and are generally designed and constructed to the NCDOT subdivision street standards with regards to geometry and load bearing capability. These streets are owned and maintained by either the developer or the HOA / POA.
- b) The intent of this specification is to provide general direction to a contractor that is installing asphalt paving on a County utility project, or at the County's direction for street repairs, patching, drives, parking areas, or the final layer of asphalt within an existing subdivision. It is not the intent of this specification to be a design guideline for street construction – all street construction shall conform with the plans and specifications prepared by an Engineer and with all applicable NCDOT street design requirements.
- c) The contractor shall provide all plant, labor, equipment, and materials in connection with the construction of a hot-mix pavement consisting of a surface course on a previously prepared base, or over an existing initial layer of asphalt, or for minor street patching and repairs, complete, in strict accordance with this specification and any applicable approved drawings prepared by the Engineer.

2.0 Surface Preparation

- a) The base course shall be placed and constructed as required in the current North Carolina Department of Transportation (NCDOT) Standard Specifications for Streets and Roads.
- b) All drainage structures and pipes shall be properly installed at the locations shown on the plans.
- c) The surface shall be graded to subgrade and compacted as specified by the Engineer. Surfacing shall be finished by fine grading to the required lines, grades, and sections, and by re-compacting the subgrade with heavy rollers.
- d) The bituminous surface course shall be of the type as shown on the plans, and shall consist of fine and coarse mineral aggregate and mineral filler uniformly mixed with hot bituminous material placed and compacted on a prepared base course to the depth specified or as shown on the plans.
- e) Newly placed and compacted asphalt surface course shall be barricaded and protected from all defects for a period of at least eight (8) hours until they have become properly hardened by cooling. Only local traffic will be allowed to egress and ingress.

- f) The contractor shall maintain the pavement in an acceptable condition until final acceptance of the project.

3.0 Adjustment of Existing Manholes and Valve Boxes

- a) All existing manhole covers, monument boxes, valve boxes, sewer cleanout boxes, etc., shall be adjusted to match the grade of the proposed overlay.

4.0 Cutting and Replacing Pavement for Utility Installation or Repairs

- a) Pavement shall be neatly cut to a straight edge prior to trenching operations. The cuts shall be made per the approved plans. Ragged and irregular edges shall be redone. Concrete pavement shall be cut with suitable concrete saw cutting equipment.

5.0 Pavement Replacement

- a) Pavement shall be repaired within the same week that it is cut. If inclement weather delays pavement replacement, the contractor shall not cut additional pavement without specific approval from the Engineer or County staff.
- b) The surface course shall be hot asphalt laid over the leveling or tack coat to the compacted thickness as shown on the approved plans. After compaction, the pavement surface shall be smooth and true to the established crown and grade. Defects shall be neatly cut out and replaced. Sections of new pavement shall be protected from traffic until the asphalt has properly hardened.
- c) All settlement and damage occurring during construction and the warranty period shall be repaired by the contractor at his cost.

6.0 Warranty

- a) The warranty period for asphalt paving shall be one (1) year from the date of acceptance by Brunswick County.

Technical Specification 018

WATER DISTRIBUTION SYSTEM

1.0 General

- a) It is the intent of this specification to ensure that all water system infrastructure constructed within the service area of the Brunswick County Public Utilities Department meets or exceeds all local, state, and federal rules and regulations as applicable. This specification also provides technical guidance to contractors and engineers to ensure that all water system infrastructure is properly constructed, tested, chlorinated, and placed in service to protect the public.

2.0 Materials and Requirements for Water Mains

- a) General
 - 1) To the maximum extent possible all materials shall be manufactured in the United States. This includes all pipe, valves, fittings, hydrants, meter boxes, etc.
 - 2) All pipe material shall be marked with the manufacturer, type, class, thickness, and date of production in lettering legible to the Engineer and County staff.
 - 3) The engineer is responsible for reviewing all shop submittals for approval. County staff may assist as needed to answer any questions concerning material suitability.
 - 4) All piping material must have a minimum pressure rating of one and one-half (1.5) times the normal working pressure of the pipe.
 - 5) All pipes, valves, hydrants, fittings, etc., must conform to the applicable AWWA standards.
 - 6) Water mains shall be constructed of AWWA C900 PVC, minimum DR-18, except when DIP, HDPE, or Fusible PVC mains are required.
 - 7) All pipes shall be shipped with gaskets installed inside the pipe bell.
 - 8) Water main installation shall conform to AWWA C600: Standard for Installation of Ductile Iron Pipe (DIP), or AWWA C605: Standard for Installation of Polyvinyl Chloride (PVC) pipe

b) Ductile Iron Pipe (DIP)

- 1) All sizes of pipe shall be manufactured to a nominal laying length of 18'-0" to 20'-0", except to make adjustments for bends, tees, and other fittings.
- 2) DIP shall conform to ANSI / AWWA C150 / A21.50 and ANSI / AWWA C151 / A21.51, with interior cement mortar lining and an exterior asphaltic coating for corrosion resistance.
- 3) Cement mortar linings shall conform to ANSI A21.4 / AWWA C104.
- 4) DIP that has an interior lining of Protecto 401 (or equivalent) for use in sewer systems shall not be permitted on potable water systems.
- 5) Joints shall be the push-on or mechanical joint type conforming to ANSI / AWWA C111 / A21.11 as modified by ANSI / AWWA C151 / A21.51.
- 6) Fittings and specials shall be cast or ductile iron conforming to ANSI 21.10 and shall be rated for one hundred and fifty (150) pounds per square inch minimum pressure.
- 7) Wall thickness shall be in accordance with Table 51.1 of ANSI/AWWA C151/A21.51 with working pressure of one hundred and fifty (150) psi. Final pipe class shall be determined based on specific structural calculations as they relate to conditions encountered during design. Brunswick County reserves the right to designate the final pipe thickness.
 - a) (4) inch – (12) inch diameter pipe: minimum pressure class 350
 - b) (14) inch – (20) inch diameter pipe: minimum pressure class 250
 - c) (24) inch pipe: minimum pressure class 200
 - d) Flanged pipe shall be minimum pressure Class 53
- 8) Rubber gaskets and lubricant shall conform to ANSI/AWWA C111/A21.11.
- 9) No metric sized pipe shall be permitted.
- 10) In corrosive, contaminated, and dredged soils, DIP and all fittings shall be wrapped in a polyethylene encasement per ANSI / AWWA A21.5 / C105 Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids. All fasteners shall be stainless steel Type 304, minimum grade.
- 11) Acceptable products are American Cast Iron Pipe Company, Griffin Pipe Company, U.S. Pipe Company, or approved equal.

c) Polyvinyl Chloride Pipe (PVC)

- 1) All sizes of pipe shall be manufactured to a nominal laying length of 18'-0" to 20'-0" except to make adjustments for bends, tees, and other fittings.
- 2) Two (2) inch PVC mains shall be SDR-21, gasketed pipe, in accordance with ASTM D2241 and shall bear the seal of the National Sanitation Foundation (NSF).
- 3) Four (4) inch through twelve (12) inch PVC mains shall be AWWA C900 Class 150 (DR-18) and shall bear the seal of the NSF. Joints shall conform to ASTM D3139 or ASTM D3212.
- 4) Fourteen (14) inch through thirty-six (36) inch PVC mains shall be AWWA C900 Class 235 (DR-18) and shall bear the seal of the NSF. Joints shall conform to ASTM D3139 or ASTM D3212.
- 5) PVC mains shall be manufactured with PVC material conforming to PVC 1120.
- 6) Fittings shall be molded PVC with joints similar to the PVC pipe. Fabricated fittings using solvent welded joints are not acceptable. Fittings may also be DIP fittings listed and approved for use with PVC pipe and shall have a cement mortar lining on the interior and an asphaltic coating on the exterior for corrosion resistance.
- 7) All PVC water mains shall be factory dyed industry standard blue.
- 8) Push on joints shall conform to ASTM D3139 with an elastomeric gasket and the joint pressure rating shall not be less than the pipe pressure rating.
- 9) In corrosive, contaminated, and dredged soils, all fittings shall be wrapped in a polyethylene encasement per ANSI / AWWA A21.5 / C105 *Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids*. All fasteners shall be stainless steel Type 304, minimum grade.
- 10) Acceptable products are Diamond Plastics Corporation, J M Eagle Manufacturing Company, National, Certainteed, North American, or approved equal.

d) Fusible Polyvinyl Chloride (Fusible PVC)

- 1) Fusible PVC pipe shall be in the four (4) inch to thirty-six (36) inch diameter range.
- 2) Fusible PVC shall be AWWA C900 with National Sanitation Foundation (NSF) certifications NSF-61 and NSF-14.
- 3) Fusible PVC shall conform to ASTM cell classification 12454.

- 4) Fusible PVC shall have a minimum safety factor of two (2.0).
- 5) Fusible PVC shall be joined by the thermal butt fusion method in accordance with ASTM F-1674 and D-638.
- 6) Four (4) through twenty-four (24) inch Fusible PVC (DIPS) shall be minimum DR-18.
- 7) Thirty (30) inch Fusible PVC (DIPS) shall be DR-25.
- 8) Thirty-six (36) inch Fusible PVC (DIPS) shall be DR-32.5.
- 9) All Fusible PVC water mains shall be factory dyed industry standard blue.
- 10) Fittings and specials shall be as stated in Section (4.0) of this specification.
- 11) Acceptable products are Fusible PVC TM by Underground Solutions, Inc.

e) High Density Polyethylene Pipe (HDPE)

- 1) HDPE mains shall be high density polyethylene conforming to AWWA C906 with PE 4710 materials and shall conform to ASTM F714 specification for HDPE pipe.
- 2) HDPE shall be joined by the thermal butt fusion method in accordance with ASTM D3261.
- 3) HDPE shall be minimum DR-9 rated at a minimum two hundred (250) pounds per square inch.
- 4) All HDPE water mains shall have a factory standard blue stripe on the pipe.
- 5) Fittings and specials for HDPE mains shall be per the HDPE manufacturer's recommendations and shall be submitted as shop submittals by the utility contractor to the engineer for review and approval prior to use. All fittings and specials shall conform to ASTM D3350 for fittings materials.
- 6) HDPE used for horizontal directional drills (HDD) shall have the pipe diameter increased in order to maintain equivalent inside diameter as the open cut installed pipe it connects to.
- 7) Acceptable products are Mono-Line Pipe System by Joseph T. Ryerson and Sons, Inc.; Driscopipe 1000 by Phillips Products, Inc.; Sclairpipe by Dupont of Canada; JM Manufacturing Company Inc. or approved equal.

3.0 Materials and Requirements for Water Services

- a) Water services that are less than fifty (50) percent of the outside diameter of the supplying main may utilize a wide band body tapping saddle. All other water service connections shall use a tapping sleeve.
- b) One (1) inch service lines and tapping saddles – three quarter ($\frac{3}{4}$) inch & one (1) inch meters

- 1) Service line piping shall be minimum one (1) inch diameter for ($\frac{3}{4}$) and (1) inch water meters and shall be HDPE tubing, SDR 9, 200 psi, conforming to ASTM D2737 / AWWA C901. No joints are allowed on a service line between the main service tap and the meter stop.

In proven contaminated soils the service line shall be Type K copper with rated and approved gaskets for contaminated soils.

- 2) Service saddles shall be wide band body service saddles, ACIPCO, US Pipe, McDonald, Mueller, Smith Blair, Ford, JCM, Romac, or approved equal. All fasteners shall be minimum high strength alloy steel.
- 3) Size of tap shall match that of the service line (1-inch minimum tap).
- 4) The corporation stop shall have AWWA inlet threads, ball type, outlet connection to be CTS /OD, conductive compression type (grip nut). Size of corporation stop shall match that of service line (1-inch minimum). Corporation stops shall be Mueller B 25028, Ford –Ball Corp FB 1100 or 1000, McDonald – Ball Corp 4704 –BT, or approved equal.
- c) Two (2) inch service lines and tapping saddles – one and one-half (1.5) inch & two (2) inch meters

- 1) Services shall be two (2) inch diameter for one and one-half (1.5) inch and two (2) inch water meters and shall be HDPE tubing, SDR 9, 200 psi, conforming to ASTM D2737 / AWWA C901. No joints are allowed on a service line between the main service tap and the meter stop.

In proven contaminated soils the service line shall be Type K copper with rated and approved gaskets for contaminated soils

- 2) Service saddles shall be wide band body service saddles, McDonald 3800 series, Mueller H 13000 or DR 2S series, Smith Blair 317, Ford FC 202, JCM 406, Romac 202, or approved equal. All fasteners shall be minimum high strength alloy steel.
- 3) Tapping valve shall be a two (2) inch, resilient wedge gate valve, Mueller A 2360, or approved equal, installed with a valve box and concrete collar per County Standard Detail.

- 4) Large meter boxes with meter setters are required for one and one-half (1.5) inch and two (2.0) inch water meters and shall be provided by the contractor and shall accommodate the Sensus AMR/AMI water meter. The contractor shall submit the proposed large meter box and lid to the Engineer for approval prior to installing the meter box.
- d) Four (4) inch service lines – three (3) inch & four (4) inch meters
 - 1) Service lines shall be four (4) inch diameter for three (3) inch and four (4) inch water meters and may be HDPE, DIP, or PVC material conforming to technical specifications for these materials per Section (3.0) of this Specification. Water meters three (3) inch and larger shall be installed in a meter vault per County Water Standard Details – Large Meter Vaults.
 - 2) Tapping sleeves are required per County Standard Details. Tapping saddles are not allowed on any services larger than two (2) inch. See Section (12) of this specification for tapping sleeve information. All fasteners shall be minimum high strength alloy steel.
- e) Services for water meters larger than four (4) inch shall be sized to match the installed meter size.
- f) All services shall be installed as shown on the approved plans and the tap shall be made perpendicular to the main and run straight to the meter box or vault. Variations from this requirement due to field conditions are only by approval of the County in advance of installation.
- g) Locating wire is required on water services and water mains. See Section (14) of this specification for locating wire information.
- h) Service taps shall be made at the 10:00 o'clock or 2:00 o'clock position on the water main. Service taps shall be staggered from one side of the main to the other with a minimum distance of eighteen (18) inches between taps. Taps are to be a minimum twenty (20) inches apart if made on the same side of the main.
- i) Services shall not be installed by the contractor until all the mains have passed hydrostatic testing, cleaning, and chlorination results are satisfactory and provided to County staff.
- j) No taps are allowed on a fire hydrant leg.
- k) No taps are allowed where rodding is in place.
- l) No burned taps are allowed.
- m) No taps are allowed on horizontally directionally drilled (HDD) pipe.

- n) Brunswick County Public Utilities is standardizing on the Sensus AMR / AMI water meter. Water meters shall be Sensus AMR / AMI, or approved equal, and shall be provided with the MXU unit and touch read pad.
- o) Water meter boxes for standard 5/8" x 3/4" water meters shall be:

Single Meter Boxes:

Ford	LYLV141-243-TP-NL
McDonald	776-208PC2G437
Mueller	H-1462-K

- 1) Or approved equal – all boxes must accommodate the Sensus water meter with AMI/AMR technology to include the MXU unit and touch read pad
- 2) Water meter boxes for meters larger than 5/8" x 3/4" shall be provided by the contractor and sized appropriately for the meter being installed

Double Meter Boxes:

Ford	DGHC118-C14439-002-NL
McDonald	773N208BCGP 434TCX001

- 1) Or approved equal – all boxes must accommodate (2) Sensus 3/4-inch water meters with AMI/AMR technology to include the MXU units and touch read pad.
- p) All new residential subdivisions that have county public sewer shall install a double water meter box, or two single gang meter boxes, on the one (1) inch service lateral on each lot to accommodate an irrigation meter for separate billing purposes – refer to county water standard detail for water services.
- q) Water meters shall be in non-traffic areas. Driveways shall not be formed around meter boxes and the nearest distance from the meter box to the driveway shall be no less than eighteen (18) inches.
- r) Large water meter vaults shall be per the County Standard Details for meter vaults. Quazite or GlasMasters polymer concrete enclosures, minimum Tier 22 rating for both the box and lid, are an approved "or equal" to a standard concrete vault. Contact County Engineering with any questions concerning large water meter vaults.

4.0 Materials and Requirements for Fittings and Specials

- a) Fittings and specials shall be class (54) ductile iron per ANSI / AWWA A21.11 / C111, ANSI / AWWA A21.53 / C153, and ANSI / AWWA A21.51 / C151, minimum class 350 for (18) inch and smaller fittings and minimum class 250 for (20) inch and larger fittings.

- b) Profiles of fittings and specials may have special dimensions as required by the pipe manufacturer.
- c) Ductile iron fittings and specials shall be cement mortar lined per ANSI / AWWA A21.4 / C104 and have an asphaltic coating on the exterior for corrosion resistance.
- d) No metric sized fittings shall be permitted.
- e) All fittings to be shipped with gaskets, glands, nuts, and bolts unless specified otherwise. Nuts and bolts shall be high strength alloy steel.

5.0 Materials and Requirements for Restrained Joints, Piping, and Fittings

- a) Restrained joints are required to prevent movement of system piping caused by forces in or on buried piping, tees, valves, branches, bends, plugs, etc.
- b) Restrained joints shall be installed as shown on the approved plans, standard details, or as directed by county staff or the Engineer.
- c) Concrete thrust blocking shall be installed as shown on the approved plans, standard details, or as directed by county staff or the Engineer.
- d) All carrier pipe installed inside a casing shall be pressure class 350 ductile iron pipes per county standard details with restrained joints.
- e) All restrained joint systems shall have a pressure rating equal to or greater than that of the pipe on which they are installed.
- f) Restraint type gaskets that provide internal restraint by means of stainless steel inserts embedded within the gasket are not permitted for use in Brunswick County.
- g) Ductile Iron Pipe (DIP)
 - 1) Install restraints in strict accordance with the manufacturer's recommendations.
 - 2) All ductile iron horizontal directional drill and bore-and-jack installations shall use boltless, integral, positive locking restraint systems that allow for joint deflection and disassembly should the need arise. The restrained joint system shall be a manufacturer's standard restrained joint system such as American (Flex-Ring or Lok-Ring), U S Pipe (TR-Flex), or Griffin (Snap-Lok), or approved equal.

Note: the aforementioned boltless, integral, positive locking restraint systems are also acceptable for use in open cut pipe installations.

- 3) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.

- 4) Restraint for valves and fittings shall have ductile iron glands. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.

- 5) Stainless steel rodding and fasteners, Type 304 minimum, is acceptable per county standard details. Manufacturer's restraint system and/or glands are preferred in lieu of rodding.

h) Polyvinyl Chloride Pipe (PVC)

- 1) Install restraints in strict accordance with the manufacturer's recommendations.
- 2) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.

- 3) Restraint for valves and fittings shall have ductile iron glands. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to

ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or approved equal.

- 4) Stainless steel rodding and fasteners, Type 304 minimum, is acceptable per county standard details. Manufacturer's restraint system and/or glands are preferred in lieu of rodding.

6.0 Materials and Requirements for Pipe Couplings – 4 inches and larger

- a) Provide couplings where needed to make piping connections.
- b) Provide full-length, mechanical joint, ductile iron solid sleeve with twelve (12) inch minimum length.
- c) Provide ductile iron cut-in sleeve with mechanical restrained joints where installing fittings in an existing line.

7.0 Materials and Requirements for Fire Hydrants

- a) Hydrants shall be the dry barrel type with breakaway flange, shall open left only, conforming to AWWA Standard C502, latest revision, with a six (6) inch mechanical joint connection on the inlet end, minimum four and one-half (4.5) inch valve opening, and two (2.5) inch hose connections and one (4.5) inch pumper connection, all with American National Standard fire hose coupling threads.
- b) Hydrants shall have breakaway barrel and operating stem with barrel length for three (3) foot main cover, six (6) inch bottom hub, and one and one-half (1.5) inch solid operating nut with O-ring seals.
- c) Main valve seat shall have bronze to bronze threads into the hydrant shoe. Hydrant shall be grease lubricated with a thrust bearing to reduce operating torque or may be oil lubricated.
- d) Hydrants shall be rated at one-hundred-fifty (150) psi working pressure and three-hundred (300) psi test pressure.
- e) Hydrants shall be shop painted chrome yellow Tnemec paint (or approved equal) and shall be touched up after installation and given one (1) field coat of chrome yellow enamel. If the hydrant is painted with color other than chrome yellow from the manufacturer, there shall be three (3) field coats of chrome yellow paint applied by the contractor after installation.

- f) Hydrant shall be dry bonnet type and be provided with a drain outlet for draining when the valve is closed and shall be provided with washed stone per County Standard Detail to ensure adequate drainage.
- g) All fire hydrants installed on water mains 12-inch and smaller shall be installed as shown on County Standard Detail W-1 using a swivel hydrant tee on the main and DIP and/or MJ GradeLok restrained joint (Mega-A-Lug or equal) piping between the hydrant gate valve and the hydrant. Mega-A-Lug is preferred in lieu of rodding. Thrust blocks are required per detail.
- h) All fire hydrants installed on water mains larger than 12-inch shall be installed with a level invert tee on the main and DIP and/or MJ GradeLok restrained joint (Mega-A-Lug or equal) piping between the hydrant gate valve and the hydrant. Mega-A-Lug is preferred in lieu of rodding. Thrust blocks are required per detail.
- i) Hydrants shall be installed plumb one-eighth (1/8) inch per foot, and set so that the pumper nozzle is eighteen (18) inches minimum above the final finished grade.
- j) Contractor shall be allowed one (1) barrel extension as required to maintain pumper nozzle at eighteen (18) inches above final finished grade and the fire hydrant shall not be left too high such that the breakaway will not work properly.
- k) Hydrants shall be Mueller, Clow, American Darling, or approved equal.

8.0 Materials and Requirements for Building Fire Sprinkler Systems

- a) Backflow prevention devices are required on all fire lines and sprinkler systems to prevent cross- contamination of the County's water transmission and distribution system. Refer to the Brunswick County Public Utilities Department's *Cross-Connections and Backflow Protection Policy* for additional information.
- b) A lockable post indicator valve (PIV) is required at the right-of-way or easement line on all fire lines to delineate ownership of the fire line between the County and the property owner. The top of the PIV shall be thirty-six (36) inches above finished grade. Refer to County Standard Details for fire lines.
- c) Backflow prevention devices shall be installed at the right-of-way or easement line immediately adjacent and downstream of the PIV. With County approval the backflow prevention device may be installed inside a building's mechanical room where the sprinkler riser is located.
- e) Where a building utilizes a sprinkler system, or has a Fire Department Connection (FDC), then the required level of backflow protection is a Reduced Pressure Zone (RPZ) backflow preventer.
- f) Fire hydrants shall not be installed on private fire lines.

9.0 Materials and Requirements for Water System Valves

a) General Information for all Valves

- 1) Valves shall be installed on all system branches from feeder mains, on hydrant legs, at each end of horizontal directional drills per standard detail, per a), b) and c) as follows, or as directed by county staff or the engineer:
 - a) Install three (3) valves at crosses
 - b) Install two (2) valves at tees
 - c) Install one (1) valve on a fire hydrant leg
- 2) For distribution mains isolation valves are required at approximately every one-hundred (100) feet per one (1) inch diameter of the installed main up to a maximum distance of two thousand (2,000) feet between valves. For example, for an eight (8) inch diameter main install a main line isolation valve every eight hundred (800) feet. Place main line isolation valves in close proximity to fire hydrants. Also adjust main line isolation valve placement to take into account subdivision entrances, driveways, fences, street intersections, other underground utilities, etc, or as directed by county staff. Restrained joint pipe is required on the first joint in each direction from a main line valve as per county standard detail
- 3) For transmission mains - defined as twelve (12) inch and larger - install an isolation valve approximately every two hundred (200) feet per one (1) inch diameter of the installed main up to a maximum distance of five thousand (5,000) feet between valves. Place main line isolation valves near fire hydrants. Also adjust main line isolation valve placement to take into account subdivision entrances, driveways, fences, street intersections, other underground utilities, etc, or as directed by county staff. Restrained joint pipe is required on the first joint in each direction from a main line valve per county standard detail.
- 4) Place main line isolation valves on the downstream side of the fire hydrant tee per the direction of water flow.
- 5) Valves shall be located per the approved plans, at the proper elevation, and operable. Hard to operate or inoperable valves and fire hydrants are not acceptable and shall be repaired or replaced prior to system hydrostatic pressure testing.
- 6) All valves shall open left – no right hand open valves are allowed.
- 7) Valves shall be rodded to the cross or tee if within ten (10) feet of the cross or tee.

- 8) All valves shall have a metal screw type valve box with lid marked WATER and a concrete collar (in non-traffic areas) installed per the County Standard Detail for valves and valve boxes. Masonry blocking shall be used to support the valve box such that it does not rest on the bonnet of valve – refer to county standard details. Valve lid shall be painted blue.
- 9) Maximum depth of the valve stem nut shall be five (5) feet. If valve stem nut is deeper than five (5) feet below grade then a valve operating nut extension kit, manufactured by the same company that produced the valve, must be installed by the utility contractor.

b) Gate Valves

- 1) All valves shall be in conformance with the latest revision of all reference standards of AWWA C509 / 515: Resilient Seated Gate Valves for Water Supply Service.
- 2) Four (4) inch through twelve (12) inch mains: use resilient wedge gate valves or ¼ turn stainless steel ball valves. No valves smaller than four (4) inch diameter are allowed.
- 3) All valves shall open left (counter clock wise) – no right hand valves allowed.
- 4) Valves shall have a two (2) inch metal operating nut with arrow indicating direction of opening.
- 5) Valves shall be designed for a working pressure of not less than one hundred fifty (150) psi unless specifically approved by county staff or the Engineer.
- 6) Valves shall be equipped with a non-rising stem. Valves installed in vaults or manholes shall be provided with hand wheel actuators.
- 7) All valves shall have a screw type valve box and a four (4) inch thick concrete collar in non-traffic areas per county standard detail.
- 8) Resilient Seated Wedge Gate Valves:
 - a) Iron body, bronze mounted, double disc, parallel seat type, factory tested to three hundred (300) psi, valve ends to be constructed for use with mechanical joints or push on joints.
 - b) Bonnet and body flanges shall be fully machined to assure proper sealing of the gasket.
 - c) Shall have O-Ring sealed stems with one O-Ring located below the thrust collar and with two O-Rings located above the thrust collar. The thrust collar between the two lower O-Rings shall be factory

filled with a lubricant to provide permanent lubrication of the thrust collar area.

- d) Provide integrally cast bronze or stainless-steel thrust collar.
- e) An antifriction thrust washer shall be provided both above and below the thrust collar for ease of operation.
- f) Acceptable product: Mueller, M & H, American Flow Control, Clow, or approved equal.

c) Butterfly Valves

- 1) Butterfly valves shall be installed on water mains sixteen (16) inch diameter and larger.
- 2) Butterfly valves shall meet the requirement of AWWA C504, latest revision.
- 3) Valves shall have mechanical joints.
- 4) Operating stem and nut shall be two (2) inch and open left only.
- 5) Resilient and elastomer seats are to be synthetic rubber (EPDM).
- 6) Shafts to be turned, ground and polished, constructed of 18-8 Type 304 stainless steel.
 - a) Shafts to be of one-piece design.
 - b) Attach disc to shaft with stainless steel tapered pins and locking nuts.
- 7) Provide operators with not less than maximum operator torque, as determined in accordance with Appendix A of AWWA C504, to operate valves under actual line pressures and velocities:
 - a) Provide worm and gear, or traveling nut type, self-locking to prevent the valve disc from creeping or fluttering when it is in any intermediate position between open and closed.
 - b) Gear operators to be permanently lubricated, totally enclosed, with adjustable stops for the open and closed position.
 - c) All exterior fasteners shall be minimum high strength alloy steel.
- 8) Epoxy coated inside and outside conforming to AWWA C550.
- 9) Rated for a one hundred fifty (150) psi working pressure.

- 10) Acceptable product: Mueller, American Darling, Pratt, or approved equal.
- d) Tapping Valves – less than 30 inches
 - 1) Tapping valves smaller than thirty (30) inches shall conform to the following:
 - a) Resilient seated wedge type conforming to AWWA C509 / C515.
 - b) Epoxy coated inside and outside conforming to AWWA C550.
 - c) Both ends shall be flanged with tapping boss by mechanical joint conforming to ANSI B16.1, Class 125 and ANSI / AWWA C111 / A21.11 respectively.
 - d) Rated for two hundred fifty (250) psi working pressure.
 - e) All exterior fasteners shall be minimum high strength alloy steel
 - f) Acceptable Product: Mueller T-2360 -16, AVK Series 25, or proved equal.
- e) Tapping valves (30) inches and larger
 - 1) Bronze seat, double disk type, conforming to AWWA C500, or resilient seated wedge conforming to AWWA C515.
 - 2) Epoxy coated inside and out conforming to AWWA C550.
 - 3) Equipped with four (4) inch by-pass valves.
 - 4) Ends shall be flanged with tapping boss by mechanical joint conforming to ANSI B16.1, Class 125 and ANSI/AWWA C111/A21.11 respectively.
 - 5) Rated for (200) psi working pressure.
 - 6) Acceptable product: Mueller t-2360 -16, AVK Series 25 or approved equal.

10.0 Materials and Requirements for Valve Boxes and Concrete Collars

- a) Install per county standard details at each water valve.
- b) Cast iron or ductile iron, screw type, with flared base, length as required for the buried valve, Valve Box Adaptor II, by Adaptor Inc., or approved equal.
- c) The word “WATER” shall be cast in the cover.
- d) The contractor shall spray paint the cover blue after installation.

- e) Install precast concrete ring around valve box in unpaved non-traffic areas per county standard detail.

11.0 Materials and Requirements for Valve Markers

- a) Valve markers shall be installed in rights-of-way and utility easements as shown on the County Standard Details
- b) Valve markers in public rights-of-way shall be concrete, extend thirty-six (36) inches above finished grade, with the cast MV (main valve), AV (air release valve), or BO (blow off) facing the nearest street. Valve markers in utility easements shall be fiberglass and extend sixty (60) inches above finished grade. Refer to county standard details for additional information.
- c) Valve markers are not required for fire hydrant leg isolation valves.
- d) Valve markers shall be painted blue for water mains.
- e) Concrete valve markers shall have a bronze, stamped, insert on top of marker per county standard detail.

12.0 Materials and Requirements for Tapping Sleeves (services larger than 2 inch)

- a) Tapping sleeves shall have outlet flange counter bored to accept a mating tapping valve for true alignment of the tapping sleeve, tapping valve, and tapping machine.
- b) Sleeves shall be stainless steel, split type, with gasket and flanged outlet.
- c) Sleeve fasteners shall be minimum high strength alloy steel.
- d) Provide for a minimum working pressure of one hundred fifty (150) psi.
- e) Provide (¾) inch NPT test plug on the tapping sleeve.
- f) Air test of tapping sleeve – minimum fifty (50) psig for five (5) minutes - shall be witnessed by county staff prior to the contractor performing tapping operations on county water mains. No taps are allowed without county staff present.
- g) Acceptable tapping sleeves are:
 - 1) Romac, Ford, and Mueller for mains four (4) inches through twenty-four (24) inches diameter.
 - 2) Dresser, Cascade, and JCM for mains thirty (30) inches and larger.

13.0 Materials and Requirements for Curb Stops and Water Meter Boxes

- a) All new residential subdivisions that have public sewer shall install a double water meter box on each lot to accommodate an irrigation meter.
- b) See Section 3.0 (o) of this specification for approved water meter boxes.
- c) All single gang water meter boxes will have an in-line curb stop valve and an in-line check valve per county standard detail.
- d) All irrigation meters, and all non-residential water meters, must have an approved backflow prevention device installed per county standard detail.
- e) Brunswick County is standardizing on the Sensus AMR / AMI water meter. All water meter boxes used in the service area of Brunswick County Public Utilities must accommodate the Sensus AMR / AMI water meter.

14.0 Materials and Requirements for Locating Wire, Marking Tape, and Marker Balls

- a) Tape shall be three (3) inches wide, blue in color, bearing continuous message "CAUTION WATER LINE BURIED BELOW". Tape shall be made of plastic or other permanent material, and shall be buried continuously above the water main at a depth of eighteen (18) inches below finished grade.
- b) All water mains shall have a #12 AWG, high strength copper clad steel conductor (HS-CCS) such as Copperhead Superflex, Pro Trace High Flex, or approved equal, with HDPE insulation, and rated for direct burial. Listed and approved underground connectors shall be used for all splices. The wire shall be brought up in valve boxes per County Standard Detail. In any event, the wire shall be brought up into a valve box at 1,000 feet maximum intervals to provide wire access points. The wire shall be taped to the top of the water main at minimum ten (10) feet intervals.
- c) The contractor shall be required to perform a signal strength test of the installed tracer wire at the end of the project with county staff present. Refer to Brunswick County standard details for tracer wire information.
- d) Individual water services shall have tracer wire installed from the main to the meter box.
- e) In addition to the tracing wire, electronic marker balls shall be installed on the water main in accordance with Brunswick County Technical Specification TS 035: Electronic Markers for Water and Sewer Pressure Mains.

15.0 Separation of Water Mains and Sewer Mains

- a) Horizontal and Vertical Separation

- 1) Minimum horizontal separation between water mains and sanitary sewer shall be ten (10) feet. The distance shall be measured edge of pipe to edge of pipe.
- 2) Should ten (10) foot separation not be feasible, then the water main may be located closer to the sewer main provided that:
 - a) It is laid in a separate trench,
 - b) It is laid in the same trench with the water main located at one side on a bench of undistributed earth,
 - c) In either of the above cases, crown elevation of the sewer shall be at least eighteen (18) inches below invert elevation of the water line.
- 3) Sewers crossing water mains shall be laid to provide a minimum vertical separation of eighteen (18) inches between the invert of the water main and the crown elevation of the sewer main. The crossing shall be arranged perpendicularly so that the sewer main joints will be equidistant and at least ten (10) feet from the crossing in each direction.
- 4) If it is impossible to maintain the required horizontal and vertical separation as described above or anytime sewer must be laid above a water main, then both the water main and sewer main must be encased in ferrous sleeves. Sleeves shall have sealed ends. If the water main is ferrous with joints equivalent to water main standards, then the water main does not have to be encased within an additional sleeve
- 5) Mechanical joints will be required for the transition in the sewer main at water main / sewer main crossings. Fernco couplings are not permitted to be used. Special structural support for the water and sewer mains may be required.

16.0 Hydrostatic Testing

- a) Conduct hydrostatic testing in accordance with AWWA C600 (DIP) or AWWA C605 (PVC) as applicable. Conduct tests on each line or valved section of line. Water mains shall be tested to one-hundred and fifty (150) percent of the pipe working pressure, but in no case shall the hydrostatic test pressure be less than (150) psig for a minimum of two (2) hours and shall be witnessed and certified by county staff and / or the Engineer.
- b) Slowly fill the main to expel air from the main through the air release valves, fire hydrants, blow offs, or other appurtenances. If permanent air release valves are not located at all high points, the contractor shall install corporation cocks at such points so that 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 end of the pressure test, the corporation cocks shall be removed and plugged.

- c) Hydrostatic pressure testing shall not be made until seven (7) days after installation of piping to be tested is backfilled, and a minimum forty-eight (48) hour notice to county staff is required.
- d) Directionally drilled pipe must be pressure tested after any manufacturer's required pipe relaxation period, as applicable, to ascertain the successful completion of the directional drill. All directionally drilled piping shall be tested again with the complete system and witnessed by county staff and /or the engineer.
- e) A suitable test pump, furnished by the contractor, shall be connected to the line by means of a tap in the line, or other suitable methods, and the proper test pressure slowly applied to the line.

17.0 Water Main Flushing and Chlorination

- a) Conduct disinfection in accordance with AWWA C651 and 15A NCAC 18C .1003 before placing a newly installed water main in service:
 - 1) Upon completion of construction thoroughly flush the water main to remove all sediment, stone, and other foreign matter.
 - 2) Hydrostatically pressures test the water main per Section (16) of this specification.
 - 3) The water main shall be disinfected by the addition and thorough dispersion of a chlorine solution in concentrations sufficient to produce a chlorine residual of at least fifty (50) milligrams per liter (or ppm) in the water throughout the water main system.
 - 4) All installed valves or other appurtenances shall be operated several times while line is filled with chlorinating agent to ensure proper filling of the entire system.
 - 5) The chlorine solution shall remain in contact with the interior surfaces of the piping system for a minimum period of twenty-four (24) hours.
 - 6) At end of retention period flush the system with potable water. At least (10) ppm of chlorine shall remain in the water at the extreme end of the system.
 - 7) If the initial disinfection procedure fails to produce satisfactory laboratory results the system must be disinfected again as needed by the contractor until satisfactory results are obtained.
 - 8) Originals of the laboratory test results shall be provided to county staff.

- b) Acceptance:
 - 1) Provide separate samples for each sample location free of coliform bacteria:
 - a) Contractor shall submit water samples to an approved laboratory for testing.
 - b) Contact County Engineering or Public Utilities for assistance and verification of sampling – a minimum forty-eight (48) hour notice is required.
 - c) The sample results shall include the free chlorine residual at the time the samples were collected.
 - d) All sample locations are to be given an identifying label.
 - e) The certified laboratory results shall indicate the absence of coliform bacteria in the water samples.
 - 2) At a minimum, sample locations shall be as required by NCDENR and the following:
 - a) The tie-in location of new and existing water lines.
 - b) The end of all dead-end lines.
 - c) At intervals of no more than (1,200) feet for all new lines longer than (1,200) feet in length.
- c) Disposal of Chlorinated Water
 - 1) The contractor is cautioned that the spent chlorine solution must be disposed of in such a way as not to be detrimental to animal, plant, or fish life.

18.0 Operation of Brunswick County Water System Valves and Fire Hydrants

- a) No county valves or hydrants shall be operated by the contractor without prior approval of county staff.
- b) All hydrant and blow-off operations shall be done in a manner so that private property is not impacted and there shall be no flooding of streets, driveways, or roadways or any other traffic problems created.
- c) The contractor shall contact county staff prior to performing system flushing or blow-off operations with a minimum forty-eight (48) hour notice.

Technical Specification 019

STORM WATER DRAINAGE SYSTEM

1.0 General

- a) This specification provides general guidance for the installation, repair, removal, and reinstallation of storm water drainage systems and separation clearances required to public utilities.
- b) The contractor under this section is responsible for the removal and re-installation and/or installation of all storm water drainage pipes, manholes, headwalls, and other related structures where shown on the plans or as may be disturbed during construction. Re-installation and/or installation will conform to the requirements as specified in the North Carolina Department of Transportation (NCDOT) "Standard Specifications for Roads and Structures" and all applicable State and local rules concerning separation requirements to other utilities.

2.0 Reuse and Replacement of Drainage Pipe and Structures

- a) The contractor shall be required to exercise extreme care in the removal and handling of existing drainage pipe and structures to prevent damage. Existing reusable drainage pipe removed shall be temporarily cleaned and properly stored for re-installation upon completion of the contracted work.
- b) The contractor is to replace all damaged drainage pipe with new re-enforced pipe and shall dispose of damaged material.
- c) Existing drainage pipe that is not suitable for reuse as determined by the Engineer shall be replaced for the unit price found on the Bid Form. If the replacement drainage pipe is not of the sizes or material found in the Bid Form, the Contractor shall replace the pipe for price of material only. Contractor is to provide invoices to satisfaction of the Engineer for the cost of material. Any drainage pipe damaged as a result of Contractor's actions shall be replaced at Contractor's expense.
- d) All pipe shall be replaced as nearly as possible to the original grade and alignment; however, the grade and alignment shall be uniform. The covers and frames from displaced manholes and structures shall also be removed and stored for use on replacement manholes and structures.

3.0 Replacement Drainage Pipe

- a) Replacement drainage pipe for damaged sections shall be of size and grade of that being replaced except that all replaced pipe shall be reinforced. Concrete pipe shall conform to ASTM C-76, latest edition Class III with tongue and groove joints and preformed mastic joint filler. Size requirements shall meet minimum NCDOT standards in public rights-of-way.

4.0 Replacement Drainage Structures

- a) Replaced manhole and inlet structures shall be precast concrete with preformed holes or knockout panels unless otherwise approved.

5.0 Execution

- a) Excavation, trenching, backfilling, and compaction shall be in compliance with Brunswick County Technical Specification 013: Excavating, Grading, Trenching, & Backfilling.

Proper clearance between storm drainage pipe and public water, gravity sewer, low pressure sewer, and transmission force mains shall be provided as indicated in the Brunswick County Standard Details and per these minimum separations:

- 1) Minimum horizontal separation: 5 feet
- 2) Minimum vertical separation - without engineered support: 24 inches
- 3) Minimum vertical separation – with engineered support: as approved by county staff

6.0 Drainage Pipe:

- a) Replacement drainage pipe shall be new pipe that is free of defects. Store in an acceptable manner until ready for installation. The pipe shall be installed from the lowest point of the system, true to line and grade, with bell or groove and facing upstream. The trench shall be maintained free of surface or ground water. Great care shall be taken to obtain well aligned and tight pipe lines to assure good flow and the exclusion of infiltration by ground water as much as possible. Installation shall conform to the respective recommendations of the pipe manufacturers or trade association.
- b) Special care shall be taken to insure the pipes are well bedded on a solid foundation, and no pipe shall be brought into position until the preceding length has been thoroughly embedded and secured in place. Whenever a pipe requires cutting to fit into the line or to bring it to the required location, the work shall be done in a satisfactory manner, so as to leave a smooth end, and without extra compensation. The pipe should be cleaned of all debris and soil as a result of construction.

7.0 Drainage Structures:

- a) Provide six (6) inches Class 1 gravel beneath structures to six (6) inches outside of structure. Precast structures shall be set plumb, with pipes centered within knockout panels. Provide opening of minimum size to accommodate pipe. Grout pipe in place with non-shrink grout.

- c) Inverts shall be pre-formed or formed with concrete or brick and concrete. All lines entering structures shall be placed upon the concrete slab prior to beginning any brick work. Any masonry work shall be brought up snugly around the lines and a tight connection made to preclude any washout and cavities at the basin. Provide minimum one (1) inch per foot slope to the flow line of the structure.

4.0 Technical Assistance

Contact the Brunswick County Stormwater Engineer as needed with any questions concerning work on new or existing storm water drainage systems.

Technical Specification 020

GRAVITY SANITARY SEWER SYSTEM

1.0 General

- a) It is the intent of this specification to ensure that all gravity sewer system infrastructure constructed within the service area of Brunswick County Public Utilities meets or exceeds all local, state, and federal rules and regulations as applicable. It is also the intent of this specification to provide the technical guidance needed to the utility contractor to ensure that county gravity sewer system infrastructure is properly constructed, tested, and placed in service. Service laterals shall be installed where shown on the drawings or as directed by the county's representative. Excavation, trenching, and backfilling is covered in Brunswick County Technical Specification TS 013: Excavating, Grading, Trenching, and Backfilling.

2.0 References

- a) ASTM D1784 - Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- b) ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 20.
- c) ASTM D2241 - Poly (Vinyl Chloride) (PVC) Pressure-rated pipe (SDR Series).
- d) ASTM D2152 - Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
- e) ASTM D2321 - Underground Installation of Flexible Thermoplastic Sewer Pipe.
- f) ASTM D2412 - External Loading Properties of Plastic Pipe by Parallel-Plate Loading.
- g) ASTM D2444 - Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight).
- h) ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- i) ASTM D3212 - Elastomeric push-on joints for plastic pipe.
- j) AWWA C600 - Installation of Ductile - Iron water mains and appurtenances.
- k) AWWA C900 - PVC Pressure Pipe 4 inch through 60 inch.
- l) ASTM D2672 - Bell-End Poly (Vinyl Chloride) (PVC) Pipe.

- m) ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- n) ASTM F478 - Precast Concrete Manhole Risers and Tops.
- o) ASTM C497 - Concrete Pipe, Manhole Sections, or Tile.
- p) ASTM F679 - Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
- q) ASTM A746 - Ductile Iron Gravity Sewer Pipe.
- r) ASTM F794 - Poly (Vinyl Chloride) (PVC) Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- s) AWWA C600 - Standard for Installation of Ductile Iron Pipe Mains and Appurtenances
- t) ASTM A536 – Standard Specification for Ductile Iron Castings
- u) ASTM A48 – Standard Specification for Gray Iron Castings
- v) ASTM F2764 – Standard Specification for 6 to 60 in [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fitting for Non-Pressure Sanitary Sewer Applications
- w) ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
- x) ASTM C1244 – Standard Test method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- y) ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

3.0 Materials and Requirements for Gravity Sewer Mains

- a) General
 - 1) To the maximum extent possible all materials shall be manufactured in the United States. This includes all pipe, valves, fittings, hydrants, meter boxes, etc.
 - 2) All pipe material shall be marked with the manufacturer, type, class, thickness, and date of production in lettering legible to county staff.
 - 3) The engineer is responsible for reviewing all shop submittals for written approval. County staff may assist to answer any questions concerning shop submittals.

- 4) All pipes, manholes, fittings, etc., must conform to AWWA standards.
 - 5) The minimum vertical ground cover over a gravity sewer main shall be thirty-six (36) inches.
 - 6) Gravity sewer mains shall be constructed of C900 DR-18 PVC piping. Ductile iron pipe (DIP) may only be used with express written permission of Brunswick County Public Utilities or Engineering Department.
 - 7) All pipes shall be shipped with gaskets installed inside the pipe bell.
 - 8) Restraint type gaskets that provide internal restraint by means of stainless steel inserts embedded within the gasket are **not** permitted for use in Brunswick County.
 - 9) PVC sewer mains shall be factory dyed industry standard green.
- b) Polyvinyl Chloride Pipe (PVC)
- 1) Sewer mains with depth of earth cover three (3) feet to ten (10) feet:
 - a) Eight (8) inch through twelve (12) inch PVC mains shall be C900 DR-18 or better conforming to ASTM D3034. Joints shall conform to ASTM D3139 or ASTM D3212.
 - b) Fourteen (14) inch through thirty-six (36) inch PVC mains, unless specified as DIP, shall be AWWA C900 Class 235 (DR-18). Joints shall conform to ASTM D3139 or ASTM D3212.
 - 2) Sewer mains with depth of earth cover ten (10) feet to twenty (20) feet:
 - a) Eight (8) inch through twelve (12) inch PVC mains shall be C900 DR-18 or better conforming to ASTM D3034. Joints shall conform to ASTM D3139 or ASTM D3212.
 - b) Fourteen (14) inch through thirty-six (36) inch PVC mains, unless specified as DIP, shall be AWWA C900 Class 235 (DR-18). Joints shall conform to ASTM D3139 or ASTM D3212.
 - 3) Sewer mains with depth of earth cover greater than twenty (20) feet:
 - a) Pipes installed at depths greater than twenty (20) feet shall be constructed of C900 DR-18 or better per manufacturer's recommendations based on depth and soils classification. DIP may be allowed with the express written permission of Brunswick County Utilities or Engineering Department.
 - 4) All PVC mains shall be manufactured with PVC material conforming to PVC 1120.

- 5) Fittings shall be molded PVC with joints similar to the PVC pipe. Fabricated fittings using solvent welded joints are not acceptable. Fittings may also be DIP fittings listed and documented as approved for use with PVC pipe and shall have an asphaltic coating on the exterior for corrosion resistance, and an interior lining of ceramic epoxy Protecto 401, Ceramapure PL90 (or equivalent), unless otherwise shown or specified.
 - 6) Acceptable products are Diamond Plastics Corporation, J M Eagle Manufacturing Company, National, Certainteed, North American, U.S. Composite Pipe or written approved equal.
- c) Ductile Iron Pipe (DIP)
- 1) Ductile iron pipe (DIP) may only be used with express written permission of Brunswick County Public Utilities or Engineering Department.
 - 2) If DIP is required, it shall conform to ANSI / AWWA C150 / A21.50 and ANSI / AWWA C151 / A21.51, with an exterior asphaltic coating for corrosion resistance, and an interior lining of Protecto 401 Ceramapure PL90 (or equivalent) unless otherwise shown or specified.
 - 3) All sizes of pipe shall be manufactured to a nominal laying length of 18'-0" or 20'-0", except to make adjustments for bends, tees, and other fittings.
 - 4) Joints shall be the push-on or mechanical joint type conforming to ANSI / AWWA C111 / A21.11 as modified by ANSI / AWWA C151 / A21.51.
 - 5) Rubber gaskets and lubricant shall conform to ANSI / AWWA C111 / A21.11.
 - 6) No metric sized pipe shall be permitted.
 - 7) If DIP is required, and the soils are found to be corrosive, then all DIP and fittings shall be wrapped in a polyethylene encasement per ANSI / AWWA A21.5 / C105 Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
 - 8) Acceptable products are American Cast Iron Pipe Company, Griffin Pipe Company, U.S. Composite Pipe, or written approved equal.
- d) Installation
- 1) Contractor shall install PVC gravity sewer mains in accordance with ASTM D2321. Ductile iron mains shall be installed in accordance with AWWA C600. Both types of material installations shall adhere to excavation, trenching, and backfilling standards as covered in Brunswick County Technical Specification TS 013: Excavating, Grading, Trenching, and Backfilling.

- 2) Pipe shall be installed starting from the lowest point and shall be laid with the spigot ends pointing in the direction of flow.
- 3) Gravity sewer trenches shall be kept free of standing water during installation by use of a pump. If deemed necessary prior to or during construction, well point systems should be used for dewatering.
- 4) All mains shall have locating tape, and shall be as follows:
 - a) Tape shall be three (3) inches wide, green in color, bearing continuous message "CAUTION SEWER LINE BURIED BELOW".
 - b) Tape shall be made of plastic or other permanent material.
 - c) Tape shall be buried continuously above the gravity sewer main at a depth of eighteen (18) inches below finished grade.
- 5) No sewer line of any type shall pass through any storm drain structure unless first approved by county staff in writing.
- 6) When a transition is required from a PVC sewer main to ductile iron pipe sewer main, mechanical joints will be used. Mechanical joints shall conform to AWWA C111. Bolts shall be high strength low alloy steel per AWWA C111.
- 7) When installing a gravity or force main above or below a water main or storm drain, all minimum separations and material requirements must be met, as defined by 15 NCAC 02T .0305 and 15A NCAC 18C .0906 (b) and (c); outlined below:
 - a) Gravity sewer mains shall be laid at least ten (10) feet horizontally from existing or proposed water mains, unless local conditions or barriers prevent a 10-foot separation, in which case;
 - b) The sewer main shall be C900 DR-18 or better and shall be laid in a separate trench, with eighteen (18) inch minimum separation between the invert of the water main and the crown of the sewer main; or the water main shall be laid in the same trench as the sewer, with the water main located at one side on a bench of undisturbed earth and with the elevation of the bottom of the water main at least eighteen (18) inches above the top of the sewer.
 - c) When a gravity sewer main crosses a water main, the sewer main will be built to water main rules (15A NCAC 18C .0906); where one full length of water pipe shall be located so that both joints will be as far from the sewer as possible.

- d) When a gravity sewer main crosses a storm sewer or other utilities, eighteen (18) inch minimum separation must be achieved. If this separation cannot be achieved, the gravity main shall be constructed in a manner concurrent with Brunswick County standard detail S-15.
- e) When a gravity sewer main crosses a reclaimed water line, eighteen (18) inch minimum vertical (reclaimed over sewer) or two (2) feet horizontal separation must be achieved.

4.0 Materials and Requirements for Sewer Services

a) General

- 1) Pipe and fittings for four (4) inch and six (6) inch gravity sewer services shall be constructed of SCH 40 PVC pipe conforming to ASTM D178 with solvent welded joints.
- 2) Sewer services shall be installed in accordance with county standard details.
- 3) All services shall be single services. No double services are to be installed.

b) Installation

- 1) All gravity sewer services are to be installed using a wye angled downstream of the main.
- 2) The service wye should be turned to the top quadrant of the gravity main – approximately (45) degrees from the top centerline of the main. In no case, shall the service laterals be stacked vertically over the gravity main.
- 3) Gravity sewer services shall be installed perpendicular to the gravity main.
- 4) Wherever possible, gravity services shall be tied into a gravity line.
- 5) Services shall be installed so that they meet minimum clearances from existing and proposed utilities, such as eighteen (18) inch minimum separation below a water main. If clearances cannot be met, then gravity sewer services shall be constructed of SCH 40 PVC pipe or better.
- 6) The minimum vertical ground cover over a gravity sewer lateral shall be twenty-four (24) inches (thirty-six (36) inches if in NCDOT right-of-way).
- 7) Sewer services shall terminate with a wye to a surface cleanout complete with square nut cap, cast iron box, and cover marked “C/O” or “SEWER”. The invert of the wye shall be capped with a watertight plug for future plumbing connection. See county standard details.

- 8) Install a 4"x4"x 6' treated timber marker at the property or easement line behind the service cleanout for location of the service. The timber shall be installed with 2' buried and 4' visible above final grade.
- 9) Services shall be installed at a minimum grade of 1/8 inch per foot. Service termination grade shall be at adequate depth for future plumbing connection.

5.0 Materials and Requirements for Manholes

a) General

- 1) To the maximum extent possible all materials shall be manufactured in the United States. This includes all precast and drop manholes, frames, grates, covers, etc.
- 2) To protect against hydrogen sulfide corrosion, polypropylene and precast polymer concrete manholes are the preferred materials for gravity sewer manholes. Concrete manholes shall not be used as receiving manholes or where pressurized sewer mains enter the manhole.
- 3) Joint surfaces between bases, risers and cones shall be manufactured to the joint surface design and tolerance requirements of ASTM C76.
- 4) Flexible joint sealants shall be butyl rubber-based conforming to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10- and 100-degrees F.
- 5) Pipe to manhole connectors shall conform to ASTM C923. The location of the pipe connectors shall vary from the location shown on the project plans by no more than (1/2) inch vertically and five (5) degrees horizontally. Provide for control of the pipe OD to within the tolerances of the connector on flexible pipes larger than twelve (12) inches.
- 6) Manholes shall have a minimum inside diameter of four (4) feet for sewer mains eighteen (18) inches diameter and smaller and shall be five (5) feet inside diameter for sewer mains larger than eighteen (18) inches. Larger inside diameters may be required for larger pipe sizes, more than two pipes, or when entrance/exit angles require a larger manhole.
- 7) The receiving manhole in a gravity sewer main line immediately before the lift station shall be polymer concrete and have a minimum inside diameter of five (5) feet.
- 8) Where pressurized sewer mains connect to a gravity sewer manhole structure, a minimum four (4) feet inside diameter plastic polypropylene or polymer concrete manhole structure shall be used.

- 9) When a watertight manhole is to be used due to flood plain location, a vent pipe shall be installed for proper ventilation of the manhole. Refer to county standard details.
- 10) All manhole covers are to be clearly marked "Sanitary Sewer".
- 11) Manhole steps shall be provided in bases, risers, and cones and aligned vertically on center. Steps shall be cast in place or, if approved by the County, secured to the wall with a compression fit in tapered holes. Steps shall not be vibrated or driven into freshly cast concrete or grouted in place. The steps shall be Copolymer Polypropylene Plastic reinforced with a ½" diameter grade 60 bar and have serrated tread and tall end lugs. Step pullout strength shall be tested per ASTM C497.
- 12) All manhole frames and covers shall conform to ASTM A48.
- 13) Sanitary sewer covers shall utilize lifting bars instead of pick holes.
- 14) Standard covers shall have up to four (4), one (1) inch diameter vent holes.
- 15) Watertight manhole covers are required for all manholes where the rim elevation is less than two (2) feet above the 100-year flood elevation or the 500-year flood elevation, whichever is lower.
- 16) The maximum separation between manholes shall be 400 feet, unless otherwise approved by Brunswick County in writing.
- 17) Outside drop manholes, for new construction, shall be provided where invert separations exceed 2.5 feet (30 inches).
- 18) Acceptable manufacturers of watertight manhole frames and covers are US Foundry, Capitol Foundry, East Jordan, or written approved equal.

b) Plastic Polypropylene Manhole Structures

- 1) Plastic polypropylene manhole structures shall have a minimum inside diameter of four (4) feet. The installation of a plastic polypropylene manhole must be according to the manufacturer's specifications and written approval by Brunswick County.
- 2) Plastic polypropylene manhole structures shall follow manufacturer specifications for minimum angles between adapters when connecting sewer mains.
- 3) Four (4) feet inside diameter and larger polypropylene manhole structures shall be fabricated from triple wall pipe made from an impact modified copolymer polypropylene meeting the material requirement of ASTM F2764. The body riser shall be provided with an integrally cast into a reinforced concrete base meeting the requirements of ASTM C478.

The base and riser shall meet the performance requirements outlined in ASTM C1244. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Water tight connections meet the testing requirements of ASTM D3212.

- 4) All plastic polypropylene manhole installations shall conform to manufacturer specifications for maximum allowable depth and deep burial installation requirements.
- 5) All new drop manhole structures shall be outside drop.
- 6) All plastic polypropylene manhole structure frames and covers shall conform to ASTM A48, unless otherwise specified by the manufacturer.

c) Concrete Manholes

- 1) Concrete shall conform to ASTM C478 and as follows:
 - a) Compressive strength: 4000 psi minimum at 28 days.
 - b) Air Content: 4 percent minimum.
 - c) Cementitious Materials: Minimum of 564 pounds per c.y.
 - d) Coarse Aggregates: ASTM C33.
 - e) Fine Aggregates: ASTM C33. Free from organic impurities.
 - f) Chemical Admixtures: ASTM C494. Calcium Chloride or admixtures containing calcium shall not be used.
 - g) Air Entraining Admixtures: ASTM C260.
- 2) Mortar shall be Type S conforming to ASTM C270.
- 3) Brick shall be used to bring concrete manhole rings to grade or filler for forming manhole inverts only and shall conform to ASTM C62 Grade SW or ASTM C32 Grade MS.
- 4) Concrete manholes shall have an eccentric cone. Concrete manholes four (4) feet deep or less may have a flat top.
- 5) Concrete manholes shall have a minimum six (6) inch extended base.
- 6) Concrete manholes shall not be used as receiving manholes or where pressurized sewer mains enter the manhole.

- 7) New concrete drop manholes shall be outside drop, unless otherwise approved by Brunswick County in writing. Where approved, inside drop manholes shall have a minimum inside diameter of five (5) feet.
- 8) Acceptable manufacturers of standard manhole frames and covers are US Foundry, Capitol Foundry, East Jordan, General Foundries, or written approved equal.
- 9) Each concrete manhole shall be equipped with an insert of high-density polymer meeting the requirements of ASTM 124. Concrete manholes located in traffic areas shall have stainless steel sewer guards.
- 10) Concrete manhole interiors shall be factory coated with a minimum twenty (20) mils coal tar epoxy or other County written approved coating, except where polymer concrete is used.
- 11) Where pressurized sewer mains connect to an existing gravity sewer manhole, the manhole shall be polymer concrete or plastic polypropylene to protect against hydrogen sulfide corrosion. Where pressurized sewer mains connect to a gravity sewer manhole, the inside diameter of the manhole shall be four (4) feet minimum.

It may be required to replace the existing manhole with a plastic polypropylene manhole structure, or precast polymer concrete manhole.

- 12) All damage to pre-cast concrete sections shall be thoroughly repaired. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before application of grout. Pre-cast sections shall be subject to rejection on account of failure to conform to any of the specification requirements. In addition, individual sections of manhole sections may be rejected because of fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint; defects that indicate imperfect proportioning, mixing, and molding; surface defects indicating honey-combed or open texture; damaged or cracked end, where such damage would prevent making a satisfactory joint; and/or any continuous crack having a surface which width of 0.01 inches or more and extending for a length of twelve (12) inches or more, regardless of position in the section wall.
- 13) For concrete manholes, all joints, cracks, lifting nooks inside the manhole are to be grouted to prevent infiltration. All interior grouting shall be covered in a field coat of coal tar epoxy. All exterior joints are to be wrapped with flat butyl rubber tape.

d) Installation

1) Setting:

- a) The contractor is responsible for getting the manhole tops to proper grade. The top of the pre-cast manhole may be brought to proper grade for receiving manhole frames by using precast riser rings, unless otherwise approved for masonry in writing. Masonry construction shall be performed by experienced and qualified workmen. All work shall be laid plumb, straight, level, square, and true. Total extensions may not be made greater than six (6) inches – limited to three (3) courses. If needed, manhole riser sections with precast steps shall be used.
- b) Manholes shall be set on a minimum of eight (8) inches of #57 crushed stone on a level undisturbed or well compacted subgrade.
- c) Manhole structures are to be level upon completion.
- d) Butyl rubber sealing shall be placed between each manhole riser section. Backing tape shall be removed prior to application and a sufficient amount of sealant shall be used to completely seal the joint.
- e) Four (4) feet inside diameter polypropylene manhole structures shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material and installation guidelines shall be specified by the manufacturer on the standard installation detail and may vary based on local conditions. Bedding material shall be well placed and uniformly compacted. The maximum standard burial depth of the four (4) feet polypropylene manhole structure is sixteen (16) feet.

2) Connections:

- a) All in place penetrations into manholes must be by core boring methods including main line and service drops. Properly sized elastomeric boots shall be set in penetrations. The boot and the pipe must be fully mortared on the inside and the outside of the manhole.
- b) The invert channels shall be $(3/4)$ the depth of the largest pipe and shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in size and grade of channels shall be made gradually and evenly. The invert channels shall be formed directly in the concrete of the manhole base or shall be built up with solid brick and Type S mortar.

- c) All main or service connections made above the shelf, not exceeding thirty (30) inches, shall have a slide constructed with brick and type S mortar. Slide shall be formed at the connection in a semicircular fashion conforming to the inside of the connected pipe. The slide shall be gradually angled toward the downstream invert of the gravity main for smooth flow. Connections made above thirty (30) inches will require a drop. Refer to Brunswick County standard details.
 - d) All plastic polypropylene manhole structures shall be outside drop. Concrete drop manholes shall be outside drop unless otherwise approved by county staff in writing. All hardware used to anchor the drop pipe shall be Type 316 stainless steel. Refer to county standard details.
- 3) Frames and Covers:
- a) For four (4) feet inside diameter polypropylene manhole structures in H-20 traffic load rated applications, a concrete load ring shall be poured in place around the grate and frame. The concrete slab must be designed taking into consideration local soil conditions, traffic volume, and other applicable design factors. For other considerations such as deep burials, ground water, and soft foundations refer to the manufacturer.
 - b) Four (4) feet inside diameter plastic polypropylene manhole structures shall have ductile iron covers and iron castings that fit the structures so that they become an integral component of the structure when installed and are supplied by Nyloplast ®.
 - c) Covers for four (4) feet inside diameter plastic polypropylene manhole structures shall be capable of supporting various wheel loads as specified by the manufacturer. Ductile iron used on the manufacture of the castings shall conform to ASTM A536 grade 70-50-05, and Nyloplast ® standard drawing 7001-110-222 Rev D, or written approved equal. Manhole covers shall be provided painted black.
 - d) For concrete and polymer concrete manholes, standard frames are to be centered over the precast opening of the manhole, sealed with butyl rubber sealant, and mortared into place inside and out. Mortar inside shall be coated with field coat of coal tar epoxy along with all other grouted surfaces.
 - e) For concrete and polymer concrete manholes, standard frames and covers shall have high density copolymer inserts in non-traffic areas, and stainless-steel inserts in traffic areas.

- f) For watertight concrete manholes, frames are to be centered over the precast opening of the manhole, sealed with butyl rubber sealant, bolted down, and mortared into place inside and out. Mortar inside shall be coated with field coat of coal tar epoxy along with all other grouted surfaces.
- g) Watertight frames and covers do not require an insert.

6.0 Requirements for Connections to Existing Gravity Sewer Systems

a) Connections to Existing Mains

- 1) Connection of a new gravity sewer collection main to an existing gravity sewer collection main shall be made by installation of a new “doghouse” manhole at the connection point. Refer to Brunswick County standard details.
- 2) Connection of a new gravity sewer service to an existing gravity sewer main shall be made by use of a tapping saddle in accordance with county standard details.
- 3) Where two or more mains of different diameters enter a sanitary sewer manhole, it is required to match the crown elevations of the different size pipes.

7.0 Requirements for Testing and Completion

a) Preparation

- 1) All personnel and materials needed for satisfactory testing of gravity systems are to be supplied by the contractor. All procedures will be performed by the contractor except where otherwise indicated.
- 2) Upon completion of construction of the new gravity collection system, all main lines and manholes are to be cleaned of any silt and debris.
- 3) All newly constructed gravity systems must be allowed a settling period of thirty (30) days from the date of completion of the system prior to any testing. In lieu of a settling period, contractor may opt to backfill trenches in one (1) foot compacted lifts upon written approval from Brunswick County. Intention must be made known at the time of the preconstruction meeting.
- 4) It is the contractor’s responsibility to schedule all testing a minimum of (48) hours in advance. The contractor shall have all testing equipment on site and in place prior to the scheduled start time of the respective test. All lines used to pull the mandrel must be in place prior to the start of testing so that personnel are not waiting for set up to take place before testing can commence.

b) Deflection Test

- 1) Deflection testing shall be performed on all sections of flexible pipe.
- 2) The maximum allowable deflection at any point shall be five (5) percent.
- 3) Deflection will be measured by a pin-type mandrel “GO/No GO” gauge outfitted for the proper pipe material and diameter.
- 4) The mandrel shall be pulled through the pipe by means of a strong cord or cable. Mandrel shall be pulled by hand.
- 5) Any section not meeting the five (5) percent deflection requirement shall be excavated, backfilled, re-compacted in one (1) foot lifts, and retested.

c) Air Test

- 1) Each segment of line shall prove airtight.
- 2) Test pressure shall be five (5) psi. No pressure loss will be allowed.
- 3) Testing time, in minutes, shall be calculated as $[0.625 \times \text{Nominal pipe diameter (in inches)}]$. Minimum air test time is five (5) minutes.

d) Displacement Test

- 1) Sewer mains will be checked by county personnel to determine whether displacement has occurred.
- 2) Displacement will be checked by shining light from manhole to manhole by means of flashlight or reflected sunlight. The line shall be visually inspected directly or with the aid of a mirror. A “full moon” shall be visible.
- 3) If any displacement is visible, the section of pipe displaced shall be excavated, backfilled, re-compacted in one (1) foot lifts, and retested for airtightness and displacement.

e) Other Testing

- 1) At the discretion of county staff, the following tests may also be required, at the expense of the contractor, prior to acceptance:
 - a) Manhole Vacuum Test
 - 1) Vacuum testing shall be performed in accordance with the requirements outlined in ASTM C1244.

b) Soil Compaction Test

- 1) All trenches suspected of not meeting compaction requirements shall be tested for conformance by a written approved facility for the locations and depths specified by county staff. The facility written approval shall be by county staff.

Technical Specification 022

WASTEWATER FORCE MAINS

1.0 General

- a) It is the intent of this specification to provide technical guidance for the proper material selection and installation for all waste water force mains that are installed in the service area of the Brunswick County Public Utilities Department.
- b) The design engineer should have a thorough understanding of the North Carolina DEQ/DWQ document “Minimum Design Criteria for the Fast Track Permitting of Pump Stations and Force Mains” in order to ensure state rules are met for force main design.
- c) Refer to Design Section Part C of this Brunswick County Engineering Design Manual, Technical Specification and Standard Details for Water and Sewer Systems for design guidance for waste water force mains permitted and constructed in the service area of Brunswick County Public Utilities.
- d) Except when necessary in making connections to other lines the contractor shall install all force main piping with the pipe bells facing in the upstream direction within the bell-and-spigot assembly.

2.0 Materials for Construction

- a) All materials used for force main construction shall be of good quality and, to the maximum extent possible, manufactured in the United States. Any materials deemed unsuitable by county staff or the Engineer shall not be used by the contractor.

3.0 References

- a) ASTM D1784 – Rigid PVC Compounds and Chlorinated PVC (CPVC) compounds
- b) ASTM D1785 - PVC plastic pipe, schedules 40, 80 and 120
- c) ASTM D2241 - Poly (Vinyl Chloride) (PVC) plastic pipe (SDR-PR)
- d) ASTM D3139 - Joints for plastic pipe using elastomeric seals
- e) ASTM F477 - Elastomeric seals for jointing plastic pipe
- f) ASTM D2467 - Socket Type PVC plastic pipe fittings - Schedule 80
- g) ANSI / AWWA C151 / A21.51 – Ductile Iron Pipe (DIP)

- h) AWWA C600 - Standard for Installation of Ductile Iron Pipe (DIP)
- i) AWWA C605 - Standard for Installation of Polyvinyl Chloride Pipe (PVC)

4.0 Pipe Materials

- a) Force main piping shall be:
 - 1) 4 – 60 inches: Polyvinyl Chloride (PVC), AWWA C900, DR-18 minimum
 - 2) Ductile Iron Pipe, (DIP), ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51 (only with express written permission of Brunswick County Utilities or Engineering Department)
 - 3) Fusible Polyvinyl Chloride, (FPVC), ASTM cell classification 12454, Fusible C900 with minimum DR 18 for 4 – 12-inch diameter; Fusible C905 with minimum DR 18 for 14 – 24-inch diameter; Fusible C905 with DR 25 for 30-inch diameter; Fusible C905 with DR 32.5 for 36-inch diameter
 - 4) High Density Polyethylene, (HDPE), PE 4710, ASTM D2239, minimum DR-9
 - 5) Polyvinyl Chloride (PVC), Schedules 40 and 80, ASTM D1785.
- b) Minimum force main piping size: 4 inch (unless written approved low-pressure sewer mains).
- c) DIP shall be lined internally with Protecto 401, Ceramapure PL90, ceramic epoxy lining or written approved equal for internal corrosion resistance.
- d) DIP shall have an exterior bituminous asphaltic coating for corrosion resistivity.
- e) DIP pressure class per pipe size shall be:

Pipe Size (inches)	Pressure Class (psi)
4 - 12	350
14 - 20	250
24 - 64	200

- f) PVC sewer force main piping shall be factory dyed industry standard green to aid in field identification. PVC reuse effluent transmission piping shall be factory dyed industry standard purple to aid in field identification. HDPE piping shall have a factory applied green strip. All pipe used for force main construction shall be labeled or otherwise identified as conveying wastewater per NCDEQ “Minimum Design Criteria for the Fast Track Permitting of Pump Stations and Force Mains”.
- g) HDPE pipe shall conform to ASTM D3035 and ASTM F714 with PE 4710 material

- h) HDPE force mains shall be joined by the thermal butt fusion method in accordance with ASTM A2657 and the manufacturer's installation recommendations.
- i) Fusible PVC force mains shall be joined by the thermal butt fusion method in accordance with ASTM D638 and the manufacturer's installation recommendations.
- j) All piping shall be clearly marked with Manufacturer, Type, Pressure Class and/or DR number, and date of production.
- k) Avoid prolonged exposure of PVC and Fusible PVC piping to ultraviolet (UV) exposure. Any piping obviously "dulled" in color due to prolonged sun exposure shall be not be used.
- l) All PVC force main piping installed within the NCDOT rights-of-way shall be a minimum DR-18 rated pipe.

5.0 Materials and Requirements for Restrained Joints, Piping, and Fittings

- a) Restrained joints are required to prevent movement of system piping caused by forces in or on buried piping, tees, valves, branches, bends, plugs, etc.
- b) Restrained joints shall be installed as shown on the approved plans, standard details, or as directed by county staff or the engineer.
- c) Concrete thrust blocking shall be installed as shown on the approved plans, standard details, or as directed by county staff or the engineer.
- d) All carrier pipe installed inside a casing shall have restrained joints per county standard details and this technical specification
- e) All restrained joint systems shall have a pressure rating equal to or greater than that of the pipe on which they are installed.
- f) Restraint type gaskets that provide internal restraint by means of stainless-steel inserts embedded within the gasket are not permitted for use in Brunswick County.
- g) Polyvinyl Chloride Pipe (PVC)
 - 1) Install restraints in strict accordance with the manufacturer's recommendations.
 - 2) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel.

Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or written approved equal.

- 3) Restraint for valves and fittings shall have ductile iron glands. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel.

Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or written approved equal.

- 4) Stainless steel rodding and fasteners, Type 304 minimum, is acceptable per county standard details. Manufacturer's restraint system and/or glands are preferred in lieu of rodding.

h) Ductile Iron Pipe (DIP)

- 1) Must have written permission of county staff to use DIP.
- 2) Install restraints in strict accordance with the manufacturer's recommendations.
- 3) All ductile iron horizontal directional drill and bore-and-jack installations shall use boltless, integral, positive locking restraint systems that allow for joint deflection and disassembly should the need arise. The restrained joint system shall be a manufacturer's standard restrained joint system such as American (Flex-Ring or Lok-Ring), U S Pipe (TR-Flex), or Griffin (Snap-Lok), or written approved equal.

Note: the boltless, integral, positive locking restraint systems are also acceptable for use in open cut pipe installations.

- 4) External bell restraint harness shall have ductile iron glands. The dimensions of the gland shall be such that it can be used with the standard mechanical joint bell. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or written approved equal.

- 5) Restraint for valves and fittings shall have ductile iron glands. Twist off nuts with preset factory torque setting shall be used to ensure proper actuation of the restraint device. All nuts, bolts, and fasteners shall be high strength alloy steel. Mechanical joint restraints shall conform to ANSI/AWWA A21.11/C111 and ANSI/AWWA A21.53/C153, latest revision.

The restrained joint system shall be a manufacturer's standard restrained joint system manufactured by EBAA Iron, Inc., Smith-Blair, Inc., JCM, Inc., or written approved equal.

- 6) Stainless steel rodding and fasteners, Type 304 minimum, is acceptable per county standard details. Manufacturer's restraint system and/or glands are preferred in lieu of rodding.

6.0 Push On, Mechanical, and Flanged Pipe Joints

- a) DIP joints (all joints shall have a minimum two hundred (200) psi pressure rating or be equal to the pressure rating of the pipe):
 - 1) Push on joints with elastomeric gaskets shall conform to ANSI A21.11 / AWWA C111. Joints shall be the integral bell and spigot type connection. Gaskets shall be factory installed integral with the bell joint.
 - 2) Mechanical joints shall conform to AWWA C111. Bolts shall be high strength alloy steel per AWWA C111.
 - 3) Flanged joints shall conform to ANSI A21.11 / AWWA C115. Bolts shall be high strength alloy steel per AWWA C111.
- b) PVC joints (all joints shall have a minimum one hundred fifty (150) psi pressure rating or be equal to the pressure rating of the pipe):
 - 1) Push on joints with elastomeric gaskets conforming to ASTM D3139 and ASTM F477. Joints shall be the integral bell and spigot type connection. Gaskets shall be factory installed integral with the bell joint.

7.0 Fittings and Specials

- a) Fittings and specials shall be class 54 ductile iron, mechanical joint in accordance with ANSI/AWWA C111/A21.11, ANSI/AWWA C153/A21.53, with a (200) pounds per square inch minimum pressure rating unless otherwise shown or specified. Ductile iron fittings and specials shall be lined on the interior with ceramic epoxy Protecto 401, Ceramapure PL90, or equal and coated on the exterior with a bituminous asphaltic coating for corrosion resistivity.

- b) Provide adaptor glands, gaskets, etc, as required to accommodate any differences in pipe and fitting dimensions.
- c) Fittings and specials for HDPE and Fusible PVC shall conform to all applicable ASTM D3261 (HDPE) and other ASTM specifications and all manufacturers' recommendations.
- d) In corrosive soils sacrificial corrosion anodes and / or poly wrap shall be required around ductile iron pipe and DIP fittings at the direction of either county staff and/or the engineer.

8.0 Gate Valves

- a) Cast iron body, bronze mounted, double disc, resilient seated in conformance with AWWA C509 or C515, with a minimum working pressure of one hundred fifty (150) psi. Valves shall have a two (2) inch operating nut and open left and shall have O-ring seals. Valve ends shall be mechanical joint or push on joint. Gate valves shall be installed in the upright vertical position. Valves shall be manufactured by Mueller, American Darling, Clow Corporation, or written approved equal.
- b) Resilient gate valves may be used for tapping an existing, active force main.
- c) All force main gate valves shall be set true and plumb and have a valve box centered over the valve per county standard detail.
- d) To the maximum extent possible all gate valves shall be located outside of roads, streets, driveways, and other paved areas.
- e) Earth fill shall be carefully tamped around each valve box to a distance of four (4) feet on all sides of the box, or to the undisturbed trench face if less than four (4) feet from the valve box.

9.0 Plug Valves

- a) Non-lubricated eccentric type with resilient faced plugs, furnished with flanged joint connections for above ground connection and mechanical joints for underground connections, ports shall be 100% port, with a minimum one-hundred fifty (150) psi pressure rating, cast iron body, plugs shall be cast iron or Ductile Iron, of one piece construction, resilient faced, with all exposed nuts, bolts, springs, washers, etc, a minimum Type 316 stainless steel. Plug valves shall be DeZurik, Kennedy, Milliken, Pratt or written approved equal.
- b) Valves shall be resilient faced plug valves unless otherwise noted on the plans.
- c) All force main plug valves shall be set true and plumb and have a valve box centered over the valve per county standard detail.
- d) To the maximum extent possible all plug valves shall be located outside of roads, streets, driveways, and other paved areas.

- e) Earth fill shall be carefully tamped around each valve box to a distance of four (4) feet on all sides of the box, or to the undisturbed trench face if less than four (4) feet from the valve box.

10.0 Location of Initial Isolation Valve from a Pump Station

- a) Unless otherwise shown on the approved plans, or as directed by the Engineer and/or county staff, the contractor shall install a force main isolation valve within one hundred and fifty (150) feet from a sewer pump station valve vault, and thereafter as shown on the approved plans.

11.0 Valve Boxes and Collars

- a) Install per county standard details at each force main valve.
- b) Cast iron or ductile iron, screw type, with flared base, length as required for the buried valve, set plumb and true.
- c) The word “SEWER” or “REUSE” shall be cast in the cover.
- d) The contractor shall spray paint the cover green (sewer) or purple (reuse) after installation.
- e) No part of the valve box is to rest on the buried valve bonnet – use masonry support per county standard detail.
- f) Install precast concrete ring around valve box in unpaved non-traffic areas per county standard detail.
- g) Valve boxes in traffic areas to be AASHTO H-20 load rated and installed per county standard detail.

12.0 Valve Markers

- a) Valve markers shall be installed in rights-of-way and utility easements as shown on the county standard details.
- b) Valve markers shall be concrete if located in the right-of-way, extend thirty-six (36) inches above finished grade, with the cast MV (main Valve), AV (air release valve), or BO (blow off) facing the nearest street – refer to county standard details. Valve markers in utility easements shall be fiberglass, extend sixty (60) inches above finished grade, and be installed with the flat face facing the valve for installation of the marking decal on the valve marker.
- c) Valve marker shall be painted green for sewer force mains and purple for reuse force mains.
- d) Concrete valve markers shall have a bronze, stamped, insert on top of marker per county standard detail.

13.0 Force Main Air and Vacuum Release Valves (AVRVs)

- a) Combination air / vacuum valves shall be installed on waste water force mains as follows:
- 1) Air and Vacuum Valve: The air and vacuum valve shall be an ARI, Inc, Model D-025 combination air / vacuum valve, or written approved equal.
 - 2) The contractor shall install the AVRVs as shown on the plans and may need to adjust actual AVRV locations in the field based upon actual field conditions to ensure the AVRVs are installed at the true high points. Actual installed markup drawings shall be maintained by the contractor so that accurate asbuilts drawings can be prepared for the County.
 - 3) The combination air / vacuum valve shall be installed in a five (5) foot diameter precast manhole with a ring and cover assembly, with the manhole lid offset from the AVRV such that the AVRV is not directly underneath the access opening, or in a Quazite or GlasMasters polymer concrete box, or written approved equal, Tier 22 rating for both the box and cover, with the box opening offset from the ARV such that that ARV is not directly underneath the access opening, per County Standard Details for air release valves.
 - 4) Maintain adequate cover over force mains at AVRV installations to ensure top of manhole or polymer concrete box is flush with the surrounding ground. The contractor shall adjust the force main depth to ensure adequate cover for the AVRV assembly per County Standard Details.
 - 5) The combination air / vacuum valve shall allow unrestricted venting or re-entry of air during filling or draining of force main. The valve shall have a large orifice for the air & vacuum function and a smaller orifice for the air release function contained within a single valve body.
 - 6) The small air release orifice shall be a Type 304 stainless steel orifice rated for working pressures up to one hundred fifty (150) psi minimum.
 - 7) The combination air / release valve shall exhaust large quantities of air during the filling of the pipeline and automatically close after all the air has been vented.
 - 8) The valve shall continue to release small quantities of air under pressure as needed to vent entrained air, and shall also automatically open to allow atmospheric pressure to re-enter the force main during draining or whenever a negative pressure occurs.
 - 9) The valve body shall have a one (1) inch NPT tap near the bottom to permit cleanout of accumulated debris from the valve body.
 - 10) Valves shall be mounted on McDonald 3800 series stainless steel saddle with Type 304 stainless steel or better valve and nipples.

- 11) Provide two (2) inch inlet, outlet, and blowoff valve, and one (1) inch flushing drain piping to include a one (1) inch flushing valve.
- 12) Valve internals to be Type 304 stainless steel linkage with a single float design. Bronze or plastic internal components are not acceptable.
- 13) The AVR assembly shall have a stainless-steel pressure gauge installed that is angled for ease of viewing from the manhole or box cover – see County Standard Details.

14.0 Pipe Marking Tape, Locating Wire, and Electronic Marker Balls

- a) Marking tape shall be three (3) inches wide, green or purple in color, bearing continuous message "CAUTION SEWER LINE BURIED BELOW" or "CAUTION REUSE LINE BURIED BELOW". Tape shall be made of plastic or other permanent material and shall be buried continuously above the force main at a depth of eighteen (18) inches below finished grade.
- b) All force mains shall have a #12 AWG, high strength copper clad steel conductor (HS-CCS) such as Copperhead Superflex, Pro Trace High Flex, or written approved equal, with HDPE insulation, and rated for direct burial. Listed and approved underground connectors shall be used for all splices. The wire shall be brought up into a valve box at 1,000 feet maximum intervals to provide wire access points. The wire shall be taped to the top of the force main at minimum ten (10) foot intervals.

The contractor shall be required to perform a signal strength test of the installed tracer wire at the end of the project with County Engineering and/or Public Utilities staff present. Refer to County Standard Details for tracer wire information.

- c) In addition to the tracing wire, electronic marker balls shall be installed on the force main in accordance with Brunswick County Technical Specification TS 035: Electronic Marker Balls for Water Mains and Sewer Force Mains.

15.0 Adjacent Facilities

- a) Separation of Sewer Force Mains and Water Mains

- 1) Horizontal and Vertical Separation

Minimum horizontal separation between water mains and sewer force mains shall be ten (10) feet. The distance shall be measured edge of pipe to edge of pipe.

- 2) Should ten (10) foot separation not be feasible, then the water main may be located closer to the sewer force main provided that:

- a) It is laid in a separate trench,
 - b) It is laid in the same trench with the water main located at one side on a bench of undisturbed earth,
 - c) In either of case (a) or (b) above, the crown elevation of the force main shall be at least eighteen (18) inches below the invert elevation of water line.
- 3) When installing a force main above or below a water main or storm drain, all minimum separations and material requirements must be met, as defined by 15 NCAC 02T .0305 and 15A NCAC 18C .0906 (b) and (c); outlined below:
- a) Sewer mains shall be laid at least ten (10) feet horizontally from existing or proposed water mains, unless local conditions or barriers prevent a 10-foot separation, in which case;
 - b) The sewer main shall be DR-18 or better and shall be laid in a separate trench, with eighteen (18) inch minimum separation between the invert of the water main and the crown of the sewer main; or the water main shall be laid in the same trench as the sewer, with the water main located at one side on a bench of undisturbed earth and with the elevation of the bottom of the water main at least eighteen (18) inches above the top of the sewer.
 - c) When a pressurized sewer main crosses a water main, the sewer main will be built to water main rules (15A NCAC 18C .0906); where one full length of water pipe shall be located so that both joints will be as far from the sewer as possible. If separation requirements cannot be achieved, the sewer main shall be constructed in a manner concurrent with Brunswick County standard detail S-15.
- 5) Mechanical joints will be required for the transition in the force main at water main / force main crossings. Fernco couplings are not permitted to be used. Special structural support for the water and force mains may be required at the discretion of County staff.
- 6) Force mains shall not be laid in the same trench with gas lines or electric wiring.
- 7) No force main shall be placed within twenty-five (25) feet of a well utilized for potable water purposes.
- 8) Minimum specifications for force mains placed between twenty-five (25) feet and fifty (50) feet of a well utilized for potable water shall meet or exceed the requirements of Class 350 ductile iron pipe with watertight joints conforming to ANSI A21.50/A21.51.

16.0 General Construction Installation

- a) Install all force mains as shown on the approved plans to line and grade.
- b) Where unsuitable soils are encountered pipe shall be bedded on #57 stone.
- c) The contractor is responsible for dewatering all trenches prior to force main installation. Include cost of dewatering, backfill, and erosion control in unit cost for pipe – separate payment for these items will not be made by the County. Stone installation shall not be used as a dewatering device.
- d) All jointing of pipe shall be in conformance with the manufacturer's recommendations.
- e) Defective pipe and / or fittings shall not be utilized in force main construction.
- f) Install all restrained joints in accordance with manufacturer's recommendations.
- g) Existing gravity manholes that have sewer force mains entering them shall be polymer concrete or plastic polypropylene to protect against hydrogen sulfide corrosion per Brunswick County Technical Specification TS 020: Gravity Sanitary Sewer Systems – Section 5.0 (c) (11). If the existing manhole is concrete, it will be required to either replace the existing concrete manhole with a plastic polypropylene or precast polymer concrete manhole or add an additional polymer concrete or polypropylene transitioning manhole. If a transitioning manhole is installed, the distance between the existing manhole and the transitioning manhole shall be no less than thirty-six (36) inches, unless approved in writing by Brunswick County.
- h) New gravity manholes, and transitioning manholes installed to allow a new force main to connect to an existing sewer system, shall be plastic polypropylene or precast polymer concrete sections conforming to ASTM C478 as manufactured by Nyloplast ® ADS, Armorock, Meyer Polycrete, or written approved equal. Riser section joints shall be bell and spigot / ship-lap design with butyl mastic and / or rubber gaskets (ASTM C990) so that on assembly the manhole base, riser(s), and top sections make a continuous and uniform manhole structure. All fasteners, wedge anchors, bolts, hooks, etc., within the manhole shall be Type 316 stainless steel or better – no mild steel will be allowed.
- i) County staff must be present at all connections to existing force mains. Forty-eight (48) hours' notice is required to schedule a force main connection.

17.0 Hydrostatic Testing of Force Mains

- a) All force mains shall be successfully hydrostatically pressure tested per AWWA standards at a pressure of one and one-half times the rated working pressure, but in no case shall the test pressure be less than one hundred fifty (150) psig for a minimum of two (2) hours.

- b) All force main pressure testing shall be witnessed and approved by county staff and / or the engineer.
- c) Minimum forty-eight (48) hours' notice is required to schedule a force main pressure test with county staff.
- d) Horizontal directional drills (HDD) shall be pressure tested as noted on the county HDD standard details and will be tested a second time as part of the overall system pressure test once the HDD force main has been connected to the installed force main system with the required valves in place at each end of the HDD.

Technical Specification 025

LANDSCAPING

1.0 General

- a) The contractor shall be responsible for providing all labor, materials, tools, equipment, topsoil, fertilizer, lime, mulch, seed, or sod if necessary for restoration and stabilization of areas disturbed under this contract.
- b) All areas disturbed, whether in street rights-of-way, permanent easements or temporary construction easements, shall be restored by the contractor upon completion of backfilling. The contractor may be required to restore original structures, decorative vegetation, grass seed, sod, and shrubbery removed to as near the original condition as possible and to the approval of the Engineer and / or Brunswick County. County staff can provide the contractor with the terms and conditions of any county negotiated easement with regards to final restoration conditions.

2.0 Protection Measures

- a) The utility contractor shall make every effort to avoid damage to existing trees, shrubs, flower beds and structural improvements. Such measures shall include, but not be limited to the following:
 - 1) Remove and replant small trees and shrubs.
 - 2) Remove and reinstall fences, mailboxes, planters, trash racks and similar improvements.
 - 3) Tie back ornamental branches that interfere with construction to avoid damage.
 - 4) Trim damaged branches of vegetation to improve appearance.
 - 5) Treat tree trunks damaged by construction or removed with an asphalt tree dressing compound.
 - 6) Use small rubber tired back hoes, trench boxes and special equipment in areas restricted in work space.
 - 7) Stripping areas of grasses normally established by sodding or sprigging such as Zoysia, hybrid Bermudagrass, St. Augustine, Bahia, Carpetgrass, etc., maintaining with proper moisture content and re-sodding original lawn materials. The contractor shall re-sod at their cost if stripping of grasses and /or sod per this section is disregarded.

3.0 Submittals

- a) The utility contractor shall submit the names and composition of the fertilizers, sod and seed mixtures and mulch type to the Engineer prior to initiation of restoration activities for review and approval.

4.0 Lawn and Roadway Shoulder Replacement

- a) The utility contractor shall re-establish turf in all areas where grass existed prior to construction, and is disturbed or damaged by construction activities without additional compensation.
 - 1) Lawns:
 - a) The type of turf shall be equal to that existing prior to construction in disturbed areas on private property. The contractor shall be required to either seed or sod disturbed areas to provide a grass stand equivalent to that existing prior to the disturbing activities.
 - 2) Roadway right-of-way / easements / public property
 - a) The type of turf shall be equal to that existing prior to construction in disturbed areas which are located inside of the right-of-way. At a minimum, the contractor shall be required to provide a satisfactory stand of perennial grass with a root system sufficiently developed to survive dry periods and winter weather, capable of re-establishment in the spring. In well maintained areas within the roadway right-of-way, easements, and public property the Engineer may require sod to be installed. The Engineer may direct areas with irrigation systems to be sodded.

5.0 Materials

- a) The contractor shall use the following materials on the project unless otherwise approved by the Engineer and /or any special requirement of NCDOT for restoration work within NCDOT rights-of-way:
 - 1) Topsoil:
 - a) Where topsoil has been previously hauled in, it shall be restored by removal, stockpiling and replacing, or by hauling in new topsoil.
 - 2) Seed:
 - a) The seed shall have 97% purity and 90% germination guarantee. All seed must meet the requirements of the North Carolina Department of Agriculture. Bags shall be labeled to describe the composition, purity, germination, and the presence of restrictive or prohibited agents. Damp or moldy seed will be rejected.

- 3) Turfgrass sod shall be of good quality, free of weeds, disease and of good color and density. Turfgrass sod composition shall match the varieties replaced and shall be supplied by a reputable sod producer.
- 4) Fertilizers:
 - a) Fertilizer shall be 10-10-10 or equivalent of uniform, free-flowing granules. The fertilizer shall be delivered to the site in the original containers labeled with contents and producer's name. The Engineer may require additional or a different fertilizer based on seed performance or soil test.
- 5) Lime:
 - a) The dolomitic lime shall consist of ground agriculture limestone containing not less than 85% of combined calcium and magnesium carbonates with 60% passing a #60 mesh sieve and 95% passing a #10 mesh sieve.
- 6) Mulch:
 - a) Mulch shall consist of dry, unchopped, unweathered small grain straw or hay free of seeds of competing plants. Apply 1 to 2 tons/acre on all seeded areas. All slopes with straw mulch exceeding 3:1 slope shall have an asphalt tack applied at the rate of 225 gallons/acre. Straw mulch that is matted or lumpy shall be loosened and separated before being used. The utility contractor may use alternate mulches upon approval of the Engineer.
- 7) Asphalt Binding Material:
 - a) The asphalt binding material for anchoring mulch shall consist of emulsified asphalt per North Carolina Department of Transportation specifications.
- 8) Water:
 - a) Water shall be potable, and free of contents which could retard grass growth.

6.0 Preparation of Disturbed Areas

- a) Uncultivated Areas:
 - 1) All uncultivated areas that are disturbed by the pipe laying operation shall be restored to good condition with similar materials as original. Restoration includes, but is not limited to, asphalt, paint stripes, concrete, curbs, culvert pipe, mailboxes and signs. Areas shall be cleaned and surplus materials removed.

- 2) Natural areas shall be graded to final grade, limed, fertilized, seeded and mulched as required and as described in Part 6.0 Cultivated Areas, except no topsoil application is required. Wetland areas are to be restored with original vegetation or with plants of same species as specified by the regulating authority. Topsoil will not be required on road shoulder adjacent to uncultivated areas except in those areas where suitable erosion ground cover is unattainable through seeding.
- b) Cultivated Areas:
- 1) Existing seeded and/or planted areas disturbed by construction shall be dressed with topsoil, limed, fertilized, seeded and mulched. Furnish and apply soil conditioners and seed as specified.
 - 2) Excess stone from construction activities left on private property or rights-of-way shall be removed by the Contractor, at his expense, to prevent damage to maintenance equipment and operations.
- c) Topsoil:
- 1) After approval of rough grading, the Contractor shall place the topsoil on all cultivated areas damaged by his operations, except for road shoulders adjacent to undeveloped and uncultivated areas. Topsoil shall be at least four (4) inches deep. All topsoil from stripping which is not used at the job site shall be removed from the site.
- d) Soil Conditioners:
- 1) Lime and fertilizer shall be spread and thoroughly worked into the topsoil at the rates of 3,000 lbs/acre and 1,000 lbs/acre, respectively. Then the soil shall be raked until the surface is finely pulverized and smooth and shall be compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades.
- e) Seeding / sodding:
- 1) Seeding / sodding shall be done when weather conditions are approved as suitable. If there is a delay, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before seeding / sodding, without additional compensation. Immediately before seeding / sodding is started, the soil shall be lightly raked.
 - 2) Seed shall be sown during the following dates at the following pound per acre rates. On a calm day and preferably by machine, but if by hand, only by experienced workmen. Hydroseeding may be permitted.

- a) For soils with good moisture retention from February 15 to April 30 or September 1 to October 31. Seed with 80 lbs tall Fescue, 50 lbs unhulled Common Bermuda Grass, 40 lbs Kobe Lespedeza.
 - b) For soils with poor moisture retention from April 1 - July 15, seed with 50 lbs unhulled Common Bermuda Grass, 5 lbs Centipede Grass and 10 lbs German Millet.
 - c) Temporarily seeding all other times (to be reseeded at the first available date listed in 1 or 2 above), 120 lbs rye (grain), 50 lbs Kobe Lespedeza.
- 3) Seed shall be raked lightly into the soil to a depth of 1/4 inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.
- 4) Wherever poor germination occurs in areas larger than three (3) square feet, the Contractor shall reseed, roll, and water as necessary to obtain proper germination. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.
- f) Mulch:
- 1) All seeded areas shall be mulched unless otherwise indicated in the Special Provisions or directed by the Engineer.
 - 2) Grain straw may be used as mulch at any time of the year. If permission to use material other than grain straw is requested by the Contractor and the use of such material is approved by the Engineer, the seasonal limitations, the methods and rates of application, the type of binding material, or other conditions governing the use of such material will be established by the Engineer at the time of approval.
 - 3) Mulch shall be applied within 36 hours after the completion of seeding unless otherwise permitted by the Engineer. Care shall be exercised to prevent displacement of soil or seed, or other damage to the seeded area during the mulching operations.
 - 4) Mulch shall be uniformly spread by hand or by approved mechanical spreaders or blowers which will provide an acceptable application. An acceptable application will be that which will allow some sunlight to penetrate and air to circulate, but also partially shade the ground, reduce erosion, and conserve soil moisture. Mulch rate shall be 2 tons per acre. When there are seasonal limitations on seeding or when other weather or erosion conditions make it desirable to mulch in advance of seeding, the Engineer may direct that mulch be applied after the application and incorporation of limestone into the seedbed, and the fertilizer and seed then applied later through the mulch in proper season or under more favorable weather conditions.

- 5) Mulch shall be held in place by applying a sufficient amount of asphalt or other approved binding material to assure that the mulch is properly held in place. The rate and method of application of binding material shall meet the approval of the Engineer. Where the binding material is not applied directly with the mulch, it shall be applied immediately following the mulch application. During the application of asphalt binding material, or other approved binding materials which may cause damage, adequate precautions shall be taken to prevent damage to traffic, structures, guardrails, traffic control devices, or any other appurtenances. The contractor shall either provide adequate covering or change methods of application as required to avoid such damage. When such damage occurs, the Contractor shall repair it, including any cleaning that may be necessary.
- 6) The Contractor shall take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water, or other causes and shall promptly remove any blockage to drainage facilities which may occur.

7.0 Inspection and Acceptance

- a) The Engineer and Owner will be furnished with duplicate copies of invoices for all sod, seed, fertilizer and lime used on the project.
- b) At the beginning of the next planting season after that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense.
- c) Restoration shall be accepted when a healthy growth of the vegetation is achieved and maintained to a height of 4" with 85% coverage; provided that no bare spots larger than 10 square feet exist.
- d) No separate payment will be made for Landscaping. All costs incurred by the contractor for this work shall be included in the unit or lump sum price for the item of work to which it pertains.

Technical Specification 026

CONCRETE REINFORCEMENT

1.0 General

- a) This specification gives general guidance and requirements for the structural reinforcement of poured in place concrete. Additional requirements may be required by the Engineer for the project and will be shown on the plans approved by the Engineer and Brunswick County.

2.0 Reference Standards and Specifications

- a) The latest editions of the reference standards listed below form a part of this specification and are applicable to this project.
- b) American Society for Testing and Materials:
 - 1) ASTM A-615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 2) ASTM A-185: Specification for Welded Steel Wire Fabric for Concrete Reinforcement
- c) American Concrete Institute:
 - 1) ACI 315: Manual of Standard Practice for Detailing Reinforced Concrete Structures
 - 2) ACI 318: Building Code Requirements for Reinforced Concrete
- d) Concrete Reinforcing Steel Institute
 - 1) CRSI 163: Recommended Practice for Placing Reinforcing Bars
 - 2) CRSI 165: Recommended Practice for Placing Bar Supports, Specifications, and Nomenclature
- e) Brunswick County Technical Specification TS 027: Cast-in-Place Concrete

3.0 Submittals

- a) The general contractor, or utility contractor, shall submit the following items to the Engineer for review and approval prior to beginning work:
 - 1) Manufacturer's certificates giving the properties of steel proposed for use. List the manufacturer's test number and heat number, chemical analysis;

yield point, tensile strength and percent elongation. Also identify on the certificates the proposed location of the steel in the work.

- 2) Submit the bill of materials along with the shop drawings for review.
- d) Shop Drawings:
- 1) Submit shop drawings for proposed reinforcement materials. Show reinforcement fabrication, bar placement location, splices, and spacing and bar designation, bar type, length size, bending number of bars, and other pertinent information, including dimensions. Information must correspond directly to data listed on the bill of material.
 - 2) Provide sufficient detail to permit placement of reinforcement without use of design drawings. Reproduction of design drawings for use as shop drawings will not be allowed. Begin fabrication of reinforcing steel after shop drawings have been reviewed and approved by the Engineer.
 - 3) Refer to ACI reference for detailing, location, placing, splicing, etc. of reinforcing steel to be shown on shop drawings.

4.0 Handling and Storage

- a) Store steel reinforcement above the ground on platforms, skids or other supports. Protect reinforcing, as far as practicable, from mechanical injury, surface deterioration and rusting caused by exposure to the weather.

5.0 Materials

- a) Deformed Bars: Use deformed bars conforming to ASTM A- 615
- b) Marking: Clearly mark all bars with waterproof tags showing the number of bars, size, mark, length, and yield strength. Mark steel with the same designation as the member in which it occurs. Key marks to the concrete placement number as designated in the concrete placement sequence shown on the drawings.
- c) Welded Wire Fabric: Use welded wire fabric per ASTM A- 185
- d) Tie Wire: Use 18-gage annealed steel for tie wire.

6.0 Accessories

- a) Submit all accessory items, such as expansion joint fillers, joint sealing compounds, riser bars, bonding agents, crack fillers, primers, and other accessory items as a shop submittal to the Engineer for review and approval prior to beginning work on the project.

7.0 Notification

- a) Notify the Engineer at least twenty – four (24) hours before concrete placement so that reinforcement may be inspected and errors corrected without delaying the work.
- b) All reinforcement shall have a minimum two (2) inch clearance from all forms unless designed to protrude into a subsequent, adjacent, concrete pour.

8.0 Payment

- a) Include all work for concrete reinforcement in the unit cost for cast-in-place concrete. Separate payment will not be made for this item.

Technical Specification 027

CAST-IN-PLACE CONCRETE

1.0 General

- a) This specification gives general guidance and requirements for cast in place Portland cement concrete work. Additional requirements may be required by the Engineer for the project and will be shown on the plans approved by the Brunswick County.
- b) Concrete shall consist of a mixture of Portland cement, aggregates, and water, and shall be proportioned in accordance with the requirements of this specification. Admixtures shall be included with these primary ingredients only when specifically authorized.

2.0 Reference Standards and Specifications

- a) ASTM C-143: Concrete Slump Testing
- b) Brunswick County Technical Specification TS 026: Concrete Reinforcement

3.0 Proportions and Consistency

- a) In proportioning concrete materials one (1) bag (sack) of cement shall be considered as being one (1) cubic foot volume and ninety-four (94) pounds weight. Portland cement shall be measured by weight when bulk cement is used and where in batching it is necessary to use a portion of a bag. Otherwise, for bag cement, the bag weight of ninety-four (94) pounds may be used.

4.0 Mixing and Delivery

- a) All concrete under this specification shall be consider machine mixed, where the volume to be placed is equal to or greater than (1) cubic yard. Hand mixing is allowed where the volume to be placed is less than (1) cubic yard, for example, for thrust blocking as requirement by County standard details.
- b) Mixers shall be stationary or truck mixers. The mixer drum shall be of adequate size to accommodate the maximum batch and shall be rotated at the rate specified by the manufacturer. The mixer shall be equipped with an automatic timing device to prevent discharge of the concrete until the specified mixing time has elapsed.
- c) The minimum mixing time for concrete shall be that minimum time specified both by the Engineer or the manufacturer and in accordance with industry standards.

- d) Central plant ready mix concrete is acceptable and shall be delivered to the work site with adequate plasticity and workability. Ready Mix concrete shall be delivered to the work site and pouring begun with a period of one and one half (1½) hours after the introduction of water to the cement and aggregates.
- e) Hand mixing shall be permitted when the amount of concrete required for any job is less than one (1) cubic yard. Hand mixed concrete shall be mixed on a watertight platform or in a mortar box in batches not to exceed 1/3 cubic yards each. The aggregate shall first be spread in a uniform layer over which the required quantity of cement shall be evenly distributed. The entire batch shall be turned with shovels until the ingredients are thoroughly blended before adding the water. After adding the proper amount of water, the batch shall again be turned with shovels until a uniform consistency is obtained.
- f) Any central plant ready mix, or hand mixed, concrete shall not be used if the mixture fails the slump test, or is rejected by the Engineer or County staff.

5.0 Concrete Consistency

- a) The consistency of the concrete shall be determined by the slump test as referenced in ASTM C-143 and / or specified by the Engineer. Slump of a given mix may be increased by adding water, increasing the percentage of fines (cement or aggregates), entraining air, or incorporating an admixture that reduces water requirements.
- b) The slump specified by the Engineer shall yield the desired consistency with the least amount of cement and water.
- c) Admixtures shall only be used when approved by the Engineer or Brunswick County staff.

6.0 Concrete Reinforcing

- a) All concrete reinforcing shall be installed by the contractor and inspected and approved by the Engineer prior to pouring concrete.

7.0 Special Precautions in Freezing Weather

- a) Frozen aggregates or aggregates containing lumps of frozen material shall be thawed before using.
- b) When the temperature falls to or below thirty-eight (38) degrees Fahrenheit, no concrete work of any kind is to be done except by special permission of the Engineer, and then strictly according to his direction.

8.0 Handling and Placing Concrete

- a) No concrete shall be used which does not reach its final position in the forms within one (1) hour after water is first added to the mix, except when concrete is continually agitated, when the time may be extended to one and one-half (1 ½) hours.
- b) Concrete shall be placed so as to avoid segregation of the materials and the displacement of the any installed reinforcement.
- c) The use of long chutes for conveying concrete from the mixer will be permitted only with permission of the Engineer. In case an inferior quality of concrete is produced by the use of long chutes, the Engineer may order discontinuance of their use and the substitution of a satisfactory method of placing the concrete.
- d) All chutes, troughs and pipes shall be kept free from coatings of hardened concrete by thoroughly flushing with water after each run; water used for flushing shall be discharged clear of the concrete already in place.
- e) Concrete shall not be dropped a distance of more than five (5) feet, and special care shall be taken to fill each part of the form by depositing the concrete as near final position as possible. The coarse aggregate shall be worked back from the face and the concrete forced around the reinforcement without displacing the bars.
- f) After initial set of the concrete, the forms shall not be jarred and no strain shall be placed on the ends of the projecting reinforcement.
- g) Concrete shall be compacted by continuous working with a suitable tool or by vibrating the forms in a manner acceptable to the Engineer.
- h) Concrete shall be placed in horizontal layers not more than twelve (12") thick, except as approved by the Engineer.
- i) Each layer shall be placed and compacted before the preceding batch has taken initial set to prevent injury to the green concrete and avoid surfaces of separation between the batches.
- j) Each layer shall be compacted so as to void the formation of a construction joint with a preceding layer which has not taken initial set.
- k) All concrete shall be placed so as to be properly finished and curing begun during daylight hours. At no time shall concrete be placed which will require the finishing, etc., to be performed by artificial light. Paving operations shall be as scheduled by the Engineer.

9.0 Inspection

- a) Proper facilities shall be provided for the inspection and sampling of concrete at the mixing plant, loading plant, and place of delivery, or as directed by the Engineer.

- b) The manufacturer shall afford the inspector, without charge to the County, all reasonable facilities for securing samples to determine if the concrete is being furnished in accordance with the Contract Documents and as specified by the Engineer. All inspection and sampling shall be so conducted as not to interfere unnecessarily with the manufacture and delivery of the concrete.

10.0 Finishing and Curing of Concrete:

- a) Concrete for curb, curb and gutter, sidewalk and driveways shall have a broomed finish. The surface shall be screened and tamped with a special tool to force the coarse aggregate away from the surface, floated to bring the surface to the required finish level, steel-toweled to an even, smooth surface and broomed with a fiber bristle brush. The surface shall be of uniform texture.
- b) Curing shall be accomplished by preventing loss of moisture, rapid temperature change, and mechanical injury or injury from rain or flowing water for a period of seven (7) days when normal portland cement has been used or three (3) days when high-early-strength portland cement has been used. Curing shall be started after placing and finishing the concrete is finished, and after all free water has disappeared from the surface of the concrete.
- c) Moist curing may be accomplished by covering with burlap, cotton, or other approved fabric mats, or with sand and shall be kept continually wet. Forms shall be kept continually wet and not removed before the end of the curing period.

11.0 Sampling and Testing:

- a) The contractor shall provide three (3) cylinders for breaking at seven (7) days and three (3) cylinders for breaking at twenty-eight (28) days, or as directed by the Engineer.
- b) The concrete shall meet or exceed the specified strength in the Contract Documents or as specified by the Engineer, at both the seven (7) day test and the twenty-eight (28) day test. Failure to meet the specified strength tests is grounds for rejection of the work.
- c) The contractor shall hire an approved independent testing firm to perform all required concrete testing and will be reimbursed for payment of successful concrete strength tests per the terms in the Contract Documents.
- d) Test results shall be delivered to the Engineer by the testing laboratory with copies sent to the contractor and Brunswick County.

Technical Specification 035

ELECTRONIC MARKER BALLS FOR WATER AND SEWER FORCE MAINS

1.0 General

- a) It is the intent of this specification to provide technical guidance on the proper installation of electronic marker balls for water and sewer mains sewer mains installed in the service area of the Brunswick County Public Utilities Department.
- b) The standard utility line locator material is a #12 AWG, high strength, copper clad steel conductor (HS – CC) tracer wire such as Copperhead SuperFlex, or approved equal.
- c) Electronic marker balls are also required for:
 - 1) Non-ferrous water mains and sewer force mains eight (8) inches in diameter and larger,
 - 2) Ferrous water mains and sewer force mains greater than twelve (12) inches in diameter.
- d) Contact Brunswick County for additional information and questions concerning the proper installation and required usage of electronic marker balls.

2.0 Materials

- a) Electronic marker balls shall be:
 - 1) Water: 3M Scotchmark Electronic Marker, model # 1403-XR, 4 – inch diameter, colored blue
 - 2) Sewer: 3M Scotchmark Electronic Marker, model # 1404-XR, 4 – inch diameter, colored green
 - 3) Reclaimed Water: 3M Scotchmark Electronic marker, model #1408-XR, 4 - inch diameter, colored purple
- b) The markers consist of a sealed shell containing a passive antenna with a low frequency resonance circuit tuned to a certain frequency depending upon the associated utility. For water and sewer systems the frequencies are:
 - 1) Water: 145.7 kHz
 - 2) Sewer: 121.6 kHz
 - 3) Reclaimed Water: 66.3 kHz

- c) The locator sends a signal to the marker, which energizes the marker, and the marker reflects the signal back to the locator. The markers are installed during new construction or repairs to system mains as specified herein.

3.0 Requirements for Electronic Marker Placement

- a) Electronic marker balls shall be placed at:

Tees	Bends	Repair points
Crosses	Utility crossings	Service laterals
Casing ends	Water crossings	Service stubs
Arcs	Rail crossings	

and at all changes in pipe diameter.

- b) Refer to the Brunswick County *Electronic Marker Ball Placement* Standard Detail.

4.0 Electronic Marker Installation, Spacing, and Depth

- | | | |
|----|--|-----------|
| a) | Minimum depth of burial: | 18 inches |
| b) | Nominal depth of burial: | 24 inches |
| c) | Maximum depth of burial: | 48 inches |
| d) | Minimum height above the main: | 6 inches |
| e) | Minimum distance between markers: | 3.5 feet |
| f) | Nominal distance between markers: | 100 feet |
| g) | Maximum distance between markers: | 200 feet |
| h) | On bends and lateral pipe deflections place one marker ball every (25) feet | |
| i) | Markers to be installed above any installed main marking tape | |
| j) | Refer to the Brunswick County <i>Electronic Marker Ball Placement</i> Standard Detail. | |

SECTION 01 10 00 SUMMARY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Specification Conventions.
 - 3. Work sequence.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes improvement of facilities and equipment replacement at Moore Street, Ninth Street, and Park Avenue pump stations in the City of Southport.
 - 1. Work of this project includes:
 - a. Installation of new polymer concrete wet wells with flood-proof access hatch, new submersible pumps, pump control panels, generator replacement or reconfiguration, and associated electrical improvements, stainless steel pump discharge piping, polymer concrete valve vaults, ductile iron valves and fittings, restrained PVC C900 force mains and connection to existing force mains, PVC C900 gravity sewer extension including polymer and precast concrete manholes, new decorative site fencing, installation/extension of gravel access driveways, and relocation of existing water meters and backflow preventers.
 - b. Demolition of existing wet wells and concrete slab on grade, removal of suction lift pumps and related piping, fiberglass pump enclosure, existing pump control panels and existing wiring, abandonment of gravity sewer and force main, and removal of existing site fencing.
- B. Perform Work of Contract under unit prices contract with Owner in accordance with Conditions of Contract.

1.3 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

1.4 WORK SEQUENCE

- A. Construct Work in stages during construction period, coordinate construction schedule and operations with Owner:
 - 1. Stage 1: Install new wet wells, valve vaults, submersible pumps and associated electrical components, and construct new force main and gravity sewer up to the point of connection with existing utilities. Existing pump station shall remain operable while work in this stage is being completed.

2. Stage 2: Upon successful testing and startup of new pump station components, make connections to existing force mains and gravity sewer and bring new pump station components into service.
3. Stage 3: Begin demolition and abandonment of pump station components, gravity sewer, and force main no longer in use.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of values.
- B. Applications for payment.
- C. Change procedures.
- D. Defect assessment.
- E. Unit prices.
- F. Alternates.
- G. Cash allowances.
- H. Contingency allowances.
- I. Testing and inspection allowances.

1.2 SCHEDULE OF VALUES

- A. Submit printed schedule on EJCDC C-620 Contractor's Application for Payment (2013). Electronic format will be provided by the Engineer.
- B. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.
- C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance.
- D. Include in each line item, amount of Allowances specified in this Section. For unit cost allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.
- E. Include within each line item direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on EJCDC C-620 Contractor's Application for Payment (2013). Electronic format will be provided by the Engineer.

- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule with each Application for Payment.
- D. Payment Period: Submit at intervals stipulated in the Agreement.
- E. Submit with transmittal letter as specified for Submittals in Section TS 007 – Project Submittals.
- F. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 - 1. Current construction photographs specified in Section TS 007 – Project Submittals.
 - 2. Partial release of liens from major subcontractors and vendors.
 - 3. Record documents as specified in Section 01 70 00 – Execution and Closeout Requirements, for review by Owner which will be returned to Contractor.
 - 4. Affidavits attesting to off-site stored products.
 - 5. Construction progress schedules, revised and current as specified in Section TS 007 – Project Submittals.

1.4 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Engineer will advise of minor changes in the Work not involving adjustment to Contract Price or Contract Time by issuing supplemental instructions.
- C. The Engineer may issue a Notice of Change including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with stipulation of overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 15 days.
- D. Contractor may propose changes by submitting a request for change to Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors. Document requested substitutions in accordance with Instructions to Bidders.
- E. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Work Change Directive. Changes in Contract Price or Contract Time will be computed as specified for Time and Material Change Order.
- F. Work Change Directive: Engineer may issue directive, on EJCDC C-940 Work Change Order Directive (2013) signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Price or Contract Time. Promptly execute change.

- G. Force Account Change Order: Submit itemized account and supporting data after completion of change within time limits indicated in Conditions of the Contract. Engineer will determine change allowable in Contract Price and Contract Time as provided in Contract Documents.
- H. Maintain detailed records of work done on Force Account basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.
- I. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.
- J. Change Order Forms: EJCDC C-941 Change Order (2013).
- K. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- L. Correlation Of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Price.
 - 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit price will be adjusted to new price at discretion of Owner.
- D. Defective Work will be partially repaired to instructions of Owner, and unit price will be adjusted to new price at discretion of Owner.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Engineer to assess defects and identify payment adjustments is final.
- G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

1.6 UNIT PRICES

- A. Authority: Measurement methods are delineated in individual Specification Sections.
- B. Measurement methods delineated in individual Specification Sections complement criteria of this Section. In event of conflict, requirements of individual Specification Section govern.
- C. Engineer or Owner will take measurements and compute quantities accordingly. Provide assistance in taking of measurements.
- D. Unit Quantities: Quantities and measurements indicated in Bid Form are for contract purposes only. Actual quantities provided shall determine payment.
 - 1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at unit sum/prices contracted.
- E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals, erection, application or installation of item of the Work, overhead, and profit.
- F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.
- G. Measurement Of Quantities:
 - 1. Weigh Scales: Inspected, tested, and certified by applicable State Weights and Measures Department within past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
 - 3. Metering Devices: Inspected, tested, and certified by applicable State Department within past year.
 - 4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
 - 5. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
 - 6. Measurement by Area: Measured by square dimension using mean length and width or radius.
 - 7. Linear Measurement: Measured by linear dimension at item centerline or mean chord.
 - 8. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.
- H. Unit Price Schedule: Refer to Bid Form.

1.7 ALTERNATES

- A. Alternates quoted on Bid Form will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work.

1.8 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts; delivery to site and applicable taxes.
- B. Costs Not Included in Cash Allowances but Included in Contract Price: Product handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.
- C. Engineer Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- D. Contractor Responsibilities:
 - 1. Assist Engineer in selection of products, suppliers, and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of selection by Owner, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- E. Differences in costs will be adjusted by Change Order.

D. PRODUCTS – NOT USED

PART 2 EXECUTION – NOT USED

END OF SECTION

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SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Quality control and control of installation.
 - 2. Tolerances.
 - 3. References.
 - 4. Testing and inspection services.
 - 5. Manufacturers' field services.
 - 6. Labeling.
 - 7. Mock-up requirements.
 - 8. Examination.
 - 9. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or Work specified by association, trades, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date for receiving Bids, (date of Owner-Contractor Agreement when there are no Bids), except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Contractual relationships, duties, and responsibilities of parties in Contract and those of Engineer shall not be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 TESTING AND INSPECTION SERVICES

- A. Employ and pay for services of an independent firm acceptable to Owner to perform specified testing and inspection.
 - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer, specialists and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. Independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Engineer.
 - 1. Laboratory: Authorized to operate in State of Project location.
 - 2. Laboratory Staff: Maintain full time registered Engineer and necessary specialists on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing and inspections may occur on or off project site. Perform off-site testing as required by Engineer or Owner.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

- E. Testing and employment of independent firm does not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- F. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Engineer.
 - 1. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
 - 2. Submit final report indicating correction of Work previously reported as non-compliant.
- G. Independent Firm Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 - 6. Perform additional tests required by Engineer.
 - 7. Attend preconstruction meetings and progress meetings.
- H. Independent Firm Reports: After each test, promptly submit one copy of report to Engineer and Owner; and two copies to Contractor, and authority having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and specifications section.
 - 6. Location in Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
- I. Limits On Independent Firm:
 - 1. May not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. May not approve or accept any portion of the Work.
 - 3. May not assume duties of Contractor.
 - 4. Has no authority to stop the Work.

1.6 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to:
 - 1. Observe site conditions.
 - 2. Observe conditions of surfaces.
 - 3. Review installation and quality of Work.
 - 4. Review start-up of equipment.
 - 5. Review testing, adjusting and balancing of equipment.

6. Initiate instructions when necessary.

- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

1.7 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.8 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Engineer.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

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SECTION 01 51 00
TEMPORARY WASTEWATER BYPASS PUMPING

PART 1 GENERAL

1.1 SUMMARY

- A. The work covered by this section consists of providing all labor, equipment, material and supplies and performing all operations required to bypass pump sewage around a manhole, sewer section and or pump station in which work is to be performed.
- B. The Contractor shall bypass pump sewage as a part of their operations. The Contractor shall provide all pumps, piping, temporary electric and/or fuel service, temporary connections, remote monitoring, and other equipment necessary to accomplish bypass pumping; perform all construction; obtain all permits; pay all costs; and perform complete restoration of all existing facilities and areas disturbed to conditions equal to or better than pre-construction conditions and to the satisfaction of the Owner or Engineer.
- C. The Contractor may bypass small diameter sewers (8-inch diameter) by pump and haul. The Contractor shall provide all pumps, remote monitoring, and hauling equipment to accomplish bypass. All existing facilities and areas disturbed shall be restored to conditions equal to or better than pre-construction conditions and to the satisfaction of the Owner or Engineer.

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall provide, maintain and operate all temporary bypass pumping facilities such as plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power and fuel, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work. Contractor to provide continuous remote monitoring of the upstream suction manhole and the downstream discharge manhole. The pumping shall have the means to control the flow rate to avoid downstream sanitary sewer overflows.
- B. The design, installation and operation of the temporary bypass pumping system shall be the Contractor's responsibility. The temporary bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. The Contractor shall provide all necessary means to safely convey the sewage past the work area.
- D. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
- E. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

- F. Violations that result from sewage spills shall be the sole responsibility of the Contractor. Additionally, Contractor will bear all costs to clean up the sewage spills.
- G. The Contractor shall ensure that the temporary bypass pumping system is properly protected against clogging. Pump impellers shall be of the open non-clog type to prevent clogging from stringy materials.
- H. The Contractor shall be responsible for monitoring, servicing and maintaining the temporary bypass pumping system for the duration of bypass pumping operations.
- I. Discharge piping: In order to prevent the accidental spillage of flows, all discharge piping shall be temporarily constructed of rigid pipe with positive, restrained joints and capable of withstanding 150 psi pressure. Under no circumstances will aluminum “irrigation type” piping or glued joint PVC be allowed. The bypass pumping system shall be 100% watertight.
- J. The Contractor may submit a plan for approval that would allow connection of existing system to new system during non-work hours. Such plan shall ensure a water-tight system. Any clearing of new system from intermittent use before its final acceptance shall be the Contractor’s sole responsibility.
- K. Where the pipe crosses a roadway, access road, or walkway the pipe shall be protected to allow passage of traffic and/or pedestrians. All road crossings shall be suitable for AASHTO H-20 Live Load with two trucks passing.
- L. Contractor shall maintain traffic control at all times. Contractor shall provide details of pump and pipe arrangement to minimize disturbance to traffic and sidewalk accessibility for pedestrian traffic. Contractor shall provide traffic rated ramps for bypass pipe in City Streets and below grade piping in NCDOT streets. Contractor shall provide barricade pumps to ensure safe traffic flow around work area. Contractor shall provide warning signs in accordance with NCDOT MUTCD for work area and pump/ramp so adequate distance is provided for motorists to reduce speed.
- M. Contractor shall notify residents/business owners of CIPP installation and sewer construction that impacts sewer service prior to bypass system startup.
- N. The Contractor shall be responsible for maintaining the sewer mains in service without wastewater spills during the entirety of the construction period.

1.3 SUBMITTALS

- A. A bypass plan sealed by a NC Professional Engineer must be submitted to the Engineer prior to pumping operations to coordinate with administration engineering staff. The plan shall be submitted to the Engineer for review and approval at least 30 days prior to commencing work. Submittal shall be in accordance with Section TS 007 – Project Submittals and shall be submitted concurrently with the Sequence of Construction Plan per 1.4.B, below.

Bypass pumps shall be capable of bypassing minimum full flow pipe capacity as shown in the table below:

1. Minimum bypass pump capacities:

Full Flow Pipe Capacity Example			
Pipe Size (in.)	Slope (ft/ft)	Full Pipe Flow (GPM)	Full Pipe Flow (MGD)
8	0.010	550	0.79
10	0.010	985	1.43
12	0.010	1,602	2.33
15	0.026	4,681	6.74
16	0.019	4,753	6.84
18	0.010	4,753	6.87
24	0.003	5,570	8.00

The Contractor shall secure pumps from a pump supplier for the proper line size and pipe slope for full flow pipe capacity. Pumping operations must be monitored 24 hours a day for each day of the pumping operation by qualified personnel in order to respond to problems or failures. 100% redundancy is required for pumping operations. In addition, back up pumps are to be connected to the bypass force main to facilitate immediate use upon failure of the primary pumps. No construction shall begin until all provisions and requirements have been reviewed and approved by the Engineer. The plan must be specific and shall include, but not be limited to, the following details:

- a. Detailed drawings showing staging area, access route, site elevations, proposed pumping system and means of providing protection to the bypass system for each phase of the bypassing operation
- b. Plugging methods and types of plugs
- c. Number and size of pumps and basis of selection
- d. Number, size, material, method of installation, and location of suction piping
- e. Number, size, material, method of installation, and location of discharge piping
- f. Bypass pump sizes, capacity, number of each size to be on site, and power requirements
- g. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range are to be submitted)
- h. Standby power generator size (if necessary), location
- i. Thrust and restraint block sizes and locations
- j. Sections showing suction and discharge pipe depth, embedment, select fill, and special backfill, if applicable
- k. Method of noise control for each pump and/or generator and the decibel rating of each
- l. Any temporary pipe supports and anchoring required
- m. Design for access to bypass pumping locations indicated on the drawings
- n. Selection of bypass pumping pipe size and material (include method of connections to pump and other piping)
- o. Schedule for installation of and maintenance of bypass pumping lines
- p. Describe how bypass pumping system will be monitored

- q. Demonstrate upstream manholes will not overflow from surcharging and that upstream service connections will not be surcharged
- r. Show discharge from bypass pump system discharge will not surcharge downstream discharge manhole
- s. Show 100% standby for pumps, power, controls, and suction piping
- t. Show force main pipe material and thickness can withstand all normal operating and surge pressures with a safety factor of 2.0
- u. Denote any conditions that will cause pumps to lose suction lift (prime) and describe procedures to rectify
- v. Show that the emergency switchover from primary to secondary pumping will be automatic should equipment fail
- w. Show emergency plan to be used if flooding occurs at work site
- x. If Contractor plans to connect the existing flow to the new pipeline during non-work hours or times of wet weather, then show means and methods of providing watertight connect between the existing and new system
- y. Show suction and discharge piping is protected from possible damage from varying creek flows and construction activities
- z. Show any planned shifting of bypass equipment during construction
- aa. Provide product information and location(s) if use of road ramps is proposed
- bb. Provide product information and type of equipment and plans to maintain flow when service laterals are disconnected

B. Sequence of Construction Plan: Furnish in accordance with Section TS 007 – Project Submittals.

- 1. Contractor's Sequence of Construction defining work to be performed, including the following items:
 - a. Schedule showing approximate start date, duration and end date on each phase of construction
 - b. Define activities to be performed by or witnessed by the Engineer and Owner and date on which these activities are to be performed
 - c. Scheduling/timing of manufacturers field services, as specified
- 2. Provide complete list of equipment and material that is required to perform each segment of work.

1.4 SERVICE LATERAL BYPASS

- A. Disconnected sewer service lateral connections shall be accommodated by bypass pumping or containment of the flow from time of disconnection to time of reconnection. This shall be accomplished by a mechanical pump and manifold system or by a watertight storage system such as a bladder tank system. The storage system shall be capable of holding adequate sewage from each sewer service lateral connection for a period of 24 hours. Each storage system shall be emptied or pumped during each 24-hour period and properly disposed of.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

- A. The Contractor is responsible for locating any existing utilities in the area that the Contractor selects to locate the bypass pipelines under or over. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner. All cost associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
- B. When working inside a manhole, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- C. The installation of the bypass pipelines is prohibited in all wetland areas. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public ways from NCDOT and the Owner.
- D. All bypass pumping operations shall be contained within permanent or temporary easements unless otherwise show on the Plans.
- E. The Contractor shall provide for utilities and services for his own operations. The Contractor shall furnish, install and maintain all temporary utilities during the contract period including removal upon completion of the Work.
- F. Contractor shall coordinate with governing authority to utilize existing storm pipes and culverts for carrying water-tight bypass piping to cross under existing roads and thoroughfares. Contractor shall be responsible for any damages and restoration of the storm pipe and/or culvert and removal of any debris or sediment that may become blocked by the bypass pipe. Contractor shall temporarily connect new sewer to the existing sewer in the event flooding is anticipated and remove bypass pipe so it does not impact hydraulic performance or the storm pipe or culverts.

3.2 INSTALLATION AND REMOVAL

- A. Installation and removal will be in accordance with the approved Bypass Pumping Plan and the approved Sequence of Construction Plan. Any modifications to the approved Plans shall be submitted to the Engineer at least two (2) weeks prior to proposed modification. Any significant modification may require a coordination meeting with Engineer and Owner.
- B. The Contractor shall pipe sections or make connections to the existing interceptor and construct temporary bypass pumping structures only at the access location and as may be required to provide an adequate suction conduit.
- C. The temporary bypass pumping system shall be tested in accordance with Section 3.6.A, before placing the system in operation. Owner and Engineer retain the right to require

the Operation Test be performed with water prior begin pumping sewage. Testing periods shall occur only between the work hours outlined in the contract documents. Testing of bypass pumping system shall NOT be allowed Friday through Sunday, on the Owner's scheduled Holidays, or on the day immediately prior to an Owner's scheduled Holiday.

- D. If any of the Contractor's operation causes a backup in the sewer, which is unacceptable to the Owner, the Contractor will be directed to cease all operations and to perform all tasks necessary to facilitate normal flow. Work and/or delays involved with relieving a backup situation shall not be cause for any additional costs to the Owner.
- E. Plugging or blocking of wastewater flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance of the work, the plugs are to be removed in a manner that permits the wastewater flow to slowly return to normal without surge, surcharging, or causing other major disturbances downstream.
- F. Before the bypass pumping system is disconnected, either to be moved to the next section or at the completion of the work, the Contractor shall discharge sewerage remaining in the bypass discharge piping and pumping equipment into the working sanitary sewer.
- G. At the conclusion of the bypass pumping operation and once written permission is granted by the Owner and Engineer, Contractor shall remove all temporary bypass components and restore the site to original conditions to the satisfaction of the Owner and Engineer.

3.3 PLUGGING AND BLOCKING

- A. Plugging or blocking of the flow shall only be allowed when the Contractor can demonstrate that the upstream gravity collection system can accommodate the surcharging without any adverse impact.

3.4 PUMPING AND BYPASSING

- A. When bypass pumping is required, the Contractor shall supply all necessary pumps, conduits and other equipment to divert the flow around the work area. The bypass system shall be of sufficient capacity to handle existing plus additional flow that may occur during rainstorm events. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. Pumps and equipment shall be continuously monitored by the Contractor during the periods that pumping and bypassing are required.
- B. The Contractor shall select pumping/bypassing equipment that will not have excessive noise levels from pumping/bypassing equipment and shall be restricted to a maximum of sixty decibels (60 dB) at a distance of 50 feet.
 - 1. Contractor shall be responsible for providing and storing a sufficient quantity of diesel fuel on-site to continually operate the pumps for the duration of the temporary bypass pumping period.
 - 2. Contractor shall check the pump fuel levels and shall re-fill the tanks to full capacity on a daily basis.
 - 3. The bypass pumps are to have variable capacity by controlling the speed of the

- diesel engine. Each pump shall have a separate control panel.
4. Provide pressure and vacuum gauges on the suction and discharge headers.
 5. Provide pressure switches to start and stop the pumps and a pressure transmitter to vary the speed of the pumping units.
 6. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of the flows.
 7. Each pump and driver shall be rated for continuous duty operation over the specified range of conditions without cavitating or overheating, and without excessive vibration or noise. In addition, each pump and driver shall be rated to operate intermittently at shut-off head against a closed discharge valve for periods of not less than 5 minutes without excessive cavitation, overheating, or vibration.
 8. All sewer plugs will be pneumatic-type plugs.
 9. All pumps are to be automatic self-priming pumps.
 10. Contractor shall provide a remote alarm system that provides notification of high level in bypass manhole. The remote alarm system shall have 24-hour backup battery. The alarm communication shall be by wireless cellular network.

3.5 FLOW CONTROL PRECAUTIONS

- A. When flow in a sewer line is plugged, blocked or bypassed by the Contractor, he shall take sufficient precautions to protect the public health and to protect the sewer lines from damage that might result from sewer surcharging. Further, the Contractor shall take precautions to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. The Contractor shall be responsible for any damage resulting from his flow control operations.
- B. When flow in a sewer line is plugged or blocked by the Contractor, he shall monitor the conditions upstream of the plug and shall be prepared to immediately start bypass pumping, if needed. Any liquid or solid matter which is bypass pumped from the sewer collection system shall be discharged to another sewer manhole or sewer line. No such liquid or solid matter shall be allowed to be discharged, stored or deposited to the open environment. The Contractor shall protect all pumps, conduit and other equipment used for bypass from traffic.
- C. Should any liquid or solid matter from the sewer collection system be spilled, discharged, leaked or otherwise deposited to the open environment as a result of the Contractor's flow control operations, he shall be responsible for all cleanup and disinfection of the affected area and notify the sewer system operating personnel and appropriate regulatory agencies and perform all required cleanup operations at no additional cost to the Owner.

3.6 QUALITY CONTROL AND MAINTENANCE

- A. Pressure Test: Contractor, with assistance from the pump supplier, shall perform low pressure air testing at a minimum test pressure of 5 psi. Test will display no leakage for a minimum of 15 minutes.
- B. Operation Test: Contractor shall operate the temporary bypass pumping system for as long as necessary to demonstrate reliable operation of the entire system, including but not limited to pumps and controls, to the satisfaction of the Owner and Engineer.

- C. Inspection: During the time the Contractor is working at the project site, Contractor shall inspect the bypass pumping system at the start of each workday to ensure that the system is working correctly and shall keep a written log of the pump inspection results.
- D. Maintenance Service: Contractor shall insure that the temporary pumping system is properly maintained, and a responsible and competent mechanic/operator shall be on-call at all times system is operational.

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Closeout procedures.
2. Final cleaning.
3. Starting of systems.
4. Demonstration and instructions.
5. Protecting installed construction.
6. Project record documents.
7. As-Built Survey
8. Operation and maintenance data.
9. Manual for materials and finishes.
10. Manual for equipment and systems.
11. Spare parts and maintenance products.
12. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
- B. Provide submittals to Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.

- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer and Owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section TS 007 – Project Submittals that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of substantial completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other seasons within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual Sections.

1.6 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.7 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Engineer.

1.8 AS-BUILT SURVEY

- A. Contractor to provide As-Built survey to be completed by a licensed Professional Land Surveyor in the State of North Carolina.
 1. Horizontal Datum: NC Grid NAD83 or as indicated on the Drawings
 2. Vertical Datum: NAVD 88 or as indicated on the Drawings
 3. As-Built survey shall be tied to the nearest NC Geodetic Monument.
 4. Engineer can provide, upon request, design drawings in AUTOCAD format for use by the Surveyor.
 5. As-Built Survey to include location of installed utilities in the x, y, and z planes and include all above ground appurtenances. All above ground appurtenances shall be labeled with the name of the appurtenance and the Northing, Easting, and Elevation.
 6. The utility shall be located, field marked, and surveyed after construction. As required, the Contractor may survey installation depths during the construction of the project. Otherwise, depths shall be clearly documented on red-line record drawings.
 7. As-Built survey to include location and label of each fitting. During construction, each fitting shall be marked above ground with a wooden stake, labeled to indicate size and type of fitting. The location of each fitting shall be surveyed on a monthly basis as construction progresses.
 8. Survey shall include the start and end point of all bore and jack and horizontal directional drill installations included as part of this project.
 9. Final Completion will not be considered reached until the submittal and acceptance of the As-Built survey by the Owner and Engineer.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring capacity expansion binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions arranged by system or process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals and Photocopies of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for reordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product Specification Sections.

- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed or by label machine.
- G. Include color coded wiring diagrams as installed.
- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- S. Additional Requirements: As specified in individual product Specification Sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Submit in accordance with the requirements of TS 007 – Project Submittals.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond date of substantial completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01 71 13
MOBILIZATION

PART 1 GENERAL

1.1 SUMMARY:

- A. The work covered by this section consists of preparatory work and operations, including but not limited to:
 - 1. Those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site.
 - 2. Those items necessary for providing the items required by the General Provisions, Special Provisions, and General Requirements.
 - 3. Those items including but not limited to: the establishment of all temporary fencing, staging areas, temporary access and haul routes, and other facilities necessary for work in the project.
 - 4. Those items necessary for the maintenance of vehicle and construction traffic; including but not limited to: portable and stationary construction signs, barricades, drums, cones, and other traffic control devices.
 - 5. Surveying and construction staking.
 - 6. All barricades, barricade lights, and other phasing and detour devices.
 - 7. Performance bond, labor and materials bond, insurance.
 - 8. Those items for all other work in the various items on the project site which must be performed or costs incurred prior to beginning work.
 - 9. This item also includes all work outside the limits of construction that is necessary to demobilize and restore areas disturbed by the Contractor to their original condition including, but not limited to, pavement rehabilitation, grading, seeding, mulching, cleaning, and disposal.

PART 2 PRODUCTS - Not Used.

PART 3 EXECUTION - Not Used.

END OF SECTION

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SECTION 02 41 16
STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolishing designated structures.
 - 2. Demolishing designated slabs-on-grade.
 - 3. Demolishing, disconnecting, and capping designated utilities.
 - 4. Removing designated items for reuse and Owner's retention.
 - 5. Protecting items designated to remain.
 - 6. Removing and disposing of demolished materials.
- B. Related Sections:
 - 1. Section TS 013 - Excavating, Grading, Trenching and Backfilling.

1.2 REFERENCES

- A. NCDOT Standard Specifications:
 - 1. Standard Specifications for Roads and Structures, latest version, published by the North Carolina Department of Transportation.

1.3 SUBMITTALS

- A. Section TS 007 – Project Submittals: Requirements for submittals.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of barricades, fences, and temporary work.
- C. Existing Structure Documentation: Submit the following for existing buildings indicated to remain.
 - 1. Photographic survey indicating conditions before, during, and after demolition work.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions.

1.5 QUALITY ASSURANCE

- A. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.

- B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.
- D. Perform Work in accordance with Section 210 and 215 of the NCDOT Standard Specifications.

1.6 QUALIFICATIONS

- A. Demolition Firm: Company specializing in performing work of this section with minimum 5 years documented experience.
- B. Electrical Removals: Entity and personnel performing electrical removals shall be electrician legally qualified to perform electrical construction and electrical work in the jurisdiction where the Site is located.
- C. Plumbing Removals: Entity and personnel performing plumbing removals shall be plumber legally qualified to perform plumbing construction and plumbing work in the jurisdiction where the Site is located
- D. Design shoring, bracing, underpinning and under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

1.7 STAGING

- A. Demolition of wet wells and other active sanitary sewer facilities and structures shall be performed after the proposed sanitary sewer facilities have been constructed, tested, and brought into service.

1.8 SCHEDULING

- A. Schedule Work to precede site excavation work.
- B. Describe demolition removal procedures and schedule.

1.9 PROJECT CONDITIONS

- A. Notify Engineer upon discovery of hazardous materials.
- B. Do not sell demolished materials on-site.
- C. Maintain existing sidewalks to greatest extent possible.

PART 2 PRODUCTS - Not Used.

PART 3 EXECUTION

3.1 EXISTING BUILDING DOCUMENTATION

- A. Document condition of adjacent structures indicated to remain.
- B. Photographically or video document existing structures before beginning demolition and after completing demolition.
- C. Submit flash drive or digital copies of photographs and videos documenting site conditions before and after demolition.

3.2 EXAMINATION

- A. Examine existing structures indicated to be demolished before demolition.
- B. Determine where removals may result in structural deficiency or unplanned collapse during demolition. Coordinate demolition sequence and procedures to prevent structures from becoming unstable.
- C. Determine where demolition may affect structural integrity or weather resistance of adjacent structures indicated to remain.
 - 1. Identify measures required to protect structures from damage.
 - 2. Identify remedial work including patching, repairing, bracing, and other work required to leave structures indicated to remain in structurally sound and if applicable, weather tight and watertight condition.
- D. Verify hazardous material abatement is complete before beginning demolition.

3.3 PREPARATION

- A. Call Local Utility Line Information service designated on Drawings not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Notify affected utility companies before starting work and comply with utility's requirements.
- C. Protect installed structures and utilities prior to and during demolition.
- D. Do not close or obstruct roadways, sidewalks, and hydrants without permits.
- E. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.

- F. Protect existing landscaping materials, trees, appurtenances, and structures indicated to remain.
- G. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

3.4 DEMOLITION REQUIREMENTS

- A. Use of explosives is not permitted unless authorized by authority having jurisdiction.
- B. Conduct demolition to minimize interference with adjacent structures.
- C. Cease operations immediately when adjacent structures appear to be in danger. Notify Owner and Engineer. Do not resume operations until directed.
- D. Conduct operations with minimum interference to public or private accesses to occupied adjacent structures. Maintain protected egress and access from adjacent structures at all times.
- E. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property.
- F. Sprinkle Work with water to minimize dust. Provide hoses and water connections required for this purpose.

3.5 DEMOLITION

- A. Water and Sewer Utility Demolition:
 - 1. Disconnect and cap designated utilities as indicated on the Drawings. Record termination or capped location on Record Documents.
 - 2. Gravity sewer and force main to be abandoned in place shall be capped on both ends and grout-filled.
 - 3. Manholes, vaults, wet wells and other underground utility structures to be abandoned shall be demolished to 5 feet below grade. All pipes entering or exiting the structure shall be capped as noted on Drawings. The structure shall be filled with granular material, topped with suitable backfill material compacted to 90% standard proctor, or better, and prepared for seeding. Access must be along established utility easements and only allowed during dry conditions. Any disturbed areas at the structure or enroute to the structure will be seeded and mulched.
- B. Electrical Demolition:
 - 1. Perform electrical demolition work in accordance with Division 26 – Electrical Sections.
 - 2. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit, and wiring which are not part of final project.
 - 3. Install temporary wiring and connections to maintain existing systems in service during construction.
 - 4. Perform work on energized equipment or circuits with experienced and trained personnel only after assessing arc flash hazard and implementing arc energy reduction measures or utilizing PPE rated for maximum possible level of hazard exposure.
 - 5. Protect and retain power to existing active equipment remaining.

6. All exposed conduits in buildings or structures to be removed, shall be cut, and plugged flush with structure or floor.
 7. Cap abandoned empty conduits at both ends (except conduits that terminate in outlet boxes, junction boxes, pull boxes, handholes, manholes, or equipment enclosures).
 8. All wiring to be removed shall be disconnected at lugs within existing electrical distribution equipment, motor control centers, VFDs, or control panels. All wiring which serves equipment to be removed shall be removed.
- C. Remove concrete slabs-on-grade as indicated on the Drawings.
- D. Backfill open pits and holes resulting from demolition, in accordance with Section TS 013 - Excavating, Grading, Trenching and Backfilling.
- E. Rough grade and compact areas affected by demolition to maintain site grades and contours and to accommodate subsequent construction operations.
- F. Salvage and Ownership:
1. Refer to Section 01 70 00 – Execution and Closeout Requirements, for requirements on salvage, ownership, and handling of equipment and materials removed during demolition and removal Work.
 2. Materials and equipment to remain Owner's property shall be carefully removed and appropriately handled by Contractor to avoid damage and invalidation of warranties in effect and shall be cleaned and stored at the Site (or other site specified in the Contract Documents) at place designated by Engineer or Owner.
- G. Continuously clean up and remove demolished materials from site. Do not allow materials to accumulate on site.
- H. Transportation and Disposal:
1. Non-hazardous Material: Properly transport and dispose of non-hazardous demolition debris to a permitted landfill or other suitable location permitted by the Division of Solid Waste Management, in accordance with Laws and Regulations. Non-hazardous material does not contain Asbestos, PCBs, Petroleum, Hazardous Waste, Radioactive Material, or other material designated as hazardous in Laws and Regulations.
 2. Hazardous Material: When handling and disposal of hazardous materials is included in the Work, properly transport and dispose of hazardous materials in accordance with the Contract Documents and Laws and Regulations.
- I. Do not burn or bury materials on site unless authorized by authority having jurisdiction. Leave site in clean condition.

END OF SECTION

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SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removing surface debris.
2. Removing designated paving, curbs, and slabs.
3. Removing designated trees, shrubs, and other plant life.
4. Removing abandoned utilities and structures where indicated.
5. Plugging abandoned utilities and filling abandoned structures where indicated.
6. Protecting plant life and structures designated to remain.

B. Related Sections:

1. Section 02 41 16 – Structure Demolition.
2. Section TS 013 - Excavating, Grading, Trenching and Backfilling: Topsoil and subsoil removal, proofrolling.

1.2 REFERENCES

1.3 NCDOT Standard Specifications:

- A. Standard Specifications for Roads and Structures, latest version, published by the North Carolina Department of Transportation.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NCDOT Section 200 of the Standard Specifications, latest edition.
- B. Maintain one copy of document on site.
- C. Conform to applicable code for environmental requirements and disposal of debris.

PART 2 PRODUCTS – Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing plant life designated to remain is tagged or identified.
- B. Identify waste area or salvage area for placing removed materials when materials are indicated to remain on site.

3.2 PREPARATION

- A. Call local utility line information service indicated on Drawings not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect from damage utilities indicated to remain.
- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect bench marks and survey control points from damage or displacement.

3.4 CLEARING

- A. Remove trees and shrubs within areas indicated on Drawings.
- B. Remove stumps, main root ball, root system, surface rock, and pavements to depth of 12 inches below proposed Subgrade elevation.
- C. Clear undergrowth and deadwood without disturbing subsoil.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, curbs, and site slabs.
- C. Where indicated on Drawings partially remove paving, curbs, and slabs. Neatly saw cut edges at right angle to surface.
- D. Remove abandoned utilities. Indicate removal termination point for underground utilities on Record Documents.
- E. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- F. Do not burn or bury materials on site unless authorized in writing by authority having jurisdiction.
- G. Leave site in clean condition.

END OF SECTION

SECTION 32 31 19
DECORATIVE FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fence framework and accessories.
 - 2. Manual gates and related hardware.
- B. Related Sections:
 - 1. Section TS 027 – Cast-In-Place Concrete

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra High Strength.
 - 3. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 4. ASTM D6577 - Standard Guide for Testing Industrial Protective Coatings
 - 5. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
 - 6. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
 - 7. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
 - 8. ASTM F2814 - Standard Guide for Design and Construction of Ornamental Steel Picket Fence Systems for Security Purposes.
 - 9. ASTM F2957 - Standard Specification for Ornamental Aluminum Fence Systems.

1.3 SUBMITTALS

- A. Section TS 007 – Project Submittals: Requirements for submittals.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.
- D. Manufacturer's Installation Instructions: Submit installation requirements including post foundation anchor bolt templates if required.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.
- C. Operation and Maintenance Data: Procedures for submittals.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 5 years experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years experience.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence materials and accessories in packed cartons or firmly tied rolls.
- B. Accept materials on site in manufacturer's original packaging and inspect for damage.
- C. Identify each package with manufacturer's name.
- D. Store materials according to manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Ornamental Aluminum Picket Fence:
 - 1. Manufactured from aluminum extrusions, having a minimum tensile strength of 35,000 psi, using 6005 T5 alloy for structural components in accordance with ASTM F2957 – 13. Fence shall have exposed pickets.
- B. Ornamental Horizontal Rails:
 - 1. Rails shall be C-Channels or Hollow Square Extrusions.
 - 2. Square holes shall be punched in the top of the rails to allow the pickets to pass through.
 - 3. Because aluminum extrusions allow metal to be placed where it is needed most, the top shall be designed for additional strength.
- C. Ornamental Posts:
 - 1. Posts shall be hollow square extrusions with holes pre-punched to allow the rails from the fence sections to slide into them.
- D. Ornamental Gates:
 - 1. Matching gates.

- E. Concrete: Class B concrete in accordance with Section 1000 of NCDOT Standard Specifications with 2500 psi compressive strength at 28 days.

2.2 COMPONENTS

A. Ornamental Fence Dimensions

1. Fence Height: 8' high.
2. Pickets:
 - a. Pickets shall be $\frac{3}{4}$ " square x .050" thick and shall be exposed at the top.
3. Horizontal Rails:
 - a. Rails shall be $1\frac{3}{8}$ " x $1\frac{1}{4}$ " with .088" sides and .065" top thickness.
4. Posts:
 - a. Line Post Spacing shall be 6'-8'.
 - 1) Posts shall be 2" square x .125" thick.

B. Gates:

1. Gates shall be 14' wide with a double gate unless otherwise directed.
2. Gates shall be fabricated with 2" square ends, $1\frac{3}{8}$ " x $1\frac{1}{4}$ " rails and $\frac{3}{4}$ " pickets.
3. Gates shall fit openings inside-to-inside of the posts.

C. Screws

1. All screws shall be stainless steel with a plating of zinc and yellow dichromate to ensure corrosion resistance under the harshest conditions.
2. The screw heads shall be painted to match the color of the fence, with a polyurethane finish.

2.3 GATES

A. General:

1. Gate Types, Opening Widths and Directions of Operation: As indicated on the drawings.
2. Gates shall be designed for operation by one person.
3. Gates shall be factory assembled prior to delivery.
4. Gates finish shall match fence. The powder coat finish shall be black.
5. Gates shall match fence styles.

B. Hinges, Springs, and Latches:

1. Hinges shall be made from aluminum extrusions with a $\frac{3}{8}$ " stainless steel pin that may be attached to either a post or a wall.
2. Self-closing springs and self-latching latches are available for all gates.

2.4 FINISHES

A. Colors:

1. The powder coat finish shall be black.

B. Styles:

1. Typical rail cross sections:
 - a. Ornamental rail with exposed pickets.
 - b. Heavy Industrial Top snaps over bottom closure to conceal screw heads.

C. Pretreatment:

1. A three stage non-chrome pretreatment shall be applied.
 - a. The first step shall be a chemical cleaning.
 - b. The second step shall be a water rinse.
 - c. The final step shall be a dry-in-place activator which produces a uniform chemical conversion coating for superior adhesion.
2. Screws shall be plated with yellow and zinc dichromate to ensure corrosion resistance.

D. Coating:

1. Fence materials shall be coated with a polyester powder-coat finish system.
 - a. The finish shall have a cured film thickness of at least 2.0 mils.
2. The screw heads shall be painted to match the color of the fence.

E. Finish:

1. The cured finish shall meet the following:
 - a. Humidity resistance of 1,000 hours using ASTM D2247.
 - b. Alt spray resistance of 1,000 hours using ASTM B117.
 - c. Accelerated weathering for 500 hours under Method 6152 of Federal Test Method 141 shall show no adhesion loss, with only slight fading, chalking and water staining.
 - d. Outdoor weathering shall show no adhesion loss, checking or crazing, with only slight fade and chalk when exposed for one year.
 - e. Minimum hardness of 2H using ASTM D3363.

2.5 CONCRETE

- A. Concrete for foundations: Class A Concrete conforming to Section 1000 of the NCDOT Standard Specifications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 – Execution and Closeout Requirements.
- B. Examine conditions under which the Work will be erected and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Do not begin installation and erection of fencing until final grading is completed.

B. Pickets:

1. The hollow pickets pass through the rails and are attached using stainless steel screws. By using this method of attachment, the pickets are always parallel regardless of the pitch of the terrain.

- C. Set intermediate, terminal, gate, and corner posts plumb, in concrete footings 33" depth recommended with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- D. Install fence in accordance with manufacturer's recommendations.

3.3 WARRANTY

- A. Fencing shall be guaranteed for 1 years. This guarantee shall cover, at minimum, defects in workmanship and materials, as well as the powder finish of the fence. The paint shall be guaranteed to not peel, crack, or chip.

3.4 ADJUSTMENT AND CLEANING

- A. Repair coatings damaged in the shop or at the Site by recoating with manufacturer's recommended repair compound, applied in accordance with manufacturer's directions.
- B. Lubricate and clean exposed operating surfaces.
- C. Repair and replace broken or bent components.

3.5 ERECTION TOLERANCE

- A. Maximum Variation from Plumb: ¼ inch.
- B. Maximum Offset from Indicated Position: 1 inch.
- C. Minimum distance from property line: 6 inches

END OF SECTION

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SECTION 33 05 62
POLYMER CONCRETE MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

- A. This specification covers polymer concrete manholes, wet wells, and valve vaults intended for use in sanitary sewers, storm sewers and water lines where corrosion resistance is required.
- B. Related Sections:
 - 1. Section TS 020 – Gravity Sanitary Sewer System
 - 2. Section 33 32 10 – Sewage Submersible Pump Station

1.2 REFERENCES

- A. ASTM C 478 (most current) Standard Specification for Precast Reinforced Concrete Manhole Sections.
- B. ASTM C 579 (most current) Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic, Surfacing, and Polymer Concretes.
- C. ASTM C 443 (most current) Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
- D. ASTM C 580 (most current) Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
- E. ASTM C 857 (most current) Standard Practice for Minimum Structural Design Loading for Underground Utility Structures.
- F. ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures & Commentary.
- G. ACI 440.1R-15 Guide for the Design and Construction of Structural Concrete Reinforced with Fiber-Reinforced Polymer (FRP) Bars.
- H. ACI 548.6R-96 Polymer Concrete-Structural Applications State-of-the-Art Report.
- I. ASTM D 648 (most current) Test Method for Deflection Temperature of Plastics Under Flexural Load in Edgewise Position.
- J. ASTM D 6783 (most current) Standard Specification for Polymer Concrete Pipe.
- K. ASTM D 2584 (most current) Test Method for Ignition Loss of Cured Reinforced Resins.

- L. ASTM C 923 (most current) Standard Specifications for Resilient Connectors between Concrete Manholes Structures and Pipe.
- M. ASTM C 990 (most current) Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections using Preformed Flexible Joint Sealants.
- N. ASTM C 497 (most current) Test Methods for Concrete Pipe, Manhole Sections, or Tile.

1.3 SUBMITTALS

- A. Section TS 007 – Project Submittals: Requirements for submittals.
- B. Submit manufacturer's data and details of following items for approval:
 - 1. Shop drawings of manhole and wet well sections, base units and construction details, jointing methods, materials, and dimensions.
 - 2. Summary of criteria used in manhole design including, as minimum, material properties, loading criteria, and dimensions assumed. Include certification from manufacturer that polymer concrete manhole design meets or exceeds the load and strength requirements of ASTM C 478 and ASTM C 857, reinforced in accordance with ACI 440.1R-15. Include current ISO 9001:2018 certification.
 - 3. Frames, grates, vent pipes, rings, and covers.
 - 4. Materials to be used in fabricating pipe drop connections.
 - 5. Materials to be used for pipe connections.
 - 6. Materials to be used for stubs and stub plugs, if required.
- C. Submitted sealed drawings by a registered Professional Engineer in state of construction.

PART 2 PRODUCTS

2.1 POLYMER CONCRETE MANHOLES

- A. Provide polymer concrete manhole sections, monolithic base sections and related components referencing to ASTM C 478. ASTM C 478 material and manufacturing is allowed compositional and dimensional differences required by a polymer concrete product.
- B. Provide base riser section with monolithic floors, unless shown otherwise.
- C. Provide riser sections joined with bell and spigot / ship-lap design seamed with butyl mastic and/or rubber gaskets (ASTM C 990) so that on assembly, manhole base, riser and top section make a continuous and uniform manhole structure.
- D. Construct riser sections for polymer concrete manholes from standard polymer concrete manhole sections of the diameter indicated on drawings. Use various lengths of polymer concrete manhole sections in combination to provide correct height with the fewest joints.
- E. Design wall sections for depth and loading conditions with wall thickness as designed by polymer concrete manufacturer.

- F. Provide tops to support AASHTO HS-20 or HL-93 or vehicle loading or loads as required and receiving cast iron frame covers or hatches, as indicated on drawings.

2.2 POLYMER CONCRETE WET WELLS

- A. Provide polymer concrete wet well sections, monolithic base sections and related components.
- B. Provide base riser section with monolithic floors, unless shown otherwise.
- C. Provide riser sections joined with bell and spigot / ship-lap design seamed with butyl mastic and or rubber gaskets (ASTM C 990) so that on assembly, manhole base, riser and top section make a continuous and uniform manhole structure.
- D. Construct riser sections for polymer concrete lift stations from standard polymer concrete cylinder sections of the diameter indicated on drawings. Use various lengths of polymer concrete sections in combination to provide correct height with the fewest joints.
- E. Design wall sections for depth and loading conditions with wall thickness as designed by polymer concrete manufacturer.
- F. Provide tops to support AASHTO HS-20 loading or loads as required and receiving non-vented, solid cast iron frame covers or hatches, as indicated on drawings.

2.3 POLYMER CONCRETE VAULTS

- A. Polymer Concrete Vaults shall meet or exceed the requirements for polymer concrete manholes and with the following supplemental requirements.
 - 1. Minimum dimensions per Drawings with a minimum base thickness of 6" and minimum wall thickness of 5".
 - 2. Live load rating of AASHTO HS-20.

2.4 DESIGN CRITERIA

- A. Polymer concrete risers, cones, flat lids, grade rings and base sections shall be designed by manufacturer to meet the intent of ASTM C 478 with allowable compositional and sizing differences as designed by the polymer concrete manufacturer.
 - 1. AASHTO HS-20 or HL-93 design or as required loading applied to manhole cover and transition and base slabs.
 - 2. Polymer manholes will be designed based upon live and dead load criteria in ASTM C 857 and ACI 350-06.
 - 3. Unit soil weight of 120 pcf located above portions of manhole, including base slab projections.
 - 4. Internal liquid pressure based on unit weight of 63 pcf.
 - 5. Dead load of manhole sections fully supported by polymer concrete manhole base.
 - 6. Buoyancy calculations to be provided with a safety factor of at least 2.0.

2.5 DESIGN

- A. Polymer concrete risers, cones, flat lids, grade rings and base sections shall be designed by manufacturer to meet loading requirements of AASHTO HS-20 loading and the polymer concrete design is as follows:
1. Polymer Concrete Mix Design shall consist of thermosetting resin, sand, and aggregate. No Portland cement shall be allowed as part of the mix design matrix. All sand and aggregate shall be inert in an acidic environment.
 2. Reinforcement - Shall use acid resistant reinforcement (FRP Bar) in accordance with ACI 440.1R-06 as applicable for polymer concrete design.
 3. The wall thickness of polymer concrete structures shall not be less than that prescribed by the manufacturer's design by less than 95% of stated design thickness.
 4. Each polymer concrete component shall be free of all defects, including indentations, cracks, foreign inclusions and resin starved areas that, due to their nature and degree or extent, detrimentally affect the strength and serviceability of the component part. Cosmetic defect shall not be cause for rejection. The nominal internal diameter of manhole components shall not vary more than 2%. Variations in height of two opposite sides of risers and cones shall not be more the 5/8 inch. The under run in height of a riser or cone shall not be more than ¼ in/ft of height with a maximum of ½ inch in any one section.
 5. Marking and Identification - Each polymer concrete structure shall be marked with the following information - Manufacturer's name or trademark, Manufacturer's location and Production Date.
 6. Polymer concrete structure joints shall be assembled with a bell/spigot or shiplap butyl mastic and/or gasketed joint so that on assembly, manhole base, riser and top section make a continuous and uniform manhole. Joint sealing surfaces shall be free of dents, gouges and other surface irregularities that would affect joint integrity.
 7. Minimum clearance between wall penetrations and joints shall be per manufacturer's design.
 8. Construct invert channels to provide smooth flow transition with minimal disruption of flow at pipe-manhole connections. Invert slope through manhole is as indicated on drawings. All precast base sections to be cast monolithically. Polymer bench and channel are to be constructed with all polymer concrete material, monolithically. Extended ballast slab requirements for buoyancy concerns can be addressed with cementitious concrete material.
 9. Provide resilient connectors conforming to requirements of ASTM C 923 or other options as available. All connectors are to be water-tight. Install approved resilient connectors at each pipe entering and exiting manholes in accordance with manufacturer's instructions.

2.6 QUALITY CONTROL

- A. Facility Quality Control should be maintained by adhering to ISO 9001:2018 for manufacturing. All fabricators will be ISO 9001:2018 Certified and provide documentation of current certification. All manufacturing will take place in an all polymer concrete facility. At no time will the polymer concrete manufacturing facility share the facility with a cementitious precast product production facility. Fabricator is also to provide references of 5 previous projects in the last 5 years performed with both owner and contractor for reference and review by owner. Polymer concrete shall be cast in a polymer only facility and shall not be manufactured in a cementitious concrete facility.

2.7 GROUTING

- A. All materials needed for grouting and patching will be a polyester mortar compound provided by the manufacturer or an approved equal by the manufacturer.

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SECTION 33 32 10
SEWAGE SUBMERSIBLE PUMPING STATION

PART 1 GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish all labor, materials, equipment and supplies and shall perform all work necessary for the complete construction of submersible pumping station as shown on the Drawings and specified herein.
- B. Related Sections:
 - 1. Section TS 007 – Project Submittals
 - 2. Section TS 013 – Excavating, Grading, Trenching and Backfilling
 - 3. Section TS 022 – Wastewater Force Mains
 - 4. Section TS 027 – Cast In Place Concrete
 - 5. Division 26 - Electrical Sections
 - 6. Section 33 05 62 – Polymer Concrete Wet Wells and Structures.

1.2 REFERENCES

- A. American National Standards Institute (ANSI)/American Water Works Association (AWWA)
 - 1. ANSI B16.1 - Cast iron pipe flanges and flanged fittings.
 - 2. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.
 - 3. ANSI/AWWA C115/A21.51 - Cast/ductile iron pipe with threaded flanges.
 - 4. ANSI 253.1 - Safety Color Code for Marking Physical Hazards.
- B. American Water Works Association:
 - 1. AWWA C219 - Bolted, Sleeve-Type Couplings for Plain-End Pipe
 - 2. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.
- C. ASTM International:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 3. ASTM A470 Standard Specification for Vacuum-Treated Carbon and Alloy Steel Forgings for Turbine Rotors and Shafts.
 - 4. ASTM A536 - Standard Specification for Ductile Iron Castings.
- D. Institute of Electrical and Electronics Engineers (IEEE)
 - 1. ANSI/IEEE Std 100 - Standard Dictionary of Electrical Terms.
 - 2. ANSI/IEEE Std 112 - Test Procedure for Polyphase Induction Motors.
 - 3. IEEE Std 242 - Protection of Industrial and Control Power Systems.
- E. National Electric Code (NEC)/National Electrical Manufacturers Assoc. (NEMA)
 - 1. NEC - National Electric Code.
 - 2. NEC 701 - National Electric Code article 701.

3. NEMA Std MG1 - Motors and Generators.

F. Miscellaneous References

1. Ten-State Standards Recommended Standards for Sewage Works.
2. Hydraulic Institute Std for Centrifugal, Rotary and Reciprocating Pumps.
3. ISO 9001 International Organization for Standardization.

1.3 SYSTEM DESCRIPTION

- A. Contractor shall furnish and install three (3) complete wastewater pumping stations to replace existing pump stations at Park Avenue, Moore Street, and Ninth Street.
- B. Principal items of equipment shall include submersible solids handling wastewater pumps, pump control panels, float-type liquid level switches, break-away fitting system, stainless steel guide rails and stainless steel lifting chain for pump removal, stainless steel discharge pipe and fittings.
1. Polymer concrete wet wells and valve vaults are specified in Section 33 05 62 – Polymer Concrete Wet Wells and Structures.

1.4 SUBMITTALS

- A. Section TS 007 – Project Submittals: Requirements for submittals.
- B. Shop Drawings: Shop Drawings shall be submitted to the Engineer for approval.
1. Pump Catalog Data, including a certified performance curve, motor data, and pump dimensional drawing
 2. Materials of construction list
 3. Mounting Accessory details
 4. Access Cover data
 5. Typical installation drawing
 6. Electrical schematics and diagrams
 7. Certified copies of test data from factory testing when specified, only after pumps have been ordered and manufactured.
- C. Informational Submittals:
1. Descriptive information on material and equipment furnished
 2. Anchorage requirements
 3. Installation instructions
 4. Manufacturer's certificate of acceptance of installation and testing
 5. List of manufacturer's recommended spare parts
 6. Installation & Operation Manual with parts list
 7. Warranty documents
 8. Name and address of factory authorized service facility
- D. Design Data: Service Manual shall be furnished for all mechanical equipment specified in this section. The manual shall contain a description of the equipment, a complete accessory and parts list, and complete installation, operation and maintenance instructions. Two copies of the manual shall be submitted for approval within 30 days after approval of the shop drawings. After approval of the manual, six (6) additional copies shall be furnished.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of pumps and appurtenances on the contract drawing, reflecting all post-bid changes.
- C. Operation and Maintenance Data: Submit maintenance instructions for equipment and accessories.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Brunswick County standards.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. All equipment shall be carefully handled and protected from damage while in storage and during installation. Equipment shall be protected from the weather at all times.
- B. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- C. Equipment damaged by the weather, handling, or construction shall be immediately repaired or replaced to the Engineer's satisfaction.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.

1.11 WARRANTY

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.
- B. Submersible wastewater pumps shall come with a 5-year, pro-rated warranty that begins at the date of shipment from the manufacturer's facility.

1.12 MAINTENANCE MATERIALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Furnish the following:
 - 1. One spare impeller, trimmed to match installed impeller.
 - 2. Two sets of special tools required for normal operation and maintenance of products furnished.

PART 2 PRODUCTS

2.1 PUMPS AND MOTORS

- A. Manufacturers:
 - 1. Barnes.
 - 2. Flygt N-Series.
 - 3. Myers.
 - 4. Fairbanks Morse.
 - 5. Sulzer ABS.
 - 6. Substitutions: Instructions to Bidders.
- B. Service Conditions:
 - 1. The pumps shall be submersible end suction centrifugal chopper, cutter, or grinder type, suitable for et pit submersible installation, with a permanently installed guide rail system, with a slide that automatically connects to the discharge piping when lowered into place. The pump will be suitable for submergence up to a depth of 66 ft
 - 2. Each pump shall be capable of handling raw, unscreened domestic sewage consisting of water and fibrous materials. The impellers will be capable of passing up to (2.5")(3")(4") diameter spherical solids. The pump (s) shall be driven by a Premium Efficient/ IE3 motor capable of operating in a 40°C/104° F environment and handling liquids with temperatures to 40°C/104° F continuously. The motor will be capable of operating continuously when fully submerged, partially submerged, or unsubmerged.
 - 3. Each pump will be capable of the following performance:

Moore Street Pump Station		
Primary Flow	400	US GPM
Primary Head	108	TDH - Feet
Minimum Hydraulic Efficiency	60	%
Secondary Flow	420	US GPM
Secondary Head	107	TDH - Feet
Discharge Size	4	In
Suction Size	4	In
Motor Speed	1750	RPM
Motor HP	20	HP
Frequency	60	Hz
Voltage	480	V

Phase	3	ph
Motor Service Factor	1.15	SF

Ninth Street Pump Station		
Primary Flow	300	US GPM
Primary Head	150	TDH - Feet
Minimum Hydraulic Efficiency	55	%
Secondary Flow	745	US GPM
Secondary Head	123	TDH - Feet
Discharge Size	4	In
Suction Size	4	In
Motor Speed	1750	RPM
Motor HP	50	HP
Frequency	60	Hz
Voltage	480	V
Phase	3	ph
Motor Service Factor	1.15	SF

Park Avenue Pump Station		
Primary Flow	315	US GPM
Primary Head	62	TDH - Feet
Minimum Hydraulic Efficiency	55	%
Secondary Flow	380	US GPM
Secondary Head	59	TDH - Feet
Discharge Size	4	In
Suction Size	4	In
Motor Speed	1750	RPM
Motor HP	15	HP
Frequency	60	Hz
Voltage	480	V
Phase	3	ph
Motor Service Factor	1.15	SF

4. Component Materials:

Volute	ASTM A48 Class 30 Cast Iron
Impeller	ASTM A536, 65-45-12 Ductile Iron
Slicing Blade	ASTM A276 440C Stainless Steel, Heat Treated to 53-60 HRC
Striker Plate	ASTM A276 440C Stainless Steel, Heat Treated to 53-60 HRC
Motor Housing	ASTM A48 Class 35B Cast Iron
Wear Ring	ASTM B505 C95400 Lead Free Bronze
External Hardware	304 Stainless Steel
Lifting Bail	304 Stainless Steel
Shaft	416 Stainless Steel

Cooling Jacket	304 Stainless Steel
Seals	Carbon/Silicon Carbide/Buna Upper, Silicon Carbide/Silicon Carbide/Buna Lower
Coating	Liquid End: Factory applied epoxy coating
Gaskets	Buna-N
O-Rings	Buna-N
Motor Rotor Bars	Die Cast Aluminum
Motor Cooling Liquid	Monopropylene Glycol and Distilled or Deionized Water
Elastomeric plug holding plate	ASTM A48 Class 30 Cast Iron
Cable Entry Housing	ASTM A48 Class 30 Cast Iron
Nameplate	304 Stainless Steel

5. Pump Components.

- a. The pump end components will be ASTM A48 Class 30 Cast Iron, aside from the impeller. The volute shall be a single piece non-concentric design, with smooth passages of sufficient size to pass solids that may enter through the impeller. The volute shall include a drain port connection. The volute discharge connection shall be a standard 125 lb. flange, slotted to accommodate ANSI or MM ISO Flanges used in sewage applications, and shall be a centerline connection. The suction connection shall be a standard ANSI 125 lb. flange. The volute shall be designed to withstand 1.5x the maximum shutoff head.
- b. The slicing blade-impeller assembly will be dynamically balanced to ISO G6.3 specifications, and will be capable of handling solids, fibrous materials, and other matter typically found in raw wastewater. The impeller shall be keyed to the shaft and shall have a taper lock connection. The impeller will be a:
 - 1) Mono-vane design with pump out vanes on both sides. The matching volute will include a replaceable volute wear ring at the inlet.
 - 2) Dual-vane design with pump out vanes on both sides. The matching volute will include a replaceable volute wear ring at the inlet. Larger models shall utilize an impeller wear ring as well.
 - 3) Tri-vane design with pump out vanes on both sides. The matching volute will include a replaceable volute wear ring at the inlet.
- c. The pump and motor shaft will be a solid, continuous piece of 416 stainless steel, keyed and tapered for the matching impeller fit to reduce rotor imbalance and minimize stress risers associated with stepped shafts. Shafts utilizing a coupling or other attachment method will not be acceptable. The shaft will have a maximum allowable deflection of 0.002 inches at the lower mechanical seal during operation.
- d. The mechanical seals will be a tandem system, consisting of two totally independent mechanical seals, each with its own single spring system acting in a common direction. The upper seal will have a carbon rotating face and a silicon carbide stationary face and will be located between the coolant chamber and the motor housing. The lower seal will have a silicon carbide rotating face and a silicon carbide stationary face and will be located between the pump and the lubricant chamber. Both seals will have 300 series stainless steel hardware and Buna-N elastomers.
 - 1) Alternate seal materials include a silicon carbide/silicon carbide upper seal, tungsten carbide/tungsten carbide upper seal, and tungsten carbide/tungsten

- carbide lower seal. Combination of these seal configurations will be acceptable.
Seal faces with materials other than those specified above will not be acceptable.
- e. Both seals shall be pinned in place to prevent rotation of the stationary seat and shall seal to the pump housing and must operate in a coolant chamber which shall provide superior heat transfer & seal cooling. The coolant must be environmentally safe non-toxic material. The seals must not require routine maintenance or adjustment but should be easily replaced. The seal shall be commercially available and not a pump manufacturer's proprietary design. Double mechanical seals with a single or double spring and/or cartridge seals will not be accepted.
 - f. The common pump and motor shaft shall rotate on two bearings. These bearings shall be high quality and commercially available. The bearings will be sealed, permanently grease lubricated for superior lubrication, cooling, and life. The lower bearing shall be of the double row ball type, locked in position to accept radial and axial thrust loads and the upper bearing shall be of the pre-loaded single ball type for radial loads as needed to provide a minimum L10 Life of 50,000 hours at -50% to +50% of BEP.
 - g. Gaskets except for seal gland and bearing retainer shall be of the angular gland compression O-ring type eliminating critical slip fits and the possibility of damage during service associated with sliding O-ring sealing arrangements. Mating surfaces where watertight sealing is required shall be machined and fitted with O-rings.
 - h. The exterior of the pump liquid end will be coated per Article 2.04 FINISHES below.
 - i. The pump shall be equipped with a stainless steel nameplate, located in an easily accessible location. The following data will be included on the nameplate:
 - 1) Manufacturer's Name
 - 2) Pump Part Number, Model Number and Serial Number
 - 3) Motor Horsepower Rating
 - 4) Voltage, Phase and Frequency
 - 5) Motor Speed
 - 6) Motor Service Factor
 - 7) Motor Full Load Amps
 - 8) Ambient Temperature Rating
 - 9) Code Letter
 - 10) Pump Weight
 - 11) Impeller Diameter
 - 12) Motor Insulation Class
 - j. Spare Parts
 - 1) One spare full diameter impeller-slicing blade assembly for each pump model.
 - 2) One spare set of mechanical seals.
 - 3) One complete set of pump bearings.
 - 4) One complete set of gaskets.
 - 5) One complete set of O-Rings.
 - 6) One complete set of wear rings for each pump model.
 - 7) One seal failure relay (if applicable).
 - 8) One set of each type of fuse used in the pump control panel and SCADA/RTU panel.
6. Motor Components
- a. The major driver components will be ASTM A48 Class 35B Cast Iron.
 - b. The motor shall be a squirrel cage induction motor housed in an air filled, watertight enclosure. The motor shall be NEMA Type B. The stator windings shall be insulated

with moisture resistant Class H insulation, rated for 180°C (356°F). The motor shall be 480 volts, 60 Hz, 3 phase, and shall have a voltage tolerance of +/- 10% from nominal voltage. The motor shall be designed to run continuously in a 40° (104°F) ambient environment.

- c. The stator shall be press fit into the motor housing, for mechanical stability and optimal heat transfer. The use of bolts or pins to secure the stator into the housing will not be acceptable.
 - d. The motor shall be inverter duty rated, in accordance with NEMA MG-1, Part 31, and shall have a minimum 1.15 service factor. The motor shall be designed for usage in submersible or dry applications, where the motor shall operate fully submerged, partially submerged, or completely unsubmerged. The motor shall continue to operate satisfactorily should the dry pit flood. The motor horsepower shall be non-overloading throughout the entire pump performance curve.
 - e. The rotor bars shall be die cast aluminum with integral cooling fins.
 - f. The motor will be capable of operating at a maximum submergence depth of 66 ft (20m), and shall be IP68 protection rated.
 - g. The motor will be IE3 rated in accordance with IEC 60034-30 at nominal voltage and frequency, with testing per CSA C390/IEEE114. The motor will be capable of 15 evenly spaced starts per hour without overheating.
 - h. The motor shall include a factory installed closed loop cooling system. The cooling system shall be completely self-contained. The cooling liquid shall be a mixture of 30% monopropylene glycol and 70% distilled or deionized water, and shall be circulated between a stainless steel jacket and the cast iron motor housing by a secondary, independent impeller. This secondary impeller shall be mounted directly to the motor shaft between the mechanical seals. The bearing bracket shall act as a heat exchanger to move the heat from the motor to the coolant liquid. The seal plate shall be finned and act as a heat exchanger to move the heat from the coolant to the pumped media. The system shall have at minimum one fill port and one drain port. An external coolant source, a cooling system circulating the pumped media or a design without a cooling system will not be acceptable.
7. Sensors
- a. A moisture sensor detection system shall be integrated within the bearing bracket and liquid ingress must trigger an alarm before reaching the bearings. A normally open float sensor with a circuit verification resistor must be installed in the seal leakage chamber to detect presence of liquid. Units sensing moisture within the motor chamber are not considered acceptable. It is recommended to use the pump monitor relay (PMR) installed inside the control panel which will trigger a warning light and shuts the pump down due to ingress of liquid.
 - b. The motor shall be equipped with thermal sensors:
 - 1) Three Phase: Three thermal sensors, one per phase, shall be embedded in the end coil of the stator windings, and wired in series. These sensors shall be used to monitor stator temperatures, in conjunction with an external motor overload protection device and wired to the control panel through the power cable.
 - 2) Single Phase: A thermal sensor shall be embedded in the end coil of the stator winding. It shall be used to monitor stator temperature, in conjunction with an external motor overload protection device and wired to the control panel through the power cable. The thermal switches shall open at 120°C (248°F). Start and run

capacitors with the starting relay shall be provided on a factory supplied backplate for mounting in the control panel.

8. Cable
 - a. The pump shall be equipped with 50 ft of a CSA qualified submersible power cable constructed in accordance with Type W guidelines. The power cable will also include the moisture and temperature sensor leads in one common jacket for most models.
 - 1) For E21 and E28 frame pumps, the cable entry system will be “Plug & Play” design, consisting of a voltage selectable expanding elastomeric plug, held in place by a cast stainless steel plate indicating the voltage and max amperage. By using this plug, pumps 20HP and below will be capable of switching between voltages with only a cord change. Pumps requiring internal wiring modifications to change voltage will not be acceptable.
 - 2) For E32 and E36 frame pumps, the cable entry system will be “Plug & Play” design, consisting of a potted cast iron housing, held in place by stainless steel hardware. The power cord shall be easily removed and replaced. Pumps with power cords that cannot be easily removed or replaced will not be acceptable.
 - b. The pumps shall be capable of being easily removed and replaced without the removal of the pump power cord from the electrical conduit.

2.2 WET WELL AND VALVE VAULT

- A. Wet well and valve vault shall be precast polymer concrete in accordance with Section 33 05 62 – Polymer Concrete Manholes and Structures.
- B. Flood-Proof Access Hatch with Fall Protection:
 1. Shall be constructed of aluminum with 1/4-inch thick, one-piece aluminum extruded frame having a continuous concrete anchor as part of the frame. Door panels shall be 1/4-inch thick aluminum diamond plate reinforced to withstand a 25-foot column of stationary water and H20 load rating. All hardware and hinges shall be stainless steel with tamper-proof fasteners. Doors shall open 90 degrees and be locked in this position with a stainless steel positive locking arm and aluminum release handle. Doors shall close flush with the top of the frame and be fully supported around the perimeter on a 1/2-inch wide lip.
 2. A grate based wet well fall protection system shall be furnished and installed by the Contractor. A system shall be installed when the door(s) is fabricated or field installed on the hatch door(s). The system shall be installed in accordance with the manufacturer’s recommendations.
 3. The System shall be designed to support a 300 PSF live load; highly visible in color; capable of locking in the fully open position; provided with lift assistance for ease of operation; UV and corrosion resistant; lockable to prevent unauthorized opening; supported with a load bearing bar(s) that provides continuous support; made of aluminum or one-piece fiberglass.

2.3 PIPING

- A. Pump discharge piping from inside wet well to valve vault shall be as follows:
 1. Stainless steel, grade 316L Schedule 40.
 2. Annealed, pickled and passivated conforming to ASTM A312.
 3. Joints: butt-welded or flanged ends with 304 stainless steel bolts.

2.4 VALVES AND FITTINGS

- A. Valves, fittings, and appurtenances in valve vault shall be the type, size, and class shown on the plans. Valves shall have a heavy cast iron body with standard flanged ends, Class 125 with operating devices as specified or shown. Valves shall be at least the same class as the pipe on which they are used. All exposed valves shall be shop primed. Insofar as possible, all valves shall be by the same manufacturer.
- B. Fittings:
 - 1. Use fittings of same size as pipe they serve.
 - 2. Dissimilar Metals: Provide dielectric fittings or suitable nonconductive material between dissimilar metals.
 - 3. Welding Fittings: Welding fittings for use with welded steel pipe shall be forged steel fittings in accordance with ANSI B16.9, standard weight.
 - 4. Flanged Fittings: Fittings for use with flanged joints on ductile or cast iron pipe or on steel pipe shall be cast iron or ductile iron fittings conforming to ANSI B16.1 or AWWA C110. Flanges shall be faced and drilled in accordance with ANSI B16.1, Class 125. All fittings shall be pressure rated at 250 psig.
- C. Restrained Flange Coupling Adapters
 - 1. Provide a restrained flanged to plain-end pipe connection. Comply with AWWA C219.
 - 2. Shall have a minimum working pressure of 250 psi.
 - 3. Gland and flange body shall be ductile iron meeting or exceeding ASTM A536, Grade 65-45-12.
 - 4. Gasket shall be made from virgin styrene butadiene rubber (SBR) compounded for water and sewer service in accordance with ASTM D2000 MBA 710. Flange gasket shall be O ring style and made of nitrile butadiene rubber (NBR) in accordance with ASTM D2000.
 - 5. Shop coat applied to cast parts for corrosion protection in transit.
 - 6. Restraining bolt shall be ductile iron, meeting or exceeding ASTM A 536.
 - 7. Restraining lugs shall be ductile iron, meeting or exceeding ASTM A 536.
 - 8. Shall be suitable for PVC, stainless steel, or ductile iron as shown on the Drawings.
- D. Plug Valves: Shall be eccentric of the non-lubricated type with resilient faced plugs. Valve bodies shall be ASTM A126 Class B cast iron according to AWWA C517. Valves shall include the following features:
 - 1. Plugs shall be resilient faced cast iron, ASTM A126 Class B. The resilient covering shall be neoprene or hycar and suitable for use with sewage.
 - 2. Sleeve metal bearings which are sintered, oil impregnated, and permanently lubricated stainless steel conforming to Type 316, ASTM A743, Grade CF-8M or AISI Type 317 L shall be used. Non-metallic bearings are not acceptable.
 - 3. Valve shaft seals shall conform to AWWA C507 and AWWA C517 and shall utilize a multiple v-ring that is externally adjustable and repackable under pressure.
 - 4. Valve actuators shall be of the lever type for all valves 6 inches and smaller.
- E. Swing Check Valves: Shall meet or exceed AWWA C508 with the following features:
 - 1. Body shall be constructed of ductile iron conforming to ASTM A536. End connections shall be flat faced flanged per ASME/ANSI 125/150 lb standard. The valve shall be rated for 250 psi cold working pressure.

2. Body seat: 316 stainless steel per ASTM A743. All external fasteners shall be stainless steel.
3. Disc and Disc Arm: Ductile iron conforming to ASTM A536. The disc shall be attached to the disk arm with 304 stainless steel fasteners.
4. Disc Seat: Acrylonitrile butadiene (NBR) securely held in place by stainless steel fasteners.
5. Pivot Shaft: One-piece 303 stainless steel per ASTM A582. Pivot shaft shall protrude through both sides of the valve body.
6. Lever and Weight: Lever arm and adjustable counterweight shall be ductile iron conforming to ASTM A536 grade 65-45-12.

F. Pressure Gauges

1. Range: 0-100 psig
2. Provide rounded type, stainless steel case, stainless steel bourdon tubes, glycerin filled, 1/4-inch NPT male bottom connection, stainless steel rack and pinion movement, white dials and black figures, and threaded ring case.
3. Gauge accuracy: within two (2) percent of the total scale range.
4. Provide diaphragm isolaters on all gauges.
 - a. Diaphragm material must be resistant to chemicals in the line being measured.

2.5 LEVEL CONTROL SYSTEM

A. Float-Tilt type level switches (qty. 4) shall be used to start and stop the pump motors in response to changes in wet well level as set forth herein and in Brunswick County SCADA/RTU Standard Details.

1. Materials:
 - a. Float material: Polypropylene with internal polyurethane foam or Teflon coated 316 stainless steel, not less than 5" in diameter.
 - b. Cable jacket: CPE, PVC, Synthetic rubber jacket; provide 1/8" thick neoprene sleeve over the cable jacket from 5" above mounting assembly to 5" below cable hinge point; provide 1/8" thick neoprene sleeve over the cable jacket from 5" above float to the top of the float switch body.
 - c. Cable clamp mounting assembly: 316 stainless steel, flanged & flared on both sides providing hinge point stress relief to both sides of the cable.
2. Design and Fabrication:
 - a. Provide switch complete with flexible electrical cable.
 - b. Micro-switch type.
 - c. Cable: 2-conductor plus ground, #16-gauge minimum stranded copper conductors, of sufficient length to reach the control panel without splices along the route as detailed in the project drawings, not less than 50 feet.
 - d. SPST contact rated 100 VA minimum up to 250 VAC.
 - e. Direct acting float switch:
 - 1) Switch actuates on rising level.
 - 2) Switch de-actuates when liquid falls 1" below actuation level.
3. A corrosion resistant weight shall be attached to a stainless-steel support cable below the lowest float to hold the switches in place.
4. Float cable holder:
 - a. Six (6) hooks, 316 stainless steel mounted with 316 stainless steel anchors.

2.6 FENCING

- A. See Section 32 31 19 - Decorative Fences and Gates.

2.7 ELECTRICAL

- A. See Division 26 sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Instructions to Bidders: Verification of existing conditions before starting work.
- B. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Follow manufacturer's instructions for proper handling.
- C. Immediately after off-loading, Contractor shall inspect items for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery.
- D. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

3.2 EXISTING WORK

- A. After proposed pump station and gravity sewer work is completed and brought into service, begin demolition work in accordance with Section 02 41 16 – Structure Demolition.
- B. Contractor shall protect new work and existing improvements to remain.

3.3 INSTALLATION

- A. Equipment shall be installed in strict accordance with the manufacturer's instructions and approved shop drawings. All anchor bolts, piping, valves, and appurtenances required for a complete installation shall be provided.
- B. Excavation, Backfilling, and Compacting of Pumping Station: All excavation, backfilling, and compaction for the pumping station shall be done in accordance with Section TS 013 – Excavating, Grading, Trenching and Backfilling of these specifications.
- C. Fencing: All fencing installation shall be installed in accordance with Section 32 31 19 – Decorative Fences and Gates of these specifications and the manufacturer's instructions.
- D. Electrical Work: All electrical installation work shall be done in accordance with the requirements of Division 26 of these specifications.
- E. Service:

1. Equipment manufacturer shall furnish all instructional and assistance necessary for proper installation and operation of all equipment specified herein and in related sections. After installation, a qualified service representative of the equipment manufacturer shall inspect the complete installation, make adjustments as needed, and place the equipment in permanent operation. Field tests shall be performed with the Engineers present to ensure proper operation.
2. After assured of proper performance, the service representative shall review with the Owner and Engineer the equipment installed demonstrating the operating methods and standard maintenance practices for the equipment installed.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Factory Tests:

1. The pump manufacturer shall perform a pump performance test to verify hydraulic performance as standard.
2. If certified testing is required, the manufacturer shall offer testing in accordance with Hydraulic Institute Standards 11.6 and 14.6. Additionally, the following tests are also available:
 - a. A check of the motor voltage and frequency
 - b. A motor and cable insulation test for moisture content or insulation defects, in accordance with CSA criteria
3. Each motor shall be dielectric tested to verify the motor insulation integrity.

C. Manufacturer's Representative

1. After equipment installation, manufacturer's representative shall inspect the equipment, carry out the equipment start-up procedures, and provide training to the operators in how to effectively operate and maintain the equipment. The manufacturer's representative may be an employee of the manufacturer's distributor.
2. Prior to Operational Testing, the Contractor shall have the manufacturer's representative perform the following:
 - a. Megger test the stator and power cables.
 - b. Check proper rotation.
 - c. Check power supply voltage.
 - d. Measure motor operating load and no-load current.
 - e. Check level control operation and sequence.
3. During Final Acceptance Testing, the manufacturer's service representative shall review recommended operation and maintenance procedures with the Owner's personnel.
4. The manufacturer's representative shall be present for a period of not less than one (1) day to complete the following:
 - a. Inspect completed installation
 - b. Observe equipment testing
 - c. Observe equipment start-up
 - d. Instruct operational personnel on equipment operation and maintenance.

D. Field Tests:

1. After installation, the pumping system shall be field tested using potable water for a minimum of 30 minutes and check for correct direction of rotation in the presence of the

manufacturer's representative and the Engineer. The Contractor shall be responsible for providing water and for conveying the water to the site and providing required meter and back-flow prevention check valve assembly. Each pump shall be cycled through the sequence of operation "pump on" as the level rises in the wet well and then "pump off" during draw down. Once each pump has been tested separately, the pumps will be operated in parallel.

2. Each pump shall operate over its intended operating range without undue noise, vibration, or cavitation. The Contractor shall monitor and record vibration at three symmetrically located points on each pump at maximum and minimum speed and supply data to the Owner.

E. Inspections

1. Upon completion of the installation and on-site testing, and before acceptance by the Owner, the Pump Manufacturer or the authorized Pump Manufacturer's Representative shall submit a written statement that the pump installation has been inspected and is completed in accordance with the manufacturer's recommendations.

ADJUSTING

- F. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

- G. Adjust parts for smooth, uniform operation in accordance with manufacturer's instructions.

3.5 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

- B. Clean equipment as recommended by manufacturer. Do not use materials or methods which may damage surface finish or surrounding construction.

END OF SECTION

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

Technical Specification 028

General Electrical Information

Revisions by Cheatham and Associates, P.A. are indicated by struck through text for deletions and red text for additions.

1.0 General

- a) The intent of this specification is to provide technical information and guidance for the furnishing of all labor, equipment, supplies, and materials, and the performing of all operations necessary to complete the installation of an electrical system as indicated on the approved plans or Contract Documents for County projects.

This work includes, but is not limited to, trenches, wiring, conduit, fittings, outlet boxes, junction boxes, pull boxes, switches, receptacles, pump stations, panel boards, lighting fixtures, lamps, relays, timers, alarms, control centers and surge arrestors.

- b) All electrical work shall be performed by a North Carolina licensed electrical contractor. The electrical contractor may function as a prime contractor or as a sub-contractor to a North Carolina licensed general contractor.
- c) The electrical contractor shall assume complete responsibility for any portion of the work provided by his subcontractors.
- d) All electrical work shall be in conformance with the National Electrical Code (NEC) and other applicable standards and local rules and codes of the Authority having Jurisdiction (AHJ).
- e) The electrical contractor shall obtain all required permits from the Authority having Jurisdiction (AHJ) prior to beginning any of the work.
- f) Related Brunswick County Technical Specifications are:
- 1) TS 029: Electrical Services
 - 2) TS 030: Grounding and Bonding
 - 3) TS 031: Surge Protection
 - 4) TS 032: Standby Emergency Power Generator for Sewer Pump Stations
 - 5) TS 033: Automatic Transfer Switch
 - 6) TS 034: SCADA Control System for Sewer Pump Stations
 - 7) Brunswick County Standard Details

- g) It is the intent and meaning of the project drawings and specifications to require completely finished work that has been tested and is ready for operation. The electrical contractor shall take this meaning into consideration and include in his bid minor pieces of material and labor to allow for contingencies and thus provide a finished product without numerous requests for minor extra labor and material.
- h) All permits for the electrical work shall be obtained and paid for by either the general contractor or the electrical contractor. All inspections, tests, or additional fees required for the completion of the work shall also be paid for by either the general or electrical contractor. Determination of who pays the required fees shall be a coordination issue between the general and electrical contractor.
- i) Work shall be executed as required by the approved drawings and accompanying technical specifications and shall be done in a neat, workmanlike manner by skilled mechanics. The electrical contractor is responsible for the finished work presenting a neat, trim, finished appearance, and capable of passing the final electrical inspection by the Authority Having Jurisdiction (AHJ).

2.0 Reference Standards

- a) National Electrical Code (NEC)
- b) National Electrical Manufacturing Association (NEMA)
- c) American National Standards Institute (ANSI)
- d) National Fire Protection Association (NFPA)
- e) Insulated Power Cable Engineers Association (IPCA)
- f) Institute of Electrical & Electronic Engineers (IEEE)
- g) Underwriter's Laboratories (UL)
- h) Electrical Testing Laboratory (ETL)
- i) Canadian Standards Association (CSA)

3.0 Submittals

- a) The electrical contractor shall submit shop drawings and other required materials to the Engineer for review and approval prior to beginning work. Such list shall include the manufacturer, trade name, type, model, series, and other pertinent information for the major items of electrical equipment proposed to be used by the electrical contractor.
- b) The electrical contractor shall submit ^{PDF files} ~~a minimum of four (4) sets~~ of all shop drawings and other materials to the Engineer per this Submittal Section. ~~One set will be returned to the electrical contractor by the Engineer after review and approval.~~

- c) The electrical contractor shall analyze all shop drawings and other materials before submittal and ensure that they meet all requirements of the approved plans and Contract Drawings and Specifications. The electrical contractor shall place his “Contractor Certification” in the form of an approval stamp on the submittals prior to delivering the submittal package to the Engineer for review and approval.
- d) Certain makes and models of electrical equipment are specified. The electrical contractor shall submit his proposal for the specified materials and equipment, or their equivalent, provided the words “or equal” or “or approved equal” follow the named manufacturers. If the “or equal” or “or approved equal” phrases do not appear on the plans, Contract Drawings, or Specifications, then the specified manufacturers shall be furnished without substitution. Equivalent or approved equal is interpreted to mean an item of material or equipment, similar to that named and which is suitable for the same use, electrical characteristics, and capable of performing the same functions as that named. The Engineer shall be the judge of equipment equality and his decision is final.
- e) Where no specific material or equipment type is referenced any first class product of a reputable manufacturer may be used provided it conforms to the requirements of the approved plans, Contract Documents, and Specifications. These materials shall be third party listed as UL, ETL, CSA, etc.
- f) If the shop submittals deviate from the approved plans, Contract Documents, or Specifications, the electrical contractor shall advise the Engineer, in writing, of the deviations and the reason for the deviation.
- g) Approval by the Engineer of the submittals by the electrical contractor shall not relieve the electrical contractor from the responsibility of furnishing same of proper dimensions, size, quantity, quality, and all performance characteristics to efficiently perform the requirements and intent of the approved plans, Contract Documents, and Specifications.
- h) Physical sizes of equipment used in the design layout are those of reputable electrical equipment manufacturers. The electrical contractor is responsible for providing equipment that will fit the space provided as shown on the approved plans, Contract Documents, and Specifications. If the electrical contractor uses an “approved equal” as reviewed and approved by the Engineer, any resulting conflicts with space clearances, NEC required clearances, or local codes shall be the responsibility of the electrical contractor to correct at his expense. The electrical contractor is responsible for providing all code required electrical clearances.
- i) The approved drawings, Contract Documents, and Specifications indicate the extent and general arrangement of the various systems. If any departures from these drawings are deemed necessary by the electrical contractor, detailed drawings and descriptions of these departures and a statement of the reasons therefore shall be submitted to the Engineer for approval as soon as practicable. No departures from the arrangements shown on the drawings shall be made without prior written approval of the Engineer or County staff.

4.0 Drawings and Specifications

- a) The electrical drawings and specifications are complementary each to the other, and what may be called for by one shall be binding as if called for by both. The drawings are diagrammatic and indicate generally the location of outlets, switches, devices, equipment wiring, etc., and show the general arrangement of conduits, raceways, fixtures, and equipment. Drawings shall be followed as closely as actual building and / or pump station construction allow, and the work of other trades will permit; however, all work shall suit the finished surroundings.
- b) For a Brunswick County sewer pump stations the Class 1, Division 1 and Class 1, Division 2 hazardous location clearances shall be maintained – no exceptions. If the electrical contractor cannot install the equipment per the approved plans and County pump station Standard Details, and maintain the Class 1 Division 1 and / or Class 2 Division 2 clearances, he is to contact the Engineer immediately to request a resolution from the Engineer and / or County staff.
- c) It is understood that where the words “furnish”, “provide”, and / or “install” are used, it is intended that the electrical contractor shall purchase and install completely all material necessary and required for a particular item, system, equipment, etc.
- d) The electrical work shall conform to the requirements shown on the approved plans, Contract Documents, Specifications, and Standard Details. General and Structural drawings shall take precedence over Electrical Drawings. Because of the small scale of the electrical drawings, it is not practical to indicate offsets, bends, fittings, and accessories that may be required. The electrical contractor shall investigate the project site and shall arrange his work accordingly, providing such fittings and accessories as may be required to meet code and provide the final finished and functional product, without additional cost to the Owner and as directed by the Engineer.

5.0 Electrical Equipment and Materials

- a) All equipment and materials provided shall be new and unused, and shall bear the manufacturer’s name, trade name, and UL label (or other listing label) as applicable.
- b) Equipment and materials shall be delivered to the job site and protected against the elements until installed. All items subject to moisture damage shall be stored in dry, heated and / or cooled, conditioned spaces. Rusty and / or corroded equipment and materials shall not be used.
- c) It shall be the electrical contractor’s responsibility to ensure that items to be furnished fit in the space available.
- d) Manufacturer’s directions shall be followed completely in the delivery, storage, protection, and installation of all electrical equipment and materials.

- e) Anchor bolts, sleeves, inserts, supports, nuts, washers, bushings, etc., shall be furnished and installed by the electrical contractor.
- f) All materials and equipment, installed under this contract shall be firmly supported and secured to the structure where required.
- g) All metal items for use outdoors or in damp locations shall be stainless steel.
- h) Current Transformer (CT) cabinets shall comply with the requirements of the electric utility company.
- i) Meter Boxes shall comply with the requirements of the electric utility company.
- j) All concrete pads for electrical equipment shall be minimum 3,000 psi, twenty-eight (28) day compressive strength concrete, or as directed by the Engineer or County staff. Pads shall be a minimum four (4) inches larger, in all directions, than the equipment being supported. Use reinforcement as specified in the approved plans, Contract Documents, Specifications, or as directed by the Engineer and / or County staff.

6.0 Electrical Equipment Identification

- a) Cable labels:
 - 1) Colored adhesive tape, self-adhesive, not less than 3 mils thick by one (1) to two (2) inches wide.
 - 2) Permanent, heat shrinkable conductor labels.
 - 3) Underground line warning tape, permanent, bright, continuous printed, vinyl tape, not less than six (6) inches wide by four (4) mils thick, compounded and approved for direct burial, embedded continuous metallic strip or core, printed legend shall indicate the type of underground conductor, installed directly above the underground cable at six (6) to eight (8) inches below finished grade.
- b) Nameplates and signs:
 - 1) Safety signs – comply with 29 CFR, Chapter XVII, Part 1910.145
 - 2) Engraved plastic nameplates and signs, melamine plastic laminate, minimum one-sixteenth (1/16) inch thick for signs up to twenty (20) square inches, and one-eighth (1/8) inch thick for larger sizes, engraved legend, black letters on white face.
 - 3) Nameplates and signs shall be fastened to electrical equipment with high performance, double coated tape with adhesive, design basis 3M # ~~0683~~, 06383, or approved equal.

- c) Installation:
- 1) All unit equipment shall contain individual unit nameplates. Nameplates will also be provided on all individual dry type transformers, individual panel boards, control panels, motor control centers, disconnect switches, enclosed circuit breakers, motor starters, push button stations, contactors, control devices, automatic transfer switches, safety switches, and combination starters.
 - 2) All pilot lights will include laminated plastic nameplates indicating status of equipment being monitored.
 - 3) If equipment identification will be applied to surfaces that require a finish the electrical contractor shall install the identification after completing the finish work.
- d) Control Cables Labels:
- 1) Permanent, heat shrinkable matching labels, installed on both ends of each control and instrumentation conductor and cable, for pump stations the label text shall match that of the County pump station SCADA / RTU and pump control panel drawings.
- e) Secondary Phase Conductors:
- 1) Phase conductors shall be color coded in accordance with the National Electrical Code (NEC) and the following colors:
 - a) 120 / 240 VAC

Phase A:	Black
Phase B:	Red
Neutral:	White
Ground:	Green
 - b) 120 / 208 VAC

Phase A:	Black
Phase B:	Red
Phase C:	Blue
Neutral:	White
Ground:	Green
 - b) 277 / 480 VAC

Phase A:	Brown
Phase B:	Orange
Phase C:	Yellow
Neutral:	Grey
Ground:	Green with yellow stripes
 - 2) Colors shall be factory applied the entire conductor length, except the following field-applied; color coding methods may be used for wire sizes larger than No. 10 AWG:
 - a) Colored, pressure sensitive plastic tape in half-lapped turns for a distance of six (6) inches from terminal points and in boxes where splices or taps are made. Apply last two (2) turns of tape with no tension to prevent possible unwinding. Use one (1) inch wide tape

in the colors specified. Adjust tape bands to avoid obscuring the cable identification markings.

7.0 Conductors and Cables

- a) Approved manufacturers:
 - 1) American Insulated Wire Corporation (a Leviton company)
 - 2) General Cable Corporation
 - 3) Houston Wire and Cable
 - 4) Kerite Cable
 - 5) Okonite
 - 6) Senator Wire and Cable Company
 - 7) Southwire Company
 - 8) or approved equal.
- b) Conductor material: copper, stranded conductors for all sizes.
- c) Conduction Insulation Types: THHN-THWN

8.0 Conductor and Insulation Applications

- a) Use type THHN-THWN, single conductors in raceway for:
 - 1) Service Entrance
 - 2) Feeder concealed in concrete and below slabs-on-grade
 - 3) Exposed Branch Circuits
 - 4) Branch Circuits concealed in concrete and below slabs-on-grade
 - 5) Class 1 Control Circuits
- b) Use manufacturer approved pulling compound or lubricant where necessary; compound used must not deteriorate the conductor or insulation; do not exceed manufacturer's recommended maximum pulling tension and sidewall pressure values.
- c) Use pulling means, including fish tape, cable, rope, and basket weave wire / cable grips that will not damage cables or raceways.
- d) Identify and label conductors and cables prior to pulling in raceways.

9.0 Connectors and Splices

- a) Approved manufacturers, wirenuts:
 - 1) AMP, Inc. / Tyco International
 - 2) Cooper
 - 3) GB
 - 4) Ideal
 - 5) King
 - 6) Thomas and Betts
 - 7) 3M Company
 - 8) or approved equal
- b) Approved manufacturers, pre-insulated connectors:
 - 1) FCI
 - 2) Greaves
 - 3) Ilsco
 - 4) NSI
 - 5) Penn Union
 - 6) or approved equal
- c) Factory fabricated connectors and splices of size , ampacity rating, material, type, and class for application and service indicated, pre-insulated connectors shall have one (1) spare port for future connection.
- d) For conductors # 8 and smaller use wirenut type twist connectors.
- e) For conductors # 6 and larger use pre-insulated solderless connectors with one spare port for future connections.
- f) Pump cable connectors:
 - 1) For conductors # 8 and smaller use waterproof wirenut type twist connectors, design basis shall be King DryConn.
 - 2) For conductors # 6 and larger use waterproof pre-insulated solderless connectors, design basis shall be NSI Polaris Blue.

- g) Tighten all electrical connectors, splices, and terminals according to the manufacturer's published torque tightening values. If manufacturer's torque values are not indicated the electrical contractor shall use those specified in UL 486A and UL 486B.

10.0 Field Quality Control

- a) After installing conductors and cables, and prior to energizing any electrical circuitry, the electrical contractor shall inspect the installed system for damage.
- b) Make splices and taps that are compatible with the conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- c) Inspect for any physical damage and test conductors and cables for continuity and shorts:

- 1) Megger test

- a) All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a five hundred (500) volt megger.

Minimum readings between conductors and between a conductor and the grounded metal raceway shall be:

- 25 mega-ohms for # 6 and smaller conductors
- 50 mega-ohms for # 4 and larger conductors

- b) The electrical contractor shall correct any malfunctioning conductors and cables, including replacement if necessary, and retest to demonstrate compliance and satisfactory testing results.

- 2) Control and Signal Transmission Media Testing:

- a) Test cable segments for faulty connectors, splices, terminations, and the integrity of the cable and its component parts.
 - b) Correct malfunctioning conductors and cables at the project site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest until satisfactory results are obtained.

- 3) Neutral – ground bond testing:

- a) After all fixtures, devices, switches, and equipment are installed and all connections completed to each panel, the electrical contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and

the grounded enclosure.

- b) If the megger reading is less than twenty-five (25) mega-ohms, the electrical contractor shall then disconnect the branch circuit neutral wires from the neutral bar and test each branch circuit neutral

separately, conductor to grounded enclosure, until the low reading ones are identified. The electrical contractor shall correct the troubles, reconnect all the branch circuit neutral wires back to the neutral bar, and re-test until a minimum twenty-five (25) mega-ohms from the neutral bar to the grounded enclosure can be achieved with only the neutral feeder disconnected.

- d) The electrical contractor shall furnish a megger and demonstrate to the Engineer and County staff the conductors and electrical panels comply with the above requirements.

11.0 Raceways and Boxes

- a) Approved manufacturers, metallic conduit and tubing:
 - 1) Anamet Electrical, Inc.
 - 2) Grinnell Company / Tyco International
 - 3) LTV Steel Tubular Products Company
 - 4) Manhattan / CDT / Cole-Flex
 - 5) O-Z Gedney
 - 6) Wheatland Tube Company
 - 7) or approved equal.
- b) Approved manufacturers, non-metallic conduit and tubing:
 - 1) American International
 - 2) Anamet Electrical, Inc.
 - 3) Arnco
 - 4) Cantex
 - 5) Certainteed
 - 6) Condux International
 - 7) ElecSYS

- 8) Electri-Flex
 - 9) Heritage Plastics Central, Inc.
 - 10) Lamson & Sessions / Carlon Electrical Products
 - 11) Manhattan / CDT / Cole-Flex
 - 12) Queen City Plastics
 - 13) RACO
 - 14) Southern Pipe, Inc.
 - 15) Spiralduct, Inc. / AFC Cable Systems, Inc.
 - 16) Thomas & Betts
 - 17) or approved equal.
- c) Approved manufacturers, metal wireways:
- 1) Hammond
 - 2) Hoffman
 - 3) Rittal
 - 4) Square D
 - 5) or approved equal.
- d) The electrical contractor shall include fittings, accessories, couplings, offsets, elbows, adapters, expansion joints, hold down straps, end caps, terminations, and other fittings as needed to match and mate with conduit, tubing, and wireways as required to produce the complete electrical system.
- e) Wireway covers shall be the flanged and gasketed type.
- f) Approved manufacturers, boxes, enclosures, and cabinets:
- 1) Austin
 - 2) Hoffman
 - 3) or approved equal.
- g) Cast metal outlet, device, pull, and junction boxes shall be NEMA FB 1, with gasketed covers.

- h) All conduit at a Brunswick County sewer pump station shall be Schedule 80 PVC unless otherwise directed by the Engineer or County staff.
- i) The minimum conduit or raceway size shall be $\frac{3}{4}$ - inch trade size.
The minimum conduit size for instrumentation & controls circuitry shall be 1".
- j) Raceway fitting shall be compatible with raceways and suitable for use and location in every respect.
- k) Condulet fittings, such as LBs, LLs, LRs, Cs, and Ts, are not allowed in Brunswick County sewer pump stations.
- l) All conduits in County sewer pump stations shall enter the bottom of electrical equipment and enclosures with a watertight hub, Myers or approved equal, as shown on the Brunswick County pump station Standard Details.
- m) Complete the raceway and / or conduit installation prior to installing conductors.
- n) Provide adequate support(s) as needed for raceways and conduits.
- o) Install temporary closures to prevent foreign matter from entering raceways, conduit, and tubing.
- p) Protect stub-ups from damage where conduits rise above finished grade. Arrange such that curved portions of bends are not visible above the finished grade.
- q) For raceways and conduit between enclosures within a County sewer pump station the electrical contractor shall route the conduit from one enclosure to the next below grade, a minimum of eighteen (18) deep, with the conduit bends non-visible below grade. Refer to County pump station Standard Details. Horizontal raceways and conduits shall not be visible above grade.
- r) Bends and offsets shall be made such that the interior diameter (I.D.) of the conduit is not reduced.
- s) Raceways and conduits embedded in concrete slabs shall be installed in the middle 1/3 of the slab with a minimum of two (2) inches of concrete cover. Secure conduit to reinforcing rods to prevent sagging or shifting during concrete pouring operations.
- t) Join raceways and conduits with fittings designed and approved for that purpose and make joints tight.
- u) Insulating bushings are required on conduit terminations inside enclosures to protect the conductors.
- v) Grounding and bonding bushings are required inside enclosures as required by the National Electrical Code.

- w) Conduit terminations inside enclosure shall be square and true, with threaded hubs, locknuts, and bushings, and securely tightened with the dished side of the locknut against the enclosure.
- x) Install pull wires in empty raceways and conduits for future use. Use polypropylene or monofilament plastic line with a minimum two hundred (200) pound tensile strength. Leave a minimum of twelve (12) inches of slack at each end of pull wire.
- y) Install raceway and conduit sealing fittings at suitable, approved, and accessible locations and fill with UL listed sealing compound or as directed by the Engineer or County staff.

12.0 Wiring Devices

- a) Wiring devices are duplex receptacles, ground fault protected duplex receptacles, ground fault circuit breakers, standard circuit breakers, arc fault protected duplex receptacles, arc fault circuit breakers, single pole snap switches, double pole snap switches, device plates, and other similar equipment.
- b) Wiring devices shall be listed and labeled as defined in the National Electrical Code, Article 100, by a testing agency acceptable to the Authority Having Jurisdiction (AHJ), and marked for intended use.
- c) All receptacles for owner furnished equipment shall match the plug configuration of the Owner's equipment.
- d) Acceptable Manufacturers:
 - 1) Bryant Electric, Inc. / Hubbell Subsidiary
 - 2) Eagle Electrical Manufacturing Company, Inc.
 - 3) Hubbell Incorporated
 - 4) Leviton Manufacturing Company, Inc.
 - 5) Pass & Seymour / Legrand
 - 6) or approved equal.
- e) Snap switches shall be heavy duty grade, quiet type, UL listed.
- f) Receptacles shall be straight blade type, heavy duty type, UL listed.
- g) Ground fault circuit interrupter (GFCI) receptacles shall be the straight blade type, feed – through capability, heavy duty, UL listed, NEMA rated, 20 ampere minimum, install in a minimum 2 ¾ inch deep outlet box without the use of an adapter ring.

- h) Device plates shall be single and combination types as required to match corresponding wiring devices.
- i) Install level, plumb, and square, flush with finished wall, with long dimension vertical, unless otherwise directed, and with grounding terminal of receptacles on top, group adjacent switches under single, multigang wall plates.
- j) Ground and bond all wiring devices and equipment in accordance with Article 250 of the National Electrical Code.
- k) Tighten electrical connectors and terminals according to manufacturer's published torque tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- l) After installing wiring devices and after the electrical circuitry has been energized the electrical contractor shall test all devices for proper voltage, polarity, ground continuity, and compliance with all National Electrical Code and local requirements.
- m) The electrical contractor shall test all GFCI devices for proper operation, according to the manufacturer's written instructions, after the electrical circuitry has been energized,
- n) The electrical contractor shall replace all malfunctioning units with new units and re-test as specified above.

13.0 Protection of Completed Work

- a) The electrical contractor shall effectively protect his work, materials and equipment from damage during the construction period. All openings into any part of the conduit system, associated fixtures and equipment must be securely covered or otherwise protected. Steel conduit and other ferrous metal supplies shall be stored where they will not be exposed to corrosion.

14.0 Final Inspections and Equipment Demonstrations

- a) The electrical contractor shall furnish ladders, tools, testing, equipment, and employees at the time of final electrical inspection to allow the Engineer, County staff, and the Authority Having Jurisdiction (AHJ) inspector access to all fixtures, boxes, panels, etc., as needed in order to successfully pass the final electrical inspection.
- b) The electrical contractor shall furnish all clamp-on type ammeter, voltmeter, megger, ground resistance tester, etc., as needed for system testing and final inspection.

15.0 Operating Instructions

- a) At the completion of the work, and after obtaining the final electrical inspection, the electrical contractor shall operate, in the presence of the Engineer and County staff, each component of the system and then the entire system as a whole. When all the requirements of the approved plans and specifications have been met and all final punch list items corrected, the electrical contractor shall instruct and train the County operating and maintenance personnel in the correct and proper procedures for the operation and maintenance of the electrical system.

16.0 Spare Parts

- a) The electrical contractor shall provide any spare parts as required by the approved plans, Contract Documents, and Specifications. The parts shall be properly packaged and labeled with the name of the project and delivered to Brunswick County staff.

17.0 Payment

- a) The electrical work shall be bid as specified in the Contract Documents, either Lump Sum or on a Unit Cost basis. All incidental material required to produce the complete system shall be included in the Lump Sum or Unit Cost bid. No separate payment will be made for incidental material required to produce the finished work.

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

Technical Specification 029

Electrical Services

1.0 General

- a) The intent of this specification is to provide technical guidance and requirements to the contractor for the installation of electrical services at county owned pump stations, buildings, and other installations. The contractor shall provide all labor, materials, tools, equipment, and related items required to furnish, install, and place into operation the required electrical service as shown on the approved plans provided by the Engineer.
- b) The contractor shall also obtain all electrical permits from the Authority Having Jurisdiction (AHJ) for the work shown on the approved plans prior to beginning work.

2.0 Reference Standards

- a) All electrical services shall comply with these reference standards and also with all local codes and ordinances:
 - 1) NEC – National Electrical Code
 - 2) OSHA – Occupational Safety and Health Administration
 - 3) ANSI – American National Standards Institute
 - 4) IEEE – Institute of Electrical and Electronics Engineers
 - 5) NEMA – National Electric Manufacturers Association
 - 6) Brunswick County Standard Details
 - 7) Brunswick County Technical Specification TS 028: General Electrical Information
 - 8) Brunswick County Technical Specification: TS 030: Grounding and Bonding
 - 9) Brunswick County Technical Specification: TS 031: Surge Protection

3.0 Coordination

- a) The electrical contractor shall be responsible for coordinating with the utility company and assisting the Owner with obtaining a permanent electrical service as shown on the approved plans.

- b) The electrical contractor shall represent the Owner and acquire all service agreements, etc., and coordinate with the Owner to obtain all required signatures and return the documents to the utility company after execution as required.

4.0 Installations

- a) All electrical work shall be performed in accordance with the National Electrical Code and the Authority Having Jurisdiction.
- b) All permits for the electrical work shall be obtained and paid for by either the general contractor or the electrical contractor. All inspections, tests, or additional fees required for the completion of the work shall also be paid for by either the general or electrical contractor. Determination of who pays the required fees shall be a coordination issue between the general and electrical contractor.
- c) All materials and equipment shall be new and include a third-party label such as UL, CSA, ETL, etc., listing approval for its installed application.
- d) The electrical contractor shall review and be familiar with the plans of other trades for coordination of the work and related and adjoining work.
- e) Any discrepancies in the approved drawings and specifications that will affect the work shall be brought to the attention of the architect and / or engineer for resolution prior to submitting bids for the project.
- f) The contractor shall provide all National Electrical Code clearances for all installed electrical equipment. Any conflicts with other trades or inadequate clearances shall be brought to the attention of the architect and / or engineer by the electrical contractor for clarification and resolution.
- g) Penetrations of structure walls, floors, and roofs shall be sealed watertight. Interiors of raceway penetrations shall be sealed with non-hardening electrical putty. All conduit connections at equipment, enclosures, and a pump station wetwell shall also be sealed with non-hardening electrical putty.
- h) All hardware exposed to the weather shall be stainless steel.
- i) All conduits shall enter the bottom only of electrical equipment. Myers watertight hubs, or approved equal, shall be used in outdoor applications.
- j) Conduit outlet bodies and / or condulets such as LBs, LLs, and LRs are not allowed unless specifically approved by Brunswick County.
- k) The electrical contractor and any of his subcontractors shall visit the project site to observe the existing conditions and become familiar with the scope of work required prior to submitting bids. Work required by existing job conditions not indicated on the drawings shall be included in the bid.
- l) Shared neutral conductors are not allowed.

- m) The general or electrical contractor shall install all required concrete pads for utility transformers, standby emergency power generators, vaults, etc., per County standard details and / or any requirement of the utility company. The electrical contractor shall coordinate all equipment pad requirements with the utility company.
- n) The electrical contractor shall coordinate the electrical services, metering, and metering equipment with the utility company for locations, arrangements, connections, etc.
- o) The electrical service entrance raceways shall be installed by the electrical contractor and sized as shown on the approved plans, contract drawings, or as required by the utility company. Service entrance conductors will be provided and installed by the utility company to the line side of the metering equipment. Service entrance conductors from the metering equipment to the service equipment shall be installed by the electrical contractor.
- p) Current transformer (CT) cabinets and self-contained meter cabinets shall be installed by the electrical contractor unless directed otherwise by the utility company. Load side connections shall be made by the electrical contractor. Coordinate metering requirements with the utility company before beginning rough-in of service raceways.
- q) Sewer pump station services shall be 277/480 VAC, 3 phase WYE, 4-wire, unless otherwise directed by Brunswick County.
- r) The electrical contractor shall provide all equipment, grounding, bonding, and additional empty conduit as shown on the approved plans, contract documents, and /or as required by the utility company.
- s) All ground wires shall be exothermically welded to ground rods as shown on the County Standard Details and per Brunswick County Technical Specification TS 030.01: Grounding and Bonding.
- t) All concrete shall be 3,000 psi, 28-day compressive strength concrete. Reinforcement shall be as shown on the approved plans, contract documents, county Standard Details, county Technical Specifications, or as directed by the Engineer and / or county staff.
- u) An operating test with the Engineer and county staff present is required once the final electrical inspection has passed, and the permanent meter has been obtained from the utility company, to demonstrate that the electrical installation is operating properly.
- v) All conduit installed in county sewer pump stations shall be Schedule 80 PVC unless otherwise approved by Brunswick County.

5.0 Submittals

- a) The electrical contractor shall submit shop drawings and other submittals to the Engineer for review and approval prior to beginning work.

6.0 Payment

- a) No separate payment will be made for electrical services. All costs incurred by the contractor for this work should be included in the unit price or lump sum price for the item of work to which it pertains.

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Technical Specification 030

Grounding and Bonding

1.0 General

- a) This specification provides general guidance on the grounding and bonding requirements for electrical systems and equipment.
- b) The electrical contractor shall furnish all labor, materials, tools, equipment and related items required to furnish and install all required electrical grounding and bonding as required by the National Electric Code (NEC).

2.0 Reference Standards

- a) All electrical grounding and bonding shall comply with these reference standards and also with all local codes and ordinances:
 - 1) NEC – National Electrical Code
 - 2) OSHA – Occupational Safety and Health Administration
 - 3) ANSI – American National Standards Institute
 - 4) IEEE – Institute of Electrical and Electronics Engineers
 - 5) NEMA – National Electric Manufacturers Association
 - 6) Brunswick County Standard Details
 - 7) Brunswick County Technical Specification TS 028: General Electrical Information
 - 8) Brunswick County Technical Specification TS 029: Electrical Services
 - 9) Brunswick County Technical Specification TS 031: Surge Protection

3.0 Submittals

- a) The electrical contractor shall submit shop drawings and other submittals to the Engineer for review and approval prior to beginning work.

4.0 Grounding and Bonding Conductors

- a) Install all grounding and bonding in accordance with the National Electrical Code Article 250: Grounding and Bonding.

- b) All grounding electrode conductors at County sewer pump stations shall be exothermically welded to the pump station grounding electrodes per County pump station Standard Details.
- c) Comply with any other special instructions in the approved drawings or as directed by the Engineer or Brunswick County staff.

5.0 Field Quality Control

- a) If a maximum ground-resistance level has been specified in the Contract Documents the electrical contractor shall test the completed grounding system at each location where a ground-resistance level is specified, at the service disconnect enclosure grounding terminal, at all ground test wells, and / or as directed by the Engineer.
 - 1) NEC Article 250 requires a single electrode consisting of a rod, pipe, or plate to have a resistance to ground of twenty-five (25) ohms or less, or an additional electrode must be installed.
- b) The electrical contractor shall measure ground resistance not less than two (2) full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage, and without chemical treatment or other artificial means of reducing the natural ground resistance.
- c) Perform the ground resistance tests in accordance with IEEE – 81: Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
- d) Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, and identify each by letter in alphabetical order, and keyed to the record of tests and observations. Include the number of ground rods driven and their depth at each location and include observations of weather and other phenomena that may affect the test results. Describe any measures taken to improve test results.
- e) If resistance to ground exceeds the specified values the electrical contractor shall notify the Engineer and include any recommendations to reduce the ground resistance to meet the specified requirements.

6.0 Payment

- a) No separate payment will be made for Grounding and Bonding. All costs incurred by the electrical contractor for this work should be included in the unit price or lump sum price for the item of work to which it pertains.

Technical Specification 031

Revisions by Cheatham and Associates, P.A. are indicated by struck through text for deletions and red text for additions.

Surge Protection

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

1.0 General

- a) This specification details the surge protection system to be installed on Brunswick County electrical services and sewer pump station control panels to protect the enclosures from transient voltages that may damage or disable electrical equipment.

2.0 Reference Standards

- a) NEC – National Electrical Code
- b) OSHA – Occupational Safety and Health Administration
- c) ANSI – American National Standards Institute
- d) IEEE – Institute of Electrical and Electronics Engineers
IEEE C62.41: IEEE Recommended Practice for Surge Voltages in Low Voltage AC Power Circuits
- e) NEMA – National Electric Manufacturers Association
NEMA ICS 1: Industrial Control and Systems General Requirements
- f) Brunswick County Pump Station Standard Details
- g) Brunswick County Technical Specification TS 028: General Electrical Information
- h) Brunswick County Technical Specification TS 029: Electrical Services
- i) Brunswick County Technical Specification TS 030: Grounding and Bonding

3.0 Acceptable Manufacturers

- a) Square D company
- b) General Electric
- c) Siemens
- d) or approved equal

4.0 Submittals

- a) The electrical contractor shall submit shop drawings and other submittals to the Engineer for review and approval prior to beginning work.

5.0 Installation

- a) Electrical services for County buildings and projects other than sewer pump stations – the electrical contractor shall install the transient voltage surge arrester shown on the approved plans or in the Contract Documents.

- b) County sewer pump station control panels:
 - 1) 277 / 480 VAC, 3- phase panels - install a Square D surge arrester, 600 VAC, 3 - phase, with LED indicator, part number ~~SDSA3650~~, per County pump station standard details. SDSA4040
 - 2) Other than 277/ 480 VAC pump stations – contact Brunswick County Public Utilities for approved transient voltage surge arrester to use.

6.0 Payment

- a) No separate payment will be made for surge protection equipment. All costs incurred by the electrical contractor for this work should be included in the unit price or lump sum price for the Electric Service, or to the item of work to which it pertains.

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

Technical Specification 032

EMERGENCY GENERATORS FOR PUMP STATIONS

1.0 General

Revisions by Cheatham and Associates, P.A. are indicated by struck through text for deletions and red text for additions.

- a) It is the intent of this specification to secure emergency standby generator systems that have been prototype tested, factory built, production tested, site tested, of the latest commercial design, together with all accessories necessary for a complete installation as detailed herein.
- b) The equipment supplied and installed shall meet the current requirements of the most current edition of the National Electrical Code (NFPA 70), the Standard for Emergency and Standby Power Systems (NFPA 110), and all applicable local and state codes and regulations.
- c) All equipment shall be new and unused and of current production by a firm that has its final assembly located within the continental United States. The generating set manufacturer shall have at least twenty-five (25) years of experience assembling power generating sets.
- d) The engine, generator, controls, and electrical disconnect shall be completely assembled and wired by the generator manufacturer. The manufacturer / supplier must have a locally authorized dealer with factory trained and certified service personnel to ensure one source responsibility for the warranty, parts, and service.
- e) All emergency power generators shall be of the Permanent Magnet Generator (PMG) type construction.
- f) Refer to Brunswick County Technical Specification 033: Automatic Transfer Switch (ATS) requirements.

2.0 Approved Emergency Generator Manufacturers

- a) Equipment and services shall be provided by:
 - 1) Detroit / MTU
 - 2) Cummins
 - 3) Caterpillar
 - 4) Kohler
- b) The supplied engine must be a Cummins, Caterpillar, Detroit / MTU unit or Kohler; additional engine manufacturers will be considered upon submittal.

3.0 Ratings

- a) The standby generator set shall be rated as standby power defined as continuous operation for the duration of any power outage. Kilowatt ratings for three phase voltages are based upon a 0.8 power factor and single phase voltages are based upon a (1.0) unity power factor. Ratings are established on an altitude of (150) feet and (77) degrees Fahrenheit.
- b) The standby generator shall be sized based upon the total connected load including pumps, control power, lighting, and all miscellaneous loads. The generator shall be able to start the LEAD pump and then start the LAG pump with the LEAD pump running at full speed and all miscellaneous loads adequately supplied.
- c) For pump stations with more than two pumps the generator shall be sized accordingly.
- d) For purposes of this specification, the following Rating Definitions will apply:

Emergency Standby

Generator output available with varying load for the duration of an emergency outage. Minimum average power output is seventy (70) percent of the standby power rating. Standby power shall be in accordance with ISO 8528.

Standby

Generator output available with varying load for the duration of the interruption of the normal source power. Minimum average power output is seventy (70) percent of the standby power rating. Standby power shall be in accordance with ISO 8528 and ISO 3046.

Prime

Generator output available with varying load for an unlimited time. Minimum average power output is seventy (70) percent of the prime power rating. Prime power shall be in accordance with ISO 8528 and ISO 3046.

Continuous

Generator output available without varying load for an unlimited time. Average power output is 70 – 100 percent of the continuous power rating. Continuous power shall be in accordance with ISO 8528 and ISO 3045.

4.0 Required Submittals

- a) The utility contractor shall submit the following to the Engineer for review and approval prior to supplying any emergency generator set:

- 1) Five sets of submittal data shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams; dimension drawings; and interconnection diagrams identifying by terminal number each required interconnection between the generator set and an automatic transfer switch for all permanent mounted gensets. Submittal drawings for permanently installed units shall clearly show concrete pad dimensions and mounting details.
- 2) A marked-up copy of this specification with notations clearly showing all deviations and/or exceptions to this specification for the submitted unit – if any deviations.
- 3) Voltage drop calculations under worst case motor starting for loads on the plan. When motor loads are not specified in the bid documents, the bidder shall provide available SKVA @ twenty-five (25) percent instantaneous voltage dip.
- 4) A letter detailing local service capability, factory trained serviceperson(s) credentials, and the specified service response per this specification.
- 5) Enclosure paint color samples for owner selection. Preferred colors are camel, neutral tan, grey, or white. Green is not a Brunswick County color option.
- 6) Testing results.

Voltage drop calculations:

9th St PS

Step 1:

- 5 kW misc load
 - 50 HP pump motor, 460V,
 Code G, 57 FLA, 377 LRA, solid
 state soft starting

Step 2:

- 50 HP pump motor, 460V,
 Code G, 57 FLA, 377 LRA, solid
 state soft starting

Moore St PS

Step 1:

- 5 kW misc load
 - 20 HP pump motor, 460V,
 Code G, 23.1 FLA, 156 LRA,
 solid state soft starting

Step 2:

- 20 HP pump motor, 460V,
 Code G, 23.1 FLA, 156 LRA,
 solid state soft starting

Park Avenue PS

Step 1:

- 5 kW misc load
 - 15 HP pump motor, 460V,
 Code J, 19.2 FLA, 151 LRA,
 solid state soft starting

Step 2:

- 15 HP pump motor, 460V,
 Code J, 19.2 FLA, 151 LRA,
 solid state soft starting

5.0 Codes and Standards

- a) The generator set shall conform to the following current codes and standards:
 - 1) IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
 - 2) NFPA70 – National Electric Code. Equipment shall be suitable for use in systems in compliance with Article 700, 701, and 702.
 - 3) NFPA 110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit – component level type tests will not substitute for this requirement.
 - 4) UL 2200 – The genset shall be listed and labeled to UL 2200.
 - 5) ISO 8528 – Reciprocating internal combustion engine alternating current generating sets.
 - 6) NEMA MG-1: 2006 Motors and Generators.

- 7) NEMA MG-2: Standard for construction and guide for selection, installation, and use of electric motors and generators.

6.0 Testing

- a) To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.

- b) Design Prototype Tests:

Components of emergency systems such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes and preproduction models, which will not be sold, shall have been used for the tests. Testing shall be performed to nameplate ratings and prototype test programs shall include the requirements of NFPA 110 and the following:

- 1) Maximum power (kW)
- 2) Maximum motor starting (SKVA) at 25% instantaneous voltage dip
- 3) Alternator temperature rise by embedded thermocouple and by resistance method per NEMA MG-1: 22.40
- 4) Governor speed regulation under steady-state and transient conditions
- 5) Voltage regulation and generator transient response
- 6) Fuel consumption at 1/4, 1/2, 3/4, and full load
- 7) Harmonic analysis, voltage waveform deviation, and telephone influence factor
- 8) Three-phase short circuit tests
- 9) Alternator cooling air flow
- 10) Torsional analysis testing to verify that the generator set is free of harmful torsional stresses
- 11) Endurance testing

- c) Final Production Tests:

Each generator set shall be tested under varying loads with guards and exhaust system in place. Testing shall be performed to nameplate ratings and tests shall include:

- 1) Single-step load pickup
 - 2) Transient and steady-state governing
 - 3) Safety shutdown device testing
 - 4) Voltage regulation
 - 5) Rated power
 - 6) Maximum power
 - 7) Upon request, arrangements to either witness these tests will be made, or certified test records will be sent prior to shipment.
- d) Site Tests:

Installation checkout, start-up, and load bank tests shall be performed by the manufacturer's local representative. The Engineer, utility contractor, electrical contractor, and County staff shall be notified of the time and date of the site tests with a minimum forty-eight (48) hours advance notice. The tests shall include:

- 1) Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations under the environmental conditions present and expected.
- 2) Accessories that normally function while each set is standing by shall be checked prior to cranking the engines. These shall include: block heaters, battery chargers, generator strip heaters, etc.
- 3) Start-up test mode to check for exhaust leaks, path of exhaust gases outside buildings, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage, and phase rotation.
- 4) Four-hour load bank test with an external load bank as follows: 1 hour @ 25% load, 1 hour @ 50% load, 1 hour @ 75% load and 1 hour @ 100% load, monitor and record the following data in 15 minute intervals: engine coolant temperature, oil pressure, battery charge level, generator output voltage, amperes, and frequency.
- 5) NFPA-110 testing with an external load bank connected to the system to load the generator to the nameplate kW rating with verification of single-step load pickup
- 6) Perform automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, test unit under actual load by starting both pumps sequentially along with all additional miscellaneous loads, and automatic shutdown. Engine coolant

temperature, oil pressure, and battery charge level along with generator voltage, amperes, and frequency shall be monitored throughout the test.

7.0 Warranty and Service

- a) The emergency generator systems shall be warranted at a minimum for (1) year or 3,000 run time hours, whichever occurs first, from the date of startup to be free from defects in material and workmanship in accordance with the manufacturers published warranty. During the warranty period all required replacement parts and labor shall be furnished at no additional cost to the County.
- b) The engine – generator distributor shall provide semi-annual servicing of the generator throughout the warranty period at no additional cost to Brunswick County. The engine-generator distributor shall furnish factory trained and certified personnel and maintain a 24-hour parts and service capability, and show, at time of submittal, that they are regularly engaged in a maintenance contract program to semi-annually inspect and test run the engines to perform manufacturer's recommended preventative maintenance service on the equipment furnished. This service agreement shall include operation of the equipment under simulated power failure conditions, adjustment of generator, transfer switch (where included), as required, and certification in the County's maintenance log of repairs made and proper functioning of all engine and auxiliary systems. At the County's option, the service agreement shall be renewable on a year-to-year basis, thereafter, with costs being paid by the County.
- c) Service Response: A factory certified service shop shall be located within a two-hour and / or one hundred (100) mile radius of the Brunswick County Utilities Field Operation Center in Supply, North Carolina. Service response shall be guaranteed to be eight hours or less upon receipt of service call notification.
- d) Manuals: Three paper sets and one digital copy of all operating and maintenance instruction manuals specific to the equipment shall be supplied for the engine, generator, governor, voltage regulator, and auxiliary system components as specified herein. No generic manuals will be accepted. Each manual must be clearly marked to identify the site where the generator set is installed.

8.0 Generator

- a) Each standby generator set shall be rated continuous standby (defined as average power output of 70% of the standby power rating) for the duration of any interruption of the normal source power), for the voltage specified in the plans or within the contract documents, 3 phase, 4 wire, 60 Hz, 80% power factor at a maximum altitude of 150 feet altitude and 77 degrees F.
 - 1) Oversized alternators shall be provided as required for motor starting capability.
 - 2) Each generator set shall be capable of starting motor loads as specified in the plans or within the contract documents, with a maximum instantaneous

voltage dip of 25%.

- 3) The generator shall power pump station components with all pumps sequentially started along with some all miscellaneous loads. Maximum voltage dip shall be determined for worst case scenario (full load demand).
- 4) The generator set shall be capable of supplying the specified SKVA for starting motor loads plus other site connected loads with a maximum instantaneous voltage dip of 25%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip shall be in accordance with MG-1, Section II, and 16.48.1. Motor starting performance and voltage dip based on 90% sustained voltage is not acceptable.
- 5) The engine – generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
- 6) Integral vibration isolators shall be provided between the engine-generator and the skid-base. Additionally, vibration pads shall be furnished loose for installation between the skid-base (or tank when a sub-base tank is included) and the concrete pad.

9.0 Engine

- a) The prime mover shall be a liquid-cooled, #2 diesel fueled engine of 4-cycle design, shall be a Cummins, Caterpillar, or Detroit/MTU unit, and shall be equipped with the following items:
 - 1) Mechanical or electric fuel transfer pump, primary and secondary fuel filters, water separator, and electric fuel shut-off valve.
 - 2) Electronic isochronous governor capable of regulating the no load to full load frequency to +/- 0.25% steady state frequency regulation.
 - 3) 12-volt or 24- volt positive engagement solenoid shift-starting motor.
 - 4) 12-volt or 24-volt belt driven battery charging alternator with solid state voltage regulation.
 - 5) Replaceable sleeved cylinders (applicable to 30 – 400 kW generator sets).
 - 6) Two flexible fuel lines rated 300 degrees F and 100 psi ending in pipe threads.
 - 7) Engine unit must be fitted with a fuel / water separator
 - 8) Dry replaceable, air cleaner with an Air Cleaner Restriction indicator.

- 9) Positive displacement full pressure lubrication oil pump, cartridge oil filters, dipstick, and crankcase oil drain.
- 10) Unit-mounted radiator, pusher type cooling fan, water pump, thermostat, and radiator duct flange (non-enclosed units) shall properly cool the engine and be designed for operation at a minimum ambient temperature of 122 degrees F (50 degrees C). Radiator (on non-enclosed units) shall include a duct flange adapter for connection to the discharge air vent.
- 11) Batteries capable of delivering the manufacturer's recommended minimum cold-cranking amps required at 0 degrees F, per SAE standard J-537, shall be supplied along with the required battery rack(s) and battery cables mounted within the generator weather protective enclosure. Batteries shall be the Augmented Glass Mat (AGM) type with corrosion resistant tin plated brass terminals. Preferred battery: Odyssey, Group 31, 1,150 minimum cold cranking amps.
- 12) Ten (10) ampere automatic float and equalize battery charger, approved for use with AGM type batteries, with +/-1% constant voltage regulation from no load over +/-10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated for ambients from (-) 40 degrees C to (+) 60 degrees C, 5% accurate voltmeter and ammeter, fused, reverse polarity and transient protected. Alarm circuit board to meet the requirements of NFPA-110 for low battery voltage, high battery voltage, and battery charger malfunction shall be provided and wired to provide annunciation on the control panel. Battery charger shall be 3rd party listed and shall be mounted within the generator set enclosure. All DC wiring shall be installed at the generator set factory and AC wiring shall be furnished by the generator set installer.
- 13) The generator set supplier shall furnish lubricating oil to fill the crankcase as recommended by the manufacturer.
- 14) The generator set supplier shall furnish 50% ethylene glycol antifreeze solution to fill the engines cooling system.
- 15) Block heater shall be compliant with NFPA – 110 requirements for Level I equipment for heater capacity, 120 VAC, and shall be thermostatically controlled. Block heater(s) shall be 3rd party listed. Higher wattage and voltage may be required for larger generators.
- 16) Gas proof, stainless steel, flexible exhaust bellows with connections compatible with the engine and silencer shall be supplied on the unit.
- 17) Critical grade exhaust silencer(s) shall be provided with internal thermal insulation. Externally mounted exhaust silencers shall be stainless steel. Exhaust silencers shall provide attenuation for compliance with the generator enclosure sound pressure level specified in Section 12 – Generator Enclosure – of this specification.

- 18) Each engine shall be equipped with pre-alarm switches and safety shutdown switches to protect the engines from the following conditions:
- a) Low oil pressure pre-alarm
 - b) High coolant temperature pre-alarm
 - c) Low coolant temperature pre-alarm
 - d) High coolant temperature shutdown
 - e) Low coolant level shutdown
 - f) Low oil pressure shutdown
 - g) Overspeed

10.0 Alternator

- a) The alternator shall be a 4-pole revolving field type with (12) reconnectable leads, self-ventilated and of drip-proof construction. The insulation material shall meet the NEMA standard (MGI- 22.40 and 16.40) for Class H insulation. The excitation system shall be of brushless construction controlled by a solid-state voltage regulator with adjustable volts-per-hertz tracking. The alternator shall be the Permanent Magnet Generator (PMG) type with a permanent magnet rotor with the associated voltage regulator for PMG field excitation and output voltage regulation. The alternator shall be provided to prevent damage due to any external fault or overload condition.
- b) On application of any load up to the full rated load at 0.8 power factor (PF) the voltage dip shall not exceed 12.5% and shall recover to stable operation $[(+/-) 1\%$ of rated voltage) within two (2) seconds. The alternator shall be capable of sustaining at least 250% of rated current for at least ten (10) seconds under a three (3) phase symmetrical short by inherent design or by the addition of an optional current boost system. The alternator shall be capable of accepting the loads and instantaneous voltage dip when loads are started as specified.
- c) The voltage regulator must be capable of maintaining voltage within $(+/-) 1\%$ at any constant load from 0 to 100% of rating. The regulator must be isolated to prevent tracking when connected to SCR loads, and provide individual adjustments for voltage range, stability, and volts-per-hertz operation, and be protected from the environment by conformal coating.
- d) The generator shall be directly connected to the flywheel housing and by means of a shaft through a flexible drive plate coupled between the alternator's rotation mass and the engine flywheel for permanent alignment. Grounding and bonding shall be in accordance with local codes.
- e) The generator set shall be furnished with a mainline circuit breaker(s), 100% rated, and sized to allow full generator set output rated amperage unless otherwise specified.

Breakers on 480 VAC systems shall have GFI (indication only) on breakers rated 1,000 amperes and larger. The breaker(s) shall have a DC shunt trip activated on engine or generator fault and shall be mounted on the side of the alternator conduit box. Adequate space shall be provided for the installation of all required conduits at the generator. All conduit connections at the generator shall utilize flexible conduit to prevent vibration damage.

11.0 Fuel System

- a) Double wall, steel, sub-base mounted fuel tank shall be provided adhering to UL code 142 requirements. There shall be a leak detection switch located in the outer tank to detect any leakage between the tanks, and this occurrence shall indicate on the generator control panel.
- b) The fuel tank shall have provisions for lifting when the tank is empty. The tank shall contain an internal volume of fuel sufficient for a minimum forty-eight (48) hour run time of the generator at one hundred (100) percent pump station load. The tank will be fitted with a fuel fitting to remove the diesel fuel from the tank. There shall also be a lockable fuel filler cap and suction and return piping. Consideration shall be given in the upper plate design to ensure free and easy access to the vibration mount hardware that connects the generator to the top of the fuel tank. There shall be an electrical access area for conduit access to the alternator connections. Fuel tanks larger than the minimum capacity specified are also acceptable.

Note: prior to pump station startup testing the fuel tank must be filled completely full and verified prior to any testing

Note: some applications shall require a larger fuel supply tank at the discretion of Brunswick County Public Utilities.

- c) A concrete mounting base shall be furnished by either the utility contractor or the generator installer such that the top of tank shall be a minimum of thirty (30) inches above grade to aid in preventing flood damage to the engine.
- d) The tank shall feature all welded construction and have the structural integrity to support the genset, accessories, and the weather-protective enclosure. The exposed tank top shall be peaked to direct water runoff away from all components.

12.0 Generator Enclosure

- a) Sound attenuated, drip-proof, weather protective enclosure shall be constructed of marine grade 5052, minimum 0.090-gauge, aluminum alloy.
- b) The enclosure shall be primed and have a powder coat baked paint finish.

e) NFPA 30 Fuel Tank Tightness Testing:

- 1) After installation on site and before being placed into service, the fuel tank and connections shall be tested in accordance with NFPA 30 requirements.
- 2) Notify the Design Team and local AHJ and Fire Marshal two weeks prior to scheduled test date to allow observation of the testing.
- 3) Obtain written acceptance of testing from the local AHJ and Fire Marshal.
- 4) Submit two copies of local AHJ and Fire Marshal written acceptance of testing.

Acceptable paint colors shall be a camel, neutral tan, grey, or white – green is not allowed.

- c) The Sound Attenuated Enclosure, along with the internally mounted critical grade, stainless steel, insulated silencer, will maintain a sound pressure level not to exceed seventy-five (75) dBa at twenty-three (23) feet when the generator set is operating at full load.
- d) The enclosure shall be fabricated and mounted to the sub-base fuel tank by the generator manufacturer. A neoprene sealing / isolation joint shall be furnished between the enclosure and sub-base tank. The enclosure roof shall be peaked to direct water runoff away from all components. All enclosures shall have stainless steel hardware throughout. All enclosures shall be rated at a minimum for a (150) mph wind load.
- e) The enclosure shall have a removable panel at the radiator end to allow access to the interior mounted exhaust silencer and for maintenance and cleaning of the radiator cooling fins. Two doors per side shall be provided for operator and service access. Hinges shall allow the doors to swing open or be removed easily for access and service. Door clips, or similar means, shall be provided to secure the doors to the sides of the enclosure to prevent accidental shutting or injury to the operator or maintenance staff. Access to the controller and main line circuit breaker must meet the requirements of the National Electric Code (current edition). All door locks shall be stainless steel and shall be keyed alike with CH-751, or as directed by Brunswick County Public Utilities staff.
- f) Cooling and combustion air shall enter the enclosure through wire screened panels. Engine exhaust gases and cooling air shall discharge horizontally or vertically (as indicated on the plans) through a screened opening.

13.0 Controller and Gauge Panel

- a) The generator set shall be provided with a microprocessor based control system designed to provide the following features and functions:
 - 1) The Generator Control Module (GCM) shall be mounted within the generator set and provide a suitable operator control panel. The control panel shall provide vibration isolation as necessary to the mounted controls to provide trouble free operation.
 - 2) The genset control shall have selector functions for automatic operation, manual operation, cool down mode, stop mode, and off-reset for shutdown faults plus interface logic with the engine auto start / stop cranking controls as follows:
 - a) Automatic - upon receipt of an input contact signal (locally or remote), genset to be signaled to start and to attain operating voltage / frequency.

- b) Manual - genset to be signaled to start and to attain operating voltage / frequency by use of a manual start switch.
 - c) Stop and cool down - generator breaker to trip open and genset to continue to run unloaded for a preset cool down time period prior to actual shutdown.
 - d) Off - if genset shuts down due to activation of a protective device then a shutdown malfunction circuit shall be latched and will require a manual reset before genset can be re-started. An operating genset shall shutdown with tripping of the generator breaker when OFF-RESET is activated.
- 3) Monitoring and control functions for the generator set shall be provided:
- a) Local monitoring and control shall be provided on the generator set operator control panel.
 - b) Control system shall have the capability for remote monitoring and control with the use of additional hardware, components, and cabling.
 - c) GCM shall provide detailed event and performance logging with capabilities to capture one hundred (100) or more events.
 - d) Upon alarm or shutdown, the GCM shall have the capability to generate and send messages compatible with the existing Brunswick County SCADA system. An RS-232 interface shall be provided on the controller.
 - e) Automatic annunciation or shutdown for generator set warning or alarm functions
- 4) GCM control functions:
- a) The control system shall include an engine cycle cranking system with adjustable settings for:
 - 1) Pre-Start Delay Time
 - 2) Maximum Crank Time
 - 3) Pause time between crank attempts
 - 4) Idle time
 - 5) Cool down time
 - b) The control system shall include an engine governing control to provide steady state frequency regulation. The governor shall

include adjustments for gain, dampening, and ramping functions to control engine speed if not provided by the engine control module supplied by the engine manufacturer.

- c) The control system shall include adjustable time delay functions for:
 - 1) Time delay for start
 - 2) Time delay for stop
- 5) Controller Operator Display
 - a) The generator set controller shall have the following operator display features at a minimum:
 - 1) Backlit graphical LCD display 64x128 pixel resolution minimum.
 - 2) Genset status LEDs shall provide the following indications:
 - a) Alarm - Preferred color is Red
 - b) Not In Auto - Preferred color is Red
 - c) Warning - Preferred color is Yellow
 - d) Running - Preferred color is Green
 - e) Ready / Auto - Preferred color is Green
 - f) Supplying Load - Preferred color is Green
 - 3) The controller panel shall be a sealed membrane type. Sealing shall meet IP64 and have operator keys for the following control functions:
 - a) Start
 - b) Stop
 - c) Fault Reset
 - d) Horn Reset
 - e) Data Entry - Mode, Page Up, Page Down, and Enter
 - 4) The genset controller shall display the following engine metering and protection functions:
 - a) Running Hour Meter

- b) Over Speed Shutdown
 - c) Low Oil Pressure Warning
 - d) Low Oil Pressure Shutdown
 - e) High Coolant Temperature Warning
 - f) High Coolant Temperature Shutdown
 - g) Low Coolant Temperature Warning
 - h) Low Fuel Level Warning
 - i) Low Fuel Level Shutdown Capabilities For 4 Programmable Analog Input Protection
- 5) The genset controller shall display the following generator set metering and protection functions:
- a) Under / over voltage
 - b) Over / under frequency
 - c) Voltage unbalance
 - d) Current unbalance
 - e) Over Frequency
 - f) Under Frequency
 - g) Over Current
 - h) Over Load
 - i) IDMT Protection
- 6) The genset controller shall display the following generator set output metering functions:
- a) AC amperes for each phase
 - b) AC voltage for each phase
 - c) Frequency
 - d) Kilowatts, 3 phase

- e) kVARs, 3 phase
 - f) kVA, 3 phase
 - g) Power factor
 - h) Kilowatt hours, 3 phase, accumulative
 - i) kVAR hours, 3 phase, accumulative
- b) Common Alarm
 - 1) A common remote audible alarm function will be provided so that a horn output will occur. The horn shall be battery powered and resettable from the operator control panel and any remote annunciator. The horn will activate if any of the following conditions occur:
 - a) Over Crank Alarm
 - b) Low Coolant Temperature Warning
 - c) High Coolant Temperature Warning
 - d) High Coolant Temperature Alarm
 - e) Low Oil Pressure Warning
 - f) Low Oil Pressure Alarm
 - g) Over Speed Alarm
 - h) Not In Automatic Warning
 - i) Low Cranking Voltage Warning
 - j) Low Coolant Level Alarm
- c) Run Relay
 - 1) A ten (10) Amp relay with 120 VAC / DC rated contacts shall be supplied to indicate the genset Run condition. The dry contacts shall be Form C and shall have connection to a terminal strip for easy interface to other control systems.
- d) Communications
 - 1) The GCM shall be capable of communicating over J1939 or Modbus RTU with electronic engine modules (ECU) within a distance of 200 meters.
 - 2) The GCM shall provide MODBUS RTU communication over both RS232 and RS485.

- 3) The GCM shall provide MODBUS TCP communication over RJ45 connection.
- 4) The GCM with extension modules shall be capable of providing remote monitoring capability over Ethernet utilizing HTTP or SNMP protocol.
- e) Hardware Specifications
 - 1) Operating temperature range of the GCM shall be at a minimum -30C to +70C.
 - 2) The GCM must be capable of monitoring speed via mag pickup, frequency based, or J1939 / CAN speed signals.
 - 3) The GCM will support five (5) ampere secondary CT output current.
 - 4) The GCM will allow for direct voltage measurement up to 480 VAC line to line.
 - 5) The GCM will have a minimum of seven (7) on board open collector type Digital/Binary outputs, with expansion capabilities.
 - 6) The GCM will have a minimum of 7 on board Digital/Binary inputs with a minimum two (2) volts level for closed contact indication; with expansion capabilities.
 - 7) The GCM will have a minimum of three (3) on board analog inputs that support 0–2500-ohm analog inputs, with expansion capabilities.

14.0 Accessory Required Items

- a) The following items must also be furnished by the generator supplier and /or installer:
 - 1) Oil and water drain lines shall be installed and extended to the outside of the weatherproof enclosure through bulkhead fittings. Each drain line shall include a brass ball valve and flexible lines. The ball valves shall be located on the interior of the packaged equipment.
 - 2) Duplex service receptacle, 110 VAC, 20 ampere, GFCI protected, with two (2) separate 20 ampere branch circuits supplying the receptacle, one circuit for the engine block heater and the second circuit for the battery charger, each 20 ampere circuit shall be on its own branch circuit breaker.
 - 3) Emergency stop button, red, mushroom head type, to be installed as directed by Brunswick County Public Utilities staff, depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

Technical Specification 033

AUTOMATIC TRANSFER SWITCH (ATS) WITH MICROPROCESSOR CONTROLLED LOGIC

1.0 General

- a) It is the intent of this specification to secure an automatic transfer switch (ATS) that has been prototype tested, factory built, production tested, and site tested, together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein.
- b) The ATS shall be provided with the correct number of poles, proper voltage and amperage rating, and correct frequency as shown by the Engineer on the approved plans.
- c) Each ATS shall consist of an inherently double-throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation. All transfer switches and control panels shall be produced by the same manufacturer.
- d) All equipment shall be new and of current production by a firm which has the final assembly of the ATS in the continental United States.
- e) All transfer switches utilized in Brunswick County owned applications shall have programmable exercise timers, Utility and Generator source available monitoring contacts, and Emergency / Normal position contacts.
- f) The ATS will shall be completely compatible with the selected and approved emergency generator unit – refer to Brunswick County Technical Specification 032 – Emergency Generators for Pump Stations for additional information.
- g) The complete ATS shall be tested to ensure proper operation of the individual components and correct overall sequence of operation, and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.
- h) The ATS unit shall be free of defects in materials and workmanship, and the supplier shall be responsible for ensuring the compatibility of all components of the ATS.

2.0 Approved Automatic Transfer Switches

- a) Approved ATS units shall be:
 - 1) ASCO 300 with the 18RX option

- 2) Cummins Power Command OTPC
- 3) or approved equal.

3.0 Codes and Standards

- a) The ATS shall conform to the requirements of:
 - 1) UL 1008 – Standard for Automatic Transfer Switches
 - 2) NFPA 70 - National Electrical Code
 - 3) NFPA 110 - Emergency and Standby Power Systems
 - 4) IEEE Standard 446--Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 - 5) NEMA ICS10-1993 (formerly ICS2-447) – AC Automatic Transfer Switches
 - 6) International Standards Organization ISOP 9001:2000

4.0 Required Submittals

- a) The utility contractor shall submit the following items to the Engineer for review and approval prior to providing the ATS:
 - 1) Manufacturer's drawings showing the physical layout with outline dimensions, cable entry and exit locations, interior and exterior component layouts, and connection data.
 - 2) Electrical schematic to include internal wiring, customer connection terminals, optional components, and controller settings.
 - 3) Product Data Sheets with Equipment Ratings.
 - 4) A marked-up copy of this specification with notations clearly showing all deviations and/or exceptions to this specification for the submitted unit – if any.

5.0 Ratings and Construction

- a) The ATS shall be furnished in a NEMA Type 4X stainless steel enclosure unless it is located inside an electrical building in which case NEMA Type 12 is acceptable.
- b) The ATS shall be listed and labeled with UL, CSA, etc.
- c) All material and parts shall be new, unused, of current manufacture, or best industrial grade, and free from defects and imperfections.

- d) All moveable parts of the operating mechanism shall remain in positive mechanical contact with the main contacts during the transfer operation without the use of separate mechanical interlocks. The transfer switch shall be electrically operated and mechanically held.
- e) The ATS shall have the correct amount of switched poles plus a solidly connected neutral unless otherwise specified by Brunswick County.
- f) Inspection and removal of all contacts, coils, springs, and control elements shall be possible from the front of the transfer switch without disassembly or disconnection of operating linkages and without disconnection of the power conductors.
- g) Automatic transfer switches not intended for continuous duty or repetitive load transfer switching are not acceptable.
- h) The automatic transfer switch shall be rated for proper voltage, amperes, frequency, # of phases, and # of wires for total system transfer including all motor loads, lighting, and miscellaneous loads.
- i) The automatic transfer switch shall be rated to withstand the RMS symmetrical short circuit current available at the automatic transfer switch terminals, with the type of overcurrent protection shown on the approved plans. The RMS symmetrical short circuit current shall be clearly labeled inside the ATS enclosure per NEC requirements.
- j) A label plate shall be affixed – without drilling the enclosure or using any type of screws – that specifies: _____VAC, _____AMPS, _____Hz, _____# OF PHASES, _____# OF WIRES on the outside of the ATS.
- k) The transfer switch mechanism shall provide a simple means of manual operation using only components that are permanently affixed in the operating position.
- l) The ATS shall permit manual operation of the transfer mechanism while the system is energized and carrying the rated load.
- m) The ATS shall provide front accessible components and wiring for easy serviceability. Power or control connections which are not readily serviceable while the transfer switch mechanism is mounted within its enclosure are not acceptable.
- n) All internal control devices used in the ATS shall be capable of being de-energized and isolated from the system by use of an accessible isolation plug for servicing procedures.
- o) All power contacts shall operate in a quick-make / quick – break manner with the speed of operation independent of the supply voltage and / or speed of operation by manual methods.

6.0. Automatic Transfer Switch Functional Requirements

- a) The ATS shall automatically transfer the load to the standby emergency generator in the event of a utility supply failure and return the load back to the normal utility supply upon restoration of normal utility power. The ATS power switching devices shall be mechanically and electrically interlocked to prevent the utility and generator power supplies from being interconnected.
- b) When the voltage on any phase of the normal utility supply is below the preset level of rated voltage for the preset time delay a contact shall close to start the emergency generator. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.
- c) The load shall transfer to the generator supply when the generator voltage and frequency have stabilized and reached a preset level and after the generator warm-up time delay has expired.
- d) Required Time Delays:
 - 1) An adjustable time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals.
 - 2) An adjustable time delay shall be provided on transfer to emergency, adjustable from zero (0) to five (5) minutes for controlled timing of transfer of loads to emergency.
 - 3) A generator stabilization time delay shall be provided after transfer to emergency.
 - 4) An adjustable time delay shall be provided on re-transfer to normal power, adjustable to thirty (30) minutes. Time delay shall be automatically bypassed if the emergency source fails and normal source is acceptable.
 - 5) A five (5) minute cool down time delay shall be provided on shutdown of the generator.
 - 6) All adjustable time delays shall be field adjustable without the use of special tools.

7.0. Automatic Transfer Switch Standard Control Features

- a) The controller shall direct the operation of the transfer switch. Sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications.
- b) The controller shall be connected to the transfer switch with an interconnecting wiring harness. The harness shall have a keyed disconnect plug to allow the controller to be disconnected from the transfer switch for routine maintenance.

- c) The controller shall be enclosed with a protective cover and be mounted separate from the transfer switch unit for safety and ease of maintenance. Interfacing relays shall be industrial grade plug-in type with dust covers.
- d) The ATS control power must be obtained from the source being transferred to. The controls shall not require any connection to external power sources. Transfer switches requiring power from the engine starting battery (or any other battery) are not acceptable.
- e) The controller shall have a flush mounted display with LED indicators for switch position and source acceptability. It shall also include test and time delay bypass switches.
- f) The voltage of each phase of the normal source shall be monitored.
- g) Single phase voltage and frequency of the emergency source shall be provided.
- h) Provisions for local and remote operator initiated system test modes shall be provided. Test modes shall allow “on load” testing of the emergency generator set.

8.0. Additional Features

- a) Engine start signal contacts, five (5) amperes, thirty-two (32) VDC is required.
- b) Push button type test switch to simulate a normal source failure is required.
- c) Engine exercising timer to include the ability to select engine exercise with or without load Transfer is required.
- d) Programmable Engine Exerciser, fourteen (14) day programmable, with digital readout display, shall include one (1) Form C contact for availability of Normal or Emergency Sources.
- e) Required Pilot Lights (must be long life LED type lights):
 - a) Green light – load on Normal Utility Source
 - b) Red light – load on Generator Source
 - c) Green light – Normal Utility Source Available
 - d) Green light – Generator Source Available
- f) Lamp Test Function to test all LED lights is required.
- g) Programmable clock and calendar is required.
- h) Control settings shall be stored in non-volatile EEPROM.
- i) The control module shall be capable of storing the following records in memory or access either locally (at the control module) or remotely (at a computer):

- 1) Number of hours transfer switch is in the emergency position (total and since record reset)
 - 2) Number of hours the emergency is available (total and since record reset)
 - 3) Total days that control has been energized (total and since record reset)
 - 4) Total transfers in either direction (total and since record reset)
 - 5) Date of record reset
 - 6) Date of last exercise period
 - 7) Date, time and description of the last four source failures
 - 8) Elapsed time during the most recent source outage
- j) Auxiliary contacts, rated ten (10) amperes, (250) VAC, shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact, closed, when the ATS is connected to the emergency source.
- k) A push-button type switch to bypass the time delay on transfer to emergency, or the engine exerciser period on the re-transfer to Normal Power time delay, whichever delay is active at the time the push-button is activated.
- l) Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to Emergency Power and for a remote contact which opens to inhibit transfer to Emergency Power and / or re-transfer to Normal Power.
- m) Terminals shall be provided to indicate actual availability of the Normal and Emergency Sources, as determined by the voltage sensing pickup and dropout settings for each source.

9.0. Other Items

- a) The supplier shall be able to provide the services of a field technician to test and adjust the system for satisfactory operation. The supplier shall be factory warranted and trained to work the complete system. A factory certified service shop shall be located within a two (2) hour / one hundred (100) mile radius of the Brunswick County Utilities Field Operation Center in Supply, North Carolina. Service response shall be guaranteed to be eight (8) hours or less upon receipt of service call notification.
- b) Each transfer switch shall be provided with two operator manuals providing installation and operating instructions.
- c) Each automatic transfer switch and generator set shall be warranted by the manufacturer for one year from the date placed in service. Where manufacturer's standard guarantees or warranties are written for a period of more than one year, at no additional cost to the County, such longer terms shall apply.

These specifications are Brunswick County Standard Specifications. Inclusion here is not intended to represent that these specifications are the work of Cheatham and Associates, P.A.

Technical Specification 034

SCADA CONTROL SYSTEMS FOR SEWER PUMP STATIONS

Revisions by Cheatham and Associates, P.A. are indicated by struck through text for deletions and red text for additions.

1.0 General

- a) It is the intent of this specification for the utility contractor to furnish and install a pump station SCADA / RTU system complete in every respect. The utility contractor shall furnish all labor, supervision, materials, tools, equipment and services necessary for the complete installation of the instrumentation and control system as detailed in this technical specification and as shown on the Brunswick County pump stations Standard Details.
- b) Refer to the following County Standard Detail drawings and Technical Specifications as applicable:
 - 1) SCADA Antenna Detail for Brunswick County
 - 2) Pump Station Details for Pump Stations 50 HP and Smaller
 - 3) Pump Station Details for Pump Stations Larger than 50 HP
 - 4) Pump Station Electrical Details 1 – 50 HP Duplex Control Panel
 - 5) Pump Station SCADA / RTU Details 1 – 50HP
 - 6) RTU / Control Panel – Pumps Larger than 50 HP utilizing Soft Starts
 - 7) RTU / Control Panel – Pumps Larger than 50 HP utilizing VFDs
 - 8) Brunswick County Technical Specification TS 023: Wastewater Pump Stations with Submersible Pumps

2.0 Submittals

- a) Submittals shall comply with the requirements of all relevant Brunswick County Standard Details and Technical Specifications as referenced herein.
- b) The utility contractor shall submit for review all shop drawings, certified prints, literature, and manufacturer's data sheets for SCADA / RTU equipment. Submittals shall go to the Engineer for review and approval.
- c) All furnished SCADA and pump controls shall be 100% compatible with the existing Brunswick County Public Utilities system. This shall include, but is not limited to, all SCADA radios, PLCs, VFDs, enclosures, soft starters, NEMA contactors, network switches, and user interface touch screens. Materials specified in County Technical Specifications and Standard Details provide full

system compatibility, adequate parts availability, wiring and communications compatibility, meet current dimensional requirements, and require minimum additional staff training and software.

- d) The results of a radio signal strength path analysis shall be submitted in a detailed report documenting the actual radio field test procedures and results along with the confirmation of the minimum required antenna height.

NOTE: Brunswick County will not accept pump station facilities if the radio signal strength is not (-) 80 dBa or less. The radio signal path analysis must be submitted for County review and approval prior to final plan approval.

- e) Contact Brunswick County Public Utilities for current radio model for SCADA / RTU panel and for assistance with the signal path analysis study.

3.0 Products

- a) Refer to County Technical Specifications and Standard Details for required equipment and materials.

4.0 Rohn SCADA Antenna

- a) The Rohn 65G antenna and foundation is the standard antenna for all Brunswick County pump stations.
- b) Refer to the *SCADA Antenna Detail for Brunswick County* Standard Detail.
- c) The Engineer and utility contractor shall review and be familiar with the *SCADA Antenna Detail for Brunswick County* Standard Detail.
- d) The tower portion for a Brunswick County Pump Station shall be installed in its entirety, turnkey, per the Standard Details, by the utility contractor. A complete unit includes the concrete foundation, base unit, antenna sections to required height, ten (10) foot antenna mast, directional antenna, conduits, coaxial cable, coaxial connections, grounding system, coaxial grounding kit, strain reliefs, weatherproof fitting as required for all conduits, cable ties, and all other materials and labor necessary for a complete, turnkey, seamless, and fully functional system.
- e) Antenna tower height shall be a minimum forty (40) feet in height.
- f) Antenna towers greater than sixty (60) feet in height require down guys and a larger pump station site footprint – contact Brunswick County Public Utilities for guidance.

- g) Rohn antenna foundation design basis parameters are:
- 1) presumptive soil type is clay soil
 - 2) dry soil conditions with water table below foundation depth
 - 3) frost depth less than or equal to 3.5 feet
 - 4) soils are non-corrosive
 - 5) soils are non-expansive
- h) The Engineer shall investigate the pump station site and existing soil conditions to determine whether any modifications are required to the standard Rohn foundation design:
- 1) If modifications are required, a geotechnical soil report and revised foundation design, sealed by a licensed Engineer in the State of North Carolina, shall be submitted to Brunswick County for review and approval.
 - 2) Upon approval of the geotechnical report by Brunswick County the Engineer shall submit revised antenna plans sheets for review and approval. Tower designs shall meet the approved national standard ANSI / EIA – 222 –F and ANSI / TIA – 222-G, Structure Class I, Exposures B & C, Topographic Category I.
- i) The antenna tower shall be rated for ¹⁵⁰~~(110)~~ mph wind speed with a three (3) second wind gust per Rohn technical literature.

5.0 Pump Station Control Systems

a) Pump Stations 1 – 50 HP

- 1) Primary control method shall be four (4) float switches in the wet well.
- 2) Refer to *Pump Station Electrical Details 1 – 50 HP Duplex Control Panel*, *Pump Station SCADA / RTU Details 1 – 50 HP*, and Brunswick County Technical Specification TS 023: *Wastewater Pump Stations with Submersible Pumps*.

b) Pump Stations > 50 HP

- 1) Primary control method shall be the Dwyer submersible transducer for pump stations greater than 50 HP using soft starts and VFDs. Refer to County standard detail for the Dwyer transducer.
- 2) Dwyer submersible transducer specifications are:
 - a) Dwyer PBLT2 submersible level transmitter 0 – 10 psi
 - b) Power: 13 – 30 VDC
 - c) Output: 4 – 20 mA, 2-wire
 - d) Accuracy: (+)(-) 0.25% of full scale
 - e) Transmitter wetted materials: 316 SS, 316L SS, Buna-N

- f) Cable wetted materials: polyurethane
 - g) Cable lengths shall be long enough to reach any junction box, RTU panel, or electrical building without splicing
 - h) Diaphragm seal: large diameter, 316 SS, non-clogging
 - i) Ventilation tube in cable assembly with maintenance free filter
 - j) ½ inch, NPT (M) conduit connection
- 3) Backup level control system shall utilize four (4) float switches.
- 4) Refer to *RTU / Control Panel – Pumps Larger than 50 HP utilizing Soft Starts*, *RTU /Control Panel – Pumps Larger than 50 HP utilizing VFDs*, and Brunswick County Technical Specification TS 023: *Wastewater Pump Stations with Submersible Pumps.*

6.0 SCADA system start-up and checkout

- a) The entire control system shall be furnished by a single supplier who shall furnish the services of a competent technical representative for a minimum of one (1) day to insure that the equipment is installed correctly, to adjust the equipment, and to instruct operating personnel in the proper operation, maintenance, and care of the equipment. This start-up checkout and testing must be scheduled a minimum of (48) hours in advance with Brunswick County Public Utilities. If the checkout and startup fails for any reason the technical representative shall schedule additional on-site time as necessary in order to achieve a successful startup of the system to the satisfaction of Brunswick County Public Utilities.

7.0 Warranty Period

- a) The utility contractor shall provide a one year warranty for all SCADA / RTU equipment stating that it is free from defects in materials and workmanship. Any equipments failures during the one year warranty period due to materials and / or workmanship shall be remedied by the utility contractor to the satisfaction of Brunswick County Public Utilities.
- b) The warranty period shall commence at either the date of Final Acceptance for a County CIP project, or the date of recordation of the Deed of Dedication for a developer installed project.

SECTION 26 05 00 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Supporting devices for electrical components.
 - 2. Cutting and patching for electrical construction.
 - 3. Touchup painting.
 - 4. Concrete equipment bases.
 - 5. Electricity-metering components.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Support channels and hardware.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Metal Items for Use Outdoors: Stainless steel.
- B. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.
- C. Slotted Support Systems Fittings and Accessories: Products of the same manufacturer as channels.
- D. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- E. Expansion Anchors: Stainless-steel wedge or sleeve type.

- F. Toggle Bolts: Stainless-steel springhead type.

2.2 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.3 CONCRETE BASES

- A. Concrete: Unless detailed otherwise; 3000-psi, 28-day compressive strength with welded wire fabric reinforcement.

2.4 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts, sleeves, raceways, boxes, etc. in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

3.2 ELECTRICAL EQUIPMENT INSTALLATION

- A. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- B. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

3.3 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Selection of Supports: Comply with manufacturer's written instructions.

- B. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb (90-kg) design load.

3.4 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Support individual horizontal raceways with separate pipe hangers or clamps.
- E. Install 1/4-inch- diameter or larger threaded hanger rods, unless otherwise detailed.
- F. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- G. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- H. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- I. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
 - 1. Wood: Fasten with wood screws or screw-type nails.
 - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 3. New Concrete: Concrete inserts with machine screws and bolts.
 - 4. Existing Concrete: Expansion bolts.
 - 5. Steel: Spring-tension clamps on steel.
 - 6. Light Steel: Sheet-metal screws.
 - 7. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.5 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage

recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated.

3.6 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

- A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.7 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from Project site after coordination with the Owner's representative. Equipment and/or materials that the Owner desires to retain shall be moved to a location designated by the Owner's representative.
- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.8 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work.

3.9 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint.
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.10 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Final Acceptance.

END OF SECTION 26 05 00

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes electrical identification materials and devices intended to comply with NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data:
 - 1. For each electrical identification product indicated.
 - 2. For double coated, adhesive tape product indicated.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 CABLE LABELS

- A. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches.
- B. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
 - 1. Not less than 6 inches wide by 4 mils thick.
 - 2. Compounded for permanent direct-burial service.
 - 3. Embedded continuous metallic strip or core.
 - 4. Printed legend indicating type of underground line.

2.2 NAMEPLATES AND SIGNS

- A. Engraved Plastic Nameplates and Signs: Engraving stock, plastic laminate, minimum 1/16" thick for signs up to 20 sq. in. and 1/8" thick for larger sizes.
- B. Fasteners for Nameplates and Signs:
 - 1. Two-part epoxy adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Circuit Identification Labels on Boxes: Panel and circuit number.
1. Exterior Boxes:
 - a. Engraved plastic label on cover; and
 - b. Pressure-sensitive, self-adhesive plastic label inside cover.
- F. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines; install continuous underground-line warning tape located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker. Install line marker for underground wiring, both direct-buried cables and cables in raceway.
- G. Color-Coding of Phase, Neutral, and Ground Conductors: Use the following colors for service, feeder, and branch-circuit phase conductors:
1.

Configuration	Phase A	Phase B	Phase C	Neutral	Ground
120/240-V, 1 Ph, 3W	Black	Red	N/A	White	Green
120/240-V, 3 Ph, 4W	Black	Orange	Blue	White	Green
120/208-V, 3 Ph, 4W	Black	Red	Blue	White	Green
277/480-V, 3 Ph, 4W	Brown	Orange	Yellow	Gray	Green
 2. For conductors #6 AWG and smaller, factory apply color the entire length of conductors.
 3. For conductors #4 AWG and larger, field apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
 4. At each panelboard, a color code legend shall be permanently posted corresponding to the conductors and voltage in that panelboard.
- H. Apply identification to conductors as follows:
1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.

2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
 3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.
- I. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment. Attached engraved labels with two-part epoxy adhesive. Apply labels for each unit of the following categories of equipment:
1. Switchgear, switchboards, panelboards, electrical cabinets, and enclosures.
 2. Disconnect switches and enclosed circuit breakers.
 3. Pump control panels.
 4. Transfer switches.

Nameplate colors shall be: White surface with black core.

END OF SECTION 26 05 53

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Enclosures.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of enclosed switch, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
2. Enclosure types and details for types other than UL 50E, Type 1.
3. Current and voltage ratings.
4. Short-circuit current ratings (interrupting and withstand, as appropriate).
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Shop Drawings: For enclosed switches.

1. Include plans, elevations, sections, details, and attachments to other work.

1.3 CLOSEOUT SUBMITTALS

A. Warranty documentation.

B. Operation and Maintenance Data: For enclosed switches to include in emergency, operation, and maintenance manuals. If Section "Operation and Maintenance Data" is included in the project manual, in addition to items there, include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches .

1.4 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed enclosed switches perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within warranty period.

1. Warranty Period: Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain products from single manufacturer.
- B. Manufacturers:
 - 1. ABB / G.E.
 - 2. Eaton Corporation; Cutler-Hammer Products.
 - 3. ESL Power Systems.
 - 4. Hubbell.
 - 5. Legrand.
 - 6. Siemens Energy & Automation, Inc.
 - 7. Square D/Group Schneider.
- C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

2.2 FUSIBLE SWITCHES

- A. Type HD, Heavy Duty:
 - 1. Single throw.
 - 2. Pole quantity, voltage, and Amperage as required for circuit controlled.
 - 3. UL 98 and NEMA KS 1, horsepower rated. Where fused, clips or bolt pads shall accommodate fuses rated for the nameplate rating of equipment controlled.
 - 4. Lockable handle with provisions to lock in either the On or OFF position and interlocked with cover in closed position.
- B. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Service-Rated Switches: Labeled for use as service equipment.
 - 4. Lugs: Suitable for number, size, and conductor material as indicated in the drawings.

2.3 ENCLOSURES

- A. Enclosed Switches: UL 489, NEMA KS 1, UL 50E, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish:
 - 1. Outdoor Locations: UL 50E Type 4X.
- C. Conduit Entry: UL 50E Types 4X enclosures may not contain knockouts.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work will indicate Installer's acceptance of areas and conditions as satisfactory.

3.2 INSTALLATION

- A. Comply with manufacturer's published instructions.
- B. Coordinate layout and installation of switches, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- C. Install individual wall-mounted switches with tops at uniform height unless otherwise indicated.
 - 1. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
 - 2. Install fuses in fusible devices.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Electrical Identification."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Visual and Mechanical Inspection:
 - a. Verify that equipment nameplate data are as described in the Specifications and shown on Drawings.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and clearances.
 - d. Verify that unit is clean. Clean interior with vacuum, not compressed air.
 - e. Inspect exposed surfaces and repair damaged finishes.
 - f. Inspect bolted electrical connections for high resistance. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of lowest value.
 - g. Switches:

- 1) Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - 2) Verify that fuse sizes and types match the Specifications, Drawings, and equipment nameplate rating requirements.
 - 3) Verify that each fuse has adequate mechanical support and contact integrity.
2. Electrical Tests:
 - a. Perform resistance measurements through bolted connections with low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of lowest value.

B. Nonconforming Work:

1. Enclosed switches will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

3.6 PROTECTION

- A. After installation, protect enclosed switches from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262816

SECTION 265619 – LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
 - 2. Luminaire supports.
 - 3. Luminaire-mounted photoelectric relays.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of luminaire.
 - 1. Arrange in order of luminaire callout designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaire.
 - 4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.
 - 5. Wiring diagrams for power, control, and signal wiring.
 - 6. Photoelectric relays.
 - 7. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Provide luminaires from a single manufacturer for each luminaire type.
- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.9 FIELD CONDITIONS

- A. Verify existing and proposed structures prior to the start of work associated with luminaire installation.
- B. Mark locations of exterior luminaires for approval by Design Team prior to the start of luminaire installation.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including luminaire support components.
 - b. Faulty operation of luminaires and accessories.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

2.2 LUMINAIRE REQUIREMENTS

- A. Source Limitations: Obtain luminaires from single source from a single manufacturer.
- B. Internal driver.
 - 1. Integral surge suppression.
- C. Input Voltage Tolerance: +/- 10% of nominal rated voltage.

2.3 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

- A. Comply with UL 773 or UL 773A.
- B. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay. Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.
 - 1. Relay with locking-type receptacle shall comply with ANSI C136.10.
 - 2. Adjustable window slide for adjusting on-off set points.

2.4 LUMINAIRE TYPES

- A. See schedule on drawings.

2.5 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- E. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

F. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.

2.6 FINISHES

- A. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.
- B. Install lamps in each luminaire.
- C. Fasten luminaire to structural support.
- D. Supports:
1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.
 3. Support luminaires without causing deflection of finished surface.
 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
- F. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

- G. Comply with requirements in Section "Conductors and Cables" and Section "Raceways and Boxes" for wiring connections and wiring methods.

3.3 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

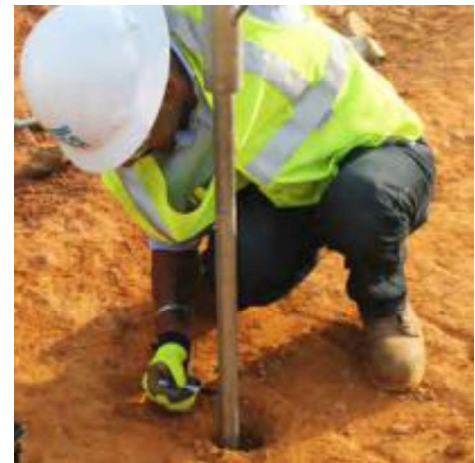
3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section "Electrical Identification."

3.5 FIELD QUALITY CONTROL

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Verify operation of photoelectric controls.
 - 3. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- C. Luminaire will be considered defective if it does not pass tests and inspections.

END OF SECTION 265619



ECS Southeast, LLC

Geotechnical Engineering Report

Southport Pump Stations

Southport, Brunswick County, North Carolina

ECS Project No. 22:34576

May 9, 2024



**ECS SOUTHEAST, LLC**

NC Engineering License No. F-1519

Geotechnical • Construction Materials • Environmental • Facilities

May 9, 2024

Mr. Monroe Huckaby, PE
WK Dickson & Co., Inc.
300 North Third Street
Wilmington, North Carolina 28401

ECS Project No. 22:34576

Reference: Geotechnical Engineering Report
Southport Pump Stations
Southport, Brunswick County, North Carolina

Dear Mr. Huckaby:

ECS Southeast, LLC (ECS) has finished the subsurface exploration and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and our design and construction recommendations.

It has been our pleasure to be of service to WK Dickson & Co., Inc. during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southeast, LLC

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"ONE FIRM. ONE MISSION."

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EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the executive summary should not be utilized in lieu of reading the geotechnical report.

- The geotechnical exploration performed for the sites included three (3) electronic cone penetration test (CPT) soundings drilled to refusal depths of approximately 35 to 40 feet.
- Provided the subgrades are prepared as recommended in this report and the wet wells are embedded approximately 20 feet below existing grades, the planned structures may be supported by conventional shallow foundations consisting of mat foundations bearing on compacted structural fill and natural soils using a net allowable soil bearing pressure of 3,000 psf.
- Provided the subgrades are prepared as recommended in this report, the planned auxiliary structures and equipment pads at the Moore Street and W 9th Ave sites may be supported by conventional shallow foundations consisting of column or strip footings bearing on compacted structural fill and natural soils using a net allowable soil bearing pressure of 3,000 psf and the planned auxiliary structures and equipment pads at the Park Avenue Extension site may be supported by conventional shallow foundations consisting of column or strip footings bearing on compacted structural fill and natural soils using a net allowable soil bearing pressure of 1,500 psf.
- Groundwater was encountered in the soundings at depths of approximately 2.8 to 6.67 feet below existing grade.

Please note this Executive Summary is an important part of this report and should be considered a ***“summary”*** only. The subsequent sections of this report constitute our findings, conclusions, and recommendations in their entirety.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design of foundations for the proposed pump stations located in Southport, Brunswick County, North Carolina. The recommendations developed for this report are based on project information supplied by WK Dickson & Co., Inc.

Our services were provided in accordance with our Proposal No. 22:27432, dated May 25, 2023, as authorized by WK Dickson & Co., Inc. on March 27, 2024.

This report contains the procedures and results of our subsurface exploration programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field test procedures and the results of testing conducted;
- A review of surface topographical features and site conditions;
- A review of subsurface soil stratigraphy with pertinent available physical properties;
- Foundation recommendations;
 - Allowable bearing pressure;
 - Settlement estimates (total and differential);
- Site development recommendations;
- Reusability of soils for use as fill material;
- In-situ soil parameters;
- Discussion of groundwater impact;
- Compaction recommendations;
- Site vicinity map;
- Exploration location plan; and
- CPT sounding logs.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The proposed sites are located off Park Avenue Extension, Moore Street, and W 9th Street in Southport, Brunswick County, North Carolina. The Park Avenue Extension site is bounded on the south by Park Avenue Extension, on the east by an existing residential property, and on the north and west by wooded land. The Moore Street site is bounded on the southeast by Moore Street, on the northeast by an existing residential property, on the northwest by wooded land and on the southwest by the cemetery. The W 9th Street site is bounded on the north by W 9th Street, and on the remaining sides by wooded land. Figures 2.1.1 through 2.1.3 below show images of where the sites are located.



Figure 2.1.1 Park Ave Ext Site Location

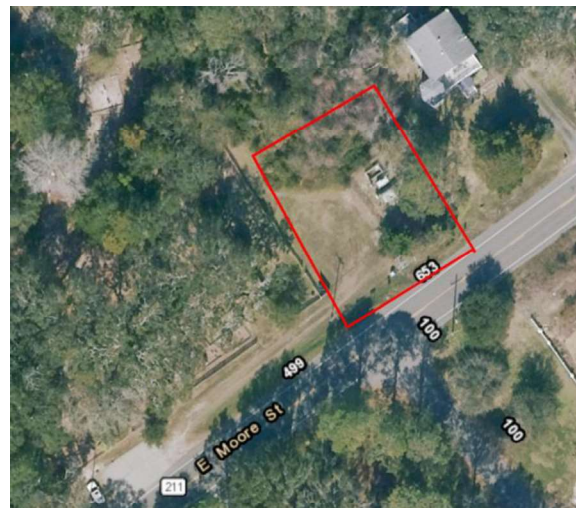


Figure 2.1.2 Moore St Site Location



Figure 2.1.3 W 9th St Site Location

At the time of our exploration, the sites currently consisted of the existing fenced pump stations. Based on our site visit, provided plans and approximate elevations from Google Earth, the sites are relatively level with typical elevations at the Park Ave Ext site ranging from approximately 9 to 12 feet, typical elevations at the Moore Street site ranging from approximately 7 to 13 feet, and typical elevations at the W 9th Street site ranging from approximately 7 to 11 feet.

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding and estimations of the planned development including proposed structures and related infrastructure.

SUBJECT	DESIGN INFORMATION / ESTIMATIONS
Usage	Pump Stations
Column Loads	Up to 300 kips
Wall Loads	Up to 9 kips per linear foot (klf)
Wet Well Diameters	
Park Avenue Extension	12 feet
Moore Street	8 feet
W 9 th Street	8 feet
Approximate Wet Well Embedment Depth	20 feet
Auxiliary Structures Finish Floor Elevations (Park Ave Ext.)	At or above existing grades
Auxiliary Structures Finish Floor Elevations (Moore Street & W 9 th Street)	within +/- 4 feet of existing grades

ECS understands the project consists of replacing the existing wet wells at each pump station site with prefabricated circular concrete wet wells that are 8 to 12 feet in diameter and construct new generator slabs on the sites. ECS understands the wet wells are anticipated to be embedded approximately 20 feet deep.

3.0 FIELD EXPLORATION TESTING

Our exploration procedures are explained in greater detail in Appendix B including the Reference Notes for Cone Penetration Sounding. Our scope of work included performing three (3) CPT soundings. Our approximate CPT sounding locations are shown on the Exploration Location Diagram in Appendix A.

3.1 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil. Please refer to the CPT sounding logs in Appendix B.

The site is located in the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain is composed of seven terraces, each representing a former level of the Atlantic Ocean. Soils in this area generally consist of sedimentary materials transported from other areas by the ocean or rivers. These deposits vary in thickness from a thin veneer along the western edge of the region to more than 10,000 feet near the coast. The sedimentary deposits of the Coastal Plain rest upon consolidated rocks similar to those underlying the Piedmont and Mountain Physiographic Provinces. In general, shallow unconfined groundwater movement within the overlying soils is largely controlled by topographic gradients. Recharge occurs primarily by infiltration along higher elevations and typically discharges into streams or other surface water bodies. The elevation of the shallow water table is transient and can vary greatly with seasonal fluctuations in precipitation.

Table 3.1.1 Subsurface Stratigraphy

Approximate Depth Range	Stratum	Description	Ranges of N*-Values (1) blows per foot (bpf)
0 to 0.2 (Surface cover)	N/A	Topsoil was encountered on-site with an observed thickness of approximately 1 to 2 inches. Deeper topsoil or organic laden soils are likely present in wet, poorly drained areas and potentially unexplored areas of the site.	N/A
(0-0.2) to 15	I	Very Loose to Dense, SILTY TO CLEAN SAND (SM, SP) with interbedded layers of Soft to Firm, SILTY, SANDY LEAN and LEAN CLAY (CL-ML, CL).	2 to 41
15 to 30	II	Loose to Dense, SILTY TO CLEAN SAND (SM, SP) with occasional interbedded layers of Soft to Stiff, SILTY and SANDY LEAN CLAY (CL-ML, CL).	4 to 49
30 to 42	III	Medium Dense to Very Dense, SILTY TO CLEAN SAND (SM, SP) and Firm to Stiff, SILTY and SANDY LEAN CLAY (CL-ML, CL)	5 to 78

Notes: (1) Equivalent Corrected Standard Penetration Test Resistances

3.2 GROUNDWATER OBSERVATIONS

Water levels were measured in our CPT soundings in Appendix B. Groundwater depths were measured at the time of drilling to range from approximately 2.8 to 6.67 feet below the ground surface. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

4.0 DESIGN RECOMMENDATIONS

4.1 SHALLOW FOUNDATIONS

Provided subgrades and structural fills are prepared as recommended in this report, and the proposed wet wells are embedded approximately 20 feet below existing grades, the proposed wet well structures can be supported by shallow foundations including mat foundations. We recommend the foundation design use the following parameters:

Table 4.1.1 Wet Well Foundations

Design Parameter	Mat Foundation
Net Allowable Bearing Pressure ⁽¹⁾	3,000 psf
Recommended Bearing Soil Material	Stratum II Soils
Minimum Width	30 inches
Minimum Footing Embedment Depth (below slab or finished grade) ⁽²⁾	12 inches
Minimum Exterior Frost Depth (below final exterior grade)	6 inches
Estimated Total Settlement ⁽³⁾	Less than 1- inch
Estimated Differential Settlement ⁽⁴⁾	Less than ½ inches between columns

Provided subgrades and structural fills are prepared as recommended in this report, the Park Ave Ext site slabs are at or above existing grades, the proposed auxiliary structures can be supported by shallow foundations including column footings and continuous wall footings. We recommend the foundation design use the following parameters:

Table 4.1.2 Auxiliary Structure Foundations

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure ⁽¹⁾ (Park Ave Ext Site)	1,500 psf	1,500 psf
Net Allowable Bearing Pressure ⁽¹⁾ (Moore St and W 9 th St Site)	3,000 psf	3,000 psf
Recommended Bearing Soil Material	Stratum I Soils or Structural Fill	Stratum I Soils or Structural Fill
Minimum Width	30 inches	18 inches
Minimum Footing Embedment Depth (below slab or finished grade) ⁽²⁾	12 inches	12 inches
Minimum Exterior Frost Depth (below final exterior grade)	6 inches	6 inches
Estimated Total Settlement ⁽³⁾	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement ⁽⁴⁾	Less than ½ inches between columns	Less than ½ inches

Notes:

- (1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
- (2) For bearing considerations and frost penetration requirements.
- (3) Based on estimated structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
- (4) Based on maximum column/wall loads and variability in borings. Differential settlement can be re-evaluated once the foundation plans are finished

Potential Undercuts: A majority of the soils at the estimated foundation bearing elevation are anticipated to be adequate for support of the proposed structure. If soft or loose soils are observed at the footing bearing elevations, the soils should be undercut and removed. Undercut should be backfilled with Structural Fill up to the original design bottom of footing elevation; the original footing may be constructed on top of the Structural Fill.

4.2 SLABS ON GRADE

The on-site natural soils are generally considered not adequate for support of the slab-on-grade floor slabs. Based on the estimation that the finished floor elevation is around existing grades, it appears that the slabs for the structures will likely bear on SANDS (SM, SP) or Structural Fill. The following graphic depicts our soil-supported slab recommendations:

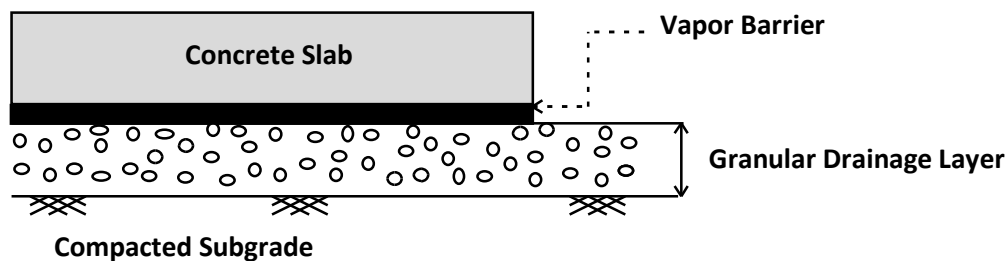


Figure 4.2.1

1. Drainage Layer Thickness: 6 inches
2. Drainage Layer Material: GRAVEL (GP) or SAND containing <5% fines passing #200 sieve (SP, SW)

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed estimating a modulus of subgrade reaction, k_1 of 150 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture vapor penetration through the floor slab. Curing of the slab should be performed in accordance with ACI specifications to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to do away with the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration inhibits the use of a free-floating slab such as in a drop down footing/monolithic slab configuration, the slab should be designed to avoid overstressing of the slab.

4.3 LATERAL EARTH PRESSURE AND SOIL PARAMETERS

Below-grade walls and shoring utilized for this project should be designed to withstand the lateral earth pressures and hydrostatic forces exerted upon them. In the design of below-grade retaining walls to restrain compacted engineered fill or in-situ natural soils, the soil parameters that can be utilized for shoring during the construction are summarized in the following table:

Table 4.3.1 Soil Parameters S-1 (Park Avenue Ext Site)

Depth (ft)	Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p	Coefficient of At-Rest Earth Pressure, K_0	Friction Angle	Cohesion (psf)	Total and Effective Unit Weight (pcf)
0-3	0.33	3.00	0.50	30	0	110 (47.6)
3-5	1.0	1.0	1.0	0	250	105 (42.6)
5-11	0.36	2.77	0.53	28	0	105 (42.6)
11-22	0.27	3.69	0.43	35	0	115 (52.6)
22-27	0.33	3.00	0.50	30	0	110 (47.6)
27-32	0.24	4.20	0.38	38	0	130 (67.6)

Table 4.3.2 Soil Parameters S-2 (Moore Street Site)

Depth (ft)	Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p	Coefficient of At-Rest Earth Pressure, K_0	Friction Angle	Cohesion (psf)	Total and Effective Unit Weight (pcf)
0-2	0.33	3.00	0.50	30	0	110 (47.6)
2-16	0.31	3.25	0.47	32	0	115 (52.6)
16-26	0.24	4.20	0.38	38	0	130 (67.6)
26-28	0.31	3.25	0.47	32	0	115 (52.6)
28-36	1.0	1.0	1.0	0	800	125 (62.6)

Table 4.3.3 Soil Parameters S-3 (W 9th Street Site)

Depth (ft)	Coefficient of Active Earth Pressure, K_a	Coefficient of Passive Earth Pressure, K_p	Coefficient of At-Rest Earth Pressure, K_0	Friction Angle	Cohesion (psf)	Total and Effective Unit Weight (pcf)
0-8	0.33	3.00	0.50	30	0	110 (47.6)
8-16	0.24	4.20	0.38	38	0	130 (67.6)
16-22	0.31	3.25	0.47	32	0	115 (52.6)
22-34	0.27	3.69	0.43	35	0	115 (52.6)

These recommendations have estimated no surcharge loads. The increased lateral pressures generated by surcharge loads (i.e., slopes, parking and building areas, etc.) should be considered in the design. A typical traffic surcharge load is 250 psf. The walls should be designed to resist hydrostatic pressures.

For wall conditions where wall movement cannot be tolerated or where the wall is restrained at the top, the "At Rest" earth pressure should be used. For wall conditions where outward wall movement in the range of 0.5 to 1 percent of the wall height can be tolerated, the "Active" earth pressure should be used. In evaluating the resistance of soil to lateral loads imposed by structures, the "Passive" earth pressure should be used. Please note that the full development of passive pressure requires deflections toward the soil mass on the order of 1 to 4 percent of the wall height.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, existing fill, existing foundations, existing pavements, and soft or loose materials from the 10-foot expanded building and 5-foot expanded pavement limits. The sounding performed in “undisturbed” areas of the site encountered approximately 1 to 2 inches of topsoil at the surface. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. ECS should be retained to verify that topsoil, existing foundations, and substandard surficial materials have been removed prior to the placement of Structural Fill or construction of structures.

5.1.2 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be proofrolled with construction equipment having a minimum axle load of 10 tons [e.g., tandem-axle dump truck loaded to capacity]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying localized yielding materials.

Where proofrolling identifies areas that are unsteady or “pumping” subgrade those areas should be repaired prior to the placement of subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting and moisture conditioning. The situation should be discussed with ECS to evaluate the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in evaluating the cause of the observed unsteady materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.1.3 Site Temporary Dewatering

Perched Groundwater: After periods of precipitation, surface water can be characterized as being broadly perched above less permeable materials. In low-lying areas, the presence of perched water is more pronounced after rain events. Once the site is graded to drain and storm features are installed, ECS anticipates the perched conditions will likely become less pronounced after rain events.

Limited Excavation Dewatering: Based upon our subsurface exploration at this site, as well as considerable experience on sites in nearby areas of similar geologic setting, we believe construction dewatering may be needed for removing accumulated rainwater and for seepage from the support of excavation (SOE) during construction of wet well, and possible installation of underground utilities.

Deep wells should not be required for the temporary dewatering system. However, the dewatering operations can be managed by the use of conventional submersible pumps directly in the excavation or temporary trenches.

If temporary sump pits are used, we recommend they be established at an elevation one to two feet below the bottom of the excavation subgrade or bottom of footing. A perforated 55-gallon drum or other temporary structure could be used to house the pump. We recommend continuous dewatering of the excavations using electric pumps or staffed gasoline pumps be used during construction.

If dewater operations are performed at the site, ECS recommends that the dewatering operations be performed in accordance with Local, State and Federal Government regulatory requirements for surface water discharges. ECS would be pleased to be consulted by the client on those requirements, if requested.

5.2 EARTHWORK OPERATIONS

5.2.1 Structural Fill

Prior to placement of Structural Fill, bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be evaluated prior to being hauled to the site to evaluate if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Structural Fill Materials: Materials selected for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	Property
Building and Pavement Areas	LL < 40, PI<10
Max. Particle Size	3 inches
Fines Content	Max. 20 % < #200 sieve
Max. organic content	5% by dry weight

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	Requirement
Compaction Standard	Standard Proctor, ASTM D698
Required Compaction (Upper 1 foot)	98% of Max. Dry Density
Required Compaction (Depths greater than 1 foot)	95% of Max. Dry Density
Dry Unit Weight	>100 pcf
Moisture Content	-2 to +2 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

On-Site Borrow Suitability: Natural deposits of possible fill material are present on all of the sites. The on-site sands (SM, SP) with fines contents less than 20 percent should meet the recommendations for re-use as Structural Fill.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: A majority of the soils encountered on site at the foundation bearing elevations are anticipated to be adequate for support of the proposed structures. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally adequate for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Loose or unsteady materials encountered should be removed and replaced with compacted Structural Fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material (AASHTO #57 stone) should be 4 inches thick, but not less than that specified by the civil engineer’s project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should meet the requirements for Structural Fill and fill placement.

Excavation Safety: Excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining steady temporary excavations and slopes. The contractor’s responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor’s safety procedures. The slope height, slope inclination, or excavation depth, including utility trench excavation depth, should not exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor’s activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by WK Dickson & Co., Inc. If this information is untrue or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

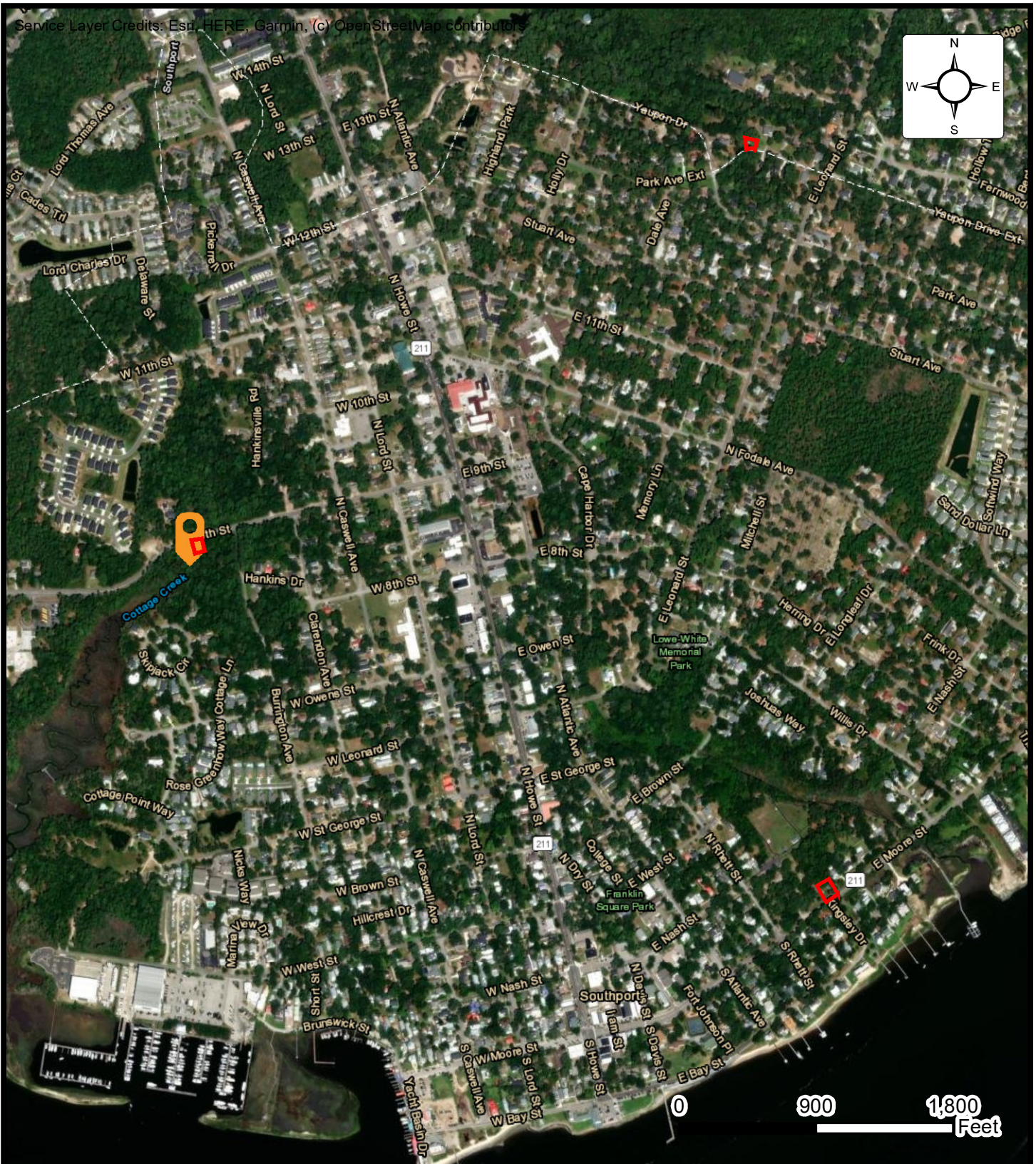
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams & Reports

Site Location Diagram
Exploration Location Diagrams



SITE LOCATION DIAGRAM SOUTHPORT PUMP STATIONS

SOUTHPORT, NC

WK DICKSON & CO., INC.

ENGINEER
WEG

SCALE
AS NOTED

PROJECT NO.
22:34576

FIGURE
1 OF 4

DATE
5/7/2024



Legend



Approximate CPT Sounding Location

0 60 120 Feet



BORING LOCATION DIAGRAM SOUTHPORT PUMP STATIONS

PARK AVE EXT, SOUTHPORT, NC

WK DICKSON & CO., INC.

ENGINEER
WEG

SCALE
AS NOTED

PROJECT NO.
22:34576

FIGURE
2 OF 4

DATE
5/7/2024



Legend



Approximate CPT Sounding Location

0 60 120 Feet



BORING LOCATION DIAGRAM SOUTHPORT PUMP STATIONS

MOORE ST, SOUTHPORT, NC

WK DICKSON & CO., INC.

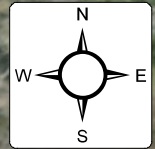
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PROJECT NO.
22:34576

FIGURE
3 OF 4

DATE
5/7/2024



Legend



Approximate CPT Sounding Location

0 60 120 Feet



BORING LOCATION DIAGRAM SOUTHPORT PUMP STATIONS

W 9TH ST, SOUTHPORT, NC

WK DICKSON & CO., INC.

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SCALE
AS NOTED

PROJECT NO.
22:34576

FIGURE
4 OF 4

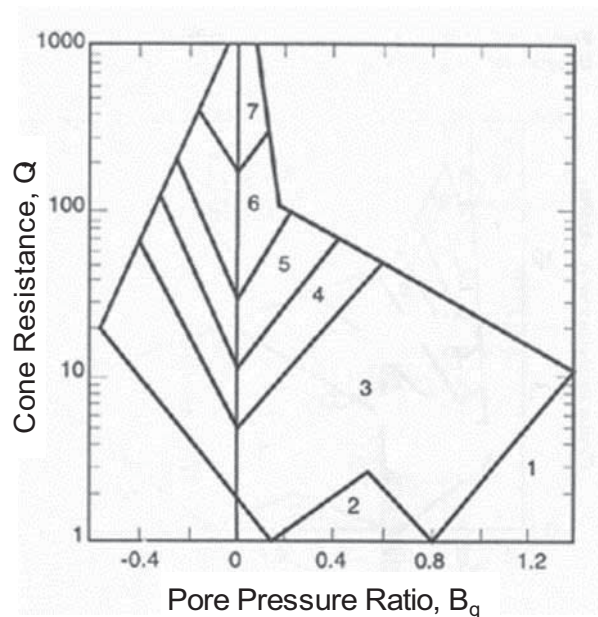
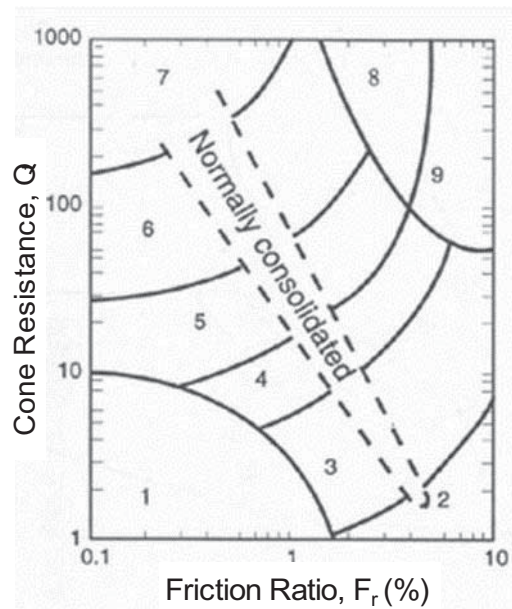
DATE
5/7/2024

APPENDIX B – Field Operations

Reference Notes for CPT Sounding Logs
Cone Penetration Test Sounding Logs (S-1 through S-3)

REFERENCE NOTES FOR CONE PENETRATION TEST (CPT) SOUNDINGS

In the CPT sounding procedure (ASTM-D-5778), an electronically instrumented cone penetrometer is hydraulically advanced through soil to measure point resistance (q_c), pore water pressure (u_2), and sleeve friction (f_s). These values are recorded continuously as the cone is pushed to the desired depth. CPT data is corrected for depth and used to estimate soil classifications and intrinsic soil parameters such as angle of internal friction, preconsolidation pressure, and undrained shear strength. The graphs below represent one of the accepted methods of CPT soil behavior classification (Robertson, 1990).



1. Sensitive, Fine Grained
2. Organic Soils-Peats
3. Clays; Clay to Silty Clay
4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt

6. Clean Sands to Silty Sands
7. Gravelly Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

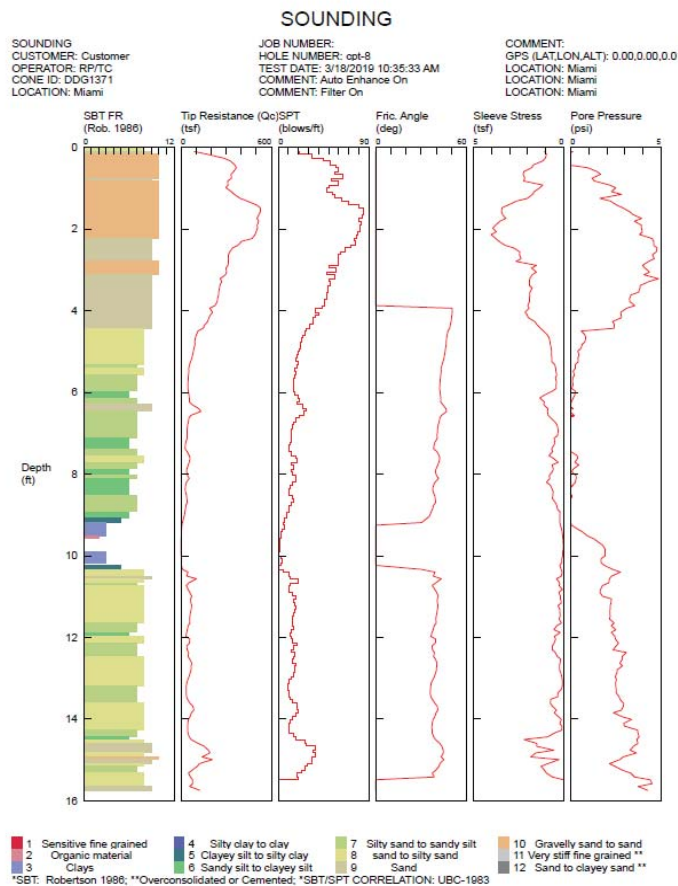
The following table presents a correlation of corrected cone tip resistance (q_t) to soil consistency or relative density:

SAND		SILT/CLAY	
Corrected Cone Tip Resistance (q_t) (tsf)	Relative Density	Corrected Cone Tip Resistance (q_t) (tsf)	Relative Density
<20	Very Loose	<5	Very Soft
20-40	Loose	5-10	Soft
40-120	Medium Dense	10-15	Firm
		15-30	Stiff
120-200	Dense	30-45	Very Stiff
		45-60	Hard
>200	Very Dense	>60	Very Hard



SUBSURFACE EXPLORATION PROCEDURE: CONE PENETRATION TESTING (CPT) ASTM D 5778

In the CPT sounding procedure, an electronically instrumented cone penetrometer is hydraulically advanced through soil to measure point resistance (q_c), pore water pressure (U_2), and sleeve friction (f_s). These values are recorded continuously as the cone is pushed to the desired depth. CPT data is corrected for depth and used to estimate soil classifications and intrinsic soil parameters such as angle of internal friction, pre-consolidation pressure, and undrained shear strength.



CPT Procedure:

- Involves the direct push of an electronically instrumented cone penetrometer* through the soil
- Values are recorded continuously
- CPT data is corrected and correlated to soil parameters

*CPT Penetrometer Size May Vary



ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34576

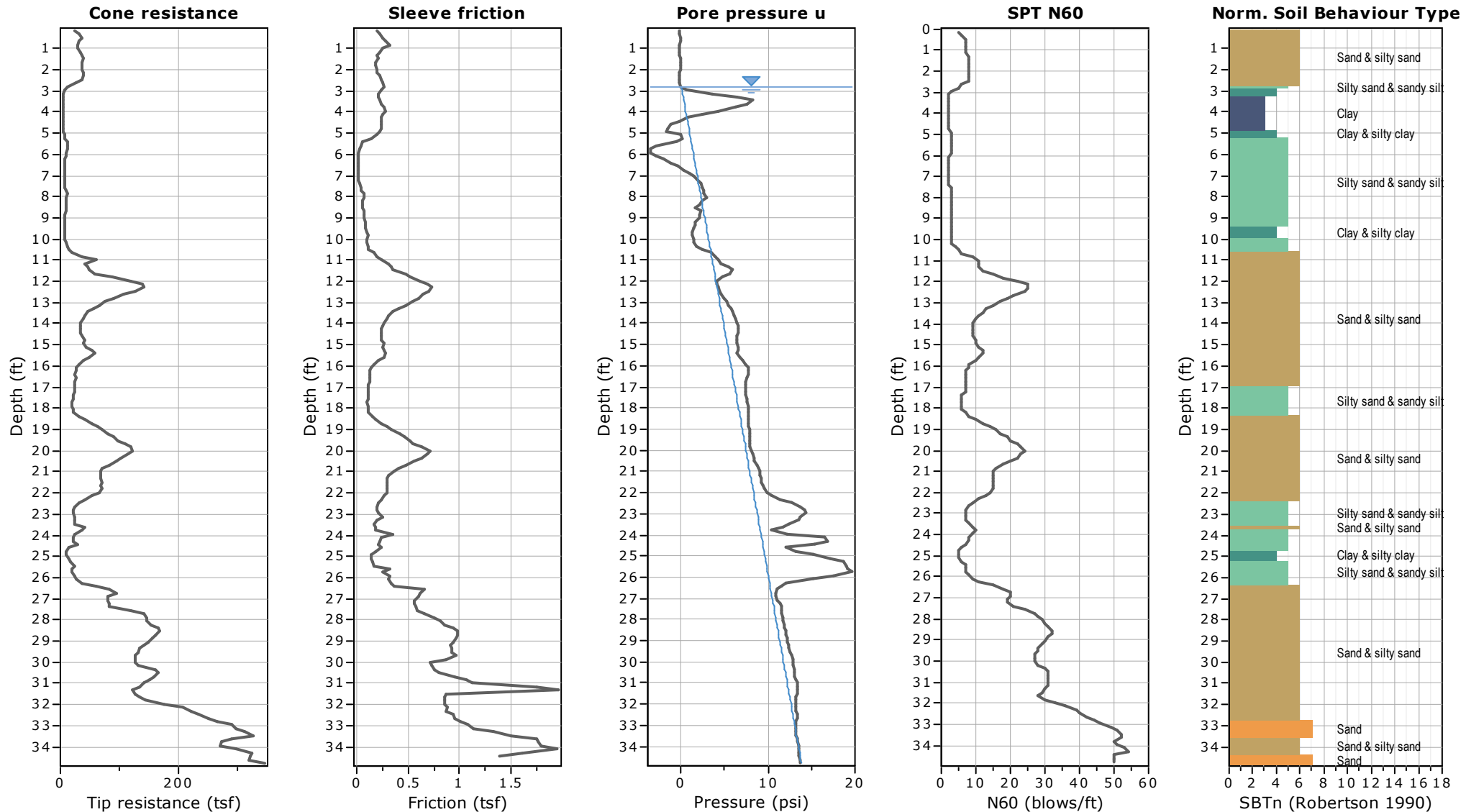
Project: Southport Pump Stations

Location: Southport, Brunswick County, North Carolina

CPT: S-1

Total depth: 34.78 ft, Date: 4/29/2024

Cone Operator: Jared Duffy





ECS Southeast, LLC
6714 Netherlands Drive
Wilmington, NC 28403
ECS Project # 22-34576

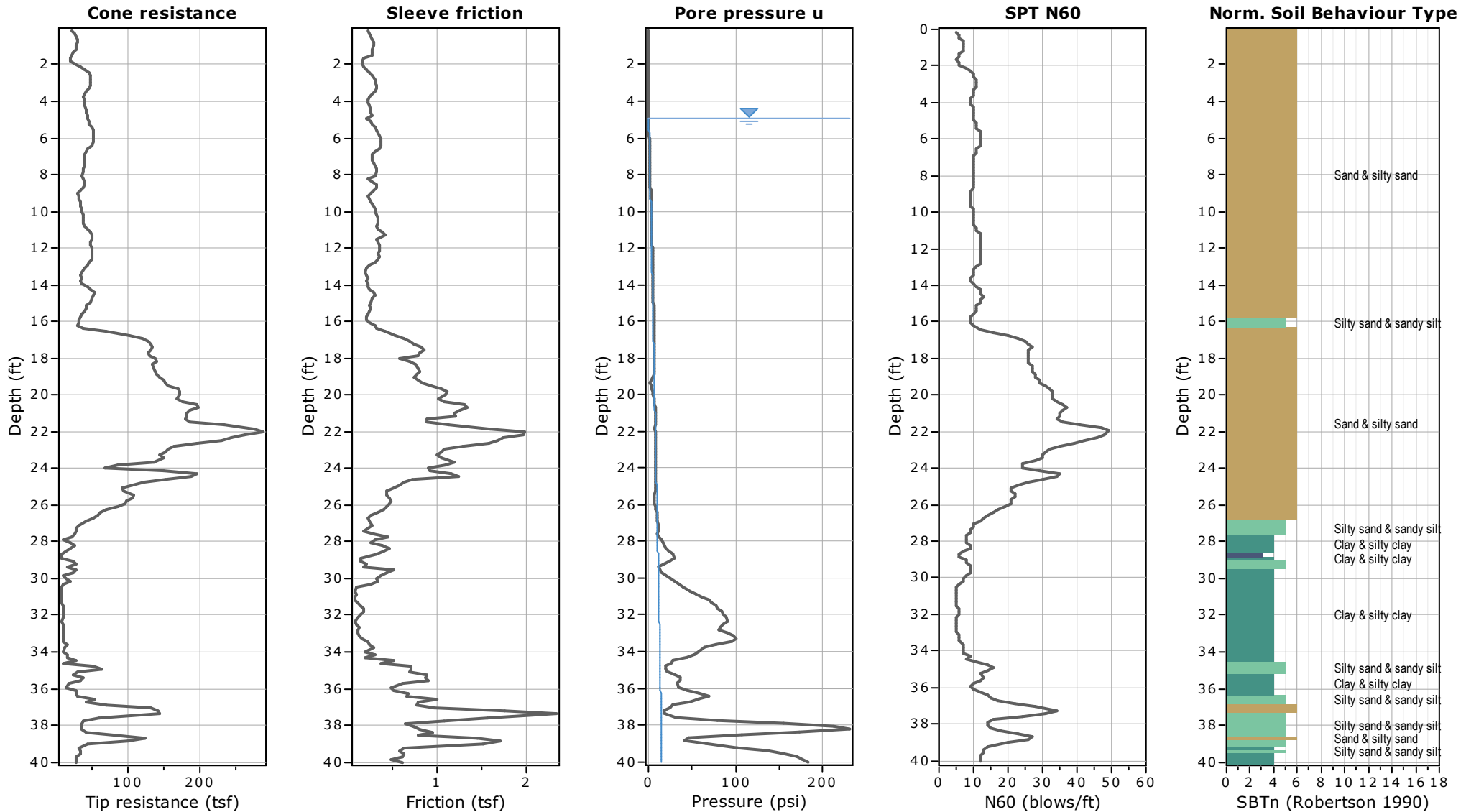
Project: Southport Pump Stations

Location: Southport, Brunswick County, North Carolina

CPT: S-2

Total depth: 40.03 ft, Date: 4/29/2024

Cone Operator: Jared Duffy





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Wilmington, NC 28403
ECS Project # 22-34576

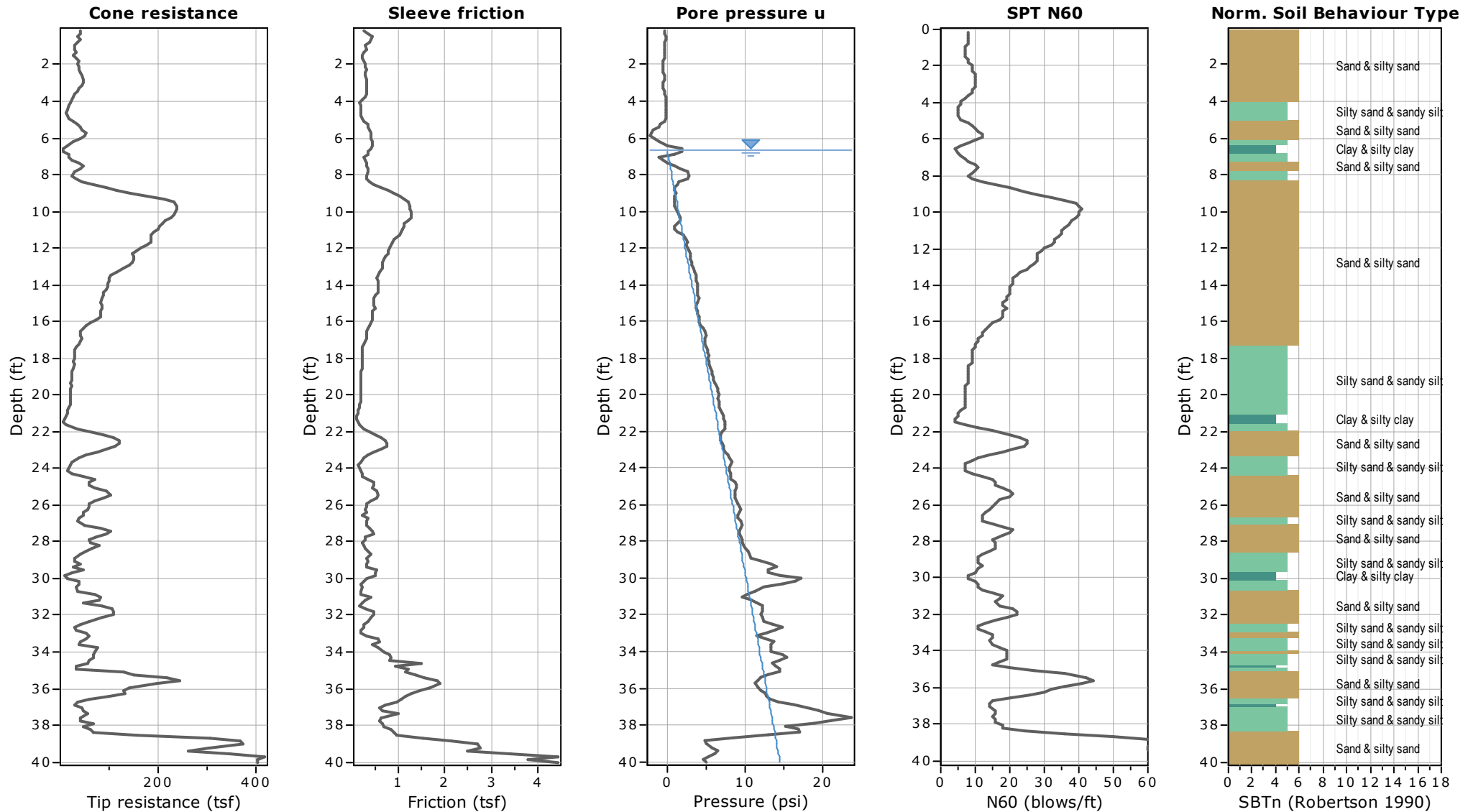
Project: Southport Pump Stations

Location: Southport, Brunswick County, North Carolina

CPT: S-3

Total depth: 40.03 ft, Date: 4/29/2024

Cone Operator: Jared Duffy



APPENDIX C – Supplemental Report Documents

GBA Document

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



Telephone: 301/565-2733

e-mail: info@geoprofessional.org www.geoprofessional.org



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

Issue For Bid Purposes Only

May 2, 2024

City of Southport
Bonnie Therien, City Manager
1029 Howe Street
Southport, NC 28461

SUBJECT: Encroachment Agreement E033-010-24-00200 (City of Southport) Sewer Line and Lift Station Replacement on NC 211 (Howe Street) and SR 1209 (W. 9th Street) in Southport, Brunswick County.

Dear Applicant,

Attached for your files is a copy of Right of Way Encroachment agreement properly executed. This agreement covers the following:

Installation of approximately 20 LF of 6 inch pvc sewer force main by open cut within NCDOT Right of Way NC 211, and approximately 32 LF of 6 inch pvc sewer force main by open cut and restoration of existing gravel access driveway within NCDOT Right of Way SR 1209 (see attached supporting documents).

- **THIS IS FOR BID PURPOSES ONLY. NOT ISSUED FOR CONSTRUCTION PURPOSES.**
- After contract is awarded, Applicant must submit an issue for construction drawings and certified traffic control plan for review.
- **NC 811 services DOES NOT provide locates of traffic signal cables. If the work is located within ½ mile of a signalized intersection, the Encroaching Party shall contact NCDOT Traffic Services at (910) 341-2200 no less than one week prior to beginning work, for the location of all traffic signal and detection cables. Location is required prior to excavation. Cost to replace or repair NCDOT signs, signals or associated equipment shall be the responsibility of the Encroaching Party.**
- 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.
- Contractor must follow all 2024 NCDOT Standard Specifications for Roads and Structures.
- All locates must be cleared prior to scheduling preconstruction meeting.
- Follow all MUTCD traffic control requirements. If working within 5 ft of edge of travel, a lane closure is required.
- From Memorial Day to Labor Day: Time Restriction – Night Work Only: No lane closures shall be allowed between 6:00am and 7:00pm and NO weekend lane closures. (HOURS SUBJECT TO CHANGE DUE TO TRAFFIC CONDITIONS).
- **For Pre-construction meeting**, the Encroaching party or their contractor shall provide Three (3) business days advance notice prior to construction activity within the NCDOT Right of Way, contact **Randy E. Chavis at (910) 398-9115 or email to rechavis1@ncdot.gov** to conduct this meeting.

This approval is subject to this work being done in accordance with the attached plan sheets and standard conditions.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5501 BARBADOS BLVD.
CASTLE HAYNE, NC 28429

TELEPHONE: 910-398-9100
CUSTOMER SERVICE: 1-877-368-4968

LOCATION:
5501 BARBADOS BLVD.
CASTLE HAYNE, NC 28429

WEBSITE: NCDOT.GOV

04-11-03 COURIER

Sincerely,

DocuSigned by:

E254FB0739E2460...

Michael L. Bass, Jr., Assistant District Engineer
For Chad Kimes, P.E, Division Engineer

DKC/mlb/rec

Attachments

cc: Trey Moore, NCDOT Brunswick County Maintenance Engineer

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT

-AND-

PRIMARY AND SECONDARY HIGHWAYS

CITY OF SOUTHPORT

1029 HOWE ST.

SOUTHPORT, NC 28461

2nd

May

THIS AGREEMENT, made and entered into this the ~~26th~~ day of ~~March~~ 20 24 by and between the Department of Transportation, party of the first part; and THE CITY OF SOUTHPORT

party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as

Route(s) NC-211 & SR-1209, located APPROXIMATELY 5,280 LF SOUTHBOUND ALONG NC-211 FROM THE INTERSECTION OF NC-211 AND SR-1528; AND APPROXIMATELY 1,740 LF WESTBOUND ALONG SR-1209 FROM THE INTERSECTION OF SR-1209 AND NC-211.

with the construction and/or erection of: APPROXIMATELY 20 LF OF 6-INCH PVC SEWER FORCE MAIN BY OPEN CUT WITHIN NCDOT RIGHT OF WAY NC 211, AND APPROXIMATELY 32 LF OF 6-INCH PVC SEWER FORCE MAIN BY OPEN CUT AND RESTORATION OF EXISTING GRAVEL ACCESS DRIVEWAY WITHIN NCDOT RIGHT OF WAY SR-1209.

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 UTILITIES ACCOMMODATIONS MANUAL, 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 Utilities Manager 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:

- 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.
- 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:

Dorothy Dutton Dorothy Dutton

DEPARTMENT OF TRANSPORTATION
DocuSigned by: Michael L. Bass, Jr., Assistant District Engineer
BY: *Michael Bass* For Chad Kimes, P.E, Division Engineer
DIVISION ENGINEER
E254FB0739E24670

Bonnie Therrien Bonnie Therrien
City Manager
City of Southport, NC
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 State Utilities Manager. 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 State Utilities Manager 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.

Encroachment Agreement Standard Conditions

District Office Contact Information:
5911 Oleander Drive, Suite 101
Wilmington, NC 28403
(910) 398-9100

The **Standard Conditions** in this document apply to this and all encroachment agreements issued by District 3.

- SC1** A **Pre-Construction meeting must be held with the District Office within 90 days of approval.** All locates Shall be completed prior to the scheduling of meeting.
- SC2** The Encroaching Party shall follow any and all revisions shown in **RED** on attached plan(s).
- SC3** This permit along with all terms and agreements shall be incorporated into any lease or sales agreement.
- SC4** If the approved permit encroaches within the limits of an active construction project the Encroaching Party will be required to coordinate with the NCDOT contractor as well as secure a hold harmless agreement prior to commencing work. If the approved permit encroaches within the limits of project in preconstruction, the Encroaching Party will be required to coordinate with the Department's Project Development Unit to ensure no conflicts are created with the installation.
- SC5** A Performance and Indemnity Bond posted with the North Carolina Department of Transportation is hereby obligated to cover work under this encroachment agreement. This bond is only for work within NCDOT Right of Way.
- SC6** An **Initial Construction Inspection is required** after the completion of the work. An Initial Inspection Report will be issued upon satisfactory completion of the work and begins the one-year warranty period. Contact the District Office to schedule an inspection by calling 910-398-9100 or email at Div3Dist3@ncdot.gov.
- SC7** A **Final inspection is required** after one year and prior to release of the bond. Contact the District Office three months prior to the end of the one-year bonding period for final inspection and creation of a list of deficiencies; this should provide enough time for corrective action prior to the end of one year. A Final Inspection Acceptance will be issued once the work has been completed and any deficiencies addressed.
- SC8** All bonds will be held for a minimum of one year from the time of the Initial Construction Inspection acceptance date. At the end of that time period, the bond may be released at the request of the applicant pending Final Inspection Acceptance.
- SC9** All flagging operations within NCDOT right-of-way require qualified and trained Work Zone Flaggers. Qualified and trained Work Zone Traffic Control Supervisors will be required on significant projects. Training for this certification is provided by NCDOT approved training sources and by private entities that have been pre-approved. For more information, visit <https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx> or contact Steve Kite, PE with the NCDOT Work Zone Traffic Control Unit at (919) 814-4937, or skite@ncdot.gov.
- SC10** No lane closures shall be allowed on State Holidays (day of, day before, and day after) or during Local events.
- SC11** No lane closures or impediment to traffic shall be allowed on weekends without prior written approval from the District Engineer. Work would be permitted on-site during these events, as long as, there are no lane closures or the impediment of traffic.
- SC12** One lane must always be open to traffic; only one lane closure will be allowed in each direction. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to Police and Fire Stations, fire hydrants and Hospitals.
- SC13** All roadway signs removed during project work shall be reinstalled immediately after completion of work. All equipment and materials shall be removed from the NCDOT right-of-way when not in use.
- SC14** Any work requiring personnel or equipment within 5' of a travel lane on an undivided roadway, or 10' of the travel lane, on a divided roadway shall require a lane closure per the latest edition of the MUTCD and the NCDOT Standard Specifications. The more stringent standards shall apply.
- SC15** Approval is only for work within NCDOT right-of-way. Any construction planned or proposed outside NCDOT right-of-way shall require the permittee to obtain concurrence and/or right-of-way from subject property owner and/or local government. This approval excludes area(s) within Railroad right-of-way and/or Municipal right-of-way which will require separate approval from the Railroad, City or Town. Approval is with the understanding that NCDOT does not guarantee the right-of-way on any road.

- SC16** 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: *Manual on Uniform Traffic Control Devices*, *Policy on Street and Driveway Access to North Carolina Highways*, *Policies and Procedures for Accommodating Utilities on Highway Rights of Way*, *Subdivision Roads Minimum Construction Standards*, *NCDOT Standard Specifications for Roads and Structures*, *NCDOT Roadway Standard Drawings*, *AASHTO Policy on Geometric Design of Highways and Streets*, *NCDOT Asphalt Quality Management System* manual, **and the approved plans.**
- SC17** 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.
- SC18** NC 811 services DOES NOT provide locates of traffic signal cables. If the work is located within ½ mile of a signalized intersection, the Encroaching Party shall contact NCDOT Traffic Services at (910) 341-2200 no less than one week prior to beginning work, for the location of all traffic signal and detection cables. Location is required prior to excavation. **Cost to replace or repair NCDOT signs, signals or associated equipment shall be the responsibility of the Encroaching Party.**
- SC19** If modifications to a traffic signal are required under this encroachment agreement, a separate traffic agreement is required prior to work. Contact the Division Traffic Engineer or Deputy Division Traffic Engineer at (910) 341-2200.
- SC20** If pavement markings are required under this encroachment agreement, the Encroaching Party shall have the pavement markings pre-marked, inspected, and approved by NCDOT personnel prior to the placement of final pavement markings. Contact Traffic Services at (910) 341-2200 for pre-marking inspections or field changes.
- SC21** All concrete or paved channelization islands shall have a 12-inch diameter round or square smooth wall hole drilled, cored, formed, or air-hammered to the subgrade and backfilled with soil placed a minimum of 10 feet from the nose of each end of the island (see Roadway Standard Drawing 904.50), or as directed by the engineer. All sign supports that are to be erected in existing or proposed concrete or paved channelization islands shall meet the same requirements. If necessary, contact Traffic Services at (910) 341-2200 to mark core locations.
- SC22** Prior to beginning work, if the area of work is within a municipality limit, it is the responsibility of the Encroaching Party to notify the municipal authorities.
- SC23** The Encroaching Party shall comply with all applicable Federal, State, and local statutes, rules, regulations, and ordinances that may be imposed by other governmental agencies. The Encroaching Party shall obtain all necessary Federal, State, and local environmental permits, including but not limited to, those related to sediment control, storm water, wetlands, streams, endangered species, and historical sites.
- SC24** All wiring and related work shall conform to the latest edition of the National Electrical Safety Code.
- SC25** No alteration of the approved plan will be allowed without written approval by NCDOT. All design plan changes proposed by the contractor shall be prepared by the Engineer of Record and submitted by the Owner/Permittee to NCDOT for review to ensure that the Engineer and Owner participate in all construction changes. Field changes constructed without prior written approval by NCDOT will not be accepted by NCDOT during the inspection process.
- SC26** An executed paper copy of the Encroachment Agreement and approved plans shall be present at the work site at all times while performing work. NCDOT reserves the right to stop all work unless evidence of approval can be shown. Additionally, NCDOT reserves the right to further limit, restrict, or suspend operations within the right-of-way.
- SC27** Material shall NOT be unloaded or stockpiled on the roadway at any time without proper lane closure during the project. Work is not permitted when the shoulder material is wet or during adverse weather conditions.
- SC28** All erosion control devices shall be placed as needed prior to disturbance and maintained throughout the project. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded within 15 calendar days with an approved NCDOT seed mixture. For disturbance of residential/commercial lawns, vegetation shall be replaced in like kind.
- SC29** For disturbance of plants, vegetation, trees, or plant beds in the NCDOT right-of-way, they shall be replaced with plants, vegetation or trees of like kind or similar shape. Contact the Division Roadside Environmental Engineer at 910-259-4919.
- SC30** The placement of curb and gutter is not allowed within shoulder sections of roadway (from the Right of Way to the edge of pavement).
- SC31** It shall be the responsibility of the property owner or local municipality to maintain any proposed sidewalk that will be placed within the NCDOT Right of Way. It is the responsibility of the Encroaching Party to place the sidewalk and wheelchair ramps per NCDOT standards and the latest edition of the Americans with Disabilities Act. This maintenance requires an encroachment agreement through the District Office.

- SC32** It shall be unlawful to place any highway obstruction, including a driveway headwall, fence, rural mailbox, newspaper delivery box, or other roadside obstruction, so as to interfere with the traffic or maintenance of the roads and highways of the state highway system. See North Carolina Administrative Code 19A NCAC 2E.0404.
- SC33** Fire Hydrant(s) shall be placed a maximum of 1 foot from the right-of-way line. (STD. 1515.02 in the NCDOT Roadway Standard Drawings).
- SC34** The Encroaching Party shall comply with all OSHA requirements and **provide a competent person on site** to supervise excavation at all times.
- SC35** The Encroaching Party is responsible for any and all damages caused from project work within the right-of-way, including damage to drainage structures, pavement, vegetation, etc.
- SC36** Any pavement damaged including settlement of the pavement or damage by equipment used to perform the project work, shall be re-surfaced to the satisfaction of the District Engineer or their representative. This may include the removal of pavement and a 50' mechanical overlay. All temporary and final pavement markings are the responsibility of the Encroaching Party.
- SC37** Centerline pavement markings shall be installed the same day resurfacing is accomplished. All other pavement markings shall be completed within five days of resurfacing.
- SC38** All pipes placed within the NCDOT Right of Way shall be NCDOT approved materials. All joints shall be sealed with mortar or other NCDOT approved material. Backfill compaction shall meet NCDOT Standardized Testing Method.
- SC39** Throughout the life of the project, the Encroaching Party shall maintain all drop-offs within the work zone such that they do not exceed the maximum of 2".
- SC40** All removed curb, driveways, and shoulder areas shall be backfilled at a 6:1 slope or flatter at the end of the days' production.
- SC41** For projects with open cuts and roadway improvements, a PE certification may be required. When applicable, upon completion of construction, a certification memo that has been signed and sealed as appropriate under General Statute 89C-16 by a North Carolina Professional Engineer or Registered Land Surveyor shall be submitted to the District Engineer prior to opening the access connection for public use. Supporting documentation shall be attached certifying that improvements for the driveway access(s) meet the approved plan and NCDOT standards. All documentation shall be dated and initialed by the contractor. Verification will include inspection reports, testing reports, or any supporting documentation and calculations. Verification will cover, but is not limited to, subgrade, pavement structure, drainage, and traffic control items.
- SC42** Directional drilling methods have not been given statewide approval for use on NCDOT right-of-way. Under no condition shall jetting alone or wet boring with water be used for the installation of utility pipelines.
- Directional boring **is not** allowed in embankment material. Directional boring **is** allowed beneath embankment material in naturally occurring soil.
 - Any changes shall be submitted to the District Engineer for approval prior to construction.
 - Directional bores are not allowed beneath bridge footings, culvert wingwall footings or retaining walls.
 - 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.
 - Directional boring using jetting with a Bentonite (or equivalent material) slurry is approved with the following conditions:
 - Minimum depth of ten (**10'**) feet below the pavement surface of roads with no control of access or fifteen (**15'**) feet below the surface of roads with partial or full control of access.
 - Minimum depth of five (**5'**) feet below any ditch line and/or creek bed.
 - Minimum depth of (**5'**) for parallel installation. Must be outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway.
 - Minimum horizontal distance of ten (**10'**) feet from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts, and box culverts.
 - Minimum vertical distance of ten (**10'**) feet from the nearest part of pipe culverts or box culverts.
 - Tip of the drill string shall have a cutter head and detection wire installed with non-ferrous material.
 - All directional drilled piping for sewer force mains and waterlines shall be a minimum of SDR-9.

- Minimum horizontal separation of five (5') feet between each conduit which is part of a multiple conduit installation (including perpendicular and parallel installations). Alternatively, install multiple conduits within a single duct.
- Over bores for pipe or encasements shall not be more than 1.5 x O.D. for pipe 12 inches or less and O.D. +6 inches for pipes larger than 12 inches.
- An overbore exceeding the prescribed maximums for pipe or encasements will only be considered if the encroachment agreement includes a statement signed and sealed by a North Carolina Registered Professional Engineer indicating that the proposed overbore in excess of NCDOT guidelines of the diameter of the pipe or encasement will arch and no damage will be done to the pavement or sub- grade.

SC43 All excavations inside the theoretical 1:1 slope from the existing edge of pavement to the bottom of the nearest trench wall shall be done in accordance with the following conditions:

- Any excavation encroaching upon the theoretical 1:1 slope from the edge of pavement of any NCDOT maintained road shall require temporary active shoring that must be reviewed and approved by NCDOT **prior to work.**
- All trench excavation inside the limits of the theoretical 1:1 slope, 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.
- The length of parallel excavation shall be limited to the length necessary to install and backfill one (1) joint of pipe at a time.
- Traffic shall be moved to a travel lane outside the limits of a theoretical 1:1 slope from the bottom of the nearest trench wall to the pavement surface.
- Installation of trench shoring shall be accomplished with minimal over-excavation. **Trench boxes shall not be used as shoring.**
- An NCDOT Inspector, the cost of which is to be borne by the Encroaching Party, shall be assigned to this project if deemed necessary by the Division Engineer.
- The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled, in accordance with Section 540-6 of the latest NCDOT Standard Specifications for Roads and Structures, which requires the backfill material to be placed in thicknesses between 4" and 8" loose and compacted to at least 97% of the maximum density obtained by compacting a sample in accordance with AASHTO T 180, as modified by the Department.
- At the first sign of trench failure, a trench shall be immediately backfilled with materials consisting of A-1, A- 3, A-2-4 soils or A-4 soils having a maximum of 45% passing a No. 200 sieve and a maximum P.I. of 6. All work shall cease, and the Division Engineer shall be contacted. The Encroaching Party shall be required to repair any damage to the pavement caused by the excavation.
- No part of any pit shall be within three (3) feet of edge of pavement or back of curb.
- Detection tape shall be buried in the trench approximately one foot above the utility or fiber optic cable, whenever conduit is installed in right-of-way and is not of ferrous material.

SC44 The proposed manholes, handholes, valves or other appurtenances shall be installed flush to match the elevation of the existing ground and shall not be located in the existing ditch line, front slope of a ditch, or in a manner that would restrict the maintenance or flow of the existing ditch line.

SC45 Any open cutting of pavement shall be repaired using the following method:

- Pavements shall be cut full depth and removed.
- After trench work is complete, the edges of the existing pavement along the trench shall be recut a minimum of 1' wider on each side of the trench. If the pavement is undermined, the edges of the existing pavement along the trench shall be recut to 1' beyond the undermined portion and the pavement removed. The design section stated below is to be placed in those areas.
- The pavement repair shall be performed using the following method and pavement design section:
 - 11.0" B25.0C or B25.0B Asphalt Concrete Base Course (accomplished in 2 lifts minimum) according to NCDOT Standard 654.01.
 - Mill the entire area a depth of 2.0", starting from 15' in front of the edge of the final pavement cut.

- Overlay entire area(a minimum 50' length mechanical overlay) with 2.0" S9.5Cor S9.5B asphalt concrete surface course for a total asphalt depth of 13". Butt joints are required with no feathering of joints.

- All open cuts shall be backfilled, paved and traversable prior to removing lane closure.

- SC46** Abandoned pipes 12" in diameter and larger in fills 20' or less shall be removed and backfilled, filled with grout, or plugged, as directed by the Manager of Right-of-Way, Division Engineer, or State Design Services Engineer. There may be unusual circumstances where the same requirements will apply on pipes smaller than 12".
- SC47** Any sewer manholes, telephone vaults or valve vaults that are to be abandoned shall either be removed or broken down two (2) feet below subgrade, plugged and filled with suitable material.
- SC48** For trenching excavations within the typical ditch cross-section, positive drainage shall be restored within the existing ditch by grading between driveway pipe invert elevations or by re-establishing the original hydraulic grade line.
- SC49** 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>

VERIFICATION OF COMPLIANCE WITH ENVIRONMENTAL REGULATIONS

(Check Appropriate Box)

- ☐ Permits from the N.C. Department of Environment and Natural Resources and the U.S. Army Corp of Engineers are not required for this project. However, all applicable federal and state regulations have been followed.
- ☒ The required permits from the N.C. Department of Environment and Natural Resources and the U.S. Army Corp of Engineers have been obtained for this project. Copies of permits and Completion Certificates are attached. **IN PROCESS**
- ☒ All applicable NPDES Stormwater Permit requirements have been met for this project. (The applicant should contact the N.C. Division of Water Quality in Raleigh to determine if a stormwater permit is required.)
- ☒ The project is in compliance with all applicable sedimentation and erosion control laws and regulations.

Project Name: Sewer Line and Lift Station Replacment

Township: City of Southport County: **BRUNSWICK**

Project Engineer: Albert M Huckaby, P.E. Phone No.: 919-782-0495

Project Contact: Albert M Huckaby, P.E.

Applicant's Name: City of Southport

Date Submitted: 4/19/2024

P.E. SEAL



April 19, 2024

Sent via e-mail attachment to rachavis1@ncdot.gov

Mr. Randy Chavis
North Carolina Department of Transportation
NCDOT Division 3 – District 3 Office
300 Division Drive
Wilmington, NC 28401

**RE: Sewer Line and Lift Station Replacement
City of Southport
WKD Project Number 20220972.00.WL**

Dear Mr. Chavis:

The City of Southport (City) plans to rehabilitate three (3) pump stations within Southport city limits as part of the Sewer Line and Lift Station Replacement (Project). The three pump stations are located on NC-211 (East Moore Street), SR-1209 (Ninth Street) and Park Avenue. The Moore Street Pump Station is located on the northern side of NC-211, approximately 5,280 linear feet (LF) southbound along NC-211 from the intersection of NC-211 and SR-1528. The Ninth Street Pump Station is located on the southern side of SR-1209, approximately 1,740 LF westbound along SR-1209 from the intersection of SR-1209 and NC-211. The Park Avenue Pump Station is not adjacent to an NCDOT road. The Project will take place primarily within the pump station property lines, outside of the public rights-of-way.

The following impacts to NCDOT right-of-way are anticipated as part of the project:

1. NC-211 (East Moore Street):
 - Open-cut installation of approximately 20 LF of 6-inch PVC force main
 - Driveway installation (separate driveway permit submitted)
 - i. Installation of approximately 26 LF of 18-inch Class IV RCP
2. SR-1209 (Ninth Street):
 - Open-cut installation of approximately 32 LF of 6-inch PVC force main
 - Rehabilitation of existing gravel driveway

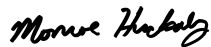
We are submitting electronically the following documents in support of a NCDOT Encroachment Agreement for the proposed utility improvements:

- The Two-Party Encroachment Agreement (RW 16.1)
- A letter from the City regarding project bonding
- The project plans
 - Additional copies will be forwarded upon your approval
- The Verification of Compliance Form

If you have any questions regarding this encroachment agreement application, please contact me at (919) 782-0495 or at mhuckaby@wkdickson.com.

Sincerely,

W. K. Dickson & Co., Inc.



Monroe Huckaby, P.E.
Project Manager

Enclosures

cc: Bonnie Therrien, City Manager, City of Southport



March 26, 2024

Mr. Randy Chavis
North Carolina Department of Transportation
NCDOT Division 3 – District 3 Office
300 Division Drive
Wilmington, NC 28401

RE: Sewer Line and Lift Station Replacement
City of Southport
WKD Project Number 20220972.00.WL

Dear Mr. Chavis:

The City of Southport (City) plans to rehabilitate three (3) pump stations within Southport city limits as part of the Sewer Line and Lift Station Replacement (Project). The proposed Project will include approximately 20 linear feet (LF) of 6-inch PVC force main and 26 LF of 15-inch RCP installed by open cut excavation within the NC-211 (East Moore Street) right-of-way, and approximately 32 LF of 6-inch PVC force main within the SR-1209 (Ninth Street) right-of-way.

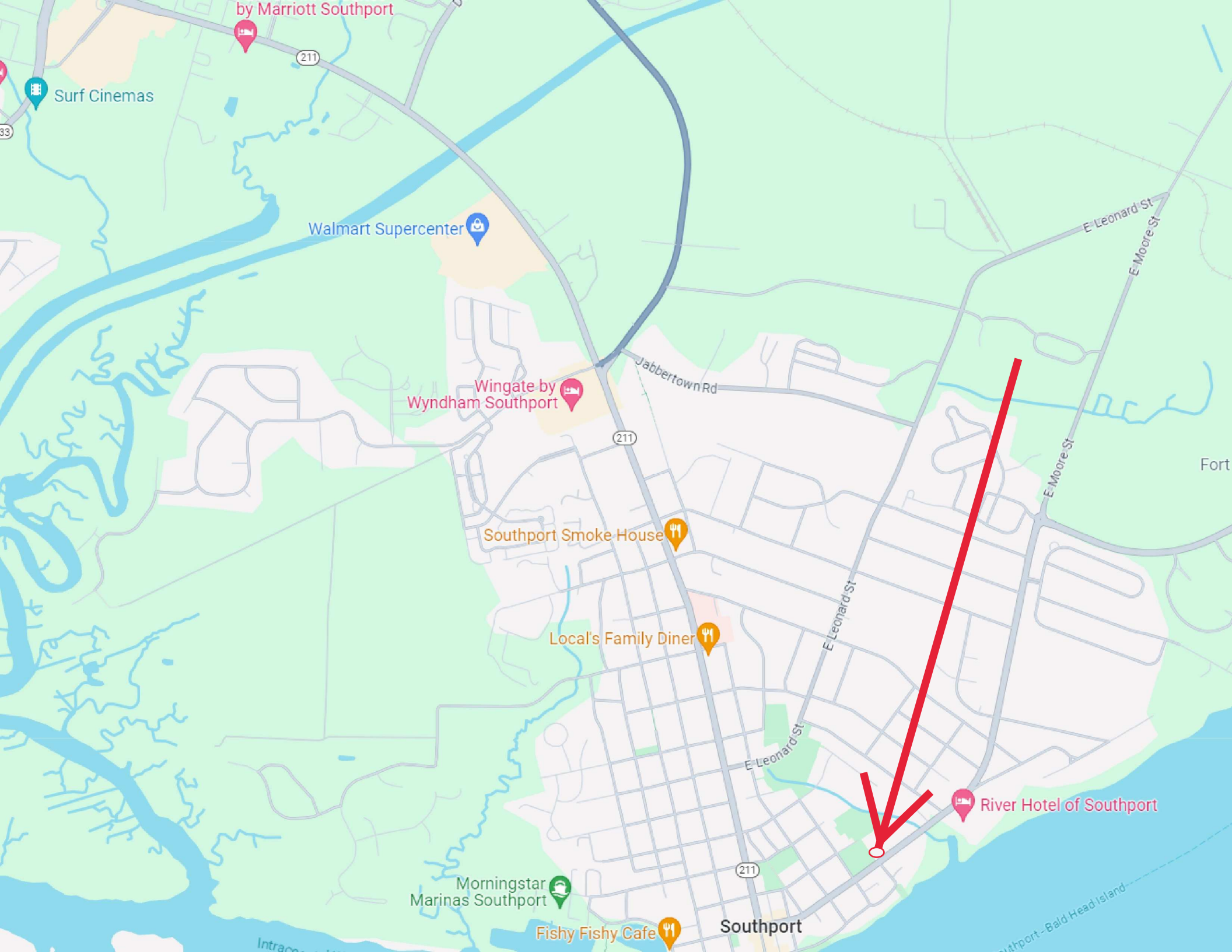
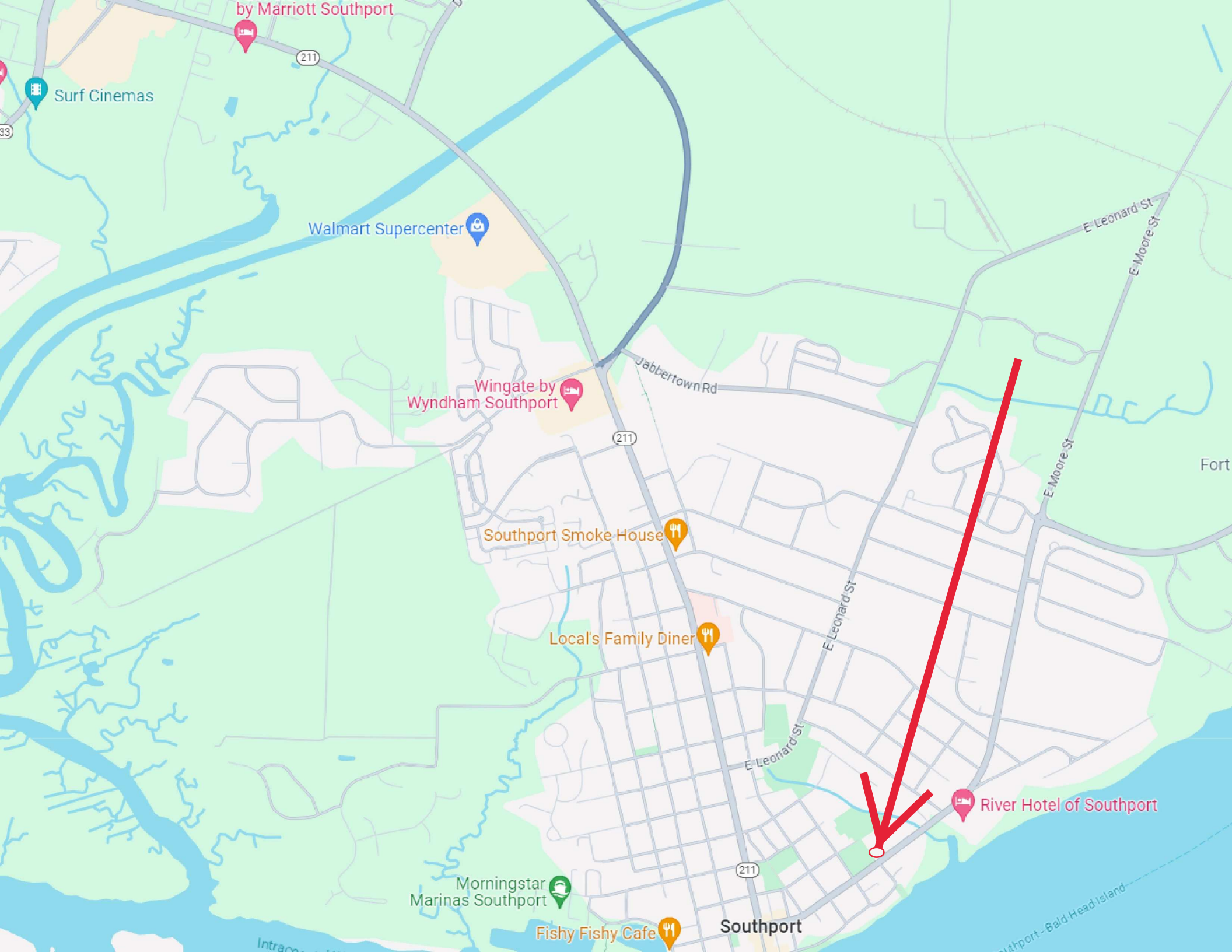
The City agrees to not release the contractor's bond until NCDOT has signed off on and approved the completed work. We understand that in doing so a separate bond will not be required from the contractor.

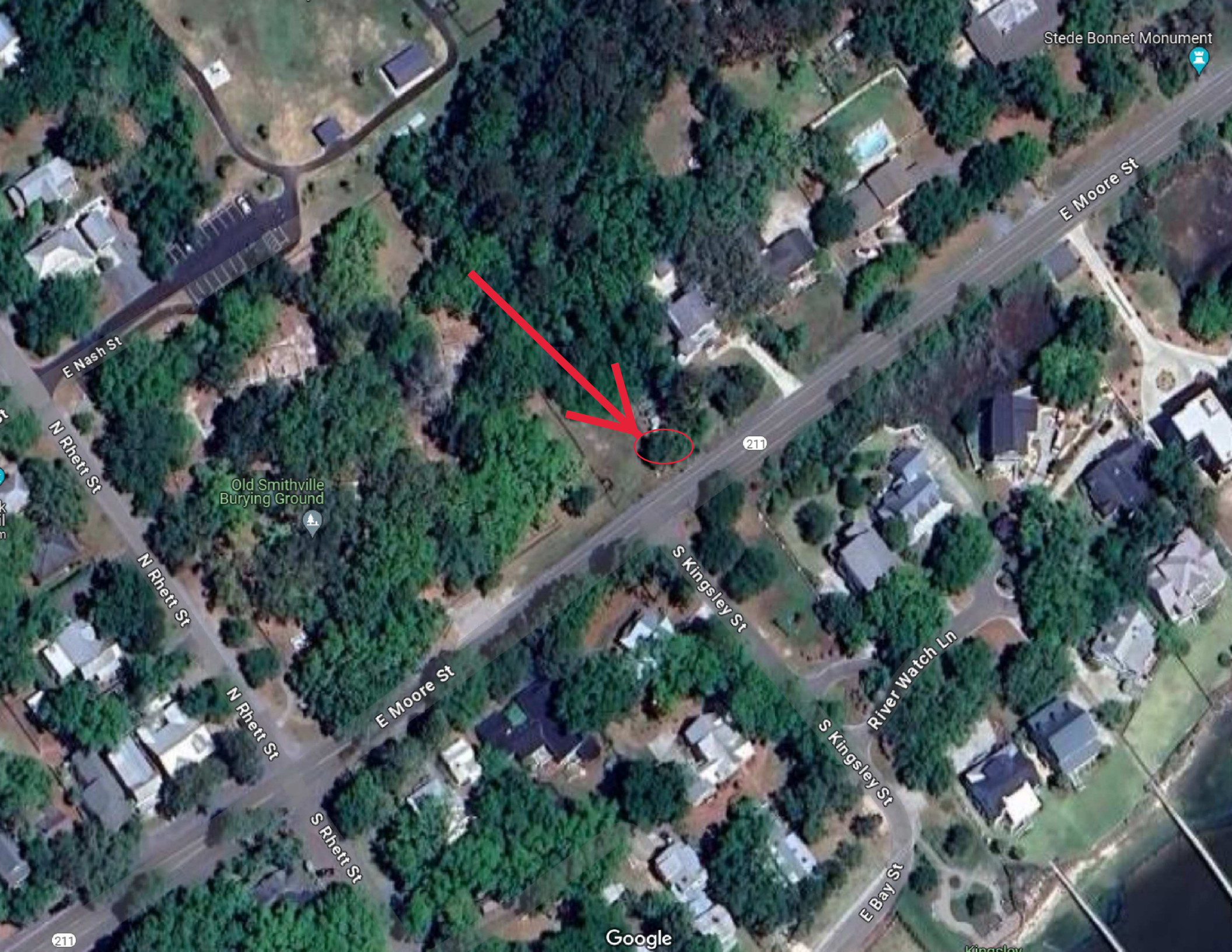
Thank you for your assistance with this matter. Please call if you have any questions.

Sincerely,

Bonnie Therrien,
City Manager
910-457-7988

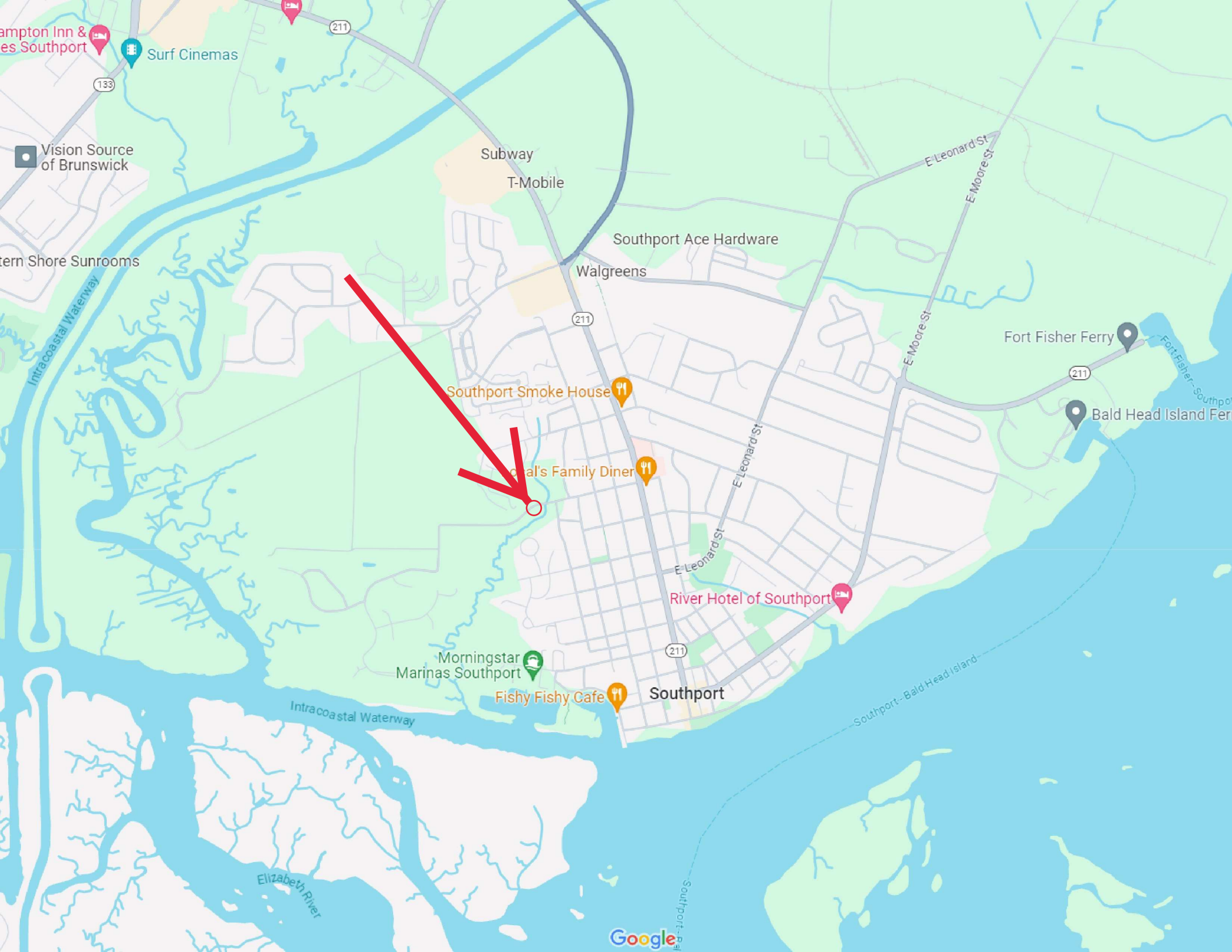
Cc: Monroe Huckaby, P.E., WK Dickson & Co., Inc.
Tom Stanley, Director of Public Works
Tom Zilinek, City Engineer





Old Smithville
Burying Ground





Hampton Inn & Suites Southport

Surf Cinemas

Vision Source of Brunswick

tern Shore Sunrooms

Subway
T-Mobile

Southport Ace Hardware

Walgreens

Southport Smoke House

Coral's Family Diner

River Hotel of Southport

Morningstar
Marinas Southport

Fishy Fishy Cafe

Southport

Fort Fisher Ferry

Bald Head Island Ferry

Elizabeth River

Google



Hankinsville Rd

W 9th St

Clarendon Ave

Clarendon Ave

W 9th St

W 9th St

W 9th St

W 9th St

Cottage Creek

Burrington Ave

Burrington Ave

Hankins Dr

Google

ROY COOPER
Governor

ELIZABETH BISER
Secretary

RICHARD E. ROGERS, JR.
Director



May 30, 2024

Bonnie Therrien, City Manager
City of Southport
1029 Howe Street
Southport, NC 28461

Subject: Permit No. WQ0045394
City of Southport
Sewer Line and Lift Station Replacement
Wastewater Collection System Extension
Brunswick County

Dear Ms. Therrien:

In accordance with your application received April 12, 2024, with additional information received May 30, 2024, we are forwarding herewith Permit No. WQ0045394 dated May 30, 2024 to the City of Southport (Permittee) for the construction and operation upon certification of the subject wastewater collection system extension. This permit shall be effective from the date of issuance until rescinded and shall be subject to the conditions and limitations as specified therein. This cover letter shall be considered a part of this permit and is therefore incorporated therein by reference.

Please pay particular attention to the following conditions contained within this permit:

Special Conditions:

Condition I.1:

Standard Conditions:

Condition II.1: This permit shall not be automatically transferable; a request must be made and approved.

Condition II.4: Requires that the wastewater collection facilities be properly operated and maintained in accordance with 15A NCAC 2T .0403 or any individual system-wide collection system permit issued to the Permittee.

Condition II.7: Upon completion of construction and prior to operation of these permitted facilities, the completed Engineering Certification form with checklist attached to this permit shall be submitted with the required supporting documents to the address provided on the form. **Permit modifications are required for any changes resulting in non-compliance with this permit, regulations, or the Minimum Design Criteria.** [15A NCAC 02T.0116]



Condition II.13: If the Permittee/Applicant holds a system-side collection system operation, maintenance and management permit (WQCS-prefix) from the Division, then the following applies: For all newly constructed, modified and rehabilitated pump stations, all equipment and components shall be sealed within a corrosion-resistant coating or encasement to the extent practicable and equivalent to the minimum design criteria unless the permittee can demonstrate it is not practicable or another form of corrosion resistance is employed. [15A NCAC 02T .0108 (b)]

It shall be responsibility of the Permittee to ensure that the as-constructed project meets the appropriate design criteria and rules. Failure to comply may result in penalties in accordance with North Carolina General Statute §143-215.6A through §143-215.6C, construction of additional or replacement wastewater collection facilities, and/or referral of the North Carolina-licensed Professional Engineer to the licensing board.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within 30 days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of North Carolina General Statutes, and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714. Unless such demands are made, this permit shall be final and binding.

If you need additional information concerning this matter, please contact Bryan Lievre at (910) 796-7215 or via e-mail at Bryan.Lievre@deq.nc.gov.

Sincerely,

DocuSigned by:

7F141E73B6F3456...

Tom Tharrington, Assistant Regional Supervisor
Water Quality Regional Operations Section
Wilmington Regional Office
Division of Water Resources, NCDEQ

Cc: Danial Khan, PE, WK Dickson & Co., Inc. (via email)
Donald Dixon, Brunswick County (via email)
Upload to Laserfiche



In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations, permission is hereby granted to the

CITY OF SOUTHPORT

BRUNSWICK COUNTY

for the construction and operation upon certification of three replacement pump stations, including: the Ninth St. PS with dual 300 gpm replacement pumps, a new wet well, approximately six linear feet (LF) of 8-inch gravity sewer and 35 LF of 6-inch force main; the Moore St. PS with dual 400 gpm replacement pumps, a new wet well, approximately 69 LF of 8-inch gravity sewer and 103 LF of 6-inch force main; and, the Park Ave PS with a new wet well, dual 315 gpm replacement pumps (increased by 5%), approximately 35 LF of 8-inch gravity sewer and 19 LF of 8-inch force main, all with on-site audible and visual high water alarms, telemetry, and permanent generators with automatic transfer switches to serve the existing system with no increase in flow as part of the Sewer Line and Lift Station Replacement project into the Brunswick County existing sewerage system, pursuant to the application received application received April 12, 2024 with additional information received May 30, 2024, and in conformity with 15A NCAC 2T; the Division's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 as applicable; and other supporting data subsequently filed and approved by the Department of Environmental Quality and considered a part of this permit.

This permit shall be effective from the date of issuance until rescinded and shall be subject to the specified conditions and limitations contained therein.

Permit Number: WQ0045394

Issued Today: May 30, 2024

DocuSigned by:

7F141E73B6F3456...

Tom Tharrington, Assistant Regional Supervisor
Wilmington Regional Office
Water Quality Regional Operations Section
Division of Water Resources, NCDEQ
By Authority of the Director and The Environmental Management Commission

SUPPLEMENT TO PERMIT COVER SHEET

CITY OF SOUTHPORT is hereby authorized to:

Construct, and then operate upon certification the aforementioned wastewater collection extension. The sewage and wastewater collected by this system shall be treated in the West Brunswick Regional WRF Wastewater Treatment Facility in accordance with Permit Number WQ0023693.

Permitting of this project does not constitute an acceptance of any part of the project that does not meet 15A NCAC 2T; the Division of Water Resources' (Division) Gravity Sewer Minimum Design Criteria adopted February 12, 1996 as applicable; and the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 as applicable, unless specifically mentioned herein. Division approval is based on acceptance of the certification provided by a North Carolina-licensed Professional Engineer in the application. It shall be the Permittee's responsibility to ensure that the as-constructed project meets the appropriate design criteria and rules.

Construction and operation is contingent upon compliance with the Standard Conditions and any Special Conditions identified below.

I. SPECIAL CONDITIONS

1. This permit shall become voidable unless the agreement between the City of Southport and Brunswick County for the collection and final treatment of wastewater is in full force and effect. [15A NCAC 02T.0304(h)]
2. Each pump station shall be clearly and conspicuously posted using a weatherproof sign with the address, a pump station identifying name/number, 24-Hour Emergency telephone number, and name of the owner/operator of the sewer system/pump station and instructions to call the number in the event of alarm activation or other emergency. Simplex pump stations or vacuum sewer pits serving a single-family residence may have a placard or sticker without the address placed on the control panel in lieu of a sign. [15A NCAC 02T .0305(h)(2)]
3. The abandonment of any existing wastewater facilities including septic systems being replaced by new sewer infrastructure shall be done in accordance with the applicable agency having compliance oversight on such facilities. [15A NCAC 02T.0105(c)(6)]

II. STANDARD CONDITIONS

1. **This permit shall not be transferable.** In the event there is a desire for the wastewater collection facilities to change ownership, or there is a name change of the Permittee, a formal permit request shall be submitted to the Division accompanied by documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request shall be considered on its merits and may or may not be approved. [15A NCAC 02T.0104; G.S 143-215.1(d3)]
2. This permit shall become voidable unless the wastewater collection facilities are constructed in accordance with the conditions of this permit; 15A NCAC 2T; the Division's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 as applicable; and other supporting materials unless specifically mentioned herein. [15A NCAC 02T.0110]
3. This permit shall be effective only with respect to the nature and volume of wastes described in the application and other supporting data. [15A NCAC 02T .0110]
4. The wastewater collection facilities shall be properly maintained and operated at all times. The Permittee shall maintain compliance with an individual system-wide collection system permit for the operation and maintenance of these facilities as required by 15A NCAC 2T .0403. If an individual permit is not required, the following performance criteria shall be met: [15A NCAC 02T .0108(b)]
 - a. The sewer system shall be effectively maintained and operated at all times to prevent discharge to land or surface waters, and to prevent any contravention of groundwater standards or surface water standards.
 - b. A map of the sewer system shall be developed and shall be actively maintained.
 - c. An operation and maintenance plan including pump station inspection frequency, preventative maintenance schedule, spare parts inventory and overflow response has been developed and implemented.
 - d. Pump stations that are not connected to a telemetry system shall be inspected every day (i.e. 365 days per year). Pump stations that are connected to a telemetry system shall be inspected at least once per week.
 - e. High-priority sewer lines shall be inspected at least once per every six-months and inspections are documented.
 - f. A general observation of the entire sewer system shall be conducted at least once per year.
 - g. Overflows and bypasses shall be reported to the appropriate Division regional office in accordance with 15A NCAC 2B .0506(a), and public notice shall be provided as required by North Carolina General Statute §143-215.1C.
 - h. A Grease Control Program is in place as follows:
 1. For public owned collection systems, the Grease Control Program shall include at least biannual distribution of educational materials for both commercial and residential users and the legal means to require grease interceptors at existing establishments. The plan shall also include legal means for inspections of the grease interceptors, enforcement for violators and the legal means to control grease entering the system from other public and private satellite sewer systems.

2. For privately owned collection systems, the Grease Control Program shall include at least bi-annual distribution of grease education materials to users of the collection system by the permittee or its representative.
3. Grease education materials shall be distributed more often than required in Parts (1) and (2) of this Subparagraph if necessary to prevent grease-related sanitary sewer overflows.
- i. Right-of-ways and easements shall be maintained in the full easement width for personnel and equipment accessibility.
- j. Documentation shall be kept for Subparagraphs (a) through (i) of this Rule for a minimum of three years with exception of the map, which shall be maintained for the life of the system.

5. **Noncompliance Notification:**

The Permittee shall report by telephone to a water resources staff member at the [Wilmington Regional Office](#), telephone number [\(910\) 796-7215](#), as soon as possible, but in no case more than 24 hours or on the next working day, following the occurrence or first knowledge of the occurrence of either of the following:

- a. Any process unit failure, due to known or unknown reasons, that renders the facility incapable of adequate wastewater transport, such as mechanical or electrical failures of pumps, line blockage or breakage, etc.; or
- b. Any SSO and/or spill over 1,000 gallons; or
- c. Any SSO and/or spill, regardless of volume, that reaches surface water

Voice mail messages or faxed information is permissible, but this shall not be considered as the initial verbal report. Overflows and spills occurring outside normal business hours may also be reported to the Division of Emergency Management at telephone number (800) 858-0368 or (919) 733-3300. Persons reporting any of the above occurrences shall file a spill report by completing and submitting Part I of Form CS-SSO (or the most current Division approved form) within five days following first knowledge of the occurrence. This report must outline the actions taken or proposed to be taken to ensure that the problem does not recur. Part II of Form CS-SSO (or the most current Division approved form) can also be completed to show that the SSO was beyond control. [G.S. 143-215.1C(a1)]

6. Construction of the gravity sewers, pump stations, and force mains shall be scheduled so as not to interrupt service by the existing utilities nor result in an overflow or bypass discharge of wastewater to the surface waters of the State. [15A NCAC 02T.0108(b)]
7. Upon completion of construction and prior to operation of these permitted facilities, the completed Engineering Certification form with checklist attached to this permit shall be submitted with the required supporting documents to the address provided on the form. A complete certification is one where the form is fully executed and the supporting documents are provided as applicable. Any wastewater flow made tributary to the wastewater collection system extension prior to completion of this Engineer's Certification shall be considered a violation of the permit and shall subject the Permittee to appropriate enforcement actions.

If the permit is issued to a private entity with an Operational Agreement, then a copy of the Articles of Incorporation, Declarations/Covenants/Restrictions, and Bylaws that have been appropriately filed with the applicable County's Register of Deeds office shall be submitted with the certification.

A complete certification is one where the form is fully executed and the supporting documents are provided as applicable. Supporting documentation shall include the following:

- a. One copy of the project construction record drawings (plan & profile views of sewer lines & force mains) of the wastewater collection system extension. Final record drawings should be clear on the plans or in accepted electronic format and are defined as the design drawings that are marked up or annotated with after construction information and show required buffers, separation distances, material changes, etc.
- b. One copy of the supporting applicable design calculations including pipe and pump sizing, velocity, pump cycle times, and level control settings, pump station buoyancy, wet well storage, surge protection, detention time in the wet well, and force main, ability to flush low points in force mains with a pump cycle, and downstream sewer capacity analysis. If a portable power source or pump is dedicated to multiple stations, an evaluation of all the pump stations' storage capacities and the rotation schedule of the portable power source or pump, include travel timeframes, shall be provided.
- c. Changes to the project that do not result in non-compliance with this permit, regulations, or the Minimum Design Criteria should be clearly identified on the record drawings, on the certification in the space provided, or in written summary form.

Prior to Certification (Final or Partial): Permit modifications are required for any changes resulting in non-compliance with this permit (including pipe length changes of 10% or greater by type & size, increased flow, pump station design capacity design increases of 5% or greater, and increases in the number/type of connections), regulations, or the Minimum Design Criteria. Requested modifications or variances to the Minimum Design Criteria will be reviewed on a case-by-case basis and each on its own merit. Please note that variances to the Minimum Design Criteria should be requested and approved during the permitting process prior to construction. After-construction requests are discouraged by the Division and may not be approved, thus requiring replacement or repair prior to certification & activation. [15A NCAC 02T .0116]

8. Gravity sewers installed greater than ten percent below the minimum required slope per the Division's Gravity Sewer Minimum Design Criteria shall not be acceptable and shall not be certified until corrected. If there is an unforeseen obstacle in the field where all viable solutions have been examined, a slope variance can be requested from the Division with firm supporting documentation. This shall be done through a permit modification with fee. Such variance requests will be evaluated on a case-by-case basis. Resolution of such request shall be evident prior to completing and submitting the construction certification. [15A NCAC 02T.0105(n)]
9. A copy of the construction record drawings shall be maintained on file by the Permittee for the life of the wastewater collection facilities. [15A NCAC 02T .0116]
10. Failure to abide by the conditions and limitations contained in this permit; 15A NCAC 2T; the Division's Gravity Sewer Design Criteria adopted February 12, 1996 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Station and Force Mains adopted June 1, 2000 as applicable; and other supporting materials may subject the Permittee to an enforcement action by the Division, in accordance with North Carolina General Statutes §143-215.6A through §143-215.6C, construction of additional or replacement wastewater collection facilities, and/or referral of the North Carolina-licensed Professional Engineer to the licensing board. [15A NCAC 02T .0104; 15A NCAC 02T .0108(b-c)]
11. In the event that the wastewater collection facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those

as may be required by this Division, such as the construction of additional or replacement facilities.
[15A NCAC 02T .0110; 15A NCAC 02T .0108(b)]

12. The issuance of this permit shall not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by the Division any other Federal, State, or Local government agencies which have jurisdiction or obtaining other permits which may be required by the Division or any other Federal, State, of Local government agencies. [G.S. 143-215.1(b)]
13. If the Permittee/Applicant holds a system-side collection system operation, maintenance and management permit (WQCS-prefix) from the Division, then the following applies: For all newly constructed, modified and rehabilitated pump stations, all equipment and components shall be sealed within a corrosion-resistant coating or encasement to the extent practicable and equivalent to the minimum design criteria unless the permittee can demonstrate it is not practicable or another form of corrosion resistance is employed. [15A NCAC 02T .0108 (b)]

FAST TRACK SEWER ENGINEERING CERTIFICATION

PERMITTEE: City of Southport
PERMIT #: WQ0045394
PROJECT: Sewer Line and Lift Station Replacement
ISSUE DATE: May 17, 2024
COUNTY: Brunswick

This project shall not be considered complete nor allowed to operate in accordance with Condition 7 of this permit until the Division has received this Certification and all required supporting documentation. Consequently, it should be submitted in a manner that documents the Division's receipt. Send the required documentation to the Wilmington Regional Supervisor, Water Quality Section at the address at the bottom.

The Permittee is responsible for tracking all partial certifications up until a final certification is received. Certifications shall include Phase/Section covered, line size & lengths installed, and listing of lots/connections to be served and pump station design, if applicable. A Final Certification shall be a complete set of record drawings and design calculations regardless of whether partials have been submitted.

PERMITTEE'S CERTIFICATION

I, the undersigned agent for the Permittee, hereby state that this project has been constructed pursuant to the applicable standards & requirements, the Professional Engineer below has provided applicable design/construction information to the Permittee, and the Permittee is prepared to operate & maintain the wastewater collection system permitted herein or portions thereof.

 Printed Name, Title

 Signature

 Date

ENGINEER'S CERTIFICATION

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to (☐ periodically, ☐ weekly, ☐ full time) observe the construction of the project name and location as referenced above for the above Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the following construction:

of three replacement pump stations, including: the Ninth St. PS with dual 300 gpm replacement pumps, a new wet well, approximately six linear feet (LF) of 8-inch gravity sewer and 35 LF of 6-inch force main; the Moore St. PS with dual 400 gpm replacement pumps, a new wet well, approximately 69 LF of 8-inch gravity sewer and 103 LF of 6-inch force main; and, the Park Ave PS with a new wet well, dual 315 gpm replacement pumps (increased by 5%), approximately 35 LF of 8-inch gravity sewer and 19 LF of 8-inch force main, all with on-site audible and visual high water alarms, telemetry, and permanent generators with automatic transfer switches to serve the existing system as part of the Sewer Line and Lift Station Replacement Project with no increase in flow;

such that the construction was observed to be built in compliance of this permit; 15A NCAC 2T; the Division of Water Resources' (Division) Gravity Sewer Minimum Design Criteria adopted February 12, 1996 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 as applicable; and other supporting materials.

North Carolina Professional Engineer's Seal w/signature & date

☐ Final ☐ Partial (include description)

Certification Comments/Qualifiers (attach if necessary):

SEWER ENGINEERING CERTIFICATION CHECKLIST

To be completed by the certifying engineer prior to operation of the permitted sewers, per 15A NCAC 02T.0116.

Certifying Engineer: _____

Certification Review Date: _____

Project Name: _____

WQ00 _____ **Project County:** _____

- 1) Has permittee information changed since the permit was issued (or last modified): change of mailing address, change of ownership, transfer from developer to HOA/POA, etc. ☐ Yes ☐ No
 - If yes, please provide either a change of ownership form or new contact information. Note that transfer of permits from the developer to the HOA/POA must occur with the first certification.
- 2) Have the as-built drawings have been signed, sealed, and dated by an N.C. PE? ☐ Yes ☐ No
- 3) Final Engineering certification? ☐ Yes ☐ No
 - **If Partial Engineering certification, provide detailed narrative including what is being certified in the current phase, what was previously certified (if applicable), and what is left to be certified.**
- 4) Adequate information related to sewer lines: ☐ Yes ☐ No ☐ N/A
 - Three feet minimum cover has been provided for all sewers unless ferrous pipe was installed.
 - Minimum diameters for gravity sewers are 8-inches for public lines and 6-inches for private lines.
 - Manholes have been installed: At the end of each line, at all changes in grade, size, or alignment, at all intersections, and at distances not greater than 425 feet; minimum diameter shall be 4 feet (48-inches).
- 5) Adequate information related to pump stations: ☐ Yes ☐ No ☐ N/A
 - Ensure power reliability option was selected per [15A NCAC 02T.0305\(h\)](#).
- 6) Was project construction completed in accordance with all of the following: ☐ Yes ☐ No ☐ N/A
 - [15A NCAC 02T, Minimum Design Criteria \(MDC\) for the permitting of Gravity Sewers](#) (latest version), and [MDC for the Permitting of Pump Stations and Force Mains](#) (latest version)?

If not, a variance approval is required in accordance with [15A NCAC 02T.0105\(b\)](#), **prior to certification and operation.**

 - Contact the Central Office to discuss the variance to determine a course of action.
 - Applicant must submit two copies of the variance request form, plans, specifications, calculations, and any other pertinent information to the Central Office (one hard copy, one digital copy).
 - The central office will review the variance request, and if approvable, specific language regarding the variance will be incorporated into the permit, either via a special condition or a supplementary letter. A copy of the reissued permit with variance language or the variance letter must be maintained with the original documents.
- 7) Does the project contains high priority lines ([15A NCAC 02T .0402\(2\)](#))? ☐ Yes ☐ No
 - If yes, ensure that the permit already contains the necessary condition related to high priority lines 15A NCAC 02T.0403 (a)(5). If the permit does not include this language, the Fast Track reviewer will reissue the permit with the appropriate language.
- 8) Are Permit modifications are required for any changes resulting in non-compliance with this permit (including pipe length difference of 10% or greater, change in flow, pump station design capacity design change of 5% or greater, and change in the number/type of connections)? ☐ Yes ☐ No
 - If yes, a permit modification request must be submitted to the appropriate Regional Office, and **a modified permit with revised certification must be issued prior to certification and operation.**