



CONTRACT DOCUMENTS &

TECHNICAL SPECIFICATIONS

PWC2526099

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

ISSUED FOR BID

June 25, 2026

Fayetteville Public Works Commission
Administrative Building
955 Old Wilmington Road
Fayetteville, NC 28301

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SECTION A – PROJECT SPECIFICS GENERAL

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ADVERTISEMENT FOR BID
FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

Cumberland County
North Carolina

Pursuant to N.C.G.S 143-129, sealed bids are solicited and will be received at Fayetteville Public Works Commission, Administration Building, Conference Room 107, 955 Old Wilmington Road, Fayetteville, NC 28301, until **2:00 p.m., EST Thursday, July 23, 2026**, at which time they will be publicly opened and read.

This project includes the replacement and upgrade of the existing Longview Acres Lift Station #41 and force main. The project consists of 2,056 feet of 8" Force Main and the installation of a new submersible Lift Station.

The foregoing description shall not be construed as a complete description of all work required. All work shall be done in accordance with PWC technical specifications and standard contract terms.

A **NON-MANDATORY** pre-bid meeting will be held at **11:00 a.m., EST Tuesday, July 7, 2026**, in the Conference Room 107, Fayetteville Public Works Commission, Administrative Building, 955 Old Wilmington Road, Fayetteville, NC 28301. Representatives of the Owner and Project Engineer will be available to answer questions.

Questions will be fielded at the pre-bid meeting and all prospective bidders are required to attend the meeting. Individual telephone inquiries are prohibited. PWC assumes no responsibility to fully inform absentees of clarifications not issued by addendum.

Bids must be enclosed in a sealed envelope addressed to Shelby Lesane, Procurement Advisor II, Fayetteville Public Works Commission, 955 Old Wilmington Road, Fayetteville, North Carolina 28301. The outside of the envelope must be marked **SEALED BID: LONGVIEW ACRES LIFT STATION 41 REPLCAMENT & SANITARY SEWER FORCE MAIN** and shall indicate the name, address and state license number of the bidder. Bids shall be submitted on the printed forms, or exact copies thereof, contained in the Contract Documents.

Each bid shall be accompanied by a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute the Contract in accordance with the bid bond and upon failure to forthwith make payment, the surety shall pay the obligee an amount equal to the amount of said bond. Said deposit shall 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 Notice of Award or give satisfactory surety as required by law.

Performance and Payment Bonds are required in the amount of 100% of the Contract amount and shall be furnished by the Contractor.

All Contractors are notified that North Carolina Statutory provisions as to licensing of Contractors will be followed as applicable in receiving and evaluating bids and in reading and awarding the Contract (Chapter 87 of the North Carolina General Statutes).

The license classification shall be:

Part 1:	Public Utilities (Water and Sewer)	-	Unlimited
	Unclassified	-	Unlimited

Plans and Specifications including Contract Documents will be available online for viewing and downloading on or about **Thursday, June 25, 2026** on the PWC Procurement website at https://www.faypwc.com/purchasing. In addition, the documents will be available from the Fayetteville State University Construction Resource Office (FSU CRO) at https://www.uncfsu.edu/academics/colleges-schools-and-departments/broadwell-college-of-business-and-economics/outreach-centers/construction-resource-office. In collaboration with the North Carolina Institute of Minority Economic Development, the FSU CRO offers services and support to help small, minority, veteran, and women-owned businesses identify and compete for construction-related projects.

At the FSU CRO, potential bidders may:

- Research, view and print project drawings to scale free of charge;
- Use available software to prepare their bid; and
- Receive certification and pre-qualification assistance.

Please email the FSU CRO to make an appointment: fsucro@uncfsu.edu

Fayetteville Public Works Commission reserves the right to reject any and all bids, to waive any and all informalities and irregularities, and to disregard all nonconforming, nonresponsive, or conditional bids. PWC further reserves the right to request additional information from any or all bidders for evaluation purposes; failure or refusal to furnish such information as requested may result in rejection of the bid.

The bid tabulation and announcement of the apparent low bidder at the bid opening do not constitute a binding contract with PWC. No contract will be considered awarded until a formal written Agreement is executed by both PWC and the successful bidder. The award of a contract, if made, will be to the lowest responsible, responsive bidder whose qualifications indicate the award will be in the best interest of PWC.

PWC also reserves the right, at its sole discretion, to re-advertise for bids if deemed in the best interest of PWC.

The bidder to whom the contract may be awarded must comply fully with the requirements of North Carolina General Statutes Section 143-129, as amended.

No bids may be withdrawn after the scheduled Bid Opening for a period of ninety (90) calendar days.

FAYETTEVILLE PUBLIC WORKS COMMISSION
Nikole Bohannon
Procurement Manager

00100 - INSTRUCTIONS TO BIDDERS
FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

A. DEFINED TERMS

Terms used in these Instructions to Bidders are defined in the Definitions and Terminology sections of PWC General Conditions.

B. COPIES OF BIDDING DOCUMENTS

1. Complete sets of the Bidding Documents as stated in the Invitation to Bidders, may be obtained from the PWC Procurement Department.
2. Complete sets of Bidding Documents shall be used in preparing Bids. PWC assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

C. EXAMINATION OF CONTRACT DOCUMENTS, OTHER RELATED DATA, AND PROJECT SITE

1. Before submitting a Bid, each Bidder shall (a) examine the Contract Documents thoroughly, (b) visit the site and become familiar with the site and any local conditions that may in any manner affect the cost, progress, or performance of the Work, (c) be familiar with federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work, and (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) give the PWC Procurement Advisor written notice of all conflicts, errors ordiscrepancies in the Contract Documents.
2. Bidders should consult the Specifications for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or reports that otherwise may affect cost, progress, or performance of the Work which may have been utilized in the preparation of the Drawings and Specifications. PWC will make copies of such reports if available at the cost (non-refundable) of reproduction to any Bidder requesting them. These reports are not intended to constitute any explicit or implicit representation as to the nature of the subsurface and latent physical conditions, which may be encountered at the site or to constitute explicit or implicit representations as to any other matter, contained in any report. Such reports are not guaranteed as to accuracy or completeness and are not part of the Contract Documents. Before submitting a Bid, each Bidder will, at its own expense, make such investigations and tests as the Bidder may deem necessary to determine his Bid for the performance of the Work in accordance with the Contract Documents.
3. On request (minimum 48 hours advance notice), PWC will provide each Bidder access to the site to conduct such investigations and tests, as each Bidder deems necessary for submission of its Bid.
4. The lands upon which the Work is to be performed, right-of-way for access thereto, and other lands available for use by the Contractor in performing the Work are identified in the Contract Documents.

5. The submission of a Bid constitutes an incontrovertible representation by the Bidder that it has complied with every requirement of this Section and that the Contract Documents are sufficient in scope and detail to indicate and convey an understanding of all terms and conditions for the performanceof the Work.

D. INTERPRETATIONS AND ADDENDA

1. All questions about the meaning or intent of the bid or Contract Documents shall be submitted in writing to Shelby Lesane, Procurement Advisor II, by email to procurement@faypwc.com. In order to receive consideration, questions must be received by Thursday, July 9, 2026 @ 5:00 p.m. Any interpretations of questions so raised, which in the opinion of the Project Engineer require interpretations, will be issued by Addenda via email or posted online by the Owner and/or Project Engineer. An Addendum extending the Bid Opening date may be issued up to five (5) business days before the Bid Opening date. An Addendum withdrawing the Invitation for Bid may be issued any time prior to the Bid Opening date. The Owner and Project Engineer will not be responsible for oral interpretations or clarifications, which anyone presumes to make on their behalf.

Bidders are expressly prohibited from contacting any PWC official or employee associated with this project, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

2. PWC may issue such additional Addenda as may be necessary to clarify, correct, or change the Contract Documents. Such Addenda, if any, will be issued in the manner and within the time stated in Paragraph 1 of this Section.

3. Each Bidder shall be responsible for determining that all Addenda issued by PWC have been received before submitting a Bid for the Work.

4. Each Bidder shall acknowledge the receipt of each Addendum on the Bid Form.

E. VENDOR REGISTRATION VIA ISUPPLIER

1. All vendors interested in doing business with PWC must register as a vendor through the iSupplier Portal using the link below. The iSupplier self-service portal enables vendors to have real-time access to information regarding purchase orders, invoices, and payments through a secure environment. Attach a copy of your W9 to your online registration.

   https://www.faypwc.com/isupplier-doing-business-with-pwc/

F. QUALIFICATION OF CONTRACTORS

1. **Bidder Qualification Form** – The Bid package shall include the completed Contractor Qualification Form and all supporting documentation.

2. **Statutory Requirements** – The Bidder shall comply with all federal, state, and local statutes, regulations, and codes as they relate to the Project. Failure to comply with these requirements shall be considered a breach of Contract.

3. Contractor to provide utility references for similar projects completed by identified crews.

4. PWC is looking for utility contractors with experienced personnel in all facets of water and/or sewer main replacement services. The minimum work experience of the following

Personnel Classifications will be required:

- **Superintendent**: Must have a minimum of 10 years of experience as a superintendent, coordinating and managing all aspects of sewer and/or water construction projects.
- **Foreman/Crew Leader**: Must have a minimum of 8 years of experience as a foreman/crew leader, coordinating and supervising a team of crew members for sewer and/or water construction projects.
- **Operator:** Must have a minimum of 8 years of experience operating heavy equipment for sewer and/or water construction projects.

5. **Equipment Requirements (Minimum)**

   - Excavator, 65,000 to 85,000 LB Class
   - Excavator, 38,000 to 64,999 LB Class
   - Excavator, 18,000 to 37,999 LB Class

   Contractor will only be paid for equipment and tools in use on work-site.

G. SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings orrequired in the Specifications without consideration of possible substitute or "or-equal" items. The procedure for submittal of substitute or “or-equal” items for consideration is set forth in the PWC General Conditions.

H. CONTRACTOR'S LICENSE

1. No General Contractor shall engage in contracting work in the State of North Carolina unless it has been licensed under in accordance with North Carolina law.
2. Bidders are prohibited from contracting for, or bidding upon, the construction, removal, repair or improvements to or upon real property owned, controlled or leased by Fayetteville Public Works Commission without a North Carolina Contractor's License.
3. Each bidder shall indicate its North Carolina Contractor's License number on the bid envelope and the Bid Form.
4. License Classification shall be:
   - Public Utilities Water and Sewer
   - Unclassified

I. SUBCONTRACTORS

1. Contractor shall subcontract no more than 49 percent (49%) of the value of the Contract.
2. Each Bidder shall submit to PWC with its bid the List of Subcontractors, Suppliers, other persons, and organizations proposed for those portions of the Work for which such identification is required. If PWC, after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, PWC may, before Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute without an increase in the Bid.

3. If the apparent Successful Bidder declines to make such a substitution, PWC may award the Contract to the next lowest responsive, responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons, and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the bid security of any Bidder. If PWC does not make written objection to a Bidder's list of Subcontractors, Suppliers, other persons, or organizations prior to giving Notice of Award, the list will be considered acceptable, subject to revocation as provided in the PWC General Conditions.

J. SMALL & DISADVANTAGED BUSINESS ENTERPRISE (SDBE) PROGRAM / SMALL LOCAL SUPPLIER (SLS) PROGRAM

1. Program Commitment: Fayetteville Public Works Commission (PWC) is committed to promoting the utilization of Small and Disadvantaged Business Enterprises (SDBEs) and Small Local Suppliers (SLS) in PWC's procurement of construction contracting. PWC seeks to provide equitable access and opportunity to qualified businesses across its operational areas.
    - The SDBE Program encourages participation from firms certified through recognized third-party agencies, including the NC Department of Administration (HUB Office), NC Department of Transportation (DBE Program), and the U.S. Small Business Administration (SBA).
    - The SLS Program continues to promote engagement of small, local firms within the Fayetteville Metropolitan Statistical Area (MSA), consisting of Cumberland, Hoke, and Harnett Counties.
2. Applicability and Bidder Requirements: For procurements of construction exceeding $30,000, Bidders must demonstrate good-faith efforts to engage certified SDBEs and, when applicable, SLSs. This includes outreach to certified firms, solicitation of quotes, and attendance at pre-bid meetings. Documentation must include completed Affidavit forms (A–E) as outlined in the SDBE Compliance Provisions within the Contract Documents. Attendance at the Pre-Bid Meeting is strongly recommended to review program expectations and compliance procedures.
3. Certification and Verification: Certifications recognized under this program include:
    - NC Department of Transportation (NCDOT) Disadvantaged Business Enterprise (DBE)
    - NC Department of Administration (DOA) Historically Underutilized Business (HUB)
    - U.S. Small Business Administration (SBA) certifications, including 8(a), WOSB, SDVOSB, and HUBZone designations
      Firms holding current certifications with these agencies are acceptable for listing in the bidder's submittal and will be counted toward participation goals.
      Vendor directories can be accessed via the following links:
    - NCDOT DBE Directory: https://www.ebs.nc.gov/VendorDirectory
    - NC HUB Directory: https://ncadmin.nc.gov/businesses/hub

K. SUBMISSION OF BIDS

1. All Bidders shall use the enclosed Bid Forms, or exact copies thereof, in submitting their bid prices. Failure to provide full and complete Bid Forms using the form provided herein will result in a bid being deemed non-responsive.
2. PWC will not accept modified Bid Forms, oral Bids, or Bids received by telephone, email, or telecopier (FAX machine) for this Bid.
3. All prices must be F.O.B. delivered to the point as indicated by this Bid. PWC will grant no allowance for boxing, crating, or delivery unless specifically provided for in this Bid.
4. The Bid Form must be completed in black ink. Black or blue pen ink is acceptable if handwritten. Discrepancies between amounts shown in words and amounts shown in figures will be resolved in favor of the amounts shown in words. Discrepancies in the multiplication of units of Work and the unit prices will be resolved in favor of the correct multiplication of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
5. Bid submittals sent by mail should be registered mail. The sealed Bid, marked as indicated above, should be enclosed in an additional sealed envelope similarly marked and addressed to:

   Fayetteville Public Works Commission
   Attn: Shelby Lesane, Procurement Advisor II
   955 Old Wilmington Road
   Fayetteville, North Carolina 28301
6. Mark the envelope in the lower left-hand corner with the project title, hour and due date of Bid, and the Bidder's North Carolina contractor registration number.
7. Bids sent by mail and arriving after the time for the opening of Bids shall not be considered valid Bids. In such instances, the Bidders shall have no claim against PWC.
8. All items contained in the Bid Checklist shall be completely filled out and submitted with the bid. Failure to submit any of the items requested with the Bid Form may be just cause for rejection of the Bid by PWC.
9. All erasures, insertions, additions, and other changes made by the Bidder to the Bid Form shall be signed or initialed by the Bidder. Bids containing any conditions, omissions, erasures, alterations, or items not called for in the Bid, may be rejected by PWC as being incomplete or nonresponsive.
10. The Bid Form must be signed in order to be considered. If the Bidder is a corporation, the Bid must be submitted in the name of the corporation, not simply the corporation's trade name. In addition, the Bidder must indicate the corporate title of the individual signing the Bid.
11. The Bid Form, the Bid security, if any, and any other documents required, shall be enclosed in a sealed opaque envelope. Any notation or notations on the exterior of the envelope purporting to alter, amend, modify, or revise the bid contained within the envelope shall be of no effect and shall be disregarded.
12. All Bids received in the Procurement Department by the deadline indicated will be kept

sealed until the time and date of the Bid Opening.

13. All late Bids shall be returned unopened to the sender.

L. BID BOND

1. Each Bid shall be accompanied by an acceptable Bid bond in the amount of five percent (5%) of the Bid amount, and made payable to Fayetteville Public Works Commission, North Carolina.
2. The Bid bond is a guarantee that if the contract is awarded by PWC to the Bidder, the Bidder shall enter into the contract with PWC for the work mentioned in this Bid or forfeit the Bid bond to PWC, not as a penalty, but as liquidated damages.
3. No forfeiture under a Bid bond shall exceed the lesser of (a) the difference between the Bid forwhich the Bid bond was written and the next low Bid of another Bidder, or (b) the face amount of the Bid bond.
4. All bonds shall be executed by a surety company selected by the Bidder, which is legally authorized to do business in the State of North Carolina (NCGS §44 A-26), and the bond shall be the same in both form as well as substance as AIA Document A310, Bid Bond.
5. The Bidder shall require the attorney-in-fact, who executed the required bond on behalf of the surety company, to affix thereto a certified and current copy of the power of attorney.
6. The bond premium shall be paid by the Bidder and the cost shall be included in the Bid price.
7. Any inspection of procurement transaction records shall be subject to reasonable restrictions to ensure the security and integrity of the records.

M. OPENING OF BIDS

1. Bids will be opened publicly and read aloud on the date and time set for the Bid Opening in the Notice to Bidders.
2. Any Bidder, upon request, shall be afforded the opportunity to inspect Bid records within a reasonable time after the opening of all Bids but prior to award, except in the event that PWC decides not to accept any of the Bids and to reopen the contract. Otherwise, bid records shall be open to public inspection only after the award of the Contract.
3. Any inspection of procurement transaction records shall be subject to reasonable restrictions to ensure the security and integrity of the records.

N. MODIFICATION OF BIDS

1. A Bid may be modified or withdrawn by the Bidder at any time prior to the time and date set for the Bid Opening. The Bidder shall notify the PWC Procurement Department in writing of its intentions.
2. Modified and withdrawn Bids may be resubmitted to the PWC Procurement Department up to the time and date set for the Bid Opening.

O. WITHDRAWAL OF BID DUE TO ERROR

1. If the Bidder desires to withdraw its Bid, the Bidder must do so before the time fixed for the opening, without prejudice, by communicating its purpose in writing to PWC. After bids are open, bids may only be withdrawn in strict accordance with N.C.G.S. Section 143-129-1.

P. BIDS TO REMAIN OPEN

1. All Bids shall remain open for ninety (90) calendar days after the day of the Bid Opening.

Q. ESTIMATED QUANTITIES

1. The estimated quantities contained herein in certain items in the Bid are for the purpose of comparing bids, and while they are believed to be close approximations, they are not guaranteed, and settlement will be made on the basis of the work as actually executed at the unit prices in the Bid as accepted. PWC further reserves the right to delete any single line item or combination of items from the bid and cannot guarantee that all quantities listed in the Contract Documents will be utilized.
2. The Contractor should verify quantities before submitting a bid. Due to conditions that may be found under pavement such as the accurate location of existing water lines, sewer lines, gas lines, and structure services of all types, quantities are subject to change during construction, but this contingency shall not be used for a claim to change unit prices submitted in the Bid.

R. AWARD OF CONTRACT

1. PWC reserves the right to reject any and all bids, to waive any and all minor informalities and irregularities, and to disregard all nonconforming, nonresponsive, or conditional bids. PWC further reserves the right to request additional information from any or all bidders for evaluation purposes; failure or refusal to furnish such information as requested may result in rejection of the bid. The bid tabulation and announcement of the apparent low bidder at the bid opening do not constitute a binding contract with PWC. No contract will be considered awarded until a formal written Agreement is executed by both PWC and the successful bidder. The award of a contract, if made, will be to the lowest responsible, responsive bidder whose qualifications indicate the award will be in the best interest of PWC. PWC also reserves the right, at its sole discretion, to re-advertise for bids if deemed in the best interest of PWC.
2. In case of a tie Bid, the tie shall be decided by lot.
3. It is the intent of PWC to recommend the award of this contract to the lowest responsive, responsible Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. In determining the lowest responsible Bidder, PWC may consider, among other criteria, the Bidder's past performance conduct on other contracts, and other information provided by the Bidder as noted below.
4. In determining the lowest responsive Bidder, PWC will evaluate the Bidder’s proposed Bid price and the completeness of the submitted bid in accordance with the requirements of the Contract Documents.

5. PWC may consider the operating costs, maintenance considerations, performance date, and guarantees of materials and equipment.
6. PWC may conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, as well as other considerations, to include but not limited to resources available to the Bidder to perform the work effectively, proposed Subcontractors and other persons and organizations to do the workin accordance with the Contract Documents to PWC's satisfaction within the prescribed time.
7. PWC reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to PWC's satisfaction.
8. If the Contract is to be awarded, PWC will give the Successful Bidder a Notice of Award within ninety (90) days after the day of the Bid Opening.
9. The Bidder to whom the contract is awarded shall, within ten (10) days after prescribed documents are presented for signature, execute and deliver the Contract Documents and any otherforms or bonds required by the Bid to PWC.
10. The Bidder is required to complete the attached forms that will allow PWC to verify that the Bidder is qualified to perform the Work described in these Contract Documents. All forms shall be completed and submitted with the Bid. Failure to submit all the required forms shall be considered grounds for PWC to reject the bid.

    PWC will review all of the bids and qualification data to determine the lowest responsive, responsible Bidder. PWC reserves the right to not award the Contract to the lowest bidder if the information provided is not complete, does not meet the satisfaction of PWC, or has been falsified. PWC will not request any additional information in order to allow the Contractor to complete bid.
11. During the evaluation phase, bid submittals will be reviewed to ascertain which bids technically and otherwise address all the requirements of these Contract Documents. Bid submittals determined to be technically non-responsive or not sufficiently responsive may be disqualified.

    The Bidder shall address each of the Evaluation Criteria as requested in the Technical Evaluation Criteria Form located within Section A Project Specifics Bid Submittal Documents. To be considered substantive, the information must respond to all requirements.
12. PWC may conduct such investigations/verifications as deemed necessary to establish the responsibility, qualification and financial ability of the Bidder. Should PWC find that the apparent low bidder is not the lowest responsive, responsible bidder by integrity of the information furnished, said apparent low bidder will be so notified and its bid bond shall be returned without prejudice. Failure or refusal to furnish any items of information requested by PWC shall be considered as non-responsive and therefore basis for rejection of the bid.

S. TAXES

1. The Successful Bidder shall pay all county, city, state and federal taxes required by laws in effect at the time Bids are received and resulting from the Work or traceable thereto, under whatever name levied.

2. Said taxes shall not be in addition to the contract price between PWC and the Successful Bidder. The taxes shall be an obligation of the Successful Bidder and not of PWC. PWC shall be held harmless from same by the Successful Bidder.

T. PERFORMANCE AND OTHER BONDS

1. The PWC General Conditions set forth PWC's requirements as to Performance and other Bonds.

U. E-VERIFY REQUIREMENTS

1. Contractor hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes.

2. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS §64-26(a).

3. Contractor hereby pledges, attests and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests and warrants that any subcontractors currently employed by or subsequently hired by Contractor shall comply with any and all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement.

V. IRAN DIVESTMENT ACT

1. As mandated by N.C.G.S. 147-86.59(a), the Contractor hereby certifies that it is not listed on the Final Divestment List created by the North Carolina State Treasurer pursuant to N.C.G.S. 147-86.58. Contractor further certifies that in accordance with N.C.G.S. 146-86.58(b) that it shall not utilize any subcontractor found on the State Treasurer's Final Divestment List. Contractor certifies that the signatory to this Purchase Order authorized by the Contractor to make the foregoing statement.

*** END OF SECTION ***

SECTION A – PROJECT SPECIFICS
BID SUBMITTAL DOCUMENTS

BID SCHEDULE – PERFORMANCE AND DELIVERY
FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

Pre-Bid Meeting:	11:00 a.m., Tuesday, July 7, 2026
(NON-MANDATORY)	Fayetteville Public Works Commission Administrative Building Conference Room 107 955 Old Wilmington Road Fayetteville, NC 28301
Deadline for Questions from Bidders[1]	5:00 p.m., Thursday, July 9, 2026
Deadline for Addenda issued by PWC Procurement Department and Project Engineer[2]	5:00 p.m., Tuesday, July 16, 2026
Bid Opening (Submittal Deadline)	2:00 p.m., Thursday, July 23, 2026 Fayetteville Public Works Commission Administrative Building Conference Room 107 955 Old Wilmington Road Fayetteville, NC 28301
Target Commission Meeting	Wednesday, August 12, 2026
Target City Council Meeting	Monday, August 24, 2026
Contract Time:	60 days
Liquidated Damages:	$1,000.00 per day for each day beyond the Final Completion Date
Bid Acceptance Period	Within ninety (90) Calendar Days unless otherwise noted

---

1. Questions regarding this bid must be submitted in writing to the attention of Shelby Lesane Procurement Advisor II, by email to procurement@faypwc.com.

   Bidders are expressly prohibited from contacting any FPWC official or employee associated with this Invitation to Bid, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

2. Any addenda to these Contract Documents will be issued by the Project Engineer no later than the date and time stated above.

BID SUBMITTAL CHECKLIST

- ☐ 1. Enter Contractor's License Number where called for in the Bid Form and on the outside of the sealed envelope containing the Bid.
- ☐ 2. Photocopy of Contractor's License.
- ☐ 3. Bid Bond
- ☐ 4. Bid Forms Section 00300.
- ☐ 5. Provide the responsible North Carolina Registered Agent for Insurance Claims. Include contact information.
- ☐ 6. Provide the proposed responsible Bonding Company name. Include contact information.
- ☐ 7. List of proposed Subcontractors and material suppliers exceeding 5% of the Contract Value.
- ☐ 8. Non-Collusive Affidavit.
- ☐ 9. Nondiscrimination Clause.
- ☐ 10. Affidavit of Organization and Authority and Sworn Statement.
- ☐ 11. Equal Employment Opportunity Acknowledgment.
- ☐ 12. Certification regarding Debarment, Proposed Debarment, and other Responsible Matters.
- ☐ 13. FTA Certification Regarding Lobbying.
- ☐ 14. Affidavit A – Listing of Good Faith Efforts, et al.
- ☐ 15. Affidavit B – (Only if the Contractor will perform **ALL ELEMENTS OF THE WORK** on this project with their own forces **AND** will complete **ALL ELEMENTS OF THIS PROJECT WITHOUT THE USE OF SUBCONTRACTORS, MATERIAL SUPPLIERS, OR PROVIDERS OF PROFESSIONAL SERVICES**.
- 16. Affidavit E - Identification of Minority Business Participation Form.
- ☐ 17. SLS / SDBE Disclosure Form.
- ☐ 18. The Completed Contractor Qualification Form.

FAILURE TO SUBMIT THE ABOVE FORMS WITH THE BID FORM PROVIDED HEREIN MAY BE JUST CAUSE FOR REJECTION OF THE BID BY THE OWNER

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00300 - BID FORM

TO: **Fayetteville Public Works Commission**
Attn: Shelby Lesane, Procurement Advisor II
955 Old Wilmington Road
Fayetteville, North Carolina 28301

PROJECT: **PWC2526099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN**

FROM: BIDDER _____

ADDRESS _____

_____

DATE OF BID _____ , 20 ____

A. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into a Contract with OWNER in the form included in the Contract Documents to perform and furnish all Work (as that term is defined in the Construction Agreement) specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

B. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including, without limitation, those dealing with the disposition of payment and performance bonds, and insurance certificates. This bid will remain open for ninety (90) calendar days after the day of Bid opening. BIDDER will sign the Contract and submit the Contract Security and other documents required by the Contract Documents within ten (10) days after the date of receipt by the BIDDER.

C. In submitting this Bid, Bidder represents, as more fully set forth in the Contract, that:

1. BIDDER has examined copies of all the Contract Documents and of the following addenda, receipt of all which is acknowledged on the bid summary page:

2. BIDDER has examined the site and locality where the Work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress of performance of the work and has made such independent investigations as BIDDER deems necessary.

3. BIDDER acknowledges that OWNER does not assume responsibility for the accuracy of dimensions or completeness of information and data shown or indicated in the Bidding Documents with respect to existing facilities.

4. BIDDER has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site of the Work (expect underground facilities)

and all drawings of physical conditions in or relating to existing surface or subsurface structures, pipelines, and utilities at or contiguous to the site are provided within these Contract Documents. Geotechnical Reports and other information regarding subsurface conditions are identified in the attached appendices and detailed in Article V of the PWC General Conditions. BIDDER acknowledges that the OWNER does not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to underground facilities at or contiguous to the site of Work. BIDDER had obtained and carefully studied (or assumes responsibility for have done so) all such additional or supplementary examinations investigations, explorations, tests, studies, and data that are necessary to identify and understand conditions (surface, subsurface, and underground facilities) at or contiguous to the site of Work or otherwise which may affect cost, progress, performance, or furnishing the Work or which relate to any aspect of means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto. BIDDER waives all rights to claim that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the proper submission of the Bid for the performance and furnishing of the Work in accordance with the Contract Time, Contract Price, and other terms and conditions of the Contract Documents.

5. BIDDER hereby certifies that, if awarded the Contract for construction of the Project, it will take all possible actions to minimize costs to the OWNER which are related to any disruptions in any part of the Work resulting from unforeseeable conditions which may be encountered and work changes or additions which may be made.

6. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, exploration, tests, studies, and data with the Contract Documents.

7. BIDDER has given OWNER written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by OWNER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

8. By bidding in response to this invitation, the BIDDER represents that in the preparation and submission of this Bid, said BIDDER did not, either directly or indirectly, enter into any combination or arrangement with any person, firm or corporation or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free, competitive bidding in violation of the Sherman Act (15 U.S.C. Section 1).

9. Bid form must be completed in blue or black ink or by typewriter. The Bid price of

each item on the form must be stated in both words and numerals. In case of a conflict, words shall take precedence. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the correct multiplication of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

10. BIDDER understands that the award of contract will be made on the basis of the total Bid amount which will be determined as the sum of the unit price and lump sum Bid Items.

11. BIDDER understands that quantities are estimated and are not guaranteed; they are solely for comparing Bids and establishing the total Bid amount. The Price will be modified by Change Order, and final payment will be based on the quantities of work actually furnished and installed by the successful BIDDER.

12. BIDDER shall complete the Work for the prices indicated on the next page.

BIDDER NAME:

FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT &
SAN. SEWER FORCE MAIN
FAYETTEVILLE, NORTH CAROLINA
BID FORM

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
		PART "A" INCIDENTALS				
A-1	1.01	Mobilization and Demobilization @_____lump sum	1	LS		
A-2	1.02	Traffic Control and Traffic Plan @_____lump sum	1	LS		
A-3	1.03	Erosion and Sedimentation Control @_____lump sum	1	LS		
A-4	1.04	Clearing and Grubbing @_____lump sum	1	LS		
A-5	1.05	Demolition of Existing Lift Station @_____lump sum	1	LS		
A-6	1.06	Install Permanent Pavement Patch (NOA) (PWC) @_____per square yard	591	SY		
A-7	1.07	Incidental Stone @_____per square yard	633	SY		
A-8	1.08	Install 2" SF9.5A Asphalt Pavement @_____per square yard	598	SY		
A-9	1.09	Submersible Lift Station @_____lump sum	1	LS		
A-10	1.10	Install Bollards @_____per each	5	EA		
A-11	1.11	Replace Gravel Driveway @_____per square yard	52	SY		
A-12	1.12	Undercut Excavation @_____per cubic yard	50	CY		
A-13	1.13	Borrow Excavation (Select Backfill) @_____per cubic yard	75	CY		
A-15	1.14	Sod (No Overage Allowed) @_____per square yard	517	SY		

BIDDER NAME:

FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT &
SAN. SEWER FORCE MAIN
FAYETTEVILLE, NORTH CAROLINA
BID FORM

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
A-16	1.15	Seeding @_____per square yard	2,448	SY		
		TOTAL PART "A" INCIDENTALS				

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
		PART "B" UTILITY CONSTRUCTION				
B-1	2.01	Lift Station Water Service @_____lump sum	1	LS		
B-2	2.02	Install Sanitary Sewer Doghouse Manhole 4' Dia 0'-6' Depth @_____per each	1	EA		
B-3	2.02	Install Sanitary Sewer Doghouse Manhole 5' Dia 6'-8' Depth @_____per each	1	EA		
B-4	2.03	Install Sanitary Sewer 5' Dia. Manhole 14'-16' Depth @_____per each	1	EA		
B-5	2.04	Install 12" CL 50 DIP Sanitary Sewer 0'-6' Depth @_____per linear foot	22	LF		
B-6	2.04	Install 8" CL 50 DIP Sanitary Sewer 6'-8' Depth @_____per linear foot	5	LF		
B-7	2.04	Install 8" CL 50 DIP Sanitary Sewer 8'-10' Depth @_____per linear foot	5	LF		
B-8	2.04	Install 8" CL 50 DIP Sanitary Sewer 10'-12' Depth @_____per linear foot	6	LF		
B-9	2.04	Install 8" CL 50 DIP Sanitary Sewer 12'-14' Depth @_____per linear foot	13	LF		
B-10	2.04	Install 8" CL 50 DIP Sanitary Sewer 14'-16' Depth @_____per linear foot	27	LF		

BIDDER NAME:

FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT &
SAN. SEWER FORCE MAIN
FAYETTEVILLE, NORTH CAROLINA
BID FORM

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
B-11	2.05	Install 8" DR18 Sanitary Sewer Force Main @_____per linear foot	1,606	LF		
B-12	2.06	Install 8" RJDIP Sanitary Sewer Force Main @_____per linear foot	390	LF		
B-13	2.07	Install 8" DIP Sanitary Sewer Force Main @_____per linear foot	60	LF		
B-14	2.08	Remove and Dispose Existing Force Main @_____per linear foot	80	LF		
B-15	2.09	Grout Fill and Abandon Existing 6" Force Main @_____per linear foot	1,791	LF		
B-16	2.10	Test San. Sewer Force Main & Gravity Sewer @_____per linear foot	2,134	LF		
B-17	2.11	Install Air Release/Vacuum Valve @_____per each	1	EA		
B-18	2.12	Connection To Existing Structures 8" @_____per each	1	EA		
		TOTAL PART "B" UTILITY CONSTRUCTION				

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
		PART "E" LIFT STATION ELECTRICAL CONSTRUCTION				
E-1	3.01	Lift Station Enclosure @_____lump sum	1	LS		
E-2	3.02	Standby Engine Generator @_____lump sum	1	LS		
		TOTAL PART "E" LIFT STATION ELECTRICAL CONSTRUCTION				

BIDDER NAME:

FAYETTEVILLE PUBLIC WORKS COMMISSION
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT &
SAN. SEWER FORCE MAIN
FAYETTEVILLE, NORTH CAROLINA
BID FORM

TOTAL PART "A" INCIDENTALS _____

TOTAL PART "B" UTILITY CONSTRUCTION _____

TOTAL PART "E" LIFT STATION ELECTRICAL CONSTRUCTION _____

TOTAL BASE BID _____

- BID SUMMARY-

TOTAL PART "A" INCIDENTALS **$_____**

TOTAL PART "B" UTILITY CONSTRUCTION **$_____**

TOTAL PART "C" OMITTED

TOTAL PART "D" OMITTED

TOTAL PART "E" LIFT STATION ELECTRICAL CONSTRUCTION **$_____**

TOTAL BASE BID **$_____**
(Total Part A+B+E)

The BIDDER has received, acknowledged, and used the following addenda in completing the Bid. (Initial and Date as appropriate).

Addendum No. 1	Date _____
Addendum No. 2	Date _____
Addendum No. 3	Date _____
Addendum No. 4	Date _____
Addendum No. 5	Date _____
Addendum No. 6	Date _____
Addendum No. 7	Date _____

The undersigned BIDDER _____ (Contractor Name) certifies that they are licensed as a Contractor under N.C.G.S **§** 87, and that their license number is_____ (License Number).

The undersigned BIDDER hereby agrees to accept an award of the Contract based on the Total Contract Amount as accepted by the OWNER and as indicated on the Notice of Award.

A. BIDDER agrees that Work shall be completed within the time frame indicated in the Agreement as follow:

    1. All work described herein to be complete, including restoration and all punch list items from Notice to Proceed until the competition date noted in the Notice to Proceed.

    2. The BIDDER acknowledges that time is of the essence in this Contract and that the OWNER will suffer financial loss if the Work is not complete within the time specified in Paragraph D.1 above plus any extensions thereof allowed in accordance with these Contract Documents. BIDDER also recognizes the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the OWNER if the Work is not complete on time. The Bidder agrees to diligently pursue all available work and complete all work in an expeditious manner.

B. The following documents are attached to and made part of this bid:

    Required Bid Security in the form of either a cashier's check or certified check or Bid Bond in the amount of 5% of maximum Bid price.

Communications concerning this Bid shall be addressed to: (SURETY’s Name, Address, Telephone Number, and Email)

_____
_____
_____
_____
_____

A. Communications concerning this Bid shall be addressed to: (CONTRACTOR's Name, Address, Telephone Number, and Email)

_____
_____
_____
_____
_____

B. The terms used in this Bid which are defined in Definitions and Terminology Section of the PWC General Conditions or as otherwise specifically defined in the Contract Documents have the meanings assigned to them therein, which are incorporated by reference as if fully set forth herein.

C. An individual contractor is required to furnish his social security number and sole proprietorship, partnership and corporation are required to furnish their employer identification numbers to Fayetteville Public Works Commission. Please indicate this information on this Bid Form as follows:

Social Security Number: _____

Federal Employer Identification Number: _____

SUBMITTED ON ____day of_____2026

AN **INDIVIDUAL**

BY:_____(SEAL)

(Individual's Name and Signature)

Doing Business as: _____

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2026

_____

NOTARY PUBLIC

My Commission Expires: _____

A **PARTNERSHIP**

BY:_____(SEAL)

(Firm Name)

(General Partner and Signature)

North Carolina Contractor Registration Number:_____

Business Address:_____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2026

_____

NOTARY PUBLIC

My Commission Expires: _____

A **CORPORATION**

BY: _____ _____

(Corporation Name) (State of Incorporation)

BY: _____ (SEAL)

(Name and Title of Person Authorized to Sign and Signature)

ATTEST: _____

(Secretary or Assistant Secretary and Signature)

North Carolina Contractor Registration Number: _____

Business Address: _____

Phone Number: _____

Subscribed and sworn to before me this ____ day of _____ 2026

_____

NOTARY PUBLIC

My Commission Expires: _____

A **JOINT VENTURE**

BY: _____

(Name and Signature)

Doing Business as: _____

North Carolina Contractor Registration Number: _____

Business Address: _____

Phone Number: _____

Subscribed and sworn to before me this____day of_____2026

_____

NOTARY PUBLIC

My Commission Expires: _____

(Each joint venturer must sign. The name of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Longview Acres Liftstation #41 and force Main Rehab
BIDDER QUALIFICATION FORM

*****MUST BE COMPLETED AND INCLUDED WITH BID*****

The Fayetteville Public Works Commission reserves the right to request information from the contractor to complete its assessment of the contractor or subcontractors qualifications. Partially complete forms may be considered non-responsive based on the quantity and quality of information provided. Wholly incomplete forms will be considered non-responsive and will result in rejection of the bid.

CONTRACTOR DOCUMENTATION

(1) Name of **Prime Contractor** and **NC License Number**:	Name: NC License No.:
a. Within the **last five (5) years**, has the contractor been involved in any judgments, claims, or arbitration with regard to construction contracts? **If so, provide list and describe each event fully. Attach additional information, as necessary.**	☐Yes (provide list and describe each event fully) ☐No
b. Within the **last five (5) years**, has any officer or principal of the organization ever been an officer or principal of another organization when it failed to complete a construction contract? **If so, provide list and describe each event fully. Attach additional information, as necessary.**	☐Yes (provide list and describe each event fully) ☐No

(2) Provide list of other **Subcontractors** and field of specialty (erosion control, access, etc.), if applicable. Additional subcontractors can be attached to the qualifications form, if necessary.

a. Subcontractor Name: Specialty:	
b. Subcontractor Name: Specialty:	
c. Subcontractor Name: Specialty:	
d. Subcontractor Name: Specialty:	

CONTRACTOR'S EXPERIENCE

(1) The Contractor shall provide not less than **four (4)** references documenting a minimum of **600** successful lateral liner installations within the last **five (5)** years. References shall be from projects within the United States. At least one (1) reference should be for an annual contract, similar in size and scope.
(2) Provide the dates of the references projects, the client representative, name, and telephone numbers. Additional projects may be attached at the Bidder's discretion.

a. Project/Location:			
Superintendent:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
b. Project/Location:			
Superintendent:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
c. Project/Location:			
Superintendent:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
d. Project/Location:			
Location:			
Superintendent:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			

(3) Provide the number of **crews** qualified and available to perform the Work:	
(4) Provide the name of the **proposed superintendent and proposed crew leaders** who are qualified and available to perform the work stated in this proposal:	Proposed Superintendent: Crew leaders/foreman:

SUPERINTENDENT'S EXPERIENCE

(1) Provide not less than **three (3)** references within the last **three (3)** years in the United States to document the proposed superintendent's ability and qualifications on projects of similar size and scope. Each reference shall be from separate projects. Additional similar projects may be attached at the Contractor's discretion.

a. Project/Location:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
b. Project/Location:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
c. Project/Location:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			
d. Project/Location:			
Number of Laterals:		Cost:	
Start Date:		End Date:	
Client:			
Client Contact Name:		Phone:	
Scope/Additional Information:			

CONTRACTOR'S EQUIPMENT AND RESOURCES

(1) Provide a list of applicable equipment **(including make/model/size/quantity) owned by the prime contractor** that will be utilized to complete the scope of work:

a. CCTV equipment:

b. Lining equipment:

c. Cleaning equipment:

d. Other Lining Support Equipment:

CERTIFICATION

(1) The Contractor shall be certified and/or licensed as an installer by the manufacturer of the cured-in-place pipe lining system. The **Contractor shall submit** a certified statement from the manufacturer that they are a certified and/or licensed installer of the lining material.

(2) All manufacturers of cured-in-place pipe lining shall be ISO 9001 or 9002 certified for the design, production, installation, and service of the lining system for a sanitary sewer collection system, and **shall submit** proof of certification.

The Fayetteville Public Works Commission may conduct such investigations/verifications as deemed necessary to establish the responsibility, qualification and financial ability of the Bidder. Should the Fayetteville Public Works Commission adjudge that the apparent low bidder is not the lowest responsive, responsible bidder by virtue of the above information furnished, said apparent low bidder will be so notified and his bid security shall be returned to him without prejudice. Failure or refusal to furnish any items of information requested by the Fayetteville Public Works Commission shall be considered as non-responsive and therefore basis for rejection of the bid.

Submitted By (print):	Date:
Title:	
Company:	
Signature:	

LIST OF SUBCONTRACTORS

In compliance with the Instructions to Bidders and the Supplementary Conditions, the undersigned submits the following names of Subcontractors to be used in performing the Work.

The Bidder certifies that all Subcontractors listed are eligible to perform the Work and that all Subcontractors performing more than five percent of the work are listed.

Subcontractor's Name	Subcontractor's Work	% of Work
		%
		%
		%
		%
		%

Bidder's Signature

BID BOND

This is a Bid Bond that is subject to the provisions of Article 3 of Chapter 44A of the North Carolina General statutes.

This Bond is executed on _____ , 20 _____ .

The name of the PRINCIPAL is _____ (1)

_____ (2)

The name of the SURETY is _____

_____

Fayetteville Public Works Commission, Fayetteville, North Carolina is the OWNER

The amount of the Bond is _____

_____ (Dollars) ($ _____)

KNOW BY ALL MEN BY THESE PRESENTS, the Principal and Surety above named are hereby held and firmly bound unto the above named OWNER hereinafter called the OWNER in the penal sum of the amount stated above in lawful money of the United States, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain Bid, attached hereto and hereby made a part hereof to enter into a Contract in writing, for the construction of:

PWC25260099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

NOW, THEREFORE

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

ATTEST:

(Principal Secretary) (SEAL)	Principal
	BY: (3)
	(Address)
Witness as to Principal	Surety
(Address)	(Address)

ATTEST:

N.C. Resident Agent
(SEAL)

Witness as to Surety

(Address)

(1) Correct name of Contractor
(2) A Corporation, a Partnership or an Individual, as the case may be
(3) If Contractor is a Partnership, all partners should execute Bond

POWER OF ATTORNEY
(Attach)

AFFIDAVIT OF ORGANIZATION AND AUTHORITY SWORN STATEMENT
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

STATE OF _____

COUNTY OF _____

_____being the first duly sworn on oath deposes and says that the Bidder on the attached Bid Form id organized as indicated below and that all statements herein made are made on behalf of such Bidder and that this deponent is authorized to make them.

(Fill Out Applicable Paragraph)

1. CORPORATION

The bidder is a corporation organized and existing under the laws of the State of _____ and its President is_____, and its Secretary is _____, and does have a corporate seal. The _____ is authorized to sign construction Contract and Bids for the company by action of its Board of Directors taken _____, a certified copy of which is hereto attached. (Strike out last sentence if not applicable.)

2. PARTNERSHIP

The Bidder is a Partnership consisting of_____ and _____, partners doing business under the name of _____.

3. SOLE TRADER

The Bidder is an individual and if operating under a trade name, such trade name is as follows: _____

4. ADDRESS

The business address of the Bidder is as follows:

_____

_____

_____ Its phone number is _____

_____

Bidder

By: _____

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract the Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant because of race, color, religion, sex, 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 race, color, religion, sex, 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 setting forth the provisions of the nondiscrimination clause.

b. 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, or national origin.

c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract understanding, a notice, to be provided, advising the labor union or worker's representative of the Contractor's commitments under the Equal Employment Opportunity Section of this Contract, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further OWNER Contracts.

e. The Contractor will include the provisions of this section in every subcontract or purchase order unless exempted by rules, regulations, or orders of the OWNER so that such provisions will be binding upon each Subcontractor or vendor.

(Use the following form for signatures by a CORPORATION):

_____
Corporate Name

ATTEST:

_____ _____
(Assistant) Secretary (Vice) President

(CORPORATE SEAL)

(Use the following form for signatures by and INDIVIDUAL):

BY: _____ (Seal)

WITNESS:

_____

(ACKNOWLEDGEMENT OF THE ABOVE SIGNATURE MUST BE NOTARIZED USING FORM ON FOLLOWING PAGE)

NONDISCRIMINATION CLAUSE

It is specifically agreed as part of the consideration of the signing of this Contract that the parties hereto, their agents, officials, employees or servants will not discriminate in any manner on the basis of age, handicap, race, color, creed, sexual orientation or national origin with reference to the subject matter of this Contract, no matter how remote.

This provision being incorporated for the benefit of Fayetteville Public Works Commission, Fayetteville, North Carolina and its residents may be enforced as set out in said ordinances, enforcement of this provision shall be by action for specific performance, injunctive relief, or other remedy as by law provided.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of this Contract.

(Use the following form for signatures by a CORPORATION):

_____
Corporate Name

ATTEST:

_____ BY: _____
(Assistant) Secretary (Vice) President

_____ BY: _____
(Printed Name) (Printed Name)

(Corporate Seal)

(Use the following form for signatures by a PARTNERSHIP or INDIVIDUAL):

BY:_____(SEAL)

_____
(Printed Name)

WITNESS:

_____

_____
(Printed Name)

NON-COLLUSIVE AFFIDAVIT

State of_____)
)
County of _____)

_____being first duly sworn, deposes and says that:

(1) He is the_____
(Owner, Partner, Officer, Representative or Agent)
of_____the BIDDER that has submitted the attached BID;

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

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

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

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

BY _____

ITS _____
(Title)

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

_____
Notary Public

My Commission Expires:

_____

END OF AFFIDAVIT

F.T.A. CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding $100,000)

The undersigned ____certifies, to the best of his or her knowledge and belief, that:

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

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq* .)]

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

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq., apply* to this certification and disclosure, if any.

_____ Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

The Primary Participant, _____ (major third party contractor), certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction or records, making false statements, or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(If the primary participant is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT _____ CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET. SEQ. ARE APPLICABLE THERETO.

_____	_____
Signature	Title
_____	_____
Printed Name	Date

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SMALL AND DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

FAYETTEVILLE PUBLIC WORKS COMMISSION'S

SDBE COMPLIANCE PROVISIONS

APPLICATION:

The requirements of Fayetteville Public Works Commission (PWC) Small Disadvantaged Business Enterprise Policy for participation in specific contracts are hereby made part of the Contract Documents. Copies of the Policy may be obtained from:

Fayetteville Public Works Commission
Economic Impact Program
P.O. Box 1089
Fayetteville, North Carolina 28302
Phone (910) 223-4016 Fax (910) 483-1429
E-mail: eiprogram@faypwc.com

NCDOT DBE Directory: www.ebs.nc.gov/VendorDirectory
HUB Directory: https://ncadmin.nc.gov/businesses/hub

SDBE Compliance Requirements:

1. The Bidder shall provide, with their Bid Form, at the time bids are due, the documents set forth below, properly executed. Returning executed copies indicates and establishes that the Bidder understands and agrees to any incorporated SDBE contract provisions.

2. All Bidders must provide, with their Bid Form, at the time bids are due, a properly completed and executed copy of **either:**

   - Affidavit A – Listing of Good-Faith Efforts **OR**
   - Affidavit B – Intent to Self-Perform with Own Workforce.[1]

   Note: Affidavit B should **only** be used if the Contractor will perform **ALL Elements** of the Work on this project with their own forces **AND** will complete **ALL Elements** of this project **WITHOUT** the use of subcontractors, material suppliers, or providers of professional services.

3. Upon being identified as the apparent lowest responsive, responsible Bidder, a Bidder shall, within twenty-four (24) hours of PWC's notification provide a properly completed and executed copy of **either:**

   - Affidavit C – Percentage of SDBE Participation **OR**
   - Affidavit D – Good-Faith Efforts.

4. All Bidders must provide with their Bid Form, at the time bids are due, a properly completed and executed copy of Affidavit E- Identification of SDBE/Local Participation Form

SMALL AND DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

All written statements, certifications, or intentions made by the Bidder shall become a part of the agreement between the Contractor and Fayetteville Public Works Commission for performance of this contract.

SUBCONTRACTOR PAYMENT REQUIREMENTS:

North Carolina General Statutes (N.C.G.S.) 143-134.1 states that the percentage of retainage on payments made by the prime contractor to the subcontractor shall not exceed the percentage of retainage on payments made by the Fayetteville Public Works Commission to the prime contractor. Failure to comply with this provision shall be considered a breach of the contract, and the contract may be terminated in accordance with the termination provisions of the contract.

The Contractor shall provide an itemized statement of payments to each SDBE subcontractor before final payment is processed.

The Contractor shall provide an itemized statement of payments to each NON-SDBE subcontractor before final payment is processed.

_____
Contractor

_____
Signature

_____,_____
Printed Name Title

_____
Date

Affidavit A: Listing of the Good Faith Efforts

Affidavit of _____
(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:

Total Available GFE Points: ***155***		*Expected Number GFE Points* ***Required*****: 50**
Points		
	10	Contacting small-disadvantaged businesses (SDBE) that reasonably could have been expected to submit a quote and that were known to the contractor or available on Federal, State, or local government-maintained lists at least 10 days before the bid or proposal date, and notifying them of the nature and scope of the work to be performed.
	10	Making the construction plans, scope of work, specifications, or requirements available for review by prospective SDBE or providing these documents to them at least 10 days before the bid or proposals are due.
	15	Breaking down or combining elements of work into economically feasible units to facilitate SDBE participation.
	10	Working with SDBE trade, community, or contractor organizations identified by the U.S. Small Business Administration, N.C. Office for Historically Underutilized Businesses, or N.C. Department of Transportation, and included in the bid documents that provide assistance in the recruitment of small, disadvantaged businesses.
	10	Attending any pre-bid meetings scheduled by the public owner.
	20	Providing assistance in getting required bonding or insurance, or providing alternatives to bonding or insurance for subcontractors.
	15	Negotiating in good faith with interested SDBEs and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of an SDBE based on a lack of qualification should have the reasons documented in writing.
	25	Providing assistance to an otherwise qualified SDBEs 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. Assisting SDBEs in obtaining the same unit pricing with the bidder's suppliers in order to help SDBEs in establishing credit.
	20	Negotiating joint venture and partnership arrangements with small, disadvantaged businesses to increase opportunities for SDBE participation on a public construction or repair project when possible.
	20	Providing quick pay agreements and policies to enable SDBE contractors and suppliers to meet cash-flow demands.
Total GFE Points (Claimed by Bidder):		***Total GFE Points (Assessed by PWC):***

In accordance with PWC's SDBE Policy and Program Plan, the undersigned will enter into a formal agreement with the firms listed in the Identification of Small Disadvantaged Business Participation schedule, conditional upon execution of a contract with the Owner. Failure to abide by any applicable statutory provision may constitute a breach of the contract. The undersigned hereby certifies that he or she has read the terms of the SDBE business commitment and is authorized to bind the Bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

Affidavit B: Intent to Perform Contract with Own Workforce

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the contract:

_____
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform **all elements of the work** on this project with his/her own current workforces; and will complete all elements of this project **without** the use of subcontractors, material suppliers, or providers of professional services.

The Bidder agrees to provide any additional information or documentation requested by the Owner in support of the above statement.

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

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

Affidavit C: Percentage of SDBE Participation

Affidavit of _____
(Name of Bidder)

I hereby certify that on contract: _____
(Name of Project)

$_____
(Dollar Amount of Total Bid)

I will expend a minimum of _____% of the total dollar amount of the contract with Small Disadvantaged Business Enterprises (SDBE). SDBEs will be employed as subcontractors, vendors, or providers of professional services. Such work will be subcontracted to the following firms listed below.

Name, Address, & Phone No.	*SDBE/Certifying Agency	NAICS	Dollar Value	% of Contract

*SDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D), Small (S)
*Certifying Agencies: NC DOA (HUB), NC DOT (DBE), U.S. SBA

Pursuant to NCGS 143-128.2(d), the undersigned will enter into a formal agreement with SDBEs for work listed in this schedule, conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

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

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

Affidavit D: Good Faith Efforts

If the Owner determines, using reasonable discretion, that Affidavit C is insufficient, Bidder agrees to provide the following information regarding any good-faith efforts.

Name, Address, & Phone No.	*SDBE Category	NAICS	Dollar Value

*SDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

Bidder may be requested to provide documentation of the Bidder's good-faith efforts. Examples of documentation may include the following:

a. Copies of solicitations for quotes to SDBEs. Each solicitation may include a specific description of the work to be subcontracted, the location where bid documents can be reviewed, the representative of the Prime Bidder to contact, and the location, date, and time when quotes must be received.
b. Copies of quotes or responses received from each firm responding to the solicitation.
c. A telephone log of follow-up calls to each firm sent a solicitation.
d. For subcontracts where an SDBE is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
e. Documentation of any contacts or correspondence to SDBE, community or contractor organizations in an attempt to meet the goal.
f. Copy of pre-bid roster.
g. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for SDBEs.
h. Letter detailing reasons for rejection of an SDBE due to lack of qualification.
i. Letter documenting proposed assistance offered to SDBEs 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.

Failure to provide the documentation listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive Bidder.

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

Affidavit E: Identification of SDBE/Local Participation

_____
(Name of Bidder)

I hereby certify that on contract: _____

(Name of Project)

We will use the following Small Disadvantaged Business Enterprises (SDBE), and Local (Cumberland, Hoke, Harnett County) as construction subcontractors, vendors, suppliers, or providers of professional or general services.

Name, Address, & Phone No.	*SDBE Category / **Local	NAICS	Dollar Value

*SDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian- Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

**Local: Fayetteville Metropolitan Statistical Area (MSA) comprising Cumberland County, Hoke County, and Harnett County. PWC is requesting this information for reporting purposes only, and the use of local entities will not be considered for compliance with the requirements of the SDBE Policy.

The total value of SDBE/local business contracting will be $_____

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

FAYETTEVILLE PUBLIC WORKS COMMISSION
SDBE ADD / CHANGE FORM

If a SDBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the good faith efforts set forth in the SDBE Policy if soliciting a replacement or additional subcontractor.

For SDBE Change Request, please provide all information below:

Prime Contractor: _____

Subcontracted Work: _____

Previous Subcontractor: _____

Reason this for change request:

_____

New Subcontractor: _____SDBE Category: _____

To Add SDBE Subcontractor/Subcontracted work:

If this is a new trade being subcontracted or a subcontractor that was not documented in the original Project Bid Information submittal, then good faith efforts to solicit an SDBE must be documented, as the original SDBE instructions indicate. Please provide all good faith efforts below showing all the SDBE firms contacted to perform this work, along with any additional good faith efforts or evidence that there are not reasonably available firms in the work area. PWC's SDBE Policy requires 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.

Name, Address, & Contact Information	SBE or DBE and Certifying agency	How was this firm contacted (email, letter, or 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

Date:_____Name of Authorized Officer: _____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of 20___

Notary Public _____

My commission expires _____

SMALL AND DISADVANTAGED BUSINESS (SDBE), SMALL LOCAL SUPPLIER (SLS), AND LOCAL BUSINESS DISCLOSURE FORM

Prime Contractor: _____
Address & Phone: _____
Project: _____
Name: _____
Pay Application # _____

Please complete the form below by providing the necessary information for the payments made to each subcontractor, vendor, or supplier for the work associated with the identified contractor application for payment. This form must be fully completed and attached to each contractor application for payment.

Firm Name	SDBE, SLS, or Local	Construction Trade or Supplies	Payment Amount
Ex. ABC Company *Ex. DEF Enterprise* *Ex. GHI Incorporated*	*SDBE – NC HUB M* *SLS – PWC* *Local – Fayetteville*	*Hauling* *Paint* *Tire Repair*	*$25,000.00* *$600.00* *$2,000.00*

_____
Signature

_____, _____
Printed Name Title

_____
Date

SECTION B - CONTRACT EXECUTION DOCUMENTS

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NOTICE OF AWARD

TO: _____
_____
_____

PROJECT DESCRIPTION: **PWC2526099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN**

The OWNER has considered the BID submitted by you for the above described work in response to its Advertisement for Bids dated _____ and Instructions to Bidders.

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

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this NOTICE to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

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

Dated this _____day of _____, 2026.

OWNER: **FAYETTEVILLE PUBLIC WORKS COMMISSION**
FAYETTEVILLE, NC

BY: Nikole Bohannon
TITLE: Procurement Manager

ACCEPTANCE OF AWARD

PWC25260099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

Receipt of the preceding NOTICE OF AWARD is hereby acknowledged this the _____

day of _____, 2026.

(CONTRACTOR)

By:_____

Title:_____

- END OF SECTION -

State of North Carolina
Cumberland County

CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT ("Agreement" or "Contract") is made by and between the Fayetteville Public Works Commission ("PWC"), a North Carolina public authority, and _____ [PER THE CHARTER (SEE SEC 6A.20), THE CONSTRUCTION CONTRACT, IF MORE THAN $500K, MUST BE BETWEEN THE CITY (BY AND THROUGH PWC) AND THE CONTRACTOR], ("Contractor"), a _____ registered to do business in North Carolina (each of PWC and Contractor is a "Party" and both are collectively the "Parties") as of the date of execution last written below (the "Effective Date"). The Parties agree as follows:

1. The Construction Project. Contractor shall furnish and bear solely the entire cost of all labor and materials necessary for the construction and/or renovation of the Project (defined hereinbelow) as specified in the Contract Documents (defined hereinbelow) and complete all Work on the Project in a Workmanlike manner in strict accordance with the Contract Documents, schedule delivery of the new materials, furnish and bear solely the entire cost of all supervision, contract administration, equipment, tools, and other means necessary to complete the Project, perform every obligation imposed by the Contract Documents, and be solely responsible for the clean-up and disposal of all materials and debris relating to or arising from the construction and renovation, subject to any exceptions that are specifically set forth in the Contract Documents. Except as otherwise specifically provided in the Contract Documents, Contractor is solely responsible for all construction means, methods, techniques, sequences, procedures, safety precautions or programs, supervising, coordinating, and performing all the Work necessary to complete the Project; provided, however, PWC shall have the right, without incurring any liability to the Contractor, to suspend Contractor's performance when a PWC employee, in his or her opinion, observes a safety violation involving a threat to life or imminent danger of bodily injury, and the suspension shall remain in effect until Contractor remedies the safety violation.

2. Terms. Capitalized terms used in this Agreement have the meaning specified below:

"Business Day" means each calendar day that is not a Saturday, Sunday, holiday observed by the federal government for its employees, or holiday observed by the State of North Carolina for its employees.

"Completion of the Project" means: (i) the Project is completed in accordance with this Agreement, except for punch list items; (ii) PWC has received any required temporary or final certificate of occupancy from the governmental agency with jurisdiction over the Project; and (iii) the registered architects or engineers (the "Designer(s)") who designed portions or components of the Project have issued certificates of Completion of the Project as to those portions or components.

"Contract Documents" means the following documents that were either made available to Contractor by PWC during the bid solicitation process (including Drawings) or executed by the Parties or both, which are all incorporated by reference herein:

SAMPLE

a. This Agreement
b. General Conditions
c. Bid Submittal Documents
d. Contractor's Submitted Bid
e. Bid Bond
f. [Form of Exceptions]
g. Notice of Award
h. Acceptance of Award
i. Performance Bond
j. Payment Bond
k. Copy of General Contractor's License
l. Power of Attorney
m. Certificate of Insurance
n. Section C – Administrative Provisions
o. Section D - Technical Specifications
p. [Additional Specifications]
q. [Appendices]

The following documents may be delivered or issued on or after the Effective Date of the Agreement and may not be attached to this Agreement, but are considered Contract Documents when executed by the Parties:

r. Notice to Proceed and Acceptance of Notice
s. Work Change Directive(s)
t. Change Order(s)
u. Field Order(s)

There are no Contract Documents other than those identified in this Agreement. The Contract Documents may only be amended, modified, or supplemented as provided in this Agreement in a writing signed by the Parties.

"Fault" means a breach of contract by Contractor, negligent, reckless, or intentional act(s) or omission(s) constituting a tort under applicable statutes or common law by one or more Responsible Persons, or violation(s) of applicable statute(s) or regulation(s) by a Responsible Person.

"Project" means _____ _____, as more specifically set forth in the Contract Documents.

"Responsible Person" means the Contractor and each of its employees, agents, representatives, subcontractors, or other persons and entities for which Contractor may be liable or responsible as a result of any statutory, tort, or contractual duty.

The terms used in this Agreement shall have the meaning as stated herein and in the General Conditions. In the event of a conflict between the terms of this Agreement and any other component(s) of the Contract Documents, the terms of this Agreement shall govern.

3. Contract Price. PWC shall pay Contractor for Completion of the Project in accordance with the Contract Documents the amount identified in the accepted Bid Form of

SAMPLE

Contractor, being in the total amount of $_____ (the "Price"). Contractor understands and acknowledges that the Price is derived from a specific appropriation of funds provided for the Project. Contractor agrees and acknowledges the Price is equal to the aggregate cost of all Work to be done on the Project, including all labor, materials, equipment, apparatus, and supplies, set in accordance with the amount specified on the Bid Form submitted by Contractor and accepted by PWC.

4. Contract Times. The Parties shall perform their obligations under this Agreement in compliance with all scheduling deadlines set forth in the Contract Documents. The Contractor shall commence the Work to be performed under this Agreement on a date to be specified in accordance with the Notice to Proceed issued by PWC. Contractor shall achieve Completion of the Project no later than 360 consecutive calendar days from said date plus any modifications thereof allowed in accordance with the Contract Documents (the "Completion Date").

5. Payment. PWC shall pay Contractor in installment payments plus a final payment, as set forth in the Contract Documents. For each applicable installment payment, Contractor shall submit an application for payment in accordance with the Contract Documents. An application for payment will be processed by PWC as provided in the Contract Documents. Such installment payments shall reflect the actual Cost of the Work, not to exceed in total the Price, and the allocable portion of the total Price for said installment. PWC shall make payment to the Contractor, less any applicable retainage set forth in the Contract Documents; provided, however, that PWC may withhold all or a portion of a payment on account of (1) incomplete Work, (2) defective or nonconforming Work, (3) claims filed or a reasonable basis to believe that such claims will be filed imminently, (4) failure of the Contractor to make payments properly for labor, services, materials, equipment or subcontracts, (5) damages caused to PWC or another party by one or more Responsible Persons, or (6) failure to comply with the terms and conditions of this Agreement. In the final payment, PWC shall pay the balance of the Price, including all retained amounts, less any Liquidated Damages and other applicable damage and claim amounts, to Contractor within forty-five (45) days of Completion of the Project; provided, however, that PWC may withhold a reasonable sum from the final payment to ensure correction of any final items or condition on the Project.

6. Retainage. Subject to any restrictions applicable to any federal grant funds that may be utilized for the Project, PWC may, in its discretion, retain up to five percent (5%) of any periodic payment due Contractor; provided, however, when the Project is fifty percent (50%) complete, PWC, with written consent of the surety, shall not retain any further retainage from periodic payments due Contractor if Contractor continues to perform satisfactorily and any nonconforming Work identified in writing prior to that time by PWC or the Designer has been corrected by Contractor and accepted by PWC or the Designer, and provided further that full payment, less authorized deductions, shall also be made for those line item trades that have reached one hundred percent (100%) completion of their contract obligations by or before the Project is fifty percent (50%) complete if Contractor has performed satisfactorily in accordance with G.S. 143-134.1(b2), contingent upon PWC's receipt of an approval or certification from the Designer that the Work performed by the subcontractor is acceptable and in accordance with the Contract Documents. If PWC determines Contractor's performance is unsatisfactory, PWC may, in its discretion, reinstate retainage for each subsequent periodic application for payment as authorized in this Section up to the maximum amount of five percent (5%). The Project shall be deemed fifty percent (50%) complete when Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the Price, except the value of materials stored on-site shall not exceed twenty percent (20%) of Contractor's gross project invoices for the purpose of determining whether the Project is fifty percent (50%)

SAMPLE

complete. Within 60 days after the submission of a pay request and one of the following occurs, as specified in the Contract Documents, PWC, with written consent of the surety, shall release to Contractor all retainage on payments held by PWC: (i) PWC receives a certificate of Substantial Completion from the Designer in charge of the Project; or (ii) PWC receives beneficial occupancy or use of the Project; provided, however, PWC may in its discretion retain sufficient funds to secure Completion of the Project or corrections on any Work. If PWC retains funds, the amount retained shall not exceed two and one-half times the estimated value of the Work to be completed or corrected. Any reduction in the amount of the retainage on payments shall be with the consent of Contractor's surety. The existence of any third-party claims against Contractor or any additive change orders to the Construction Documents shall not be a basis for delaying the release of any retainage on payments. Notwithstanding anything in this Section to the contrary, following fifty percent (50%) completion of the Project, PWC shall be authorized to withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%), in order to allow PWC to retain two and one-half percent (2.5%) total retainage through the Completion of the Project. In the event that PWC elects to withhold additional retainage on any periodic payment subsequent to release of retainage on a line-item of Work pursuant to G.S. 143-134.1(b2), Contractor may also withhold from the subcontractors remaining on the project sufficient retainage to offset the additional retainage held by PWC, notwithstanding the actual percentage of retainage withheld by PWC of the Project as a whole. Neither PWC's nor Contractor's release of retainage on payments as part of a payment in full on a line-item of Work pursuant to G.S. 143-134.1(b2) shall affect any applicable warranties on Work done by Contractor or subcontractor, and the warranties shall not begin to run any earlier than either PWC's receipt of a certificate of Substantial Completion from the Designer in charge of the Project or PWC receives beneficial occupancy.

7. Liquidated Damages. Time is of the essence with respect to performance of each of the Parties' obligations under this Agreement. Contractor recognizes and acknowledges that PWC will suffer financial and other losses if the Project is not completed by the Completion Date. The Parties recognize and agree that the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by PWC if the Project is not completed by the Completion Date. Accordingly, instead of requiring any such proof, Contractor and PWC agree that in the event Contractor fails to achieve Completion of the Project by the Completion Date, Contractor shall pay to PWC as liquidated damages to compensate PWC for damages related to the delayed Completion of the Project one thousand dollars ($1000.00) per day ("Liquidated Damages") for each calendar day Contractor fails to achieve Completion of the Project by the Completion Date.

8. Contractor's Representations and Warranties. In order to induce PWC to enter into this Agreement, Contractor makes the following representations and warranties to PWC:

a. Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform this Agreement in accordance with the terms and conditions of this Agreement, and this Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

b. Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

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c. Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project. Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

d. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Contract Documents and any accompanying reports and drawings, and (2) reports and drawings relating to hazardous environmental conditions, if any, at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.

e. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

f. Based on the information and observations referred to in subsection e. of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Price commencing on the commencement date and in accordance with the other terms and conditions of the Contract.

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

h. Contractor has given PWC's Designer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by the Designer is acceptable to Contractor.

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

j. Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

k. Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops

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during the performance of Work on the Project.

9. Contractor's Payment Obligations. Contractor shall pay all of its obligations arising out of or in connection with the Project in a timely manner to all persons supplying materials in the prosecution of the Work and to all laborers and others employed thereon.

10. Performance and Payment Bonds. Contractor shall obtain and deliver to PWC a performance bond in the amount of one hundred percent (100%) of the Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be solely for the protection of PWC. Contractor shall obtain and deliver to PWC a payment bond in the amount of one hundred percent (100%) of the Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable. The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A. In the event PWC deems the surety or sureties upon any bond necessary for this Agreement and the completion of the Project, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, within five (5) days after the receipt of notice from PWC, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC. Contractor understands and acknowledges that PWC, as a public authority, is not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

11. Contractor's Damage Repair Obligations. Contractor shall be responsible for all damages to the property of the City of Fayetteville and of PWC that may result from the normal procedure of a Responsible Person's actions in the prosecution of the Work or that may be caused by or result from the negligence of a Responsible Person during the progress of or connected with the prosecution of the Work, whether within the limits of the Work or elsewhere. Contractor shall promptly restore all such property so damaged to a condition as good as it was immediately prior to Contractor initiating the Work on the Project.

12. Defective Work. The Project shall be subject to observation and approval by PWC, Designer, and representatives of governmental agencies with jurisdiction over the Project. PWC and Designer shall be entitled to enter at all reasonable times the premises subject to construction or renovation to inspect the Work performed by or on behalf of Contractor, provided that such entry and inspection does not materially interfere with the progress of construction. Contractor shall correct promptly, at no cost to PWC, all Work reasonably rejected by PWC or by its representatives. Should Contractor fail to correct rejected Work, PWC may, acting in its sole discretion, correct such Work and the Contractor shall pay PWC's actual costs of correction and any other applicable amounts identified in the Contract Documents.

13. As-Built Drawings. Contractor shall maintain during the progress of the Project as-built drawings indicating the current status of the Project as actually performed. Upon Completion of the Project, Contractor shall prepare a final version of such as-built drawings and

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submit them to PWC for approval.

14. Assignment. This Agreement shall be binding upon and inure to the benefit of the Parties, their legal representatives, successors, and assigns. Contractor may not assign, transfer, convey, or encumber, whether voluntarily or by operation of law, this Agreement or any obligations, rights under, or interests in this Agreement to a third party without the prior written consent of PWC; and, specifically, but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

15. Indemnity. Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City of Fayetteville and its elected officials, managers, employees, agents, and representatives and Design Engineer (collectively "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified. Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of this Agreement.

16. Insurance. Contractor shall maintain during the Work and for at least three (3) years following Completion of the Project the insurance coverage set forth in the Contract Documents, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rated A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC. Prior to initiating any Work, Contractor shall deliver certificates of insurance confirming each such coverage required by the Contract Documents, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period. PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies. Commercial general liability coverage shall be written on an "occurrence" basis. Contractor shall not reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC. The insurance provisions of this Agreement shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Completion of the Project shall survive the termination of this Agreement.

17. Warranty. The Contractor hereby grants to PWC a warranty on all materials and Workmanship involved in the Project for a period of one (1) year from the Completion Date and a period of two (2) years from the Completion Date for any latent structural defects. PWC shall

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give written notice to Contractor of any claim under this Section within the time specified hereinabove. This warranty shall be in addition to, and not in derogation of, all other rights and privileges which PWC may have under law, equity, or instrument, and shall survive the Completion Date and the final settlement and shall be binding on Contractor notwithstanding any provision in any other writing executed by PWC heretofore or contemporaneous with the execution of the Agreement or prior to the Completion Date.

18. Waiver. No failure on the part of any party to exercise, and no delay in exercising, any right, power, or privilege hereunder shall operate as a waiver thereof, nor shall any single or partial exercise of any right hereunder preclude any other or further cumulative and not exclusive of any remedies provided by law. This Agreement shall be binding upon and inure to the benefit of the parties, their legal representatives, successors, and assigns. This Agreement may not be assigned, transferred, conveyed, or encumbered, whether voluntarily or by operation of law, by either party without the prior written consent of the other party, which consent shall not be unreasonably withheld.

19. Law. THIS AGREEMENT SHALL BE GOVERNED BY AND INTERPRETED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NORTH CAROLINA WITHOUT GIVING EFFECT TO THE CHOICE OF LAW PROVISIONS THEREOF. The Contractor shall at all times comply with all applicable Federal, state, and local laws and building codes in the performance of its obligations under the Agreement.

20. Dispute Resolution. In the event of any dispute, controversy, or claim of any kind or nature arising under or in connection with this Agreement (a “Dispute”) and involving any two or more of the following parties, PWC, Designer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties’ selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate arbitration proceedings. Any controversy or claim arising out of or relating to the Contract Documents, or the breach thereof, shall be settled by binding arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina. The costs of the mediator and arbitrator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolution and the remainder of the cost shall be divided equally among the other parties participating in the dispute resolution. PWC shall, in its contractual arrangements with Designer, and Contractor shall, in its contracts with subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in the Contract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

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21. Execution; Modification; Entire Agreement; Severability. This Agreement may be executed in counterparts with the same effect as if the signatures to each counterpart were upon a single instrument, and all such counterparts together shall be deemed an original of this Agreement. For purposes of this Agreement, a facsimile copy or scanned copy or photocopy of a party's signature shall be sufficient to bind such party. This Agreement shall be subject to execution by electronic means in accordance with Article 40 of Chapter 66 of the North Carolina General Statutes. No oral communication, promise, understanding, or agreement before, contemporaneous with, or after the execution of this Agreement shall affect or modify any of the terms and conditions and obligations of the Contract Documents. The Contract Documents shall be modified only by a subsequent writing signed by both Parties. The Contract Documents shall be conclusively considered to contain and express all the terms and conditions agreed upon by the Parties, notwithstanding any prior or contemporaneous written communication, promise, understanding or agreement. Should any provision of this Agreement or any of the Contract Documents at any time be in conflict with any law, statute, rule, regulation, order, or ruling and thus be unenforceable, or be unenforceable for any other reason, then the remaining provisions of this Agreement shall remain in full force and effect and the court or arbitrator shall give the offending provision the fullest meaning and effect permitted by law. The titles of the Sections throughout this Agreement are for convenience only and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction, or meaning of the provisions of this instrument.

22. Notices. Any notice which either Party is required or desires to give the other hereunder shall be deemed sufficiently given if, in writing, it is delivered personally, or sent by certified U.S. mail, return-receipt requested, postage prepaid, to the addresses listed herein below, or such other address as either Party shall give to the other Party by written notice in accordance herewith. Any notice given herein by personal delivery shall be deemed delivered when received. Any properly addressed notice given herein by certified mail shall be deemed delivered on third Business Day after the same is deposited in an official United States Post Office, postage prepaid, or if sooner upon the date when the return receipt therefore is signed, or refusal to accept the mailing by the addressee is noted thereon by the postal authorities.

To PWC:
Fayetteville Public Works Commission
Attn: Timothy Bryant, CEO/General Manager
PO Box 1089
Fayetteville, NC 28302

To Contractor:

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23. Termination. PWC may terminate this Agreement immediately if during the progress of the Work or during the warranty period, the Contractor:

a. Persistently fails to prosecute the Work properly and in accordance with this contract, including but not limited to include failure to provide sufficient crews, equipment, or resources, or failure to adhere to the schedule;

b. Demonstrates disregard for the policies, procedures, or requirements of PWC;

c. Demonstrates complete disregard of the authority of PWC or its designated representatives; or

d. Violates in any substantial way the provisions and requirements of this Agreement.

Such termination shall be effective upon written notice to Contractor and its surety. PWC may terminate the contract for its convenience by providing Contractor at least seven (7) calendar days prior written notice, in which event Contractor shall be paid for all Work completed, plus other expenses as mutually agreed upon between PWC and Contractor.

24. Compliance. Contractor hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the Work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to Work in the United States, shall verify the Work authorization of the employee through E-Verify in accordance with N.C.G.S. §64-26(a). Contractor hereby pledges, attests, and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2, Chapter 64 of the North Carolina General Statutes and further pledges, attests, and warrants that all subcontractors currently employed by or subsequently hired by Contractor shall comply with all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement. Contractor hereby further acknowledges that the execution and delivery of this Agreement constitutes Contractor's certification to PWC and to the North Carolina State Treasurer that, as of the date of the Effective Date of this Agreement, Contractor is not listed on (a) the Final Divestment List created and maintained by the North Carolina Department of State Treasurer pursuant to the Iran Divestment Act of 2015, Chapter 147, Article 6E of the General Statutes of North Carolina (the "Iran Divestment Act"); or (b) the list of companies that the North Carolina State Treasurer determines to be engaged in a boycott of Israel in accordance with Article 6G of Chapter 147 of the General Statutes of North Carolina. Contractor represents and warrants to Commission that Contractor, and all persons and entities owning (directly or indirectly) an ownership interest in it: (i) are not, and will not become, a person or entity with whom a party is restricted from doing business with under regulations of the Office of Foreign Asset Control ("OFAC") of the Department of the Treasury (including, but not limited to, those named on OFAC's Specially Designated and Blocked Persons list) or under any statute, executive order (including, but not limited to, the September 24, 2001, Executive Order 13224 Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action; and (ii) are not knowingly engaged in, and will not knowingly engage in, any dealings or transactions or be otherwise associated with such persons or entities described in clause (i) above. Contractor also shall at all times during the term of this Agreement comply with Executive Order 11246, including but not limited to the Equal Opportunity Clause requirements set forth in 41 C.F.R. § 60-1.4. Contractor shall abide by the requirements of 41 CFR 60–300.5(a) and 60–741.5(a) prohibiting discrimination against qualified individuals on the basis of protected veteran status or disability and requiring affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and individuals with disabilities.

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IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representatives.

Fayetteville Public Works Commission

[PER OUR CHARTER (SEE SEC 6A.20), THE CONSTRUCTION CONTRACT, IF MORE THAN $500K, MUST BE BETWEEN THE CITY (BY AND THROUGH PWC) AND THE CONTRACTOR]

By:_____
Timothy Bryant, CEO/GM

Date: _____

CONTRACTOR

By:_____

_____
(Printed Name, Title)

Date: _____

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act (N.C. Gen. Stat. § 159-1 et seq.).

By:_____
Rhonda Haskins, Chief Financial Officer

Approved as to form:

_____
Legal Dept.

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GENERAL CONDITIONS FOR
FAYETTEVILLE PUBLIC WORKS COMMISSION

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General Conditions

Article I. Definitions and Terminology

Section 1.01 Definitions

Capitalized terms used in the Bid Documents or Contract Documents, including the singular and plural forms, shall have the meaning indicated in the definitions below. In addition to terms specifically defined below, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

(a) Addenda—Written or graphic instruments issued before the opening of Bids which clarify, correct, or change the Bid Documents or other Contract Documents.

(b) Agreement—The written instrument, executed by PWC and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties, designates the specific documents that encompass the Contract Documents, and provides other material provisions that govern the relationship between the parties as it relates to the Project. The Agreement is also referred to, and titled as, the “Construction Agreement.”

(c) Application for Payment—The form that Contractor shall use during the Work in requesting progress or final payments. Any Application for Payment shall be accompanied by such supporting documentation as is required by the Contract Documents.

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

(e) Bidder—An individual or entity that submits a Bid to PWC for the Project.

(f) Bid Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

(g) Bidding Requirements—The Invitation to Bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bidder’s original Bid with any requisite attachments.

(h) Business Day—each calendar day that is not a Saturday, Sunday, or holiday observed by PWC (New Year’s Day, Martin Luther King, Jr. Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving Day (and the day after), and Christmas (2 days) for its employees.

(i) Change Order—A document that is signed by Contractor and PWC, which authorizes an addition, deletion, or revision in the Work, an adjustment in the Contract Price or the Contract Times, a change in the scope of the Project, or other revision to the Agreement, issued on or after the Effective Date of the Agreement.

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

(k) Completion of the Project—Has the meaning as set forth in the Construction Agreement.

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

(m) Contract Price—The money that PWC has agreed to pay Contractor for Completion of the Project in accordance with the Contract Documents. May also be referred to as "Price" throughout the Contract Documents.

(n) Contract Times—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; and (b) Completion of the Project.

(o) Contractor—The individual or entity with which PWC has contracted for performance of the Work and Completion of the Project.

(p) Cost of the Work

A. Costs Included: To determine Cost of the Work when Cost of the Work is a component of the Contract Price, except as otherwise may be agreed to in writing by PWC, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the excluded costs specifically itemized below, and shall include only the following items:

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

(ii) Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

(iii) Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and

fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this subsection (p).

(iv) Supplemental costs including the following:

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

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

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

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

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

(i) Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications agreed upon by Owner and Contractor. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

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

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

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

(v) Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included herein.

(vi) Contractor's fee.

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

(q) Day—a calendar day of 24 hours measured from midnight to the next midnight. Also referred to throughout the Contract Documents as "days" or "calendar days."

(r) Design Engineer—The Engineering firm identified on the Contract Drawings and their duly authorized employees and agents, such employees and agents acting within the scope of the particular duties entrusted to them in each case.

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

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

(u) Final Completion—The day the on which any specified Work is complete in accordance with the Contract Documents.

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

(w) Laws and Regulations; Laws or Regulations—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction. Such terms, unless otherwise specified, shall refer to North Carolina laws and regulations.

(x) Milestone—A principal event in the performance of the Work that the Agreement requires Contractor to achieve by an intermediate completion date or by a time prior to Completion of the Project.

(y) Non-Compliance Notice—A written notice issued by PWC to Contractor indicating a violation of any term, provision, or requirement of the Contract Documents.

(z) Notice of Award—The written notice by PWC to a Bidder providing of PWC's acceptance of the Bid upon timely compliance by the Bidder with any conditions precedent provided in the notice.

(aa) Notice to Proceed—A written notice by PWC to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

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

(cc) Project—has the meaning ascribed to it in the Agreement and is as more specifically set forth throughout the Contract Documents. "Project" includes the total undertaking to be accomplished for PWC by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

(dd) Project Engineer—the PWC employee assigned by PWC to coordinate, manage, monitor, and otherwise perform the administration necessary and consistent with PWC's responsibilities for the Completion of the Project. The Project Engineer has authority to coordinate and work with the Design Engineer regarding any engineering questions, concerns, revisions, alterations, deletions, or additions to the Work, and has authority to approve any changes in the scope of the Work. Project Engineer may assign a "Project Coordinator" who will also be an employee of PWC and have the duties and responsibilities set by the Project Engineer.

(ee) PWC—Fayetteville Public Works Commission. PWC may also be referred to in the Contract Documents as "Owner."

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

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

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

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

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

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

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

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

(nn) Successful Bidder—The Bidder whose Bid PWC accepts, and to which PWC provides a Notice of Award.

(oo) Supplementary Conditions—Any part of the Agreement that amends or supplements these General Conditions.

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

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

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

(ss) Unit Price Work—Work to be paid for on the basis of unit prices.

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

(uu) Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by PWC and recommended by the Project Engineer, ordering an addition, deletion, or revision in the Work.

Section 1.02 Terminology

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

(a) Intent of Certain Terms or Adjectives:

(i) The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Project Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Project Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the

Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Project Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions the Contract Documents.

(b) Defective—when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

(i) does not conform to the Contract Documents; or
(ii) does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
(iii) has been damaged prior to Project Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by PWC at Substantial Completion in accordance with the Contract Documents).

(c) Furnish, Install, Perform, Provide

(i) The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
(ii) The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
(iii) The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
(iv) If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

Article II. Preliminary Matters

Section 2.01 Delivery of Bonds and Evidence of Insurance

(a) Bonds: Contractor shall deliver to PWC such bonds as Contractor is required to furnish simultaneously with delivering the executed Agreement to PWC.

(b) Contractor's Insurance: Contractor shall deliver to PWC the certificates and other evidence of the insurance required by the Contract Documents simultaneously with delivering the executed Agreement to PWC.

Section 2.02 Copies of Documents

(a) PWC will furnish to Contractor up to five (5) printed copies of the Contract Documents upon request by Contractor, and one (1) copy in electronic portable document format

(PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

(b) PWC will maintain and safeguard at least one original printed record version of the Agreement, including Drawings and Specifications signed and sealed by Design Engineer or other design professionals as applicable. PWC agrees to make such original printed record version of the Agreement reasonably available to Contractor for review during PWC's normal business hours. PWC may delegate the responsibilities under this provision to Design Engineer.

Section 2.03 Before Starting any Work

(a) Within ten (10) Days after the Contractor receives the Notice of Award from PWC (or as otherwise specifically required by the Contract Documents), Contractor shall submit to PWC for timely review:

(i) a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the identifiable aspects of the Work, including any Milestones specified in the Contract Documents;
(ii) a preliminary Schedule of Submittals; and
(iii) Any Shop Drawings, Samples, and other submittals required by the Contract Documents before the Preconstruction Conference.

Section 2.04 Preconstruction Conference; Designation of Authorized Representatives

(a) Before any Work at the Site is started, a preconstruction conference attended by PWC, Project Engineer, Contractor, Design Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss general Project issues including, but not limited, the following:
(i) The schedules and submittals referred to in Section 2.03;
(ii) Contractor's designated authorized representative as described in Section 2.04(b);
(iii) Safety;
(iv) Procedures for handling Shop Drawings, Samples, and other submittals;
(v) Processing Applications for Payment, electronic or digital transmittals;

(b) At the preconstruction conference Contractor shall designate, in writing, a specific individual to act as its authorized representative with respect to its services and responsibilities under the Contract Documents. Such individual shall have the authority to transmit and receive information, render decisions relative to the requirements of the Contract Documents, and otherwise act on behalf of the Contractor.

Section 2.05 Initial Acceptance of Schedules

(a) At least twenty (20) Days before submission of the first Application for Payment a conference, attended by Contractor, PWC, and others as appropriate, will be held to review for acceptability to Project Engineer as provided below the schedules submitted in accordance with Paragraph 2.03(a). PWC shall have ten (10) Days to review the submission and provide feedback to Contractor. Contractor shall then have ten (10) days to make any corrections and adjustments as indicated by PWC and to complete and resubmit the schedules as necessary. No progress payment shall be made to Contractor until acceptable schedules are submitted to and approved by Project Engineer.

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

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

Section 2.06 Electronic Transmittals

(a) Except as otherwise stated elsewhere in the Contract Documents, PWC and Contractor and their authorized agents may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through electronic mail at the address(es) designated by each Party.

(b) When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

Article III. Contract Documents: Intent, Requirements, Reuse

Section 3.01 Intent

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

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

(c) Project Engineer, Design Engineer, or both, will issue clarifications and interpretations of the Contract Documents as provided herein.

(d) To the extent necessary that Work, construction, or conditions not covered by these General Conditions is required for Contractor to achieve Completion of the Project, "Special Conditions" for such Work will be provided to Contractor and shall be part of the Contract Documents.

(e) In case of any inconsistency, conflict, or ambiguity among the Contract Documents, the documents shall govern in the following order: (1) Change Orders; (2) Addenda; (3) the fully executed Agreement; (4) Special Conditions; (5) any Drawings and Technical Specifications; and (6) General Conditions.

Section 3.02 Reference Standards

(a) Standards Specifications, Codes, Laws and Regulations

(i) Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or North Carolina laws and regulations in effect as of the Effective Date of the Agreement, except as may be otherwise specifically stated in the Contract Documents.

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

Section 3.03 Reporting and Resolving Discrepancies

(a) Contractor's Verification of Figures and Measurements

(i) Before undertaking any portion of the Work, Contractor shall review all of the Contract Documents to and check and verify all figures and dimensions for the Project. Contractor shall promptly report in writing to Project Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Project Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to these General Conditions.

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

(b) Resolving Discrepancies:

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

1) the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
2) the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

Section 3.04 Reuse of Documents

(a) Contractor and its Subcontractors and Suppliers shall not have or acquire any title to or ownership rights in any of the:

(i) Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Design Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of PWC and Design Engineer and specific written verification or adaptation by Design Engineer, where applicable; or

(ii) Contract Documents and shall not reuse any such Contract Documents for any purpose without PWC's express written consent.

(b) The prohibitions of this provision shall survive final payment or termination of the Agreement. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

Article IV. Commencement and Progress of the Work

Section 4.01 Commencement of Work

(a) The Contract Times will commence to run on the day indicated in the Notice to Proceed issued by PWC to Contractor. A Notice to Proceed may be given at any time after the Effective Date of the Contract.

(b) Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date. Contractor's failure to commence the Work within fifteen (15) Days of the date stated in the Notice to Proceed shall be deemed a material breach of the Agreement unless PWC otherwise determines in its sole discretion and agrees in writing to a delay of the Contract Times based on the applicable circumstances.

Section 4.02 Reference Points

(a) Construction staking will be performed by Design Engineer, who will also prepare and furnish construction cut sheets, signed and sealed by a North Carolina professional land surveyor, to PWC and Contractor. Contractor shall not install any utilities without a sheet. All requests for staking shall be made not less than 96 hours in advance.

(b) Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and staking, and shall make no changes or relocations without the prior written approval of Project Engineer. Contractor shall report to Project Engineer whenever any reference point staking 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 staking by professionally qualified personnel.

Section 4.03 Progress Schedule

(a) Contractor shall adhere to the Progress Schedule established in accordance with Section 2.03 as it may be adjusted from time-to-time as provided below. Contractor shall submit to Project Engineer for acceptance any proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article IX.

(b) Contractor shall carry on the Work and adhere to the Progress Schedule during any disputes or disagreements with PWC. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by these General Conditions or as PWC and Contractor may otherwise agree in writing.

Section 4.04 Delays in Contractor's Progress

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

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

(c) Contractor must submit any Change Proposal, consistent with the procedure set forth in Article IX, seeking an adjustment in Contract Price or Contract Times under this provision within ten (10) calendar days of the commencement of the event that causes the delay, disruption, or interference with the Work and Contract Times.

Article V. Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions

Section 5.01 Availability of Lands

(a) PWC will be responsible for obtaining any required easements and encroachments, and otherwise furnishing the Site, necessary to complete the Work, except as provided elsewhere in the Contract Documents.

(b) Upon reasonable written request, PWC shall furnish to Contractor a current statement of record legal title and legal description of the lands upon which the Work is to be completed and PWC's interest therein.

(c) Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment necessary to complete the Work. Any and all agreements between the Contractor and any individual property owner(s) shall not obligate PWC, PWC's employees, Project Engineer, or Design

Engineer in any manner, and Contractor shall, before performing any work on any such property, obtain a signed and notarized release of liability of PWC and Design Engineer that is suitable to PWC as confirmed in writing.

(d) Contractor and any of its Subcontractors shall exercise care and caution to avoid damage to any private property. Should any such damage to private property occur, it is Contractor's responsibility to notify the Project Engineer promptly in writing that such damage occurred, the extent of the damage, and Contractor's written plan to remedy the damage. If Contractor fails to timely correct damage to private property, PWC reserves the right to withhold progress payments until damage is corrected and/or to correct damage and back-charge Contractor for costs incurred. At the Completion of the Project, Contractor shall obtain a signed release from all owners of private property to which damage occurred that releases PWC and Design Engineer and acknowledges a settlement for the damage or that such damage was adequately remedied.

Section 5.02 Use of Site and Other Areas

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

(b) Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris during the progress of the Work. Removal and disposal of such debris shall conform to applicable Laws and Regulations.

(c) Prior to Completion of the Project, Contractor shall clean the Site and the Work and make it ready for utilization by PWC. At the completion of all of the Work, Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

(d) Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

Section 5.03 Differing Subsurface or Physical Conditions or Underground Facilities

(a) If Contractor believes that any subsurface or physical condition or Underground Facilities that is uncovered or revealed at the Site either:

(i) is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely is materially inaccurate;
(ii) is of such a nature as to require a change in the Contract Documents;
(iii) differs materially from that shown or indicated in the Contract Documents; or

(iv) 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 Underground Facilities or performing any Work in connection therewith, notify PWC and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement approved by PWC permitting Contractor to do so.

(b) After receipt of Contractor's written notice, Project Engineer will review the subsurface or physical condition or Underground Facilities in question; determine the necessity of PWC obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any of the differing site condition categories in this Section5.03; and obtain any pertinent cost or schedule information from Contractor.

(c) Project Engineer will issue a written statement to Contractor regarding the subsurface or physical condition or Underground Facilities in question, which addresses the resumption of Work in connection with such condition and indicates whether any change in the Contract Documents will be made.

(d) Possible Price and Times Adjustments:

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

1) such condition must fall within at least one of the categories in this Section 5.03; and,
2) Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

(ii) Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition or Underground Facilities if:

1) Contractor knew of the existence of such condition at the time Contractor proffered its Bid to PWC or executed the applicable Agreement for the Project; or
2) the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's Bid; or
3) Contractor failed to give the written notice as required.

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

(iv) Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 calendar days after Project Engineer's written statement to Contractor regarding the

subsurface or physical condition or Underground Facilities in question.

Section 5.04 Underground Utilities

(a) Contractor shall ascertain the location and type of all underground utility lines or structures that may be located within the limits of the Site or any area where Work is to be performed.

(i) The exact location of underground utilities or structures may vary from prior plans, permits, maps, or other documentation, 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 limits of the Site or the area where the work is to be performed, whether known or unknown by PWC, and for providing necessary protection and/or repair if damage.

(ii) Should uncharted or incorrectly charted piping or other utilities be encountered during excavations, the Contractor shall immediately halt any Work, notify PWC, and await direction from PWC before proceeding with any Work. The Contractor shall fully cooperate with PWC and any other utility company in keeping respective services and facilities in operation.

(b) PWC has used reasonable care to locate and depict existing underground installation on the construction drawings, but the accuracy cannot be guaranteed, and some items may not be shown which exist. Actual horizontal and vertical locations have not been verified. As part of the Work, the Contractor is required to dig up each utility which may conflict with construction in advance to verify locations. The utilities shall be “dug up” a minimum of fourteen (14) Days in advance of actual installation of new utilities to allow PWC an opportunity to adjust grades and alignments, to avoid a conflict, and to address any other issues.

(c) The Contractor shall adhere to the provisions of the North Carolina Underground Utility Safety and Damage Prevention Act. The Contractor shall make a documented request to the North Carolina One Call Center, and/or individual utility owners, in order to locate any facilities within the Site limits or any area where Work is to be performed at least forty-eight (48) hours in advance of the day the Work is scheduled to begin. The Contractor shall include the cost of any coordination and cooperation for utilities in its Bid.

(i) Location assistance requested from PWC by Contractor should include the actual horizontal location, type number, size, and depth of all lines. All costs associated with locating and marking existing utilities or the utilities representatives shall be the responsibility of the Contractor.

(ii) The Owner, Project Engineer, Design Engineer, and/or Consultants shall not be liable to the Contractor for any claims, costs, losses, or damages incurred or sustained on or in connection with locating existing underground installations.

(d) If the Contractor fails to schedule locates or perform advance physical locations in advance of the construction and a conflict arises, the Contractor will be required to make corrective measures as instructed by the Project Engineer at the Contractor’s expense. The Contractor’s failure to advance plan (minimum fourteen (14) days) by physically

uncovering existing utilities in advance of construction shall not be cause for claim of lost time or for additional compensation. No additional payment will be made for re-mobilization required by the utility locator.

(i) 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 any aspect of any Work.

(e) PWC and Design Engineer shall not be responsible for the accuracy or completeness of any information or data provided to the Contractor with respect to underground facilities.

(f) The entire cost of all of the following will be included in the Contract Price, and Contractor shall bear full responsibilities for all such costs, including but not limited to:

(i) Reviewing and checking all such information and data;

(ii) Locating all underground facilities shown or indicated in the Contract Documents;

(iii) Coordination of the Work with the owners of such underground facilities, including PWC, during any portion of the Work; and

(iv) The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.

(g) Contractor shall be responsible for the discovery of existing underground installations, in advance of any excavating or trenching as required in the Contract Documents.

(h) If an underground facility is discovered at or contiguous to the Site that was not shown or indicated in the Contract Documents or of which Contractor was not aware prior to starting that portion of any Work, Contractor shall, immediately 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 PWC. Upon receipt of written notice, PWC will review the pertinent condition, determine the necessity of obtaining additional information, and advise Contractor in writing. During such time, Contractor shall be responsible for the safety and protection of such underground facility. If PWC concludes that a change in the Contract Documents is required, a Change Order will be issued.

(i) The Contract Price and/or the Contract Time, may be adjusted if PWC determines, in its discretion, 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 to the following:

1) Facility was not shown or indicated in the Contract Documents, and
2) The Contractor did not know of or could not anticipate the facility.

Section 5.05 Hazardous Environmental Conditions at Site

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

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

(c) If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency); and (3) immediately notify Project Engineer (and promptly thereafter confirm such notice in writing). Project Engineer will evaluate such condition or take corrective action, if any. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then PWC may have the Hazardous Environmental Condition removed and remediated and impose a set-off against payments to Contractor to account for the reasonable associated costs.

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

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

(f) If after receipt of such written notice Contractor does not agree to resume such Work based on reasonable evidence it is unsafe or does not agree to resume such Work under such special conditions, then PWC may order the portion of the Work that is in the area affected by such condition to be deleted from the Work.

Article VI. Bonds and Insurance

Section 6.01 Performance and Payment Bonds

(a) Contractor shall obtain and furnish to PWC a performance bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the faithful performance of the Project and all Work in accordance with the Contract Documents, which bond shall be

solely for the protection of PWC.

(b) Contractor shall obtain and furnish to PWC a payment bond in the amount of one hundred percent (100%) of the Contract Price, conditioned upon the prompt payment for all labor or materials for which the Contractor or one or more of its subcontractors is liable, which payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which the Contractor is liable.

(c) The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina, shall become effective upon the awarding of the construction contract by PWC to Contractor, and shall at all times comply with the requirements set forth in Article 3 of North Carolina General Statutes Chapter 44A.

(d) In the event PWC deems the surety or sureties upon any bond necessary for the Agreement and the completion of the Project, or if for any reason, such bond ceases to be adequate to cover the performance and/or payment of the Work, Contractor shall, at its expense, and within ten (10) days after the receipt of notice from PWC, furnish such additional bond(s) in such form and amount, and with such surety or sureties, as shall be satisfactory to PWC. In such event no further payment to Contractor shall be deemed to be due under this Agreement until new or additional security for the performance and payment of the Project shall be furnished in manner and form satisfactory to PWC.

(e) By executing the Agreement, Contractor understands and acknowledges that PWC, as a public authority, and the City, as a municipal corporation, are not subject to the provisions of Articles 1 and 2 of Chapter 44A of the General Statutes, in accordance with G.S. 44A-34 and applicable law.

Section 6.02 Insurance

(a) Contractor shall maintain during the life of the Agreement and during the completion of any Work the following insurance coverages, which insurance shall be placed with insurance companies authorized to do business in the State of North Carolina and rate A minus VII or better by the current edition of Best's Key Rating Guide or otherwise approved in writing by PWC:

(i) Commercial general liability insurance with limits of $1,000,000 per occurrence, $2,000,000 aggregate other than products/completed operations; $2,000,000 aggregate for products/completed. Commercial general liability coverage shall be written on an "occurrence" basis.

(ii) Automobile liability insurance in an amount not less than $1,000,000 combined single limit per accident for bodily injury and property damage from owned, non-owned, and hired automobiles.

(iii) Workers' compensation insurance as required by the Laws and Regulations. In the event any employee(s), contractor(s), or subcontractor(s) engaged to perform any Work under the Agreement is not protected under the applicable workers' compensation laws, the Contractor shall provide adequate coverage for the protection of such employee(s), contractor(s), or subcontractor(s) not otherwise protected.

(iv) In the event the Project concerns building construction or repair work, Contractor shall purchase and maintain "Builder's Risk" insurance. This insurance shall include the interests of the PWC, Contractor, and any Subcontractor(s) and shall be written on a one hundred percent (100%) completed value basis (full value as of the date that all construction is finished and includes the Contractor's Contract Price), and to remain in force until Completion of the Project.

(v) Regardless of the nature of the work to be performed, coverage must also be provided for the theft or damage of building materials and supplies, which are not permanently attached or stored on Site for any period of time. This coverage shall be an "Installation Floater." If no building construction or repair is involved for the Project, the amount of the coverage shall equal the value of the materials stored on site.

(b) Prior to initiating any Work on the Project, Contractor shall deliver certificates of insurance confirming each such coverage set forth above, and Contractor shall direct its insurers to provide annually to PWC certificates confirming each such coverage during the coverage period.

(c) PWC shall be named as an additional insured in the comprehensive automobile and commercial liability insurance policies.

(d) Contractor shall not reduce or allow the required insurance coverages to lapse without PWC's prior written approval. All policies for insurance must be endorsed to contain a provision giving PWC a thirty (30) calendar day prior written notice by certified mail of any cancellation of that policy or material reduction in coverage. Should a notice of cancellation be issued for non-payment of premiums or any part thereof, or should Contractor fail to provide and maintain certificates as set forth herein, PWC shall have the right, but shall not have the obligation, to pay such premium to the insurance company or to obtain such coverage and to deduct such payment from any sums that may be due or become due to Contractor, or to seek reimbursement for said payments from Contractor. Any such sums paid by PWC shall be due and payable immediately by Contractor upon notice from PWC.

(e) The insurance coverage requirements shall not be construed as a limitation on Contractor's responsibilities and liabilities pursuant to the terms and conditions of this Agreement. Contractor's obligation to maintain insurance for three (3) years after Completion of the Project shall survive the termination of this Agreement.

(f) If Contractor fails to obtain and maintain any required insurance, PWC may exclude Contractor from the Site, impose an appropriate set-off against payment, and exercise PWC's termination rights pursuant to the Contract Documents.

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

Article VII. Contractor's Responsibilities

Section 7.01 Supervision and Superintendence

(a) Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention and applying such skills and expertise as may be necessary to

perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction subject to the terms, provisions, and specifications set forth in the Contract Documents.

(b) At all times during the progress of the Work, Contractor shall assign a competent superintendent, satisfactory to Project Engineer, to supervise the Work and to respond to Project Engineer concerning PWC's interests in the Work.

(c) Contractor's superintendent shall have full authority to act on behalf of Contractor and all communications, instructions, directions, and notices given to the superintendent by the Project Engineer shall be binding to the Contractor.

(d) Contractor's superintendent shall be responsible for coordination of the Work with other contractors or subcontractors. The superintendent shall not be replaced without written notice to PWC except under extraordinary circumstances.

(e) Subcontractors

(i) Contractor shall submit the names and references all Subcontractors to the Project Engineer for approval before commencing any Work.

1) In the event Contractor seeks to substitute any Subcontractor that was identified in Contractor's Bid, Contractor shall promptly provide PWC with: (1) the Subcontractor it seeks to substitute; (2) the identity of the Subcontractor to be substituted; and (3) the reason for the requested substitution.

2) PWC will review the requested substitution within five (5) Business Days and provide written approval or denial of the substitution, with such approval not to be unreasonably withheld.

(ii) Contractor's superintendent shall be available to be present at the Site at any time that any Subcontractor(s) is performing any of the Work. Construction activity shall be stopped if the Contractor's superintendent is not available to be at the Site.

Section 7.02 Labor; Working Hours

(a) Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site. Contractor shall remove from the Project any person who appears incompetent, disorderly, or otherwise unsatisfactory. Contractor shall also remove any person who appears in PWC's sole discretion to be incompetent, disorderly, or otherwise unsatisfactory

(b) Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed on Business Days. Contractor will not perform Work on non-Business Days. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with PWC's written consent, which will not be unreasonably withheld. In such circumstances, Contractor shall submit a written request to PWC at least two (2) Business Days prior to any Work that it requests to complete on a

non-Business Day and PWC will, in its sole discretion, approve or deny such request. If such work outside of a Business Day is approved, PWC will set forth the specific parameters that Contractor must follow, including time of work, personnel, and any other issues.8

Section 7.03 Services, Materials, and Equipment

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

(b) All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise specified in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of PWC. If required by PWC or its designee, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

Section 7.04 "Or Equals"

(a) Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Project Engineer authorize the use of other items of material or equipment under the circumstances described below.

(i) If Project Engineer determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Project Engineer shall deem it an "or equal" item and confirm such in writing to Contractor. A proposed item of material or equipment will be considered functionally equal to an item so named if:

1) in the exercise of reasonable judgment Project Engineer determines that:

a) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
b) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
c) it has a proven record of performance and availability of responsive service; and
d) it is not objectionable to PWC.

2) Contractor certifies that, if approved and incorporated into the Work:

a) there will be no increase in the Contract Price or Contract Times; and

b) it will conform substantially to the detailed requirements of the item specified in the Contract Documents.

(b) Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.

(c) Project Engineer will be allowed a reasonable time to evaluate each “or-equal” request. Project Engineer may require Contractor to furnish additional data about the proposed “or-equal” item. Project Engineer will be the sole judge of acceptability. Contractor shall not order, furnish, install, or utilize any “or-equal” it until Project Engineer has reviewed the request, determined that the proposed item is an “or-equal,” and provided written confirmation to Contractor.

(d) Project Engineer’s denial of an “or-equal” request shall be final and binding and may not be reversed through an appeal under any provision of the Contract Documents.

Section 7.05 Concerning Subcontractors, Suppliers, and Others

(a) Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to PWC.

(b) Contractor shall not subcontract more than forty-nine percent (49%) of the final Contract Price.

(c) Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract Documents.

(d) After the submittal of Contractor’s Bid or final negotiation of the terms of the Agreement, PWC may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work.

(e) Prior to entry into any binding subcontract or purchase order, Contractor shall submit to PWC the identity of the proposed Subcontractor or Supplier (unless PWC has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to PWC unless PWC raises a substantive, reasonable objection within five (5) Business Days.

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

(g) Contractor shall be fully responsible to PWC for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor’s own acts and omissions.

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

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

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

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

(l) Nothing in the Contract Documents:

(i) shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between PWC or Design Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

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

Section 7.06 Patent Fees and Royalties

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

Section 7.07 Permits

(a) Unless otherwise specified in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses necessary to achieve Completion of the Project. Contractor shall timely seek assistance from PWC if necessary to obtain any permits or licenses; provided that, the Contract Time shall not be extended if PWC determines, in its discretion, that Contractor delayed or otherwise did not act expeditiously in requesting such assistance. PWC shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for Completion of the Project that are applicable at the time of the submission of Contractor's Bid.

Section 7.08 Taxes

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

Section 7.09 Laws and Regulations

(a) Contractor shall give all notices required by, and shall comply with, all Laws and Regulations applicable to the Project. Except as otherwise expressly required, PWC shall

not be responsible for monitoring Contractor's compliance with any Laws or Regulations.

(b) Contractor shall bear all resulting costs and losses for any of its actions or inactions that are contrary to Laws or Regulations.

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

Section 7.10 Record Documents

(a) Contractor shall maintain in good order one (1) printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. These record documents, together with all approved Samples, will be available to Project Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to PWC.

Section 7.11 Safety and Protection

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

(i) all persons on the Site or who may be affected by the Work;
(ii) all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
(iii) other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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

(c) Contractor shall comply with the requirement of any of PWC's applicable health programs, which may be revised from time to time based on specific circumstances or applicable guidance from the Center for Disease Control or other applicable entity. Such health programs will be identified in the Special Conditions if applicable to the Project.

(d) Contractor shall comply with the requirements of PWC's applicable safety programs. The Special Conditions identify any of PWC's safety programs that are applicable to the Project.

(e) Contractor shall remedy, at its expense, all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

(f) Contractor's duties and responsibilities for safety and protection shall continue until such time as Completion of the Project is achieved.

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

(h) Contractor shall designate in writing to PWC a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Section 7.12 Emergencies

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

Section 7.13 Shop Drawings, Samples, and Other Submittals

(a) Contractor shall timely submit Shop Drawings and Samples required by the Contract Documents to Project Engineer for review and approval in accordance with applicable specifications.

(b) Before submitting a Shop Drawing or Sample, Contractor shall have

(i) reviewed the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
(ii) verified all measurements, quantities, dimensions, performance and design criteria, installation requirements, materials, catalog numbers, and similar information;
(iii) verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
(iv) verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

(c) With each submittal, Contractor shall give Project Engineer specific written notice of any

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

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

(e) Project Engineer will provide timely review of any required Shop Drawings and Samples. Such review, and subsequent determination of approval, will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

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

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

(h) Project Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall not result in such item becoming a Contract Document.

(i) Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples.

(j) Resubmittal Procedures:

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

(ii) Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three (3) submittals. If PWC has engaged a Design Engineer for the Project, Design Engineer will record Design Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Design Engineer's charges to PWC for such time. PWC may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

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

Section 7.14 Contractor's General Warranty and Guarantee

(a) In order to induce PWC to enter into an Agreement with Contractor for the Project, Contractor warrants and guarantees to PWC that:

(i) Contractor is duly licensed in the State of North Carolina to complete all Work necessary for the Project, is duly organized, validly existing and in good standing and has all requisite powers, rights, and authority to execute, enter into, and perform the Agreement in accordance with the terms and conditions of the Agreement, and the Agreement constitutes a legal, valid, and binding obligation of Contractor enforceable against it in accordance with its terms.

(ii) Contractor has read the Contract Documents, and acknowledges and understands all data, materials, specifications, and requirements identified in the Contract Documents.

(iii) Contractor has visited the site for the Project, conducted a thorough, visual examination of the site and adjacent areas, and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance in completing the Project.

(iv) Contractor is familiar with and is satisfied as to all laws and regulations that may affect cost, progress, and performance to complete the Project.

(v) Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the site and all drawings of physical conditions relating to existing surface or subsurface structures at the site that have been identified in the Detail Specifications and any accompanying reports and drawings, and (2) reports and drawings relating to any Hazardous Environmental Condition at or adjacent to the site that have been identified in the Contract Documents and any accompanying reports and drawings.

(vi) Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

(vii) Based on the information and observations referred to in subsection "(v)" of this Section, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price and in accordance with the other terms and conditions of the Contract Documents.

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

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

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

(xi) Contractor's entry into this Agreement constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

(xii) Contractor has no business or personal relationship with any PWC Commissioner, officer, director, manager, or supervisor and Contractor covenants to disclose immediately to PWC any such relationship that develops during the performance of Work on the Project.

(b) 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:

(i) observations by Project Engineer;
(ii) recommendation by Project Engineer or payment by PWC of any progress or final payment;
(iii) the issuance of a certificate of Substantial Completion by Project Engineer or any payment related thereto by PWC;
(iv) use or occupancy of the Work or any part thereof by PWC;
(v) any review and approval of a Shop Drawing or Sample submittal;
(vi) the issuance of a notice of acceptability by Project Engineer;
(vii) any inspection, test, or approval by others; or
(viii) any correction of defective Work by PWC.

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

Section 7.15 Indemnification

(a) Contractor shall indemnify, defend, and hold harmless PWC and its Commissioners, officers, employees, agents, and representatives and the City and its elected officials, managers, employees, agents, and representatives and Designer (collectively "Indemnitees") from and against all claims, actions, liabilities, damages, losses, costs, and expenses (including, without limitation, injury to or death of any persons and damage to property, economic and consequential damages and attorneys' fees) asserted by one or more third parties against one or more of the Indemnitees if the Fault of one or more Responsible Persons is a proximate cause of the loss, damage, or expense indemnified.

(b) Contractor's obligation to indemnify, defend, and hold harmless the Indemnitees shall survive the termination of the Agreement.

(c) In any and all claims against the Indemnitees of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, Contractor's indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

Section 7.16 Claims Procedure

(a) PWC shall notify the Contractor of all potential claims related to the Work within seven (7) calendar days of receiving notification or having knowledge of such potential claim. Should the Contractor receive a potential claim related to the Work, the Contractor shall notify PWC within seven (7) calendar days of receiving notification. The Contractor shall provide the claimant and PWC with a written response acknowledging receipt of the claim within

seven (7) calendar days.

(b) If the Contractor meets with the Claimant about the claim, a representative designated by PWC shall be present at all times. PWC shall maintain a record of any claim received, and the steps taken to resolve. PWC shall also concurrently investigate each case. The Contractor agrees to furnish PWC any information regarding the claim, the actions which led to the claim and/or the investigation of the claim. Contractor shall provide their proposed response to PWC within thirty (30) calendar days of receiving the claim. Upon receipt of the response PWC and the Contractor will discuss and reach a mutual agreement of the response necessary to send to the Claimant within fifteen (15) calendar days. Once the agreement is made the Contractor shall make a formal written resolution to the claimant.

(c) Failure to act in good faith or respond to a claim in the timelines established by the Contract Documents will constitute a lack of response by the Contractor, therefore validating the claim. PWC will deduct the total amount of the claim from the monthly pay application. Failure to comply with the above requirements for resolving claims may, at the sole discretion of PWC, result in breach of contract.

(d) The Contractor is aware of these claims procedures and understands that it is the PWC's practice to pursue reimbursement/subrogation for any and all claims related expenses, which are incurred as a result of the Contractor's performance under this Contract Documents and allowed within the applicable statute of limitations.

Section 7.17 Delegation of Professional Design Services

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

(b) If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, PWC will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to PWC.

(c) PWC shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided PWC has specified to Contractor all performance and design criteria that such services must satisfy.

(d) Pursuant to this Section, PWC's, or its designee's, review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. PWC specifically retains final approval of such

submittals.

(e) Contractor shall not be responsible for the adequacy of the performance or design criteria specified by PWC.

Article VIII. PWC's Responsibilities

(a) In awarding the bid to Contractor and executing the applicable Agreement, PWC acknowledges the following responsibilities:

(i) Except as otherwise provided in these General Conditions, PWC shall issue all communications directly to Contractor or its designee.
(ii) PWC may at its discretion replace Design Engineer and Project Engineer. The replacement Design Engineer or Project Engineer's status under the Contract Documents shall be that of the former Design Engineer or Project Engineer.
(iii) PWC shall promptly furnish the data required of PWC under the Contract Documents.
(iv) PWC shall make payments to Contractor when they are due as provided in the Contract Documents.
(v) PWC shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. PWC will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
(vi) Upon request of Contractor, PWC shall furnish to Contractor reasonable evidence that financial arrangements have been made to satisfy PWC's obligations under the Contract Documents (including obligations under proposed changes in the Work).
(vii) While at the Site, PWC's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which PWC has been informed.
(viii) PWC shall furnish copies of any applicable PWC safety program(s) to Contractor, which Contractor shall review and implement.

Article IX. Amending the Contract Documents; Changes in the Work

Section 9.01 Amending and Supplementing Contract Documents

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

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

(ii) Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are

unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 9.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. PWC must submit any dispute or request seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

Section 9.02 PWC-Authorized Changes in the Work

(a) Without invalidating the Agreement and without notice to any surety, PWC may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Design Engineer's recommendation when applicable and to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work as revised. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

Section 9.03 Unauthorized Changes in the Work

(a) Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented.

Section 9.04 Change of Contract Price

(a) The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of these General Conditions.

(b) An adjustment in the Contract Price will be determined as follows:

(i) where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved; or
(ii) where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit as agreed to in writing by the Parties); or
(iii) where the Work involved is not covered by unit prices contained in the Contract Documents and the Parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work plus a reasonable Contractor's fee for overhead and profit.

(c) Contractor's Fee: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

(i) a mutually acceptable fixed fee; or
(ii) if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

1) for unit prices, the Contractor's fee shall be fifteen percent (15%);
2) for all other costs incurred, the Contractor's fee shall be five percent (5%);
3) the amount of credit to be allowed by Contractor to PWC for any change that results in a net decrease in the Contract Price will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
4) when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change.

Section 9.05 Change of Contract Times

(a) The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 9.06.

(b) An adjustment of the Contract Times shall be subject to the limitations set forth in these Contract Document as it concerns delays in Contractor's progress.

Section 9.06 Change Proposals

(a) Contractor shall submit a Change Proposal to PWC to request an adjustment in the Contract Times and/or Contract Price. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

(i) Procedures: Contractor shall submit each Change Proposal to PWC promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to PWC within 15 calendar days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.
(ii) PWC Action: PWC will review each Change Proposal and, within 30 calendar days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing to Contractor. If PWC does not take action on the Change Proposal within 30 calendar days, then the Change Proposal is deemed denied, thereby commencing the time for appeal under these General Conditions.
(iii) Binding Decision: PWC's decision will be final and binding unless Contractor appeals the decision.

Section 9.07 Execution of Change Orders

(a) PWC and Contractor shall execute appropriate Change Orders covering:

(i) changes in the Contract Price or Contract Times that are agreed to by the parties, including any undisputed sum or amount of time for Work performed in accordance with a Work Change Directive;
(ii) changes in Contract Price resulting from a PWC set-off, unless Contractor has duly contested such set-off;
(iii) changes in the Work which are: (a) ordered by PWC, (b) required because of PWC's acceptance of defective Work or PWC's correction of defective Work, or (c) agreed to by the parties, subject to the need for Design Engineer's recommendation if the change in the Work involves the design (as set forth in the Contract Documents), or other engineering or technical matters; and
(iv) changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results.

(b) If PWC or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Section, it shall be deemed to be of full force and effect as if fully executed.

Section 9.08 Notification to Surety

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

Article X. Tests, Inspections, and Approvals; Correction, Removal, or Acceptance of Defective Work

Section 10.01 Access to Work

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

Section 10.02 Tests, Inspections, and Approvals

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

(b) PWC shall retain and pay for the initial services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by PWC, except those costs incurred in connection with tests or inspections of covered Work shall

be governed by the provisions of Paragraph 10.05.

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

(d) Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

(i) by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to PWC;
(ii) to attain PWC's and Design Engineer's acceptance of materials or equipment to be incorporated in the Work;
(iii) by manufacturers of equipment furnished under the Contract Documents;
(iv) for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
(v) for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to PWC, as confirmed in writing by Project Engineer to Contractor.

(e) If the Contract Documents require the Work (or part thereof) to be approved by PWC or its designee, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

(f) If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Project Engineer, Contractor shall, if requested by Project Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given PWC timely notice of Contractor's intention to cover the same and PWC had not acted with reasonable promptness in response to such notice.

Section 10.03 Defective Work

(a) It is Contractor's obligation to assure that the Work is not defective.

(b) PWC or its designee has the authority to determine whether Work is defective, and to reject defective Work.

(c) Prompt notice of all defective Work of which PWC has actual knowledge will be given to Contractor.

(d) Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if PWC has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

(e) When correcting defective Work, Contractor shall take no action that would void or otherwise impair PWC's special warranty and guarantee, if any, on said Work.

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

Section 10.04 Acceptance of Defective Work

(a) If, instead of requiring correction or removal and replacement of defective Work, PWC prefers to accept it, PWC may do so (subject, if such acceptance occurs prior to final payment, to Design Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles and will not endanger public safety).

(b) Contractor shall pay all claims, costs, losses, and damages attributable to PWC's evaluation of and determination to accept such defective Work (such costs to be approved by PWC as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order.

(c) If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then PWC may impose a reasonable set-off against payments due. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to PWC.

Section 10.05 Uncovering Work

(a) PWC has discretion to require, at its initial cost, additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

(b) If any Work is covered contrary to the written request of PWC, then Contractor shall, if requested by PWC or its designee, uncover such Work for observation, and then replace the covering, all at Contractor's expense.

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

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

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

Section 10.06 PWC May Stop the Work

(a) If the Work is defective, or Contractor fails to supply sufficiently skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then PWC may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of PWC to stop the Work shall not give rise to any duty on the part of PWC 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.

Section 10.07 PWC May Correct Defective Work

(a) If Contractor fails within the time specified by PWC in a written notice from PWC to correct defective Work, or to remove and replace rejected Work as required by PWC, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then PWC may, after seven (7) calendar days written notice to Contractor, correct or remedy any such deficiency.

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

(c) All claims, costs, losses, and damages incurred or sustained by PWC in exercising the rights and remedies under this Section will be charged against Contractor as set-offs against payments due. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

(d) Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by PWC of PWC's rights and remedies under this Section.

Article XI. Claims

Section 11.01 Claims Process

(a) The following disputes between PWC and Contractor shall be submitted to the Claims process set forth in this Article:

(i) Appeals by PWC or Contractor of Design Engineer's decisions regarding Change Proposals;
(ii) PWC or Contractor's demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
(iii) Disputes that Design Engineer has been unable to address because they do not involve the design (as set forth in the Contract Documents), the acceptability of the Work, or other engineering or technical matters.

Section 11.02 Submittal of Claim

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

Section 11.03 Review and Resolution

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

Section 11.04 Dispute Resolution

(a) In the event of any dispute, controversy, or claim of any kindor nature arising under or in connection with this Agreement (a "Dispute") and involving any two or more of the following parties, PWC, Design Engineer, Contractor or any subcontractor of Contractor, the party initiating the Dispute shall serve written notice of a Dispute on the party(ies) to the dispute, and those parties shall endeavor to settle the dispute first through direct, informal discussions between the parties' selected representatives. Any such representative(s) shall have binding authority to settle the Dispute. In the event the parties do not settle the Dispute within ten (10) calendar days from the date of written notice of the Dispute, any party to the Dispute may, by written notice to the other party(ies), engage a mediator certified under the laws of the State of North Carolina to mediate the Dispute within thirty (30) calendar days of such notice. The parties to the Dispute shall attend mediation in good faith. In the event mediation is unsuccessful, any party to the dispute may initiate arbitration proceedings. Any controversy or claim arising out of or relating to the Contract Documents, or the breach thereof, shall be settled by binding arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. All of the foregoing dispute resolution procedures shall be held in Cumberland County, North Carolina. The costs of the mediator and arbitrator in a dispute resolution process shall be divided equally among the parties to the process; provided, however, PWC shall bear at least one-third of the cost if PWC is a party to the dispute resolutionand the remainder of the cost shall be divided equally among the other parties

participating in the dispute resolution. PWC shall, in its contractual arrangements with Design Engineer, and Contractor shall, in its contracts with Subcontractors and they in their contracts with lower-tier subcontractors authorize and direct such parties to participate in the dispute resolution procedures set forth in this Section. Unless otherwise directed in writing by PWC, Contractor shall continue the Project and maintain compliance with the scheduling deadlines set forth in theContract Documents during any dispute resolution proceedings. If Contractor continues to perform, PWC shall make payments due for the continued performance in accordance with this Agreement. The provisions of this Section shall not extend any applicable statutes of limitation or repose.

Article XII. Payments to Contractor; Set-Offs; Completion; Correction Period

Section 12.01 Progress Payments

(a) The Schedule of Values will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Project Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period. Progress payments for cost-based Work will be based on the Cost of the Work completed by the Contractor during the pay period.

(b) Applications for Payments:

(i) Contractor shall submit to Project Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that PWC has received the materials and equipment free and clear, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect PWC's interest.

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

(iii) The amount of retainage for progress payments will be as stipulated in the Contract Documents.

(c) Review of Applications:

(i) Project Engineer will, within ten (10) Business Days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to PWC, or return the Application to Contractor indicating in writing Project Engineer's reason(s) for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application.

(ii) Project Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Project Engineer to PWC, based on Project Engineer's observations of the executed Work, and on Project Engineer's review of the

Application for Payment and the accompanying data and schedules, that to the best of Project Engineer's knowledge, information, and belief:

1) the Work has progressed to the point indicated;
2) the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work, and any other qualifications stated in the recommendation); and
3) the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Project Engineer's responsibility to observe the Work.

(iii) By recommending any such payment Project Engineer will not thereby be deemed to have represented that:

1) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Project Engineer in the Contract Documents; or
2) there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by PWC or entitle PWC to withhold payment to Contractor.

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

1) to supervise, direct, or control the Work, or
2) for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
3) for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
4) to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price.

(v) Project Engineer may refuse to recommend the whole or any part of any payment if, in Project Engineer's opinion, it would be incorrect to make the representations to PWC outlined in this Section.

(d) Project Engineer will recommend reductions in payment (set-offs) necessary in Project Engineer's opinion to protect PWC from loss because:

(i) the Work is defective, requiring correction or replacement;
(ii) the Contract Price has been reduced by Change Orders;
(iii) PWC has been required to correct defective Work or has accepted defective Work in accordance with these General Conditions;
(iv) PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
(v) Project Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

(e) Payment Becomes Due:

(i) Twenty (20) Business Days after presentation of the Application for Payment to PWC with Project Engineer's recommendation, the amount recommended (subject to any PWC set offs) will become due, and when due will be paid by PWC to Contractor.

(f) Reductions in Payment by PWC:

(i) In addition to any reductions in payment (set-offs) recommended by Project Engineer, PWC is entitled to impose a set-off against payment based on any of the following:

1) PWC has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
2) Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
3) Contractor has failed to provide and maintain required bonds or insurance;
4) PWC has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
5) PWC has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
6) the Work is defective, requiring correction or replacement;
7) PWC has been required to correct defective Work or has accepted defective Work in accordance with the Contract Documents;
8) the Contract Price has been reduced by Change Orders;
9) an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
10) liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or Completion of the Project; or
11) there are other items entitling PWC to a set off against the amount recommended.

(ii) If PWC imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Project Engineer, PWC will give Contractor immediate written notice stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. PWC shall promptly pay Contractor the amount so withheld, or any adjustment agreed to by PWC and Contractor if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

(iii) Upon a subsequent determination that PWC's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due and subject to interest as provided in the Contract Documents.

Section 12.02 Substantial Completion

(a) When Contractor considers the entire Work ready for its intended use Contractor shall notify PWC and Design Engineer in writing that the entire Work is substantially complete and request that PWC acknowledge in writing that Contractor has met Substantial Completion.

(b) Promptly after Contractor's notification, PWC, Contractor, and Design Engineer shall make an inspection of the Work to determine the status of completion. If PWC does not consider the Work substantially complete, PWC will notify Contractor in writing giving the reasons therefor. PWC shall thereafter submit to Contractor an initial draft of punch list items to be completed or corrected before final payment.

(c) If Design Engineer considers the Work substantially complete, Design Engineer will deliver to PWC a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Design Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. PWC shall have seven (7) Business Days after receipt of the preliminary certificate to make written objection to Design Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, PWC concludes that the Work is not substantially complete, PWC will, within fourteen (14) calendar days after submission of the preliminary certificate to PWC, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor.

(d) At the time of receipt of the preliminary certificate of Substantial Completion, PWC and Contractor will confer regarding PWC's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by PWC. Unless PWC and Contractor agree otherwise in writing, PWC shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon PWC use or occupancy of the Work.

(e) After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment and shall complete such items within the time specified by PWC. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

(f) PWC shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

Section 12.03 Partial Use or Occupancy

(a) Prior to Substantial Completion of all the Work, PWC may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which PWC, Design Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by PWC for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

(i) At any time PWC may request in writing that Contractor permit PWC to use or occupy any such part of the Work that PWC believes to be substantially complete.
(ii) At any time Contractor may notify PWC and Design Engineer in writing that Contractor considers any such part of the Work substantially complete and request Design Engineer

to issue a certificate of Substantial Completion for that part of the Work.

(iii) Within a reasonable time after either such request, PWC, Contractor, and Design Engineer shall make an inspection of that part of the Work to determine its status of completion. If Design Engineer does not consider that part of the Work to be substantially complete, Design Engineer will notify PWC and Contractor in writing giving the reasons therefor.

(iv) No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements regarding builder's risk or other property insurance.

Section 12.04 Final Inspection

(a) Upon written notice from Contractor that Completion of the Project has been achieved or an agreed portion thereof is complete, PWC will promptly make a final inspection with Project Engineer, Design Engineer, and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Section 12.05 Final Payment

(a) Application for Payment:

(i) After Contractor has, in the opinion of PWC, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents, and other documents, Contractor may make application for final payment.

(ii) The final Application for Payment shall be accompanied (except as previously delivered) by:

1) all documentation called for in the Contract Documents;
2) consent of the surety, if any, to final payment;
3) satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to PWC free and clear or will so pass upon final payment;
4) a list of all disputes that Contractor believes are unsettled; anD
5) complete and legally effective releases or waivers (satisfactory to PWC) required by the Contract Documents.

(iii) If Design Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Design Engineer will, within ten (10) Business Days after receipt of the final Application for Payment, indicate in writing Design Engineer's recommendation of final payment and present the Application for Payment to PWC for payment. Such recommendation shall account for any set-offs against payment that are necessary in Design Engineer's opinion to protect PWC from loss for the reasons stated above with respect to progress payments. At the same time Design Engineer will also give written notice to PWC and Contractor that the Work is acceptable and that Completion of the Project has been achieved. Otherwise, Design Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

(iv) Within thirty (30) calendar days after the presentation to PWC of the final Application for

Payment and accompanying documentation, the amount recommended by Design Engineer (less any further sum PWC is entitled to set off against Design Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by PWC to Contractor.

Section 12.06 Waiver of Claims

(a) The making of final payment will not constitute a waiver by PWC of claims or rights against Contractor. PWC expressly reserves claims and rights arising from defective Work appearing after final inspection, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from Contractor's indemnification obligations, or from Contractor's continuing obligations under the Contract Documents.

(b) The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against PWC other than those pending matters that have been duly submitted or appealed under the provisions of the Contract Documents.

Section 12.07 Correction Period

(a) If within one (1) year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to PWC and in accordance with PWC's written instructions:

(i) correct the defective repairs to the Site or such other adjacent areas;
(ii) correct such defective Work;
(iii) if the defective Work has been rejected by PWC, remove it from the Project and replace it with Work that is not defective, and
(iv) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

(b) If Contractor does not promptly comply with the terms of PWC's written instructions, or in an emergency where delay would cause serious risk of loss or damage, PWC may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

(c) In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date only as provided in the Contract Documents.

(d) Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Article XII, the correction period hereunder with

respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

(e) Contractor's obligations under this Article XII are in addition to all other obligations and warranties. The provisions of this Article XII shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

Article XIII. Suspension of Work and Termination

Section 13.01 PWC May Suspend Work

(a) At any time and without cause, PWC may suspend the Work or any portion thereof for a period of not more than 90 consecutive calendar days by written notice to Contractor and Design Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than thirty (30) calendar days after the date fixed for resumption of Work.

Section 13.02 PWC May Terminate for Cause

(a) The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

(i) Contractor's continued failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
(ii) Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
(iii) Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
(iv) Contractor's repeated disregard of the authority of PWC, Project Engineer, or Design Engineer.

(b) If one or more of the events identified in Paragraph 13.02(a) occurs, then after giving Contractor (and any surety) ten (10) calendar days written notice that PWC is considering a declaration that Contractor is in default and termination of the Agreement, PWC may proceed to:

(i) declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
(ii) enforce the rights available to PWC under any applicable performance bond.

(c) Subject to the terms and operation of any applicable performance bond, if PWC has terminated the Contract for cause, PWC may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which PWC has paid Contractor but which are stored elsewhere, and complete the Work as PWC may deem expedient.

(d) PWC may not proceed with termination of the Contract under Paragraph 13.02(b) if Contractor within seven (7) calendar days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure and such efforts

are agreed to by PWC.

(e) If PWC proceeds as provided in Paragraph 13.02(b), Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by PWC, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to PWC. Such claims, costs, losses, and damages incurred by PWC will be reviewed by PWC as to their reasonableness and, when so approved by PWC, incorporated in a Change Order.

(f) Where Contractor's services have been so terminated by PWC, the termination will not affect any rights or remedies of PWC against Contractor then existing or which may thereafter accrue, or any rights or remedies of PWC against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by PWC will not release Contractor from liability.

(g) The provisions of any applicable payment or performance bond shall govern over any inconsistent provisions of this Section.

Section 13.03 PWC May Terminate For Convenience

(a) Upon seven (7) calendar days written notice to Contractor, PWC may, without cause and without prejudice to any other right or remedy of PWC, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

(i) 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;
(ii) expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
(iii) other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

(b) Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

Section 13.04 Contractor May Stop Work or Terminate

(a) If, through no act or fault of Contractor, (1) the Work is suspended for more than ninety (90) consecutive calendar days by PWC or under an order of court or other public authority or (2) PWC fails for sixty (60) calendar days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) calendar days written notice to PWC, and provided PWC does not remedy such suspension or failure within that time, terminate the Contract and recover from PWC payment on the same terms as provided in this Article.
(b) In lieu of terminating the Contract and without prejudice to any other right or remedy, if PWC has failed for thirty (30) calendar days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) calendar days after written notice to PWC, stop the Work until payment is made of all such amounts due Contractor, including interest thereon.

The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

Section 13.05 Morality

(a) If, in the sole opinion of PWC, at any time Contractor or any of its owner(s) or employee(s) or agent(s) (each party, owner, employee, and agent is an "Actor") engages in any one or more actions that bring disrepute, contempt, scandal, or public ridicule to the Actor or subject the Actor to prosecution or offend the community or public morals or decency or denigrate individuals or groups in the community served by PWC or are scandalous or inconsistent with community standards or good citizenship or may adversely affect PWC's finances, public standing, image, or reputation or are embarrassing or offensive to PWC or may reflect unfavorably on PWC or are derogatory or offensive to one or more employee(s) or customer(s) of PWC, PWC may immediately upon written notice to Contractor terminate the Agreement, in addition to any other rights and remedies that PWC may have pursuant to the Contract Documents or at law or in equity.

Article XIV. Miscellaneous

Section 14.01 Additional General Terms and Conditions

(a) Contractor shall be subject to any additional terms and conditions for this Project as set forth in the applicable Appendices as specific in the Agreement, which is incorporated by reference as if set forth word-for-word herein.

Section 14.02 Giving Notice

(a) Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

(i) delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended;
(ii) delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice; or
(iii) sent to PWC or Contractor's designee(s) via email, with a confirmation of receipt.

Section 14.03 Computation of Times

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

Section 14.04 Cumulative Remedies

(a) The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which

are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

Section 14.05 Limitation of Damages

(a) With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither PWC nor Design Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

Section 14.06 No Waiver

(a) A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or any other provision of the Contract Documents.

Section 14.07 Survival of Obligations

(a) All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement or termination of the services of Contractor.

Section 14.08 Controlling Law

(a) The Agreement shall be governed by the law of the State of North Carolina.

Section 14.09 Headings

(a) Article and paragraph headings, numbers, and letters are inserted for convenience only and do not constitute parts of these General Conditions.

DIVISION I
01000 – SUPPLEMENTARY CONDITIONS

1.01 Summary

A. This project includes the replacement and upgrade of the existing Longview Acres Lift Station #41 and force main. The project consists of 2,056 feet of 8" Force Main and the installation of a new submersible Lift Station.

All work shall be done in accordance with the terms and conditions outlined herein, Fayetteville Public Works Commission (PWC) "Manual for the Design and Construction of Water and Wastewater System Extensions" (most recent edition), in accordance with the NCDOT Standard Specifications for Roads and Structures (most recent edition), and subject to final approval and acceptance by Fayetteville Public Works Commission.

1.02 Stored Materials

A. The option to incorporate stored materials shall be addressed prior to the first pay estimate. The Contractor will not be permitted to request payment for stored materials on future pay applications once the first application has been signed by the Contractor and submitted to the Owner. If considered for payment, stored materials shall be delivered and stored to the satisfaction of the Project Coordinator. Stored material estimates must be submitted in a form acceptable to the Project Engineer. All invoices shall accompany the pay estimates and be separated by the associated project "Part" (i.e. Part A, Part B, etc.). Stored materials shall be paid for according to eighty-five percent (85%) of the actual invoice value including sales tax.

1.03 Materials

A. All materials to be utilized are to be in new condition. Materials are to be stored in strict accordance with the manufacturer's directions. Materials are to be of the type and brand specified within these Contract Documents. No alternative or substitute materials shall be considered prior to award of the Contract.

B. The Contractor shall submit all requests to utilize materials other than specified to Fayetteville Public Works Commission for review. The Contractor shall be responsible for providing all required documentation necessary for Fayetteville Public Works Commission to review and make a determination if the substitute material meets the required specification.

C. The Contractor will be responsible for providing documented proof that the proposed substitution has a proven record of performance when used in the intended application as confirmed by actual field test(s) or by successful installations. Fayetteville Public Works Commission reserves the right to reject any such proposed changes or substitutions at their sole discretion, and is under no obligation to justify their decision.

1.04 Weight/Quantity Tickets

A. Weigh/quantity tickets shall be required for those Contract quantities that are not measured in place, including but not limited to select material and undercut excavation.

Work of this nature requires the Project Engineer or Project Coordinator's approval prior to beginning or the Project Engineer reserves the right not to pay for unauthorized work.

B. All quantity tickets for items not measurable in place shall be submitted to the Project Coordinator. Each ticket shall indicate the date, Contractor, job location, name of project, quantity of material, truck number and signature of the Contractor. The Contractor shall furnish the tickets to the Project Coordinator by the end of the next working day. No tickets shall be accepted after that time unless otherwise authorized by Project Engineer.

C. When a material is to be paid for on a per ton basis (i.e, material for undercut excavation), the weighing devices shall be certified by the N.C. Department of Agriculture. All scales shall be operated by a public weigh master licensed in accordance with the North Carolina General Statues. A certified weigh certificate shall be issued for each load and contain the following information:

1. Project
2. Date
3. Time issued
4. Type of material
5. Gross weight (tons)
6. Tare weight
7. Net weight of material
8. Quarry or plant location
9. Truck number
10. Contractor's name
11. Public Weigh Master's stamp or number
12. Public Weigh Master's signature or initials in ink

D. The Project Engineer and/or the Project Coordinator may direct the Contractor to re-weigh the contents of any truck load that is delivered to the project on approved platform scales at no additional cost to the Owner.

E. When material is to be paid for on per cubic yard basis (i.e., select backfill), the payment shall be based on 75% of the gross volume of the truck(s) hauling the material. The truck ticket shall include the gross volume of the truck.

DIVISION 1

PERFORMANCE BOND

Date of Execution: _____

Name of Principal: _____

(Contractor)

Name of Surety: _____

Name of Contracting Body: Fayetteville Public Works Commission, Fayetteville, N.C.

Amount of Bond: _____

PROJECT: PWC2526099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN

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 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 present.

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 there of 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 bounded parties have executed this instrument under the 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 _____ counterparts.

Witness:	CONTRACTOR:
(Proprietorship of Partnership)	(Trade or Corporate Name)
By:	By:
Title:	Title:
(Corporate Secretary or Assistant Secretary, Only)	(Owner, Partner, Corporate President or Vice-President, Only) **(CORPORATE SEAL)**

Witness:	SURETY COMPANY:
	(Surety Company Name)
	By:
Countersigned:	Title:
(N.C. Licensed Resident Agent)	(Attorney in Fact) **(SURETY CORPORATE SEAL)**

PAYMENT BOND

Date of Execution: _____

Name of Principal: _____

(Contractor)

Name of Surety: _____

Name of Contracting Body: Fayetteville Public Works Commission, Fayetteville, N.C.

Amount of Bond: _____

PROJECT: **PWC2526099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN**

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 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 and 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 bounded parties have executed this instrument under the 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 _____ counterparts.

Witness:	CONTRACTOR:
(Proprietorship of Partnership)	(Trade or Corporate Name)
By:	By:
Title:	Title:
(Corporate Secretary or Assistant Secretary, Only)	(Owner, Partner, Corporate President or Vice-President, Only) **(CORPORATE SEAL)**

Witness:	SURETY COMPANY:
	(Surety Company Name)
	By:
Countersigned:	Title:
(N.C. Licensed Resident Agent)	(Attorney in Fact) **(SURETY CORPORATE SEAL)**

POWER OF ATTORNEY
(ATTACH)

CERTIFICATE(S) OF INSURANCE
(Attach)

NOTICE TO PROCEED

TO: _____ Date: _____

PROJECT: **PWC2526099 - LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SANITARY SEWER FORCE MAIN**

You are hereby notified to commence work in accordance with the Contract dated _____, 2026, on or before _____, 2026, and you are to complete the WORK within the **contract period** thereafter. The date of final completion therefore is _____.

FAYETTEVILLE PUBLIC WORKS COMMISSION

BY: _____

Nikole Bohannon

Procurement Manager

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged this the _____ day of _____, 2026.

(CONTRACTOR)

BY: _____

TITLE: _____

- END OF SECTION –

SECTION C - ADMINISTRATIVE PROVISIONS

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DIVISION 1

01025 – MEASUREMENT AND PAYMENT

GENERAL

The purpose of this Section is to define the methods of measurement and payment for each of the unit prices and/or lump sum prices listed in the Bid Form, which are required to construct the Work.

The unit price and/or lump sum price bid shall be full compensation for the work required under each bid item, which shall include all incidental costs relative thereto. Certain items of work are specified and/or shown as a detail in the Contract Documents; bid prices shall include all items of work required to furnish and/or install each in accordance with the Project requirements, whether specifically stated or itemized in the Measure and Payment description.

INCIDENTAL ITEMS

1.01 Mobilization and Demobilization

A. The lump sum prices shown under each PART of the Bid Form are based on a percentage of the Design Engineer's estimate of probable cost. Payment under this item shall include all costs of mobilization, demobilization, bonds and insurance and other related costs. This item shall also include all costs associated with the required temporary bypass pumping, including pump mobilization and demobilization.
B. Fifty percent *(50%)* of the mobilization items will be paid under the first payment application submitted and the balance under the second payment application submitted.

1.02 Traffic Plan and Traffic Control

A. The lump sum prices bid under each PART in the Bid Form shall include all costs for the preparation and implementation of required traffic management plans, furnishing, installing and maintaining traffic control signage and devices, relocating or removing signs or other traffic control devices, replacement of street signs, replacement of traffic signal loops, and all other incidental work throughout the project site, throughout the project duration. The Contractor shall coordinate his activities so as to minimize disruption of traffic and inconvenience to residents and the general public. All such traffic control devices, signage, traffic patterns and road closures shall be approved by the City of Fayetteville and/or NCDOT.

B. Payment under the lump sum prices bid for each part shall be made on a monthly basis based on actual estimated percentage of work completed and maintained as determined by the Project Coordinator or Project Engineer. In no case shall the monthly payment exceed ten (10) percent of the lump sum prices bid without approval by the Project Engineer.

C. Prospective bidders are advised that failure to provide and maintain adequate traffic control devices and/or signage may result in the Project Engineer's refusal to make payment until corrective measures are in place.

D. Improper signage and/or traffic control devices will not be allowed. The City of Fayetteville, NCDOT, and/or the Fayetteville Public Works Commission reserves the right relocate and/or remove such non-conforming signs and devices, setup proper signage to ensure public safety and deduct all costs for these items which may be incurred by the Owner. The Contractor shall make no claim for such work performed.

1.03 <u>Erosion and Sedimentation Control</u>

A. The lump sum prices bid under the applicable PARTs in the Bid Form bid for erosion and sedimentation control shall include all costs for furnishing, erecting, maintaining and removing silt fence, temporary sedimentation control devices, rip-rap, rock check dams, temporary seeding, gravel construction entrances, filter fabric, integral straw, culled wood matting, inlet protection and any other erosion control devices shown or as may be required by the appropriate regulatory agencies throughout the project site, throughout the project duration. No additional payment will be made for removal of soil and debris from drainage structures, features, or reconditioning grading that is part of the normal maintenance activities associated with the approved erosion control plan. No additional payment shall be made for any other work due to inadequate or improperly maintained measures.

B. Prospective bidders are advised, that erosion and sedimentation control will be strictly enforced, and any failure to conform to required standards is considered a right precedent to the Owner to deny payment. Additional measures required by the North Carolina Department of Environmental and Natural Resources (NCDENR) shall not be cause for change in the lump sum price bid. Bidders shall make themselves aware of all NCDENR regulations and requirements. The Contractor shall be responsible for all fines levied due to improper erosion and sediment control measures to include all costs incurred by City of Fayetteville and/or Fayetteville Public Works Commission necessary to bring a non-conforming site into compliance.

C. The lump sum price bid shall include all costs necessary for the Contractor to comply with the requirements of the NPDES permit that is associated with the approved erosion control permit. Such activities include, but are not limited to: installation and maintenance of rain gauges, completing the required inspection reports, posting the permit and reports on the project, and furnishing copies of the inspections reports to the Owner.

D. Payment under the lump sum prices bid for each PART shall be made on a monthly basis as indicated in the Contractor's schedule for the substantial completion of all work under this Contract. In no case, shall the monthly payment exceed ten (10) percent of the lump sum prices bid without the approval of the Owner.

1.04 Clearing and Grubbing

A. The unit price bid per acre shall include the costs for felling trees, stump removal and disposal off-site, cutting trees in pulpwood length and stacking on or off easement areas if required, disposing of all trimmings, removing and disposing off-site all logs, branches, trunks, root mats, brush, vegetation, debris from clearing and grubbing operations and all other incidental materials not to be re-used in the work. Areas containing and requiring cutting and removal of weeds, grass, grain annual or perennial plants, or saplings less than one inch in diameter shall not be measured and paid for as clearing and grubbing. Payment shall be based on the horizontal area cleared and grubbed as designated on the plans or as directed by the Owner. Measurement will be made to the nearest one hundredth of an acre.

B. The unit price bid per acre shall also include all work as noted for permanent easements and shall also include protection of all trees, floral bushes or plants not to be removed or disturbed.

1.05 Demolition of Existing Lift Station

A. The lump sum prices bid under the Bid Form shall include all costs for the preparation and implementation of complete or partial demolition of lift station(s) in accordance with these Contract Documents. This price shall include coordination with PWC and other utilities to disconnect utilities and return any components as required; excavation; demolition; draining and/or abandonment of existing lines; proper disposal of materials; cutting, capping, plugging, grout filling and abandonment of existing pipes and conduits; patching asphalt in accordance with standard pavement repair detail or in accordance with entity that maintains the street (NCDOT, City of Fayetteville or Town of Hope Mills) any pavement cuts required to properly abandon existing utilities; and safe removal, transport and return to PWC of various items as specified by the Contract Documents; as well as all other items associated with safe demolition, abandonment, and removal of materials from the site in accordance with North Carolina regulations and PWC Specifications and any other incidentals necessary to complete the work.

B. This item shall also include all costs associated with the installation and maintenance of all necessary containment items, coordination with residents/businesses, clean-up of the bypass lines, continuous monitoring of the bypass system, appropriate air release valves, fuel, lubricants, labor, materials, equipment, and all other incidentals necessary to ensure that the pumping operation provides uninterrupted sanitary sewer service to customers is in compliance with North Carolina regulations and PWC Specifications. Payment shall be made after demolition and restoration activities are complete at each lift station site.

1.06 Install Permanent Pavement Patch (NOA) (PWC)

A. Payment for placing a minimum of two (2) inches of Asphalt Pavement Surface Course (SF9.5A) and eight (8) inches of Aggregate Base Course (ABC), shall be made at the unit price bid per square yard completed and accepted as listed in the Bid Form. Installation of the permanent pavement patch shall be completed in accordance with these Contract Documents. Measurement shall be based on the number of square yards. The square yards

will be calculated using the maximum trench widths.

B. Maximum payment widths for trenches have been established as indicated below. Payment widths shown include a minimum cutback of six (6) inches on each side of the trench prior to placing pavement patch. Any pavement removed or damaged beyond the limits specified, shall be replaced by the Contractor at his own cost unless directed otherwise by the Project Engineer. No payment for overage beyond the quantity shown in the Bid Form will be made.

C. Maximum Pay Widths for Permanent Pavement Patch

Storm Drainage	6’	(for pipe 24” in diameter and less)
Storm Drainage	8’	(for pipe 30” up to 42” in diameter)
Storm Drainage	10’	(for pipe 48” up to 54” in diameter)
Storm Drainage	12’	(for pipe greater than 54”)
Sanitary Sewer	10’	(0’ to 10’ depth, measured to invert of pipe)
Sanitary Sewer	12’	(greater than 10’ depth, measured to invert of pipe)
Sewer Laterals	6’	
Water Main	4’	
Water Services	4’	

D. Payment for furnishing and placing permanent asphalt pavement patch shall include re-cutting pavement to straight uniform widths parallel and perpendicular to the road with no jagged edges, removal and disposal of asphalt offsite, re-compaction of pavement subgrade, placement and compaction of ten (10) inches of ABC, maintaining ABC stone at pavement grade until removal of upper two (2) inches for paving, installation and maintenance of transitions to accommodate road travel, adjusting structures as required, tack coat, placing and compacting of asphalt material, cleanup, and all costs for labor, materials, tools, equipment, and incidentals necessary to complete the work.

1.07 INCIDENTAL STONE

A. Payment for incidental Aggregate Base Course (ABC) authorized by the Project Coordinator to be placed for the maintenance of driveways and street intersections shall be made at the unit price bid per ton. Contractor shall submit tickets to the Project Coordinator in accordance with these Contract Documents. Payment for incidental stone will not be made without copies of the accompanying tickets.

B. Payment shall include all costs for labor, tools, materials, equipment, furnishing, placing, supplementing stone required for maintenance, grading stone, wetting, compaction, removing and disposal of incidental stone immediately prior to asphalt pavement patch in each area. Incidental stone that is stockpiled or not placed will not be considered for payment.

C. Contractor shall remove a minimum two (2) inches of soil, place, grade, and compact stone in order to be considered for payment.

D. No payment shall be made for incidental ABC stone placed unless authorized by the PWC Project Coordinator.

1.08 Install 2" SF9.5A Asphalt Pavement

A. Payment for placement of asphalt surface course (SF-9.5A) shall be made at the unit price bid per square yard completed and accepted with a minimum compacted thickness of two (2) inch. Installation of the Asphalt Surface Course shall be completed in accordance with these Contract Documents. Measurement shall be based on the number of square yards in place and accepted.

B. The payment shall be full compensation for all work including preparation of existing surfaces, asphalt, cement, tack coat, and all incidentals necessary to complete the work to include maintenance and repair until final project acceptance.

C. Payment shall also include the adjustments of structures to finish grade of the overlay that may be necessary project wide.

D. This Measurement and Payment description only applies if the City of Fayetteville elects to proceed with an overlay as part of this Project. This line item is to be bid as an alternate, and if not incorporated into the Contract, shall not apply.

1.09 Submersible Lift Station

A. Payment for the submersible lift station as described herein shall be made at the lump sum unit price contained in the Bid Form. Payment shall include all necessary piping, fittings, wet well installation (including excavation, shoring, backfill, stone bedding, compaction), all necessary work to grade, clear, and prepare the site in accordance with the detailed site plan, fencing and gates, construction of the access road, pumps, bypass assembly, electrical work, control panels, site lighting, coordination as required for the installation and delivery of pumps, materials, electrical and mechanical equipment, coordination as necessary with the electrical service provider to provide the required electrical service to the lift station site, hoist assembly and wiring, valve vault, installation of piping and equipment, labor, materials, equipment, and all other necessary work required to furnish a complete installation as specified herein and shown on the Contract Drawings.

1.10 Install Bollards

A. Measured and paid for by the units of each for the number of bollards installed on the project. It shall consist of Guard post with six-inch diameter and total length of seven feet; four feet is to be raised over the ground for its practical purpose.
B. Guard Posts shall be made of steel or ductile iron filled with concrete and domed on the top. Posts are to be painted three coats with yellow color. Fourteen-inch diameter concrete encasement to be made around the bollards foundation which is basically three feet inside the subgrade from the topsoil.

1.11 Replace Gravel Driveway

A. Removal and replacement of gravel/soil driveways shall be paid for at the unit price bid per square yard. Gravel/soil drives shall be installed in accordance with the Owner's requirements. Measurement shall be made to the nearest one-tenth square yard. Payment shall be full compensation for removal of the existing driveway, removing and disposing of excess or unsuitable materials off-site, grading, compaction, and all equipment, tools, labor, and incidentals necessary to complete the work.

1.12 Undercut Excavation

A. This item shall be measured by cubic yard (CY) of unsuitable material excavated below the bedding limit line of six (6) inches below the pipe. Payment under this item will not be made without prior authorization by the PWC Project Coordinator.
   i. Payment shall be based on the internal diameter of the pipe plus two (2) feet, and to the authorized additional depth required for proper support of the pipeline.
   ii. Payment for structures shall be based on the external diameter/dimension of the structure plus two (2) feet, to the authorized depth required for proper support of the structure.
   iii. Payment shall be made at the applicable unit price as listed in the Bid Form.
   iv. The unit price shall include the costs for all labor, tools, materials and equipment including but not limited to the removal and disposal of unsuitable soil, furnishing and placing stone bedding material and all other incidentals necessary to complete the work. No payment for undercut will be made for over-excavation by error or where proper dewatering methods are not in place for trench and/or excavation stabilization.

1.13 Borrow Excavation (Select Backfill)

A. Borrow excavation (select backfill) shall be paid for at the unit price bid per cubic yard, as contained in the Bid Form. Payment shall constitute full compensation for all material, equipment, labor and all else required for acquisition, placement and compaction of select backfill material from borrow. Borrow excavation material shall be supplied by the Contractor from approved borrow areas located off-site. Materials utilized "on-site" within the Project limits or as defined, as the "free haul limit" will not be considered for payment as borrow excavation.

B. The Contractor shall submit tickets to the Project Coordinator in accordance with these Contract Documents. The cubic yards of select backfill to be paid for shall be 75% of the volume indicated on the submitted truck tickets. Disposal of unsuitable and/or excess suitable excavated material will not be paid for as a separate bid item. The Owner reserves the right to verify the actual amount of material in place.

C. Payment under this item shall include all costs necessary to furnish and install select material necessary to provide proper suitable backfill material compacted and in place as measured. Work shall include all costs to acquire, place, and compact select backfill material, removal and proper disposal of unusable material, and all labor, materials,

equipment, and incidentals necessary to complete the work. The PWC Project Coordinator shall approve the use of select material within the limits of this project.

1.14 Sod

A. Payment for placing sod shall be made at the unit price bid per square yard listed in the Bid Form. Payment shall include placing and grading a minimum of 4 in. of suitable topsoil, fine raking, sod bed preparation, pest and disease control, soil amendments, placing sod, anchoring, watering, maintaining, protection of turf areas, removal and replacement of dying sod. No payment will be made for sod placed in areas outside of easements or rights-of-way disturbed or otherwise damaged by the Contractor. The Proposal quantity reflects the total quantity of sod the Owner will pay for. In general, the maximum pay widths are shown below.

B. In some cases, specific quantities of sod in individual easement areas are identified on the Drawings and no overage will be allowed or paid for in these specific locations.

C. Stripping of topsoil will not be measured and paid for as a separate bid item. All work shall be included for payment under the applicable items listed in the Bid Form. Work shall include stripping, stockpiling, spreading, leveling, supplemental topsoil, filling, grading and compaction of suitable topsoil along right-of-way and easements.

i. Maximum Pay Widths for Sod

a. Permanent Easements - 20’ (or as indicated on the plans)
b. Temporary Easements- 20’ (or as indicated on the plans)
c. Storm Drainage - 15’
d. Water Mains -12’
e. Sanitary Sewer Laterals- 6’
f. Water Laterals- 4’

2.02 Seeding

A. Seeding of wetlands areas, easements and along right-of-way will be paid for at the unit price bid listed in the Bid Form and shall include all costs for soil preparation, placing and grading a minimum of 4 in. of suitable topsoil, pest control, disease control, anchoring, placing soil amendments, topsoil, grading, raking, seeding, fertilizing, mulching, crimping, watering, protection of turf areas, maintenance, reseeding if required, tack, and other work incidental thereto. Area to be paid for shall be measured horizontally and payment for this work will be made to the nearest one tenth (1/10) of an acre. No payment will be made for seeding areas outside of permanent and temporary easements and along rights-of-way disturbed by the Contractor’s operations.

B. Stripping of topsoil will not be measured and paid for as a separate bid item. All work shall be included for payment under the applicable items listed in the Bid Form. Work shall include stripping, stockpiling, spreading, leveling, supplemental topsoil, filling, grading and compaction of suitable topsoil along right-of-way and easements.

2.01 Lift Station Water Service

A. Water services shall be one inch (1") copper measured by actual count, complete, in place, and accepted. Payment will be made at the applicable unit price bid as listed in the Bid Form. Payment shall be made under the applicable unit price bid per each as contained in the Bid Form. Payment shall include saw cutting, removing and disposal of pavement, excavation, shoring, tapping and connecting to water mains, fittings, service pipe, corporations, installation of a reduced pressure backflow device in an insulated above ground enclosure, yard hydrant, standard meter box, all associated fittings, backfill, compaction, and all other incidentals necessary to complete the work. Metering for the service will be installed by the utility provider once the installation has been completed and accepted.

2.02 Furnish and Install Doghouse Manhole

A. Payment under this item shall include all costs necessary to furnish and install various diameter doghouse manholes as specified on the plans. Payment per each doghouse manhole shall be made at the applicable unit prices for each size and pay depth as indicated on the Bid Form. Work shall include all costs for excavation, shoring, backfill, compaction, cutting and removal of pavement, inverts, pipe slides, installation of the doghouse manhole, reinforced concrete footing, installation of the specified frame and cover, stone bedding, removal and disposal of unsuitable material off-site, dewatering, cutting and removal of the existing pipe, concrete collar, and all labor, materials, equipment, and incidentals necessary to complete the work.

2.03 Furnish and Install Manhole

A. Payment under this item shall include all costs necessary to furnish and install various diameter manholes as specified on the plans. Payment per each manhole shall be made at the applicable unit prices for each size and pay depth as indicated on the Bid Form. Work shall include all costs for excavation, shoring, backfill, removal and disposal of unsuitable material off-site, linings, inverts, pipe slides, dewatering, compaction, cutting and removal of pavement, stone bedding, installation of the manhole installation of the specified frame and cover, concrete collar, and all labor, materials, equipment, and incidentals necessary to complete the work.

2.04 Ductile Iron Sanitary Sewer Main

A. Installation of the ductile iron sewer main shall be accomplished in accordance with PWC Standard Specifications 02730 Sanitary Sewer Systems. Payment per linear foot of sanitary sewer shall be made at the applicable unit prices for each size and pay depth as indicated on the Bid Form. Work shall include all costs for excavation, shoring, backfill, compaction, dewatering, cutting and removal of pavement, proper disposal of waste materials, installation of the pipe at the specified line and grade, stone bedding, linings, coatings and all labor, materials, equipment, and incidentals necessary to complete the work. The Contractor shall be responsible for completing the installation, proper alignment

and grade of the installed main, and all other items related to proper installation. All pipe segments installed shall pass must have passed the detailed compaction requirements in order to be considered for payment.

2.05 Install 8" DR18 Sanitary Sewer Force Main

A. Payment under this item shall include all costs necessary to install sanitary sewer force main in accordance with the NCDEQ Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains. The Contractor shall perform all excavation, shoring, backfill, tracer wire, tracer wire connecting points, (if needed), utility identification posts (if needed) compaction, dewatering, and removal of unsuitable materials off-site as required for proper installation. The pipe shall be installed at the specified line and grade with a minimum cover of 36 inches and a maximum cover of 42 inches to finish grade, unless otherwise directed or approved by the Engineer. Where necessary, additional cover shall be provided to accommodate utility controls, tie-ins to existing facilities, eliminate high points in the pipeline, or provide clearance from existing or proposed utilities, drainage structures, or other field conditions. Automatic air release valves shall be installed at all high points along the pipeline. All labor, materials, equipment, and incidentals necessary to complete the work shall be included in the unit price. Pipe segments must pass all contract compaction requirements and be installed in accordance with PWC standards to be eligible for payment per linear foot.

2.06 Install 8" RJDIP Sanitary Sewer Force Main

A. Payment under this item shall include all costs necessary to install 8" Restrained Joint Ductile Iron Pipe (RJDIP) sanitary sewer force main. The Contractor shall perform all excavation, shoring, backfill, tracer wire, tracer wire connecting points (if needed), utility identification posts (if needed), compaction, dewatering, and removal of unsuitable materials off-site as required for proper installation. Pipe shall be installed at the specified line and grade. All labor, materials, equipment, and incidentals necessary to complete the work shall be included in the unit price.

2.07 Install 8" DIP Sanitary Sewer Force Main

A. Payment under this item shall include all costs necessary to install 8" Ductile Iron Pipe (DIP) sanitary sewer force main. The Contractor shall perform all excavation, shoring, backfill, tracer wire, tracer wire connecting points (if needed), utility identification posts (if needed), compaction, dewatering, and removal of unsuitable materials off-site as required for proper installation. Pipe shall be installed at the specified line and grade. All labor, materials, equipment, and incidentals necessary to complete the work shall be included in the unit price.

2.08 Remove and Dispose Existing Force Main

A. Payment under this item shall include all necessary costs to remove and dispose of the existing force mains to be removed. Work shall include all costs to remove and dispose of the force mains, proper disposal of force mains, and all labor, materials, equipment, and incidentals necessary to complete the work. Remove and disposal of the force main shall occur after PWC has accepted the new force main.

2.09 Abandon & Grout Fill Existing Sewer

A. Payment under this item shall include all necessary costs to grout fill the existing sewer mains to be abandoned. Work shall include all costs to plug the sewer mains at the manholes, hoses, pumps, fittings, grout, and all labor, materials, equipment, and incidentals necessary to complete the work. Grouting of the sewer mains shall occur after PWC has accepted the new sewer main and laterals.

2.10 Testing

A. Payment under this item shall include all costs necessary to perform the required testing on the sewer mains, low pressure sewer systems, force mains, manhole plugs, bypass lines, laterals, manholes and hydrostatic testing. Work shall include all costs for furnishing test equipment, installation and removal of blow-offs and fittings, coordination with the PWC Project Coordinator, and all labor, materials, equipment, and incidentals necessary to complete the work. Payment under this line item shall not be made until all performed tests are successful. No extra payment will be made for laterals connecting directly to manholes. Payment under this line item will not be made until all required tests are successful.

2.11 Install Air Release/Vacuum Valve

A. Payment under this item shall be measured by actual count, complete, in place. Payment will be made at the applicable unit price as listed in the Bid Form. Payment shall include all necessary costs to install a vacuum/air release valve, excavation, shoring, backfill, removal and disposal of unsuitable material off-site, dewatering, compaction, removal of pavement, stone bedding, installation of the manhole, fittings, installation of the vacuum/air release valve, coatings, and all labor, materials, equipment, and incidentals necessary to complete the work.

2.12 Connect to Existing Structure

A. Connections to existing manholes will be paid for at the unit price bid per each as listed in the Bid Form completed and accepted and shall include all costs of equipment, labor, tools, excavation, shoring, backfill, removal and disposal of unsuitable material off-site, dewatering, compaction, removal of pavement, proper disposal of waste, materials and all other incidentals necessary to complete the work. Connections shall consist of coring the manhole, installing flexible boots, re-building inverts, and sealing penetrations as required.

3.01 Lift Station Enclosure

A. Payment for furnishing and installing the enclosure for the specified lift station shall be made at the lump sum unit price contained in the Bid Form. All items necessary to provide a complete enclosure, including but not limited to required electrical service and distribution equipment, transfer and control equipment, lighting, power panels, transformers, appurtenances, associated conduit and wiring, and all related labor, materials, equipment, and incidental work; as well as fans, vents, attachment to the slab, and all other work necessary to provide a complete and fully functional installation as specified herein and shown on the Contract Drawings, shall be included in the unit price bid.

3.02 Standby Engine Generator

A. Payment for furnishing, installing, testing, and placing into service the 125-kW standby engine generator shall be made at the lump sum unit price contained in the Bid Form. Payment shall include the generator unit, required fuel system components, exhaust, cooling, starting, controls, and all associated electrical, mechanical, and site work; coordination with utility and control systems; installation of foundations and appurtenances; testing and commissioning; and all labor, equipment, materials, and incidental work necessary to provide a complete, operational standby power system as specified herein and shown on the Contract Drawings.

*** END OF SECTION ***

DIVISION 1
01300 – SUBMITTALS

GENERAL

1. THE REQUIREMENT

This section specifies the means of all submittals. All submittals shall be submitted to the Fayetteville Public Works Commission. A general summary of the types of submittals and the number of copies required is as follows:

Electronic Submittal	Type of Submittal
1	Administrative Submittals
1	Construction schedule
1	Shop drawings
1	Product samples
1	Preconstruction Video
1	Certificates of compliance
1	Warranties

All submittals shall be provided in accordance with this Section, and as outlined in Section 01000 – Supplementary Conditions. The Contractor shall refer to other Specification Sections within these Contract Documents, to ensure that all submittal requirements are adhered to. No construction shall proceed until all required submittals have been reviewed and approved by the Fayetteville Public Works Commission. Any and all work performed prior to review and acceptance of the submittals by the Fayetteville Public Works Commission shall be at the Contractor's sole risk. Further, failure to comply with the requirements of this Section may be considered Breach of Contract, and grounds for termination.

2. SUBMITTAL PROCEDURES

The Contractor shall transmit each submittal with a form acceptable to the Fayetteville Public Works Commission, clearly identifying the project and the Contractor, the enclosed material and other pertinent information specified in other parts of this section. The submittal shall identify variations from the Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

The Contractor shall revise and resubmit submittals as required, identifying all changes made since previous submittals. Resubmittals shall be noted as such.

The Contractor shall distribute copies of reviewed submittals to concerned parties, with instructions to those parties to promptly report any inability to comply with provisions.

3. ADMINISTRATIVE SUBMITTALS

All administrative submittals shall be prepared and submitted in accordance with the Submittal Checklist provided in these Contract Documents. All Preconstruction Administrative submittals must be submitted and approved prior to the release of Contractor's first Application for Payment. Construction Administrative Submittals must be submitted and approved prior to the

release of monthly pay applications. Post Construction Administrative Submittals must be submitted and approved prior to the release of the Contractor's Final Application for Payment.

4. CONSTRUCTION SCHEDULE

The construction schedule shall be prepared and submitted in accordance with Specification Section 01310. One electronic copy of the schedule shall be submitted to the Project Engineer within 10 calendar days after the date of the Notice to Proceed.

The construction schedule shall be revised to reflect comments by the Fayetteville Public Works Commission and updated monthly, depicting progress to the last day of the month. One electronic copy shall be submitted to the Project Engineer no later than the Monday prior to each Monthly Progress Meeting.

Changes to the schedule shall be accompanied by a letter of explanation with appropriate reference and revision date on the schedule.

5. SHOP DRAWINGS

General: The Contractor shall submit for review shop drawings for concrete reinforcement, structural details, materials fabricated especially for this Contract, and materials for which such Drawings are specified (as outlined in these Contract Documents) or as specifically requested by the Fayetteville Public Works Commission.

Shop drawings shall show the principal dimensions, weight, structural and operating features, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the Drawings.

When so specified, or if considered by the Fayetteville Public Works Commission to be acceptable, the manufacturer's specifications, catalog data, descriptive matter, illustrations, etc. may be submitted for review in place of shop drawings. In such case, the requirements shall be as specified for shop drawings, insofar as applicable.

The Contractor shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to the Work due to the absence of such Drawings. The Fayetteville Public Works Commission will review the shop drawings within 10 business days of receipt of such Drawings. Reviewed shop drawings will be returned to the Contractor by regular mail.

Time delays caused by rejection of submittals are not cause for extra charges to the Fayetteville Public Works Commission or time extensions.

Requirements: All shop drawings shall be submitted to the Fayetteville Public Works Commission through the Contractor. The Contractor is responsible for obtaining shop drawings from his subcontractors and returning reviewed Drawings to them. All shop drawings shall be prepared on standard size, 24-inch by 36-inch sheets, or smaller, as approved by the Fayetteville Public Works Commission. All Drawings shall be clearly marked with the name of the project, Fayetteville Public Works Commission, Contractor, and pay item to which the drawing applies. Drawings shall be suitably numbered and stamped by the Contractor. Each shipment of Drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.

6. PRODUCT DATA

Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Submissions showing only general information will not be accepted.

Product data shall include materials of construction, dimensions, performance characteristics and capacities, etc.

Pipe manufacturer shall submit documentation for all pipe being supplied to this project indicating date of manufacture, type and place of storage, shipping methods, dates of delivery to site, and all required testing data. Pipe internal surface shall be smooth and free of all cuts, gouges, or scratches. Surface cuts or scratches greater than or equal to the maximum defect depth are not acceptable.

7. SAMPLE WARRANTIES

When warranties are called for, a sample of the warranty shall be submitted with the shop drawings. The sample warranty shall be the same form that will be used for the actual warranty.

8. WORK PRIOR TO REVIEW

No material or equipment shall be purchased, fabricated especially for this Contract, or delivered to the project site until the required shop drawings have been submitted, processed and marked either "APPROVED" or "APPROVED AS NOTED". All materials and Work involved in the construction shall be as represented by said Drawings.

The Contractor shall not proceed with any portion of the Work for which the design and details are dependent upon the design and details of equipment for which submittal review has not been completed.

9. CONTRACTOR'S REVIEW

Only submittals which have been checked and corrected should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting shop drawings to the Fayetteville Public Works Commission, the Contractor shall check thoroughly all such Drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. Drawings which are correct shall be marked with the date, checker's name and indications of the Contractor's approval, and then shall be submitted to the Fayetteville Public Works Commission; other Drawings submitted to the Fayetteville Public Works Commission will be returned to the Contractor unreviewed.

The review of shop drawings will be general and shall not relieve the Contractor of the responsibility for details of design, dimensions, etc., necessary for proper fitting and construction of the Work required by the Contract and for achieving the specified performance.

For submissions containing departures from the Contract Documents, the Contractor shall include proper explanation in his letter of transmittal. Should the Contractor submit for review equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, he shall also submit for review details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Fayetteville Public Works Commission, shall do all Work necessary to make such modifications.

10. SUBSTITUTIONS

Whenever a particular brand or make of material, equipment, or other item is specified, or is indicated in these Contract Documents, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications. Any other brand or make which, in the opinion of the Fayetteville Public Works Commission, is equivalent to that specified or indicated may be offered as a substitute subject to the following provisions:

- Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature, and performance data together with samples of the materials,

where feasible, to enable the Fayetteville Public Works Commission to determine if the proposed substitution is equal.

- Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.
- A list of installations (including contact information) where the proposed substitution is equal.
- Where the acceptance of a substitution requires revision or redesign of any part of the Work, all such revision and redesign, and all new Drawings and details required therefore, shall be provided by the Contractor at his own cost and expense, and shall be subject to review of the Fayetteville Public Works Commission.
- In all cases the Fayetteville Public Works Commission shall be the sole judge as to whether a proposed substitution is to be accepted. The Contractor shall abide by the Fayetteville Public Works Commission 's decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item, or substitute, as specified. No substitute items shall be used in the Work without written acceptance of the Fayetteville Public Works Commission. The Fayetteville Public Works Commission reserves the right to reject any such proposed changes or substitutions at their sole discretion, and is under no obligation to justify their decision.
- Acceptance of any proposed substitution shall in no way release the Contractor from any of the provisions of the Contract Documents.

Each submittal shall be complete in all aspects incorporating all information and data required to evaluate the products' compliance with the Contract Documents. Partial or incomplete submissions shall be returned to the Contractor without review.

- Shop Drawing Distribution: The Contractor shall submit an electronic PDF copy of all shop drawings to the Fayetteville Public Works Commission for review. Shop drawings will be reviewed, stamped and distributed with the appropriate box checked either "APPROVED", "APPROVED AS NOTED", “NOT APPROVED” or "REVISE AND RESUBMIT". The Fayetteville Public Works Commission shall return an electronic copy to the Contractor.

If the Contractor requires additional copies of returned shop drawings, he shall include extra Drawings in his original submittal. The Fayetteville Public Works Commission will process the Drawings and return them to the Contractor.

11. PRODUCT SAMPLES

Contractor shall furnish for review all product samples as required by the Contract Documents or requested by the Fayetteville Public Works Commission to determine compliance with the specifications.

Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show complete project identification, the nature of the material, trade name of manufacturer and location of the Work where the material represented by the sample will be used.

Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Fayetteville Public Works Commission and shall bear the Contractor's

stamp certifying that they have been so checked. Transportation charges on samples submitted to the Fayetteville Public Works Commission shall be prepaid by the Contractor.

Fayetteville Public Works Commission's review will be for compliance with the Contract Documents, and his comments will be transmitted to the Contractor within 15 business days of receipt.

Acceptable samples will establish the standards by which the completed Work will be judged.

12. PRECONSTRUCTION VIDEO

The Contractor shall document pre-existing conditions on the project site in accordance with these Contract Documents. This shall be done prior to Work beginning in the area.

The video shall be submitted to the Project Engineer before the first payment application can be released.

13. RECORD DRAWINGS

Upon completion of the Work, the Contractor shall provide two complete sets of drawings recording all changes to the work to indicate actual installation. Changes shall be noted in legible red letters. These changes shall include but are not limited to the following:

- Change in pipe material
- Change in manhole location
- Size, depth, and installed elevations of mains, laterals, force mains, manholes and lift stations.
- Location of valves, blow-offs, and other appurtenances
- Changes in location or extent of grout filled mains.
- Changes in force main bend locations, restrained joints or casings.

Completion of the Contractor’s record drawings is a specific contract requirement, and final payment will not be made until these drawings and project manual (as required) have been submitted to and approved by the Project Engineer.

14. CERTIFICATES OF COMPLIANCE

Copies of certificates of compliance and test reports shall be submitted for requested items to the Fayetteville Public Works Commission prior to request for payment.

15. WARRANTIES

Original warranties, called for in the Contract Documents, shall be submitted to the Fayetteville Public Works Commission. When warranties are required for an item, the warranty shall be submitted prior to request for payment of that item.

When warranties are requested, a sample of the warranty to be provided shall be submitted with, and considered part of, the shop drawings.

The Contractor shall warrant to the Fayetteville Public Works Commission that all material and labor used in the construction are covered by his warrantee for a minimum of a one (1) year period upon approval and acceptance by the Fayetteville Public Works Commission. The Contractor shall replace or repair defects at no cost to the Fayetteville Public Works Commission during the warrantee period.

*** END OF SECTION ***

DIVISION I

GENERAL REQUIREMENTS

CONSTRUCTION SCHEDULE

Part 1 – GENERAL

1.01 Work Included:

A. This section specifies requirements and procedures in preparing and updating construction schedules and reports for planning, coordinating, executing and monitoring the progress of the work. The construction work shall be scheduled to be completed within the specified duration of the Contract.

1.02 Related Work Specified Elsewhere

A. Special Provisions

B. General Conditions

C. Submittals

1.03 Scheduling Responsibilities

A. The construction schedule will be used to monitor job progress. The Contractor will be responsible for providing all information concerning the sequencing, logic and durations of planned activities. The Contractor will be responsible for providing monthly update information on logic changes, percent complete, actual start and finish dates and duration changes. The Contractor will be required to produce the monthly, computerized printout of the schedule updates.

B. Assembling the initial schedule in hand drawn or computer-generated (preferred) form is the responsibility of the Contractor.

C. It should be clearly understood that the initial schedule and all update information must be provided by the Contractor and that this information is a representation of the best efforts of the Contractor and his subcontractors as to how they envision the work to be accomplished. Similarly, all progress information to be provided by and through the Contractor must be an accurate representation of his or his subcontractors' or suppliers' actual performance. The schedule shall at all times remain an accurate reflection of the Contractor's actual or projected sequencing of the work. Once accepted, adherence to the schedule shall be obligatory upon the Contractor and his subcontractor for the work under this Contract. Owner may require the Contractor to revise the schedule if, in the Project Engineer's judgment, the schedule does not accurately reflect the actual extension of the work, or is in violation of any provision of the Contract Documents. The Contractor shall provide the necessary information required to revise the schedule as often as is necessary during the course of performance of the work without additional cost to the Owner.

1.04 Progress of Work

A. The work shall be started on the date indicated in the Notice to Proceed and shall be executed with such progress as may be required to prevent delay to other Contractors or to the general completion of this project. The Contractor shall at all

times, schedule and direct his work so that it provides an orderly progression of the work to completion within the specified Contract Time. The Contractor shall account for traffic control requirements, access of citizens within the work area and the requirements for timely restoration.

B. The Contractor agrees that, whenever it becomes apparent from the current monthly schedule update that delays to the planned progress of work have resulted and these delays are through no fault of the Owner and hence, the Contract completion date will not be met, or when so directed by the Project Engineer, he will prepare a recovery schedule outlining steps to recover time and to complete the project on schedule.

C. The Contractor shall submit for review a written statement of the steps he intends to take, to remove or arrest the delay to the schedule. The Contractor shall promptly provide such level of effort at no additional cost to the Owner. In addition, should schedule delays persist; the Contractor's surety will be asked to attend a schedule update meeting.

D. Failure of the Contractor to comply with the requirements of this provision shall subject him to, at the Owner's sole discretion, withholding, in partial or in total, payments otherwise due the Contractor for work due under this Contract. The Contractor agrees that any withholding of monies is not a penalty for noncompliance, but is an assurance for the Owner that funds will be available to implement these requirements should the Contractor fail to do so, since failure of the Contractor to comply with these requirements shall mean that the Contractor failed to execute the work with such diligence as to ensure its completion within the time for completion.

Part 2 – CONSTRUCTION SCHEDULE

2.01 Schedule Requirements

A. The schedule shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the Contractor. The schedule shall show how the start date of a given activity is dependent on the completion date of preceding activities how its completion restricts the start of succeeding activities. A time scaled precedence format will be followed. The schedule shall indicate the start date, completion date, and duration (in days), of each activity.

B. The Schedule Activities shall be developed into two major groups:

1. Construction Activities - Construction activities will be physical work activities that describe how the job will be constructed. Work shall include planned restoration and paving.

2. Post Construction Testing, Start-up, Training and Close-out - Activities for this group shall include all work required satisfying appropriate specification requirements sections and meeting the requirements of final completion. There are at least 3 mandatory activities: Punch list, Final Walkthrough and Project Complete.

C. The Contractor shall break the work into activity durations of one to twenty (1 to 20) working days each, except for non-construction activities (such as procurement of

materials and delivery of equipment) and other activities that may require longer durations. To the extent feasible, activities related to a specific physical or geographic area of the project should be grouped on the schedule for ease of understanding and simplification. The selection and number of activities shall be subject to the review of the Project Engineer.

D. Each activity on the schedule shall have indicated for it the following:

1. Construction activities will be divided by easily recognizable division points such as stationing or street names, area of work, etc.
2. A brief description of the activity will be included. If this description is not definitive, a separate listing of each activity and a descriptive narrative may be required.
3. Where the Contractor intends to perform work concurrently, a resource or crew identifier will be assigned to the activity to indicate parallel paths.
4. Established PWC holidays and other non-work days will be excluded from the schedule.

E. Failure to include on the schedule any element of work required for the performance of this Contract shall not excuse the Contractor from completing all work required within the applicable Contract Time.

F. A schedule which shows a completion of any portion of the construction work prior to the Contract Time dates may be accepted but in no event shall be acceptable as a basis for a claim for any delay against the Owner by the Contractor.

Part 3 – SCHEDULE OF SUBMITTALS

3.01 Schedule Implementation

A. Within (10) calendar days after the Notice to Proceed, the Contractor shall submit one electronic copy of their proposed construction schedule for the entire Contract duration to the Project Engineer.

B. The Contractor shall submit hard copies and a schedule on disk in a format wholly compatible with Microsoft Project. Submission of an electronic schedule does not preclude any other of the aforementioned individual activity requirements.

C. If a review of the submitted schedule indicates a work plan that will not complete the work within the Contract time, it shall be the responsibility of the Contractor to revise the schedule as required and resubmit it until it is acceptable. Failure by the Contractor to submit an acceptable schedule may, at the Owner's sole discretion, be cause for the withholding of any partial payment(s) otherwise due under the Contract.

D. Acceptance of the schedule shall not constitute a representation by the Owner that the work can be completed as shown on the schedule.

3.02 Schedule Updates

A. The Contractor shall submit a Schedule Update on the Monday prior to the monthly progress meeting, (or as directed by the Project Engineer), to allow the Project

Engineer to review the schedule. The schedule shall be up-to-date as of the previous Friday or as directed by the Project Engineer. Actual progress of the previous month shall be recorded and future activities will be reviewed. The duration of activities and their logical connections may be revised as needed. Decisions made at these meetings and agreed to by all parties are binding with the exception that no contractual completion dates will be modified without formal written requests and acceptance as specified in the Contract Documents. The Contractor must provide the following information for each update at a minimum:

1. Actual start and finish dates for all completed activities.
2. Actual start dates for all started but incomplete activities including remaining durations and/or percent completes.
3. Revisions in the logic, critical path or resource assigned to an activity that would affect the anticipated early start of all activities not yet started.
4. Any approved extension of Contract time shall be included in the next monthly updating of the schedule.

B. Provide a Monthly Progress Status Report that provides the following items:

1. Summarized revisions made to the Construction Schedule since the previous submittal.
2. Work anticipated to be started during the next period, including those activities already in progress.
3. Problem areas, anticipated delays, and the impact on the schedule.
4. Corrective action.
5. The effect of changes on schedules of other prime Contractors in adjacent work areas.

C. Failure to provide update information listed above, or failure to attend progress meetings may result in the Owner withholding partial payments.

DIVISION 1
01400 QUALITY CONTROL

1. QUALITY ASSURANCE

Quality: All materials shall be new and correctly designed, and shall conform to the requirements outlined in these Contract Documents. They shall be standard first-grade quality produced by expert workmen and be intended for the use for which they are offered. Materials which, in the opinion of the Fayetteville Public Works Commission, are inferior or of a lower grade than indicated, specified, or required will not be acceptable.

Source Limitations: To the greatest extent possible for each unit of Work, the Contractor shall provide products, materials, or equipment from a single manufacturer.

Compatibility of Options: If the Contractor cannot obtain all necessary products, materials, and/or equipment from a single manufacturer, the Contractor shall submit compatible products, materials, and/or equipment to the Fayetteville Public Works Commission for review and approval. Once the Fayetteville Public Works Commission has issued approval of the proposed products, materials, and/or equipment, the Contractor shall only utilize that manufacturer's products, materials, and/or equipment, unless otherwise approved in writing by the Fayetteville Public Works Commission.

2. QUALITY CONTROL

Quality control is the sole responsibility of the Contractor and shall include the activities of his Subcontractors and all suppliers as required.

3. TESTING SERVICES

The Contractor shall cooperate with the Fayetteville Public Works Commission's Consultant performing required testing and provide equipment, access, or other means required at no additional expense to the Fayetteville Public Works Commission. The Contractor shall be responsible for coordinating testing with the PWC Project Coordinator. The Contractor shall be responsible for all costs incurred by the Fayetteville Public Works Commission's Consultant when scheduled testing cannot be performed.

The Fayetteville Public Works Commission shall employ and pay for the services of an independent laboratory for specified testing as outlined in these Contract Documents, with the following exceptions:

- If Laws and Regulations of any public body having jurisdiction specifically require any part of the Work to be tested, inspected, or approved by an employee or other representative of that public body, the Contractor shall be responsible for arranging and obtaining such inspections and/or approvals. The Contractor shall bear all costs associated with the required testing, inspections, and/or approvals, and shall furnish the Fayetteville Public Works Commission all required documentation that the required testing, inspection, and/or approvals have been obtained.
- If any part of the Work is found to be defective and not in compliance with the Contract Documents, the Contractor shall be responsible for all subsequent testing necessary to prove that the Work has been brought into compliance. Any necessary testing to ensure compliance shall be directed by the PWC Project Coordinator and/or PWC Project Engineer.
- When scheduled testing by the Fayetteville Public Works Commission's Consultant cannot be performed.

- Arranging and obtaining any required inspections, testing, or approvals required in connection with the Fayetteville Public Works Commission's acceptance of a material supplier, or equipment proposed to be incorporated into the Work, or materials, mix designs, etc. submitted for approval prior to purchase for incorporation into the Work. All inspections, tests, and approvals shall be performed by organizations acceptable to the Fayetteville Public Works Commission.

4. PRODUCT EVALUATION

Testing shall be accomplished as deemed necessary by the Fayetteville Public Works Commission to ensure that the products conform to the requirements of the Contract Documents.

The work or actions of the testing laboratory shall in no way relieve the Contractor of his obligations under the Contract. The laboratory testing work will include such inspections and testing required by the Contract Documents, existing laws, codes, ordinances, etc. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform, accept or approve any of the Contractor's Work.

The Contractor shall allow the Fayetteville Public Works Commission ample time and opportunity for evaluation and testing materials to be used in the Work. The Contractor shall advise the Fayetteville Public Works Commission promptly upon placing orders for materials so that arrangements may be made, if desired, for evaluation before shipment from the place of manufacture. The Contractor shall at all times furnish the Fayetteville Public Works Commission and his representatives, facilities including labor, and allow proper time for evaluation and testing materials, and workmanship. The Contractor must anticipate that possible delays may occur due to the necessity of materials being inspected and accepted for use. The Contractor shall furnish, at his own expense, all samples of materials required by the Fayetteville Public Works Commission for testing, and shall make his own arrangements for providing water, electric power, or fuel for the various evaluation and tests of structures and materials.

The Fayetteville Public Works Commission will bear the cost of all tests, evaluation, or investigations undertaken by the order of the PWC Project Engineer for the purpose of determining conformance with the Contract Documents if such tests, evaluation, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Fayetteville Public Works Commission as a result of such tests, evaluation, or investigations, the Contractor shall bear the full cost of any additional tests, evaluations and investigations, which are ordered by the Fayetteville Public Works Commission to ascertain subsequent conformance with the Contract Documents.

5. EVALUATION AT PLACE OF MANUFACTURE

Unless otherwise specified, all products and materials shall be subject to evaluation by the Fayetteville Public Works Commission at the place of manufacture.

The presence of the Fayetteville Public Works Commission at the place of manufacture, however, shall not relieve the Contractor of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of the Fayetteville Public Works Commission.

6. SAMPLING AND TESTING

Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered. However, the Fayetteville Public Works Commission reserves the

right to use any generally accepted system of sampling and testing which will ensure that the quality of the workmanship is in full accord with the Contract Documents.

Any waiver by the Fayetteville Public Works Commission of any specific testing or other quality assurance measures shall not be construed as a waiver of any requirements of the Contract Documents. The Fayetteville Public Works Commission may require a guarantee of substantial performance and/or a performance bond to ensure any necessary corrective or remedial Work, should a waiver be granted.

The Fayetteville Public Works Commission reserves the right to make independent investigations and tests. Failure of any portion of the Work to meet any of the requirements of the Contract Documents shall be reasonable cause for the Fayetteville Public Works Commission to require the removal or correction and reconstruction of any such work in accordance with the Contract Documents. In addition to any other evaluation, observation or quality assurance provisions that may be specified, the Fayetteville Public Works Commission shall have the right to independently select, test, and analyze, at their expense, additional test specimens or any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the Contractor to determine compliance with the applicable specifications for the materials so tested or analyzed. The Contractor shall be responsible for all costs of removal, correction, and reconstruction or repair of any such Work that fails to meet the requirements of the Contract Documents.

7. SITE INVESTIGATION AND CONTROL

The Contractor shall verify all dimensions in the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to their failure to comply with this requirement.

The Contractor shall inspect related and appurtenant Work and shall report in writing to the Fayetteville Public Works Commission any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at their sole cost and expense.

8. RIGHT OF REJECTION

The Fayetteville Public Works Commission shall have the right, at all times, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work. If the Fayetteville Public Works Commission, through an oversight or otherwise, has accepted materials or Work which is defective or which is contrary to the Contract Documents, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be subsequently rejected by the Fayetteville Public Works Commission.

The Contractor shall promptly remove rejected articles or materials from the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.

WATERTIGHTNESS OF STRUCTURES

It is the intent of these Contract Documents that all Work shall be performed as required by quality construction to ensure proper sealing so that groundwater and/or rainwater will not leak into any collection line, service lateral, or manhole.

The Contractor shall provide at its own expense all labor, material, temporary bulkheads, pumps, water, measuring devices, etc., necessary to perform the required tests.

9. HYDRAULIC UPLIFT ON STRUCTURES

The Contractor shall be completely responsible for any pipelines or manholes that may become buoyant before the Work is completed and accepted. The Contractor shall take all necessary steps to prevent any structures from becoming buoyant. Damage to any structures due to floating or flooding shall be repaired or replaced at the Contractor's expense.

10. TIME OF OBSERVATION AND TESTS

Samples and test specimens required under these Contract Documents shall be furnished and prepared for testing in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. The Contractor shall furnish and prepare all required test specimens within the scope of the Contract. Except as otherwise provided in the Contract Documents, the performance and cost of the required tests will be the responsibility of the Fayetteville Public Works Commission. However, the costs of any test which shows unsatisfactory results shall be borne by the Contractor. Whenever the Contractor is ready to backfill, bury, cast in concrete, or otherwise cover any Work under the Contract, the Fayetteville Public Works Commission shall be notified not less than twenty-four hours in advance to request inspection before beginning any such Work of covering. Failure of the Contractor to notify the Fayetteville Public Works Commission a minimum of twenty-four hours in advance of any such inspections shall be cause for the Fayetteville Public Works Commission to order a delay in the Contractor's schedule to allow time for inspections. Any remedial or corrective Work required, and all costs of such delays, including its effect upon other portions of the Work, shall be borne by the Contractor.

- END OF SECTION -

DIVISION 1
01700 PROJECT CLOSEOUT

1. FINAL CLEANUP

The Contractor shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, temporary structures and facilities, construction signs, tools, scaffolding, materials, supplies and equipment which may have been used in the performance of the work. The Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds. Final acceptance of the Work by the Fayetteville Public Works Commission will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

The Contractor shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces.

The Contractor shall remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering.

The Contractor shall remove paint, clean and restore all equipment and material nameplates, labels and other identification markings.

The Contractor shall maintain cleaning until project is accepted by the Fayetteville Public Works Commission.

The Contractor shall:

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
B. Use each type of cleaning material on only those surfaces recommended by the cleaning material manufacturer.
C. Use only materials which will not create hazards to health or property.

2. CLOSEOUT TIMETABLE

The Contractor shall establish dates for testing, acceptance periods, and on-site instructional periods (as required under this Contract). The dates shall be established a minimum of seven (7) calendar days prior to beginning any of the foregoing items, to allow the Fayetteville Public Works Commission sufficient time to schedule attendance at the activities.

3. FINAL SUBMITTALS

Before the final acceptance of the project, the Contractor shall submit to the Fayetteville Public Works Commission certain records, certifications, etc., which are specified elsewhere in these Contract Documents. Missing, incomplete or unacceptable items, as determined by the Fayetteville Public Works Commission, shall constitute grounds for withholding final payment to the Contractor. A partial list of such items appears below, but is shall be the Contractor's responsibility to submit any other items which are required in these Contract Documents:

A. Written Test results of project components.
B. Written guarantees, where required.
C. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
D. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

4. PUNCH LISTS

Final cleaning shall be scheduled upon completion of the project.

The Fayetteville Public Works Commission will make his final inspection whenever the Contractor has notified the Fayetteville Public Works Commission that the work is ready for the inspection. Any work not found acceptable and requiring cleaning, repair and/or replacement will be noted on the punch list. Work that has been inspected and accepted by the Fayetteville Public Works Commission shall be maintained by the Contractor, until final acceptance of the entire project.

Whenever the Contractor has completed the items on the punch list, the Contractor shall notify the Fayetteville Public Works Commission that it is ready for final inspection. This procedure will continue until the entire project is accepted by the Fayetteville Public Works Commission. The final payment will not be processed until the entire project has been accepted by the Fayetteville Public Works Commission and all of the requirements in these Contract Documents have been satisfied.

5. TOUCH-UP AND REPAIR

The Contractor shall repair any and all damage to existing facilities and surfaces. If in the opinion of the Fayetteville Public Works Commission the repair work is not satisfactory, the Contractor shall make repairs until the Fayetteville Public Works Commission accepts it.

6. MAINTENANCE AND GUARANTEE

The Contractor shall comply with all maintenance and guarantee requirements of these Contract Documents.

Replacement of earth fill, backfill, or asphalt where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor obtained a statement in writing from the affected private owner or public agency releasing the Fayetteville Public Works Commission from further responsibility in connection with such repair or resurfacing.

*** END OF SECTION ***

SECTION D – TECHNICAL SPECIFICATIONS

DIVISION I
02000 – SPECIAL PROVISIONS

1.01 Summary

A. This project includes the replacement and upgrade of the existing Longview Acres Lift Station #41 and force main. The project consists of 2,056 feet of 8" Force Main and the installation of a new submersible Lift Station.

B. All work shall be done in accordance with the terms and conditions outlined herein, Fayetteville Public Works Commission (PWC) "Manual for the Design and Construction of Water and Wastewater System Extensions" (most recent edition), in accordance with the NCDOT Standard Specifications for Roads and Structures (most recent edition), and subject to final approval and acceptance by Fayetteville Public Works Commission.

1.02 Fayetteville Public Works Commission Responsibilities

A. Fayetteville Public Works Commission is the owner of the water and sanitary sewer utilities within the public rights-of-way within the project area. Fayetteville Public Works Commission will have a Project Coordinator assigned to this project, to observe construction of the water and sanitary sewer utilities. All work related to the water and sanitary sewer utilities shall be coordinated through Fayetteville Public Works Commission. The Contractor shall notify Fayetteville Public Works Commission a minimum of two (2) business days in advance of beginning any construction on the water and sanitary sewer utilities.

B. Should there be any changes to the design of the water and sanitary sewer utilities, such changes shall be approved by Fayetteville Public Works Commission, in writing, before the Contractor proceeding with the proposed revision. Fayetteville Public Works Commission has sole authority regarding decisions impacting the water and sanitary sewer utilities within the project area.

C. Fayetteville Public Works Commission shall review and approve all requests for payment related to the construction of the water and sanitary sewer utilities. The Contractor shall submit all requests for payment in accordance with these Contract Documents.

1.03 Resolving Discrepancies

A. Except as may be otherwise specifically stated in the Contract Documents, the following order of precedence shall be adhered to for resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents as they relate to PWC water and/or sanitary sewer utilities:

1. Any addendum issued prior to the opening of Bids
2. Section 02000 – Special Provisions
3. Section 01025 – Measurement and Payment
4. Approved Contract Drawings
5. PWC Standard Details

6. PWC Technical Specifications
7. General Conditions of the Contract Documents

1.04 Customer Service

A. The Contractor is expected to make every effort to reduce the impact of their operation to PWC's operation and maintenance of the water and/or sanitary sewer system, and the affected residents within the project area. Full cooperation and coordination with PWC personnel and residents is expected. It is expected that the Contractor will promptly respond to any concerns voiced by residents and/or PWC personnel, and make every effort to resolve them immediately. Providing exemplary customer service shall be incidental to this Contract, and no additional payment will be made for this service.

B. The Contractor at all times shall conduct the work in such a manner as to ensure the least obstruction to traffic practicable. The convenience of the general public and of the residents and businesses along and adjacent to the Work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. The Contractor shall construct and maintain any necessary ramps, boardwalks, or other means to maintain pedestrian traffic. Costs for such work shall be incidental to the unit prices bid. The Contractor shall at all times cooperate with the public and merchants as affected by the construction operations and shall endeavor to maintain good public relations at all times.

C. The Contractor shall fully coordinate their operations and schedule with Fayetteville Public Works Commission.

1.05 Customer Notification

A. Whenever the property owner's use of the water and/or sanitary sewer utilities must be interrupted by the Work, the Contractor shall notify the residents well in advance of the interruption. This notification shall be accomplished with door hanger notification cards placed at the addresses of the affected residents. Property owners shall be informed when service interruption takes place and the expected duration. This notice shall be a minimum 48 hours prior to service interruption. The Contractor shall make every effort to minimize inconvenience to the public and property owners.

B. Service interruptions to residents shall be limited to no more than eight (8) hours at any given time.

C. The notifications shall describe the work to be undertaken and shall clearly indicate the dates and times of the work. The text of the notifications shall be approved by Fayetteville Public Works Commission in advance. The Contractor shall notify the PWC Project Coordinator each time such notification is issued to the residents.

1.06 Guarantee

A. All water and/or sanitary sewer work completed under these Contract Documents shall be guaranteed by the Contractor for a period of one (1) year from the date of final acceptance. During that period, all serious defects discovered in the water and/or

sanitary sewer work, as determined by Fayetteville Public Works Commission, shall be removed and replaced in a satisfactory manner by the Contractor at no cost to Fayetteville Public Works Commission. Fayetteville Public Works Commission may conduct an independent inspection, at their sole expense, of the completed water and/or sanitary sewer work prior to the completion of the one (1) year guarantee period.

B. Should Fayetteville Public Works Commission's inspection determine that the water and/or sanitary sewer work is not in accordance with these Contract Documents; the Contractor shall mobilize and make all necessary repairs at no expense to Fayetteville Public Works Commission. The Contractor will receive written notification from Fayetteville Public Works Commission, and be allowed the chance to review any available inspection pictures or other documentation. The Contractor shall respond to Fayetteville Public Works Commission with a plan of action within 30 calendar days of receiving notification. The Contractor shall mobilize and begin to complete the repairs/replacement within 60 calendar days of receiving notification. The Contractor shall:

    1. Repair such defective land or areas.
    2. Correct such defective Work, or if the defective Work has been rejected by the PWC Project Engineer, remove it from the project and replace it with Work that is not defective.
    3. Satisfactorily correct, repair, remove, or replace any damage to other Work, damage to the work of others, and damage to other land or areas.

C. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Fayetteville Public Works Commission reserves the right to contract with another party to complete the warranty work, at the sole expense of the Contractor. All claims, costs, losses, and damages (including but not limited to all fees and charges or design professionals, attorneys, and other professionals and all court, arbitration or other dispute resolution costs arising out of or relating to such correction or repair or such removal and replacement of work of others) shall be paid by the Contractor.

D. The warranty period stated is specifically for the water and/or sanitary sewer work installed by the Contractor. Any collateral damage discovered during the warranty period will be investigated and the Contractor will be required to respond if the damage is determined to have occurred during the construction process.

1.07 Discovery of Defects

A. The Contractor warrants and guarantees to Fayetteville Public Works Commission, that all water and/or sanitary sewer work will be in accordance with these Contract Documents, will not be defective, and that all materials and equipment used for the work are appropriate for the Project. Fayetteville Public Works Commission shall provide prompt notice of all defects to Contractor upon discovery. All defective water and/or sanitary sewer work, whether or not in place, may be rejected, corrected, or accepted, at Fayetteville Public Works Commission's sole discretion.

B. Fayetteville Public Works Commission reserves the right, should an error be discovered in the estimate or conclusive proof of defective work or materials used by or on the part of the Contractor be discovered either before or after the final payment has been made, to claim and remove by process of law such sum or sums as may be sufficient to correct the error or make good the defects in the work and materials.

1.08 Cleanliness During Construction

A. The Contractor shall perform a daily clean-up of all dirt, debris, scrap materials and other disposable items resulting from the Contractor's operations, whether on-site or off-site. The Contractor shall remove all construction equipment, barricades, tools, surplus materials, etc. no longer required at the site. No open accumulation of refuse, surplus or scrap materials will be permitted. Failure of the Contractor to maintain a clean site will be basis for Fayetteville Public Works Commission to issue a written notice of non-compliance with the Contract. Should that notice to correct not be complied with within twenty-four (24) hours, Fayetteville Public Works Commission may authorize the cleanup to be performed by others and the costs shall be deducted from monies due the Contractor. The Contractor shall legally dispose off-site all waste materials and other excess materials resulting from construction. No separate payment shall be made for maintaining a clean project site.

B. The Contractor shall control the dust in all areas of the project limits for the entire duration of construction. Dust control may be accomplished by use of either water or dust control materials, or as directed by the PWC Project Engineer. No separate payment shall be made for dust control.

1.09 Working Times

A. The Contractor shall limit their operations to Monday through Friday, between the times of 7:00 am and 5:00 pm, unless otherwise approved by Fayetteville Public Works Commission (NCDOT Encroachment may limit work to 9:00 am to 4:00 pm). No work is permitted on legal Holidays (to include holiday weekends). No work, unless otherwise required due to an emergency and authorized by Fayetteville Public Works Commission, shall be performed on weekends or after hours without prior written approval from Fayetteville Public Works Commission. Requests to work other than regular working hours must be submitted in writing to Fayetteville Public Works Commission a minimum of two (2) full business days in advance in order to arrange for appropriate personnel to be at the site of the Work. Requests shall only be approved if Fayetteville Public Works Commission determines that the work is necessary in order to meet the contract completion date. The written request shall include a proposed schedule for the work to be completed. During the course of construction, it may be necessary to complete portions of the Work outside of the normal working hours, to accommodate the utility owner's operations, traffic, and/or public convenience. The Contractor, Fayetteville Public Works Commission, and the utility owner will determine an acceptable schedule required for Work during such hours. The costs for such Work shall be considered incidental to the Project and no additional payment will be made.

B. Inspector Overtime shall be charged during those times when the Contractor is authorized to work outside of the normal working hours outlined above. The overtime will be charged at $125.00 per hour. The Project Coordinator shall be present at all times when the Contractor is approved to work outside of normal hours. The overtime charge will be deducted from the Contractor's pay application Inspector overtime may be waived for circumstances beyond the Contractor's control as deemed by the Project Engineer or Project Coordinator.

C. Should the Contractor be granted permission to work outside of the normal working day or time, the Contractor shall adhere to the time restrictions agreed to in the Project Engineer's approval of the request. The Contractor will be assessed a penalty of $250 per 30-minute interval for any portion thereof, should the Contractor fail to leave the site at the agreed upon time. Inspector overtime will charged during the approved hours, as outlined above. The penalty may be waived for circumstances beyond the Contractor's control, as deemed by the Owner.

   Note: The Contractor, may, without penalty, complete servicing of equipment in the approved staging yard after normal work hours.

D. Legal holidays observed by Fayetteville Public Works Commission include New Year's Day, Martin Luther King's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving (2 days), and Christmas (2 days).

1.10 Construction Staking

A. All utility construction shall be staked in the field. Cut sheets shall be provided to Fayetteville Public Works Commission and the Contractor. No construction will be allowed to proceed unless the installation is staked and cut sheets are on site. The Contractor shall always maintain cut sheets on the project site and make them available for inspection by PWC staff.

1.11 Equipment

A. The Contractor shall be equipped with equipment perfectly adaptable for the type of construction required; all such equipment shall be of sufficient capacity to handle the work in an expeditious and safe manner. Fayetteville Public Works Commission reserves the right to deny the use of inadequate equipment or of equipment not capable of performing the work in an acceptable manner.

B. With respect to the foregoing, it is the intent of Fayetteville Public Works Commission to require that the Contractor be equipped to perform the work shown and specified, expeditiously and in accordance with the best modern practice.

1.12 Warranty Against License Agreements

A. The Contractor shall warrant to Fayetteville Public Works Commission that the equipment used on this Contract, where covered by patents or license agreements, is furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements. The Contractor shall defend, indemnify, and hold Fayetteville Public Works Commission harmless from and against any and all costs, loss, damage, or expense

arising out of or in any way connected with any claim of infringement of patent, trademark, or violation of license agreement.

1.13 Agreements with Property Owners

A. Any and all agreements between the Contractor and individual property owners for work, services, rent of staging areas, etc. located outside of any easements or public rights-of way shall not obligate the City of Fayetteville, Fayetteville Public Works Commission, or the Design Engineer in any manner. Prior to performing any work on private property, which could remotely infer the Contractor acting on behalf of Fayetteville Public Works Commission, the Contractor shall furnish to Fayetteville Public Works Commission a signed and witnessed statement executed by the Property Owner acknowledging that the City, Fayetteville Public Works Commission, and Design Engineer are not liable for any agreements between the Property Owner and the Contractor, and that the Contractor shall hold harmless and defend the City, Fayetteville Public Works Commission, and the Design Engineer from all claims, damages, etc.

B. Additionally, the Contractor shall have the responsibility to secure any and all agreements with property owners for any actions taken by their Subcontractors.

C. Prior to release of final payment, the Contractor shall obtain written releases from the property owners for satisfaction, completion, and restoration. Copies of those written releases shall be submitted to Fayetteville Public Works Commission with the final pay application.

D. The Contractor bears complete responsibility for any damage to private properties outside of the PWC easements and/or rights-of-way.

1.14 Submittals

A. The Contractor shall provide submittal information regarding the water as outlined below. The Contractor shall not perform any portion of the Work requiring submittal and review until the respective submittal has been approved by Fayetteville Public Works Commission. Work performed prior to review and acceptance shall be at the Contractor’s risk.

B. The Contractor shall submit to Fayetteville Public Works Commission one (1) set electronically (as an Adobe pdf) of all required submittal data for review and approval. The Contractor shall furnish, prior to use of the materials, satisfactory written certification of his compliance with the manufacturer’s standards for all materials, conformance with the methods of the manufacturer, and accordance with all standards specified and referenced within these specifications. If requested by Fayetteville Public Works Commission, the manufacturer of materials, equipment, or product shall submit evidence of having consistently produced materials of satisfactory quality and performance for a period of at least two (2) years.

C. The Contractor shall provide submittals on the following:

1. Contractor’s safety plan, including confined space program
2. Contractor personnel emergency contact information

3. Labor and equipment rates
4. Sample property owner agreement (if applicable)
5. Executed property owner agreement (if applicable)
6. Pre-construction video and pictures
7. Project Sign (if applicable)
8. Proposed schedule
9. Ductile iron pipe materials and fittings
10. Staging Yard
11. Restrained joint ductile iron pipe and fittings

D. All information contained within the submittals shall be in accordance with these Contract Documents. Facsimile (fax) copies of the submittals or re-submittals will not be acceptable.

E. Fayetteville Public Works Commission shall review and approve, disapprove, or approve with comment the submittal within 10 business days of receipt. All notifications on the submittals will be provided to the Contractor in writing. Fayetteville Public Works Commission shall return one (1) electronic (as an Adobe pdf) copy of the submittals to the Contractor.

F. Fayetteville Public Works Commission's review of the submittals will cover only general conformity to these Contract Documents, external connections, and dimensions which affect the layout. Fayetteville Public Works Commission's review does not indicate a thorough review of all dimensions, quantities, and details of the material, equipment, device, or item shown. Fayetteville Public Works Commission's review shall not relieve the Contractor of the Contractor's sole responsibility for errors, omissions, or deviations in the drawings and data, nor of the Contractor's sole responsibility for compliance with these Contract Documents.

G. Any need for more than one (1) re-submission, or any other delay in obtaining Fayetteville Public Works Commission's review of submittals, will not entitle the Contractor to an extension of the contract duration, unless the delay of the Work is directly caused by a change in the Work authorized by a Change Order or by failure of Fayetteville Public Works Commission to review any submittal within the submittal review period specified herein and to return the submittal to the Contractor.

1.15 Limits of Construction

A. The Contractor shall confine their construction operations to the existing permanent easement or the existing street rights-of-way. The Contractor may use additional area for staging, storage, or other operations, provided that written permission is obtained from the property owner and all disturbed areas are restored to conditions equal or better than existing.

1.16 Traffic Control

A. All traffic control measures shall be in accordance with the Manual of Uniform Traffic Control Devices, NCDOT and/or COF approved traffic control plans. It shall be the Contractor's responsibility that all requirements set forth by the appropriate agency are adhered to through the duration of the project.

1.17 Erosion Control

A. The provisions of Chapter 139, North Carolina Statues as amended, Soil Erosion and Sedimentation Control shall be applicable to this project. The minimum requirements for erosion and sediment control are shown on the drawings, based on the anticipated construction methods. The Contractor shall adjust the measures to complement their operations and prevent the transmittal of silt. All necessary erosion control measures shall remain serviceable until the site is restored and stabilized. Upon such time, the Contractor shall remove all temporary measures.

B. All fees, penalties, fines for non-compliance and all civil actions resulting there from shall be the Contractor's responsibility and shall in no way involve the Public Works Commission. The Contractor shall immediately notify the Public Works Commission of any fine, penalty, or notice of non-compliance by NCDENR. The Contractor may be required to modify or supplement the measures at no additional cost to the Public Works Commission.

C. In addition to installing and maintaining the appropriate erosion control devices, the Contractor shall maintain a neat and clean jobsite. The Contractor shall take the necessary measures to minimize dust, ensure the streets are clean and free of debris, and other measures as required. The Contractor shall maintain the proper erosion control devices to ensure against erosion. The Contractor shall ensure that the catch basin and inlet protection devices are free of dirt and debris.

D. Permanent and temporary erosion control measures proposed by the Contractor for staging areas, haul roads, etc. shall be at the Contractor's expense and shall not constitute additional compensation.

E. The Contractor shall be required to prepare and obtain an approved erosion control plan addressing staging/storage area, haul roads, borrow pit operations and/or disposal/waste areas. The Contractor shall pay all fees associated with the supplemental plan and a copy of the NCDENR approved plan shall be furnished to the Owner. Work cannot begin until the plan is approved. Permanent and temporary erosion control measures proposed by the Contractor for staging areas, haul roads, etc. shall be at the Contractor's expense and shall not constitute additional compensation.

F. The Contractor shall be required to display at the job-site office (or readily available on the project site) both the Owner's Erosion Control Permit and the Contractor's Erosion Control Permit.

1.18 Sanitary Sewer and Water Laterals

A. During construction it may be necessary to change the proposed lateral location(s). The Contractor shall coordinate with the Project Coordinator to establish the new location and invert elevation to install the lateral. If the location of the lateral changes prior to installation, the Contractor shall install the lateral at no additional cost to the Owner. If the location changes after installation, the Contractor may submit a request for additional compensation in accordance with these Contract Documents. The existing lateral and main connection shall be abandoned in accordance with PWC requirements.

1.19 Fire Department Coordination

A. Existing fire hydrants shall be accessible to the Fire Department at all times. If the fire hydrants are in need of replacement, relocation, or connected to a new water main, Fayetteville Public Works Commission, PWC Project Coordinator, and the appropriate Fire Department shall be notified and coordinated with prior to commencing work. Fire hydrants shall not be removed from service without prior approval of Fayetteville Public Works Commission.

1.20 Emergency Response

A. The Contractor shall maintain a construction crew capable of performing emergency maintenance work 24 hours a day, seven (7) days a week, including all holidays. The Contractor shall furnish phone numbers for at least three (3) individuals in responsible charge (capable of making company binding decisions) to be available 24 hours a day, seven (7) days a week, including holidays. The emergency phone numbers and responsible individual's names shall be furnished to Fayetteville Public Works Commission at the pre-construction conference. The Contractor's designated emergency personnel shall be expected to respond and perform emergency maintenance work immediately, in less than two (2) hours, or the work will be performed by others and all associated costs shall be deducted from the Contractor's payment.

B. Once on-site, the Contractor shall notify the PWC Dispatcher (910-678-7400) of the problem, the anticipated response time, and the estimated time required to complete the repair work. It is the Contractor's responsibility to maintain the appropriate repair materials on-site in order to provide an immediate response to the emergency.

1.21 Construction around Utility Poles and Guy Wires

A. The Contractor will be required to perform construction work around utility poles and guy wires which may be left in place within the construction limits of the project. The Contractor shall contact the owner of the utility to coordinate securing the poles during construction. It may be necessary for the Contractor to hire an electrical utility contractor to secure poles. All work outlined in this paragraph shall be at no additional cost to Fayetteville Public Works Commission.

1.22 Protection of Existing Utilities

A. The Contractor shall take every precaution to guard against any or all damage to existing structures, pipe lines, and/or equipment of Fayetteville Public Works Commission. Any damage to existing structures and/or pipe lines shall be the direct responsibility of the Contractor. Damage shall be replaced and/or repaired by the Contractor as directed by the PWC Project Coordinator, or the value of such deducted from any monies due the Contractor under this Contract.

B. The PWC Project Coordinator shall supervise the Contractor's operation of all valves, gates, and other equipment. Except in case of emergency, the Contractor shall notify the PWC Project Coordinator a minimum of two (2) business days in advance of the need for operation of valves, gates, and other equipment necessary to allow the work to progress.

C. The Contractor shall in no case permit the introduction of water from the existing system into any new main without prior approval of the PWC Project Coordinator. The Contractor shall notify the PWC Project Coordinator a minimum of two (2) business days in advance of commencing the connection to an existing main.

D. The Contractor shall notify the PWC Project Coordinator a minimum of 48 hours in advance to coordinate any proposed service interruption. Note: the scheduling and coordination of a water outage within the PWC system shall be done in accordance with Item 40 of these Special Provisions. If an unscheduled service interruption occurs, the Contractor shall immediately notify the PWC Project Coordinator. The Contractor shall immediately commence repairs as directed by the PWC Project Coordinator.

E. In any event debris or other items from the Contractor's operation enters the sanitary sewer system, the Contractor shall immediately contact the PWC Project Coordinator. The Contractor shall then immediately commence efforts to capture that debris at the downstream manholes. The Contractor shall continue to search for and recover any debris until either all debris is captured or instructed otherwise by Fayetteville Public Works Commission. Any costs incurred by Fayetteville Public Works Commission to help search for and/or retrieve the debris shall be the responsibility of the Contractor.

F. During the course of construction, some work will need to be performed during non-normal working hours to accommodate Fayetteville Public Works Commission's operations, traffic, and/or public convenience. The Contractor and the PWC Project Engineer will determine an acceptable schedule required for work during such hours. The cost of this work shall be included in the base bid.

1.23 Existing Utilities

A. The Contractor shall locate existing underground utilities in the areas of work. If utilities are to remain in place, the Contractor shall provide protection during construction operations. Additionally, the Contractor will coordinate with utility companies when working in close proximity to their line/services.

B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavations, the Contractor shall immediately consult the PWC Project Engineer for directions as how to proceed. The Contractor shall fully cooperate with Owner and utility companies in keeping respective services and facilities in operation.

C. The Contractor shall adhere to the provisions of the 1985 Underground Damage Prevention Act, North Carolina General Statutes. The Contractor shall contact the NC One Call System for locates prior to beginning work in a particular area. The Contractor shall include the cost of any coordination and cooperation for utilities in his bid.

D. Actual horizontal and vertical locations have not been verified. As part of the Contract work, the Contractor is required to excavate each utility which may conflict with construction in advance to verify locations. The utilities shall be excavated a minimum of 14 business days in advance of actual installation of new utilities to allow the PWC Project Engineer an opportunity to adjust grades, alignments, etc., to avoid a conflict. Separate payment will not be made to physically verify the utility locations.

E. If the Contractor fails to schedule locates or perform advance physical locations in advance of the construction and a conflict arises, the Contractor will be required to make corrective measures as instructed by the PWC Project Engineer at the Contractor's expense. The Contractor's failure to advance plan (minimum 14 business days) by physically uncovering existing utilities in advance of construction shall not be cause for claim of lost time or for additional compensation. No additional payment will be made for re-mobilization required by the utility locator.

F. When the Contractor's controlling operations are halted due to the failure of a utility owner to relocate or adjust a utility after being properly notified by the Contractor, the contract period may be extended by the amount of time the Contractor's controlling operations have been delayed while awaiting the relocation or adjustment. Contractor shall proceed with work in areas not affected by the relocation or adjustment delay.

G. Fayetteville Public Works Commission shall not be liable to the Contractor for any claims, costs, losses, or damages incurred or sustained on or in connection with locating existing underground installations.

1.24 Crossing Existing or Proposed Utilities

A. The Contractor shall conduct their operations so that the following requirements are adhered to:

1. Underground telephone, cable TV, and gas utilities or conduit banks shall be crossed maintaining a minimum of 12-inch separation or clearance.

2. Electrical crossings shall be performed while the conductor is de-energized and at all times in the presence of the utility owner. Electrical crossings shall be in accordance with NESC Requirements. Electrical primary conductor crossings shall be as follows:

i. Crossing over a conductor, maintain a minimum of 12 inches of undisturbed soil encasing the conductor.

ii. Crossing under a conductor shall be accomplished by boring, maintaining 12 inches of undisturbed soil encasing the conductor.

B. No separate payment shall be made for this work.

1.25 Replacement of Fencing

A. The Contractor is to replace any fencing disturbed as part of their operations for the work described within these Contract Documents. Replacement of fencing is considered incidental to the operation, and no additional payment will be made for this work. In addition, if temporary fencing is required, the Contractor shall provide such fencing as necessary, at no additional cost to Fayetteville Public Works Commission. Fences shall be removed and replaced, using new materials.

1.26 Preconstruction Video

A. The Contractor shall complete a pre-construction video inspection of the project area, to document pre-existing conditions. The video shall be in a standard digital video file format (mp4 or avi) and on a standard portable digital media (USB Flash Drive or USB

Hard Disk Drive). The intent of this video is to document the existing project conditions: the driveways; the condition of the curb and gutter, if any; the condition of the road, the condition of the mailboxes, retaining walls, fences and gates, landscaping, any other resident installed improvements; and the condition of the sod. The Contractor shall also include any easement areas, especially those passing through yards, driveways, etc. The video must identify the house number and the street name in the audio track and visually. The Contractor may also include any pre-existing conditions they want brought to the attention of the PWC Project Engineer by including notes and time position on the index sheet. The Contractor can also include still pictures of the areas, for additional documentation. The pre- construction video will be utilized by Fayetteville Public Works Commission in the resolution of complaints. Therefore, it is in the Contractor's best interest to ensure that the pre-construction video is comprehensive and covers all areas to be impacted by the Work.

1.27 Monthly Progress Meetings

A. The Contractor and PWC Project Engineer shall mutually establish a regular time to meet on a monthly basis, for the duration of the project. The meetings shall be held at Fayetteville Public Works Commission complex at 955 Old Wilmington Road or on Microsoft Teams and will generally last about an hour. The Contractor's superintendent or designated representative shall attend these meetings. The Contractor's representative shall be knowledgeable of the project, issues that need to be addressed, and be able to make binding decisions for the Contractor.

B. The purpose of the meeting is to discuss various project related items, including, but not limited to: safety concerns, overall project status and schedule, the Contractor's schedule for the upcoming month, issues that the Contractor and/or PWC Project Engineer need to address, and any proposed or potential change orders.

C. The cost for the Contractor's representative to attend the monthly meetings shall be included in the unit prices bid.

1.28 Project Schedule

A. The Contractor shall provide Fayetteville Public Works Commission a project schedule, in accordance with the requirements of this paragraph. Each week, the Contractor shall provide Fayetteville Public Works Commission with their schedule for the upcoming week. The Contractor shall contact the PWC Project Coordinator on a daily basis, to confirm their schedule for that day. The Contractor shall immediately notify Fayetteville Public Works Commission of any deviations to their schedule. Failure to notify Fayetteville Public Works Commission of any deviations may result in payment being withheld.

1.29 Permits

A. This project is required to have sewer permit, which will be issued by Fayetteville Public Works Commission. The Contractor shall have a set of the approved plans on the jobsite at all times. The Contractor shall make the approved plans available for inspection by PWC staff.

B. The Contractor will be required to obtain a Truck Route Permit from the City of Fayetteville and will be required to bond those City streets outside the project limits utilized for construction activities and/or deliveries. It is anticipated that the City will be require a $25,000 bond for the truck route permit. The cost of the bond shall be included in the Contractor's bid prices and shall not be paid for separately. The truck route permit application and fee shall be submitted to the Owner for forwarding to the City.

1.30 Bulk Water Usage

A. Fayetteville Public Works Commission will allow the Contractor to use water from its existing water system. The Contractor shall utilize proper backflow prevention devices when obtaining water from Fayetteville Public Works Commission's system. The Contractor shall contact PWC's Environmental System Protection Department at 910-223-4699 to determine the required backflow prevention devices, and to obtain a bulk water use permit. The Contractor shall be responsible for the cost of the bulk water permit fee. The bulk water permit fee is an annual fee, and shall be paid by the Contractor each year that this Contract is in effect. The Contractor shall provide documentation on the amount of water used for their operations, and provide a monthly statement to Fayetteville Public Works Commission.

1.31 Replacement of Water Services

A. The Contractor shall replace any existing water services that are damaged as a result of their operations, utilizing copper tubing. Should the Contractor's operations damage a marked service, the Contractor shall replace that service at no cost to Fayetteville Public Works Commission. Installation of the services shall be in accordance with PWC standard detail W.24. Damaged water services shall be replaced from the meter to the existing main. The Contractor shall properly abandon the existing tap, and install a new tap, utilizing a new tapping saddle and corporation.

B. All new lock valves and fittings shall be installed in the new meter boxes, in accordance with PWC standard detail W.24. The Contractor shall install a new tailpiece, as required in the standard detail. The Contractor shall be responsible for connecting the new tailpiece to the customer's existing service, utilizing brass fittings. The Contractor is responsible for all necessary fittings in order to connect the copper tubing to the existing meter.

C. Additionally, the existing meter boxes shall be replaced as part of the renewal of the water services. The meter boxes shall be in accordance with PWC standard detail W.4. A composite, H-20 rated meter box shall be used if the meter is to be located in asphalt or concrete, in accordance with PWC standard detail W.4B. The Contractor shall be responsible for furnishing and installing the meter boxes. All work shall be reviewed and approved by the PWC Project Coordinator.

D. Should the PWC Project Engineer determine that an existing water service be replaced, the Contractor shall replace that service in accordance with the above paragraphs. Payment for replacement of water services directed by the PWC Project

Engineer shall be paid for in accordance with the Measurement and Payment section of the Contract Documents.

E. Water services shall be abandoned by cutting the service at the main, plugging the corporation, and turning the corporation off. At the meter box, the abandoned service is to be cut or crimped, and buried a minimum of three (3) feet below grade.

1.32 Replacement of Castings

A. All existing valve boxes and manhole ring and covers within the area(s) to be re-paved shall be replaced with new castings provided by Fayetteville Public Works Commission at no cost to the Contractor. The Contractor shall be responsible for exchanging castings at Fayetteville Public Works Commission facility (1097 Public Works Drive). All castings shall be installed to the finished grade, and shall be in accordance with Fayetteville Public Works Commission standards. The Contractor shall coordinate with the PWC Project Coordinator regarding the exchange of castings. Any debris that falls into a manhole and/or valve box shall be removed immediately.

1.33 Testing

A. The Contractor shall coordinate and fully cooperate with the PWC Project Coordinator when scheduling testing. The Contractor shall provide a minimum of two (2) business days notice when scheduling testing with the PWC Project Coordinator. All testing shall be in accordance with PWC technical specifications.

B. All manholes (except doghouse manholes), sewer mains, and sewer laterals shall be tested to the satisfaction of Fayetteville Public Works Commission, prior to being placed into service.

C. The Contractor shall provide all equipment, materials, personnel, traffic control and all means necessary to perform all testing and inspection at no additional costs to Fayetteville Public Works Commission. If the same line segment and/or manhole fails the required testing more than two (2) times, the Contractor shall be charged a fee of $100.00 per test, beginning with the third attempt, until a passing test achieved.

1.34 Compaction Requirements

A. These Contract Documents contain compaction requirements in Specification Section 02222. The testing requirements listed below specifically pertain to annexation projects. This procedure shall be used at all times.

B. Tests for density of compaction are made at the sole direction of the Project Engineer or the Project Coordinator. All deficiencies shall be corrected by the Contractor without additional cost to the Owner. The following outlines the requirements for compaction testing:

Sanitary Sewer Main

A. For every section of sanitary sewer main line less than 250 feet between manholes, one (1) test series each shall be completed at the 95% and 98% compaction zones (for a total of two tests). For sections of sanitary sewer greater than 250 feet between manholes, two (2) test series shall be completed at the 95% and 98% compaction zones (for a total of four tests). Additionally, for the sub-grade, one (1) test shall be taken on each street or every 250 feet (whichever is shorter).

B. If a compaction test fails, the Contractor, at his option and cost, can perform two (2) additional tests fifteen (15) feet on either side of the failing test. If those two tests pass, the Contractor is required to re-excavate and re-compact that section between the passing tests. If one (1) of the tests fails, the Contractor shall re-excavate and re-compact from the passing test to the next manhole. If both tests fail, the Project Coordinator has the sole option to require another compaction test deeper within the zone (i.e., 95% compaction). This additional test shall be done at the Owner's cost. Should this additional test fail, the Contractor shall re-excavate and re-compact the entire zone from manhole to manhole. Should the Project Coordinator elect not to complete an additional compaction test at a deeper depth, the Contractor shall re-excavate and re-compact the entire section at the test elevation, from manhole to manhole. Any section re-excavated and re-compacted shall be re-tested in accordance with these specifications. Each retest (bracket or otherwise) will be at no cost to the Owner. Contractor will only receive payment for mainline pipe if it has passed compaction testing requirements.

C. For every lateral installed on the project the Project Coordinator shall request, at a minimum, one (1) out of every three (3) laterals be tested. It is the Project Coordinator's sole option in determining the location and number of laterals to be tested. If a compaction test fails, the Contractor must re-excavate and re-compact the failing location and the other two (2) laterals in the group. Each retest will be at no cost to the Owner. The Contractor shall only receive payment for laterals that pass compaction testing requirements. Additionally, for the sub-grade, tests may be taken at the discretion of the Project Coordinator.

Water Main

A. For testing of water main trench backfill, one (1) test series shall be completed at the 95% and 98% compaction zones (for a total of two tests) per street/easement area or every 250 feet, whichever is shorter. To test the sub-grade, one (1) test shall be taken on each street/easement area or every 250 feet whichever is shorter.

B. If a compaction test fails, the Contractor, at his option and cost, can perform two (2) additional tests fifteen (15) feet on either side of the failing test. If those two tests pass, the Contractor shall re-excavate and re-compact that section between the passing tests. If one (1) of the tests fails, the Contractor is required re-excavate and re-compact from the passing test to 125 feet either side of the original failing test. If both tests fail, the Contractor shall re-excavate and re-compact 125 feet of either side from the initial test, for a total of 250 feet. Any section re-excavated and re-compacted shall be re-tested in accordance with these specifications. Each retest (bracket or otherwise) will at no cost to the Owner. Contractor will only receive payment for mainline pipe if it has passed compaction testing requirements.

C. For every lateral installed on the project the Project Coordinator shall request, at a minimum, one (1) out of every three (3) laterals be tested. Additionally, for the sub-grade, tests may be taken at the discretion of the Project Coordinator.

D. It is the Project Coordinator's sole option in determining the location and number of laterals to be tested. If a compaction test fails, the Contractor must re-excavate and re-compact the failing location and the other two (2) laterals in the group. Each retest will be at no cost to the Owner. The Contractor shall only receive payment for laterals that pass compaction testing requirements.

Storm Drainage

A. For every section of storm drainage less than 250 feet between structures, one (1) test series each shall be completed at the 95% and 98% compaction zones (for a total of two tests). For sections of storm drainage line greater than 250 feet between structures, two (2) test series shall be completed at the 95% and 98% compaction zones (for a total of four tests). Additionally, for the sub-grade, one (1) test shall be taken on each street or every 250 feet (whichever is shorter).

B. If a compaction test fails, the Contractor, at his option and cost, can perform two (2) additional tests fifteen (15) feet on either side of the failing test. If those two tests pass, the Contractor is required to re-excavate and re-compact that section between the passing tests. If one (1) of the tests fails, the Contractor shall re-excavate and re-compact from the passing test to the next structure. If both tests fail, the Project Coordinator has the sole option to require another compaction test deeper within the zone (i.e., 95% compaction). This additional test shall be done at the Owner's cost. Should this additional test fail, the Contractor shall re-excavate and re-compact the entire zone from structure to structure. Should the Project Coordinator elect not to complete an additional compaction test at a deeper depth, the Contractor shall re-excavate and re-compact the entire section at the test elevation, from structure to structure. Any section re-excavated and re-compacted shall be re-tested in accordance with these specifications. Each retest (bracket or otherwise) will be at no cost to the Owner. Contractor will only receive payment for mainline pipe if it has passed compaction testing requirements.

1.35 Ductile Iron Sewer Pipe

A. All ductile iron pipe, to include laterals and fittings, installed for sanitary sewer service shall have an interior coating of Protecto401 or approved equal. All ductile iron pipe and fittings shall be in accordance with PWC standards. All couplings (sleeves) shall be long pattern mechanical joint (minimum 12-inches in length). Sleeves shall be utilized as specified on the Contract Drawings and as directed by Fayetteville Public Works Commission.

1.36 Waste Disposal

A. The Contractor shall properly dispose of all debris resulting from their operations, in accordance with applicable Federal, State, and local laws, regulations, and rules.

1.37 Contractor's Responsibility for Work

A. Until final acceptance by Fayetteville Public Works Commission, the project site and all the Work shall be the responsibility of the Contractor. The Contractor shall take every precaution to prevent damage to the project site, Work, and the surrounding areas. It shall be the responsibility of the Contractor to address any damage or injury arising from their direct or indirect performance on this project. The Contractor shall be responsible for maintaining the project site at all times, as required by these Contract Documents. The Contractor shall also be responsible for ensuring that the Work is installed and maintained in accordance with these Contract Documents until accepted by Fayetteville Public Works Commission. This paragraph does not supersede the requirements of the general warranty.

1.38 Responsibility for Material

A. All pipe, fittings, manholes, and other materials shall be inspected upon arrival at the job site by a competent superintendent before unloading to insure that the quality of the materials conform to the specifications. All materials shall be subject to inspection by Fayetteville Public Works Commission. Materials found to be defective shall be clearly marked to assure the necessary repairs are made, if approved by the PWC Project Coordinator. If approved, the material is incorporated in the work or replaced with sound material without additional expense to Fayetteville Public Works Commission.

1.39 Water Outages

A. The Contractor shall schedule a coordination meeting with Fayetteville Public Works Commission a minimum of three (3) business days prior to any planned water outage. The coordination meeting shall be conducted prior to any notices being issued. Additionally, the Contractor shall locate (vertically and horizontally) any utilities within the work area, in accordance with these Contract Documents. The locations of all utilities within the work area shall be determined prior to the coordination meeting. Any conflicts with the pending work and the existing utilities shall be identified, and a plan for resolving any conflicts shall be presented.

B. The purpose of this coordination meeting is to ensure that the Contractor has a good understanding of the requirements related to the pending outage, verify that there are no utility conflicts that will prevent the work from being completed, all equipment is in good working order, all equipment is functional, all materials are on site, all necessary tools are on site, discuss any necessary contingency plans, and any other items necessary to ensure that Fayetteville Public Works Commission has confidence that the work can be accomplished within the given time period. Should, for any reason, Fayetteville Public Works Commission deem that the Contractor is not prepared for the proposed outage, the outage notifications will not be distributed, and the outage shall be postponed a minimum of two (2) weeks. Fayetteville Public Works Commission will provide written notification to the Contractor of this decision. No additional contract time will be granted for this delay. Should the contract time expire within that two (2) week period, Fayetteville Public Works Commission reserves the right to assess liquidated damages, as outlined in these Contract Documents.

C. Once the water outage notifications have been issued, a follow-up coordination meeting with Fayetteville Public Works Commission shall be held a minimum of 24 hours prior to the scheduled outage. The purpose of this meeting is to verify that the Contractor is prepared to proceed with the outage, and that all equipment, materials, tools, and all other incidentals are on the project site and functioning. If for any reason Fayetteville Public Works Commission deems that the Contractor is not prepared, the outage shall be postponed, and all customers immediately notified of the cancellation. The outage shall be postponed a minimum of two (2) weeks. No additional contract time will be granted for this delay. Should the contract time expire within that two (2) week period, Fayetteville Public Works Commission reserves the right to assess liquidated damages, as outlined in these Contract Documents.

D. The Contractor shall complete the required work and restore water service within the given time period for the outage. Should the Contractor fail to complete the work within the allotted time, Fayetteville Public Works Commission shall assess a penalty of $500 per 15-minute interval or any portion thereof until water service is restored. This penalty will be deducted from the Contractor's pay application or be billed directly to the Contractor. The penalty may be waived for circumstances beyond the Contractor's control, as deemed by Fayetteville Public Works Commission. Fayetteville Public Works Commission reserves the right to cancel or postpone the outage at any given time, for any given reason.

1.40 Confined Space

A. Prior to entering manholes or other areas that are defined as confined spaces, the Contractor shall follow all requirements and procedures as outlined by OSHA's Confined Space Entry requirements. A confined space entry program shall be included as part of the Contractor's Safety Plan.

1.41 Excavation

A. The Contractor shall be responsible for utilizing all measures necessary to comply with the applicable OSHA regulations.

B. Before excavating, the Contractor shall contact the NC One-Call Center for the location of existing utilities within the project area. Costs of utility repairs, temporary service and other costs resulting from damage to or interruption of utilities, resulting from operations under this contract, shall be done by Contractor at no additional cost to Fayetteville Public Works Commission.

C. Prior to excavation, the Contractor shall sawcut and remove asphalt or concrete pavement within the limits of allowable trench width. Where the excavation is within grassed easement areas, the Contractor shall take care to minimize disturbance and/or removal of trees, shrubs, bushes, etc.

1.42 Site Restoration

A. Once construction is completed, the Contractor shall be responsible for restoring the site to as good as, or better than existing conditions. All exposed areas not otherwise improved with asphalt, concrete, etc. are to be replaced with sod to insure against erosion, in accordance with the Soil Erosion and Sedimentation Control requirements.

B. For those areas outside the project limits, the Contractor shall be responsible for installing asphalt, concrete, etc. on non-turf areas and sod in all disturbed areas, unless otherwise noted on the plans, and for the full replacement of any driveways, sidewalks, pavements, etc. disturbed as part of their operations.

1.43 Review of Contractor Pay Request

A. Prior to the Contractor submitting an application for payment, the Contractor and Fayetteville Public Works Commission shall review and agree on all items and quantities that the Contractor is requesting payment for. Each pay request shall contain a certificate documenting any sales tax paid by the Contractor for that billing period. A certified form is required even if no sales tax was paid for that pay request

period. The Contractor shall include all copies of invoices supporting the sales tax claimed in the certified sales tax form.

B. Final payment will not be made until:

1. all testing requirements have been satisfactorily met,
2. Fayetteville Public Works Commission has completed a final inspection of the work,
3. all deficiencies noted in the final inspection have been satisfactorily addressed,
4. all necessary site restoration has been completed, and
5. all required documentation (reports, release of liens, Property Owner release, etc.) has been submitted.

1.44 Final Inspection/Acceptance of Work

A. When the PWC Project Coordinator deems the project completed and ready for final inspection, the PWC Project Coordinator shall notify the PWC Project Engineer. During the final inspection any items documented shall be compiled in a final punch list and provided to the Contractor within five (5) business days. The Contractor shall be required to complete each item in the final inspection punch list within 30 calendar days of receipt. Failure to complete the punch list in that time may result in liquidated damages being assessed. The project will not be considered complete until all punch list items are completed and accepted, unless otherwise determined by the PWC Project Engineer. All punch list items shall be completed prior to release of final payment. Once the deficiencies have been addressed to Fayetteville Public Works Commission's satisfaction, a final acceptance letter will be issued to the Contractor.

B. Prior to the final inspection, the Contractor shall complete the following:

1. Sanitary Sewer:

i. Place a green paint mark at the curb, indicating the location of the lateral. The paint shall be heavily applied, so that the paint will last. The Contractor shall maintain and/or re-mark the locations as directed by the Owner until the project is accepted.
ii. Verify all plugs have been removed.
iii. Complete all restoration.
iv. Complete all required testing.

2. Water

i. Place a blue paint mark at the curb, indicating location of the lateral. The paint shall be heavily applied so that the paint will last. The Contractor shall maintain and/or re-mark the locations as directed by the Owner until the project is accepted.
ii. Verify all valves are fully open.
iii. Verify all valves are accessible and can be operated.
iv. Complete all restoration.
v. Complete all required testing.

C. No separate payment shall be made for this work.

D. FINAL COMPLETION DOCUMENTATION

1. Prior to receiving final payment, the Contractor shall complete and/or provide the following:

    i. Complete all punch list items to the satisfaction of the PWC Project Engineer;
    ii. Satisfactorily resolve all customer complaints and obtain the required releases;
    iii. Provide project record drawings; and
    iv. Provide project close-out submittals.

1.45 Record Drawings

A. Upon completion of the Work, the Contractor shall provide two complete sets of drawings recording all changes to the work to indicate actual installation. Changes shall be noted in legible red letters. These changes shall include but are not limited to the following:

1. Change in pipe material.
2. Size, depth, and installed elevations of mains.
3. Location of valves, laterals, blow-offs, and other appurtenances

Completion of the Contractor's record drawings is a specific contract requirement, and final payment will not be made until these drawings have been submitted to the PWC Project Engineer in an acceptable form.

DIVISION 2
SITE WORK

02110 SITE CLEARING

SCOPE

Work described in this section includes clearing and grubbing site, protecting adjoining property and trees as indicated on the drawings or as specified herein. The work shall include the complete removal and satisfactory disposal of all growth including trees, stumps, logs and roots; organic material, and other debris or items that interfere with construction operations. The site clearing operations shall be conducted in a manner to insure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

PROTECTION OF TREES AND VEGETATION

Trees and vegetation to be left standing shall be protected from damage incidental to clearing, grubbing, and construction operations, by the erection of timber barriers or by such other approved means. Such barriers must be placed and approved by the Engineer before construction operations can proceed. The protection shall include unnecessary cutting, breaking or skinning of roots; skinning and bruising of bark; smothering of trees by stockpiling construction materials or excavated material within the drip lines; excessive foot and vehicular traffic including parking of vehicles within drip line. Trees and vegetation receiving damage shall be repaired or replaced in a manner acceptable to the Engineer.

Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1½ inches or more in diameter and shall be trimmed of live branches to such heights and such manner as directed. Limbs and branches to be trimmed shall be neatly cut close to the hole of the tree or main branch. Cuts more than 1½ inches in diameter thus made shall be painted with an approved tree wound paint.

CLEARING AND GRUBBING

Clearing shall consist of the felling, trimming and cutting of trees into sections, and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring within the areas to be cleared. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface except such trees and vegetation as may be indicated or directed to be left standing. Clearing operations shall be conducted so as to prevent damage by falling trees to trees left standing, to existing structures and installations and to those under construction, and so as to provide for the safety of employees and others.

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. This material, together with logs and other

organic or metallic debris not suitable shall be excavated and removed to a depth of not less than 3 feet below any subgrade shoulder and slope surfaces in excavated areas indicated to be grubbed and in areas indicated as construction areas under this contract such as areas for buildings, roads, streets, shoulder areas, sidewalks. Depressions made by grubbing shall be filled with suitable material compacted to make the surface conform to the original adjacent surface of the ground. The required fill material will not be measured or paid for but should be included as part of the grubbing cost. Grubbing inside the drip line of trees to be left standing shall be by hand methods.

The combined item of clearing and grubbing shall also include the removal and satisfactory disposal of fences, steps, walls, building foundations, pavement, other rubble and debris.

DISPOSAL

All timber, logs, stumps, roots, brush, rotten wood, and other debris from the clearing and grubbing operations shall be disposed of off-site in an approved disposal pit. Such approval will include the conditions covering the disposal of such logs and stumps without burning, including the disposal area off-site. The contractor will be responsible for compliance with all state and local laws and regulations. Burning of timber and other refuse is not allowed within the City of Fayetteville.

DIVISION 2
SITE WORK

02111 SITE CLEARING FOR PWC UTILITIES

SCOPE

Work described in this section includes clearing and grubbing, site, protecting adjoining property and trees as indicated on the drawings or as specified herein. The work shall include the complete removal and satisfactory disposal of all growth including trees, stumps, logs and roots; organic material, and other debris or items that interfere with construction operations. The site clearing operations shall be conducted in a manner to insure minimum interference with roads and other adjacent occupied or used facilities.

PROTECTION OF TREES AND VEGETATION

Trees and vegetation to be left standing shall be protected from damage incidental to clearing, grubbing, and construction operations. The protection shall include un-necessary cutting, breaking or skinning of roots; skinning and bruising of bark; smothering of trees by stockpiling construction materials or excavated material within the drip line; excessive foot and vehicular traffic including parking of vehicles within drip line. Trees and vegetation receiving damage shall be repaired or replaced in a manner acceptable to the Engineer.

Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1 - 1/2" or more in diameter and shall be trimmed of live branches to such heights and such manner as directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branch. Cuts more than 1-1/2” in diameter shall be painted with an approved tree wound paint.

CLEARING AND GRUBBING

Clearing and grubbing shall be performed within the permanent right-of-ways. In the interest of conserving natural resources and protecting the environment, clearing shall be kept to a minimum within the temporary right-of-ways limits. Where permanent and temporary right-of-ways are offset, the additional temporary area may be used as a "buffer" zone to aid in sediment control where possible. Clearing shall consist of cutting trees, with a stump left not more than two inches (2") above natural ground. Saleable timber shall become the property of the Contractor. Reasonable care shall be taken during construction to avoid damage to vegetation not located in the right-of-ways. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed to improve the appearance. Tree trunks receiving damage shall be treated with approved tree dressing.

Several areas along the main where a temporary easement is indicated on the plans and is located in people's yards, the Contractor shall limit clearing only as absolutely necessary for the sewer

installation. Where possible, individual trees shall be worked around and preserved. These particular areas will be noted on the plans.

In the interest of erosion and sediment control, if possible, clearing and grubbing should be staged in ½ mile sections or less. In all cases, the time of disturbance between clearing and grubbing operations and actual sewer line construction should be kept to a minimum, particularly if ditches and temporary roads are utilized for access to the project.

DIVISION 2 SITE WORK

02211 GRADING FOR ROADS AND DRAINAGE

GENERAL

This section covers grading for the roadways and drives including all excavations, formation of embankments, preparation of subgrade for pavements and finishing and dressing of graded earth areas, shoulders, and ditches.

MATERIALS

Topsoil, material obtained from excavation suitable for topsoils, is defined as natural, friable soil, characteristics of representative soils in the vicinity that produce heavy growth of crops, grass, or other vegetation. Topsoil shall be free from roots, stones, and other materials that hinder grading, planting, and maintenance operations, and free from objectionable weed seeds.

Satisfactory soil materials are defined as those in accordance with AASHTO Soil Classification Groups, A-1, A-2-4, A-2-5 and A-3 (or in accordance with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, SP, SC.) as determined by the Engineer. Satisfactory material shall be free from roots, organic matter, trash, debris, frozen material or stones larger than three (3) inches in any dimension.

Unsatisfactory soil materials are defined as those in accordance with AASHTO Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, A-7 (or in accordance with ASTM D2487 soil classification groups GC, ML, MH, CL, CH, OL, OH, and PT) as determined by the Engineer.

Materials determined by the Engineer as too wet or too soft to provide a stable subgrade, foundation, or fill will be classified as unsatisfactory regardless of soil classification. The Engineer may require the Contractor to condition the wet and/or soft soils to provide a stable subgrade, foundation, or fill. The Contractor shall recondition the materials at no additional cost to the Owner.

CONSERVATION OF TOPSOIL

Areas designated for operations that contain a blanket of soil, which is more satisfactory for the growth of grass than the embankment material to be placed, shall be stripped to a depth of approximately four (4) to six (6) inches and placed in convenient stockpiles as directed in the field, for later use as a topsoil blanket on the new graded areas specified herein, or as designated. The stripping of material for use as topsoil shall be carefully determined and only the quantity required shall be stripped and stockpiled. Material ordered stockpiled shall be placed in a satisfactory manner to afford drainage. When grading operations permit, instead of stockpiling, the topsoil shall be hauled and spread directly on the areas to receive topsoil.

Topsoil shall be placed on all shoulders, slopes, ditches, and other earth areas graded under this contract, excluding borrow areas, unless otherwise specified on the plans. Topsoil shall be uniformly placed on these areas to a compacted depth of not less than three (3) inches or more than four (4) inches. The material shall be free from clods of soil, matted roots greater than ½ inch in diameter, and any other objectionable material which might hinder subsequent grass and mowing operations. The material shall be placed, leveled, and lightly compacted with at least one pass of a cultipacker, or other approved equipment weighing 100 to 160 pounds per linear foot of roller, to required cross sections, but shall be left one-tenth of a foot below the finished earth grade as specified in the paragraph FINISHED EXCAVATION.

BORROW EXCAVATION (Select Backfill)

Where satisfactory materials are not available in sufficient quantities from the required excavation, approved materials shall be obtained from borrow areas. Borrow excavation material shall be supplied by the Contractor from borrow areas located off-site. The work covered by this section shall consist of the excavation of approved material from borrow sources and the hauling and utilization of such material as required on the plans or directed by the Engineer. The borrow material shall be approved by the Engineer and shall not contain roots, root mats, stumps, highly plastic clay or other unsatisfactory materials. The material shall be a soil material which meets requirements of AASHTO Ml 45 for soil classification A-i-a, A-i-b, A-2-A, A-3 acceptable for select backfill. All borrow material shall be in accordance with the NCDOT Standard Specification for Roads and Structures, most recent edition. Borrow excavation shall be in accordance with the NCDOT Standard Specification for Roads and Structures, most recent edition. Excess material removed within the work limits, suitable for borrow excavation, during “Unclassified Excavation” operations shall not be considered or paid for as borrow excavation.

UNDERCUT EXCAVATION

When the Owner determines that the natural soil materials in areas where fill is to be placed, or in the finished graded subgrade roadway cross section, or in areas supporting structures or pipes, are determined to have a poor supporting value, the Engineer may require the Contractor to remove the materials and backfill with approved properly compacted material to the finished graded section. The Contractor shall conduct undercut operations in such a way that the Engineer can take the necessary measurements before any backfill is placed. Any material removed and backfilled without the approval of the Engineer, and/or all necessary measurements taken, and/or to a depth, length or width exceeding the dimensions shall not be considered undercut excavation and will not be paid for such. All undercut excavation shall be in accordance with the NCDOT Standard Specification for Roads and Structures, most recent edition. Undercut excavations suitable for backfill on toes of slopes and other approved areas will not be paid for as borrow excavation.

FINISHED EXCAVATION

All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified. Ditches shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials. Surfaces shall be finished not more than 0.15 foot above or below the established grade and approved cross section. In areas where the bulking of soil as a result of grassing operations will tend to retard surface drainage along the edge of pavements, the finished grades shall be left 0.1 foot below grade prior to grassing.

Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades re-established to the required elevations and slopes. Embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained in such a manner as to drain effectively at all times. The finished subgrade shall not be disturbed by traffic of other operations and shall be protected and maintained by the Contractor in a satisfactory condition until subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade shall not be permitted. No base course or pavement shall be laid until the subgrade has been checked and approved, and in no case shall base, surfacing, or pavement be placed on a muddy, spongy, or frozen subgrade. All work shall be conducted in accordance with the environmental protection requirements of the contract.

DIVISION 2
SITE WORK

02222 EXCAVATION AND BACKFILLING FOR UTILITY SYSTEMS

GENERAL

Work described in this section consists of the excavation, backfill, compaction, and finish grading required to install the utility systems. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defect in material or workmanship shall be cause for the replacement and correction of such defect as directed by the Public Works Commission.

RELATED SECTIONS

A. 02305 – Pipe Bursting
B. 02660 – Water Distribution
C. 02730 – Sanitary Sewer Systems
D. 02732 – Sewage Force Mains
E. Chapter 24 of the City of Fayetteville Ordinance (most recent version)

MATERIALS

Suitable soil materials are defined as those in accordance with AASHTO Soil Classification Groups A-1, A-2-4, A-2-5 and A-3 (or in accordance with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, SP, SC) as determined by the Public Works Commission. Suitable material shall be free from roots, organic matter, trash, debris, frozen material or stones larger than three (3) inches in any dimension.

Unsuitable soil materials are defined as those in accordance with AASHTO Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, A-7 (or in accordance with ASTM D2487 soil classification groups GC, ML, MH, CL, CH, OL, OH, and PT) as determined by the Public Works Commission. Unsuitable material as defined above shall be replaced with select material as determined by the Public Works Commission.

Suitable materials determined by the Public Works Commission as too wet or too soft to provide a stable subgrade, foundation, or fill will be deemed as unsuitable regardless of soil classification. Materials deemed unsuitable shall be conditioned or replaced, as directed by the Public Works Commission. The Contractor shall recondition and stockpile the materials at no additional cost to the Public Works Commission.

EXCAVATION

All excavation shall be to the lines and grades indicated. The work shall consist of the excavation, placement, and compaction of suitable material as outlined in this Specification and proper disposal of all unsuitable materials. During excavation, suitable material for backfilling shall be stockpiled. The stockpiles shall be protected from contamination by unsuitable excavated material or other material. If

any material becomes unsuitable, such material, if directed, shall be removed and replaced with suitable on-site or imported material from approved sources at no additional cost to the Public Works Commission.
Where the line parallels a creek and/or ditch the excavated material shall be stockpiled opposite the creek, with the trench separating the two. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes, or other approved methods. Grading shall be done to prevent surface water from entering the excavation. Any water within the trench shall be removed.

Suitable excavated material shall be stockpiled or placed in the excavation's backfill. Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Unauthorized over excavation shall be backfilled with select bedding material at no additional cost to the Public Works Commission. The Contractor, at their expense, shall properly dispose of all excess excavated material unless directed to place it in another area of the project by the Public Works Commission. The Contractor's obligation to remove and dispose of excess materials shall in no manner convey to him any rights of property in any material taken from any excavation.

It shall be the Contractor's responsibility to investigate the site and existing conditions. No compensation will be allowed due to excavation and/or grading being different than anticipated.

TRENCH EXCAVATION

The trench width shall be in accordance with the PWC standard details. All work shall be in accordance with the applicable OSHA regulations.

The subgrade beneath the centerline of the pipe shall provide uniform support for each section of the pipe. Stones three (3) inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed.

Where unsuitable material is encountered at the elevation established for installation of pipe or structures, additional undercut excavation shall be done as directed by the Public Works Commission. The additional undercut excavated area shall be backfilled with stone bedding material. Unauthorized undercut excavation shall be backfilled with stone bedding material and compacted as directed by the Public Works Commission. The Contractor shall conduct undercut operations in such a way that the Public Works Commission can take the necessary measurements before any backfill is placed. Any material removed and backfilled without the approval of the Public Works Commission, and/or all necessary measurements taken, and/or to a depth, length or width exceeding the dimensions shall not be considered undercut excavation and will not be paid for such.

Where unsuitable material is encountered at the elevation established for installation of roads, parking lots, or other paved areas, additional undercut excavation shall be done as directed by the responsible agency (i.e., City of Fayetteville, Town of Hope Mills, NCDOT, etc.). The additional undercut excavated area shall be backfilled with stone bedding material. Unauthorized undercut excavation shall be backfilled with stone bedding material and compacted as directed by the responsible agency. The Contractor shall conduct undercut operations in such a way that the responsible agency can take the

necessary measurements before any backfill is placed. Any material removed and backfilled without the approval of the responsible agency, and/or all necessary measurements taken, and/or to a depth, length or width exceeding the dimensions shall not be considered undercut excavation. All undercut excavation shall be in accordance with the NCDOT Standard Specification for Roads and Structures (most recent edition), or the responsible agency's specifications.

Excavation for manholes, meter vaults, or similar structures shall leave a minimum of 12-inches clear space around the structure. Removal of unsuitable material shall be as specified above. Preparation of the subgrade shall be in accordance with the applicable detail and as directed by the Public Works Commission.

PIPE LAYING

All pipe shall be installed in accordance with PWC Specification Section 02660 – Water Distribution, Specification Section 02730 – Sanitary Sewer Systems, and/or PWC Specification Section 02732 – Sewage Force Mains.

TRENCH SAFETY

All excavations shall comply with all Federal, State, and local rules and regulations. The Contractor shall have a trenching and shoring "competent" person on the job at all times when there is an open excavation. Under no circumstance shall an employee of the Public Works Commission be considered the "competent" person for the operation.

TRENCH STABILIZATION (SHORING)

The Contractor shall furnish, install, and maintain all necessary shoring to ensure a safe excavation. The method of shoring and excavation shall be in strict accordance with OSHA Regulations. The Contractor shall be responsible for installation, maintenance, and removal of all trench stabilization measures. The Contractor shall be responsible for any damage to adjacent structures resulting from the installation, maintenance, removal, or absence of trench stabilization measures.

DEWATERING

Excavations shall be kept dry at all times. Any required dewatering shall be the Contractor's responsibility. The Contractor shall be responsible for any damage to the adjacent property resulting from the installation, maintenance, discharge, and removal of the dewatering system. All discharge from the dewatering system shall be in accordance with the applicable erosion control rules and regulations.

BACKFILL

Backfill shall consist of suitable material free from debris, stone, etc. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. The backfill operation shall be conducted to prevent damage and/or movement of the pipe.

Backfill material in trenches shall be placed in layers not exceeding six (6) inches loose thickness to a point at least 12-inches above the pipe compacted to 90 percent maximum density. The remainder of the trench shall be backfilled in layers not exceeding six (6) inches in loose thickness compacted as specified in subparagraph COMPACTION. Each layer shall be thoroughly compacted by an approved mechanical tamping device.

Backfill material around structures shall be placed in a manner that the structure will not be damaged. No backfill shall be placed around manholes, thrust blocks, or similar structures until the concrete has been allowed to cure for three (3) days. The backfill material shall be compacted as specified in subparagraph COMPACTION.

No backfilling will be allowed when weather conditions prevent compliance with these Specifications.

BORROW EXCAVATION (Select Backfill)

Borrow excavation material shall be supplied by the Contractor when sufficient quantities of suitable materials are not available within the project limits. The borrow material shall be approved by the Public Works Commission and shall not contain roots, root mats, stumps, highly plastic clay or other unsatisfactory materials. All borrow material shall be in accordance with the NCDOT Standard Specification for Roads and Structures, most recent edition.

COMPACTION

Backfill shall be compacted in accordance with the following table as a percentage of the maximum density at optimum moisture content as determined by the Standard Proctor Test, ASTM D-698.

Area	Percent ASTM D-698 Maximum Dry Density
Around and 1' above top of pipe	95
Remaining trench (within 4' of subgrade)	95
Pavement subgrade and shoulders	
Last 1' of fill (below subgrade)	100
Last 3' of fill to 12" below subgrade	98
Base material	100
Adjacent to structures (Areas not paved)	95
Under structures	98
Utility Outfalls (Cross Country)	95

Compaction testing may be performed at the option of the PWC Project Coordinator, or as required by the responsible agency (i.e., City of Fayetteville, NCDOT, etc.). Compaction testing shall be done in

accordance with the responsible agency's requirements. Deficiencies shall be corrected by the Contractor without additional cost to PWC.

FINISHED EXCAVATION

All areas covered by the project shall be uniformly graded to the established elevations and approved cross sections. Ditches shall be graded to permit proper drainage. Newly graded areas shall be protected from traffic and/or from erosion, and any settlement or washing prior to acceptance shall be repaired and the required grades re-established. Ditches and drains along the subgrade shall be maintained to drain at all times. The finished subgrade shall be protected and maintained by the Contractor. The storage or stockpiling of materials on the finished subgrade shall not be permitted. No base course or pavement shall be laid until the subgrade has been checked and approved. All work shall be conducted in accordance with the environmental protection requirements of the Contract.

DIVISION 2
SITE WORK

02272 EROSION CONTROL - GENERAL PROVISIONS

GENERAL

The Contractor shall be responsible for conducting his site grading and drainage operations in such manner as to prevent or lessen excessive soil erosion of the construction site work areas. He shall at all times provide satisfactory means to prevent or minimize the movement and washing of large quantities of soil. The Contractor is expected to review his site grading and drainage operations periodically to determine the areas most susceptible to erosion by excessive rainfall and periodically maintain all installed measures for the project duration. The Contractor shall correct any deficiencies or problem areas as directed by the Owner or the North Carolina Department of Environment and Natural Resources (NCDENR) inspector within 48 hours.

EXECUTION

The Contractor's attention is directed to the fact that unless exposed earth areas are properly cared for during construction, they may result in substantial sedimentation damage downstream from the construction area. He shall at all times provide satisfactory means to prevent or minimize the movement and washing of quantities of soil onto pavements or into adjacent ditches, swales, inlets, and drainage pipes, to avoid the possibility of these structures becoming clogged with soil. Should this happen as a result of erosion at the site of this construction, the Contractor will be required to immediately provide means for removal of the soil and/or debris from the structures to restore the proper functioning of these structures. The Contractor shall assume all responsibilities to the affected property owners for correction of all damages. The Contractor is expected to review his site grading and drainage operations periodically with the Owner with the view in mind of determining the areas most susceptible to erosion by excessive rainfall and shall take necessary temporary measures in sufficient time to minimize the washing away of the site soils that would likely occur before the areas are finished graded, topsoiled and planted. The temporary measures to be provided by the Contractor at the critical areas may consist of, but not limited to, any one or a combination of the following, or by other approved means selected by the Contractor:

Silt Fence
Gravel Construction Entrance/Exit
Inlet Protection

If any earthwork is to be suspended for any reason whatsoever for longer than 15 days, the disturbed areas shall be seeded with temporary vegetative cover or otherwise protected against excessive erosion during the suspended period. Suspension of work in any area of operation does not relieve the Contractor of the responsibility for the erosion control and temporary measures will not be considered cause for a change in the price bid.

MAINTENANCE

The Contractor shall inspect and maintain each erosion control measure until the project is stabilized and accepted. After each significant rainfall, the Contractor shall remove and dispose of silt accumulation from each individual measure. The following maintenance may be required for each specific erosion and sediment control measure:

Silt Fence: Fabric shall be removed and replaced whenever deteriorated to such an extent the effectiveness is reduced. The toe of the fabric shall be buried a minimum of 6 inches.

Gravel Construction Entrance/Exit: Periodic top dressing with two inches (2") of graded stone. Remove all objectionable materials spilled, washed or tracked onto public roadways.

Sediment Trap: Remove sediment and restore trap to original dimensions when accumulated silt volume equals ½ the design depth. Replace the contaminated gravel facing.

Gravel Inlet Protection: Remove sediment as necessary to provide adequate volume. Replace contaminated gravel facing if required.

Rip-Rap: Make repairs to dislodged stone and/or supplement as required if erosion occurs during heavy rainfalls.

REMOVAL

After the area has been stabilized and the project accepted, the Contractor shall remove all temporary erosion and sediment control measures. Silt fences shall be removed, sediment traps/pits and/or basins filled with suitable soil, compacted and seeded. The materials removed shall remain the property of the Contractor and shall be disposed of off-site, or may be reused in other locations if approved by the Owner.

DIVISION 2
SITE WORK

02273 TEMPORARY SILT FENCE

GENERAL

The work covered by this section consists of furnishing, installing, maintaining and removing a water permeable filter type silt fence for the purpose of removing suspended particles from the water passing through it.

The quantity of temporary silt fence to be installed will be affected by the actual conditions which occur during the construction of the project. The quantity of temporary silt fence may be increased, decreased, or eliminated entirely at the direction of the Owner. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

MATERIALS

Either wood posts or steel posts may be used. Wood posts shall be a minimum of 6 feet long, at least 3 inches in diameter, and straight enough to provide a fence without noticeable misalignment. Steel posts shall be 5 feet long, 1 3/4 inches wide and have projections for fastening the wire to the fence.

Wire fence fabric shall be at least 32 inches high, and shall have at least 6 horizontal wires. Vertical wires shall be spaced 12 inches apart. The top and bottom wires shall be at least 10 gage. All other wires shall be at least 12½ gage.

Burlap shall be at least 36 inches wide and shall weigh at least 6.7 ounces per square yard. Other materials may be used in lieu of burlap, provided those materials have been approved by the North Carolina Department of Environment and Natural Resources (NCDENR).

Wire staples shall be No. 9 staple and shall be at least 1½ inches long.

INSTALLATION

The Contractor shall install temporary silt fence as shown on the plans and details. The silt fence shall be constructed at the locations shown on the plans and at other locations directed by the Owner.

Posts shall be installed so that no more than 3 feet of the post shall protrude above the ground and at least18 inches are driven into the ground. Filter fabric shall be attached to the wire fence fabric by wire or other acceptable means. The fabric shall be continual in length. The fabric shall extend into a 6"x 6" trench along the uphill side of the fence. The trench shall be backfilled and compacted. Place 6 inches of No. 57 stone along the toe of the fence to secure the fabric in place. The single stripe located approximately 6 inches form the silt fence outer edge should not be visible if the fabric and fencing are installed properly.

DIVISION 2
SITE WORK

02274 GRAVEL CONSTRUCTION ENTRANCE/EXIT

GENERAL

The work covered by this section consists of furnishing, installing, maintaining and removing temporary gravel construction entrance/exits. The entrance/exit shall be located at points where vehicles enter and exit the project and as indicated on the plans to limit sediment "tracked" off the site.

Where there are differences or conflict between this specification and those requirements outlined in an approved Erosion Control Plan, the specifications in the erosion control plan shall take precedence

MATERIALS

The stone shall be two inch (2") to three inch (3") washed stone.

INSTALLATION

The Contractor shall install the gravel construction entrance as shown on the plans and details. The construction entrance shall be constructed at the locations shown on the plans and at other locations directed by the Engineer.

The area to receive the stone shall be cleared of all vegetation, roots and other objectionable materials. The subgrade shall be graded and properly compacted. Areas yielding shall be covered with engineering fabric or undercut as directed by the Engineer. The stone shall be placed, graded and compacted to a minimum depth of eight inches (8") and as shown on the plans. The minimum construction entrance dimensions shall be 50 feet in length and 12 feet in width. The construction entrance/exit shall be maintained and the stone supplemented throughout the life of the project and shall be removed upon stabilization and disposed of off-site at the Contractor's expense.

DIVISION 2
SITE WORK

02500 – TRAFFIC CONTROL

GENERAL

The purpose of these specifications is to outline the Contractor's requirements for furnishing, erecting, maintaining, relocating, and removing traffic control devices for the maintenance of traffic during the Contractor's construction operations. The Contractor shall furnish all labor, materials, accessories, equipment and tools for performing all required traffic control operations.

REFERENCES

All work shall be in accordance with:

A. The North Carolina Department of Transportation Standards and Specifications for Roads and Structures (most recent edition)
B. The North Carolina Department of Transportation Roadway Standard Drawings (most recent edition)
C. The Manual on Uniform Traffic Control Devices (MUTCD) – most recent edition
D. The North Carolina Supplement to the MUTCD
E. Section 01000 – Special Conditions, of these Contract Documents

REQUIREMENTS

TRAFFIC CONTROL PLAN

The Contractor shall submit a traffic control and phasing plan for the overall project to be reviewed and approved by the PWC Project Engineer, prior to starting construction. The Contractor shall obtain an approved copy of the traffic control plan for the overall project area prior to any excavation within roadways. The plan must indicate how traffic will be managed, signage to be used, and potential traffic patterns resulting from plan implementation. The plan shall be submitted to the PWC Project Engineer in accordance with Section 01000 "Special Conditions" and Section 01300 "Submittals" of these Contract Documents. Failure of the Contractor to submit the required traffic control plan sufficiently in advance shall not entitle the Contractor to any extension of Contract Time.

TRAFFIC CONTROL DEVICES

The Contractor working in public rights-of-way on streets open to vehicular traffic, shall be required to provide, erect, and maintain all necessary traffic control devices throughout the project area to include any connecting streets affected by construction activities. The Contractor shall provide a sufficient number of personnel, and take all precautions for the protection of the work and safety of the public. All traffic control devices in place shall be in accordance with the approved traffic control plan. All traffic control devices and device installation shall be placed and maintained in strict accordance with the resources listed above.

The Contractor shall be liable for any damages resulting from using unapproved and/or inadequate work zone traffic control. The Fayetteville Public Works Commission reserves the

right to stop any work for non-compliance. The Contractor shall have no claim for delay due to stoppage of work as a result of non-compliance.

TRAFFIC CONTROL PLAN AND ROAD CLOSURE NOTIFICATION

1. TRAFFIC CONTROL PLAN – The Contractor shall notify the PWC Project Engineer, in writing, by 5:00 p.m. Wednesday, indicating which roadways will be affected by the work the following week. The Contractor shall notify NCDOT of work to be done per the terms of the approved encroachment agreement. The PWC Project Engineer shall receive copies of all correspondence via fax or email (PWC fax 910-829-0203; email addresses will be provided at the pre-construction meeting).

   Traffic cannot be altered without notification and approval from the appropriate agency as outlined in the above paragraph. Failure to do so will result in the Contractor not being able to work within the street the next week.

   No work on the individual streets shall start until all the traffic control devices required for the particular work activity have been installed in accordance with the approved traffic control plan.

2. ROAD CLOSURE NOTIFICATION - When deemed to be in the best interest of the public, the Fayetteville Public Works Commission and the Contractor, a street may be closed for a duration mutually agreed upon. The Contractor shall submit a request in writing to the PWC Project Engineer for approval to have a street closed. The PWC Project Engineer will forward the request to the appropriate agency (i.e., City, Hope Mills, NCDOT) for approval of the closure. The PWC Project Engineer will include their recommendation regarding approval or disapproval of the request. The PWC Project Engineer will respond in writing with any recommendation for approval or disapproval of the request.

   The request shall be submitted a minimum of five (5) business days prior to the desired closure date. The request shall include the street name and the limits of the closure based on the points of intersection. The request shall also state the proposed duration the street is to be closed and shall include a traffic control plan showing the detour route, traffic control devices, etc. The traffic control plan submitted shall be in accordance with the requirements listed in this Specification.

   Once the street closure has been approved, in writing, by the PWC Project Engineer, the Contractor accepts full responsibility for the closure, to include the installation, maintenance, and removal of all traffic control devices and all implied liability.

TRAFFIC CONTROL LOOPS

The Town of Hope Mills, City of Fayetteville, and NCDOT maintain traffic detection loops at various intersections throughout the project limits. Due to the location of the proposed utility improvements, it may be necessary for these detection loops to be damaged. The Contractor shall coordinate with the appropriate agency a minimum of three (3) days prior to excavating, in order for the agency to locate these loops, or make any necessary revisions to the traffic signal facilities.

The agency will hire a third-party contractor to repair the damaged traffic detection loops. The invoice for this work shall be submitted to the Contractor for payment. The cost for this shall be incidental to the Contract.

STEEL PLATING ROADWAYS

Steel plating shall not be used without the prior written approval of the Project Engineer. The Contractor shall submit their proposed plan to utilize steel plates a minimum of five (5) working days prior to the proposed activity. Plating shall only be considered if the trench depths are 14 feet or greater. Should plating be approved the Contractor shall adhere to the following:

1. The trench shall be adequately shored to support bridging and traffic loads.
2. The trench box shall be sealed so there are no open voids.
3. Steel plates shall rest on trench box.
4. Steel plates shall extend beyond the outer edges of the trench box on all four sides.
5. There must be a minimum of two (2) feet of compacted backfill above steel plates.
6. Compacted backfill shall match existing street grade.
7. Provide documentation that the plates are capable of supporting potential loads.

Steel plating shall not exceed two (2) consecutive calendar days in any given week. However, provided that work is progressing in that particular section of sewer the Contractor may be allowed to utilize plating for a longer duration as approved in writing by the Project Engineer.

STEEL PLATING ROADWAYS (NCDOT STREETS)

Steel plating shall not be used without the prior written approval of the Fayetteville Public Works Commission Project Engineer. The Contractor shall submit their proposed plan to utilize steel plates a minimum of five (5) business days prior to the proposed activity. Should plating be approved, the Contractor shall adhere to the following:

1. The plates shall be secured against any movement from traffic. Options include "countersinking" the plates to be flush with the existing pavement, or bolting the plates to the pavement.
2. The plates shall overlap the excavation a minimum of two (2) feet on all sides.
3. The plates shall be sufficient to withstand the expected traffic loads.
4. Provide documentation that the plates are capable of supporting potential loads.

Steel plating shall not exceed two (2) consecutive calendar days in any given week. However, provided that work is progressing in that particular section of the project, the Contractor may be allowed to utilize plating for a longer duration as approved in writing by the Fayetteville Public Works Commission Project Engineer.

MATERIALS

A. The Contractor shall utilize interim pavement marking paint as specified in the North Carolina Department of Transportation Standards and Specifications for Roads and Structures (most recent edition)

B. Traffic cones may be utilized when approved by the Fayetteville Public Works Commission Project Engineer. If approved, traffic cones shall either be double stacked or weighted to prevent movement by traffic.

C. All traffic control devices furnished by the Contractor shall remain the property of the Contractor, unless otherwise specified in these Contract Documents.

INSTALLATION

The furnishing, erecting, maintaining, relocating, and removal of traffic control devices shall be in accordance with the MUTCD (most recent edition), the requirements outlined in the approved traffic control plan, and these Contract Documents.

All traffic control devices shall be in place prior to the Contractor beginning work, removed during intervals when work is not on-going, and removed at the end of each business day (unless otherwise approved, as outlined in this specification).

The Contractor shall not obstruct or impede any traffic on adjacent streets, during the installation or removal of the traffic control devices, or during construction.

The Contractor shall not close a lane to through traffic after normal working hours and during periods of construction inactivity, unless otherwise approved in writing by the Fayetteville Public Works Commission Project Engineer.

The Fayetteville Public Works Commission Project Engineer may restrict the Contractor from placing lane closures during certain hours, holidays, or as deemed necessary for the convenience of the public. All lane closure types, hours of installation, and durations shall be as approved in writing by the Fayetteville Public Works Commission Project Engineer.

The use of police and/or trained flaggers to control traffic through the work site shall be provided by the Contractor as required. The Contractor shall be responsible for obtaining trained personnel to direct traffic and contacting local authorities for use of police for traffic control where applicable.

INTERIM PAVEMENT MARKINGS

The Contractor shall be required to place interim pavement markings (centerlines, lane lines, edgelines, railroad, and school symbols) daily on any street with existing pavement markings that have been obliterated.

THERMOPLASTIC PAVEMENT MARKINGS

The Contractor shall be required to place thermoplastic pavement marking centerlines, lane lines, and edge lines within three (3) calendar days after the completion of the resurfacing operation.

The Contractor shall be required to place all thermoplastic pavement marking symbols (arrows, crosswalks, stop lines, school symbols, railroad symbols, raised pavement markers, etc.) within seven (7) calendar days of the completion of the project.

NCDOT STREETS

All traffic control measures for work within NCDOT road rights-of-way shall be in accordance with the approved NCDOT encroachment agreement, and as specified herein. Where there is a conflict between the requirements of this specification and the approved encroachment, the requirements of the approved encroachment shall govern.

END OF SECTION

DIVISION 2
SITE WORK

02505 ADJUSTMENT OF EXISTING STRUCTURES

GENERAL

The work covered by this specification consists of the raising or lowering of existing manholes and valve boxes encountered within the limits of the project to match the adjacent finished work.

RELATED SECTIONS

A. 02222 – Excavation and Backfilling for Utility Systems
B. 02660 – Water Distribution
C. 02730 – Sanitary Sewer Systems

Where conflicts occur between the specifications, the more stringent requirement shall apply.

MATERIALS

All materials shall be in strict accordance with the requirements of the Public Works Commission and as set forth in this standard.

Adjustable riser rings are not approved for use within the Public Works Commission water and/or sewer system. All manhole adjustments shall be done utilizing a concrete grade ring. If a concrete grade ring cannot be utilized, the manhole shall be broken down and rebuilt to the proper grade, in accordance with PWC standards.

INSTALLATION

Adjustment of structures shall not be performed until after placement of base course and/or any leveling course, and prior to placement of final course. All adjustments of structures shall be accomplished a minimum of 72 hours prior to placing the final surface course. All defective, damaged, or worn castings shall be replaced with new castings provided by the Public Works Commission at no cost to the Contractor. The Contractor shall be responsible for exchanging castings at the Public Works Commission's facility.

The Contractor shall take all necessary precautions to prevent debris from entering the sanitary sewer system. Any debris that falls into the manhole or valve box during adjustment shall be removed immediately.

Manholes

For all manholes that need adjustment, the Contractor shall remove all concrete grade rings to the top of the cone section. All loose material shall be removed and properly disposed of. The Contractor shall utilize new concrete grade rings to ensure that the new manhole ring and cover will be at final grade. If no concrete grade rings are required to adjust the structure to final grade, the Contractor shall set the ring and cover in a bed of clean fresh mortar.

If the manhole needs to be lowered, and there are no existing concrete grade rings, then the Contractor shall tear down the existing manhole and rebuild it, utilizing new riser and cone sections, in order to ensure that the installed ring and cover will be at final grade. The Contractor shall remove all necessary sections of the existing manhole in order to make the adjustment.

If the manhole needs to be raised, and there are 12-inches of concrete grade rings already in place, the Contractor shall tear down the existing manhole and re-build it. The Contractor shall utilize new riser and cone sections, as required, to ensure that the installed ring and cover will be at final grade. The Contractor shall remove all necessary sections of the existing manhole in order to make the adjustment.

Valve Boxes

In order to adjust valve boxes, the top section of the valve box shall be raised or lowered as required to meet the final grade. If the height of the final grade exceeds the length of the existing top section, the Contractor shall remove the existing valve box and install a new one at final grade.

All adjustments shall be protected for at least 72 hours before the placement of any surfacing material, in order to allow the concrete to properly set. The Contractor shall be responsible for protecting the raised structure from damage due to traffic. After the 72 hours, a temporary asphalt transition shall be placed around the raised structure, to allow vehicular traffic to pass over. The asphalt transition shall extend a minimum of 18 inches from the structure in every direction. The Contractor shall be responsible for maintaining this asphalt transition until such time the final surface course is placed. Immediately prior to paving, the asphalt transition shall be removed. In the event paving is stopped for the day prior to completing the work, the Contractor shall re-install the temporary asphalt transition. The finish surface tolerance shall not vary more than ¼" (0.25 inch) in any direction. Every effort shall be made to ensure that the surface course and castings provide as smooth a ride as possible.

DIVISION 2
SITE WORK

02573 PERMANENT PAVEMENT PATCH

GENERAL

Permanent pavement patching shall be completed as indicated on the Contract Plans and in accordance with these Contract Documents. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defect in material or workmanship shall be cause for replacement and correction of such defect as directed by the Public Works Commission. All materials and workmanship shall be in complete accordance with the standards and specifications of the Public Works Commission and subject to Public Works Commission inspection and approval. The materials and installation shall conform to the North Carolina Department of Transportation (NCDOT) Standards, (latest revision), the NCDOT HMA/QMS Manual (latest revision), and as specified herein.

REMOVAL

The Contractor shall cut the existing pavement to straight uniform widths parallel and perpendicular to the roadway. Jagged saw cuts will not be acceptable. The pavement shall be removed its entire depth. The Contractor shall properly dispose of all removed pavement. If the Contractor elects to mill the asphalt, the millings cannot exceed two (2) inches in size, and shall be swept into the trench and re-compacted. The removal limits shall extend a minimum of six (6) inches into solid undisturbed base course prior to patching or as directed by the Public Works Commission.

Pavement removal shall not exceed 3,000 feet total for the entire project at one time. It shall be the Contractor's responsibility to maintain the trench (swept, wetted, compacted, etc.) until paved.

PAVEMENT

Replacing the pavement shall consist of the following:

Tack Coat

All existing pavement edges shall be tacked in accordance with the North Carolina Department of Transportation Standard Specifications for Roads and Structures (latest revision).

Asphalt Surface Course

The asphalt surface course shall be Type S9.5, placed in accordance with the PWC Standard Detail M.2. All asphalt surface course shall be in accordance with the NCDOT HMA/QMS Manual (latest revision) and the North Carolina Department of Transportation Standard Specifications for Roads and Structures (latest revision).

The pavement repair shall be constructed to the line, grade, crown and cross section of the existing street. The asphalt plant mix shall be compacted to density in accordance with the HMA/QMS Manual (latest revision). The Contractor shall provide a smooth transition from the existing pavement to the top of the backfill, so as to have no vertical drop (in any direction). The transitions shall only be removed the day of patch paving.

The permanent pavement patch shall be made within 30 days of installation of the line. If settlement should occur within one (1) year warranty period, the Contractor shall be required to remove asphalt, re-compact base and sub-base, and re-patch any areas of settlement at no expense to PWC. All repairs shall be in accordance with these Contract Documents.

Base Course

The base course shall be aggregate base course (ABC) installed to a minimum eight (8) inches thickness (compacted) and extending a minimum of six (6) inches beyond the edge of the trench as indicated on the PWC Standard Detail M.2. The base course shall be compacted to 100% maximum dry density at optimum moisture content as determined by the AASHTO T-99 as modified by NCDOT.

The Contractor, with permission of the Public Works Commission, may use asphalt concrete intermediate course, placed in a minimum four (4) inch layer extending a minimum of six (6) inches beyond the edge of the trench as indicated on the Permanent Patch Detail. The Asphalt Concrete Intermediate Course shall be in accordance with the North Carolina Department of Transportation Standard Specifications (latest revision), and the NCDOT HMA/QMS Manual (latest revision).

Prior to patch paving, the Contractor shall remove the upper ten (10) inches of backfill, if ABC is to be used or upper six (6) inches if Asphalt Concrete Intermediate Course is to be used, in the trench. All asphalt edges along the trench shall be cut straight, uniform width, parallel and perpendicular to the road with no jagged edges. The outer six (6) inches (minimum) of the trench adjacent to the newly removed asphalt shall be on undisturbed soil.

The pavement repair shall be constructed to the line, grade, crown and cross section of the existing street. The asphalt plant mix shall be compacted to density in accordance with the HMA/QMS Manual.

Maintenance shall be performed at least weekly, after a rainfall, or at the direction of the Public Works Commission. Maintenance shall include sweeping the adjoining pavement, blading, wetting and compacting the stone to insure smooth drivable surface.

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DIVISION 2
SITE WORK
02574 – TEMPORARY PAVEMENT PATCH

GENERAL

Open cutting and replacing existing pavement shall be performed in accordance with these Contract Documents. The materials and installation shall conform to the North Carolina Department of Transportation Standard Specification (most recent edition), the NCDOT HMA/QMS Manual (most recent edition), and as specified herein. Encroachment permits will be obtained by the Public Works Commission, but all necessary insurance as required by NCDOT shall be furnished and paid for by the Contractor.

REMOVAL

The Contractor shall cut the existing pavement to straight uniform widths parallel and perpendicular to the roadway. Jagged saw cuts will not be acceptable. The pavement shall be removed its entire depth. The Contractor shall properly dispose of all removed pavement. If the Contractor elects to mill the asphalt, the millings cannot exceed two (2) inches in size, and shall be swept into the trench and re-compacted. The removal limits shall extend a minimum of six (6) inches into solid undisturbed base course prior to patching or as directed by the Public Works Commission.

Pavement removal shall not exceed 3,000 feet total for the entire project at one time. It shall be the Contractor's responsibility to maintain the trench (swept, wetted, compacted, etc.) until paved.

PAVEMENT

Replacing the pavement shall consist of the following:

Tack Coat

All existing pavement edges shall be tacked in accordance with the North Carolina Department of Transportation Standard Specifications for Roads and Structures (most recent edition).

Asphalt Surface Course

Where streets are indicated to be temporarily patched and overlaid with an asphalt surface course, the patch shall be constructed of asphalt intermediate course, Type I-19.0. The Asphalt Intermediate Course, material shall be in accordance with NCDOT Standard Specifications for Roads and Structures (most recent edition) and the NCDOT HMA/QMS Manual (most recent edition).

The pavement repair shall be constructed to the line, grade, crown and cross section of the existing street. The asphalt plant mix shall be compacted to density in accordance with the NCDOT HMA/QMS Manual (most recent edition).

The temporary pavement patch shall be a minimum three (3) inches compacted thickness and extend a minimum of six (6) inches beyond the edge of the trench in accordance with the PWC

Standard Detail. No more than 24 hours prior to patch paving, the Contractor shall remove the upper three (3) inches of backfill in the trench. All asphalt edges along the trench shall be cut straight, uniform width, parallel and perpendicular to the road with no jagged edges. The outer six (6) inches (minimum) of the trench adjacent to the newly removed asphalt shall be on undisturbed soil. The Contractor shall provide a smooth transition from the existing pavement to the top of the backfill, so as to have no vertical drop (in any direction). The transitions shall only be removed the day of patch paving.

The temporary pavement patch shall be made within thirty (30) days of installation of the line. If settlement should occur within the one (1) year warranty period, the Contractor shall be required to remove asphalt, re-compact base and sub-base, and re-patch any areas of settlement at no expense to PWC. All repairs shall be in accordance with these Contract Documents.

END OF SECTION

02575 – DRIVEWAY REPLACEMENT GENERAL

Removal and replacement of existing driveways is required as indicated in the Contract Drawings and shall conform to the requirements of this Specification and the Contract Documents. The Contractor shall furnish all labor, equipment, materials, and incidentals necessary for the removal and replacement of the driveways disturbed as part of the utility construction. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defects in material or workmanship shall be cause for the replacement and correction of such defect as directed by the Public Works Commission at no expense to the Public Works Commission.

All work shall be done in accordance with the terms and conditions outlined herein, the Public Works Commission "Manual for the Design and Construction of Water and Wastewater System Extensions" (most recent edition), in accordance with the North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (most recent edition), and subject to final approval and acceptance by the Public Works Commission. In case of conflicting requirements between this Specification and the above referenced documents, this Specification shall govern.

The Contractor shall provide resident's access to their driveways at all times. The Contractor shall coordinate with the resident to provide access to their home during removal and replacement of the driveway. The Contractor shall make every attempt to coordinate their efforts with the schedule and wishes of the resident.

RELATED SECTIONS

A. 02222 – Excavation and Backfilling for Utility Systems

REMOVAL

The Contractor shall provide a neat edge along the concrete or asphalt driveway pavement being retained by sawing, straight and true, approximately two (2) inches deep before breaking away. The portion of driveway to be removed shall be as indicated on the Contract Drawings or as directed by the PWC Project Coordinator. The concrete or asphalt driveway pavement shall be removed for its entire depth, removed from the site, and disposed of at the Contractor's sole expense.

The Contractor shall remove the existing gravel drive to the limits shown on the Contract Drawings or as directed by the PWC Project Coordinator. The driveway shall be removed for its entire depth, removed from the site, and disposed of at the Contractor's sole expense.

ASPHALT DRIVES

Replacing the asphalt driveway shall consist of the following:

Base Course:

The stabilized aggregate base course shall be installed to a minimum eight (8) inches compacted

thickness as indicated on the Asphalt Driveway Patch Detail. The base course shall be compacted to 100% maximum dry density at optimum moisture content as determined by the AASHTO T-99 as modified by NCDOT. In lieu of utilizing aggregate base course, the Contractor, with approval from the City of Fayetteville, may utilize a minimum of four (4) inches of I-19.0 intermediate course.

In locations approved by the PWC Project Engineer, where the stone base course is to remain for a defined period of time prior to asphalt paving, the stone base course shall be maintained by the Contractor. Maintenance shall include sweeping the adjoining pavement, blading and/or leveling the stone, compacting and wetting the stone to insure smooth driveable surface. The Contractor shall have on the project the proper equipment to complete this work. Maintenance shall be performed at least weekly, after a rainfall, or at the direction of the PWC Project Engineer.

Tack Coat:

All existing pavement edges shall be tacked in accordance with the North Carolina Department of Transportation Standard Specifications for Roads and Structures (most recent edition).

Bituminous Concrete Surface Course:

The bituminous concrete surface course shall be Type SF9.5, placed in a two (2) inch minimum thickness or to the existing full depth thickness whichever is greater and in strict accordance with the North Carolina Department of Transportation Standard Specifications for Roads and Structures (most recent edition).

CONCRETE DRIVES

Where new concrete is to be placed against existing concrete, preformed expansion joint filler, three-quarter inches in width and of a depth extending for the full thickness of the slab, shall be used. All concrete shall have a minimum 28 day compressive strength of 3,000 psi and shall be placed to the same thickness as the removed portion except that in no case shall any new slab be less than five (5) inches thick. The concrete shall be accurately screed to produce a uniform surface, floated, and given a broom finish. All work shall be in accordance with PWC standard details and City of Fayetteville requirements.

GRAVEL DRIVES

Gravel driveways shall be restored or replaced in all locations disturbed by construction. The replacement gravel driveway shall consist of six (6) inches thick compacted Number 57 stone or aggregate base course stone, whichever matches or more closely matches the existing gravel driveway.

ACCEPTANCE

Acceptance of the installed driveways shall be based on the conformance with the requirements outlined herein, the Public Works Commission's review of the installation, and written concurrence

from the property owner. The Public Works Commission will not accept any installation without the written release from the property owner. The Contractor shall be responsible for obtaining the written release from the property owner.

WARRANTY

If settlement should occur within one (1) year, the Contractor shall repair/re-pave the area to provide a smooth transition between the new and existing driveways. The finished product shall be neat in appearance and of equal or exceeding quality of the surrounding driveway or area.

END OF SECTION

DIVISION 2
SITE WORK

02660 WATER DISTRIBUTION

GENERAL

Water lines and all appurtenant items shall be constructed of materials specified and/or as indicated on the approved drawings. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defects in material or workmanship shall be cause for the replacement and correction of such defect as directed by the Fayetteville Public Works Commission (PWC) at no expense to the Fayetteville Public Works Commission.

RELATED SECTIONS

A. 02211 – Grading, Utilities
B. 02222 – Excavation and Backfilling for Utility Systems
C. 02301 – Boring And Jacking (Roadways And Railroads)

MATERIALS

MANUALLY OPERATED GATE VALVES

All manually operated gate valves four (4) inches and larger shall be ductile iron or cast iron body resilient wedge type rated for 250 psig working pressure gate valves and shall conform to American Water Works Association (AWWA) C-509/C-515 and NSF 61. All valves must open counter-clockwise equipped with a two (2) inch square operating nut. The operating nut shall have an arrow cut in the metal, indicating the direction of opening. All valves shall have a non-rising stem. All valves up to and including thirty-six (36) inch diameter shall have triple "O" ring stem seals. The design and machining of valves shall be such as to permit the replacement of the upper two (2) "O" rings without undue leakage while the valve is wide open and in service. The wedge shall be ductile iron encapsulated in nitrile rubber (for four (4) inch through 12 inch) and SBR rubber for 14-inch through 24-inch sizes.. All internal and external surfaces of the valve body and bonnet shall have a fusion bonded epoxy coating complying with ANSI/AWWA C550 applied electrostatically prior to assembly, conforming to AWWA C-550-90. All valves up to and including 36-inch diameter shall have a safe working pressure of 250 psi. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve. All valves shall be tested for leakage and distortion in strict accordance with the latest revision of AWWA Specification C-500.

Gate valves installed in meter vaults shall have a wheel in lieu of a square operating nut and shall also have a non-rising stem. The wheel shall have an arrow cut in the metal indicating the direction of opening. Flanges shall not be buried. An approved pit shall be provided for all flange connections.

Resilient seated tapping valves shall be furnished with the tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange in accordance with MSS-SP60.

Tapping valves without the raised face on the tapping flange are not permitted since they do not assure the proper alignment required to prevent damage by a misaligned shell cutter. The interior of the waterway in the body shall be a full opening and capable of passing a full sized shell cutter equal to the nominal diameter of the valve.

All valves shall be manufactured in strict accordance with the latest specifications of the American Water Works Association (AWWA). Valves shall be manufactured by: Mueller Company, Clow Corporation, or American Darling Company. Certification shall be furnished to the Fayetteville Public Works Commission by the manufacturer that all valves are in accordance with PWC standards. Where specified on the plans and approved by the Fayetteville Public Works Commission, resilient wedge gate valves may be furnished with spur gearing for valves installed in a vertical position and bevel gearing for valves installed in a horizontal position. All gate valves shall be installed in accordance with PWC standard details.

BALL VALVES

For all valves smaller than four (4) inches, ball valves shall be used. Ball valves shall be installed in accordance with PWC standard details.

Ball valves shall be all bronze construction, with tee head operator and having a removable disc. Ball valves shall have threaded connections, in accordance with PWC standard details. Ball valves shall be manufactured and tested in accordance with AWWA/ANSI C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM Specifications and shall also meet the approval of the Public Works Commission. The turn required to travel from fully closed to fully open on the ball valve shall be 90 degrees.

VALVE BOXES

Valve boxes shall be "slip-type" made of close-grained, gray cast iron metal painted with a protective asphaltic coating. Construction shall be in three pieces as follows: The lower of base pieces, which shall be flanged at the bottom, the upper part which shall be flanged on the lower end, and of such size as to telescope over the lower part, the upper end being constructed in the form of a socket to receive the cap or cover; and the cover or cap shall have cast on the upper surface, in raised letters, the word "WATER". All valve boxes shall be equal in quality and workmanship to those manufactured by Sigma Corporation (VB-462), Tyler Union (6855 Series), Star Pipe Products (VB-0004), or an approved equal. The valve box shall be installed in accordance with PWC standard details. The valve box shall have a 3/8-inch hole drilled in the upper part four (4) to six (6) inches from the top of the box to accommodate a ¼-inch x 1-1/2-inch galvanized bolt for securing tracer wire.

Valve box protector rings shall be installed to protect valve boxes located outside pavement. The ring shall be constructed and installed in accordance with PWC standard details.

FIRE HYDRANTS

All fire hydrants shall be dry barrel, traffic type and conform to the latest revision of AWWA Specification C-502 except as listed below or as otherwise directed by the Public Works Commission. All working parts shall be bronzed. The size of the fire hydrants (designated by the nominal diameter of the valve opening) shall not be less than four and one-half (4 ½) inches. All hydrants shall be able to deliver a minimum of 1,000 gallons per minute with a friction loss of not more than five (5) pounds per square inch (psi) total head loss through the hydrant. Hydrants shall be of compression type (opening shall be of such design that when the barrel is broken off the hydrant valve will remain closed and reasonably tight against leakage). All hydrants shall be mechanical joint to accommodate the spigot end of six (6) inch Pressure Class 150, AWWA Standard, ductile iron pipe. The installation of the fire hydrant shall be in accordance with PWC standard details. Bosses (6") may be substituted for tees in pipe sizes exceeding 24 inches in diameter, with prior approval from PWC. The boss shall be welded to the bottom of the main to provide effective flushing of the system.

All hydrants shall be furnished with two (2) two and one-half (2 ½) inch nozzles and one (1) four and one-half (4 ½) inch pumper nozzle. Outlets shall have American National Standard fire hose coupling thread, in accordance with the City of Fayetteville standard, and shall be provided with nozzle caps securely chained to the body of the hydrant. The base of the hydrant shall have two (2) cast lugs suitable for use in strapping the hydrant to the connecting pipe. The operating nut shall be pentagonal in shape, finished with a slight taper to one and one-half (1 ½) inches from point to flat to conform to the standard wrench used by the Fayetteville Public Works Commission. All hydrants shall open left or counter-clockwise. Hydrants shall be suitable for working pressure of 150 psi and a test pressure of twice the working pressure. Fire hydrants shall be specific models manufactured by Mueller Company (Model Centurian 200), Clow Corporation (Medallion), American Darling (Model Mark 73-1) or approved equal. The interior of the hydrant shoe shall be coated with a four (4) mil thickness FDA approved epoxy coating.

COMBINATION AIR VALVES ASSEMBLY

Combination air valves shall be of the single housing style that combines the operation features of both an air/vacuum and air release valve. The combination air valve shall have a two (2) inch inlet and one (1) inch outlet connections and an orifice diameter to be determined by the Design Engineer for each project for a maximum working pressure of 300 psi. The assembly shall be equipped with a two (2) inch cut-off valve as shown on the PWC standard detail. The combination air valve body shall be constructed of 316 stainless steel or reinforced nylon with the only exception being the Buna-N Rubber seat and gasket. Valves shall be as manufactured by Crispin (Model UX20), ARI (D-020), or approved equal. Combination air valves shall be installed in accordance with PWC standards.

WATER DISTRIBUTION PIPE

DUCTILE IRON PIPE

The raw material from all ductile iron pipe and fittings shall have an average minimum content consisting of 90% recycled iron and steel. Ductile iron pipe and fittings shall be manufactured in the United States of

America in accordance with ANSI/AWWA A21.51/C151. The manufacturer of the ductile iron pipe shall be a member of the Ductile Iron Pipe Research Association (DIPRA).

All ductile iron pipe shall be designated as "Pressure Class", unless otherwise specified. The pipe furnished shall have a minimum thickness calculated in accordance with ANSI A 21.50 (AWWA C-150), with a factor of safety of two (2); a working pressure of 150 psi to 350 psi, plus 100 psi water hammer allowance; and AASHTO H-20 live truck load with 2.5 feet of cover. In no case shall "Pressure Class" pipe's nominal thickness be less than the following:

SIZE	PRESSURE CLASS	NOMINAL THICKNESS (In.)
4"	350	0.25
6"	350	0.25
8"	350	0.25
10"	350	0.26
12"	350	0.28
16"	250	0.30
24"	250	0.37

PUSH-ON JOINTS

Push-on joints shall be as specified and installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Push on joints, rubber gaskets and lubricant shall conform to ANSI A21.11. Pressure rating shall not be less than 200 psi unless otherwise specified. All ductile iron pipe shall be lined with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI A21.4 (AWWA C-104). The pipe shall have an outside asphaltic coating as specified in AWWA Standard C-151.

RESTRAINED JOINTS

Factory Restrained Joints

Factory restrained joint pipe shall be utilized for all pipe greater than 12-inches in diameter, unless otherwise approved by the Fayetteville Public Works Commission. Factory restrained joint pipe shall be furnished for the locations shown on the approved drawings. The pipe, joints, and gaskets shall be in accordance with ANSI/AWWA Standards as specified for ductile iron pipe. Factory restrained joints shall be rated for a working pressure of 350 psi for sizes up to 12-inches and 250 psi for larger sizes.

All factory restrained joint pipe shall have the restraints internal to the pipe (i.e., "boltless"). All restrained joint ductile iron pipe and fittings larger than 12-inches shall be as manufactured by U.S. Pipe's TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal. The method of restraining the valves to the factory restrained ductile iron pipe shall be reviewed and approved by PWC on a case by case basis. The valves shall have the same working pressure as the pipe.

Flanged Joints

Flanges shall be specifically designed for each application. The flange pipe shall be in accordance with ANSI/AWWA C-115/A21.15. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA 115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable.

Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C-110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per ANSI/AWWA C-111/A21.11 with a minimum 1/8 inch thickness. Linings and coatings shall be as previously outlined for all ductile iron pipe and fittings.

Mechanical Joints

Mechanical joints shall be as specified and installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four (4) inch pipe through 12-inch pipe. Mechanical joints, rubber gaskets and lubricant shall conform to ANSI A21.11. Pressure rating shall not be less than 200 psi unless otherwise specified.

Special accessories such as mechanical joint retainer glands or mega-lugs are acceptable on pipe 12-inches and less in diameter, upon approval from the Fayetteville Public Works Commission. Mega-lug and/or grip-ring restraint mechanisms will not be an acceptable method of restraint for pipe, fitting and/or valves on sizes larger than 12-inches in diameter. For mains larger than 12-inches and at locations specified by the Fayetteville Public Works Commission, factory restrained joints shall be utilized, in accordance with these Specifications.

Field Lok Gaskets

Special accessories such as US Pipe's Field-LOK gasket, Ford’s Uni-Ring, or Romac’s Grip-Ring are acceptable on pipe 12-inches and less in diameter, upon approval from the Fayetteville Public Works Commission. Mega-lug and/or grip-ring restraint mechanisms will not be an acceptable method of restraint for pipe, fitting and/or valves on sizes larger than 12-inches in diameter. For mains larger than 12-inches and at locations specified by the Fayetteville Public Works Commission, factory restrained joints shall be utilized, in accordance with these Specifications.

FITTINGS

Mechanical Joint

All fittings shall be ductile iron and shall be manufactured in accordance with AWWA Standard C-110 (ANSI A21.11). Compact fittings shall be mechanically restrained, ductile iron in accordance with ANSI A 21.53 (AWWA C-153) for four (4) inch through 12 inch sizes only. Where thrust blocking is utilized, fittings shall be full body ductile iron in accordance with ANSI A 21.53 (AWWA C110).

All ductile iron fittings shall be lined with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI A21.4 (AWWA C-104). All fittings shall have an outside asphaltic coating as specified in AWWA Standard C-151 and C-110, respectively.

Factory Restrained

Factory restrained joint fittings shall be utilized for all pipe greater than 12-inches in diameter, unless otherwise approved by the Fayetteville Public Works Commission. Factory restrained joint fittings shall be furnished for the locations shown on the approved drawings. The fittings, joints, and gaskets shall be in accordance with ANSI/AWWA Standards as previously specified for ductile iron pipe. Factory restrained joints shall be rated for a working pressure of 350 psi for sizes up to 12-inches and 250 psi for larger sizes. All factory restrained joint fittings shall have the restraints internal to the fitting (i.e., "boltless"). All fittings shall be compatible with the factory restraint system. All restrained joint ductile iron fittings larger than 12-inches shall be as manufactured by U.S. Pipe's TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal.

Bosses

Tangential welded on outlets (i.e., bosses) shall only be utilized on pipe 24-inches and larger, as approved by PWC. All bosses shall be factory welded; field fabrication is not allowed. The pipe shall be in accordance with these specifications. Bosses shall be of the size and location indicated on the approved drawings.

AERIAL CROSSINGS

For aerial crossings, the ductile iron pipe shall be thickness class, as specified on the plans and standard details. All thickness class pipe shall be in accordance with ANSI A21.51 and AWWA C-151, with a minimum working pressure of 200 psi.

For aerial crossings which are four (4) inches to 12 inches in diameter, Class 53 manufactured factory restrained joint or Class 53 flanged ductile iron pipe shall be used in accordance with the PWC standard details. No other means of restraint are allowed for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, Class 53 flanged ductile iron pipe shall be used in accordance with the PWC standard details.

All aerial crossings shall be designed and installed in accordance with PWC standard details.

PIPE IN CASINGS

All ductile iron pipe (regardless of diameter) within casings shall be factory restrained, in accordance with these specifications and the applicable PWC standard details. The use of any other restraints (i.e., mega-lugs, grip-rings, etc.) shall not be utilized on pipe within casings.

All restrained joint ductile pipe in casings shall be in accordance with the PWC standard details.

TRENCHLESS APPLICATIONS

All ductile iron pipe (regardless of diameter) utilized for trenchless installations (i.e., horizontal directional drilling, pipe-bursting, etc.) shall be factory restrained, in accordance with these specifications and the applicable specification section for the trenchless technology. The use of any other restraints (i.e., mega-lugs, grip-rings, etc.) shall not be utilized.

PVC PIPE

Two (2) inch water main pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR21, pressure class 200 in accordance with ASTM D 2241. Fittings for two (2) PVC pipe shall be solvent weld Schedule 80 PVC. Brass FIP x pack joint for PVC fittings shall be used to transition from PVC to brass. The pipe shall be plainly marked with the manufacturer's name, size, material (PVC) type and grade or compound, NSF seal, date of manufacture, pressure rating and reference to appropriate product standards.

All PVC pipe (4-inches through 12-inches diameter) shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4,000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C-900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. The pipe joints shall be of the integral bell type with rubber gaskets and shall conform to the requirements of ASTM D-3139 or ASTM F-477.

PVC fittings are not acceptable for water mains four (4) inches or greater. Fittings and specials shall be ductile iron, bell end in accordance with AWWA C-110, 150 psi pressure rating unless otherwise shown or specified. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Ductile iron fittings and specials shall be cement mortar lined (standard thickness) in accordance with ANSI A21.4.

Mechanical restraining systems (i.e. mega-lug, grip-ring) shall not be used on PVC pipe.

TRACING WIRE

For the purpose of locating non-metallic pipes, a continuous "detectable" tracing wire shall be installed. The wire shall be a minimum 12 gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. Splices shall be accomplished utilizing a corrosion proof wire connector. The connectors shall "lock" the wires in place and contain a dielectric sealant to prevent corrosion. The connector shall be the "Snake Bite" connector manufactured by Copperhead Industries, LLC, or approved equal. The wire shall be buried continuously along the pipe. The wire shall be secured into valve boxes such that a direct/conductive metal detector may be used to trace the pipe location. Bolts shall be used to secure the wire and the attachment location shall be readily available from finished grade without special equipment.

POLYETHYLENE PLASTIC WATER TUBING

Polyethylene (PE) plastic water tubing shall be installed in accordance with PWC standard details. All services installed in new construction shall be one continuous run of pipe with no splices from the corporation stop to the meter. The PE water tubing shall meet the requirements of ASTM D2737, AWWA C901, and NSF Standards 14 and 61. Pipe dimensions shall meet Iron Pipe Size (IPS) standards.

The PE tubing material shall be high density polyethylene conforming to the minimum requirements of cell classification 445574E, as defined and described in ASTM D3350. The resin shall have a material designation code of PE4710 by the Plastic Pipe Institute.

The PE water tubing shall be SIDR 7, with a minimum pressure rating of 250 psi. Fittings for the PE water pipe shall be cast brass compression fittings, made to the PE water pipe dimension. All brass fittings shall have a 300 psi minimum pressure rating.

For the purpose of locating plastic water services during trenching, a continuous tracing wire shall be installed. The wire shall be a minimum 12 gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. The wire shall be buried along the water service lateral from the main to the meter box. The wire shall extend a minimum of 12 inches into the meter boxes.

COPPER WATER TUBING

Copper water tubing shall be installed in accordance with PWC standards. All services installed shall be one continuous run of pipe with no splices from the corporation stop to the meter.

Copper water tubing shall be Type K, soft copper manufactured in accordance with ASTM B88. The minimum pressure rating for the copper water pipe shall be 655 psi. Fittings for the copper water pipe shall be brass compression fittings, made to the copper water pipe dimensions. All brass fittings shall have a 300 psi minimum pressure rating.

TAPPING SLEEVES

Tapping sleeves shall be ductile iron mechanical joint or stainless steel and have a minimum working pressure of 150 psi for all tapping of mains up to and including 24-inch diameter with a branch less than or equal to 12-inches diameter. Branch diameter greater than 12-inches on a 16-inch diameter pipe and larger shall require full body ductile iron mechanical joint tapping sleeve.

Ductile iron mechanical joint tapping sleeves shall be as manufactured by Clow, M&H, Mueller, American, or an approved equal and shall be furnished with complete joint accessories. The mechanical joint sleeve shall be compatible with type and class of pipe being tapped. The outlet flange shall be class 125 per ANSI B16.1 compatible with approved tapping valves.

Stainless steel tapping sleeves shall be as manufactured by Romac, Smith-Blair, or approved equal, and shall be furnished with all accessories. The sleeve, lugs, bolts and nuts shall be 18-8 type 304 stainless steel, as provided by the manufacturer. The outlet flange shall be ductile iron or stainless steel. The gasket shall be a grid pattern design and shall provide full circumferential sealing around pipe to be

tapped. The sleeve shall include a 3/4 NPT test plug. All welds shall be passivated. The outlet flange shall be class D per AWWA C-207-ANSI 150 lb. drilling compatible with approved tapping sleeves.

The tapping sleeve and valve shall be in accordance with PWC standard details.

All tapping sleeves shall be hydrostatically pressure tested prior to the tap being accomplished. **Use of air to complete the pressure test is not acceptable.** The tapping sleeve shall be tested to 150 psi. The PWC Project Coordinator shall witness and approve the testing.

WATER SERVICE SADDLES

All water service saddles for use on two (2) inch PVC shall be one (1) inch brass saddles as manufactured by Ford, McDonald, or Mueller.

Water service saddles for one (1) and two (2) inch taps on four (4), six (6), eight (8), 12-inch and larger size PVC and asbestos-cement (AC) and also four (4) inch and larger size iron pipe shall be ductile iron with stainless steel strap(s), bolts, nuts and washers. Ford Models FS 101, FS 202; Romac Models 101S, 202S; or Smith-Blair Model 315.317 shall be used. Stainless steel straps must be pre-formed at the factory to the specified outside diameters of the pipe.

Water service saddles with a two (2) inch outlet shall be double strap.

Water service saddles for pipe sizes 12-inch through 24-inch shall be double strap.

Water service saddles for pipe sizes exceeding 24-inches shall be as specified by the PWC Water Resources Engineering Department.

INSTALLATION

GENERAL

Pipe installation shall be in strict accordance with Specification Section 02222 – Excavation and Backfilling for Utility Systems and as outlined herein.

PIPE INSTALLATION

Pipe installation shall be in accordance with the manufacturer's instructions. All pipes and fittings shall be handled to prevent damage to the protective coatings and linings.

All dust, dirt, oil, tar, or other foreign matter shall be cleaned from the jointing surfaces, and shall be lubricated with lubricant recommended by the manufacturer.

All pipe shall be installed in accordance with the approved drawings and cut sheets, unless otherwise directed by PWC.

All dead ends on new mains shall have a two (2) inch blow-off assembly as indicated on the approved drawings. The blow-off assembly shall be in accordance with PWC standard details.

For pipe sizes up to 12-inches, mechanical equipment should not be utilized to assemble the pipe. For pipe sizes over 12-inches, mechanical equipment may be utilized, in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by PWC.

Adjustments in grade by exerting force on the barrel of the pipe with excavating equipment shall not be allowed. The Contractor shall verify line and grade after assembling each joint.

When pipe installation is not in progress, the open ends of the pipe shall be closed by a water tight plug or other means approved by the PWC Project Coordinator. If water is present, the plug shall remain in place until the water is lowered to a level that allows for proper installation. No pipe shall be laid in water or where in the PWC Project Engineer's and/or PWC Project Coordinator's opinion trench conditions are unsuitable. Every precaution shall be taken to prevent material from entering the pipe while it is being installed.

ALIGNMENT AND GRADE

The Contractor shall be responsible for installing the pipe and appurtenances to proper line and grade.

All ductile iron pipe and fittings shall be installed in accordance with ANSI/AWWA C-110/A21.10. All C-900 pipe shall be installed in accordance with ASTM D-2774. The amount of deflection in the PVC or ductile iron pipe shall not exceed the applicable AWWA standards and the manufacturer's recommendations. If the required deflection exceeds the specified limitations or as determined by the Public Works Commission, mechanical joint bends shall be utilized.

Pipe passing through walls of NCDOT bridges, retaining walls, and other concrete structures shall be factory restrained joint ductile iron and be installed in casings/sleeves in accordance with NCDOT specifications. Annular space between walls and sleeves shall be filled with an approved cement mortar that meets NCDOT specifications. The annular space between the sleeve and the pipe shall be filled with an approved mastic.

Pipe passing through the walls of meter vaults, valve pits, and storm drainage structures shall be restrained joint ductile iron, as specified by PWC. Pipe shall be installed in a casing/sleeve if determined to be necessary. Annular space between walls and sleeves shall be filled with an approved cement mortar. Annular space between pipe and sleeves shall be filled with an approved mastic. Proposed conflict boxes with storm and water shall be reviewed by the PWC Water Resources Engineer and approved on a case by case basis.

All ductile iron pipe (regardless of diameter) within casings shall be factory restrained, in accordance with these specifications and the applicable PWC standard details. The use of mechanical restraints (i.e., mega-lugs, grip-rings, etc.) shall not be utilized on pipe within casings.

When pipe is field cut, the cut end shall be smooth and at right angles to the axis of the pipe. All sharp edges shall be removed. All field cut pipe shall be beveled. The beveled end of PVC pipe shall be removed, when installing into mechanical joint ductile iron fittings.

When connecting unlike (class, material, etc.) pipe, an approved PWC fitting shall be used. All pipe shall be installed in accordance with AWWA C-600 or C-605 as applicable, for buried lines and the manufacturer's recommendations. For mechanical joint pipe and fittings, all nuts shall be torqued to the manufacturer's recommendations.

Concrete thrust blocking shall be utilized on all PVC water mains. The concrete thrust blocking shall be in accordance with PWC standard details. When thrust blocking is to be utilized, backfilling shall not occur until the concrete has time to set. No hydrostatic pressure testing shall occur until the concrete thrust blocking has cured for a minimum of five (5) calendar days.

FIRE HYDRANTS

Fire hydrants shall be installed as shown on the approved drawings. Each fire hydrant shall be connected to the main with a six (6) inch branch line and shall have a minimum of 42-inches of cover. Fittings between the valve and fire hydrant may be utilized, with prior approval from PWC. The valve shall be located at the main unless otherwise approved by PWC. Hydrants shall be set plumb with pumper nozzle facing the roadway. The hydrant branch shall not be backfilled until inspected and approved by the PWC Project Coordinator. Fire hydrants shall be installed in accordance with PWC standard details.

HYDROSTATIC TESTS

All mains and laterals shall be subjected to a hydrostatic pressure test. Each valved section maybe tested individually.

The Contractor shall furnish all labor and material, including test pumps, taps, and corporations, necessary to complete the work. Any taps which are not to be utilized shall be killed out at the main. If any taps are to be used for irrigation laterals they shall be installed in accordance with PWC standard details. A PWC Project Coordinator shall be present and observe all valve operation by the Contractor. Under no circumstances shall a Contractor operate any PWC-owned valves unless it is an emergency.

The duration of the pressure test shall be at least one hour or longer, as directed by the PWC Project Coordinator. The hydrostatic pressure shall be 200 psi. The pipe to be tested shall be slowly filled with water and the specified test pressure shall be applied. Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not located to properly expel the air, taps shall be made as approved by PWC.

Damaged or defective materials discovered as a result of the pressure test shall be removed and replaced with new material, and the test shall be repeated until the test results are satisfactory to the Public Works Commission.

All replacement, repair or retesting shall be accomplished by the Contractor at no additional cost to the Public Works Commission. All repairs shall be reviewed and approved by PWC prior to backfill. The use of couplings, fittings, sleeves, etc. shall be reviewed and approved by PWC prior to use. The main must successfully pass the hydrostatic test prior to sterilization.

STERILIZATION

Sterilization shall be in accordance with the requirements of NCDEQ, the North Carolina Rules Governing Public Water Supply, AWWA C651, and AWWA C655 (most recent editions). The Contractor shall furnish all chlorinating equipment, sterilization solution, materials, excavation, barricades, backfilling, and any taps and corporations necessary to complete the work. The Contractor shall fully cooperate with the PWC Project Coordinator, furnish any needed assistance, and schedule the testing.

Prior to performing the hydrostatic test, water mains, laterals, and appurtenances shall be flushed to remove air, sediment, contaminants, and/or foreign matter. After completion of a successful hydrostatic test, the water system shall be disinfected by the thorough dispersion of a chlorine solution. The chlorine level shall be between 50 parts per million (ppm) and 100 ppm throughout the water system. In no case shall the chlorine level exceed 300 ppm. If the chlorine level is over 300 ppm, the system shall be completely flushed and re-chlorinated. **In no case shall chlorine be introduced into the water system in a dry solid state.**

The chlorine solution shall remain in contact with the interior surfaces of the water system for a minimum period of 24 hours and shall result in not less than 10 ppm of chlorine throughout the system. Then the water system shall be flushed with water from the existing PWC water system until the chlorine solution is dispelled. The Contractor shall take all necessary measures to prevent downstream erosion caused by flushing the lines. All erosion/damages shall be repaired at no additional expense to the Public Works Commission. All environmental regulations governing the release and/or disposal of chlorinated testing water shall be met by the Contractor. AWWA C655 defines “highly chlorinated” water as water having more than four (4) ppm. Any water with a chlorine level greater than four (4) ppm shall be de-chlorinated by the Contractor prior to being released to the environment.

If any disruption to the disinfection process occurs, or if any repair procedure is necessary then the disinfection process shall start over.

After disinfection, the water supply shall not be accepted or placed into service until bacteriological tests results or representative water samples analyzed in the Public Works Commission’s laboratory are found to be satisfactory. The disinfection shall be repeated until tests indicate the absence of pollution for at least two (2) full days. The PWC Project Coordinator shall be responsible for taking the sample(s) and transporting them to the PWC laboratory.

If the initial sample taken after disinfection and flushing does not indicate that the water main is sterilized, the Contractor shall, in conjunction with the PWC Project Coordinator, flush the lines. Once flushing is complete, another sample will be taken to the Public Works Commission’s laboratory for analysis. Should this second sample also fail to indicate that the main is sterilized; the Contractor shall repeat the disinfection process. This process shall be repeated until the samples are satisfactory. The Contractor

shall fully cooperate with the PWC Project Coordinator, furnish any needed assistance, and schedule the testing.

DIVISION 2
SITE WORK

02730 SANITARY SEWER SYSTEMS

GENERAL

Sanitary sewer lines and all appurtenant items shall be constructed of materials specified or indicated on the drawings. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defect in material or workmanship shall be cause for the replacement and correction of such defect as directed by the Public Works Commission.

RELATED SECTIONS

A. 02211 – Grading, Utilities
B. 02222 – Excavation and Backfilling for Utility Systems
C. 02732 – Sewage Force Mains

MATERIALS

SEWER MAINS

Prior to shipment each joint of pipe shall be stamped by an independent testing laboratory, certifying compliance with the specifications stated therein. Pipe sizes indicated shall be understood to be nominal inside diameter of the pipe. All sewer pipe materials shall be either PVC (as specified herein) or ductile iron (as specified herein), unless otherwise approved in writing by the Public Works Commission. Written approval shall be obtained prior to installation.

DUCTILE IRON PIPE

The raw material from all ductile iron pipe and fittings shall have an average minimum content consisting of 90% recycled iron and steel. Ductile iron pipe and fittings shall be manufactured in the United States of America in accordance with ANSI/AWWA A21.51/C151. The manufacturer of the ductile iron pipe shall be a member of the Ductile Iron Pipe Research Association (DIPRA).

All ductile iron pipe and fittings shall be in strict accordance with ANSI A21.51 and AWWA C151, Class 50 or Class 51, as applicable, in every respect. The working pressure shall be a minimum of 200 psi. Pipe shall be furnished in 18 or 20-foot lengths. All pipe joints used in open trench construction shall be furnished with "push-on" joints, unless otherwise indicated on the drawings or specified. All joints and fittings shall be in accordance with ANSI A21.11 and AWWA C111. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils (Protecto401 or approved equal). The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110. Specifications for the ceramic epoxy can be found in Specification Section 09802.

For aerial crossings which are 4 inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be utilized in accordance with the standard Public Works Commission detail for aerial crossings. Mega-lugs, field-lok, and gripper rings are not an allowable means of restraint for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be utilized in accordance with the standard Public Works Commission details. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with ANSI/AWWA C-115/A21.15. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA 115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C-110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per ANSI/AWWA C-111/A21.11 with a minimum 1/8" thickness. Linings and coatings shall be as outlined for ductile iron pipe.

If the Public Works Commission determines that an expansion coupling is required, it shall be installed as indicated on the drawings. The expansion coupling shall not be buried.

For subsurface water crossings (i.e., streams, wetlands), restrained joint ductile iron pipe shall be utilized. No mechanical restraint systems (e.g., mega-lugs, field-lok gaskets, etc.) shall be utilized. The pipe shall be installed in a casing, in accordance with the approved Public Works Commission detail, unless otherwise specifically approved by the Public Works Commission.

PVC PIPE

PVC sewer pipe and fittings 4 inches thru 15 inches shall be in accordance with ASTM D-3034 with a standard dimension ratio (SDR) of 26 for sewer mains and laterals. Larger diameter pipe (18 inches through 27 inches) shall be in accordance with ASTM F-679, with a SDR of 26. Both pipe and fittings shall be made of PVC plastic having a cell classification of 12454 as specified in ASTM D-1784.

Pipe joining shall be push on elastomeric gasket joints only and the joints shall be manufactured and assembled in accordance with ASTM D-3212. Elastomeric seals shall meet the requirements of ASTM F-477. The pipe shall be furnished with integral bells and with gaskets that are permanently installed at the factory and in accordance with ASTM D-3212 and contain a steel reinforcing ring. PVC sewer pipe shall be made by continuous extrusion of prime green unplasticized PVC and contain identification markings as required by the applicable ASTM standard.

SEWER FITTINGS

Ductile Iron Push-on Fittings:

Ductile iron sewer fittings on PVC mains shall be deep bell, gasketed joint, and air test rated. Gasket groves shall be machined in the factory. Material shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12 and ASTM F1336. Wall thickness shall meet the requirements of AWWA C153. Gaskets shall have a minimum cross sectional area of 0.20 square inches, and conform to ASTM F477.

All ductile iron fittings shall have an interior coating of Protecto 401, or approved equal. All ductile iron fittings on PVC pipe shall provide a flow line that provides a smooth transition between the materials. Ductile iron fittings shall be as manufactured by the Harrington Corporation (Harco), or approved equal.

Mechanical Joint Fittings:

Joints shall be installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four inch (4") pipe and larger. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA Standard C-110 (ANSI A21.11). Compact fittings shall be ductile iron in accordance with ANSI A 21.53 (AWWA C-153) for 4" thru 24" sizes only. Note: mechanical joint wyes are not included in the AWWA C-153 specification. Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron fittings shall have an interior coating of Protecto 401, or approved equal. Mechanical joint fittings shall be utilized on ductile iron mains and ductile iron laterals. Mechanical joint fittings shall not be utilized on PVC mains, unless otherwise approved by the Public Works Commission.

PVC Fittings:

PVC fittings shall be manufactured in accordance with ASTM D-3034, F-1336, and F-679. Molded fittings shall be utilized in sizes from 4” to 8” (or larger, if available). Fabricated fittings shall only be utilized with prior approval from the Public Works Commission. Fabricated fittings are defined as those fittings that are made from pipe or a combination of pipe and molded components. All PVC fittings shall contain identification markings as required by the applicable ASTM standard. All PVC fittings shall be gasketed joint, except as indicated for interior drop structures. Plastic fittings shall be as manufactured by GPK Products, Inc., Plasti-Trends, the Harrington Corporation (Harco), or approved equal.

Ductile Iron Pipe Size x SDR26 Transition Adapter:

All ductile iron x PVC transition adapters shall be one (1) piece, bell x bell (gasket x gasket). Transition adapters shall range in size from four (4) inches through 12 inches. Transition adapters for pipe larger than 12-inches shall be as specified by the Public Works Commission. All transition adapters shall have a flow way tapered to allow a smooth transition between the ductile iron and PVC. Transition adapters shall be either PVC or ductile iron, in accordance with the following:

PVC – All PVC transition fittings shall be made from DR 18 C900 pipe stock. The C900 pipe stock shall meet the requirements of AWWA C900/C905, and have a minimum cell classification of 12454 as defined in ASTM D1784. The wall thickness shall meet or exceed DR 18. PVC transition fittings shall have SBR gaskets in accordance with ASTM F477. All six (6) inch and eight (8) inch adapters shall be molded. Molded fitting joints shall be 235 psi rated, in accordance with ASTM D3139, and shall have SBR rubber gaskets. Four (4) inch, ten (10) inch and 12 inch transition adapters shall have SBR Rieber style gaskets meeting ASTM F477. Joints shall be 235 psi rated, in accordance with ASTM D3139 for the C900 (ductile iron) bell, and in accordance with ASTM D3212 for the sewer (SRD26) bell. Molded C900 bell depths shall comply with AWWA C907. Fabricated (4-inch, 10-inch and 12-inch) bell depths and molded sewer (SDR26) bell depths shall be in accordance with ASTM F1336. PVC transition adapters shall be manufactured by the Harrington Corporation (Harco), GPK Products, or approved equal.

Ductile iron – Ductile iron transition fittings shall be deep bell, push-on joint, and air test rated. The ductile iron material shall comply with ASTM A536, Grade 65-45-12 or 80-55-06. The bell depth shall be in accordance with ASTM F1336. Gaskets shall be of SBR rubber, in accordance with ASTM F477. Transition gaskets are not allowed. All ductile iron transition fittings shall have an interior coating of Protecto401 or approved equal. Ductile iron transition fittings shall be manufactured by the Harrington Corporation (Harco) or approved equal.

Saddles:

Sewer service saddles may be utilized for sewer lateral installations. All sewer service saddles shall be ductile iron with stainless steel straps, bolts, nuts, and washers. The nuts shall be coated to prevent galling. The saddle body shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12. The gasket material shall be SBR, in accordance with ASTM D2000. Saddles for PVC or DI laterals shall have an alignment flange. Sewer service saddles shall be as manufactured by Geneco, or approved equal. All stainless steel straps shall be pre-formed at the factory, to the specified outside diameters of the pipe.

SEWER LATERALS

Ductile iron laterals – For ductile iron mains, utilize mechanical joint fittings or an approved saddle with an alignment flange (Geneco or approved equal). For PVC mains, utilize an approved saddle with an alignment flange (Geneco or approved equal) or ductile iron fittings as specified above.

PVC laterals – utilize a saddle with an alignment flange (Geneco or approved equal) on PVC or ductile iron mains; utilize a mechanical joint tee with SDR 35 transition gaskets on ductile iron mains; or utilize PVC fittings as specified above on PVC mains.

The following table summarizes the materials to be utilized for sewer main to lateral connections:

	PVC Main	DI Main
DI Lateral	DI fitting or approved saddle	MJ fitting or approved saddle
PVC Lateral	PVC fitting or approved saddle	MJ fitting with transition gasket or approved saddle

Sewer laterals shall be in accordance with these Specifications and PWC standard details S.10, S.11, and S.12.

PRECAST CONCRETE MANHOLES

Pre-cast circular reinforced concrete manhole units shall be in accordance with ASTM C-478. The tongue and groove ends of the manhole sections shall be manufactured for jointing with rubber gaskets (i.e., con-seal). An eccentric cone shall be utilized on all manholes, unless otherwise approved by the Public Works Commission.

Manhole steps shall be placed in all manholes and shall be steel reinforced (½" grade 60) copolymer polypropylene plastic steps in accordance with ASTM C-478 for material and design. The steps shall be spaced 16" on center with serrated treads and wide enough to stand on with both feet.

Manhole frames and covers shall be made of gray cast-iron, and the iron shall possess a tensile strength of not less than 18,000 psi. Cast iron shall conform to ASTM Specification A 48-83 Class 35. The frame and cover shall be manufactured by the same manufacturer. All castings shall be in accordance with Public Works Commission standard details. Any defective castings shall be removed and replaced.

Any special linings and coatings that are specified for a manhole and installed at the production facility, in the field, or during repairs, shall be applied in accordance with the applicable special coatings specification and the manufacturer's specifications for that material.

Camlock ring and covers shall be in accordance with Public Works Commission standard details. Camlock bolt head shall be compatible with PWC standard tool for turning camlock mechanism. Camlock ring and covers shall be installed as indicated on the drawings, in accordance with PWC standard details.

SELECT BEDDING MATERIAL

Select bedding material shall be crushed stone (No. 57 or No. 5), in accordance with Public Works Commission standard details. Bedding material shall be provided for all pipe materials.

INSTALLATION

Pipe installation shall be in strict accordance with Specification Section 02222 – Excavation and Backfilling for Utility Systems and as outlined herein.

PIPE LAYING

Pipe installation shall be in accordance with the manufacturer's instructions. Proper equipment shall be utilized to perform the work in a manner satisfactory to PWC. All pipes and fittings shall be carefully lowered into the trench in such a manner to prevent damage to the protective coatings and linings. Under no circumstances shall pipe materials be dropped or dumped into the trench. Pipe shall be carried into position and not dragged.

All dust, dirt, oil, tar (other than standard coating), or other foreign matter shall be cleaned from the jointing surfaces, and the gasket, bell, and spigot shall be lubricated with lubricant recommended by the manufacturer.

The pipe shall be laid upgrade, beginning at the lower end with the tongue or spigot ends pointing in the direction of the flow to the correct line and grade, unless otherwise approved by PWC. The pipe section to be installed shall be aligned by batter board or laser beam with the last installed pipe section. Mechanical equipment should not be used to assemble the pipe. Pipe shall be assembled in accordance

with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by PWC.

Adjustments in grade by exerting force on the barrel of the pipe with excavating equipment shall not be allowed. The Contractor shall verify line and grade after assembling each joint.

At any time when pipe laying is not in progress, the open ends of the pipe shall be closed by a water tight plug or other means approved by the PWC Project Coordinator. If water is in the trench, the plug shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or where in the PWC Project Engineer's and/or PWC Project Coordinator's opinion trench conditions are unsuitable. Every precaution shall be taken to prevent material from entering the pipe while it is being installed.

ALIGNMENT AND GRADE

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

Pipe shall be visually inspected by shining a light between structures and /or by closed circuit television inspection. Any defects discovered, including poor alignment, shall be corrected as directed by the Public Works Commission.

The bottom of the trench shall be excavated to a minimum of four inches (4") below the outside bottom of the pipe being installed to allow adequate placement and compaction of bedding material prior to installation.

Select bedding material shall be placed a minimum of four inches (4") and a maximum of six inches (6") under the pipe for full width of the trench and halfway up the pipe on the sides. Bedding material shall be placed in layers not exceeding six inches (6") loose thickness for compacting by vibratory mechanical tamps under the haunches and concurrently on each side of the pipe for the full width of the trench. The final result shall be "Class B" bedding for rigid pipe. If the existing material under the pipe bedding material is unsuitable, the unsuitable material shall be removed and replaced with select bedding material (No. 57 or No. 5 stone), as authorized and approved by the Public Works Commission Project Coordinator.

The same material pipe shall be utilized from manhole to manhole, unless otherwise approved by PWC. If the section of pipe between manholes is 250 feet or less, no transitions will be allowed (either all PVC or all ductile iron). Should the length between manholes exceed 250 feet, only one transition will be allowed. Use of a C900 x SDR 26 adaptor shall be used to accomplish the transition. A transition is defined as the use of one C900 x SDR26 adaptor. No more than one (1) adaptor shall be utilized in any given manhole to manhole segment.

All manholes shall be constructed to Public Works Commission's standards. Installation shall be in accordance with ASTM C-891 and PWC standards.

Manholes shall be constructed of precast reinforced concrete circular sections installed on a base riser section with integral floor and shall be cored to accommodate the various pipe connections, as indicated on the drawings. Pipe connections to a manhole shall be by gasketed flexible watertight connections (boot for small diameter and A Loc for larger diameter pipe) or as approved by the Public Works Commission. The manhole size shall be in accordance with the following table, unless otherwise specified:

Pipe Size	Manhole Diameter **
24" and less	48" *
27" - 36"	60"
42"	72"

* Where interior drop structures are required, use 60" diameter as required in the Public Works Commission standard details.
** Where multiple connections or acute angles are required, larger diameter manhole may be required as indicated on the plans.

The invert channel shall be constructed of brick and mortar, in accordance with Public Works Commission standard details. **Precast inverts are not allowed**. The invert channel shall be smooth and semicircular in shape conforming to the inside of the connecting sewer section. Changes in direction of flow shall be made with a smooth curve as large as a radius as the size of the manhole will permit without a decrease in flow velocity. Changes in size and grade of the channel shall be made gradually and evenly. The invert channel walls shall be constructed to three quarters (3/4) of the height of the crown of the outlet sewer and in such a manner not to obstruct maintenance, inspection or flow in the sewers. The inverts shall have a minimum slope of one (1) percent across the bottom of the manhole. A shelf shall be provided on each side of any manhole invert channel. Inverts in manholes with standing water will not be acceptable. The shelf shall be sloped not less than 1:12 (min) and no more than 2:12 (max). The bottom of the boot for the new sewer main or lateral shall be set one inch above existing shelf unless otherwise indicated.

When used in a paved street, the ring and cover shall be set in suitable mortar surrounded by a concrete collar in accordance with Public Works Commission standard details. When used in places other than in a paved street, the ring and cover shall be set to the grade shown on the plans or directed by the Public Works Commission. In unpaved areas cam-lock ring and cover shall be used. Camlock ring and cover shall be installed in accordance with Public Works Commission standard details.

The interior manhole riser joints, lift holes and grade adjustment rings shall be sealed with non-shrinking mortar to provide a watertight manhole. Lift holes sealed by the manufacturer with plastic caps do not require mortar seal. The hardened mortar shall be smooth to rub with no sharp edges. Use of grade rings with cam-lock ring and cover are not allowed, unless approved by the PWC Project Coordinator. **Use of grade rings is not allowed for above grade adjustments**.

All exterior manhole riser joints, including the joint at the cone, shall be sealed with an external rubber sleeve. The sleeve shall be made of stretchable, self-shrinking rubber, with a minimum thickness of 30

mils. The back side of each wrap shall be coated with a cross-linked reinforced butyl adhesive. The butyl adhesive shall be a non-hardening sealant, with a minimum thickness of 30 mils. The seal shall be designed to stretch around the manhole joint and then overlap to create a fused bond between the rubber and butyl adhesive. The application shall form a continuous rubber seal for the life of the application. The sealing system shall be as manufactured by Concrete Sealants, Inc. (Con-Seal), Sealing Systems, Inc., or approved equal. The wrap shall be a minimum of six (6) inches in width, and shall be centered on the joint. All manhole joints (including the cone section to the last riser) shall be wrapped and sealed. Care shall be taken to prevent damage to the wrap during backfill operations. The manhole surface shall be prepared in accordance with manufacturer's specifications, prior to installing the joint wrap.

Materials shall not enter the sewer line during construction of the manhole. The manhole shall be kept clean of any and all debris or materials. Any debris or material that entered the manhole shall be immediately removed. This condition shall be maintained until final acceptance of the work.

CONNECTION TO EXISTING MANHOLES OR LIFT STATIONS

All connections to existing manholes and/or lift stations shall be approved by the Public Works Commission. Where new mains are to be connected to existing active sanitary sewers, the active sewers shall remain in service. Unless otherwise indicated, where new lines are connected into existing manholes, all or such portion of the manhole invert as is necessary shall be removed and a new invert shall be constructed to accommodate both new and existing flows. All work shall conform to the requirements specified for new manholes. The existing structure connection shall be cored and a flexible watertight connection (i.e., boot) installed. The boot shall be installed in accordance with Public Works Commission standard details and requirements. The Contractor shall coordinate and cooperate with the Public Works Commission's Project Coordinator.

PIPE TO MANHOLE CONNECTOR (BOOT)

A watertight, flexible pipe-to-manhole connector shall be utilized on all pipe to manhole connections, for both new and existing manholes and pipes, unless otherwise specifically authorized in writing by the Public Works Commission.

The connector assembly shall be the sole element to provide a watertight seal of the pipe to the manhole or other structure. The connector shall consist of a rubber gasket, an internal compression sleeve, and one or more external take-up clamps. The connector shall consist of natural or synthetic rubber and Series 300 non-magnetic stainless steel. No plastic components shall be allowed.

The rubber gasket shall be constructed of synthetic or natural rubber, and shall meet or exceed the requirements of ASTM C-923. The connector shall have a minimum tensile strength of 1,600 psi. The minimum cross-sectional thickness shall be 0.275 inches.

The internal expansion sleeve shall be comprised of Series 300 non-magnetic stainless steel. No welds shall be utilized in its construction.

Installation of the connector shall be performed utilizing a calibrated installation tool furnished by the connector manufacturer. Installation shall require no re-tightening after the initial installation. Installation shall be done in accordance with the manufacturer's instructions.

The external compression take-up clamps shall be Series 300 non-magnetic stainless steel. No welds shall be utilized in its construction. The clamps shall be installed utilizing a torque-setting wrench furnished by the connector manufacturer. Installation shall be done in accordance with the manufacturer's instructions.

The Contractor shall utilize the proper size connector in accordance with the connector manufacturer's recommendations. All dead-end pipe stubs shall be restrained in accordance with ASTM C-923.

The finished connection shall provide a sealing to a minimum of 13 psi, and shall accommodate a minimum pipe deflection of seven (7) degrees without the loss of seal.

The pipe to manhole connector shall be PSX: Direct Drive as manufactured by Press-Seal, or approved equal.

INSIDE DROP MANHOLE STRUCTURE

Inside manhole drop structures shall be constructed and installed in accordance with Public Works Commission standard details.

CLEANING

Prior to final inspection, all sanitary sewer laterals, mains, and manholes newly installed on the collection system shall be flushed and cleaned. During the flushing operation, the downstream manhole shall be closed with a watertight plug to protect the existing sewer main. All water and debris shall be removed and properly disposed of by the Contractor. This condition shall be maintained until the Public Works Commission issues final acceptance for the project.

TESTING

Completed sewers shall be tested in accordance with the provisions outlined below. The Contractor shall furnish all equipment, labor, materials, and pay all costs associated with the tests performed. The Contractor shall schedule all testing with the Public Works Commission's Project Coordinator, a minimum of 48 hours in advance. The Contractor shall cooperate with the Public Works Commission's Project Coordinator and furnish any needed assistance necessary to complete the required testing.

For annexation and/or retrofit projects: No testing shall be conducted prior to successful completion of the compaction testing.

For all other projects: No testing shall be completed until all utilities are installed, prior to preparation of the road subgrade. The Contractor may elect to perform testing to satisfy them that the sewer utility is

installed properly prior to commencing installation of other utilities. However, such testing shall not be construed as acceptance by PWC.

The deflection/mandrel test shall not be performed until a minimum of thirty (30) calendar days after backfill operations are completed and the area graded to final contours. In lieu of waiting thirty (30) calendar days, the Contractor has the option to have an independent testing laboratory verify that compaction has been completed to achieve the maximum density as shown in the detail. The location and elevation of the compaction testing shall be determined reviewed and approved by the Public Works Commission's Project Coordinator. The Contractor shall provide the Public Works Commission with a copy of the density testing results.

Compaction testing shall be done in accordance with Specification Section 02222 – Excavation and Backfilling for Utility Systems.

Vacuum Testing Manholes:

All precast sanitary sewer manholes installed by the Contractor shall be vacuum tested for leakage. This test shall be done in accordance with ASTM C-1244 and in the presence of a Public Works Commission Project Coordinator. The Contractor shall be responsible for providing all the necessary labor, materials, equipment, testing apparatus, and all other incidentals necessary to complete the vacuum test. All testing equipment utilized shall be approved for use in vacuum testing manholes.

Each manhole shall be tested after assembly. All lift holes shall be plugged with an approved non-shrink grout. All lines, including laterals, entering the manhole shall be temporarily plugged. The Contractor should take care to ensure that the pipes and plugs are secure in place to prevent them being drawn into the manhole. The test head shall be placed directly on top of the concrete surface of the manhole following the manufacturer's recommendations, rather than to the cast iron seating ring.

Manholes may be tested either prior to backfill or post backfill at the contractor's option. For pre-backfill testing, a vacuum of 10 inches of Mercury (inches Hg) shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of Mercury (inches Hg). The manhole is acceptable if the time for the vacuum reading to drop from 10 inches of Mercury to 9 inches of Mercury meets or exceeds the values indicated below:

	Diameter of Manhole		
Manhole Depth	**4' Diameter**	**5' Diameter**	**6' Diameter**
10' or less	**25 sec**	**33 sec**	**41 sec**
11' to 15'	**38 sec**	**49 sec**	**62 sec**
16' to 20'	**50 sec**	**65 sec**	**81 sec**
21' to 25'	**62 sec**	**82 sec**	**101 sec**

25’ to 30’	**74 sec**	**98 sec**	**121 sec**

Vacuum testing backfilled manholes is not recommended in the presence of groundwater. Vacuum testing a backfilled manhole that is subjected to hydrostatic pressure may exceed the design limits of the flexible connecters and could lead to failure of the structure, joints, and/or connectors. Where groundwater is present a reduction in the vacuum pressure applied to the manhole will be required. The vacuum shall be reduced by 1 inch of Mercury for every 1 foot of hydrostatic head between 12 feet and 21 feet. A vacuum test should not be performed when the hydrostatic head exceeds 22 feet. See the chart below:

Hydrostatic Head (ft)*	12	13	14	15	16	17	18	19	20	21	22
Vacuum Pressure (in Hg)	10	9	8	7	6	5	4	3	2	1	**

*Hydrostatic head above the critical connector (critical connector is bottom most flexible connector)
**Do not perform vacuum test

If the manhole fails the initial test, the manhole shall be repaired by an approved method until a satisfactory test is obtained. All repair methods shall be approved by the Public Works Commission prior to being utilized. Retesting shall be performed until a satisfactory test is accomplished.

Mandrel Testing:

Deflection tests shall be performed on all PVC pipe installations. PVC pipe's maximum deflection after backfilling shall not exceed five (5) percent. The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on the type of pipe manufactured and the applicable ASTM Standard. The PVC pipe shall be measured in compliance with ASTM D2122 “Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings”. The Contractor shall supply all labor, equipment and materials necessary to perform the test in the presence of the Public Works Commission’s Project Coordinator. The test shall be performed without mechanical pulling devices. The mandrel shall be constructed so as to preclude any yield in diameter, and with a pull line on each end to facilitate withdrawal. If the deflection exceeds the allowable, the Contractor shall remove and replace the pipe.

Air Testing:

Air testing shall be performed on all mains and laterals to determine acceptability. The length of sewer subject to an air test shall be the distance between two adjacent manholes. The tests shall be conducted in accordance with the appropriate ASTM standard. The air test shall be coordinated with the Public Works Commission. The Contractor is required to supply all equipment, labor, materials and pay all costs associated with the test performed.

Air Test for PVC Pipe

The low pressure air test on PVC pipe shall be performed with satisfactory results in accordance with ASTM F1417 “Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using

Low-Pressure Air". The pipe, including lateral assemblies, shall be plugged and air added slowly until the internal pressure of the line is raised to 4.0 psi. After the pressure of 4.0 psi is obtained, regulate the air-supply so that the pressure is maintained between 3.5 and 4.0 psi for at least two (2) minutes, depending on air/ground temperature conditions. The pressure will drop slightly until equilibrium is obtained; however, a minimum of 3.5 psi is required. Once the 3.5 psi is maintained, the test will begin. If the pressure drops 1.0 psi within the time indicated below, the test fails.

Pipe Dia (in)	Minimum time (minutes)	Length for Min Time (ft)	Time for Longer Length (sec)
4	3:46	597	0.380L
6	5:40	398	0.854L
8	7:34	298	1.520L
10	9:26	239	2.374L
12	11:20	199	3.418L
15	14:10	159	5.342L
18	17:00	133	7.692L
21	19:50	114	10.470L
24	22:40	99	13.674L
27	25:30	88	17.306L
30	28:20	80	21.366L
33	31:10	72	25.852L
36	34:00	66	30.768L

The Contractor shall observe all safety precautions to include allowing no one in the manholes during testing, securing all plugs and providing additional plug bracing. The Contractor shall be required to furnish, install and remove after testing at no additional cost, a temporary glue cap/plug to be airtight for all cleanout stacks to accomplish air testing. The air pressure shall never exceed 8 psi. All gauges shall be accessible outside of the manholes.

HYDROSTATIC TESTS

After the ductile iron sewer pipe has been laid within the "protected" area and backfilled to finished grade, the pipe shall be subjected to a hydrostatic pressure test. All laterals within the "protected" area shall be ductile iron. All sewers subject to hydrostatic testing shall include (1) sewers entering or crossing streams, (2) sewers located less than 100 feet from any public or private water supply source including any WS-I waters or Class I or Class II impounded reservoirs, (3) where the minimum 18 inch vertical and 10 feet horizontal separation cannot be maintained between sewers and water mains (see NC DENR Regulations), or (4) as specified and/or indicated on the drawings. The Contractor will furnish all labor and material, including test pumps, plugs, and all other incidentals for making hydrostatic tests. Hydrostatic pressure testing shall be conducted on the completed main, including the laterals.

The duration of the pressure test shall be at least one hour or longer, as directed by the Public Works Commission. The hydrostatic pressure shall be 150 psi. Each section of pipe shall be slowly filled with water and the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the

pipe in a manner satisfactory to the Public Works Commission. Before applying the specified test pressure, all air shall be expelled from the pipe.

All joints showing visible leaks shall be made tight. Cracked or defective pipe, joints, laterals, and fittings discovered in consequence of the pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic test may be waived by the Public Works Commission in certain situations. The test shall be repeated until satisfactory to the Public Works Commission.

The results of the pressure tests shall be satisfactory as specified. All replacement, repair, or retesting shall be accomplished by the Contractor. All repairs shall be reviewed and approved by the Public Works Commission prior to backfill. The use of couplings, sleeves, etc. shall be reviewed and approved by the Public Works Commission prior to use.

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DIVISION 2
SITE WORK

02732 SEWAGE FORCE MAINS

GENERAL

Sewage force mains and all appurtenant items shall be constructed of materials as specified or indicated on the drawings. The intent and purpose of these specifications is to require a complete and satisfactory installation in every respect and any defect in material or workmanship shall be cause for replacement and correction of such defect as directed by the Public Works Commission and at no expense to the Public Works Commission. All materials and workmanship shall be in complete accordance with the standards and specifications of the Public Works Commission and subject to Public Works Commission inspection and approval.

RELATED SECTIONS

A. Section 02222 – Excavation and Backfilling for Utility Systems
B. Section 02660 – Water Distribution
C. Section 02730 – Sanitary Sewer System
D. Section 02736 – High Density Polyethylene Pipe
E. Section 02753 – Submersible Lift Stations
F. Section 02754 – Self-Priming Lift Stations
G. Section 09801 – Special Coatings – Anti-Microbial Admixture
H. Section 09802 - Special Coatings – Ceramic Epoxy

MATERIALS

PVC PIPE

In order to prevent the sanitary sewer force main from being mistaken for a water main, **all force main PVC pipe shall be green in color.**

Two (2) inch PVC pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR21, pressure class 200 in accordance with ASTM D 2241 or SDR-17 with a pressure rating of 250 psi, in accordance with ASTM D-2241. Fittings for two (2) inch PVC shall be solvent welded Schedule 80 PVC. The pipe shall be plainly marked with the manufacturer's name, size, material (PVC) type and grade or compound, NSF seal, pressure rating and reference to appropriate product standards.

All PVC pipe four (4) inches through 12 inches and couplings shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C-900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe and fittings shall be manufactured to withstand 755 psi quick burst

pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. Couplings shall be compression, twin gasket type in accordance with ASTM D-3139 for push-on joints and ASTM F-477 for elastomeric seals (gaskets). PVC fittings are not acceptable for mains other than two (2) inch. The pipe joints shall be of the integral bell type with rubber gaskets shall conform to the requirements of ASTM D-3139 or ASTM F-477. Fittings and specials for mains four (4) inches and larger shall be ductile iron, bell end in accordance with AWWA C-110, 200-psi pressure rating unless otherwise shown or specified, except that profile of bell may have specials of the same material as the pipe with elastomeric-gaskets, all in conformance with the requirements of AWWA C-900. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Fittings shall be for bell and spigot pipe or plain end pipe, or as applicable.

Mechanical restraining systems shall not be used on PVC pipe.

DUCTILE IRON PIPE

The raw material from all ductile iron pipe and fittings shall have an average minimum content consisting of 90% recycled iron and steel. Ductile iron pipe and fittings shall be manufactured in the United States of America in accordance with ANSI/AWWA A21.51/C151. The manufacturer of the ductile iron pipe shall be a member of the Ductile Iron Pipe Research Association (DIPRA).

All ductile iron pipe and fittings (six (6) inches and above) shall be in strict accordance with ANSI/AWWA C-150/A21.50 and ANSI/AWWA C-151/A21.51, Class 50 in every respect. Four (4) inch ductile iron pipe shall be Class 51. Joints shall be mechanical joint or push on joint as specified and installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four (4) inch pipe through 12-inch pipe. Push on joints, rubber gaskets and lubricant shall conform to ANSI A21.11. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA Standard C-110 (ANSI A21.11).

Compact fittings shall be mechanically restrained, ductile iron in accordance with ANSI A 21.53 (AWWA C-153) for four (4) inch through 12-inch sizes only. Where thrust blocking is utilized, fittings shall be full body ductile iron in accordance with ANSI A 21.53 (AWWA C110). Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils (Protecto401 or approved equal). The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110. Specifications for the ceramic epoxy can be found in Specification Section 09802.

All pipe joints within an encasement shall be furnished with manufactured restrained joints, and as specified in the standard Public Works Commission detail for encasements.

For aerial crossings which are four (4) inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be utilized in accordance with the standard Public Works Commission detail for aerial crossings. Mega-lugs, field-lok, and gripper rings are not an allowable means of restraint for aerial crossings. For aerial crossings larger than 12 inches, or

as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be utilized in accordance with the standard Public Works Commission details. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with ANSI/AWWA C-115/A21.15. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA 115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C-110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per ANSI/AWWA C-111/A21.11 with a minimum 1/8" thickness. Linings and coatings shall be as outlined for ductile iron pipe.

If the Public Works Commission determines that an expansion coupling is required, it shall be installed as indicated on the drawings. The expansion coupling shall not be buried.

For subsurface water crossings (i.e., streams, wetlands), restrained joint ductile iron pipe shall be utilized. No mechanical restraint systems (e.g., mega-lugs, field-lok gaskets, etc.) shall be utilized. The pipe shall be installed in a casing, in accordance with the approved Public Works Commission detail, unless otherwise specifically approved by the Public Works Commission.

Transition between ductile iron pipe and HDPE shall be accomplished utilizing mechanical restraints as approved by PWC.

HDPE PIPE

All high density polyethylene (HDPE) pipe and fittings shall be in accordance with PWC Standard Specification Section 02736, most recent edition.

COMBINATION AIR RELIEF AND VACUUM VALVE ASSEMBLIES

All sewer force mains shall have automatic air release valves installed as indicated on the plans, and in accordance with Public Works Commission requirements. The automatic air release valve shall be a combination air release valve. Combination air release valves shall be heavy duty "universal" style, single body units, incorporating the functions of an air and vacuum valve within a single housing.

The tap size shall be a minimum of two (2) inches, however if a larger tap is needed it shall be sized accordingly. The valve body, cover flange, and all internal parts shall be 316 stainless steel. The air release orifice shall be as specified by the Design Engineer. The air release valve shall have a maximum working pressure of 200 psi.

All air and vacuum combination release valves shall be Crispin Model UX20, ARI D-020, H-Tec Model 986, or approved equal. All air release valves shall be installed in accordance with the manufacturer's recommendations.

Air relief and vacuum valve manholes shall be 60 inch diameter precast concrete units conforming to ASTM C-478. The combination air relief vacuum valve manhole shall be cast with an anti-microbial

admixture, in accordance with manufacturer's instructions. The manholes and valves shall be installed in accordance with the standard PWC detail. The force main shall consist of one full joint of PVC C-900 (DR18) pipe centered at the air relief valve and a minimum of four (4) feet deep.

Combination air relief and vacuum valves shall be installed using stainless steel double strap service saddles, a two (2) inch ball valve, and a two (2) inch x one (1) inch brass tee with a quick connect attachment as shown in the PWC standard detail.

Service saddles for two (2) inch taps on four (4) inch and larger size iron pipe shall be ductile iron with stainless steel double straps, bolts, nuts and washers

Ball valves shall be all bronze construction, with a handle operator. Ball valves shall be manufactured and tested in accordance with AWWA/ANSI C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM specifications and shall also meet the approval of PWC. The turn required to travel from fully closed to fully open on a ball valve shall be 90 degrees.

AIR RELEASE VALVE MANHOLE RING AND COVER

Cast iron manhole frames and covers shall conform to the drawings in all essentials of design with vent holes. The frames and covers shall have a combined weight of not less than 310 pounds and shall conform to ASTM A-48, Class 30 frame and Class 35 cover. Lettering on the cover shall conform to the City of Fayetteville Public Works Commission standards and shall be stamped or cast into all covers so as to be plainly visible. Unless otherwise shown on the drawings, the frames and covers shall be so set that the top of the cover will be flush with finished grade or as directed by PWC.

BY-PASS PUMPING ASSEMBLIES

By-pass pumping assemblies shall be installed in accordance with PWC standard detail S.21. The bypass pumping assembly shall be constructed of ductile iron pipe which meets the requirements of this specification.

INSTALLATION

Pipe installation shall be in strict accordance with Specification Section 02222 – Excavation and Backfilling for Utilities Systems, and as outlined herein.

PIPE LAYING

Pipe installation shall be in accordance with the manufacturer's instructions. Proper equipment shall be utilized to perform the work in a manner satisfactory to PWC. All pipes and fittings shall be carefully lowered into the trench in such a manner to prevent damage to the protective coatings and linings. Under no circumstances shall pipe materials be dropped or dumped into the trench. Pipe shall be carried into position and not dragged.

All dust, dirt, oil, tar (other than standard coating), or other foreign matter shall be cleaned from the jointing surfaces, and the gasket, bell, and spigot shall be lubricated with lubricant recommended by the manufacturer.

Mechanical equipment should not be used to assemble the pipe. Pipe shall be assembled in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by PWC.

Adjustments in grade by exerting force on the barrel of the pipe with excavating equipment shall not be allowed. The Contractor shall verify line and grade after assembling each joint.

At any time when pipe laying is not in progress, the open ends of the pipe shall be closed by a water tight plug or other means approved by the PWC Project Coordinator. If water is in the trench, the plug shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or where in the PWC Project Engineer's and/or PWC Project Coordinator's opinion trench conditions are unsuitable. Every precaution shall be taken to prevent material from entering the pipe while it is being installed.

ALIGNMENT AND GRADE

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

Threaded PVC and cemented joints will not be permitted. The ends of push on joints shall be beveled to facilitate assembly. Pipe shall be marked to indicate when the pipe is fully seated and the gasket lubricated to prevent displacement. Care shall be exercised to insure that the gasket remains in proper position in the bell or coupling while marking the joint.

All pipe installations shall be properly restrained, utilizing either thrust blocks or approved restraint systems. The thrust blocking shall be in accordance with PWC standards, and as designed by the Engineer. The approved restraint system shall be installed in accordance with the manufacturer's instructions.

For the purpose of identification of buried pipes during future trenching or location, a continuous "detectable" identification wire shall be installed as well as green, "Sanitary Sewer Force Main" marking tape. The wire shall be a minimum 12 gauge single strand, coated copper wire or copper clad steel wire that is suitable for underground use. The wire shall be buried continuously along the pipe. The wire shall be "stubbed" into marker posts and air release valve manholes and secured such that a "direct"/conductive metal detector may be used to trace the pipe location.

The marker posts shall be Rhino TriView TracerPeds which are green with a "Sewer Force Main" warning decal (GD-5314K) and have internal terminals. The marker posts shall utilize the TriGrip Anchor system for direct bury installations. The identification wire shall be attached to the marker posts

in accordance with PWC standards. Tracing wire marker posts shall be located no more than 500 feet apart.

When the force main is located in unpaved areas such as easements the marker posts shall be installed along the centerline of the force main. When the force main is located in paved areas the marker posts may be offset from the centerline of the force main in a uniform manner. The wire shall be installed with all non-metallic pipelines.

The "Sanitary Sewer Force Main" marking tape shall be green and labeled to warn of the presence of the sewer main. The tape shall be manufactured for durability and resistance to the elements. The marking tape shall be installed with both PVC and ductile iron force mains.

CONNECTION TO EXISTING MANHOLES

Where new mains are to be connected to existing active sanitary sewers, the active sewers shall remain in service by the Contractor. Unless otherwise indicated, where new lines are connected into existing manholes, all or such portion of the manhole invert as is necessary in the opinion of the PWC Project Coordinator shall be removed and a new invert shall be constructed to accommodate both new and existing effluent pipes and flows. Where force mains enter manholes, pipe and fittings shall be restrained as indicated on the plans with the force main outlet directed toward invert out.

All work shall conform to the applicable requirements specified for new manholes including all necessary concrete works, brick work, cutting, shaping and pipe fitting. Existing manhole walls, inverts, and shelves shall be coated with cement mixed with an anti-microbial additive in accordance with Specification Section 09801. New manholes that contain a force main discharge shall be cast with an anti-microbial admixture, in accordance with Specification Section 09801. The Contractor shall coordinate and cooperate with the Public Works Commission Project Coordinator on all connections. Connections to any manhole shall be made using the core and boot method. If necessary, drop or slide structures shall be installed, in accordance with PWC standards.

HYDROSTATIC TESTS

After the pipe has been laid, the valves installed, the taps made and the system has been partially backfilled as specified, all newly laid pipe shall be subjected to a hydrostatic pressure test. Where any section of a force main is provided with concrete thrust blocking for fittings, the hydrostatic test shall not be made until at least five (5) days after installation of the blocking unless otherwise approved. The Contractor will furnish all labor and material, including test pumps, taps, and corporations, for making hydrostatic tests. Cost for said tests shall be included in the Proposal. A PWC Project Coordinator shall be present for all testing. The Contractor shall coordinate with the PWC Project Coordinator for disposing of the test water from the system.

The duration of the pressure test shall be at least one hour or longer, as directed by the PWC Project Coordinator. The hydrostatic pressure shall be 200 psi. The pipe shall be slowly filled with water and the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in

a manner satisfactory to the PWC Project Coordinator. Before applying the specified test pressure, all air shall be expelled from the pipe. If blow offs are not available at the high places, taps shall be made to provide blow offs.

The results of the pressure test shall be satisfactory as specified. All replacement, repair or retesting shall be accomplished by the Contractor at no additional cost to PWC. All materials and methods used to make repairs shall be approved by PWC. The PWC Project Coordinator shall be present while all repair work is taking place.

DIVISION 2
SITE WORK

02750 WASTEWATER FLOW CONTROL (BYPASS PUMPING)

GENERAL

The intent and purpose of these specifications is to provide wastewater flow control, i.e., bypass pumping, of the sanitary sewer flows during the Contractor's operations. The Contractor shall furnish all labor, materials, accessories, equipment and tools for performing all operations required to bypass pump sewage around a manhole or sewer section in which work is to be performed.

The Contractor shall provide all pumps, piping, and other equipment to accomplish this task; perform all construction; obtain all permits; pay all costs; and perform complete restoration of all existing facilities to equal or better condition to the satisfaction of the Fayetteville Public Works Commission. The Contractor shall be responsible for the design, installation, operation, and maintenance of the temporary bypass pumping system. The Contractor shall provide sufficient documentation to the Fayetteville Public Works Commission to demonstrate that he, or his designated subcontractor, have the experience in the design, installation, and maintenance of temporary bypass pumping systems.

RELATED SECTIONS

A. Section 02305 – Pipe Bursting
B. Section 02500 – Traffic Control
C. Section 02730 – Sanitary Sewer System
D. Section 02760 – Television Inspection
E. Section 02766 – Sewer Line Cleaning
F. Section 02780 – Cured-in-Place Lining

REQUIREMENTS

The Contractor shall be responsible for all aspects of the bypass operation, including but not limited to: providing access to install, move, and maintain the pumps in the proper position, traffic control, installation and removal of bypass equipment, pump monitoring, testing of the bypass system, re-fueling, maintenance, notification of property owners (should access to private property be necessary), wastewater and fuel spill containment, and removal and replacement of manhole cones (if necessary). The bypass system (pumps and piping) shall be monitored by Contractor personnel at all times, when the bypass operation is in effect.

The Contractor shall have all materials and equipment on site to immediately respond to any emergencies or other event that could impact the bypass system (i.e., leak in the discharge piping, pump failure, flooding, etc.). The Contractor shall have sufficient support staff and equipment to mobilize to repair and/or service any equipment within one (1) hour of notification, 24 hours a day, seven (7) days a week. In the event of an emergency, the Contractor shall provide an immediate response and fully cooperate with the Fayetteville Public Works Commission.

The Contractor shall install the bypass pumps, equipment, and discharge lines to minimize impacts to the property owners, residents, and environment. The Contractor shall be responsible for determining the best

location for the bypass equipment, to include, but not limited to, the need for any special provisions to ensure access for the customers, preventing the pumps and manholes from flooding, etc. Such special provisions include, but are not limited to: installation of ramps, excavation and burial of the bypass lines, temporary fencing, sandbagging, construction of berms, raising the pumps, etc. The Contractor bears all responsibility for the maintenance and restoration of any trenches, ramps, access, etc. necessary for the temporary bypass pumping operation.

The Contractor shall take appropriate steps to ensure that all pumps, piping and hoses that carry raw sewage are protected from traffic. The Contractor shall identify the proposed methods to protect the temporary bypass pumping system from traffic as part of the detailed temporary bypass pumping plan. Traffic control shall be performed in accordance with these Contract Documents.

The bypass pumping system shall be monitored by Contractor personnel at all times (24 hours a day, 7 days a week), when the bypass operation is in effect. The Contractor's personnel shall be on-site at all times (24 hours a day, 7 days a week), and stationed at the primary bypass pumps. Depending on the location and system set-up, it may be necessary for the Contractor to station personnel at each of the various bypass pump locations. Unless otherwise approved by the Fayetteville Public Works Commission, one (1) person cannot monitor multiple bypass pump locations. All bypass pumps, regardless of their location (primary or on secondary lines), shall be equipped with an automatic dialer (or other similar device). The Contractor personnel shall immediately respond to any issue regarding the temporary bypass pumping system. All temporary bypass piping shall be periodically monitored (patrolled from pumps to discharge), but no less frequently than once every 12 hours. The bypass pumping equipment shall be automated and capable of functioning without the assistance of an operator.

SUBMITTALS

All submittals shall be provided in accordance with these Contract Documents, and the requirements outlined herein. The Contractor shall submit a detailed bypass pumping plan to the Fayetteville Public Works Commission for approval, prior to initiating the bypass operation. The Contractor shall submit this information far enough in advance to allow sufficient time to complete the necessary coordination, including but not limited to obtaining permits (i.e., encroachments), getting permission from property owners to cross and/or utilize their property, and gaining any necessary regulatory approvals. Failure to submit a complete and comprehensive bypass pumping plan in a timely manner shall not be cause for any extension of the Contract Time.

The detailed temporary bypass pumping plan shall include the following information:

- Method of monitoring the pumps to ensure proper operation, to include method of notifying personnel (Fayetteville Public Works Commission and Contractor) in the event of an emergency, activation of back-up pumps, etc.
- Method of monitoring upstream system levels to ensure surcharging does not result in back-ups into buildings, overflows, etc.
- The amount, if any, of any required surcharging.
- Method to initiate back-up pumps.
- Map showing general location of the pumps and bypass lines. This shall include means to maintain access to driveways, etc.
- Measures to secure the bypass system (lines, pumps, etc.) from traffic, vandalism, high stream flows, etc.

- Method of plugging (and securing the plug(s)) and type of plugs.
- Size and location of manholes or other access points for suction and discharge piping.
- Size of pipeline(s) or conveyance system(s) to be bypassed.
- Number, size, material, location, and method of installation of suction piping.
- Number, size, material, location, and method of installation of discharge piping.
- Bypass pump sizes, capacities, and number of each size to be provided on-site, including all primary, secondary, and spare pumping units.
- Calculations of static lift, friction losses, minimum inlet submergence, and flow velocity (pump curves showing pump operating range shall be submitted). Calculations shall be signed and sealed by a licensed Professional Engineer registered in the State of North Carolina. Calculations shall be provided for both the peak flow rate and a normal daily rate (see PUMPING AND BYPASSING section for sizing requirements).
- Measures to protect discharge manhole(s) or structure(s) from erosion and damage due to the bypass operation.
- Erosion control measures.
- Emergency contact information for the personnel responsible for the pump operation.
- Emergency contact information for Contractor personnel to respond in the event of an emergency.
- List of available resources (equipment, materials, personnel) and contact information for emergency response.
- Method to contain potential releases of sewer flow from air release valves.
- Contingency plan for responding to potential sewer spills caused by weather, vandalism, acts of God, etc. The plan shall include communication protocols, available resources, and the steps to be taken in the event of an emergency.

No bypass operations shall proceed until all bypass submittals have been reviewed and approved by the Fayetteville Public Works Commission.

COORDINATION

The Contractor shall fully coordinate their temporary bypass pumping operations with the Fayetteville Public Works Commission. It is the Contractor's responsibility to fully determine the scope and location of the temporary bypass pumping system. As outlined in these Contract Documents, the Fayetteville Public Works Commission may provide assistance with the building and maintenance of access roads, clearing of easements, etc. All coordination (to include location of the pumps and discharge lines) shall be fully discussed and agreed to prior to commencement of bypass operations.

The Contractor shall schedule a coordination meeting with the Fayetteville Public Works Commission and other personnel (Contractor, bypass sub-contractor, etc.) a minimum of three (3) business days prior to starting the temporary bypass pumping system. The purpose of this coordination meeting is to ensure that the Contractor and their sub-contractors have a good understanding of the requirements and expectations of operating the temporary bypass pumping system, discuss contingency plans (to include protocols for emergency contacts), identify location(s) of pumps, verify necessary materials (repair sleeves, containment devices, etc.) are on-site and available, and any other items necessary to ensure that the Fayetteville Public Works Commission has confidence that the appropriate personnel can operate and maintain the temporary bypass pumping system. Should, for any reason, the Fayetteville Public Works Commission deem that the Contractor and/or their sub-contractor is not prepared to operate and maintain the temporary bypass pumping system, the temporary bypass pumping system shall not be started. The Contractor shall take all necessary steps to address any concerns to the satisfaction of the Fayetteville Public Works Commission. Upon

completion of those actions, another coordination meeting shall be held, in order for the Fayetteville Public Works Commission to confirm that the Contractor and their sub-contractor is prepared to operate and maintain the temporary bypass pumping system. This process will be repeated until the Fayetteville Public Works Commission is satisfied that the Contractor and their sub-contractor are prepared to operate and maintain the temporary bypass pumping system. No additional contract time will be granted for this delay.

The temporary bypass pumping system shall run for a minimum of 24 hours, or longer as deemed by the Fayetteville Public Works Commission, prior to any activity occurring (cleaning, closed circuit television {CCTV}, etc.) within the main(s) being bypassed.

FLOW CONTROL PRECAUTIONS

Where the raw sewage flow will be blocked during the Work as a result of the temporary bypass pumping operation, the Contractor shall take all necessary precautions to protect the public health. No septic conditions shall be allowed due to Contractor's operations. The sewer system (mains, manholes, laterals, etc.) shall also be protected from damage. The following occurrences shall not be allowed:

1. No sewage shall be allowed to back up into any homes or buildings.
2. No sewage shall overflow any manholes, cleanouts or any other access to the sewers.
3. Users upstream of the project area shall be able to use all their water and sewer utilities without interruption or limitations.

If any of the above occur or are expected to occur, the Contractor shall take immediate action to alleviate one or all of the conditions. Additionally, the Contractor is required to observe the conditions upstream of the plug and be prepared to immediately increase bypass pumping or release the flows, as required. Any damage claims resulting from the Contractor’s failure to properly maintain sewer flows shall be the Contractor's responsibility.

All sump pumps, bypass pumps, trash pumps or any other type pump which pulls sewage or any type of material out of the sanitary sewer system shall discharge into another sanitary sewer manhole, or appropriate vehicle or container acceptable to the Fayetteville Public Works Commission. Under no circumstances shall untreated sanitary sewer be discharged, stored or deposited on the ground, swale, road or open environment. The Contractor shall not allow any flow of sewage onto private property, streets, or into creeks and drainage systems. Damage due to negligence of the Contractor, including, but not limited to, flooded dwellings, damaged property, damaged driveways, etc., shall be corrected immediately by the Contractor at no additional cost to the Fayetteville Public Works Commission.

PLUGGING AND BLOCKING

In some applications, the wastewater flow may be plugged and contained within the capacity of the collection system. This shall only be done when it has been determined the system can accommodate the surcharging without any adverse impact. The Contractor has the sole responsibility for determining whether the system can accommodate surcharging. If this option is selected, the Contractor shall be responsible for continuously monitoring the system to ensure no sewer spills or overflows occur.

A sewer line plug shall be inserted into the line at a manhole upstream from the section being surveyed or repaired. The plug shall be so designed that all or any portion of the operation flows can be released. The Contractor shall secure the plug, to prevent it from being dislodged and moving downstream. Flows shall be bypassed for the initial CCTV inspection and shall be bypassed throughout the duration of the work, to

include the final CCTV inspection. Flows shall be bypassed in accordance with the approved temporary bypass pumping plan. Upon acceptance of the work by the Fayetteville Public Works Commission, the temporary bypass pumping system shall be removed and flows restored.

PUMPING AND BYPASSING

The Contractor, when and where required, shall divert sewer flows for the sewer pipe rehabilitation process, cleaning, television inspection, pipe repairs, manhole replacement and/or rehabilitation, obstruction removals, or other related as required to complete the Work. The pumps and bypass lines shall be of adequate capacity and size to handle and prevent backup or overflow for all flows.

The temporary bypass pumping system shall be designed to maintain the flows necessary to meet the requirements of each particular location. The temporary sewer bypass system shall have the capacity to handle the flows outlined in these Contract Documents. The temporary sewer bypass system shall be sized to handle 2.5 times the average daily flow rate, or the specified peak flow – whichever is greater.

The Contractor shall be responsible for furnishing the necessary labor and supervision to set up, operate, and maintain the temporary bypass pumping system. A "set up" consists of the necessary pumps, conduits and other equipment to divert the flow of sewage, from the start to finish of work performed. Each "set-up", regardless of location, shall have Contractor personnel on-site at all times (24 hours a day, 7 days a week) and stationed at the pumps, unless otherwise approved by the Fayetteville Public Works Commission. The temporary bypass pumping system shall include:

- A minimum of one (1) redundant pump so that the temporary bypass pumping system is capable of transmitting the peak flow with the largest duty pump out of service.
- Pumps shall be provided with a means of automatic control via level sensing. Systems requiring manual starting and/or stopping shall not be allowed.
- All equipment (primary and secondary pumps) shall be equipped in a manner to keep noise to a maximum of 65 dBA at 30 feet.
- An automatic dialer (or similar) to immediately notify (in a sequential operation) Contractor and Fayetteville Public Works Commission personnel in the event of equipment failure. The automatic dialer shall be set to issue notifications prior to flow level reaching critical elevations and having a spill occur. All bypass pumps (regardless of location) shall be equipped with an automatic dialer (or similar).

The temporary bypass pumping system shall be provided in such a way as to maintain access for businesses and residences. The Contractor shall be responsible for determining the best location for the bypass equipment, and the need for any special provisions to ensure access for the residents and businesses. Such special provisions include, but are not limited to: installation of ramps, excavation and burial of the bypass lines, etc. The Contractor shall use bridges over the bypass lines, temporary lines under driveways, alternate routes, or other means to accomplish this item. The bypass plan submittal shall indicate the means of maintaining access. The Contractor bears all responsibility for the maintenance of any trenches, ramps, etc. necessary for the bypass operation.

Pumps, equipment, and bypass lines shall be continuously (24 hours a day, 7 days a week) monitored by on site Contractor personnel capable of starting, stopping, refueling and maintaining these pumps during the Work. The temporary bypass pumping system shall be provided with an automatic dialer (or other similar device) that will immediately notify (in a sequential operation) the Contractor and the Fayetteville Public Works Commission in the event of equipment failure. All bypass pumps (regardless of location) shall be

equipped with an automatic dialer. This automatic dialer (or similar) shall be set to issue notifications prior to flow levels reaching critical elevations and having a spill occur.

The automatic dialer shall be set to issue notifications through a sequential operation. Automatic dialers that are not set up for sequential notifications shall not be acceptable. The Contractor's personnel shall be the first to receive any notifications from the automatic dialer. The automatic dialer shall only notify the PWC personnel after all Contractor notifications have been ignored and/or not responded to. The Contractor shall properly adjust the level at which the automatic dialer initiates notification to provide adequate time for the sequential notification to occur. If the PWC personnel are notified by the automatic dialer, the PWC personnel shall assume that a spill is occurring or is imminent, and respond accordingly. The Contractor shall be responsible for all costs for the PWC to mobilize and respond to the notification, regardless if a spill occurred or not.

In some applications, it may be necessary to surcharge the system in order to ensure proper pump operation. This shall only be done when it has been determined the system can accommodate the surcharging without any adverse impact. The Contractor has the sole responsibility for determining whether the system can accommodate surcharging. In the event surcharging is necessary, the Contractor shall be responsible for continuously monitoring the system to ensure no sewer spills occur.

All bypass piping shall successfully pass a hydrostatic test prior to bypassing the sewer flows. The hydrostatic test pressure shall be no less than the expected discharge pressures, and shall be held for a minimum of one (1) hour. All testing shall be observed by the Fayetteville Public Works Commission. Testing shall be coordinated with the Fayetteville Public Works Commission a minimum of 24 hours in advance.

SPILL RESPONSE

The Contractor shall not discharge or pump any sewage, solids, or debris on the ground, streets, storm water system, ditches, or streams. Any sewage spills shall be immediately reported to the Fayetteville Public Works Commission Water Resources Construction Department, (910) 223-4716. After normal business hours, the Contractor shall contact the Fayetteville Public Works Commission Dispatch Center, (910) 678-7400 or (910) 323-0178. The Contractor shall take complete responsibility for all costs related to the clean-up of the spill, including any fines issued by the North Carolina Department of Environmental Quality (NC DEQ).

In the event that raw sewage (in any quantity) is spilled, discharged, leaked or otherwise deposited in the open environment, due to the Contractor's work, the Contractor is responsible for any cleanup of solids and disinfection of the area affected. This work will be performed at the Contractor's expense with no additional cost to the Fayetteville Public Works Commission. The Contractor is also responsible for complying with any and all regulatory requirements in regards to the size spill with no additional cost to the Fayetteville Public Works Commission. The Contractor shall cooperate fully with the Fayetteville Public Works Commission and the applicable State agencies in responding to and cleaning up the spill. Any work completed by the Fayetteville Public Works Commission in responding to a spill caused by the Contractor's operations shall be billed to the Contractor.

Where sewage has backed up into a property due to any aspect of the Contractor's operation, the Contractor shall immediately notify the Fayetteville Public Works Commission, inspect the property with the Fayetteville Public Works Commission and agree on remedial measures. The Contractor shall be responsible for all cleaning, repair and/or replacement of damaged property, temporary relocation of all occupants of the affected properties, if required, all to the satisfaction of the property owner. These actions shall be undertaken

immediately upon learning of the backup. Cleaning shall be performed by firms specializing in this type of work. All costs associated with the cleaning, repair, replacement of damages, occupant accommodations, insurance and spill remediation shall be borne by the Contractor. All remediation measures required as part of a spill response are part of acceptance of the project, and final payment shall not be made until such time all required measures are addressed and approved by the appropriate regulatory agency.

*** END OF SECTION ***

DIVISION 2
SITE WORK

02753 SUBMERSIBLE PUMP LIFT STATION

GENERAL

This section includes all pumps, piping; fittings, valves, structures and other appurtenances that form an integral part of a submersible pump lift station. All work shall be accomplished in a neat, workmanlike manner meeting the requirements of the City of Fayetteville Public Works Commission. PWC shall be supplied with shop drawings of all equipment and materials for approval prior to installation. The Contractor shall supply six (6) sets of O & M Manuals, for the lift station, including support literature, shop drawings and O & M instructions before final approval and acceptance of the operational station. The lift station start up shall be performed by a qualified factory representative capable of supervising PWC's personnel in proper operation and maintenance.

SUBMITTALS

Prior to fabrication, pump station equipment suppliers shall submit six (6) copies of submittal data for review and approval by PWC. Submittal shall include shop drawings, electrical ladder logic drawings, and support data as follows: Catalog cut sheets reflecting characteristics for major items of equipment, materials of construction, major dimensions, motor data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), and hydraulic brake horsepower (BHP). Electrical components used in the motor and liquid level control shall be fully described. The electrical ladder logic drawings shall illustrate motor and liquid level control circuits to the extent necessary to validate function and integration of circuits to form a complete working system. Shop drawings for pre-engineered stations shall provide layout of mechanical equipment and contractor piping connections.

SUBMERSIBLE PUMPS

The pumps shall be non-clog, explosion proof, submersible units capable of passing a three-inch (3”) sphere. Pumps shall be specifically designed to handle raw, unscreened sanitary sewage and shall be selected to perform under following operating conditions:

Pump Performance	
Target Operating Point	gpm @ ft.
Maximum Pump Speed	RPM
Minimum Pump Efficiency	%

Pump discharge diameter shall be as noted on the plan drawings.

The pump shall be provided with an oil-filled cast iron, watertight enclosure sealed with O-rings. Heat sensors shall be attached to the windings and shall be wired for auto-shut off. The pump motor shall be provided with tandem seal arrangements incorporating two completely separate seals. Each seal shall be held in contact by its own spring system. The seal faces shall be tungsten carbide. The mechanical seal chamber shall be oil filled and equipped with a moisture detection device. The pump shall rotate on a minimum of two bearings permanently lubricated but capable of being re-greased, suitable for a minimum L10 bearing life of 40,000 hours.

All areas of the pump casing and volute, which are exposed to sewage, shall be constructed of cast iron meeting the requirements of ASTM A-48, Class 30.

The pumps shall be provided a rigid discharge base-elbow to support the total weight of the pumping unit. The base shall be bolted directly to the wet well floor with a 90° elbow having a 125-pound ANSI flange discharging vertically.

Pumps shall be Meyers or Fairbanks Morse.

IMPELLER

The impeller shall be two vane one piece, single suction, enclosed, non-clog, and ductile iron. The impeller shall be of a radial flow design with well-rounded leading vane edges and thick hydrofoil shape with large openings. The impeller shall be balanced and secured to a straight fit on the shaft by means of a key and fastener. The impeller waterways and clearance between the impeller periphery and volute cutwater shall be capable of passing a 3-inch sphere. The impeller is to be matched to a constant velocity equalizing pressure volute.

MOTORS

Each submersible solids handling pump shall be driven by a completely sealed, electric submersible squirrel cage induction motor with the following characteristics:

Motor Performance	
Horsepower	
Service Factor	
RPM	
Voltage / Phase	

The motor nameplate horsepower rating shall not exceed the brake horsepower requirements of the specified head and capacity conditions. The motor shall be UL listed for Class 1, Division 1, Group C and D explosion-proof hazardous locations. The windings and leads shall be insulated with moisture-resistant Class F insulation and shall be designed along with the motor, for

continuous duty. The motor shaft shall be one piece 416 stainless steel along with all appurtenant hardware. The rotor shall be dynamically balanced to meet NEMA vibration limits. Heavy duty lifting lugs shall be cast into the motor housing and shall be of adequate strength to lift the entire pump and motor assembly.

AUTOMATIC PUMP CONTROLS

1. General Requirements
    a. Refer to Chapter 9, Specification Section 13446 – Remote Telemetry, Lift Stations of PWC's Permit Design Manual for additional requirements.
    b. Refer to Chapter 9, Specification Section 16231 – Emergency Power Systems of PWC's Permit Design Manual for additional requirements.
    c. Refer to Chapter 9, Specification Section 16010 - Electrical of PWC's Permit Design Manual for additional requirements.
    d. Refer to applicable detail drawings contained within PWC's Permit Design Manual for additional requirements.
2. Functional Requirements
    a. The pump control panel shall be provided with an alarm horn, a remote mounted alarm light, and an alarm silence pushbutton. Remote Pump Control Panel Alarm Horn Disable/Enable contacts shall be provided from the RTU to control alarm horn actuation. The pump control panel shall annunciate all alarm and failure conditions on the inside dead front mounting panel. Only the High Wetwell Level Alarm shall cause the alarm horn and remote mounted alarm light to annunciate.
    b. Each pump shall be provided with a HAND-OFF-AUTO switch on the pump control panel. The pumps shall not run in the OFF position and run in HAND position. In AUTO position, the pumps shall operate as follows:
        i. On rising liquid level in the wetwell, a float switch shall start the lead pump. As the liquid level continues to rise, the second float switch shall start the lag pump. The pump(s) will continue to operate until the liquid level recedes to the level of a third float switch which shall stop all pumps. A fourth float switch shall actuate the high level alarm within the pump control panel, should the liquid level rise above the lag pump cut-on elevation. A fifth float switch shall be routed through the pump control panel to the RTU and shall actuate at the same level that the pump control panel's high level alarm float switch actuates.
        ii. The pumps shall automatically alternate between the lead and lag starts by means of an alternator relay in the pump control panel.
        iii. Remote RTU Control Enable and Start/Stop Command contacts shall be provided for each pump. When enabled, the RTU shall provide remote pump control of each pump

and override any automatic control functions excluding safety and equipment protection interlocks.

iv. On a restoration of power after loss event a timer(s) shall prevent simultaneous starting of pumps.

3. Pump Control Panel

a. A Pump Control Panel for each lift station shall be shipped to the site, completely pre-wired, pre-assembled and ready for service. The control panel enclosure shall be NEMA-4X stainless steel with a continuous hinged and pad-lockable door. The enclosure shall have a back mounting panel and a front inside hinged panel to make the control panel "dead-front" when outside door is open. The panel shall be UL508A and NEC 409 labeled and shall include the following as a minimum:

i. Multi-colored wires (or equivalent marking) shall be provided to facilitate trouble shooting. Refer to Division 16 – Electrical for wire color standards.

ii. Motor control shall be provided by a full voltage non-reversing (FVNR), reduced voltage auto-transformer (RVAT), or reduced voltage solid state starter (RVSS). Reduced voltage starters shall be capable of starting the motor under all expected load conditions. RVSS starters shall include a bypass contact in case of electronics failure. A combination type starter shall be provided for each pump motor, labeled "PUMP 1", "PUMP 2", etc. The starter for each motor shall be provided with under-voltage release and quick-trip ambient-compensated overload protection for each leg. Starter shall be Cutler-Hammer, Allen-Bradley, Square D, GE, or Siemens.

iii. Phase monitoring capability which shall override and stop the normal operation of the pumps.

iv. Automatic pump alternator relay as manufactured by TimeMark or equal.

v. Individual timers (0-999 sec.) for each pump to prevent pumps from starting at the same time on restoration of power after loss of power.

vi. A NEMA 3R transformer with a minimum rating of 3 KVA shall be provided mounted to the exterior of the pump control panel for supplying 120/240 VAC single phase loads. The transformer shall be provided with a secondary circuit breaker within the pump control panel. Branch circuit breakers shall be provided within the pump control panel for the follow loads as a minimum:

a) Pump controls

b) GFCI receptacle mounted on equipment rack (20A CB).

c) RTU control panel (15A CB)

d) Generator controls / battery charger

e) Generator heater

f) Spare 20A circuit breaker (800 watt minimum)

vii. The following controls shall be mounted on the exterior of the pump control panel:

a) Power Available white indicator light

b) NEMA 4X Alarm horn with adjustable volume. Alarm horn shall be by Edwards, Federal Signal, or equal.

viii. The following controls shall be mounted on the front inside panel of the pump control panel:

a) Hand-Off-Auto selector switch for each pump

b) Pump Running red indicator light for each pump

c) Pump Running Hours elapsed time meter for each pump. Meters shall be 6 digits with rear mounted reset.

d) Pump Motor Overload Alarm amber indicator light for each pump

e) Pump Motor High Temp Alarm amber indicator light for each pump

f) Moisture Intrusion Alarm amber indicator light for each pump (submersible pumps only)

g) High Wetwell Level Alarm amber indicator light

h) Loss of Phase Alarm amber indicator light

ix. The control panel shall have dry contact relay outputs to connect to the SCADA System RTU Panel. The outputs shall be as follows:

a) All pump off level

b) Lead pump on level

c) Lag pump on level

d) High level alarm

e) Loss of phase

f) Generator running

g) Pump 1 running

h) Pump 1 common failure

i) Pump 2 running

j) Pump 2 common failure

k) Pump 1 in auto

l) Pump 2 in auto

m) Refer to Specification 13446 Remote Telemetry, Lift Stations for signal interface requirements Pages 17 - 18), and Remote Telemetry Unit (RTU) Control Panel Construction Drawing (Sheet 4 of 4).

x. The pump control panel shall accept dry contacts (control inputs) from the SCADA System RTU. Refer to Specification 13446 Remote Telemetry, Lift Stations for signal interface requirements (Page 18), and Remote Telemetry Unit (RTU) Control Panel Construction Drawing (Sheet 4 of 4). The inputs shall be as follows:

a) Pump 1 start/stop command

b) Pump 1 RTU control enable

c) Pump 2 start/stop command

d) Pump 2 RTU control enable

e) Pump Control Panel alarm horn disable/enable

f) Spare

xi. All necessary internal wiring separation, relays, intrinsic safety barriers, etc. to provide an intrinsically safe operation for a Class I Division 1 Hazardous Area wetwell shall be provided. All signals provided to the RTU through the pump control panel from a hazardous area shall be provided with barriers eliminating the requirement for intrinsically safe wiring of that signal.

4. Standby Power Source: The generation unit and transfer switch shall provide control interface signals to the pump control panel and remote telemetry unit as specified therein.

a. Refer to Chapter 9, Specification Section 13446 – Remote Telemetry, Lift Stations of PWC's Permit Design Manual for additional requirements.

b. Refer to Chapter 9, Specification Section 16231 – Emergency Power Systems of PWC's Permit Design Manual for additional requirements.

c. Refer to Chapter 9, Specification Section 16010 - Electrical of PWC's Permit Design Manual for additional requirements.

d. Refer to applicable detail drawings contained within PWC's Permit Design Manual for additional requirements.

5. Appurtenances

a. Float switches shall be of the mercury-tube type, encapsulated in polyurethane or vinyl floats. The units shall be waterproof, shockproof, explosion-proof and equipped with

sufficient UV resistant submersible cable to extend to the control panel from the wetwell without splicing. Float switches shall be suspended in the wetwell on a suitable rack or rail of stainless steel construction. The float switch rack shall be easily accessible from outside the wetwell to eliminate "Confined Space" entry requirements for operation personnel. Float switches shall be unaffected by flows, etc., entering the wetwell. Any required weights shall be provided. Two sets of four (4) float switches shall be provided for duplex stations and two sets of five (5) provided for triplex stations. An additional High Level Alarm float connected to the RTU will be provided for a total of nine (9) or eleven (11) installed for duplex and triplex stations respectively. Each set shall be suspended separately in the wetwell, so that removal of either does not affect the operation of the other set. Both sets of float switches shall have their cables routed to the pump control panel and connected to terminals within the panel. The pump control panel will include a manual selector switch to allow alternation between the "primary" and "backup" sets of float switches. Each set of float switches shall provide for the following signals as a minimum:

i. All Pump Stop Level (provide two - Primary / Backup)

ii. Lead Pump Start Level (provide two - Primary / Backup)

iii. Lag Pump Start Level (provide two - Primary / Backup)

iv. Lag-Lag Pump Start Level – Triplex Stations only (provide two - Primary / Backup)

v. Pump Control Panel High Level Alarm (provide two - Primary / Backup)

vi. RTU High Level Alarm (One only)

Float switches provided shall be Meyers, Anchor Scientific (Roto-Float) or Conery (Model 2900).

b. A stainless steel equipment rack shall be provided to mount the electrical panels (e.g. meter base, main service disconnect, pump control panel, remote telemetry panel, etc.). The rack shall include a sun/rain shield and a concrete personnel pad. The pump control panel remote alarm light shall be mounted on the sun/rain shield at a location approved by PWC. The alarm light shall be a NEMA 4X red strobe light as manufactured by Edwards, Federal Signal, or equal. Refer to the detail drawings provided within PWC's *Permit Design Manual* for additional requirements.

c. The lift station site shall be provided with area lighting. The lighting shall meet the requirements of the local power company and should be sited as shown on the drawings.

PUMP REMOVAL / REPLACEMENT SYSTEM

The pump assembly shall be provided with a guide "rail" system to permit ease of installation and removal. The system shall consist of two - 2-inch diameter continuous stainless steel guide rail pipes and appropriate sized stainless steel cables. The guide rails shall align the pump with the discharge elbow as it is lowered into place. A rail guide bracket shall be used to support and align the rails at the top of the sump.

The pump shall be raised and lowered into position by a telescopic hoist assembly. The telescopic hoist shall extend a minimum of five-feet above the wet well access hatch when in the upright position and shall be secured by a pin-lock device. The hoist shall be located in a manner that permits the removal of either pump and shall allow full three hundred sixty degree rotation for direct loading into a service vehicle. The hoist shall be located on the wet well's slab, or located on its own foundation, provided the requirements of this specification are met. The hoist shall have a rated capacity of not less than 1,600 pounds. The stainless steel lifting cables shall be arranged to allow connection to the hoist for pump installation or removal.

VALVES AND PIPING

1. Ductile Iron Pipe and Fittings

   All piping in the lift station wetwell and valve vault shall be ductile iron, Class 53, AWWA/ANSI C115/A21.15. Flanges shall be Class 125, ANSI B16.1. Piping interior surfaces shall be coated with ceramic epoxy lining as specified in Section 09802 "Special Coatings – Ceramic". Exterior piping surfaces shall be shop primed. All flange gaskets shall be 1/8-inch full-face serrated rubber material.

2. Gate Valves

   Each pump shall be equipped with a resilient wedge gate valve to allow both pumps to be isolated from the force main. Valve shall pass 3" spherical solids. Gate valves shall be ductile iron body resilient wedge type rated for 250 psig working pressure gate valves and shall conform to AWWA C-515 and NSF 61. Valve body shall have flanged end connections drilled to 125 pound standard. Valves for aboveground use or installed inside vaults shall be NRS design with handwheel. Valves shall open by turning in a counterclockwise direction. The handwheel shall have an arrow cut in the metal, indicating the direction of opening. Valves shall have a clear waterway equal to the full nominal diameter of the valve. All valves shall be tested for leakage and distortion in strict accordance with the latest revision of AWWA Specification C-500. All gate valves shall be manufactured in strict accordance with the latest specifications of the AWWA. Valves shall be manufactured by: Mueller Company, Clow Corporation, American Darling Company, or approved equal. Certification shall be furnished to PWC by the manufacturer that all valves meet project specifications. Where specified on plans, resilient valves shall be supplied with gearing. Valves installed in a vertical position shall have spur gearing and bevel gearing for valves installed in a horizontal position.

Valve boxes shall be installed as specified in SECTION 02660, WATER DISTRIBUTION.

3. Check Valves

Each pump shall be equipped with a full flow type check valve with flanged ends and fitted with an external lever and spring. Each valve shall be capable of passing a 3" spherical solid. Valve clapper shall be cast iron, and shall swing completely clear of waterway when valve is full open. The seating shall be by a resilient field replaceable ring on the valve disc contacting a bronze or stainless seat ring in the valve body. Hinge pin shall be of 18 8 stainless steel construction and shall be utilized with bronze bushings and packing type seal. Valves shall be equipped with removable cover plate to permit entry or for complete removal of internal components without removing the valve from the line. Valve ends for use in above-ground or vault installations shall be flanged end connections drilled to 125 pound standard. Valve shall be rated at 175 psi water working pressure, 350 psi hydrostatic test pressure. Valves other than full flow type or valves mounted in such a manner that prevents the passage of a 3" spherical solid shall not be acceptable.

4. By-Pass Pumping Valves and Piping

All Lift Stations shall have a By-Pass Pumping Assembly incorporated into the force main piping downstream from valve vaults or common header piping. By-Pass Pumping Assemblies shall be installed according to plan drawings and details with materials as specified in SECTION 02732, SEWAGE FORCE MAINS. Valve boxes shall be installed as specified in SECTION 02660, WATER DISTRIBUTION.

WET WELL/VALVE VAULT

The wet well and valve pit structures shall be precast concrete sections with a coal tar epoxy interior coating. The structures shall be manufactured and installed in accordance with ASTM C-890, ASTM C-891, ASTM C-913 and ASTM C-478. Joints between precast sections shall be sealed with one-inch diameter butyl rubber sealant conforming to SS-S-00210-A and AASHTO-198. Flexible rubber pipe wall penetrations and/or connections shall be in accordance with ASTM C-923. The wet well shall be watertight. The wet well base shall be manufactured specifically for direct mounting to an open top manhole and shall be provided with all mounting hardware and anchor bolts.

The minimum wet well diameter shall be six (6) feet, and the minimum valve vault shall be five (5) feet.

Access hatches shall be provided as shown on the drawings. Hatches shall be 3/16-inch aluminum checker plate with a stainless steel hardware frame. The frame shall be 1/4-inch thick

aluminum reinforcement cast into the concrete top. The hatch shall be designed for H-2O loading and shall provide for a latch with locking device.

The cable junction box shall be provided in an NEMA 3 or NEMA 4 enclosure mounted outside of the wet well.

SITE LIGHTING

The lift station site shall be provided with area lighting. The lighting shall meet the requirements of the local power company and should be sited as shown on the drawings.

SITE FENCING

The lift station site shall be fenced as shown on the drawings. Fencing shall be installed as specified in SECTION 02831, CHAIN LINK FENCING.

SITE ACCESS

Site access to the lift station shall be provided by a gravel access drive/parking area. The drive shall be a minimum of 10-feet wide and shall be oriented as shown on the plans. It shall consist of a minimum of 6 inches compacted ABC stone base. The drive shall be graded to drain and shall be installed in such a way as to minimize the runoff and erosion potential. Parking area shall be of sufficient size for a vactor truck to turn around during wet well cleaning.

WATER SERVICE

Each lift station site shall be provided with a source of water for routine maintenance purposes. If possible, a fire hydrant shall be located adjacent to the lift station site to facilitate filling of the wet well during lift station start up.

A one (1) inch water service with a standard PWC meter box, a reduced pressure backflow preventer, and a yard hydrant shall be installed at each lift station. The meter shall be installed inside the easement or right-of-way, in accordance with PWC standards. The meter box shall be in accordance with PWC standards. The reduced pressure backflow preventer shall be installed within 100’ of the tap on the main and inside the lift station fencing unless the distance exceeds 100’. A non-freeze 1" yard hydrant shall be provided, located as shown on the approved site plan. The yard hydrant shall be installed in accordance with the Yard Hydrant standard detail.

INSTALLATION

Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Immediately after off-loading, contractor shall inspect pumps and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all equipment serial numbers and parts lists with shipping documentation. Notify the appropriate manufacturer's representative of any unacceptable conditions noted with shipper.

Install, level, align, and lubricate pumps and all related equipment as required by the manufacturer. Equipment installation shall be in accordance with written instructions supplied by the respective manufacturer.

FIELD QUALITY CONTROL

Prior to acceptance by PWC, an operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.

After construction debris and foreign material has been removed from the wet well, the contractor shall supply clear water volume adequate to operate station through several pumping cycles. Observe and record operation of pumps, discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems.

The Contractor shall co-ordinate station start-up with pump manufacturers technical representative. The representative or factory service technician shall inspect the completed installation and calibrate and adjust instrumentation, correct or supervise correction of defects or malfunctions, and instruct operating personnel in proper operation and maintenance procedures.

OPERATION AND MAINTENANCE MANUALS

Installation shall be in accordance with written instructions provided by the pump equipment supplier. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.

Documentation shall be specific to the pump station and collated in functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied. Support data for all equipment supplied shall be provided by those supplying the equipment, and included into the O&M manual. Instructions shall include the following as a minimum:

a. Functional description of each major component, complete with operating instructions.
b. Instructions for operating pumps and pump controls in all modes of operation.
c. Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routine maintenance.
d. Support data for all components shall be incorporated into the O&M Manual.
e. As-built electrical schematic diagram of the pump station circuits shall illustrate pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individual components, not normally repairable by the station operator, need not be included. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of an overall system diagram.
f. As-built mechanical layout drawing of the pump station and components, prepared in accordance with good commercial practice, shall provide installation dimensions and location of all pumps, motors, valves and piping.

QUALITY ASSURANCE

Upon request from PWC, pre-engineered pump station suppliers shall prove financial stability and ability to produce the pump system within the specified delivery schedules. Evidence of facilities, equipment and expertise shall demonstrate the manufacturer's commitment to long-term customer service and product support.

MANUFACTURER'S WARRANTY

The contractor shall warrant all equipment to be of quality construction, free of defects in material and workmanship. A written warranty shall include specific details described below.

All equipment, apparatus, and parts furnished shall be warranted for one (1) year, excepting only those items that are normally consumed in service, such as light bulbs, oils, grease, packing, gaskets, O-rings, etc. The pump manufacturer shall be solely responsible for warranty of the

pumps and all related equipment. The pump shaft seal shall be warranted for a minimum of four (4) years from date of shipment. Should the seal fail within the first year, the manufacturer shall furnish a new seal, without charge to owner, F.O.B. factory. The warranty replacement cost for seals after the first year will be pro-rated as follows:

Failure Within	Percent New Price
2 years	25%
3 years	50%
4 years	75%

Components failing to perform as specified by the engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer without cost of parts or labor to the owner.

DIVISION 2
SITE WORK

02756 PRE-CAST CONCRETE ENCLOSURES FOR LIFT STATIONS

PART 1 - GENERAL

1.1 REQUIREMENTS

Contractor shall furnish and install Pre-cast Concrete Enclosure(s) to shelter wastewater pumps, electrical switchgear and miscellaneous appurtenances as specified in Section 02740, SELF-PRIMING LIFT STATIONS. The enclosure(s) shall be transportable to the site in modular wall and roof panel sections and assembled in place on a concrete slab prepared in accordance with manufacturer's recommendations and the requirements of applicable sections of these specifications.

1.2 RELATED SECTIONS

Section 02740 - SELF-PRIMING LIFT STATIONS
Section 16010 – ELECTRICAL, LIFT STATIONS
Section 03301 – CONCRETE CONSTRUCTION, UTILITY

1.3 CODES AND STANDARDS

The following Codes and Standards are incorporated by reference into this specification. The latest edition of these references shall be applicable.

A. ACI 318-99, "Building Code Requirements for Reinforced Concrete", American Concrete Institute.

B. ASCE 7-98, "Minimum Design Loads for Buildings and other Structures", American Society Of Civil Engineers

C. "Manual of Standard Practice", Concrete Reinforcing Steel Institute.

D. Local Codes and Standards for Project Location.

E. UL-752 Level 4 Bullet Resistance, certified by an independent structural engineer. (Pre-cast elements Only)

F. Fabricator must be producer member of the National Pre-cast Concrete Association (NPCA).

G. Building fabricator must have a minimum of five (5) years' experience manufacturing and setting transportable pre-cast concrete buildings.

In case of conflicting requirements between the specification and these referenced documents, the more stringent shall govern.

1.5 SUBMITTALS

Contractors shall within 30 calendar days after receiving Owner's Notice to Proceed, submit the following product data:

A. Materials list of items proposed to be provided under this Section.

B. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

C. Shop drawings showing plan, elevation and sectional views, materials of construction, and anchor details.

1.6 DELIVERY, STORAGE AND HANDLING

The pre-cast concrete enclosure panels and the accessory items shall be carefully transported, stored, handled and erected in a manner that will prevent damage. During storage prior to installation and following installation, but prior to placing in service, the manufacturer's recommendations regarding handling shall be followed.

PART 2 – PRODUCTS

2.1 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS

Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacturer of such products and shall essentially duplicate items that have been in satisfactory use for at least 5-years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Engineer, reasonably convenient to the site.

2.2 PRE-CAST CONCRETE ENCLOSURES

Each separate enclosure shall be erected on a concrete slab placed at grade and either wholly or partially over a single new pre-cast concrete wet well with size and depth as shown on the drawings. Enclosure outside dimensions shall be as specified in the following table:

Lift Station Designation	**Structure Length**	**Structure Width**	**Roof Height at Peak**

2.2.1 Design Requirements

A. Seismic load performance category "C", Exposure Group I, III

B. Standard Roof Live Load - 40 psf.

C. Standard Floor Load – 250 psf.

D. Standard Wind Load – 44 psf (100 mph) (ASCE 7-93)

E. Floor: Floor shall include a ½" turn down edge on all four sides to prevent migration of water into building along bottom of wall panels.

F. Roof: Roof shall have a peak in center of 12-foot direction and shall slope 2" to each side. Roof shall extend a minimum of 3" beyond wall panels on all sides and include a ½" turn down edge with built in drip feature that caps all four walls to prevent migration of water into the building along top of wall panels. Roof shall have a smooth form edge on all four sides. The roof shall be removable as a unit, allowing for complete access to the equipment with a crane.

G. Roof, walls and floor panels shall be sealed at all joints. Wall panels shall set on top of floor panel with the exterior surfaces of the wall panels aligned flush with outside edges of floor panel so that no overhang is allowed.

2.2.2 Pre-cast Concrete Materials

A. Concrete: Steel reinforced, 5000 psi minimum 28-day compressive strength, air-entrained (ASTM C260), water reduced normal weight.

B. Reinforcing Steel: ASTM A615, grade 60, deformed bar unless otherwise indicated.

C. Post-tensioning Strand: 41K Polystrand CP50, .50, 270 KSI, 7-wire strand, greased plastic sheath, (ASTM A416). Roof and floor to be post-tensioned by a single, continuous tendon. Said tendon shall form a substantially rectangular configuration having gently curving corners and a corner where the tendon members are anchored. Tendons shall be greased and enclosed within sheathing. If post-tensioning is not used in the roof panel, the following guidelines must be followed to ensure a watertight roof design.

1) The entire pre-cast concrete roof panel surface must be cleaned and primed with a material that prepares the concrete surface for proper adherence to the coating material.
2) The entire pre-cast concrete roof panel surface shall be sealed with .045 EPDM continuous membrane cemented to the concrete with a compound designed for this purpose.

D. Caulking: All joints between panels shall be caulked on the exterior and interior surface of the joints. Caulking shall be Sonneborn "Sonolastic" NP-1 Limestone sealant or equal. Exterior caulk joint to be ½" x ½" square so that sides of joints are parallel for correct caulk adhesion.

E. Vents: Two extruded aluminum vents, clear anodized, with aluminum insect screen to be cast in rear wall. Vents shall be Sunvent FL 164, or equal.

F. Panel Connections: All panels shall be securely fastened together with ¼" thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A36 HR, prime coated after fabrication. All fasteners to be ½" diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #F-63, or equal.

2.2.3 Doors and Hardware

A. Single Entrance Doors: The pre-cast enclosure shall be provided with one single entrance door, 3'-0" wide x 6'-8" high located on the structure as indicated on the plan drawings.

1) The door shall comply with the Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames" (SDI-100) and as herein specified.
2) Door and frame are to be factory bonderized and primed.
3) The door threshold shall be ½" high for easy stepover and transport of equipment through the doorway.
4) The door and frame shall be complete with a stainless steel hasp and staple assembly intended for padlock use (padlocks furnished by PWC).
5) Single door and all hardware shall be able to withstand 125 MPH winds.
6) A wall mounted drip molding shall be located above each door.

B. Double-Entrance Doors: The enclosure shall be provided with one double entrance door, 6'-0" wide x 6'-8" high located on the structure as indicated on the plan drawings.

1) Double door and all hardware shall be able to withstand 125 MPH winds.
2) Double hung door design shall incorporate 3-point locking hardware, door closer, and hinges on each section to allow complete access to the 6'-0" x 6'-8" full door opening without the need for a center sill.
3) Double door design shall adhere to the same material and workmanship specifications as described above for single door design.

2.2.4 Finishes: The coating materials noted below are specified as the standard of quality. The usual "or equal" clause shall apply. No request for substitution will be considered which decreases the film thickness designated and/or the number of coats to be applied or which offers a change from the generic type of coating specified. Requests for substitution shall contain the full name of each product; descriptive literature and directions for use; its generic type, and its non-volatile content by volume. All materials shall be brought to the job site in the original sealed and labeled containers of the paint manufacturer and shall be subject to inspection by the Engineer on the job. Only new paint materials shall be used.

A. Interior of Building: Smooth steel form finish on all interior surfaces.

B. Exterior of Building:

1) Standard: Architectural, pre-cast, concrete Brick Finish: Finish must be imprinted in top face of panel while in form using an open grid impression tool. Finished brick size shall be 2-3/8" x 7-5/7" with vertical light broom finish. Joints between each brick must be 3/8" wide x 3/8" deep. Back of joint shall be concave to simulate a hand-tooled joint. Each brick face shall be coated with a silicone acrylic concrete stain as manufactured by H&C Concrete Care Products. Color shall be H&C #HC02 "Brick Red" unless specified otherwise. Stain shall be applied per manufacturer's recommendations. Joints shall be kept substantially free of stain to maintain a gray concrete color.

2) (Option): Washed brown riverstone aggregate finish on exterior wall surfaces. Aggregate must be seeded into top of panel while in form.

3) (Option): A Vertical Broom Finish shall be applied to exterior wall surfaces and shall be coated with a silicone acrylic concrete stain as manufactured by H&C Concrete Care Products. Color shall be H&C #HC25 "Concrete Gray" unless specified otherwise. Stain shall be applied per manufacturer's recommendations.

B. Doors and Frames

1) Standard: Door(s) and Frame(s) shall be top coated with one coat of Sherwin Williams #SW4025, "Anchor Gray" Industrial and Marine Coating (unless specified otherwise).
2) (Option): If either exterior finish option above is selected, then: Door(s) and Frame(s) shall be top coated with Sherwin-Williams #SW4001 "Bolt Brown" Industrial and Marine Coating (unless specified otherwise).

2.2.5 Electrical Materials and Equipment

Electrical materials shall conform to the requirements in Section 16010 – ELECTRICAL, LIFT STATIONS.

A. Electrical Distribution: Provide and install two, duplex, GFCI receptacles, mounted 48" above finished floor. Receptacle shall be furnished with a corrosion resistant weatherproof cover. The receptacles shall be wired to the electrical junction box. Circuit protection for the receptacles shall be provided within the pump control panel.

B. Interior Lighting: Provide and install surface-mounted, vapor-tight, three (3) F32T8 lamp, fluorescent light fixtures providing a minimum of two (2) watts illumination per square foot. A weatherproof wall switch mounted shall be mounted adjacent to the enclosure single door. Manual on/off switches shall also be provided and installed adjacent to both the single and double enclosure doors. The lighting shall be provided with conduit and wiring to the electrical junction box. Circuit protection for the lighting shall be provided within the pump control panel.

C. Exterior Lighting: Provide and install exterior security lighting fixtures mounted over both the single and double enclosure doors. The lighting fixtures shall be shielded to prevent "spillage" onto neighboring properties and shall be fitted with photocell sensors for dusk to dawn operation. Exterior lighting shall be provided with conduit and wiring to the electrical junction box. Circuit protection for the exterior lighting shall be provided within the pump control panel.

D. Exhaust Fan: Provide and install a thermostatically controlled, 120 VAC, exhaust fan with screen and weatherproof shutters shall be installed in the wall approximately opposite a fresh air intake vent. Manual on/off switches shall also be provided adjacent to both the single and double enclosure doors. The fan shall have a minimum capacity of 1600 CFM at free air and be capable of changing the air in the enclosure a minimum of six times per hour. The vent fan shall be wired to the electrical junction box. Circuit protection for the vent fan shall be provided within the pump control panel.

E. Heater: Provide and install a high capacity electric blower type heater for the protection of the internal equipment. The heater shall maintain an inside/outside differential temperature of 30 degrees F while operating on the primary voltage supplied to the pump control panel. The heater shall be provided with an adjustable thermostat, and be wired through conduit to the electrical junction box. Circuit protection shall be provided within the pump control panel.

2.3 CONCRETE MATERIALS

Concrete materials including forms and reinforcement shall conform to Section 03301 – CONCRETE CONSTRUCTION, UTILITY

PART 3 – EXECUTION

3.1 PRE-CAST CONCRETE ENCLOSURE INSTALLATION

A. Locate Pre-cast Enclosure as indicated on Drawings.

B. Erect enclosures using personnel experienced and trained in placement and securing of architectural pre-cast concrete units. Lift and handle pre-cast panels using lift points and embeds as shown on pre-cast shop drawings. Fill all lift holes with hydraulic cement.

C. Erection Tolerances: Erect within tolerances listed in PCI MNL 117, Appendix I or ACI 533R. Erect level, plumb, and true to line. Do not allow cumulative dimensional errors to develop. Adjustments such as shimming which would place additional stress on units will not be permitted. Adhere to dimensional tolerances in accordance with PCI recommendations. Erect and secure in a manner to prevent damage to units or units in place. Replace damaged units which cannot be successfully repaired.

D. Where two stage joint seal is required, sequence with sealant application to ensure that sealant, gaskets, and similar items required for interior side seal are installed concurrently with installation of pre-cast units.

3.2 CONCRETE

Construct concrete pad complying with the Project Drawings and applicable sections of these Specifications. Floor slab shall be a minimum of 6” thick, 4,000 psi @ 28 day minimum, steel reinforced concrete. Slab shall be level to within 1/8” in both directions, comply with local codes and standards, and shall be capable of supporting all imposed loads. Concrete forming, reinforcement, placement and curing shall conform to requirements in Section 03301 – CONCRETE CONSTRUCTION, UTILITY

3.3 ELECTRICAL

Installation of electrical equipment and materials shall conform to the requirements in Section 16010 – ELECTRICAL, LIFT STATIONS.

3.4 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

3.5 MANUFACTURER’S WARRANTY

The Pre-cast Concrete Enclosure shall be provided with a 5-year manufacturer's warranty against defects in material and workmanship.

DIVISION 2
SITE WORK

02831 CHAIN LINK FENCING

GENERAL

Where shown on the plans there shall be installed a "chain link" fence with all necessary posts, braces, top rail, gates, fabric, extension arms, and three strand barbed wire.

The erected fence shall meet the following requirements:

> The enclosing fence shall have an overall fabric height of six feet (6') and an additional one foot (1') of three strand barbed wire, for a total height of seven (7'). The gates shall be seven feet (7') in overall height.

MATERIALS

Fabric: Fencing shall be chain link #9 gauge aluminized continuously woven wire 2" uniform square mesh without knots or ties, except for knuckling and barbing. Both the top and bottom edges of the fabric shall be barbed unless otherwise shown on the plans. The Contractor shall not piece together a number of short pieces of fence fabric.

Tensile Strength Test: Wire pickets of which this fabric is made to stand a tensile strength test of approximately 70,000 pounds per square inch based on the cross sectional area of the galvanized wire.

Framework: All posts and other appurtenances used in construction shall be hot-dipped, galvanized with a minimum of 1.8 oz. per square foot surface.

Line Posts: Hot dip galvanized "H" column (2" x 2 1/4") weight 4.1 pounds per linear foot, minimum carbon content 0.355. No used or open seam material will be permitted in posts or rails. (Alternate 2 1/2" O.D. galvanized pipe weight 3.65 pounds per linear foot or C-section line posts of the same dimension as H-post, 0.120 in wall thickness and fabricated from steel conforming to ASTM A-570, Grade E.) Intermediate posts shall be evenly spaced no more than 10 feet apart on center.

Top Rail: Hot dip galvanized pipe 1 5/8" O.D., weight 2.27 pounds per linear foot protected with outside sleeve type couplings at least 7 inches long. No used or open seam material will be permitted.

Terminal Posts: End, corner and pull posts hot dip galvanized pipe 3" O.D. - 5.79 pounds per linear foot. Gate posts hot dip galvanized pipe of "H" construction as specified.

Tension Wire: A bottom tension wire 7 gauge, alzd. (0.4 oz./s.f.), 6 inches above grade. Wire shall be fastened to fabric with aluminum rings at 24" on center and to each intermediate post.

Extension Arms: Hot dip galvanized. Line post arms of pressed steel malleable base; end, and corner post arms of malleable iron; gate posts to have ornamental top. Each extension arm to carry three strands of barbed wire approximately 12 inches out from fence line. Barbed wires to be securely fastened in by means of self-locking grooves. The barbed wire shall support a minimum of 400 lbs. vertical dead load from tip of arm. The barbed wire shall be 4-point pattern composed of two strands of No. 12 1/2 gauge galvanized wire.

Gates: Frame to be galvanized pipe 2.0 inches O.D. weighing 2.27 pounds per foot. Each frame to be equipped with 3/8-inch diameter adjustable truss rods. Gateposts and corner posts shall be 3 inches O.D. weighing 5.11 pounds per foot. Gates are to be manufactured using 2" aluminum tubing in lieu of the specified Schedule 40 steel pipe. Gateposts and corner posts shall be 6 5/8" O.D. for swing gates (greater than 20 feet in length and 4" O.D. for slide gates, weighing minimum of 5.11 pounds per foot. Corner fittings to be heavy pressed steel or malleable castings. Fabric to be same as in fence. Gates to be completed with malleable ball and socket hinges, catch, stops and rest. Hinges to permit gate to swing back against fence, 180 degrees if required. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate regardless of the latching arrangement.

Braces: Brace material to be hot dip galvanized and same as top rail, to be spaced midway between top rail and ground, and to extend from terminal post to first adjacent line post. Braces to be securely fastened to post by suitable connections, and then trussed from line post back to terminal post with 3/8 inch round rod equipped with a turnbuckle for adjusting.

Fittings: Hot dip galvanized. All fittings to be malleable, cast iron or pressed steel.

Fabric-Bands: Fabric to be fastened to line post with (9 gauge) fabric bands spaced approximately 18 inches apart, and to top rail with wires (9 gauge) spaces approximately 24 inches apart.

Locks: Locks will be provided by the Owner.

INSTALLATION

General: Installation shall be made in a workmanlike manner by skilled workers experienced in the erection of this type of fence and in accordance with the manufacturer's recommendations. The fence shall be erected on a previously prepared surface to the lines and grades indicated on the plans.

Post Setting: All posts shall be set plumb and in alignment into a 36-inch concrete footing of proper size and shape so as to furnish sufficient support to withstand any strain or shock ordinarily brought to bear on a fence of this character. The concrete strength shall be 3000 psi (ASTM C-94) and the foundations a minimum of 9 inches in diameter for line post and 12 inches for terminal post.

Concrete shall be thoroughly compacted so as to be free of voids and finished in a dome. Straight runs shall not exceed 500 feet between brace posts. Concrete shall cure a minimum of 72 hours before any further work is done on the posts.

Fabric: The fabric and barbed wire shall be stretched to the proper tension as recommended by the manufacturer and securely fastened to the framework members to result in a straight fence line without sagging. The bottom of the fabric shall be held as uniformly as is practicable to the finished grade.

DIVISION 2
SITE WORK

02931 SOD

GENERAL

Restoration of existing lawn areas outside of the public right-of-way disturbed by construction activities shall be by installation of new sod. Restoration and sod shall be performed as soon as practical, but the time period between initial disturbance, the utility installation and sod placement shall not exceed 60 days. Sod is defined as blocks, squares, strips of turf grass and adhering soil used for vegetative planting. Sodding and preparation of the sod bed shall be performed by an experienced landscape subcontractor specializing in this type of operation unless otherwise approved by the Public Works Commission in writing.

The Contractor shall adhere to the standards set forth by the American Association of Nurseryman and the Associated Landscape Contractors of America. All personnel shall be appropriately trained with regard to the degree of involvement so to assure the Owner the highest level of workmanship. Sod species suitable in this area are hybrid bermuda, centipede and zoysia; however the sod placed for each individual's lawn shall be the same species of sod as existing. Sodding may be performed at any time of the year except frozen sod shall not be placed nor shall sod be placed on frozen ground. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary for the successful establishment and growth of a vigorous, disease free and weed free sod lawn.

MATERIAL

Materials, equipment and products incorporated in the work shall be approved by the Public Works Commission. The Contractor shall submit a list of the proposed materials with samples, if required. Package materials should be delivered in unopened original containers showing weight, analysis and name of manufacturer. The Contractor shall protect the material from deterioration and/or damage

Sod shall contain 95 percent permanent grass; not more than five (5) percent weeds and undesirable grasses, good texture and free from obnoxious grasses, roots, stones and foreign materials. Sod shall be uniformly 1 ½ to 2 inches thick with a well developed fibrous root mat system in topsoil with clean cut edges. The sod shall be sufficiently dense and cut to the minimum required thickness such that if the sod is suspended by one corner, the sod will not tear apart. The sod shall be recently mowed to a height of not more than three (3) inches prior to harvest. The sod shall be supplied and maintained in a healthy condition as evidence by the grass being a normal green color in appearance, dense, and free from insects, pests, disease or injury. Sod shall be delivered to the job site within 24 hours after being cut and shall be installed within 24 hours after delivery. Any sod which is torn, broken or too dry will be rejected.

SOIL BED PREPARATION

Before landscape construction is to begin, the site shall be cleaned and disposed of brush, rubbish, stones, gravel and other foreign material within the area to be landscaped. Exposed ground surfaces disturbed during construction activities shall be graded to the original contours (allowing for the thickness of the sod) or as in the case of an altered contour such as a fill slope, graded as directed by the Public Works Commission to finish grade, or typical cross section. The sod bed shall be excavated to such a depth that after sod placement the top of the sod shall be flush with surrounding grade or contours. Rake areas to be sodded smooth, free from unsightly variations, bumps, ridges or depressions. Do not start work until conditions are satisfactory and do not work during inclement or impending inclement weather.

The surface area to receive sod shall contain a minimum of four (4) inches of good, fertile, friable, organic natural topsoil loam as a base for laying the sod. Topsoil shall be free of clumps, brush, sticks, weeds, stones, roots, trash or other objectionable material. Contractor shall insure all topsoil to be free of plants or plant parts of quackgrass, johnson grass, nut sedge, poison ivy or other noxious weeds. The Contractor shall furnish and supplement the existing topsoil at no additional costs to the Public Works Commission providing a minimum four (4) inch thickness as specified. Soil preparation shall not be performed in frozen or extremely wet conditions. The finished topsoil bed shall be uniform in grade, with a yard like appearance. All changes in grade shall have a smooth, rounded peaks and valleys.

The soil shall be scarified or otherwise loosened to a depth of not less than five (5) inches and all clods shall be broken. The top four (4) inches shall be worked into an acceptable smooth, friable and uniformly fine texture sod bed by use of soil pulverizes, drags, harrows or by other methods approved by the Public Works Commission. Commercial grade fertilizer (8% nitrogen, 8% phosphate, 8% potash) shall be applied at a rate of 20 pounds per 100 square feet, super-phosphate at 12 pounds per 1,000 square feet and lime (dolomite limestone containing not less than 85% total carbamates) shall be applied at a rate of 25 pounds per 1,000 square feet or at a rate recommended for the type of sod being placed. Apply soil amendments within 24 hours after raking topsoil base surface and not more than 48 hours prior to laying sod. Mix thoroughly a minimum depth into the upper four (4) inches of topsoil and lightly water to aid in dissipation. Sod placement shall not begin until the soil preparation is inspected and approved by the Public Works Commission. During application of soil amendment fertilizer etc., adequate precautions shall be taken to prevent damage to existing features such as traffic, structures, landscape, trees, vegetation, utilities or any other appurtenances. The Contractor shall be required to repair or clean any damages.

PLACING SOD

The Contractor and his landscape subcontractor shall coordinate the placing of the sod to begin

within 24 hours after the topsoil base preparation is completed and accepted by the Public Works Commission. Sod shall be brought to the site as near to the time of placing as possible. Store sod in the shade, and keep watered particularly in extreme hot and dry condition to insure vitality and to prevent the dropping off of soil during handling. During wet weather, the sod shall be allowed to dry sufficiently to prevent tearing. Handling shall be done in a manner which will prevent tearing, breaking, drying or other damage. Carefully place sod in rows with the longer side perpendicular to slopes and the ends staggered in each successive row in a brick-like pattern. Butt the ends and sides together tightly and do not overlap or stretch the sod. Do not leave any voids or gaps. Unavoidable gaps shall be closed with small pieces of torn or broken sod if kept moist and approved by the Public Works Commission. After the sod is laid, irrigate thoroughly to allow water to penetrate a minimum six (6) inches into the soil below the sod. Sod shall not be placed when the atmospheric temperature is below 32oF.

Tamp and roll completed sod installation with a manual roller or approved equipment to eliminate minor irregularities and to form close contact with the soil bed immediately after placing and watering. The type of rolling and tamping equipment to be used shall be submitted to the Public Works Commission for approval prior to construction. On steep slopes 3:1 (horizontal and vertical) or greater, in drainage ditches or any areas where sod slipping may occur, anchor sod with approved wooden stakes (½"x ¾" x 12") or staples spaced not over two (2) feet apart in any direction and/or in sufficient number to prevent slippage or displacement. The anchors shall be driven flush with the surface of the sod. The wide flat side of the stake shall be driven parallel to the slope. Staking shall be done concurrently with sod placement and prior to tamping. Sod shall be laid with the long horizontal edge of the strips parallel to the contour starting at the bottom of the slope. The edge of the sod shall be turned slightly in the ground at the top of a slope and a layer of earth placed over it and compacted so as to conduct the surface water over and onto the top of the sod. Upon completion of the above described work, the surface of the sodded areas shall coincide with the finished grade and not exceed ¼" plus or minus variation to adjoining grade or proposed contour. Extreme care shall be taken to prevent the installed sod from being torn or displaced.

MAINTENANCE

The Contractor shall, at no additional cost to the Public Works Commission, make whatever arrangements necessary to supply water of suitable quality and purity to sustain and encourage vigorous plant growth, and supply all equipment for proper delivery and application to planted areas. Water obtained from a PWC fire hydrant shall be metered and properly protected with an approved backflow prevention device. PWC must inspect and approved any connections to their water system to include the proposed water application and storage equipment. The Contractor shall not use private resident's water. The Contractor is solely responsible to provide watering of the sod. The method of application of water shall be approved by the Public Works Commission. Limit watering to early morning or late afternoon to enable to soil the absorb maximum amount of water.

Maintenance shall begin immediately after sodding operation. The Contractor shall maintain all sodded areas until sod is firmly established and as outlined below. Maintenance will include watering, fertilizer, pest control, soil amendments, disease control, erosion repair, mowing, protecting turf area from traffic (i.e. temporary fences, barriers, signs, etc.) and replacement of any dead or damaged sod.

Watering

- Water lawn areas once a day with a minimum ½ inch water for the first three (3) weeks after area sodded.
- After the three (3) week period, water twice a week with a ¾ inch of water each time unless a comparable amount of rainfall has occurred.
- Make weekly inspections to determine moisture content of soil and supplement the above watering schedule as needed.
- Excessive runoff puddling and wilting shall be prevented.

Fertilizer and Pest Control

- Evenly spread fertilizer composite at a rate of 40 pounds per 5,000 square feet or as recommended by the manufacturer. Fertilizer shall not be applied until two (2) weeks after initial placement of the sod or prior to the advent of winter dormancy.
- Treat areas of weed and insect infestation as recommended by the treatment manufacturer.

Mowing

- The Contractor shall do mowing operations, (in yards not being mowed by residents) until provisional acceptance.
- Mowing shall be done only when the grass is dry with a rotary type mower having a blade height set not lower than one and one half (1½) inches nor higher than three (3) inches.
- Mowing operations shall be conducted at intervals, which ensure grass height does not exceed four (4) inches between mowing.
- The Contractor shall complete at least one mowing operation before the work will be considered for acceptance.

The Contractor shall protect and not allow access of vehicular traffic into any newly sodded areas and shall repair any damaged turf to original grade. Maintenance shall continue for a period of 90 days after placement or until provisional acceptance by the Public Works Commission. A written record shall be furnished to the Owner of the maintenance work performed. At least two weeks shall elapse after chemical control is applied before a request of inspection.

ACCEPTANCE

Fifteen (15) days prior to the end of the 90 day maintenance period, the Contractor shall make a written request to the Public Works Commission for an inspection and provisional acceptance of

the sod. Failure to notify the Public Works Commission will not relieve the Contractor of the maintenance provisions required and the Contractor will continue to be responsible for the maintenance of the sod.

Replacement of dead sod shall be performed within seven (7) days after notification by the Public Works Commission and the maintenance period for these areas or individual lawns shall be extended for the 90 day maintenance period. Failure to replace dead sod within the specified seven (7) day period will result in the Public Works Commission having the work performed and deducting the cost from the Contract; however, the Contractor shall be responsible for the maintenance.

Final acceptance will be given upon satisfactory contract performance exhibited at final inspection and acceptance. Sodded areas are to be fully rooted prior to acceptance. The Owner shall be the sole judge as to whether or not the lawns are acceptable. Should any deficiencies be disclosed at final inspection, the Contractor shall make the necessary corrections in a timely manner and request re-inspection.

GUARANTEE

The Contractor shall guarantee a dense, vigorous stand of turf free of weeds, disease, pests or any dead areas more than one half of a square foot in size for a period of 90 days from initial placement or replacement whichever is greater. Total dead area shall not exceed one percent (1%) of total square footage for each individual resident's lawn.

DIVISION 2
SITE WORK

02933 LAWNS AND GRASSES (SEEDING)

GENERAL

All exposed ground surfaces that have been disturbed during construction shall be graded to original contours as practicable, shaped to drain, and free of trash and debris. Grassing shall be accomplished as soon as practicable after sections of work are completed. Seeding and/or planting shall be performed by an experienced subcontractor specializing in this type of operation, unless otherwise approved by the Public Works Commission in writing. Disturbed sections shall not exceed one mile, without prior approval by the Public Works Commission. Grassing shall be in accordance with the Contract Documents.

PREPARATION OF THE SOIL

The surface area to receive seed shall contain a minimum of four (4) inches of good, fertile, friable, organic natural topsoil loam as a base for spreading the seed. Topsoil shall be free of clumps, brush, sticks, weeds, stones, roots, trash or other objectionable material. Contractor shall insure all topsoil to be free of plants or plant parts of quackgrass, johnson grass, nut sedge, poison ivy or other noxious weeds. The Contractor shall furnish and supplement the existing topsoil at no additional costs to the Public Works Commission providing a minimum 4 inch thickness as specified. Soil preparation shall not be performed in frozen or extremely wet conditions. The finished topsoil bed shall be uniform in grade, with a yard like appearance. All changes in grade shall have a smooth, rounded peaks and valleys.

The topsoil shall be loosened and mixed to the depth of four inches (4"). Suitable equipment (cultipackers, harrows, drags) meeting the approval of the Public Works Commission shall be used. This operation shall be accomplished by cutting on one (1) foot centers parallel to the contour of the slopes. On slopes that are steeper than 2:1, both depth preparation and degree of smoothness may be reduced, if approved by the Public Works Commission, but in all cases the slope surface shall be scarified groove, trenched or punctured so as to provide a textural plane of cut forming pockets, ridges, or trenches in which seeding material can lodge. Soil preparation shall not be performed when the soil is frozen, extremely wet or in an otherwise unfavorable working condition. The soil shall be free of any substance that might inhibit plant growth. Assistance of the local agricultural agent is recommended.

Lime shall be applied at the rate of 1/2 tons per acre. 10-20-20 commercial fertilizer shall be applied at the rate of 1,000 pounds per acre and well worked in to the top four inches (4”) of top soil. If hydroseeding, use 500 pounds of 10-10-10 fertilizer on slopes steeper than 1/2 horizontal

to 1 vertical.

SEED MIXTURE AND SOWING THE SEED

Seed shall be seed certified to be the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures and pure live seed. The producer's seed label shall indicate it the minimum percent of pure live seed (which shall be 82.45 for Bermuda, 88 for Rye Grain), the minimum percent of germination in hard seed and maximum percent of weed seed (no more than 1 percent for Bermuda, 0.5 percent for Rye Grain). Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable State seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable.

The following seed mixture shall be used:

	POUNDS OF SEED PER ACRE			
	K-31 Fescue	Grain Rye	Common Bermuda	Centipede
April 15 - Sept. 1	75	-	60 (hulled)	5
Aug. 15 - Nov. 15	120	-	25 (hulled)	5
Nov. 1 - April 1	120	120	25 (un-hulled)	5

Note: If there are differences in the seed mixture between the mixture stated in these specifications and that which is specified as part of an approved Erosion Control Plan, the seed mixture specified in the erosion control plan shall take precedence.

Where construction crosses a pasture that has been grassed, the Contractor shall re-seed the area with the same type of grass as found on the site. All highway rights-of-way, and private yards disturbed shall also be re-seeded or with the same type of grass previously found. The seed mixture specification shall be used as a guide and the Contractor is charged with the responsibility of seeding areas with the proper type of grass that matches the existing.

Seed shall be broadcast uniformly by hand or by approved sowing equipment. One half of the seed shall be sown in one direction and the remaining shall be sown at right angles to the first. Do not seed when the wind velocity exceeds five (5) miles per hour. Rake lightly into top 1/8 inch of the soil prior to compacting, with a roller not exceeding 100 pounds.

All seeded areas will be mulched with two (2) tons per acre of small grain straw or wood cellulose fiber spread uniformly, approximately 1/4 of ground should be visible to avoid

smothering seedlings. Asphalt emulsion (ASTM D-977 and ASTM D-2028) shall be used to anchor the straw applied at 150 gallons per ton of straw, or crimped to stabilize. Asphalt emulsion shall be required from November 1st to March 31st. The Contractor shall take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water or other causes and promptly remove any blockage which may occur.

SPECIAL CONSIDERATIONS

Shrubbery shall be expertly removed and carefully preserved for replanting, unless otherwise directed by the Public Works Commission adequate earth ball shall be removed to guard against damage to the root system. Shrubbery shall be replanted only after all construction is complete. The excavation made for replanting shall be six inches (6") larger in every dimension than the root ball removed. This additional space shall be filled with a mixture of one half topsoil and one half peat moss. Care shall be taken to set the top of the ball slightly above or flush with the surrounding surface. Any shrubbery damaged or that dies shall be replaced with an equal or better plant material at the Contractor's expense.

MAINTENANCE

The Contractor shall protect and maintain grassed areas as necessary to establish a uniform turf composed of the grasses specified. The Contractor shall re-seed any bare areas and repair all eroded areas.

Watering of seeded areas will be required during periods of dry weather to promote maximum growth. The Contractor shall supplement natural rainfall to insure a minimum of one (1) inch of rainfall weekly.

Maintenance of lawns begins immediately after the area is planted and continues for the period required to establish acceptable lawns, but not less than sixty (60) days after initial seeding, or until provisional acceptance by Owner. Maintain seeded areas by watering, fertilizing, mowing, weeding and other operations such as rolling, re-grading, replanting, aerating, and mulching as required to establish an acceptable lawn free of eroded or bare areas.

ACCEPTANCE

Fifteen (15) days prior to the end of the sixty (60) day maintenance period, the Contractor shall make a written request to the Owner for an inspection and provisional acceptance of the seeded area. Failure to notify the Owner will not relieve the Contractor of the maintenance provisions required and the Contractor will continue to be responsible for the maintenance of the seeded area.

Replacement of dead seed area(s) shall be performed within seven (7) days after notification by the Public Works Commission and the maintenance period for these areas or individual lawns

shall be extended for an additional sixty (60) day maintenance period. Failure to replace seeded area(s) within the specified seven (7) day period will result in the Owner having the work performed and deducting the cost from the Contract; however, the Contractor shall be responsible for the maintenance.

Final acceptance will be given upon satisfactory contract performance exhibited at final inspection and acceptance. Seeded areas are to be fully rooted prior to acceptance. The Owner shall be the sole judge as to whether or not the lawns are acceptable. Should any deficiencies be disclosed at final inspection, the Contractor shall make the necessary corrections in a timely manner and request re-inspection.

Payment to the Contractor for seeding areas will be approved once the seed has been established and meets the requirements of this paragraph of this specification.

GUARANTEE

The Contractor shall guarantee a stand of turf is considered acceptable when a live vigorous stand of permanent grass is established with growing sprouts visible at the surface showing not less than 9 seedlings of permanent grass at least 2 inches long in each square foot, and where no gaps larger than 4 inches in diameter occur anywhere in the lawn area. Permanent grass is defined as Common Bermuda, Centipede, and Fescue.

DIVISION 2
SITE WORK

03301 CONCRETE CONSTRUCTION (UTILITY)

GENERAL

Concrete construction specified in this section shall be applicable to all "site work" and is not intended to cover general building specifications. The concrete work shall include all furnishing, hauling, fine grading and subgrade, form work, etc. and all incidentals necessary for completion of the work as it pertains.

MATERIALS

Concrete

The Contractor shall furnish and place concrete in strict accordance with the requirements of ACI 318 (most recent edition). Ready-mixed concrete from an approved mixing plan shall be used throughout the work and conform to the requirements of ASTM C-94 for batch, mixing, and transporting. Concrete shall be in accordance with the following requirements:

A. Under Ground - Regular Weight Concrete

28-day compressive strength	3000 psi
Coarse aggregate	1 ½” max. size stone
Slump	2" minimum, 4" maximum
Air Entrainment	No requirement

B. Walls, Slabs, Sidewalks, Curb and Gutter - Regular Weight Concrete

28-day compressive strength	3000 psi
Coarse aggregate	3/4" max. size stone
Slump	2" minimum, 4" maximum
Air Entrainment	5 more or less 1

The Contractor shall submit for approval mix designs, designed and tested by an approved testing laboratory, following the requirements of ACI 318 for each class of concrete to be used on this project. Mix designs in excess of one year old shall be verified. The Contractor will be responsible for all costs involved in the mix design. Material suppliers and material proportions incorporated in the mix design and certification shall not change without written permission from the Public Works Commission.

Admixtures used to produce entrained or air shall be sulforated hydrocarbons or neutralized vinsol resins conforming to ASTM C-260. Calcium chloride, other accelerators, or "anti-freeze"

shall not be used without written approval by the Public Works Commission.

Reinforcing Steel

Reinforcing bars shall be new billet stock and shall conform to ASTM A-615, Grade 60. Bars shall be deformed to conform to ASTM A-305. The Contractor shall check and submit for approval four (4) sets of shop and erection drawings prepared by the fabricator. Reinforcement detailing and placement shall conform to ACI 318. All reinforcing bars shall be tied in place according to approved erection drawings, using bar supports and accessories conforming to ACI 315. Laps or splices shall conform to ACI 318, and consist of the following minimum dimensions:

Tension Splices	36 Bar Diameters
Compression Splices	30 Bar Diameters

All reinforcing bars shall be tagged and stored in such manner as to be readily available at the time needed. Tag mark substitutions will not be made.

Welded wire mesh fabric reinforcing shall conform to the requirements of ASTM A-185. Lap splices shall be at least one full mesh plus 2" staggered to avoid continuous laps in either direction and securely wired or clipped.

GRADING

The Contractor shall use every effort to observe any possible misalignments in line or grade of the installed forms and will call such to the attention of the Public Works Commission promptly. The Contractor is cautioned that he shall be responsible for any damage to utility lines caused by his negligence. The Public Works Commission or his representative shall then inspect the forms and if approved, pouring operations may begin. Where unstable material exists, the Contractor shall remove such material to a depth required to provide a stable subgrade at no additional cost to the Public Works Commission.

FORM WORK

Metal forms shall be used throughout the work except for short, odd length sections and in accordance with ACI 301 and ACI 347 (most recent editions). Earth cuts may be used as forms for unexposed vertical surfaces on footings, provided the soil and workmanship allow an accurate and curable excavation. Forms shall be kept in good condition at all times. Any forms which have become out of shape or otherwise unsuitable shall be removed from the work. Forms shall be of such section and design that they will adequately support the concrete and any construction equipment used in the work. Form sections shall be provided with interlocking joints to insure that the forms are tightly jointed together free from movement. Forms shall be held in place by metal pins, not less than eighteen (18) inches in length, with fastenings of metal and wedges to insure a correct, rigid setting.

Forms shall be of the dimension required for the designed cross-section shown on the plans. Built up sections to attain the required depth will not be permitted.

Forms shall be set true to the lines and grades established by the Design Engineer or as indicated on the plans.

Forms shall be held rigidly in position and shall be of sufficient strength to resist springing out of line when concrete is placed.

PLACING CONCRETE

Prior to placing concrete, the subgrade shall be moistened and the contact side of the forms shall be cleaned and coated with a heavy oil. The Contractor shall not place any concrete without the forms, reinforcing steel and subgrade being inspected and approved by the Design Engineer. Placing of concrete is to be in accordance with ACI 304 (most recent edition). Water shall be removed from the excavation before placing concrete and water shall be diverted to prevent washing over freshly deposited concrete.

Concrete shall be placed as not to disturb concrete already in place and in such a manner as to require the minimum amount of lateral movement. Concrete shall be deposited in the forms without segregation. A tremie shall be used when the fall exceeds five (5) feet. Care shall be taken not to upset any forms during the concrete pouring operations. Any concrete showing misalignment due to form movement shall be removed and replaced at no additional cost to the Public Works Commission.

All concrete shall be consolidated in accordance with ACI 309 (most recent edition). Mechanical vibrators shall be operated by experienced workmen. Spading and rodding may be required to supplement mechanical vibration. Consolidation shall be adequate to remove any voids and after removal of the forms, no honeycomb shall be present. Should any honeycomb be present, the Design Engineer shall determine if the honeycomb is of a minor nature, the voids may be filled with mortar as approved by the Design Engineer.

All concrete within forms shall be brought to true section by the use of an approved straight edge and shall be tamped with straight edge to bring mortar to the surface, after which it shall be floated smooth by means of wood floats. No steel floats will be permitted. After true surface of section has been obtained, and after initial set has taken place, the entire surface shall be brushed with a dampened brush. All joints and all exposed edges shall be rounded off with approved jointing and edging tools. The type of finish required will be specified in the specific item of work specified or indicated on the drawings. All exposed surfaces of retaining walls, structures, etc. shall be given a Class 2 finish with ¼ inch chamfered edges.

No more concrete shall be laid than can be properly finished and covered during the daylight, unless adequate artificial light satisfactory to the Design Engineer is provided.

Immediately after finishing operations have been completed, the entire surface of the concrete shall be sprayed with an approved curing compound. The use of liquid retarding agents shall conform to standards specified by current AASHTO or ASTM Specifications.

Cold weather concreting shall be in accordance with ACI 306 (most recent edition) and hot weather concreting shall be in accordance with ACI 305 (most recent edition). Concreting shall be done when weather conditions are favorable unless otherwise directed by the Design Engineer. Concrete operations shall be discontinued when the temperature of 40 degrees Fahrenheit is reached on a falling thermometer. No concreting shall be attempted when local weather bureaus indicate temperatures below freezing within the ensuing 24 hours unless proper precautions are made to protect concrete by covering with straw or other thermal insulation satisfactory to the Design Engineer. The Contractor shall be responsible for the quality and strength of the concrete laid during cold weather or hot weather and any concrete damaged by frost action or freezing shall be removed and replaced as directed by the Design Engineer and/or the Public Works Commission at the Contractor's expense.

Forms shall not be removed from the concrete for a minimum of 7 days, unless approved by the Design Engineer. The Contractor shall apply a curing compound or provide measures to maintain moisture for proper curing at his expense, if early form removal is approved. Immediately after the forms have been removed, all honeycomb areas shall be repaired (with one part cement and two parts sand) and earth backfill material shall be placed adjacent to the finished concrete and smoothed off to prevent an accumulation of standing water, subgrade saturation or under wash in the event of rain.

Both pedestrian and vehicle traffic shall be excluded from crossing the concrete for a period of 14 days by the erection and maintenance of suitable barricades. Contractor shall be responsible for any damage resulting from traffic within the 14 day period and he shall remove and replace any concrete damaged as directed by the Design Engineer and/or Public Works Commission.

MASONRY MATERIALS

Brick shall be in accordance with ASTM C-32 Grade MS laid in full beds of mortar with shove joints.

Concrete masonry blocks shall be in accordance with ASTM C-139. Blocks shall be at least 5", but not more than 8" in thickness nor less than 8" in length and of such shape that the joints can be effectively sealed and bonded with cement mortar.

Cement mortar for brick work shall be in accordance with ASTM C-270, Type M. Use Type IIA cement in accordance with ASTM C-150.

TESTING

The requirements of ACI318 (most recent edition) shall be used to control the evaluation of all concrete strengths. The strength is to be checked during construction by four (4) cylinders at the option and cost of the Public Works Commission, of which 1 shall be broken at 7 days, 2 at 28 days. If the specified strength is not achieved in 28 days, 1 reserved shall be stored and broken as specified by the Design Engineer. Cylinders shall be made and stored in accordance with ASTM C-13. Cylinders shall be for each day concrete is poured in excess of 10 cubic yards of each different type of concrete, as determined by the Design Engineer. All additional expenses required because of the failure of the materials to meet routine testing requirements, or poorly scheduled concrete deliveries, shall be borne by the Contractor.

DIVISION 2
SITE WORK

09801 ANTI-MICROBIAL ADMIXTURE

GENERAL

All reinforced concrete precast manholes shall include a liquid anti-microbial admixture to render the concrete uninhabitable for bacterial growth. The admixture shall be included in the fabrication of the manhole by an approved concrete precast manhole manufacturer. Coatings applied to the interior walls of the manhole shall not be acceptable.

Further, all field mixed mortar, utilized in concrete precast manholes, shall include the anti-microbial admixture. The intent and purpose of this specification is to render all concrete and/or mortar within sanitary sewer service uninhabitable for bacterial growth. Any defects shall be cause for the replacement and correction of such defect as directed by the Fayetteville Public Works Commission (PWC), at no expense to the Fayetteville Public Works Commission.

RELATED SECTIONS

A. 02730 – Sanitary Sewer Systems
B. 02732 – Sewage Force Mains

REFERENCES

A. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
B. ASTM C1443 – Standard Specification for Precast Reinforced Concrete Pipe
C. ASTM C1577 – Standard Specification for Precast Reinforced Concrete Pipe

SUBMITTALS

All submittals shall be provided in accordance with the Contract Documents, and the requirements outlined herein. The Contractor shall submit, in accordance with the Contract Documents, product data, certifications, and product data, to include the following:

1. U.S. Environmental Protection Agency (EPA) registration number.
2. Documentation that the product has a minimum of 10 years of successful prevention of microbial induced corrosion in sanitary sewers.
3. Documentation that the precast facility is certified by the anti-microbial manufacturer.
4. Documentation from the precast facility stating that the correct amount and correct mixing procedure was followed for all anti-microbial concrete.

QUALITY ASSURANCE

A color identifier shall be applied to the interior of each concrete piece fabricated with the anti-microbial admixture. Each piece shall also be plainly stenciled with the name of the anti-microbial admixture on the exterior of each piece.

MATERIALS

All manholes shall conform to PWC standard specifications and details, unless otherwise approved in writing by the Fayetteville Public Works Commission. All concrete and mortar utilized in the construction of the manholes shall contain an anti-microbial admixture.

Anti-Microbial Admixture:

The liquid anti-microbial admixture shall be used in accordance with the manufacturer's recommendations. The amount of the admixture shall be included in the total water content of the concrete or mortar mix design. The admixture shall be added to the concrete or mortar mix water, to ensure even distribution of the admixture throughout the concrete or mortar mix. When properly prepared, the anti-microbial admixture shall render the concrete or mortar uninhabitable for bacterial growth.

The anti-microbial admixture shall be ConShield, ConBlock, or approved equal. The ConShield liquid anti-microbial admixture can be obtained from ConShield Technologies, Inc. or an approved precast facility. TheConBlock liquid anti-microbial admixture can be obtained from ConSeal Concrete Sealants, Inc., or an approved precast facility.

Field Repairs:

Field repairs to the precast concrete or mortar shall be in accordance with the admixture manufacturer's recommendations. All field repairs shall be completed in accordance with PWC requirements.

ACCEPTANCE

Acceptance of the concrete and mortar with the anti-microbial admixture shall be based on conformance with the requirements herein, the Fayetteville Public Works Commission's review of the installed manhole, and results of all testing.

DIVISION 2
SITE WORK

09802 SPECIAL COATINGS - CERAMIC EPOXY (PROTECTO401)

GENERAL

The interior surfaces of all ductile iron pipe and fittings shall be full coated with a ceramic epoxy lining. The ceramic epoxy lining shall be applied to ductile iron pipe free of any other interior lining material. The finish coat shall be applied to yield a minimum dry film thickness of 40 mils for a complete lining.

MATERIALS

The lining material shall be an amine cured novalac epoxy containing at least 20% by volume of ceramic quarts pigment.

The epoxy material shall meet the following minimum performance requirements:

Permeability Rating: 0.00 perms when tested according to ASTM E-96 Procedure A with a test duration of 30 days.

ASTM 6-95 Cathodic Disbandment: 1.5 volts at 77° F.

ASTM B-117 Salt Spray: 0.00 undercutting after one year.

Immersion Testing ASTM D-714	Duration
20% Sulfuric Acid	1 Year
25% Sodium Hydroxide at 140° F	1 Year
160° F Distilled Water	1 Year
120° F Tap Water	1 Year

The above requirements shall be verified and tested by an approved testing laboratory. Copies of the laboratory test showing that the lining conforms to the specifications shall be furnished to the Public Works Commission, certified by the Supplier.

APPLICATION OF LININGS

Surface Preparation: All interior barrel and joint surface areas which will be exposed to the sewer liquids and gases shall be prepared for lining by removing all laitance form oil and other loose, foreign or deleterious materials which would adversely affect the bond of the lining compound of the pipe surface. All areas to receive the protective coating shall be abrasive blasted using compressed air nozzles with sand or grit media. The entire surface to be lined shall be struck with blast media so

that all rust, loose oxides, etc., are removed from the surface. Any area where rust appears before lining must be re-blasted.

Qualification of Applicator and Workmen:

The lining shall be applied by a competent firm with a five year history of lining sewer pipe. The workmen employed by the applicator shall be experienced and competent in the application and inspection of the lining compound to be applied. The Public Works Commission shall have the right to require the applicator to furnish bonds covering proper performance and guaranteeing the payment of all obligations arising as a result of improper materials and workmanship.

Equipment: All application equipment shall be as recommended by the suppliers of the lining compound.

Application Technique: After the surface has been thoroughly prepared for application, the interior of the pipe shall be coated with the ceramic epoxy to a minimum dry film thickness of 40 mils. No lining shall take place when the substrate or ambient temperature is below 40° F. The surface must be dry and dust free. The number of coats of lining material applied shall be as recommended by the lining manufacturer, but in no case shall it be applied above the dry film thickness per coat recommended by the lining manufacturer. The time between coats shall be that specified by the lining manufacturer.

Repair: All damaged areas or test areas shall be repaired in accordance with the manufacturer's recommendation, so that the repaired areas are equal to the undamaged lined areas in all respects.

Inspection: All pipe linings shall be checked for thickness using a magnetic film thickness gauge, the thickness testing shall be done in accordance with the method outlined in SSPC-PA-2 film thickness rating. The interior linings shall also be tested for pinholes with a non-destructive 2,500 volt test. Any defects found shall be repaired as noted above.

Markings: Each joint, manhole unit, or pipe bend special shall be marked with the date of application of the coating system, the date of inspection, and the numerical sequence of application on that date.

Shipping and Handling: Equipment used to handle and transport the lined pipe shall be suitably designed and operated not to damage the lining. Any damage which does occur shall be repaired prior to the installation of the pipe in accordance with the manufacturer's recommendations, so the repaired area is equal to the undamaged lining in all respects.

DIVISION 2
SITE WORK

09804 SPECIAL COATINGS – EPOXY LINING (PERMOX OR TNEMEC)

GENERAL

The interior surfaces of all ductile iron pipe and fittings in sanitary sewer service shall be fully coated with a ceramic epoxy lining. The lining system shall be a two component, amine cured novalac epoxy. The ceramic epoxy lining shall be applied to ductile iron pipe free of any other interior lining material. The finish coat shall be applied to yield a minimum dry film thickness of 40 mils for a complete lining. Any defects in the lining shall result in the pipe or fitting being replaced, at no additional cost to the Public Works Commission.

RELATED SECTIONS

A. 02730 – Sanitary Sewer Systems
B. 02732 – Sewage Force Mains

REFERENCES

A. ASTM B 117 – Standard Practice for Operating Salt Spray (Fog) Apparatus
B. ASTM C 413 – Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
C. ASTM C 868 – Standard Test Method for Chemical Resistance of Protective Linings
D. ASTM D 714 – Standard Test Method for Evaluating Degree of Blistering of Paints
E. ASTM D 870 – Standard Practice for Testing Water Resistance of Coatings Using Water Immersion
F. ASTM D 1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
G. ASTM D 1653 – Standard Test Methods for Water Vapor Transmission of Organic Coatings
H. ASTM D 2240 – Standard Test Method for Rubber Property – Durometer Hardness
I. ASTM D 2370 – Standard Test Method for Tensile Properties of Organic Coatings
J. ASTM D 2583 – Standard Test Method ofr Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
K. ASTM D 2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
L. ASTM D 4060 – Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
M. ASTM D 4400 – Standard Test Method for Sag Resistance of Paints Using a Multinotch Applicator
N. ASTM D 4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
O. ASTM G 8 – Standard Test Methods for Cathodic Disbonding of Pipeline Coatings
P. ASTM G 95 – Standard Test Method for Cathodic Disbondment Test of Pipeline Coatings
Q. ASTM G154 – Standard Practice for Operating Fluorescent Ultraviolet Lamp Apparatus for Exposure of Nonmetallic Materials

Unless otherwise specified, references to documents shall mean the documents in effect at the time of bid. If the referenced document(s) have been discontinued by the issuing organization, references to those documents shall mean the replacement documents or the last version of the document before it was discontinued.

Where conflicts exist between the standards and this specification, the more stringent shall apply.

MATERIALS

All ductile iron pipe and fittings shall be in accordance with the Public Works Commission standard specification 02730 – Sanitary Sewer Systems, Public Works Commission standard specification 02732 – Sewage Force Mains, and these Contract Documents.

The lining material shall be an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment (no silica fume, fly ash, or alumina dust). The lining shall be both coal tar (polycyclic aromatic hydrocarbons) free and hazardous air polluting solvents (HAPS) free. The lining system shall be 100% solids by volume.

The ceramic epoxy lining system shall be the Perma-Shield PL Series 431 as manufactured by Tnemec Company, Inc., Permox-CTF as manufactured by Permite Corporation, or approved equal.

The ceramic epoxy lining system shall meet the following minimum performance requirements:

A. Abrasion (ASTM D 4060, CS-17 wheel, 1,000 grams) – 76 mg loss
B. Adhesion (ASTM D 4541) – not less than 1,860 psi
C. Severe Wastewater Analysis Test (150oF, 500 ppm H2S, 4,000 ppm NaCl, 10% sulfuric acid, EIS Permeation Analysis) – Initial impedance of 11.2 (log-z). No blistering, cracking, checking, or loss of adhesion. Reduction in electrical impedance of 0.5 after 28 days of exposure.
D. Cathodic Disbondment (ASTM G 8, 1.5 V, Classification Group A) – no more than 0.000 inch disbanded equivalent circle diameter.
E. Dielectric Strength (ASTM D 149) – greater than 600 V per mil
F. Hardness (ASTM D 2240) – Shore D hardness of 79
G. Impact (ASTM D2794) – No visible cracking or delamination after 160 inch-pounds direct impact.
H. Chemical resistance by immersion testing, in accordance with ASTM D 714, as outlined in the following table:

20% Sulfuric Acid at 77^{o} F	2 years, no effect
25% Sodium Hydroxide at 140^{o} F	2 years, no effect
5% Sodium Chloride at 77^{o} F	2 years, no effect
Distilled Water at 160^{o} F	2 years, no effect

I. Salt Spray (ASTM B 117) – No blistering, cracking, rusting, or delamination of film. No rust creepage at scribe after 1,000 hours.
J. Sag Resistance (ASTM D 4400) – Not less than 90 mills wet film thickness.

K. Water Absorption (ASTM C 413) – 0.0 percent water absorption
L. Water Vapor Transmission (ASTM D 1653, Method B, Wet Cup, Condition C) – 1.25 g/m2 per 24 hour water vapor transmission and 0.09 perms water vapor permeance.

The above requirements shall be verified and tested by an approved testing laboratory. Copies of the laboratory test showing that the lining conforms to the specifications shall be furnished to the Public Works Commission upon written request and certified by the Supplier.

QUALITY ASSURANCE

The manufacturer of the specified coating system shall have a minimum of 10 years experience in manufacturing high performance epoxy coating systems. The epoxy coating material shall be from a single manufacturer.

Application of the ceramic epoxy lining system shall be in accordance with the manufacturer's requirements. Preparation of the ductile iron pipe to be lined shall be completed by an installer approved by the lining system manufacturer.

SUBMITTALS

In accordance with these Contract Documents, the Contractor shall submit the following:

1. Manufacturer's certification that the coatings comply with the specified requirements and are suitable for the intended application.
2. Product data sheet.
3. Material Safety Data Sheet.
4. Copies of test data for all the physical, chemical, and permeation properties listed within this specification.

WARRANTY

The ceramic epoxy lining manufacturer shall warranty its products as free from material defects for a period of five (5) years. The Public Works Commission will solely determine whether the pipe should be replaced if any defects are discovered in the lining within the warranty period. All costs to replace the pipe or fitting, including but not limited to, bypass pumping, excavation, and traffic control shall be the manufacturer's responsibility.

APPLICATION OF LININGS

Application of the ceramic lining system shall be completed by an installer approved by the manufacturer of the lining system.

Surface Preparation: All interior barrel and joint surface areas which will be exposed to the sewer liquids and gases shall be prepared for lining by removing all laitance, form oil and other loose, foreign or deleterious materials which would adversely affect the bond of the lining compound of the pipe surface. All areas to receive the protective coating shall be abrasive blasted using compressed air nozzles with

sand or grit media. The entire surface to be lined shall be struck with blast media so that all rust, loose oxides, etc., are removed from the surface. Any area where rust appears before lining must be re-blasted.

Qualification of Applicator and Workmen: The ceramic epoxy lining shall be applied by a competent firm with a ten (10) year history of lining sewer pipe. The workmen employed by the applicator shall be experienced and competent in the application and inspection of the lining compound to be applied. The Public Works Commission shall have the right to require the applicator to furnish bonds covering proper performance and guaranteeing the payment of all obligations arising as a result of improper materials and workmanship.

Equipment: All application equipment shall be as recommended by the suppliers of the lining compound.

Application Technique: After the surface has been thoroughly prepared for application, the interior of the pipe shall be coated with the ceramic epoxy to a minimum dry film thickness of 40 mils. No lining shall take place when the substrate or ambient temperature is below 40^{o}F. The surface must be dry and dust free. The number of coats of lining material applied shall be as recommended by the lining manufacturer, but in no case shall it be applied above the dry film thickness per coat recommended by the lining manufacturer. The time between coats shall be that specified by the lining manufacturer.

Repair: All damaged areas or test areas shall be repaired by the lining manufacturer prior to shipment, in accordance with the manufacturer's recommendation, so that the repaired areas are equal to the undamaged lined areas in all respects.

Inspection: All pipe linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done in accordance with the method outlined in SSPC-PA-2 film thickness rating. The interior linings shall also be tested for pinholes with a non-destructive 2,500 volt test. Any defects found shall be repaired as noted above. All ceramic epoxy lined pipe and fittings shall be visually inspected for any defects, including runs, sags, or debris within the lining. All repairs shall be performed by the manufacturer prior to shipment.

Markings: Each joint, manhole unit, or fitting shall be marked with the date of application of the coating system, the date of inspection, and the numerical sequence of application on that date.

Shipping and Handling: Equipment used to handle and transport the lined pipe shall be suitably designed and operated not to damage the lining. Any damaged pipe or fitting shall be replaced at no cost to the Public Works Commission.

INSTALLATION

Cutting Pipe: The Contractor shall cut the pipe without damaging the pipe or interior ceramic epoxy coating. All cuts shall be at right angles to the pipe axis. All cut ends shall be dressed with a power grinder to remove all sharp edges. The cut ends of push-on joint pipe shall be beveled in accordance with the pipe manufacturer’s instructions. All field cuts shall be coated and sealed prior to installation. Application of the lining shall be done in accordance with the ceramic epoxy lining manufacturer’s recommendations.

Handling: All ceramic epoxy lined pipe and fittings shall be handled only from the outside. No forks, chains, straps, hooks, cables, or other equipment shall be placed inside the pipe and fittings for lifting, positioning, or installation. The pipe and fittings shall not be dropped or unloaded by rolling. The pipe and fittings shall not strike sharp objects while moving or unloaded. Ductile iron pipe shall not be placed on grade utilizing hydraulic pressure from machinery or hammers. The use of nylon straps or other similar lifting devices are to be used.

Pipe Installation: All pipe and fittings shall be installed in accordance with PWC standard specifications 02222 – Excavation, Trenching, and Backfilling for Utility Systems, 02730 – Sanitary Sewer Systems, 02732 – Sewage Force Mains, and these Contract Documents.

SECTION 13446
DUPLEX PUMP STATION CONTROL CENTER AND TELEMETRY SCADA

PART 1 GENERAL:

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Locations of pump station control center with telemetry equipment and extent of work is shown on the drawings.

B. Furnish and install all equipment necessary to provide a complete station control system as specified herein and shown on the drawings.

C. The software code shall be provided by PWC and tested for acceptance with the Control Panel. The Control Panel shall pass an I/O inspection prior to implementation.

SYSTEM DESCRIPTION

System shall be designed and constructed to monitor on site conditions at remote facilities and transmit data by remote control panel (RCP's) to the Fayetteville PWC CTU. The telemetry, sensors, and associated components are to be fully compatible with the PWC's existing SCADA system. The system shall communicate via a cellular modem.

System shall have the following inputs and outputs:

Location: Pump Stations

a. Power Connection

b. Control Panel

   1) Ensure all outputs and inputs from control panel are connected and functioning properly.

c. Battery Backup – 2 hours minimum

d. Discrete Outputs 120 Vac
   1) Generator Run
   2) Pump #1 On
   3) Pump #2 On

   Six (6) spare discrete outputs

e. Discrete Inputs 120 Vac
   1) Pump #1 Running
   2) Pump #1 In Auto
   3) Pump #2 Running
   4) Pump #2 In Auto
   5) Phase Fail Input
   6) Generator Status
   7) Power Failure
   8) High Water Level
   9) Low Water Level
   10) Generator Fail
   11) Pump #1 Fail
   12) Pump #2 Fail
   13) ATS on utility
   14) ATS on generator
   15) Ten (10) spare discrete inputs

f. Analog Inputs 4-20 Ma
   1) Wetwell level
   2) Six (6) spare analog inputs

g. Analog Outputs – 4-20 Ma
   1) Wetwell level
   2) Three (3) spare analog outputs

COMMUNICATIONS

RCP communication: transmit data through cellular radios that communicate through third and fourth generation GSM and, or CDMA cellular networks
provide cellular radios with private IP addresses
communication link structure: TCP socket connection from RCP through cellular system to the supplier's servers; short message service (SMS), user datagram protocol (UDP), and satellite-based data transmission methods not permitted
provide private gateways through respective cellular networks
data encryption: transmit data after application layer encryption and with carrier level encryption
end-to-end data acknowledgment: confirm every data packet from RCP to central server with central server acknowledgement back to RCP in real-time
communication failure alarms: dispatch communication failure alarm
monitor and report secure socket connections for end-to-end uptime
report interruption durations 15 seconds and greater, and every disconnect/reconnect event

Cellular service:
- provide relationships with cellular providers
- included in annual managed service fee
- maintain cellular data contract with cellular carrier and interface with carrier when technical support is required
- obtain approval from cellular provider, accepting cellular radios for use on respective cellular network in accordance with FCC requirements

Data transmission rates
- off-normal conditions: transmit data on occurrence to initiate alarm notifications; ability to delay alarm notifications via the web portal user interface
- the data transmission rates shall be configurable over-the-air by manufacturer

1.03 REVISE BELOW AS REQUIRED

A. Refer to other Division-16 specifications for requirements related to instrumentation and basic electrical materials and methods.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The control center manufacturer shall have at least five years of successful experience in the manufacturing and operation of such equipment. Pump station control centers shall be a standard product of the manufacturer. Manufacturer with less than the required years of experience shall provide a bond equal to the cost of the equipment pro-rated to the difference in years experience versus years experience required.

B. Certified Factory Test: Upon completion of the control center assembly, a factory test shall be conducted to determine the proper function of the equipment as designed. All functions of the system shall be tested. A certified report shall be prepared by the manufacturer. The Engineer shall be allowed to observe the test.

C. The completed control center shall be UL certified and have affixed the proper label.

D. Initial Start-up and Field Testing: Upon completion of the equipment installation, the manufacturer's factory-trained representative shall visit the project for not more than one 8-hour day to inspect the equipment for proper installation and then to initially start the equipment, making necessary tests so as to insure the proper operation of the equipment.

1.05 SUBMITTALS

A. Shop Drawings shall be submitted according to the requirements of Division-1 specifications.

B. Operation and Maintenance Manuals shall be submitted according to the requirements of Division-1 specifications.

1.06 TELEMETRY SCOPE

A. Lift stations shall be provided with remote monitoring and control with the pump control panel through the provision of Remote Telemetry Units (RCPs). Each lift station RCP shall communicate to PWC's existing remote SCADA system. RCPs shall be constructed in accordance with the specifications herein and the applicable detail drawings provided within PWC's

Permit Design Manual. The RCP shall be provided to interface with the lift station's pump control panel, ATS, generator, and other miscellaneous controls as specified herein.

B. PWC shall provide configuration and programming of their existing remote SCADA system to poll, monitor, and provide remote control of the lift station via the RCP and radio transmission system provided by the Contractor. Installed equipment provided by the Contractor is limited to the lift station site.

C. The following major items of supply shall be provided by the systems integrator:

1. Furnish and install RCP integral with the pump control panel as specified
2. Interfacing with control panels provided by other equipment suppliers under this contract
3. Furnish and install cellular modem from the lift station RCP to PWCs existing remote SCADA system.
4. Programming of RCP PLC functions
5. Coordinate RCP programming with PWC for compliance with PWC's standards and interface with their existing remote SCADA system at the Central Station location.
6. Configuration and testing of the complete system at the lift station.

D. Software programming of new system components shall utilize the PWC's existing licensed versions of programming and configuration software. Where this is not possible and a new software version or product is required, the product shall be submitted for approval by PWC.

1.07 RELATED WORK SPECIFIED ELSEWHERE

A. Lift Station Specifications

1. Refer to the equipment and controls specified within the following applicable lift station specifications:

    a. Specification Section 02753 Submersible Pump Lift Station
    b. Specification Section 02754 Self-Priming Lift Station

B. Division 16 - Electrical

1. The following work shall be provided under Division 16 – Electrical:

    a. Conduit, raceways, and installation of wire and cable for all Remote Telemetry system signal wiring, grounding systems, special cables and network cables except as noted.
    b. Remote Telemetry system signal field wire.
    c. Final wire preparation and termination of field wires to Remote Telemetry system equipment as directed by the Control System Integrator.
    d. Grounding systems for all Remote Telemetry system equipment.
    e. Mounting of Remote control panel & Telemetry system electrical enclosures (i.e. control panels, TVSS boxes, etc.) with exclusion of antennas.

2. The Control System Integrator shall provide all termination information for the Remote Telemetry system equipment, to support equipment terminations provided under Division 16. This information shall be provided within 10 days of equipment arrival onsite or as required by the project schedule. The information shall be in the form of drawings and termination lists, showing complete termination information (to/from panels, terminal numbers, terminal block locations, signal types, voltages, etc.).

1.08 SUBMITTALS:

A Every submittal shall have a separate section entitled "Requested Deviations from Remote Telemetry System Specifications" which shall clearly define and explain all deviations and exceptions to this specification and corresponding drawings detailing the remote telemetry system requirements.

B. Hardware Submittal

1. Provide data / specification sheets for each component listing all model numbers, optional, and ancillary devices that are being provided.
2. Provide control panel drawings in accordance with the detail shown within the NFPA 79 for typical drawings. The following drawing types shall be provided:

    a. Cabinet assembly and layout Drawings to scale. These shall include both front and interior layouts.
    b. Panel wiring diagrams showing all interconnecting wiring and components. The wiring diagrams shall be in ladder logic. Show all wire numbers, terminal block designations, components tags, component make/model, and PLC addresses.

C. Software Submittal

1. The software submittal shall include a PLC program listing which shall include the following minimum information:

    a. Project Identification
    b. PLC Identification
    c. Revision tracking to include date last revised, programmer, and organization, and contact info
    d. PLC configuration and addressing including tag/variable names.
    e. Program functional identification and description with functional explanation of logical functional blocks of ladder logic. Functional blocks shall be broken down into signal processing, alarms, individual equipment logic, subroutines, and communications processing at a minimum.

2. The software submittal shall include configuration files for any electronically configured equipment (e.g. radio).

D. Testing Documentation Submittal

1. Testing documentation shall be submitted documenting the acceptable completion of system testing. The testing documentation shall demonstrate that the Control System Integrator has designed and configured a system that meets the specifications and drawing requirements. The documents for the test plan shall be structured so that the PWC understands what the inputs were, what the predicted outputs should be, and what the actual outputs were.

2. The complete test plan should include but not be limited to the following:

c. 100 percent I/O point test including all spare points based upon the previously submitted System I/O list.
d. Functional and Control strategy tests.
e. Communications tests.
f. Specification and drawing conformance.

E. Operational and Maintenance Manuals

1. Prior to installation of any equipment onsite, preliminary O&M manuals shall have been submitted and approved. No installation of equipment shall be permitted without the Contractor maintaining an updated version of these preliminary O&M manuals available on demand by PWC or the Engineer.

2. Preliminary O&M manuals shall contain all planning information, site preparation instructions, grounding and bonding procedures, cabling diagrams, plug identifications, safety precautions or guards, and equipment layouts in order to enable the Contractor to proceed with the detailed site preparation for all equipment.

3. After all field changes or corrections made during installation and field check out have been completed, then all system supplier documentation shall be revised to reflect the “as installed, corrected, and accepted" condition of the system and final record copies of O&M manuals for the system shall be provided to PWC and Engineer for approval.

4. Final system documentation shall be provided in 3-hole type binders of archival quality (e.g. slant D or elliptical binding, vinyl with metal hinge or extra heavy weight vinyl, etc.) with a binding no larger than 3”. Materials shall be printed on 8.5” x 11” or 11” x 17” paper. Drawings shall be either folded to fit within an 8.5” x 11” binder or in an 11” x 17” three-hole binder. Each binder shall include 15% spare space for the addition of future material.

5. All electronic media (i.e. software, electronic documentation, configuration files/reports, etc.) shall be provided with 6 copies of USB drives.

6. Operation and Maintenance manuals shall include but not be limited to the following:

a. Manufacturer standard O&M manuals for all equipment and software f furnished.

b. Custom O&M information describing the specific configuration of equipment and software, and the operation and maintenance requirements for this particular project.

c. All modifications to manufacturer standard equipment and/or components shall be clearly identified and shown on the drawings and schematics. All information contained therein shall apply specifically to

d. the equipment furnished and shall only include instructions that are applicable.

e. Complete approved copies of all submittals required within this specification.

1.09 Control System Integrator

A. Control system integrator shall be CITI, Piedmont Animation, or custom controls.

B. The Control System Integrator shall be regularly engaged in the detailed design, fabrication, installation, and startup of Remote Telemetry Systems for water and wastewater treatment facilities. Any Control System Integrator that has been subject to litigation or the assessment of liquidated damages for nonperformance on any project within the last five calendar years shall not be acceptable.

C. Where specific manufacturers and/or models of major hardware or software products (PLC, radio equipment, etc.) are specified to be used on this project, the Control System Integrator shall have completed at least one project using that specified hardware or software.

D. The Control System Integrator shall have field service staff located within 150 miles from the city of Fayetteville.

E. The PWC shall have the right of access to the Control System Integrator's facilities and the facilities of their equipment suppliers to inspect materials and parts; witness inspections, tests and work in progress; and examine applicable design documents, records and certifications during any stage of design, fabrication and tests. The Control System Integrator and their equipment suppliers shall furnish office space, supplies and services required for these surveillance activities.

PART 2 PRODUCTS

2.01 GENERAL

A. The general equipment stipulations shall apply to all equipment furnished under this section.

2.02 LIFT STATION ELECTRICAL AND CONTROLS

A. General Requirements

1. Refer to *Chapter 9 Specification 13446 – Remote Telemetry, Lift Stations* of PWC's *Permit Design Manual* for additional requirements.
2. Refer to *Chapter 9 Division 16 - Electrical* of PWC's *Permit Design Manu*al for additional requirements.
3. Refer to applicable detail drawings contained within PWC's *Permit Design Manual* for additional requirements.
4. The main power feed to all pump stations shall be equipped with an above-grade, fused disconnect switch.
5. Electrical and instrumentation/control systems and components shall be located such that they may be disconnected from outside a wetwell.
6. The pump supplier shall provide the pump control panel and accessory equipment. The Contractor shall install the controls as shown on the Drawings and manufacturer's instructions. The control system shall include all motor starters, alternator, relay, level control switches, control panel, circuit breakers, alarm apparatus, and internal wiring. Controls and pumps shall be covered by same warranty.
7. Enclosures for electrical and control components for the pump station shall be located outside of the wet well and in a location such that they are readily accessible, ensure maximum electrical and personnel safety, and are protected from damage due to vehicular traffic and flooding.
8. If not housed, electrical enclosures shall have a minimum NEMA 4X rating unless stated otherwise. NEMA 4X enclosures shall be used in locations where the potential for flooding and the development and accumulation of corrosive gases exist. **This Pump Control Panel shall be Nema 4X stainless steel.**
9. All conduits entering enclosures from below grade shall be sealed to prevent moisture intrusion.
10. All conduits and wire routed from or through a hazardous area shall be sealed or provided with an air gap in accordance with approved hazardous area wiring methods contained within NFPA 70 National Electric Code. Where an air gap is used to prevent hazardous atmosphere from entering conduits, that cable shall be outdoor rated (wet area and UV resistant). Where hazardous area seals are used, the seal shall be located such that it will not be disturbed during routine operation and maintenance functions at the wet well for a Class I, Division 1 location.

11. PWC's lock-out/tag-out procedures shall be considered in the design of all electrical enclosures and disconnects to be installed at the pump station.

B. Functional Requirements

1. The pump control panel shall be provided with an alarm horn, a remote mounted alarm light, and an alarm silence pushbutton. Remote RCP Alarm Silence contacts shall be provided to disable the alarm horn. The pump control panel shall annunciate all alarm and failure conditions.

2. Each pump shall be provided with a HAND-OFF-AUTO switch on the pump control panel. The pumps shall not run in the OFF position and run in HAND position. In AUTO position, the pumps shall operate as follows:

   a. On rising liquid level in the wetwell, a shall start the lead pump. As the liquid level continues to rise, the second float switch shall start the lag pump. The pump(s) will continue to operate until the liquid level recedes to the level of a third float switch which shall stop all pumps. A fourth float switch shall actuate the high level alarm within the pump control panel, should the liquid level rise above the lag pump cut-on elevation. A fifth float switch shall be routed through the pump control panel to the RCP and shall actuate at the same level that the pump control panel's high level alarm float switch actuates. A submersible Transducer shall be the primary level control actuator. The float switches shall be a back up.

   b. The pumps shall automatically alternate between the lead and lag starts by means of an alternator relay in the pump control panel.

   c. Remote RCP Control Enable and Start/Stop Command contacts shall be provided for each pump. When enabled, the RCP shall provide remote pump control of each pump and override any automatic control functions excluding safety and equipment protection interlocks.

   d. PWC shall be contacted as to which of the following control options shall be provided within the pump control panel.

      a) Option 1: On a restoration of power after loss event a timer(s) shall prevent simultaneous starting of pumps.

C. Pump Control Panel

1. A Pump Control Panel for each lift station shall be shipped to the site, completely pre-wired, pre-assembled and ready for service. The control panel enclosure shall be NEMA-4X stainless steel with a continuous hinged and pad-lockable door. The enclosure shall have a back mounting panel and a front inside hinged panel to make the control panel "dead-front" when outside door is open. The panel shall be UL508A and NEC 409 labeled and shall include the following as a minimum:

2. Multi-colored wires (or equivalent marking) shall be provided to facilitate trouble shooting. Refer to Division 16 – Electrical for wire color standards.

3. Motor control shall be provided by a soft start reduced voltage solid state starter (RVSS). Reduced voltage starters shall be capable of starting the motor under all expected load conditions. RVSS starters shall include a bypass contact in case of electronics failure. A combination type starter shall be provided for each pump motor, labeled "PUMP 1", "PUMP 2", etc. The starter for each motor shall be provided with under-voltage release and quick-trip ambient-compensated overload protection for each leg. Starter shall be Cutler-Hammer, Allen-Bradley, Square D, or Siemens. Provide bypass contactors for across the line starting.

4. Phase monitoring capability which shall override and stop the normal operation of the pumps.

5. Automatic pump alternator relay as manufactured by TimeMark or equal.

6. Individual timers (0-999 sec.) for each pump to prevent pumps from starting at the same time on restoration of power after loss of power.

7. A NEMA 4X transformer with a minimum rating of 3 KVA shall be provided mounted to the exterior of the pump control panel for supplying 120/240 VAC single phase loads. The transformer shall be provided with a secondary circuit breakers within the pump control panel. Branch circuit breakers shall be provided within the pump control panel for the follow loads as a minimum:

   a) Pump controls

   b) GFCI receptacle mounted on equipment rack (20A CB).

   c) RCP control panel (15A CB)

   d) Generator controls / battery charger

   e) Generator heater

   f) Spare 20A circuit breaker (800 watt minimum)

8. The following controls shall be mounted on the exterior of the pump control panel:

   a) Power Available white indicator light

   b) NEMA 4X Alarm horn with adjustable volume. Alarm horn shall be by Edwards, Federal Signal, or equal.

9. The following controls shall be mounted on the front inside panel of the pump control panel:

   a) Hand-Off-Auto selector switch for each pump

   b) Pump Running red indicator light for each pump

   c) Pump Running Hours elapsed time meter for each pump. Meters shall be 6 digits with rear mounted reset.

   d) Pump Motor Overload Alarm amber indicator light for each pump

e) Pump Motor High Temp Alarm amber indicator light for each pump

f) Moisture Intrusion Alarm amber indicator light for each pump (submersible pumps only)

g) High Wetwell Level Alarm amber indicator light

h) Loss of Phase Alarm amber indicator light

10. Refer to Specification 13446 Remote Telemetry, Lift Stations for signal interface requirements.

11. All necessary internal wiring separation, relays, intrinsic safety barriers, etc. to provide an intrinsically safe operation for a Class I Division 1 Hazardous Area wetwell shall be provided. All signals provided to the RCP through the pump control panel from a hazardous area shall be provided with barriers eliminating the requirement for intrinsically safe wiring of that signal.

D. Standby Power Source

1. The lift station shall be connected to an automatically activated stand-by power generation source with automatic reset. (See Section 16622)

2. The generation unit shall be capable of powering the pump motors' starting current, electrical systems, instrumentation/controls and alarm systems, and other auxiliary equipment as may be necessary to provide for the safe and effective operation of the pump station.

3. The generation unit shall have the appropriate power rating to start and continuously operate under all connected loads.

4. The generation unit shall be protected from operating conditions that would result in damage.

5. The generation unit shall be protected from damage when restoration of the power supply occurs.

6. The generating unit shall be located in a building structure or otherwise protected from the weather elements and shall be adequately ventilated.

7. The generation unit shall be provided with on-site fuel storage. In no case shall the fuel storage be less than that needed to operate the generating unit for 24 continuous hours.

8. PWC shall be contacted as to which of the following generator sizing options shall be provided.

a) Option 1: The generator shall have the capacity to run all pumps with staggered starting.

9. The generation unit and transfer switch shall provide control interface signals to the pump control panel and remote telemetry unit as specified therein.

E. Appurtenances

1. Primary level sensing shall be with an analog pressure level sensing transducer.

   The sensor shall be an automatic duplex differential setpoint controller responding to levels as shown on the plans. The DIN-Rail mounted controller shall provide indication and adjustment of the operating setpoints via a LCD/keypad interface without the need for tools. The controller shall be powered by 24 VDC which shall also supply power for the analog sensor's excitation and for activation of the I/O module's discrete inputs. The module's discrete inputs shall be configurable as sourcing inputs. The Controller shall contain one analog input which shall be used for the level-sensing transducer input. The Controller shall allow the operator to scale the analog inputs to meet the applications requirements. The Controller shall contain four independent relay outputs. The outputs shall be rated for 8 amps DC/ 10 amps AC. The Controller shall be UL/UCL listed and FM approved.

   The Controller's displayed process level shall be field adjustable to nominally coincide with the user's specified range tto a maximum of 35 feet. The Controller shall provide four independent differential control states which operate in a Pump-Down (ie. tank emptying) mode. Each of the control stages shall be provided with an On and Off setpoint. Setpoint adjustments shall be made via the

   Controllers's LCD/Keypad. The On and Off setpoints shall be adjustable in increments of on-tenth of a foot.

   The Controller shall contain Status/Adjustment, Information, Setpoint Alarm and calibration displays. The Status/Adjustment displays shall show the present wet well level and the respective stage's On or Off setpoint. The information screens shall show the Active/Inactive Inputs and Outputs. The Setpoint Alarm screens shall notify the operator in case of Setpoint Inversion (ie. the On setpoint and Off setpoint levels are incorrect. ..the On is below the Off). The calibration displays shall allow the operator/field-technician to adjust the controller's displayed level to nominally coincide with analog sensor's maximum range.

   The Controller shall be a Contegra Model CA-400 or approved equal.

2. Submersible Sensor Level Transmitters: The transmitters shall be specifically designed for wastewater depth measurement. The transmitters shall be designed for total submergence and shall include encapsulated electronics and molded cable with integral polyurethane vent tube for vented gauge pressure measurement. The transmitters shall be of two-wire 4-20 mA dc design with Lightning Arrestor, Sensor Termination Enclosure with desiccant and Digital Display. The transmitter body and pressure fittings shall be electron beam welded titanium. The transmitter transduction principle shall be integrated silicon strain gauge bridge. The submersible level transmitter shall be installed as shown on the drawings and in accordance with the manufacture's

recommendations. The transmitter shall be GE Sensing PTX or PMC-Versaline.

The transducers shall be mounted at the sensing point and wired to the enclosure. The transducers shall have a ¼ inch or ½ inch MPT. Process pressure connection. Transducers shall have factory signal cabling and be suitable for a minimum of 100 ft. submerged duty.

Level transducers shall be of the all solid – state 2-wire transmitter type with a 4-20mA output from a 10.5-24VDC excitation. The units shall be powered from the pump control panel power supply.

In the event that the level simulator controller fails the system shall automatically revert to the emergency logic controls based level control with the top and bottom float operating until the control panel is placed in the emergency backup mode.

3. Backup float switches shall be mechanical non-mercury-tube type, encapsulated in polyurethane or vinyl floats. The units shall be waterproof, shockproof, explosion-proof and equipped with sufficient UV resistant submersible cable to extend to the control panel from the wetwell without splicing. Float switches shall be suspended in the wetwell on a suitable rack or rail of stainless steel construction. Float switches shall be unaffected by flows, etc., entering the wetwell. Any required weights shall be provided. Two sets of float switch shall be provided. Each set shall be suspended separately in the wetwell, so that removal of either does not affect the operation of the other set. Both sets of float switches shall have their cables routed to the pump control panel. One set shall be connected to terminals within the panel; the other (backup) set shall be labeled and left coiled in the bottom of the control panel with sufficient cable to reach anywhere within the panel. Each set of float switches shall provide for the following signals as a minimum:

4. All Pump Stop Level
    a. Lead Pump Start Level
    b. Lag Pump Start Level
    c. Lag-Lag Pump Start Level (Triplex Lift Stations Only)
    d. Pump Control Panel High Level Alarm
    e. RCP High Level Alarm
    f. Primary control system shall be the level transmitter set for the preceding levels with the back-up floats as standby controls.

5. An equipment rack shall be provided to mount the electrical panels (e.g. meter base, main service disconnect, pump control panel, remote telemetry panel, etc.). The rack shall include a sun/rain shield and a concrete personnel pad. The pump control panel remote alarm light shall be mounted on the sun/rain shield at a location approved by PWC. The alarm light shall be a NEMA 4X red LED light as manufactured by Edwards, Federal Signal, or equal. Refer to the detail drawings provided within PWC's *Permit Design Manual* for additional requirements.

6. The lift station site shall be provided with area lighting. The lighting shall meet the requirements of the local power company and should be sited as shown on the drawings.

2.03 TELEMETRY SCADA GENERAL REQUIREMENTS:

A. All materials, equipment, and devices shall, as a minimum, meet the requirements of UL, where UL Standards are established for those items, and the requirements of NFPA-70. These items shall have the U.L. label. All items shall be new unless specified or indicated otherwise.

B. Field equipment, including remote telemetry equipment and control enclosures, may be subjected to wind, rain, lightning, and corrosives in the environment, with ambient temperatures from -20 to 40 degrees C and relative humidity from 10 to 95 percent. All supports, brackets and interconnecting hardware shall be aluminum, 316 stainless steel, or as shown on the installation detail drawings.

C. The Contractor shall be responsible for providing a signal transmission system free from electrical interference that would be detrimental to the proper functioning of the remote telemetry equipment.

C. The Contractor shall be responsible for coordinating signal types and transmission requirements between the various parties providing equipment for the lift station under this Contract. This shall include, but not be limited to, distribution of appropriate shop drawings among the equipment suppliers, the electrical subcontractor, and the Control System Integrator.

2.04 FUNCTIONAL REQUIREMENTS

A. Three contiguous memory areas shall be provided within the RCP PLC for remote monitoring and control. One shall be provided for the monitoring of all monitored, values, statuses, and alarms and another shall be provided for all control commands. A third shall be provided for setpoints which may or may not be changed remotely. The configuration of these memory areas shall be coordinated with PWC to match a standard configuration used by their existing remote SCADA system.

B. Provision shall be made in the RCP PLC logic to suppress nuisance alarms and control actions by the use of adjustable time delays where needed. Initial settings for time delays shall be 10 seconds (range 0-999 seconds). In addition, process logic shall be used to suppress any alarms that are not applicable due to associated process or equipment status.

C. PLC processor statuses and communications faults shall be monitored and generate alarms.

D. The PLC shall store runtime values for all motorized equipment. The initial runtime values shall not automatically be assumed to be zero and shall be capable of being set / reset to a specified value.

E. Pump Fail-to-Start alarms shall be generated by the RCP if the Pump Run Status signal is not received by the PLC after an adjustable time delay (0-999 seconds, initial setting: 30 seconds) of issuing a Pump Start Command and a Pump RTU Control Enable.

F. Pump Fail-to-Stop alarms shall be generated by the RCP if the Pump Run Status signal is received by the PLC after an adjustable time delay (0-999 seconds, initial setting: 30 seconds) of issuing a Pump Stop Command and a Pump RCP Control Enable.

G. Pump Local Control Failure alarm shall be generated by the RCP if the Lead Pump On Level signal and one Pump Run Status signal is not received or if the Lag Pump On Level signal and two Pump Run Status signals are not received or if the Hig Level Alarm signal and two Pump Run Status signals are not received by the PLC after an adjustable time delay (0-999 seconds, initial setting: 60 seconds). Disable alarms for modes when a pump is not available for local control.

H. The RCP shall provide remote manual start/stop control of each pump when the Pump RCP Control Enable is remotely commanded. Remote manual control shall be interlocked to stop pumps on All Pumps Off Level signal.

I. Generator/ATS Failure alarm shall be generated if the Generator Run Status signal is not received after an adjustable time delay (0-999 seconds, initial setting: 60 seconds) while receiving a RCP Power Fail or Loss of Phase signal.

J. The RCP shall provide remote horn silence control of the lift station's pump control panel alarm horn. The output from the PLC shall be de-energized to disable the pump control panel's alarm circuit and silence the horn.

2.05 REMOTE CONTROL PANEL (RCPS)

A. Refer to applicable detail drawings contained within PWC's *Permit Design Manual* for additional requirements on the design, construction, and installation of Remote Control Panel (RCP).

2.06 CONTROL ENCLOSURES

A. Control enclosures (RCPs, cabinets, panels, boxes, etc.) shall be formed or welded construction, reinforced with Unistrut, Powerstrut, or equal to facilitate mounting of internal components or equipment. Enclosures with any dimension 36 inches or greater shall be provided with removable lifting lugs designed to facilitate safe moving and lifting of the panel during installation. No screws or bolts shall protrude through from the interior enclosure.

A. Enclosures shall be NEMA 4X stainless steel, All stainless steel enclosures shall be polished to a No. 4 finish.

B. Enclosures shall be fitted with pad-lockable latch kits. Door latches shall be all stainless steel, single handle latch, which do not require bolts or screws to secure. Gaskets shall be polyurethane.

C. Enclosures shall provide mounting for radios, PLCs, power supplies, control equipment, input / output subsystems, panel mounted equipment, and appurtenances. Ample space shall be provided between equipment to facilitate servicing and cooling. Enclosures shall be sized to adequately dissipate heat generated by equipment mounted inside the panel.

D. The temperature inside each Remote Control Panel (RCP). enclosure shall be continuously monitored, and shall generate an alarm to the nearest PLC if the temperature rises to an adjustable, preset high temperature.

E. Enclosures shall be prefabricated cabinets and panels by Hoffman, Rittal, or Saginaw. The Contractor may optionally provide enclosures custom fabricated by a reputable panel fabrication shop acceptable to the Engineer.

2.07 UNINTERUPTIBLE DC POWER SUPPLY

A RCPs shall be provided with an uninterruptible DC power supply to provide power conversion and backup power in the event of utility power failure. During normal operation, the power supply shall convert 120 VAC to the required DC voltages (12v, 24v) and provide a maintenance charge to the batteries. On power failure the batteries shall provide power. A separate DC-DC power converter may be required if the power supply does not provide 24 VDC for controls and 12 VDC for the radio. The uninterruptible DC power supply shall include, but not be limited to the following:

1. Battery charging circuit.
2. Status lights indicating operating mode and battery charge.
3. Dry contact output for power failure, wired into the RCP/PLC I/O to represent primary power status.
4. Dry contact output for low battery, wired into the RCP/PLC I/O.
5. Battery backup power shall be provided for a minimum of 4 hours.

2.08 CONTROL OPERATORS

A Control operators such as pushbuttons (PB), selector switches (SS), and pilot lights (PL) shall be Cutler-Hammer/Westinghouse Type E34, Square D Company Type SK, or equal. Control operators shall be 30.5 mm, round, heavy-duty, oil tight NEMA 4X corrosion resistant. Pushbuttons shall be non-illuminated, spring release type. Pushbuttons shall include a full guard.

2.09 LIGHTNING PROTECTION AND/OR TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

A. Lightning protection and TVSS shall be provided to protect all electronic equipment from multiple lighting strikes, power surges, and adverse conditions on all antenna cables and power feeds.

B. INSTALLATION AND GROUNDING OF LIGHTNING PROTECTORS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

C. AC line TVSS shall be mounted inside of the equipment's enclosure where practical. In other locations, the TVSS shall be mounted immediately adjacent to the protected device in a NEMA 4X enclosure. Each TVSS shall have the capability to withstand repeated surge currents of at least 20,000 amps peak at 8 x 20 microsecond wave. Performance shall be equal and reliable for surges of either polarity. TVSS devices for power shall be Edco, Phoenix Contact, or approved equal.

SCADA TELEMETRY PLC

Programmable logic controllers supplied shall be Allen-Bradley, 1768/1769 CompactLogic series processor CompactLogic 5370 L2 controller. Provide all required communication modules and ports, I/O modules, cables, chassis and power supplies, etc. Provide an Operator Interface Terminal, exact model number and at the locations as shown on the equipment list herein.

Operator Interface Terminals shall be Red lion.

HUMAN MACHINE INTERFACE SOFTWARE (HMI):

The HMI software shall be Trihedral Software VTScada. 1K runtime

The information collected by the process system shall be displayed on graphic and alphanumeric displays. The graphic displays shall be developed at a minimum 1024 X 768 resolution using at minimum a palette of 32,000 colors. It shall be possible to import Auto CAD or other windows standard graphic file formats for use as symbols or displays. The process displays shall be created using an object oriented graphics and animation editor. Displays shall contain the necessary text, analog values, analog totals, digital status, digital totals, results of math calculations, trends and control status to accurately depict the plant process and control system.

The supervisory system shall consist of an operator interface software system which includes support for process supervisory control, data acquisition, alarming, trending, and report generation. It shall utilize object based graphics and object based development. The HMI shall have an open architecture that allows the system to run in a multitasking environment with support for on-line, dynamic data exchange with other applications such as spreadsheets, and database programs. The system shall have the built-in flexibility to permit easy configuration of the system in accordance with the specific objectives of the end user as well as quick and easy modification of the end application by the user in the field.

The operator shall be able to access displays using soft key menus with a choice of function keys, mouse pointer, cursor control keys, or any key on the keyboard.

The system shall support operator access to multiple displays at one time, including split screens where the operator may view more than one process area at a time. In addition, the system shall support unlimited use of pop-up displays for additional help or diagnostic information.

All displays shall be password-protectable against unauthorized use.

Visibility of command buttons, symbols, etc. shall be controllable based upon the operator's security level.

The operator shall be able to have access to context sensitive help at any time during operation of the system.

The operator shall be prompted by a pop-up display to acknowledge an alarm, and then be given the opportunity to go to an alarm summary display or return to the previous display.

MEDIA CONVERTORS

PUMP CONTROL PANEL & TELEMETRY TO BE COMBINED IN ONE ENCLOSURE. PROVIDE TO RECIEVE FIBRE OPTIC CABLE. FIBER COMMUNICATION PROTOCOL TCPIP-CIP & CELLULAR COMMUNICATION PROTOCOL DNP3.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Properly store, adequately protect, and carefully handle equipment and materials to prevent damage before and during installation. Handle, store, and protect equipment and materials in accordance with the manufacturer's recommendations. Replace damaged or defective items.

B. All software and configuration programs shall be complete and tested prior to the respective equipment being shipped to site.

C. All outdoor equipment and enclosures shall be grounded using the practice defined in Section 800.40 of the National Electric Code.

3.02 TESTING, GENERAL REQUIREMENTS

A. The Control System Integrator shall test all equipment hardware and software at the factory prior to shipment.

B. The Contractor shall require the Control System Integrator to coordinate all of his testing with himself, all affected subcontractors, and PWC.

C. The Engineer reserves the right to test or retest all specified functions whether or not explicitly stated in the prior approved test procedures. The Engineer's decision shall be final regarding the acceptability and completeness of all testing.

D. All specified signals and RCP functions shall be field tested from their primary actuation or process measurement to the radio transmission of RCP memory registers to PWC’s existing

remote SCADA system. The Control System Integrator shall coordinate with PWC and their existing remote SCADA system to be used in the testing of the lift station remote telemetry.

3.03 All controls and wiring shall be furnished and installed in accordance with the NEC and any applicable State and local codes.

3.04 ASSEMBLY

A. All interior components shall be mounted on a panelboard which shall be mounted within the enclosure.

B. All control equipment shall be operational and all lights visible on the interior door. Holes cut through the interior door shall be located and cut by the manufacturer of the control center, with care taken to prevent rough edges. The interior door shall be of such strength, thickness, and bracing (as required by enclosure manufacturer) to prevent any significant sagging or flexing after the holes have been cut and the equipment mounted.

C. The pump station control center and telemetry shall be fully assembled and tested prior to shipment. Isolation between the high level and low level signals shall be provided in the enclosure if required.

3.05 SYSTEM ACCEPTANCE TEST (SAT)

A. The Control System Integrator shall perform an unwitnessed test to completely test the system in preparation for the witnessed test by PWC and the Engineer. The Control System Integrator shall submit a letter certifying that the system has been completely tested successfully and is ready for witnessing by PWC and the Engineer. Within 2 weeks of receiving the letter the witnessed test shall be scheduled.

B. After all functions have been tested and all corrections made, the system shall operate continuously for 15 days without failure before this test will be considered successful.

C. As part of the list station Remote Telemetry System testing, all system input and output signals shall be tested to verify that these signals are correctly transmitted from the field equipment (CP's, starters, valves, instruments, switches, etc.) through the wireless and other network media to the existing HMI computer screens at the PWC's facilities.

3.06 WARRANTY:

A. The warranty period for this system shall be for one year and shall begin upon acceptance of the completed lift station by PWC. During this warranty period, the Control System Integrator shall provide, at no additional cost to the PWC, the services of a trained, competent, field service engineer who shall arrive on site within 36 hours of notification

by the PWC or Engineer, to repair and/or replace any faulty device or equipment supplied by the Control System Integrator as part of the lift station Remote Telemetry System. All preventive and corrective activities shall be documented with service reports, which shall identify the equipment being serviced, state the condition of the equipment, describe all work performed, and list materials used. A copy of all service reports shall be delivered to the PWC on or before the next business day.

B. The Control System Integrator shall be capable of providing, after the warranty period for this system expires, a 1-year renewable service contract whereby a trained, competent field service engineer shall arrive on site within 36 hours of notification by the PWC. Information relative to charges for such service and availability of such service shall be submitted to the PWC and the Engineer.

PART 4 –REMOTE TELEMETRY INPUT / OUTPUT SCHEDULE

4.01 The following table lists required remote telemetry inputs and outputs (I/O).

1. Input / Output types are as follows:

    a. DI - Discrete Input (dry contact to RTU)
    b. DO - Discrete Output (dry contact from RTU)

4.02 The following notes apply to the Remote Telemetry I/O Schedule.

1. This output is normally energized to enable the alarm horn.

Duplex Lift Station Input / Output Schedule						
To Control Panel	From Equipment	Type	Description	Open State	Close State	Notes
PLC	Pump Control Panel	Digital In	Wet Well Float High	OK	Alarm	
PLC	Pump Control Panel	Digital In	Wet Well Float Lag	Off	Lag Start	
PLC	Pump Control Panel	Digital In	Wet Well Float Lead	Off	Lead Start	
PLC	Pump Control Panel	Digital In	Wet Well Float OFF	Off Level	On	
PLC	Pump Control Panel	Digital In	Wet Well HI Limit Override	OK	Alarm	
PLC	Pump Control Panel	Digital In	High Limit Float Control Reset PB	Off	On	
PLC	Pump Control Panel	Digital In	Main CB Aux Contact	Off	On	
PLC	Pump Control Panel	Digital In	Main CB Aux Contact Tripped Signal	OK	Alarm	
PLC	Pump Control Panel	Digital In	Main Service Voltage/Phase Fail	Alarm	Ok	
PLC	Pump Control Panel	Digital In	120V Control Power Normal Status	Alarm	Ok	
PLC	Pump Control Panel	Digital In	E-Stop Status	OFF	OK	
PLC	Pump Control Panel	Digital In	Panel UPS "On Battery" Status	OK	Alarm	
PLC	Pump Control Panel	Digital In	Pump 1 Running	Off	On	
PLC	Pump Control Panel	Digital In	Pump 2 Running	Off	On	
PLC	Pump Control Panel	Digital In	Control Panel Door Switch	Alarm	Off	
PLC	Pump Control Panel	Digital In	Panel UPS "Ready" Status	Alarm	Ok	
PLC	Pump Control Panel	Digital In	Panel UPS "Replace Battery"	Alarm	Ok	
PLC	Pump Control Panel	Digital In	Pump 1 Selector SW In Auto	Off	Auto	
PLC	Pump Control Panel	Digital In	Pump 1 Selector SW In Local	Off	Local	
PLC	Pump Control Panel	Digital In	Pump 1 MSP Tripped/OFF	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Pump 1 Seal Failure	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Pump 1 High Temperature	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Pump 2 Selector SW In Auto	Off	Auto	
PLC	Pump Control Panel	Digital In	Pump 2 Selector SW In Local	Off	Local	

PLC	Pump Control Panel	Digital In	Pump 2 MSP Tripped/OFF	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Pump 2 Seal Failure	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Pump 2 High Temperature	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Automatic Transfer Switch in Utility Position	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Automatic Transfer Switch in Generator Position	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Generator Running Status	Off	On	
PLC	Pump Control Panel	Digital In	Generator Fault Status	Ok	Alarm	
PLC	Pump Control Panel	Digital In	Phase Monitor	Alarm	Ok	
PLC	Pump Control Panel	Digital In	Pump 1 Fault	Alarm	Ok	
PLC	Pump Control Panel	Digital In	Pump 2 Fault	Alarm	Ok	
PLC	Pump Control Panel	Digital Out	Pump 1 Run	Off	On	
PLC	Pump Control Panel	Digital Out	Pump 2 Run	Off	On	
PLC	Pump Control Panel	Digital Out	PLC OK	Off	On	
PLC	Pump Control Panel	Digital Out	Remote Alarm Silence	Off	On	
PLC	Pump Control Panel	Digital Out	Remote Alarm Reset	Off	On	
PLC	Pump Control Panel	Digital Out	Cell Modem Power Cycle	Off	On	
PLC	Pump Control Panel	Analog In	Wet Well Level Transmitter			4-20ma = 0-20Ft
PLC	Pump Control Panel	Analog In	Pump 1 Current	N/A	N/A	4-20ma
PLC	Pump Control Panel	Analog In	Pump 2 Current	N/A	N/A	4-20ma

*****END OF SECTION*****

SECTION 16010
ELECTRICAL LIFT STATIONS

PART I - GENERAL

1.1 THE REQUIREMENT

A. Furnish all labor, materials, equipment and incidentals required for a complete electrical installation for the Work associated with the Contract Documents, as hereinafter specified and shown on the Drawings. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Section shall be furnished at no extra cost. All workmanship shall be of the highest quality; sub-standard work will be rejected.

B. Certain equipment will be furnished as specified in other sections of these Specifications which will require mounting and wiring thereto and/or complete installation as indicated. All materials necessary for the complete installation shall be furnished and installed by the Contractor to provide complete power, lighting, communication systems, instrumentation, wiring, and control systems as indicated on the Drawings and/or as specified herein.

C. Provide complete grounding systems for all equipment and structures as required by the National Electric Code (NEC), as specified herein, shown on the contract documents, and as required for specific pieces of equipment per manufacturer.

D. The work shall include complete testing of all equipment and wiring at the completion of the work arid making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment.

E. Electrical work shall conform to the construction schedule and progress of other trades. All power interruptions to existing equipment shall be at the PWC's convenience. Each interruption shall have prior approval.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Mount and wire control panels and process instruments furnished under other Divisions of these Specifications unless specifically stated otherwise. For process instrumentation, furnish and install all conduit, wire and interconnections between primary elements, transmitters, local indicators, surge protection devices and receivers.

B. Mount and wire electric heaters, and heat tracing furnished under other Sections of this Specification.

C. Lift Station Specifications

1. Refer to the equipment and controls specified within the following applicable lift station specifications:
   a. Section 02753 Submersible Pump Lift Station
   b. Section 02754 Self-Priming Lift Station

D. Remote Telemetry

1. Refer to the equipment and controls specified within the Specification Section 13446 Remote Telemetry, Lift Stations.

E. Automatic Transfer Switch

1. Refer to the equipment and controls specified within the Specification Section 16619 Automatic Transfer Switch.

F. Standby Generator

1. Refer to the equipment and controls specified within the Specification Section 16622 Standby Generator.

G. Duplex Pump Station Control Center

1. Refer to equipment and controls specified within the Specification Section 16912 Duplex Pump Station Control Center

H. Additional related sections include but are not necessarily limited to the following:

1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 1- General Requirements.
3. Section 03301- Concrete Construction.

1.3 CODES AND STANDARDS:

A. The electrical system and associated equipment shall comply with the following codes and standards as well as any others within the specifications and drawings.

1. Applicable federal, state, county, and municipal code requirements.

2. PWC Water Resources Manual for the Design and Construction of Water and Wastewater System Extensions.

3. Applicable standards of the National Fire Protection Association (NFPA)
   a. National Electrical Code (NEC).

b. National Electric Safety Code

4. American Iron and Steel Institute {AISI):

a. Steel Products Manual - Stainless and Heat Resisting Steel.

5. American Society for Testing and Materials (ASTM):

a. A36, Specification for Structural Steel.
b. Al53, Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
c. D698, The Moisture-Density Relations of Soils using a 5.5 LB Rammer and a 12-inch Drop.

6. Factory Mutual System (FM):

a. A Guide to Equipment, Materials and Services.

7. Institute of Electrical and Electronics Engineers (IEEE):

a. 141, Recommended Practice for Electrical Power Distribution for Industrial Plants.
b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.

8. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 V Maximum)
b. 1CS 6, Enclosures for Industrial Control and Systems

9. National Fire Protection Association (NFPA):

a. 70, National Electrical Code (NEC).
b. 70E, Standard for Electric Safety in the Workplace
c. 79, Electrical Standard for Industrial Machinery
d. 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities

10. Underwriters Laboratories. Inc (UL):

a. 508, Industrial Control Equipment
b. 508A, Industrial Control Panels
c. 698, Industrial Control Equipment for Use in Hazardous Locations.

B. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations shall apply:

1. American Association of State Highway and Transportation Officials (AASHTO).
2. American Iron and Steel Institute (AISI).
3. American National Standard Institute (ANSI).
4. American Society for Testing and Materials (ASTM).
5. ETL Testing Laboratories, Inc (Eli).
6. Insulated Cable Engineers Association (ICEA).
7. Institute of Electrical and Electronic Engineers (IEEE).
8. Illuminating Engineering Society of North America (IES).
9. Instrument Society of America (ISA).
10. Lightning Protection Institute (LPI).
11. National Electrical Manufacturers Association (NEMA).
12. National Fire Protection Association (NFPA).
13. Occupational, Health and Safety Administration (OSHA).
14. Underwriters Laboratories Inc (UL).

C. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, drawings and specifications, or within either document itself, the more stringent condition shall govern.

1.4 AREA CLASSIFICATIONS

A. Outdoor Areas: Those locations on the project site where the equipment is normally exposed to wind, dust, rain, snow, etc. Outdoor areas include areas protected by a roof or rain/ sun shields but not enclosed within four walls of a structure. Outdoor locations may contain wet, corrosive and hazardous areas:

1. Corrosive and hazardous areas are specified herein or identified on the Drawings. Areas not identified as such shall be considered wet.

B. Indoor Areas: Those locations on the project site where the equipment is normally protected from wind, dust, rain, snow, etc. Indoor locations may contain unclassified, damp, wet, corrosive and hazardous areas:

1. Damp, wet, corrosive and hazardous areas are specified herein or identified on the Drawings. Areas not identified as such, but provided with heating shall be considered unclassified. Areas not identified as such, but provided without heating shall be considered damp.

C. Hazardous Locations:

1. Hazardous locations shall be as defined in NFPA 70 NEC, NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities, and other applicable standards or codes governing the classification of a particular type of facility or location. In addition, areas

are classified as shown on drawings and as follows:

a. Class I Division 2 areas are identified on Drawings and at the following locations:

1) Residential Only Wastewater (Sewer) Pump Station Wetwells. Systems of 5 or less residences are not classified as a hazardous location.
2) Wastewater Pump Station Drywells.
3) Dry areas of enclosed wastewater piping (i.e. valve vaults, meter vaults, etc.).

b. Class I Division 1 areas are identified on Drawings and at the following locations:

4) Wastewater Pump Station Wetwells.

1.5 SUBMITTALS:

A. Every submittal with any deviations or exceptions from Contract Documents shall have a separate section entitled "Requested Deviations from Electrical System Specifications" which shall clearly define and explain all deviations and exceptions to this specification and corresponding drawings detailing the electrical system requirements.

B. Shop Drawings:

1. Shop drawings shall be arranged and labeled according to specifications section and/ or contract documents.
2. Submit shop drawings prior to purchase or fabrication of equipment. See individual specification sections for specific requirements.
3. Prior to submittals of shop drawings, coordinate electrical equipment, particularly motor control equipment, control panels, and instrumentation, with all applicable equipment and systems interfacing that equipment.
4. Submittals shall be made in the following combinations:

a. Conduits, busway, wireway, cable tray, ductbank details, wire and cable 600 V and below, boxes, fittings, and wiring devices.
b. Motor control centers and control equipment, low voltage switchboards, safety switches, dry-type (specialty) transformers, panelboards, power factor correction capacitors, grounding.
c. Lamps, interior lighting, exterior building lighting, site lighting.
d. Provide a conductor identification schedule for all power, control, communication and protective circuits. The schedule shall include the following information:

1) Conductor identification number.
2) Conductor size.
3) Number of conductors.
4) Type of conductor.
5) Size of conductor.
6) Size of conductor usage descriptions.
7) Conductor run (to and from).
8) Conduit size and type.

5. For each product, clearly identify manufacturer by name.
6. Provide manufacturer's technical information on products to be used, including:
   a. Product descriptive bulletin.
   b. Electrical data pertinent to the project and necessary to assure compliance with Specifications and Drawings.
   c. Equipment dimensions, where applicable.
   d. Evidence that the products submitted meet the requirements of the standards referenced.
7. When general data sheets are provided as part of the submittal, specifically identify the products to be used on this project.
8. Ensure that all submittals clearly indicate the equipment is UL or ETL listed or is constructed utilizing UL or ETL listed or UL recognized components. Where a UL standard has not been established, clearly identify that no UL standard exists for that equipment.
9. For all equipment, provide manufacturer's installation instructions.

C. Two copies of manufacturer's warranties.

D. When a quality standard has been established by identification of a specific manufacturer or catalog number, submittals for proposed alternates and substitutions shall include:

1. Alternate and substitute equipment cross-referenced to the equipment it is replacing. Submittal shall be marked to show how differences will be accommodated.
2. Calculations and other detail data to allow determination of alternate and substitute equipment equivalency to the equipment it is replacing. Data supplied shall allow detailed comparison of all significant characteristics upon which the design equipment is based.
3. Dimensioned drawings, of the same or larger scale as the Contract Drawings, for all alternate and substitute equipment which differs in size, configuration, service accessibility or in any significant way from the equipment it is replacing.

   a. Complete system layout except that portion which is identical to the Contract Document Drawings.
   b. Redesign and modifications to all work required by the alternate or substitute equipment.

E. Operation and Maintenance Manuals: Shall be submitted according to the individual specification section, contract drawings and/or contract documents.

F. Record Drawings:

1. The Contractor shall maintain a marked up set of Contract Document Drawings showing actual installed circuit numbers, conduit sizes, cable tray routing, number of conductors, conductor sizes (other than #12) and

   all other deviations from the design drawings.

2. All underground conduit and concealed items shall be dimensioned on the Drawings from permanent, visible, building features.
3. Provide actual motor size, starter size, and heater size, along with all other protective equipment for all motor circuits as part of the one-line record drawings.
4. Revise all conductor identification and circuit schedules to indicate as installed conditions.

1.6 DELIVERY, STORAGE. AND HANDLING

A. The Contractor shall unload and handle materials using methods, rigging, and equipment that will prevent damage to the materials. Care shall be used to prevent damage to painted and galvanized surfaces.

1. Bare wire rope slings shall not be used for unloading and handling materials and equipment, except with the specific written permission of the Engineer.

B. Stored equipment and materials shall be adequately supported and protected to prevent damage.

F. Stored materials and equipment shall not be allowed to contact the ground.

2. Equipment and materials which incorporate electrical equipment or which have finished painted surfaces, and other items which would be damaged by outdoor exposure, shall be stored indoors.

   a. Provide covering and shielding for all equipment to protect from damage.
   b. When such storage would present an unreasonable building space or volume requirement, the equipment or materials may, when acceptable to the Engineer, be stored under weatherproof coverings on shoring or platforms.

3. All small loose items that could be easily lost, stolen, broken, or misused shall not be stored on open platforms or shoring.

4. All storage methods and schedules shall be acceptable to the Engineer.

C. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage-either inside or on top of enclosures.

D. Project nameplates on electrical equipment to prevent defacing.

E. Repair, restore or replace damaged, corroded and rejected items at no additional cost to the PWC.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS:

A. In accordance with North Carolina Building Code Council, all electrical utilization equipment famished and installed under this Contract, including all electrical instrumentation and equipment control panels, instrument devices, power distribution equipment, electric valve actuators, and miscellaneous electrical devices, shall bear the label of a North Carolina approved nationally recognized testing laboratory (NRTL). The label shall convey the laboratory's declaration of the equipment safety and suitability for intended use on this project. A list of the approved testing laboratories per equipment type is available at the following web address:

www.ncdoi.com/OSFM/Engineering/BCC/engineering_bcc_third_party.asp

B. Shop Fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established. When equipment is shop fabricated for the project, the electrical devices and enclosures utilized shall be UL or ETL listed and labeled or shall be UL recognized.

C. Outdoor equipment may be subjected to wind, rain, lightning, and corrosives in the environment with ambient temperatures from -20 to 40 degrees C and relative humidity from 10 to 95 percent. All supports, brackets and interconnecting hardware shall be 316 stainless steel or as shown on the installation detail drawings.

D. Trade names and catalog numbers may be used in the Drawings or Specifications to establish quality standards and basics of design.

E. Layout dimensions will vary between manufacturers and the layout area indicated on the drawings is based on typical values. Contractor shall review the contract drawings, the manufacturer's layout drawings and installation requirements, and make any modifications required for proper installation subject to acceptance by Engineer.

F. Shop or Factory Finishes: Interiors of other painted equipment shall be either white or light gray.

G. Enclosures for use with Electrical Equipment shall be provided as follows unless specifically shown or specified elsewhere in the Contract Documents:

1. NEMA 12: Use in unclassified indoor locations.

2. NEMA 3R: Use with non-electronic equipment in wet outdoor locations protected from weather by means of a roof or rain/sun shield as approved by the Engineer.

3. NEMA 4:

   a. Use in wet indoor locations.
   b. Use in wet outdoor locations. Enclosed electronic equipment shall be provided with rain/ sun shields.

4. NEMA 4X: Use in all corrosive locations.

   a. Nonmetallic enclosures shall not be used in areas subject to physical damage or sun without approval by the Engineer.
   b. Outdoor locations for enclosed electronic equipment shall be provided with rain/ sun shields.

5. NEMA 7: Use in all Class I Division {1} {2}, Group {A}, {B}, {C}, {D} locations.

   a. Unless other enclosures are approved and UL listed for the application.

6. NEMA 9: Use in all Class II. Division {1} {2}, Group {E} {F} {G} and Class III, Division {1} {2} locations.

   a. Unless other enclosures are approved and UL listed for the application.

7. Exceptions:
   a. As modified in other specification sections.
   b. As otherwise indicated on the Drawings.

2.2 WIRE AND CABLE

A. The wire and cable to be furnished and installed for this project shall be the product of manufacturers who have been in the business of manufacturing wire and cable for a minimum of ten (10) years. It is intended to be standard equipment of proven performance as manufactured by the Okonite Company. BICC Industrial Cable Company (Cablec), or approved equal. Wire and cable shall be designed, constructed and installed in accordance with the best practices of the trade, and shall operate satisfactorily when installed as specified herein and shown on the Drawings. Only one manufacturer for each cable type shall be permitted.

B. 600 Volt Power Wire and Cable: 600 volt power cable and wire shall consist of stranded copper conductor with insulation rated THHN, 90°C for wet locations and THWN, 75°C for dry locations, 600 volt cable and wire for below grade service entrances or below grade runs between structures shall consist of stranded, copper conductor with insulation rated XHHN-2, 90°C for wet or dry locations. Conductors shall be tin or alloy coated, stranded copper per ASTM-B8, B-33 and B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum size wire shall be No. 12 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. 600 volt individual power wire and cable shall be Okoseal-N as manufactured by the Okonite Company, BICC industrial Cable Company (Cablec) equivalent, or approved equal. Multi-conductor power cables shall be Okoseal-N Type TC Cable as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal. All #10 AWG and #12 AWG wire shall be solid.

C. 600 Volt Control Cable: 600 volt control cable shall consist of stranded, copper conductor with insulation rated THHN, 90° C for dry locations and THWN, 75° C for wet locations. The individual conductors of the multiple conductor cable shall be color coded for proper identification. Color coding shall be equal to ICEA S-68-514, Table K-I. Cables shall meet requirements of IEEE-383. Conductors shall be tin or alloy coated, stranded copper per ASTM B-8 and B 33 or B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum wire size shall be No. 14 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. 600 volt individual conductor control wire shall be Okoseal-N as manufactured by the Okonite Company. BICC Industrial Cable Company (Cablec) equivalent, or approved equal. Multi-conductor control cable shall be Okoseal-N Type TC Cable as manufactured by the Okonite Company, BICC Industrial Cable Company (Cablec) equivalent, or approved equal. All wire shall be color coded by pigmentation.

D. Lighting and Receptacle Wire and Cable: The lighting and receptacle branch circuit wire shall consist of solid, copper conductors with insulation rated THHN, 90°C for wet locations and THWN, 75°C for dry locations. Conductors shall be tin or alloy coated, stranded copper per ASTM-B8, B-33 and B-189, Class B or C stranding contingent on the size unless otherwise specified. Minimum size wire shall be No. 12 AWG. Uncoated conductors shall only be allowed if specifically accepted by the Engineer. Lighting and receptacle cables and wire shall be Okoseal-N as manufactured by the Okonite Company, BICC Industrial Cable

Company (Cablec) equivalent, or approved equal. All wire shall be color coded by pigmentation.

E. Instrumentation Cable: The instrumentation cable for analog signals shall be individually shielded twisted pair cable (TSP) or individually shielded twisted multi-pair cable (M#TSP, where # = number of pairs). Conductors shall be tin or alloy coated, soft, annealed copper, 16 AWG minimum with a minimum of 19 strands with 600 volt insulation rated for 75°C. Pairs shall have 100% coverage foil shields with an 18 AWG tinned copper drain wire. Outer jackets shall be chromed PVC. The instrumentation cable shall be Belden 8719 or Okonite Okoseal-N Type P-OS hit single pair applications and Okonite Okoseal-N Type SP-OS for multiple pair applications, or approved equal.

3. CONDUIT AND RACEWAYS

A. Rigid Steel Conduit (RGS): Rigid steel conduit shall be heavy wall hot-dip galvanized, shall conform to ANSI C80.1, and shall be manufactured in accordance with UL 6.

B Liquidtight Flexible Metal Conduit: Liquidtight flexible metal conduit shall be hot dip galvanized steel, shall be covered with a moisture-proof polyvinyl chloride jacket, and shall be UL labeled. Refer to PVC-Coated Rigid Steel Conduit for fittings, condulets, and mounting accessories in non indoor dry areas.

C. Rigid Nonmetallic Conduit (PVC): PVC conduit shall be heavy wall, Schedule 80, UL labeled for aboveground and underground uses, and shall conform to NEMA TC 2 and UL 651. PVC conduit shall be rated for direct sunlight exposure, 90°C wire and fire retardant with low smoke emission.

D. PVC-Coated Rigid Steel Conduit (RGS-PVC): The conduit shall be rigid steel. Before the PVC coating is applied, the hot dip galvanized surfaces shall be coated with a primer to obtain a bond between the steel substrate and the coating. The PVC coating shall be bonded to the primed outer surface of the conduit. The bond on conduit and fittings shall be stronger than the tensile strength of the PVC coating. The thickness of the PVC coating shall be at least 40 mils.

A chemically cured two-part urethane coating, at a nominal 2 mil thickness, shall be applied to the interior of all conduit and fittings. The coating shall be sufficiently flexible to permit field bending the conduit without cracking or flaking of the coating.

Every female conduit opening shall have a PVC sleeve extending one conduit diameter or 2 inches, whichever is less, beyond the opening. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit before coating. The wall thickness of the sleeve shall be at least 40 mils.

All fittings, condulets, mounting hardware, and accessories shall be PVC coated. All hallow conduit fittings shall be coated with the interior urethane coating described above. The screw heads on condulets shall be encapsulated by the manufacturer with a corrosion-resistant material.

PVC coated rigid steel conduit shall be manufactured by Ocal, Perma-Cote, Robroy, or approved equal.

2.4 BURIED ELECTRICAL WARNING TAPE

A. All buried conduits, wire, and ductbanks shall be provided with warning tape. Warning tape shall be constructed of 3.5 mils thick x 6 inches wide polyethylene with a magnetic layer, have a tensile strength of 1750 psi, and have a continuous preprinted permanently imbedded warning message.

2.5 JUNCTION BOXES, PULL BOXES. AN GUTTERS

A. Indoor boxes (larger than switch. receptacle, or fixture type) and gutters shall be constructed of sheet steel, shall be galvanized after fabrication, and shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.

B. Indoor boxes and gutters in corrosive or wet areas indicated on the drawings and outdoor boxes and gutters shall be NEMA Type 4X, ABS or stainless steel and shall be rigidly supported by PVC coated or stainless steel framing materials. Mounting hardware, which includes nuts, bolts, and anchors, shall be stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.

C. Bolt on box covers with any dimension larger than 3 feet or heavier than 25 lbs shall have rigid handles. Covers larger than 3 by 4 feet shall be split.

2.6 DISCONNECT/ SAFETY SWITCHES

A. Unless otherwise specified or shown, each disconnect switch shall be 3 pole, nonfusible, 600 volts, with a continuous current rating as indicated on the drawings.

B. Switches shall be NEMA Type HD, heavy duty, single throw, externally operated, fused or non-fused as required. Switches shall have high conductivity copper, visible blades; nonteasible, positive, quick make, quick break mechanisms; and switch assembly plus operating handle as an integral part of the enclosure base. Each switch shall have a handle whose position is easily recognizable and which can be locked in the "Off" position. The "On" and "Off" positions shall be clearly marked. Switches shall have defeat able door interlocks that prevent the door from being opened while the operating handle is in the "On" position.

C. Disconnect Switches shall be provided in following enclosures as a minimum based on their location, Multiple ratings of enclosures may apply.

I. Indoor dry areas: NEMA 1A
2. Indoor damp areas: NEMA 12
Corrosive or indoor wet process areas: NEMA 4X 316 stainless steel.
4. Outdoor areas: NEMA 12/3R with exterior rain/ sun shield that covers back of enclosure and extends at least 18 inches from sides and front; otherwise NEMA 4X in outdoor areas.
5. Hazardous areas: suitable for the Class, Division, and Group to suit the application.

D. A complete set of fuses for all switches shall be furnished and installed as required. Time current characteristic curves of fuses serving motors or connected in series with circuit breakers shall be coordinated for proper operation. Fuses shall have voltage rating not less than the circuit voltage. When equipment is shop fabricated for the Project, the electrical devices and enclosures utilized shall be UL or ETL listed and labeled or shall be CL recognized.

E. Switches shall be manufactured by Square D. Cutler-Hammer, General Electric, or approved equal.

2.7 SEPARATELY ENCLOSED CIRCUIT BREAKERS

A. Unless otherwise specified or shown, circuit breakers shall be 3 pole, 230/480 volt, molded case circuit breakers of not less than 25,000 amperes interrupting rating at 480 volts AC, complete with thermal and instantaneous trip elements.

B. Breaker enclosures shall have NEMA designations appropriate for the locations where they will be installed. NEMA Type 4X stainless steel enclosures shall be provided for outdoor locations. Each breaker shall be manually operated with a quick make, quick break, trip free toggle mechanism. Bimetallic thermal elements shall withstand sustained overloads and short circuit currents without injury and without affecting calibration.

C. Circuit breakers shall have an operating handle as an integral part of the enclosure base. Each circuit breaker shall have a handle whose position is easily recognizable and which can be locked in the “Off” position. The “On” and “Off” positions shall be clearly marked. Circuit Breakers shall have defeatable door interlocks that prevent the door from being opened while the operating handle is in the “On” position.

D. Circuit breakers shall be provided in following enclosures as a minimum based on their location. Multiple ratings of enclosures may apply.

1. Indoor dry areas: NEMA 1A

2. Indoor damp areas: NEMA 12
3. Corrosive or indoor wet process areas: NEMA 4X 316 stainless steel or non-metallic
4. Outdoor areas: NEMA 12/3R with exterior rain/ sun shield that covers back of enclosure and extends at least 18 inches from sides and front; otherwise NEMA 4X in outdoor areas.
5. Hazardous areas: suitable for the Class, Division, and Group to suit the application.

E. Circuit Breakers shall be manufactured by Square D. Cutler-Hammer, General Electric, or approved equal.

2.8 PANELBOARDS

A. Each lighting or power panel shall be a dead front. 120/240 volt, single phase or 120/230 volt, or 277/480 volt three phase panelboard with circuit breakers in accordance with the drawings and as specified.

B. Cabinet: The panel shall have a flush-mounted or surface-mounted enclosure with a NEMA designation appropriate for the location where it will be installed. The enclosure shall have a door with latch and lock. At the completion of the contract, a neatly printed or typed directory listing the panel and circuit identities shall be mounted inside the door.

C Circuit Breakers: Circuit breakers shill be thermal magnetic, bolt in, individually front replaceable, and shall indicate “On” “Off”, and “Tripped”. Breakers indicated as multiple pole shall be common trip type. Breakers up to 240 volts shall have interrupting ratings not less than 22,000 amperes. Breakers for 277 volts shall have interrupting ratings not less than 25,000 amperes. Breakers for 480 volts shall be rated 600 volts, with interrupting ratings not less than 25,000 amperes at 480 volts. Handle clips to prevent casual operation of breakers shall be provided for 10 percent (at least two) of the breakers and applied to the circuits directed.

D Buses: The panel shall have main and neutral buses insulated from the cabinet and a ground bus. Buses shall be copper, with ampere ratings and main lugs or breaker as indicated. The ground bus shall be similar to a neutral bus and shall have a good ground connection to the cabinet, a removable bond to the neutral bus, clamp type lugs for the ground cable in each supply conduit, and connections for a ground cable in each load conduit.

E. Panelboards shall be manufactured by Square D. Cutler-Hammer. General Electric, or approved equal.

2.9 LIGHTING AND AUXILIARY POWER TRANSFORMERS

A. Separately mounted transformers shall be provided in the phases, kVA, and voltages indicated on the drawings. Transformers shall be self air cooled, dry type, wall or floor mounted, and enclosed for wiring in conduit. Transformers installed outdoors shall be weatherproof. Transformers shall have at least two full capacity voltage taps. Transformers shall meet NEMA TP I guidelines for energy efficiency. Outdoor transformers shall be stainless steel encapsulated.

2.10 POWER CENTERS

A. Power centers shall consist of a primary breaker, a 480-120/240 volt or 480-120/208 volt transformer, a secondary breaker, and a distribution panelboard in a NEMA 4X stainless enclosure. Transmitter and circuit breaker configuration and ratings shall be as indicated on the drawings.

B. Transformers: Transformers shall be self-cooled, dry type. Transformers shall have at least two full capacity voltage taps.

C. Circuit Breakers: Circuit breakers shall be thermal-magnetic, bolt in, individually front replaceable, and shall indicate “On”, “Off” and “Tripped”. Breakers and provisions for future breakers shall be provided in the quantities, poles, and ampere ratings indicated on the drawings. Breakers shall be single pole, 20 amperes, except as indicated otherwise.

2.11 LIGHTING

A. Refer to light fixture schedule on the drawings.

2.12 OUTDOOR ELECTRICAL EQUIPMENT RACKS

A. Refer to outdoor equipment rack detail drawing.

PART 3— EXECUTION

3.1 POWER AND SERVICE ENTRANCE

A. Contractor shall consult the local electric utility regarding their service installation requirements, and shall furnish the service equipment in compliance with these requirements. Contractor shall install all power service equipment components except for components installed by the utility as directed in the utility service installation requirements.

B. Power service equipment to be furnished by Contractor shall include, but is not limited to, meter board, meter socket, meter test cabinet, meter transformer cabinet, disconnecting means, grounding materials, riser conduits, and other service entrance fittings required by the utility and for compliance with local codes and regulations.

C. Contractor shall also provide trenching and backfill, conduits, service cables, and

other underground service entrance fittings required by the utility for underground service installation.

D. A weatherhead shall be provided on each service riser conduit.

3.2 INSTALLATION

A. Equipment shall be installed in accordance with the requirements of the NEC.

B. Coordinate the installation of electrical equipment with other trades.

1. Arrange for the building in of equipment during structure construction.
2. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs, openings, etc., as required to allow installation of equipment after structure construction is complete.

C. Verify that equipment will fit layouts indicated.

D. Equipment Dimensions and Clearances:

1. Do not use equipment that exceeds the indicated dimensions, except as approved in writing by the Engineer.
2. Do not use equipment or arrangements of equipment that reduce required clearances or exceed the space allocation.

E. Install equipment in accordance with the manufacturer’s instructions.

F. Equipment Access:

1. Install equipment so it is readily accessible for operation and maintenance.
2. Equipment shall not be blocked or concealed.
3. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.

G. Equipment shall be installed plumbed, square and true with the structure construction and shall be securely fastened.

H. Outdoor wall-mounted equipment shall be provided with corrosion-resistant spacers to maintain 1/4 inch separation between the equipment and the wall.

I. Screen or seal all openings into outdoor equipment to prevent the entrance of rodents and insects.

J. Equipment fabricated from aluminum shall notbeplaced in direct contact with earth or concrete.

K. Provide all necessary anchoring devices and supports:

1. Use supports as detailed on the Drawings and as specified. Where not detailed on the Drawings or specified, use supports and anchoring devices rated for the equipment load and as recommended by the manufacturer.
2. Supports and anchoring devices shall be rated and sized based on dimensions and weights verified from approved equipment submittals.
3. Hardware shall be malleable type, corrosion resistant and shall be supported by heavily plated machine screws or brass, bronze or stainless steel bolts.
4. Do not cut, or weld to, building structural members.
5. Do not mount safety switches and external equipment to other equipment enclosures, unless enclosure-mounting surface is properly braced to accept mounting of external equipment.

L. Contractor shall verify exact rough-in location and dimensions for connection to electrical items furnished by others.

1. Shop drawings shall be secured from those furnishing the equipment.
2. Proceeding without proper information may require the Contractor to remove and replace work that does not meet the conditions imposed by the equipment supplied, at no cost to the Owner.
3. Provide sleeves wherever openings are required through new concrete or masonry members. Place sleeves accurately and coordinate locations with the Engineer.
4. Should any cutting and patching be required on account of failure of the Contractor to coordinate penetrations, such cutting and patching shall be done at the sole expense of the Contractor.

    a. Contractor shall not endanger the stability of any structural member by cutting, Digging, chasing, or drilling and shall not, at any time, cut or alter the work without the Engineer’s written consent.

        i. Provide additional reinforcing if required.
        ii. Cutting shall be done neatly using proper tools and methods.

    b. Subsequent patching to restore walls, ceilings, or floors to their original condition shall be done by workmen skilled in their particular field.

M. Provide concrete foundations or pads required for electrical equipment as indicated or specified.
    1. Floor-mounted equipment shall be mounted on a four (4) inch high concrete housekeeping pad. Pad shall be poured on top of the finished floor or slab.

N. To avoid interference with structural members and equipment of other trades, it may be necessary to adjust the intended location of electrical equipment. Unless specifically dimensioned or detailed, the Contractor may, at his discretion, make minor adjustments in equipment location without obtaining the Engineer's approval. Deviations in equipment location that are specifically dimensioned or detailed, or exceed those defined above require the Engineer's prior approval.

O. Device Mounting Schedule:

1. Dimensions are to center of item unless otherwise indicated.

2. Mounting heights as indicated below unless otherwise indicated on the Contract Drawings:

a. Light switch: 48 IN.
b. Receptacle in all other locations: 48 IN.
c. Disconnect/ Safety switch: 54 IN.
d. Panelboard (to top): 72 IN.
e. Motor starter: 54 IN.
f. Pushbutton motor control station: 48 IN.

3.3 CABLE INSTALLATION

A. General Except as otherwise specified or indicated on the drawings. cable shall be installed according to the following procedures, taking care to protect the cable and to avoid linking the conductors, cutting or puncturing the jacket, contamination by oil or grease, or any other damage.

1. Stranded conductor cable shall be terminated by lugs or pressure type connectors. Wrapping stranded cables around screw type terminals is not acceptable.

2. Stranded conductor cable shall be spliced by crimp type connectors. Twist-on wire connectors may be used for splicing solid cable and for terminations at lighting fixtures.

3. Splices shall be made only at readily accessible locations.

4. Cable terminations and splices shall be made as recommended by the cable manufacturer for the particular cable and service conditions. All shielded cable stress cone terminations shall be IEEE Class 1 molded rubber type. Shielded cable splices shall be tape or molded rubber type as required. Shielded cable splices and stress cone terminations shall made by qualified splicers. Materials shall be by 3M Company, Plymouth/Bishop, Raychem Electric Power Products, or approved equal.

5. Cable shall not be pulled tight against bushings nor pressed heavily against

enclosures.

6. Cable-pulling lubricant shall be compatible with all cable jackets: shall not contain wax, grease, or silicone; and shall be Polywater “Type J”.

7. Spare cable ends shall be taped, coiled, and identified.

8. Cables shall not be bent to a radius less than the minimum recommended by the manufacturer.

9. All cables in one conduit, over I loot long, or with any bends, shall be pulled in or out simultaneously.

10. Circuits shall not be combined to reduce conduit requirements unless acceptable to Engineer.

B. Underground Cable Pulling Procedure: Care shall be taken to prevent excessive physical stresses that would cause mechanical damage to cables during pulling.

3.4 CONDUIT INSTALLATION.

A. Contractor shall be responsible for routing all conduits. This shall include all conduits indicated on the one-lines, riser diagrams, and home-runs shown on the plan drawings. Conduits shall be routed as defined in these specifications. Where conduit routing is shown on plans, it shall be considered a general guideline and shall be field verified to avoid interferences.

B. Except as otherwise specified or indicated on the drawings, conduit installation and identification shall be completed according to the following procedures.

C. Installation of Interior and Exposed Exterior Conduit. This section covers the installation of conduit inside structures, above and below grade, and in exposed outdoor locations. In general, conduit inside structures shall be concealed. Large conduit and conduit stubs may be exposed unless otherwise specified or indicated on the drawings. No conduit shall be exposed in water chambers unless so indicated on the drawings.

D. Unless otherwise indicated on the drawings, Contractor shall be responsible for routing the conduit to meet the following installation requirements:

1. Conduit installed in all exposed indoor locations, except corrosive areas indicated on the drawings, and in floor slabs, walls, and ceilings of hazardous (classified) locations, shall be intermediate metal. Exposed conduit shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.

2. Conduit installed in floor slabs and walls in non-hazardous locations shall

be rigid Schedule 80 PVC.

3. Conduit installed in all exposed outdoor locations shallbePVC-coated rigid steel, rigidly supported by PVC-coated framing materials. Mounting hardware, which includes nuts, bolts, and anchors, shall be stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.

4. Final connections to dry type transformers, to motors without flexible cords, and to other equipment with rotating or moving parts shall be liquidtight flexible metal conduit with watertight connectors installed without sharp bends and in the minimum lengths required by the application, but not longer than 6 feet unless otherwise acceptable to Engineer.

5. Terminations and connections of rigid steel and intermediate metal conduit shall be taper threaded. Conduits shall be reamed free of burrs and shall be terminated with conduit bushings.

6. Exposed conduit shall be installed either parallel or perpendicular to structural members and surfaces.

7. Two or more conduits in the same general routing shall be parallel, with symmetrical bends.

8. Rigid Schedule 80 PVC conduit shall have supports and provisions for expansion as required by NEC Article 352.

9. Metallic conduit connections to sheet metal enclosures shall be securely fastened by locknuts inside and outside.

10. Rigid Schedule 80 PVC conduit shall be secured to sheet metal device boxes using a male terminal adapter with a locknut inside or by using a box adapter inserted through the knockout and cemented into a coupling.

11. Conduits in walls or slabs, which have reinforcement in both faces, shall be installed between the reinforcing steel. In slabs with only a single layer of reinforcing steel, conduits shall be placed under the reinforcement. Conduits larger than 1/3 of the slab thickness shall be concrete encased under the slab.

12. Conduits that cross structural joints where structural movement is allowed shall be fitted with concretetight and watertight expansion/deflection couplings, suitable for use with metallic conduits and rigid Schedule 40 PVC conduits. The couplings shall be Appleton Type DF, Crouse-Hinds Type XD, O-Z Type DX, or approved equal.

13. Conduit shall be clear of structural openings and indicated future

openings.

14. Conduits shall be capped during construction to prevent entrance of dirt, trash, and water.

15. Exposed conduit stubs for future use shall be terminated with galvanized pipe caps.

16. Concealed conduit for future use shall be terminated in equipment or fitted with couplings plugged flush with structural surfaces.

17. Where the drawings indicate future duplication of equipment wired hereunder, concealed portions of conduits for future equipment shall be provided.

18. Conduit shall not be routed across the surface of a floor or walkway unless approved by PWC.

19. PVC-coated rigid steel conduit shall be threaded and installed as recommended by the conduit manufacturer's installation procedure using appropriate tools.

20. All conduits that enter enclosures shall be terminated with acceptable fittings that will not affect the NEMA rating of the enclosure.

21. Nonmetallic conduit, which turns out of concrete slabs or walls, shall be connected to a 90 degree elbow of PVC-coated rigid steel conduit before it emerges.

22. Power conductors to and from adjustable frequency drives shall be installed in steel conduit.

E. Underground Conduit Installation. All excavation, backfilling, and concrete work shall conform to the respective sections of these specifications. Underground conduit shall conform to the following requirements:

1. All underground conduits shall be concrete encased as indicated on drawings, within 15 feet of building entrances and under and within 5 feet of roadways.

2. Concrete encased conduit shall be Schedule 80 PVC. Conduits shall have end bells where terminated at walls. All joints shall be solvent welded in accordance with the recommendations of the manufacturer.

3. Underground conduits indicated not to be concrete encased shall be rigid Schedule 80 PVC.

4. Underground conduit bend radius shall be at least 2 feet at vertical risers and at least 3 feet elsewhere.

5. Underground conduits and conduit banks shall have at least 2 feet of earth cover, except where indicated otherwise.

6. Underground nonmetallic conduits, which turn out of concrete or earth in outdoor locations, shall be connected to 90 degree elbows of PVC-coated rigid steel conduit before they emerge.

7. Conduits not encased in concrete and passing through walls, which have one side in contact with earth, shall be sealed watertight with special rubber-gasketed sleeve and joint assemblies or with sleeves and modular rubber sealing elements.

8. Underground conduits shall be sloped to drain to handholes / manholes.

9. Instrument cables shall be separated the maximum possible distance from all power wiring in pull-boxes, manholes, and handholes.

F. Sealing of Conduits. After cable has been installed and connected, conduit ends shall be sealed by forcing non-hardening sealing compound into the conduits to a depth at least equal to the conduit diameter. This method shall be used for sealing all conduits at handholes, manholes, electrical enclosures with connecting conduit routed below grade, and for 1 inch and larger conduit connections to equipment.

1. Conduits entering hazardous (classified) areas and submersible or explosion proof enclosures shall have Appleton “Type ESU” or Crouse-Hinds “EYS” scaling fittings with sealing compound.

G. Reuse of Existing Conduits. Existing conduits may be reused subject to the concurrence of Engineer and compliance with the following requirements:

1. A wire brush shall be pulled through the conduit to remove any loose debris.

2. A mandrel shall be pulled through the conduit to remove sharp edges and burrs.

3.5 GROUNDING AND BONDING

A. Ground Rods: Ground rods shall be rolled to a commercially round shape from welded copper clad steel manufactured by the molten welding process or by die electro formed process (molecularly bonded). They shall have an ultimate tensile strength of 75,000 pounds per square inch (psi) and an elastic limit of 49,000 psi. The rods shall be not less than 3/4 inch in diameter by 10 feet in length; and the proportion or copper shall be uniform throughout the length of the rod. The copper shall have a minimum wall thickness of 0.013 inch at any point on the rod.

B. Fittings: Grounding connections to equipment shall be bolted. Cable end

connections may be made by use of the crucible weld process or bolted type connectors. Bolted type connectors for this application shall consist of corrosion resistant copper alloy with silicone bronze bolts, nuts and lockwashers which are designed for this purpose.

C. Grounding Conductors: A green, insulated equipment grounding conductor, which shall be separate from the electrical system neutral conductor, shall be furnished and installed for all circuits. Equipment grounding conductors shall be furnished and installed in all conduits. Use of conduits as the NEC required equipment grounding conductor is not acceptable. Where specified or shown, a copper strap shall be furnished and installed as the grounding conductor.

D. The maximum resistance to ground of a driven ground rod shall not exceed 10 ohms under normally dry conditions. Where the resistance obtained with one (1) ground rod exceeds 10 ohms, additional ground rods shall be installed not less than 10 feet on centers. Except where specifically indicated otherwise, all exposed noncurrent-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductors in nonmetallic raceways and neutral conductors of wiring systems shall be grounded.

E. The ground connection shall be made at the main service equipment and shall be extended to the point of entrance of the metallic water service. Connection to the water pipe shall be made by a suitable ground clamp or lug connection to a plugged tee. If flanged pipes are encountered, connection shall be made with the lug bolted to the street side of the flanged connection. If there is not suitable metallic water service to the facility, the ground connection shall be made to the driven ground rods on the exterior of the building.

F. Where ground fault protection is employed, care shall be taken so that the connection of the ground and neutral does not interfere with the correct operation of the ground fault protection system.

G. Equipment grounds shall be solid and continuous from a connection at earth to all distribution panelboards. Ground connections at panelboards, outlets, equipment, and apparatus shall be made in an approved and permanent manner.

H. All metal boxes shall be bonded to the grounding system. Metal surfaces where grounding connections are to be made shall be clean and dry. Steel surfaces shall be ground or filed to remove all scale, rust, grease, and dirt. Copper and galvanized steel shall be cleaned with emery cloth to remove oxide before making connections.

I. Main ground grid shall be provided for each structure and interconnecting structure grids consisting of driven ground rods. The ground rods shall be driven deep enough to obtain a ground resistance of not more than 10 ohms and shall interconnected by the use of copper cable bus (3" strap minimum), or a bare copper conductor sized to the largest service entrance ground, welded to the rods by the crucible weld process. The grounding cables shall be installed after the excavations for the building have been completed and prior to the pouring of concrete for the footings, mats, etc. Copper "pigtails" shall be connected to the ground system and shall enter the buildings and structure from the outside and shall be connected to steel structures, and equipment as described in this Section and as required to provide a complete grounding system.

J. Grounding conductors shall be continuous between points of connection; splices shall not be permitted. Where conductors are exposed and subject to damage from personnel, traffic, etc., conductors shall be installed in metal raceway. The raceway shall be bonded to the grounding system. Connections to ground rods shall be exposed to permit maintenance and inspection for continuity and effectiveness of grounding system. Where subsurface conditions do not permit use of driven ground rods to obtain proper ground resistance, rods shall be installed in a trench or plate electrodes shall be provided, as applicable and necessary to obtain proper values of resistance.

K. Conduit which enters equipment such as motor controls, instrument and control panels, and similar equipment shall be bonded to the ground bus, where provided, and as otherwise required by the NEC.

3.6 IDENTIFICATION.

A. Cable. Except for lighting and receptacle circuits, each individual wire in power, control, indication, and instrumentation circuits shall be provided with identification markers at the point of termination. The wire markers shall be of the heat-shrinkable tube type, with custom typed identification numbers. The wire numbers shall be as indicated on the equipment manufacturer's drawings. The wire markers shall be positioned to be readily visible for inspection. Power wires shall be color coded with electrical tape or colored wire jacket: white-N, black. and red for 120/240 volt, 3-wire; and gray-N, brown, orange and yellow for 480/277 volt, 4-wire circuits.

B. Pump Control Panels. Panels shall be provided with nameplates identifying the related equipment. Pilot controls and indicating lights shall have engraved or etched legends ("start", "stop", etc.) as indicated on the drawings. Nameplates shall be laminated black-over-white plastic, with 1/8 inch engraved letters, and shall be securely fastened with stainless steel screws to the motor starters.

C. Circuit Breakers. Circuit breakers shall be provided with nameplates identifying

related equipment. Nameplates shall be laminated black-over-white plastic, with 1/8 inch engraved letters, and shall be securely fastened with stainless steel screws to the circuit breakers.

D. Disconnect Switches. All switches shall have front cover-mounted permanent nameplates that include switch type, manufacturer's name and catalog number, and horsepower [kW] rating. An additional nameplate, engraved or etched, laminated black-over-white plastic, with 1/8 inch letters, shall be provided to identify the associated equipment. Both nameplates shall be securely fastened with stainless steel screws to the enclosure.

E. Arc Flash Hazard Labels. Lighting panels, power panels, power centers, and meter socket enclosures shall be provided with permanent labels warning the risk of arc flash and shock hazard. Labels shall be designed in accordance with ANSI Z535.4-1998, NFPA 70E, and shall include the following:

WARNING
Arc Flash and Shock Hazard

Appropriate personal protection equipment (PPE) required.
SEE NFPA 70E. Equipment must be accessed by qualified personnel only.
Turn off all power sources prior to working on or inside equipment.

3.7 FIELD QUALITY CONTROL

A. Equipment furnished under this Contract for use on future work and all concealed equipment, including conduits, shall be dimensioned, on the record drawings, from visible and permanent building features.

B. After installation, all equipment shall be tested as recommended by the manufacturer.

C. Verify all components are operational.

D. Perform ground-fault performance testing as required by NEC Article 230-95 (c).

E. Test Equipment Interface:

1. Verify systems coordination and operation.

F. Set all adjustable trip protective devices as required for system protection and coordination.

G. Verify all system and equipment ground continuity.

H. Adjust installed equipment for proper operation of all electrical and mechanical

components.

I. Replace equipment and systems found inoperative or defective and re-test.

1. If equipment or system fails re-test, replace it with products that conform to Contract Documents.
2. Continue remedial measures and re-tests until satisfactory results are obtained.
3. Remedial measures and re-tests willbedone at no cost to the PWC.

J. Tests shall be performed in the presence of the Engineer.

1. Tests shall be scheduled with the Engineer and Owner, a minimum of two (2) weeks in advance.
2. Required certificates of testing or review shall be presented to the Engineer upon completion of the tests.

K. At Completion of Installation:

1. Test to ensure all equipment is free of short circuits and improper grounds.
2. Test to ensure all equipment is operational.

3.8 CLEANING

A. Clean dirt and debris from all surfaces.

B. Apply touch-up paint as required to repair scratches, etc.

C. Replace nameplates damaged during installation.

D. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

3.9 DEMONSTRATION

A. Demonstrate equipment in accordance with Contract and Bidding Requirements.

B. PWC to provide a final inspection and approval to ensure equipment, quality of workmanship, and installation are in accordance with PWC's published design standards.

SECTION 16619
AUTOMATIC TRANSFER SWITCH

PART I GENERAL

1.01 WORK INCLUDED

A. Longview Acres Lift Station 41
Standby Power Automatic Transfer Switch

1.02 REFERENCES

A. UL 1008

1.03 SUBMITTALS

A. Provide shop submittals including catalog and fabrication information. Provide as part of Engine Generator Package.

PART 2 PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH

A. Furnish and install where shown on the accompanying plans the complete load transfer switch and accessories. The bidder is cautioned to make sure that all equipment necessary for the satisfactory operation of the generator and switch are included in the bid. The function of this switch is to AUTOMATICALLY switch load to the generator and back to commercial power. Transfer switch shall be furnished in the engine generator package. The transfer switch shall bring wiring to terminal block switch control to start generator and transfer load and to retransfer load and deenergize generator.

B. The load transfer switch shall be manufactured by Russelectric, Detroit, Onan or Asco.

C. The transfer switch shall have a rating of 400 amperes 120/240 VAC 3 phase 4 wire at a normal and alternate source sized according to station.

D. The transfer switch shall be capable of switching all classes of load and shall be rated for continuous duty when installed in a non-ventilated enclosure constructed in accordance with Underwriter's Laboratories, Inc. Standard UL-1008.

E. The transfer switch shall be 4 pole double throw, actuated by a single electric operator momentarily energized and connected to the transfer mechanism by a simple overcenter type linkage with a total transfer time not to exceed one-half second. The transfer switch shall be capable of transferring successfully in either direction with 70% of rated voltage applied to the switch terminals. The neutral switching contact shall be on the same shaft as the main contacts.

F. The normal and emergency contacts shall be positively interlocked mechanically and electrically to prevent simultaneous closing. Main contacts shall be mechanically locked in position in both the normal and emergency position without the use of hooks, latches, magnets or springs and shall be silver-tungsten alloy protected by arcing contacts with magnetic blowouts on each pole. Interlocked molded case circuit breakers or contactors are not acceptable.

G. The transfer switch shall be equipped with a manual mechanical operator that is designed to prevent injury to the operating personnel if the electrical operator should suddenly become energized during manual transfer. The manual operator shall provide the same contact - to- contact transfer speed as the electrical operator to prevent a flashover from switching the main contacts slowly.

H. Sequence of Operation: Engine starting contacts shall be provided to start the generating plant if any phase of the normal source drops below 80% of rated voltage after a non-adjustable time delay period of 3 seconds to allow for momentary dips. The transfer switch shall transfer to emergency as soon as the voltage and frequency have reached 90% of rated voltage and adjustable time delay period of 0-30 minutes shall delay transfer to normal power until it has had time to stabilize. If the emergency power source shall fail during the time delay period, the time delay shall be bypassed and the switch shall return immediately to the normal source. After the switch has retransferred to normal, the engine generator shall be allowed to operate at no load for an adjustable period of time (0-5 minutes) to allow it to cool before shutdown. A manual switch shall be mounted on the cabinet door to indicate the switch position. Two auxiliary contacts rated 25 amperes, 120 volts, shall be mounted on the main shaft; one closed on normal, the other closed on emergency. Provide pilot light to indicate switch position on the door.

I. For proper system coordination, the manufacturer of the transfer switch shall verify that his switch is listed by Underwriter's Laboratories, Inc. at the time of the bid opening, under UL-1008 with a withstand and closing rating at least equal to the interrupting rating of the circuit breaker and/or fuse specified by the Engineer to protect the circuit.

J. When conducting temperature rise tests to Paragraph 17 of UL-1008, the manufacturer shall include post endurance temperature rise tests to verify the ability of the transfer switch to carry full rated current after completing the overload endurance tests.

K. In addition to the above, the transfer switch must have a short circuit withstand capability in excess of the UL minimum requirement for 400 ampere switch of 42,000 RMS amperes symmetrical at 230 volts, when coordinated with circuit breakers.

L. To establish conformance with the above, the manufacturer must produce certified test reports from an independent testing laboratory (factory tests not acceptable) to verify that identical samples have been subjected to three phase short circuit currents at 230 VAC for a minimum of 3 cycles duration without contact damage or contact welding and without the use of current limiting fuse protection.

Oscillograph traces are to be supplied to verify that the test parameters have been met. Product submitted (exact rating of poles, etc.) must be product manufactured for at least 5 years so performance record is established (UL listing required).

M. The transfer switch shall be housed in a NEMA 4X Stainless Steel enclosure suitable for rack mounting.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide automatic transfer switch to be field installed adjacent to the main distribution breaker arrangement in NEMA 4X Stainless Steel enclosure.

B. Interconnect all commercial power failure alarms, etc.

C. Provide NEMA rated hubs for all conduit terminations.

D. Provide 3/4” conduit with 4# 14 AWG wires Cu. THHN/THWN from ATS to generator control panel.

*****END OF SECTION*****

SECTION 16621
PACKAGE ENGINE GENERATOR SET

The standby generator shall be furnished and installed for the new Longview Acres lift station 41 as part of the general contract at the locations shown on the drawings and as specified herein with all accessories and transfer panels as required.

PART 1 GENERAL

1.01 It is the purpose and intent of this specification to obtain for the Owner a complete operating standby electric generating set, including all the accessories and appurtenant equipment necessary to a reliable system. Evidence of a satisfactory installation of similar equipment within a reasonable distance shall be furnished on request. The system shall be built, tested and shipped by the manufacturer of the alternator, who has been regularly engaged in the source of supply and one responsibility. The performance of the electric plant series and automatic transfer switch shall have been certified by an independent testing laboratory as to the plant's full power rating, voltage, and frequency regulation and shall be warranted under a written and published factory warranty for five years against defects in material and factory workmanship. The generator system shall be UL 2200 listed.

1.02 Dealer assembled units will not be accepted. The supplier shall have available complete parts and service departments employing full time, factory authorized and factory trained personnel, devoted exclusively to this service, an located within a reasonable distance of the installation site. Service shall be by a factory trained representative in operation and service of the system. A copy of the factory test shall be furnished with the unit.

Permanent engine generators are as follows:

#1	125 kw	120/230 VAC	Dependant on the station	Three Phase

1.03 The Contractor shall furnish and install a MTU DS-125 or equal by Caterpillar or Cummins/Onan standby electric generating set. The set shall consist of a water cooled, diesel fuel unit, rated as above. The set shall be a package of new and current equipment, complete with all standard equipment including, but not limited to, the following:

A. ENGINE

1. The engine shall be diesel fueled, 4 cycle, water-cooled with mounted radiator, fan and pump. It shall have 4 cylinders inline or V design and a minimum displacement of 293 cu. in 4.8 Liters for 125 KW and a bhp to generated rated kw with all appurtenant equipment at its operated speed of 1800 rpm.

2. Overhead valve design. Hard faced exhaust valves with rotators shall be provided. Lubrication shall be full pressure as suplied by a positive displacement lube oil pump.

The engine shall have an air cleaner and oil filter with replaceable elements, and a carburetor for the fuel specified with all required accessories. Engine speed shall be governed by an electronic governor to maintain 2% from no-load to full-load alternator output. The engine shall have a 24 volt battery charger DC alternator with transistorized voltage regulator. Remote starting shall be by a 24 volt, solenoid shift, electric starter. Engine shall be sized for maximum 25% voltage dip with all motors starting.

Also provide engine lube oil and 50% ethylene glycol antifreeze solution, water jacket heater, tank type 1000 watts, 120 volts, automatic shut-off of jacket heater when engine is running.

B. ENGINE COOLING SYSTEM: The radiator fan shall direct the air flow from the engine outward through the radiator, with horizontal air discharge. A duct system and motor operated louver shall vent the air on to the exterior as shown on the plans. These louvers and the intake air louvers shall be relay operated at the generator control cabinet. The fan shall be driven directly from the engine crankshaft or through V-belt drive. The radiator shall have sufficient capacity to dissipate not less than the total British thermal units per hour rejected by the engine to the cooling system at 100 percent rated load in 40 degrees F. ambient, and against a static restriction of 0.5 inches of water as may be imposed by louvers, ductwork, etc. Cooling section shall have a tube and fin type core which shall consist of copper or copper base alloy tubes with nonferrous fins. The radiator shall be protected by a strong grill or metal bar guard on the exterior, and the fan shielded with a metal canopy. Filler caps shall be designed for pressure relief prior to removal. A thermostatic control valve shall be installed in the jacket water system of the engine to maintain the water system temperature of the engine. The thermostatic valve shall be standard modulating type with self-contained thermostats. The valve shall be capable of passing the water flow as determined by the manufacturer without excessive pressure drop across the valve. The valve shall be provided with one or more interchangeable thermostatic elements. The elements shall be nonadjustable type and the operating temperature shall be set at the temperature recommended by the engine manufacturer. The valve shall be designed so that in event of the thermostatic element failure, water will be able to flow through the engine. Engine shall be delivered with anti-freeze for protection at 10 degrees Fahrenheit.

C. ENGINE CONTROL PANEL

1. The microprocessor based combination standard circuit board control panel and output box shall be unit mounted and shall be built, tested and shock mounted by the manufacturer of the alternator. It shall be capable of starting the engine manually at the control panel or from a remote closing relay, stopping on opening the relay, and shall contain the following instruments:

a. oil pressure gauge
b. Battery charger rate ammeter
c. Water temperature gauge
d. RUN-STOP-REMOTE selector switch
e. 60 - 75 second cranking limiter
f. Adjustable printed circuit modular engine monitor with individual emergency fault lights and alarm terminals to signal actuation of low speed, overspeed, or overcrank safeties.
g. Complete printed solid state engine start controls and terminals.
h. AC voltmeter
i. AC ammeter
j. Voltmeter-ammeter selector switch
k. Frequency meter
l. Voltage adjusting rheostat
m. Running time meter
n. Panel lights
o. Manual reset overload protection (field circuit breaker)
p. Low fuel level alarm @ 25%

Provide for remote alarm/communication interconnection for:

a. Generator "run"
b. Generator "Fail to Start"
c. Generator Low Fuel Alarm

Provide relay output box with relays to provide the above dry contact Signals to a remote telemetry panel input.

2. There shall be one main line molded case, three pole 230 VAC single throw service entrance rated circuit breaker with a trip setting of 400 amperes three phase at 104 degrees F. (40 degrees C) ambient temperature. This rating shall include at least 25% additional capacity for overload and operating temperature rise over 104 degrees F (40 degrees C). It shall operate both manually for normal switching functions and automatically during short circuit conditions.

The circuit breaker shall meet standards established by Underwriters Laboratories, National Electric Manufacturers Association, and National Electric Code.

Generator circuit breakers shall be Service Entrance Rated and enclosed in an output box.

Access for all controls and equipment shall be from the side. No access shall be required from the end of the generator.

D. ALTERNATOR

1. The alternator shall be broad range, 12 lead reconnectable, 4 pole, revolving field type with rotating exciter and solid state voltage regulator. No commutator or commutator brushes shall be allowed. It shall be directly connected to insure permanent alignment. Voltage regulation shall be within plus or minus 2% of rated voltage from no to full load. A rheostat shall provide plus or minus 5% voltage adjustment. Stable alternator operation conditions shall be re-established within 2 seconds following any sudden change in load between no load and full or between full load to no load. Stable alternator operations is defined as frequency variation not exceeding plus or minus 0.5% and voltage variation plus or minus 1% of their mean value for constant loads from no load to full load. Temperature rise shall be within rating as defined by NEMA MG 1 -22.40. Insulation shall be Class F as defined by NEMA-MG- 1.65.

E. RATING

1. The rating of the electric set shall be based on operation of the set when equipped with all necessary operating accessories. The electric set shall be rated and capable of producing 125 KW156 KVA at 0.8 power factor for standby power service.

F. ELECTRIC PLANT MOUNTING

1. The plant shall be set on vibration isolators, cushion mounted on welded structural steel skid base which shall provide suitable mounting to any level surface. Provide at least six spring type isolators for the unit.

G. AUTOMATIC TRANSFER SWITCH: Automatic transer switch shall be furnished with the generator package and designed for rack mounting. Coordinate load transfer switches. See specifications section 16619.

H. BATTERIES AND CHARGER

1. An automatic "float" type battery charger shall be provided to maintain the batteries at normal capacity and to recharge batteries after cranking. The charger shall be 120 volts input with 24 volt output. It shall include AC compensation, current limit, DC ammeter, voltmeter to show battery voltage, equalizing switch, fused AC input and DC output, complete isolation of AC input and DC output and be designed as not to discharge the battery in event of failure.

2. The battery charger shall be capable of recharging completely discharged battery in a maximum of 8 hours. The charger shall bear Underwriter's Laboratory label.

3. Batteries shall be lead acid type.

4. Capacity shall be for at least 3 cranking cycles (each cycle consisting of 3 each 10 second cranks with 5 second rest period between each crank).

5. Provide box to completely enclose the battery rack assembly. It shall have ventilation holes and removable cover.

I. MISCELLANEOUS EQUIPMENT

1. Provide an electric water jacket heater with the generator set. It shall have an adjustable temperature setting and capable of keeping the engine water temperature at a constant 120 degrees F. during the coldest winter weather. The heater shall be suitable for operation on 120 volts, single phase AC power.

2. Provide circuit breaker at the generator to provide overload and short circuit protection for the generator.

3. Provide ultra - critical level special type stainless steel silencer and complete exhaust system. Silencer shall reduce total engine exhaust noise by by 35 – 45 db. Provide insulation of muffler and exhaust system. Silencer shall be supplied for mounting within the generator set enclosure. Unit shall be complete as side in/end out type with discharge tailpipe, raincap and all required stainless steel hardware. A stainless steel flexible exhaust connection shall connect the engine exhaust outlet to the silencer.

4. Install permanent type anti-rust, anti-freeze to 20 degrees below zero.

J. FUEL SUPPLY.

1. Provide a solenoid valve in the supply line wired to prevent fuel from flooding the engine. Include day tank if necessary with sufficient tank capacity to provide adequate fuel source. Mount within enclosure.

2. Provide overspill containment vessel on the fill valve.

K. GENERATOR ENCLOSURE:

The weatherproof enclosure shall be all aluminum, primed and painted with the manufacturer's standard outdoor finish. Hinged access doors shall be provided as required for the operation and maintenance of the set. Provide a radiator core guard. The doors to the unit shall be lockable. In addition, the following shall be provided:

Enclosure and all other items to be designed and built by engine manufacturer as an integral part of the entire generator set and be designed to perform without overheating in the ambient specified.

Enclosure shall include sound attenuation 65.5 db at 23 feet and shall be of 12 gauge construction and suitability reinforced to be vibration free.

Side and rear panels to be completely and simply removable to allow major service accessibility. Panels shall be double wall 12 GA and aluminum.

Baked enamel, moisture cured polyurethane, or catalyzed epoxy finish with primer and finish coat to be painted before assembly. All fasteners to be rust resistant.

Catches shall be provided to hold the doors in the open position.

Unit shall have sufficient guards to prevent entrance of small animals, rodents, etc.

Batteries and charger shall fit inside the enclosure alongside the engine.

Units shall have coolant and oil drains outside the unit to facilitate maintenance. Each drain line is to have a high quality valve located near the fluid source, and a cap or plug on the outer end.

Fuel filters shall be inside the base perimeter and located so spilled fuel cannot fall on hot parts of engine of generator. A cleanable primary fuel strainer shall be used to collect water and sediment between tank and main engine fuel filter.

Crankcase fume disposal shall terminate in front of the radiator or into the intake manifold to prevent oil from being blown around.

All oil and coolant drains shall be piped to the exterior of the skid and be include a valve and cap at the base.

L. SUBBASE FUEL TANK

1. A 550 gallon capacity (60 hours at ¾ load) subbase fuel tank shall be provided for the 125 KW unit. This tank shall be installed under the generator set and shall be designed to properly support the generator set, weatherproof enclosure and all associated accessory equipment. The subbase fuel tank shall be of double wall construction to provide inherent tank rupture containment,

supplied complete with rupture alarm provisions. The subbase fuel tank shall be supplied complete with level gauge, low fuel level alarm, vent cap, lockable fill cap, generator set fuel line-connections, and both inner and outer tank drain provisions. The inner tank shall be constructed of formed 3/16 inch mild steel with all seams being double welded. Outer tank shall be of ¼ inch mild steel with generator mounting surface to be 3/8 inch steel treadplate. Suitable mounting provisions for generator set shall be provided as an integral part of the subbase fuel tank. Provide subbase fuel tank with corrosion resistant coating.

2. The subbase fuel tank shall have a maximum height of 24 inches. If the fuel tank is larger that the generator footprint, it shall extend off the front of the generator. Any metal extending from beyond the generator footprint shall be crowned to facilitate water run off.

3. The subbase fuel tank shall have an overspill container on the fill valve.

M. Provide concrete mounting slab to be 12 inches around the generator footprint with a 1 inch chamfer. Provide 8 inch slab with # 4 rebar @ 6" on center each way. Provide 4000 psi. concrete.

N. TESTING - OPERATION –MAINTENANCE-WARRANTY

1. Before the equipment is installed, a dealer certified test log of the generator set showing a minimum of ¾ hour testing with ½ hour at 100% rated load continuously shall be submitted to purchaser. Normal preliminary engine and generator tests shall have been performed before unit assembly.

2. Operational test of the system shall be conducted by a representative of the manufacturer of this equipment in the presence of the specifying engineer, the Owner and the operating personnel. It shall be demonstrated during this test that the complete system performs at the specified setting. A full load bank test shall be conducted at 100% rated load. Also, that with all motors running from commercial power, the commercial power is to be disconnected and the generator will be tested to assume the load. Coordinate the resetting of time delay switches as required. After completing all test and making all adjustments, the test run of the generator shall continue for a 4 hour period. This 4 hour period run shall be with a 100% full load bank for testing. Testing shall be in accordance with NFPA 110 Chapter #7.13.

3. The engine-generator set bidder shall be authorized dealer of the engine manufacturer, and shall be fully qualified and authorized to provide service and parts for both the engine and generator at any time during the day of night. Availability of parts and service will be a factor in making the award. Packagers not having local service, assembly and engine parts inventory will not be considered.

4. The units offered under these specifications shall be covered by the manufacturer's 5 year warranty or guarantee on new machines.

5. All components, including batteries, chargers, transfer switches, etc. shall be provided to contractor (or Owner as applicable) by the engine generator dealer in his package to insure proper coordination of all components. Purchase of components by contractor thru other sources shall not be allowed.

6. Prior to the final acceptance, the manufacturer shall supply three (3) copies of complete instruction manuals to the owner. The manuals shall include operation and maintenance procedures, complete parts lists, dimensional drawings, unit wiring diagrams and schematics, and interconnection wiring drawings.

7. Prior to final acceptance, the manufacturer shall provide comprehensive training to the owner's designated personnel. Training shall cover, but not be limited to, operation, maintenance and troubleshooting of the equipment.

0. FACTORY PROTOTYPE MODEL TESTS

1. The power system consisting of prime mover, generator and all necessary controls must be tested as a complete system on representative engineering prototype models. The tests, being potentially damaging to the equipment tested, must not be performed on equipment sold, but on separate prototype models. A certificate certifying that this prototype testing has been accomplished, shall be submitted along with submittal data for approval.

a. Maximum power level (maximum kW).

b. Maximum motor starting capacity (maximum KVA)

c. Structural soundness.

d. Torsigraph analysis per MIL-STD 7.50B, method 504.2. A torsional analysis shall be calculated using data from actual tests by the generator set manufacturer to verify freedom from torsional stresses within $\pm$ 10% of rated speed. Results shall be made available to engineer for inspection upon request. Actual torsional fatigue test must be performed on the complete prototype generator set. Calculations based on engine and generator data separately are not acceptable.

e. Engine-alternator cooling air flow

f. Transient response and steady-state governing

g. Alternator temperature rise by embedded thermocouplers and by resistance method per NEMA MG 1 -22.40.

h. Harmonic analysis and voltage wave form deviation per MIL-STD705B, method 601.4.

i. Three phase short circuit test for mechanical and electrical strength. With system operating at rated volts, amps, power factor, and speed the generator terminals must be short circuited ten (10) times on all three phases for a duration of thirty seconds. Generator set must build up and perform normally without manual interventions of any kind such as re-setting of circuit breakers or other tripping devices when the short circuit is removed.

j. Failure mode test for voltage regulator. With generator set operating at no load, rated speed and voltage, the AC sensing circuit to the regulator must be disconnected for a period of at least one hour. The generator set must be fully operative after test, and without evidence of any kind of damage.

k. Endurance testing at rated load and speed is required without significant damage or failures of electrical or mechanical components occurring.

P. FACTORY PRODUCTION MODEL TESTS

1. Before shipment of the equipment, the generator set and system, components shall be tested under rated load and power factor for performance and proper functioning of control and interfacing circuits. Testing at unity power factor only (resistance banks only) is not acceptable, since kW output is affected by the higher generator efficiency at unity power factor, and the KVAR for motor starting and regulation is not correctable between unity and rated power factor. Other tests shall include:

a. Single step load per NFPA 76A.
b. Transient response and steady state governing
c. Alternator temperature rise by resistance method
d. Functional compatibility between gen-set controls and transfer switch controls (start, transfer, retransfer, stop, with all time delays)
e. Fuel consumption.

Q. INFORMATION REQUIRED FOR SPECIFIED STANDBY SYSTEMS

1. Certified final factory test report shall be provided to the engineer, certifying this unit's full power rating, stability, voltage and frequency regulation. Complete operating instructions and maintenance manuals with parts list. A factory trained representative shall consult with contractor during installation and start-up. He shall fully instruct Owner's personnel as to correct operating

and testing procedures. Furnish 10 sets of catalog cuts and wiring diagrams for Architect/Engineer's approval.

2. Equipment furnished shall be equal in every way to that specification herein, including quality, operation, and function. The equipment spacing, mounts, electrical wiring, ventilation equipment, fuel and exhaust components have all been sized and designed around the equipment. Verify all work with the equipment manufacturer.

R. MAINTENANCE CONTRACT

1. The engine generator supplier shall offer an optional maintenance contract covering one year of operation of the engine generator set. The service contract shall provide for semi-annual inspections and two annual oil and filter changes, labor and materials included.

The Owner, at his discretion, may exercise the option to purchase this contract up to 90 days after acceptance of the generator set. Cost for this contract shall not be included in the price bid for this project, but, if said option, is requested by the owner, the owner will separately enter into such maintenance contract and pay for it outside of this project.

S. FUEL

1. Provide fuel tank completely full upon Generator acceptance. Provide all fuel for testing. Diesel fuel shall be treated with an alchohol-free additive to disperse water and clean injectors.

2. A copy of the load test report shall be sent to the Engineer and the Owner,

*****END OF SECTION*****

APPENDICES

RONNA ROWE GARRETT, COMMISSIONER
DONALD L. PORTER, COMMISSIONER
CHRISTOPHER G. DAVIS, COMMISSIONER
RICHARD W. KING, COMMISSIONER
TIMOTHY L. BRYANT, CEO/GENERAL MANAGER

FAYETTEVILLE PUBLIC WORKS COMMISSION
955 OLD WILMINGTON RD
P.O. BOX 1089
FAYETTEVILLE, NORTH CAROLINA 28302-1089
TELEPHONE (910) 483-1401
WWW.FAYPWC.COM

February 27, 2026

Kevin Howell, P.E.
Fayetteville Public Works Commision
955 Old Wilmington Road
FayettevilleNC28301

Re: Engineering Plans and Specifications Approval
Wastewater Collection System Extension
Longview Acres Lift Sation 41 Replacement and Sanitary Sewer Force Main
Cumberland County
Permit # PWC2026-S015

Dear Kevin Howell, P.E.,

In accordance with your application, the Fayetteville Public Works Commission (PWC), on behalf of the State of NC Environmental Management Commission, has assigned Permit Number **PWC2026-S015,** effective **February 27, 2026,** to the addressee for the construction of the subject wastewater collection system extension as described in the application for **Longview Acres Lift Sation 41 Replacement and Sanitary Sewer Force Main.**

This permit is valid for 24 months from the date of issuance, or until revoked, and shall be subject to the conditions and limitations as specified below:

1. The enclosed Authorization to Construct shall be posted at the primary entrance of the job site throughout construction.

2. The project shall be constructed in accordance with the approved application, engineering plans, and the PWC standards, specifications, PWC's Delegated Sewer Collection System and Water Distribution System Permit Program authorized by the City of Fayetteville's Code of Ordinances on behalf of the State of NC Environmental Management Commission and other applicable Laws, Rules, and Regulations. Permission is hereby granted to **Fayetteville Public Works Commision for** the construction **of 78 of 12" DI and 0 GPD** of collected domestic wastewater into the PWC/Fayetteville Collection System (WQCS 00007), pursuant to the application received and in conformity with 15A NCAC 02T, PWC's Design Manual, the State's Minimum Design Criteria as applicable, and any other supporting data subsequently filed and approved by PWC.

3. The wastewater collected by this system shall be treated in the PWC **Cross Creek Wastewater Treatment Facility Permit NC0023957** prior to being discharged into the receiving stream.

4. **This permit is not transferable.** In the event there is a change of Applicant, a formal permit application shall be submitted to PWC accompanied by documentation from the parties involved, and other supporting materials as may be appropriate.

5. This permit shall become voidable unless the wastewater collection facilities are constructed in accordance

with the conditions of this permit, PWC's Design Manual, applicable State rules and regulations, and other supporting material, unless specifically mentioned herein.

6. This permit shall be effective only with respect to the nature and volume of wastes described in the approved application and other supporting data.

7. Construction of the gravity sewers, pump stations, and force mains shall be scheduled so as not to interrupt service to the existing utilities nor result in an overflow or bypass discharge of wastewater to the surface waters of the State.

   Upon completion of construction and prior to operation of these permitted facilities, the completed Engineering Certification form shall be submitted with the required supporting documents to the address provided on the form. 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 Applicant to appropriate enforcement actions.

   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 and profile views of sewer lines and force mains) of the wastewater collection system extension. Final record drawings should be clear on the plans 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 pump station 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, including 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 increases of 10% or greater, 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 must be reviewed by the State and 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 by the State during the permitting process prior to construction. After-construction requests are discouraged by the State and may not be approved, thus requiring replacement or repair prior to certification and activation.

8. Gravity sewers installed greater than ten percent below the minimum required slope per the State'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 State with appropriate supporting documentation. This shall be done through a permit modification with fee submitted to the State. 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.

DRAFT

1. 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 Applicant to an enforcement action by PWC, in accordance with PWC's Delegated Sewer Collection System and Water Distribution System Permit Program authorized by the City of Fayetteville's Code of Ordinances, construction of additional or replacement wastewater collection facilities, and/or referral of the North Carolina-licensed Professional Engineer to the licensing board.

2. In the event that the wastewater collection facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Applicant shall take immediate corrective action, including those as may be required by PWC, such as the construction of additional or replacement facilities.

3. The issuance of this permit shall not exempt the Applicant from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by PWC, any other Federal, State, or Local government agencies which have jurisdiction or obtaining other permits which may be required by PWC or any other Federal, State, or Local government agencies.

4. **Prior to receiving any water meters for use on the above referenced project, PWC must have received and approved:**
   - ❑ **The Engineering Certification from the Design Engineer**
   - ❑ **Record Drawings**
   - ❑ **The PWC Project Coordinator's inspection report**
   - ❑ **The Applicant's "Statement of Total Project Cost" summary.**
   - ❑ **NCDOT Encroachment Installation Certification Memo**
   - ❑ **Cad File, Model Space Only, of Water & Wastewater Linework (see Record Drawing Checklist available when submitting Record Drawing to GeoCivix)**

Please allow approximately thirty (30) calendar days for PWC to process the above documentation.

If any parts, requirements, or limitations contained in this permit are unacceptable, an adjudicatory hearing shall be requested within 30 calendar days following receipt of this permit. This request must be in the form of a written petition, in accordance with PWC's Delegated Sewer Collection System and Water Distribution System Permit Program authorized by the City of Fayetteville's Code of Ordinances. This permit shall be final and binding, unless such petition has been properly filed.

We are enclosing one (1) set of approved plans for construction. The project must comply with all permit requirements as contained herein, all requirements found in the PWC Design Manual, and all regulations related to the Environmental Management Commission.

If you have any questions regarding this matter, please contact **Allan J. Riddle at 910-223-4785**.

Sincerely,
PUBLIC WORKS COMMISSION

Kevin Howell (Feb 27, 2026 11:34:20 EST)

Kevin Howell, P.E.
Manager
Water Resources Engineering

Enclosures: DS-15615
cc: **Jeffrey B Reitzel, P.E.**
Project File

PERMIT

Authorization To Construct

Project Name:	**Longview Acres Lift Sation 41 Replacement and Sanitary Sewer Force Main**
Permit Number:	**PWC2026-S015**
Issued To:	**Fayetteville Public Works Commision**
Issue Date:	**February 27, 2026**
Expiration Date:	**February 26, 2028**

In accordance with Fayetteville PWC requirements this Authorization to Construct must be posted for inspection at the primary entrance of the job site during all construction.

PERMIT

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING DEPARTMENT

APPLICATION FOR SANITARY SEWER SYSTEM EXTENSION

PWC Permit # PWC2026-S015

This application is for sewer extensions involving gravity sewers, pump stations and force mains, or any combination thereof. The applicant and the design engineer must certify that the project meets the requirements of 15A NCAC 02T and that **plans, specifications and supporting documents have been prepared in accordance with 15A NCAC 02T, Fayetteville PWC Minimum Design Criteria, and good engineering practices.**

I. Applicant and General Project Information

1. Longview Acres Lift Station 41 Replacement & San. Sewer Force Main
2. Fayetteville Public Works Commission
3. Kevin Howell,PE, WRE Manager
   Signing Official per 15A NCAC 2T .0106(b)
4. 955 Old Wilmington Road, Fayetteville, NC 28301
5. 910-223-4361 kevin.howell@faypwc.com
6. Applicant Type:
   - ☐ Corporation ☐ General Partnership ☐ Individual
   - ☐ Privately-Owned Public Utility ☒ Municipal ☐ State/County
   - ☐ Federal ☐ Other:

   - If a corporation or LLC, submit documentation indicating the Applicant is registered for business with the North Carolina Secretary of State
   - If the Applicant is a Partnership or d/b/a, submit a copy of the certificate filed with the Register of Deeds in the county of business
7. Application/Project Status:
   ☒ Proposed (New Permit) ☐ Existing Permit/Project

   Is this a change in developer for an existing permit? ☐ Yes If yes, provide existing permit number: _____

   Is this a modification of an existing permit? ☐ Yes If yes, provide existing permit number: _____

   For modifications, **also attach a detailed narrative description that includes the following:**
   - ☐ Identify the previously permitted items to remain in the permit.
   - ☐ Items to be added, and/or items to be modified. Include whether any previously permitted items have been certified.
   - ☐ Clearly identify the requested permitting action and accurately describe the sewers to be listed in the final permit.
8. 0449-07-3720 Located in Cumberland County
9. ☒ After installation and PWC's acceptance, ownership of the proposed sewer system will be relinquished to Fayetteville PWC. The Applicant as designated above shall execute an Agreement for Utility Service(s) or a Utility Service Commitment Agreement prior to PWC accepting ownership of the system.

II. Engineer Information

1. James M. Kizer, Jr., PE 20680
2. Moorman, Kizer & Reitzel, Inc.
3. 115 Broadfoot Avenue, Fayetteville, NC 28305
4. 910-484-5191 jkizerjr@mkrinc.com

III. Downstream Sewer and Treatment Facility Information

1. Fayetteville PWC — Owner of Receiving Sewer
2. WQCS00007 — Permit # of Receiving Sewer (if known)
3. 15" — Receiving Sewer Size
4. Facility that will treat wastewater from this project:
   ☐ Rockfish WWTF: Permit NC 0050105 ☒ Cross Creek WWTF: Permit NC 0023957

IV. Nature of Wastewater Generated by this Project

1. Origin of Wastewater (Check all that apply)

☒ Residential (Individually Owned)	☒ Retail (stores, centers, malls)	☐ Car Wash
☐ Residential (Leased)	☐ Retail with food preparation/service	☒ Hotel and/or Motels
☐ School / preschool / day care	☐ Medical / dental / veterinary facilities	☐ Swimming Pool /Clubhouse
☒ Food and drink facilities	☒ Church	☐ Swimming Pool/Filter Backwash
☒ Businesses / offices / factories		☐ Nursing Home
☐ Other (Explain in Attachment)		

2. Nature of Wastewater: **80** % Domestic **20** % Commercial
___ % Industrial (See 15A NCAC 02T .0103(20) and the City of Fayetteville Code of Ordinances)

For Industrial flows, is there a Pretreatment Program in effect? ☐Yes ☐No

3. Has a flow reduction been approved under Rule .0114(f)? ☐Yes ☒No
   - If yes, provide a copy of flow reduction approval letter

4. Summarize wastewater generated by this project

Establishment Type (see 02T.0114(f))	Daily Design Flow[a,b]	No. of Establishment Units	Flow
N/A	gal/		GPD
	gal/		GPD
	gal/		GPD
	gal/		GPD

a. See 15A NCAC 02T .0114(b), (d), (e)(1) and (e)(2) for caveats to wastewater design flow rates (i.e. minimum flow per dwelling; proposed unknown non-residential development uses; and public access facilities located near high public use areas.)
b. Per 15A NCACA 02T .0114(c), design flow rates for establishments not identified in table 15A NCAC 02T .0114 shall be determined using available flow data, water using fixtures, occupancy or operation patterns, and other measured data.

5. Wastewater generated by project: **0** **GPD**
(per 02T.0114) Do not include future flows or previously permitted allocations.

6. If permitted flow is zero, indicate why:
☐ Pump Station/Force Main or Gravity Sewer where flow will be permitted in subsequent permits that connect to this line.
☐ Flow has already been allocated in Permit Number: Permit No.and issuance date:
☒ Rehabilitation or replacement of existing sewers with no new flow expected
☐ Other (Explain):

V. Gravity Sewer Design Criteria (If Applicable)

Summarize gravity sewer mains to be permitted

Size (inches)	Length (ft)	Material
12"	78'	DI

- Section II & III of the MDC for Permitting of Gravity Sewers contains information related to design criteria
- Section III contains information related to minimum slopes for gravity sewer(s)
- **Oversizing lines to meet minimum slope requirement is not allowed and a violation of the Minimum Design Criteria**

VI. Pump Station Design Criteria (If Applicable)

COMPLETE FOR EACH PUMP STATION INCLUDED IN THIS PROJECT

1. Longview Lift Station 41 (Pump Station ID) | 35°11'72" (Latitude) | -78°86'52" (Longitude)

3. Total number of pumps at the pump station: 2

4. Design flow of the pump station: 1.26436 millions gallons per day (firm capacity)
   - This should reflect the total GPM for the pump station with the largest pump out of service.

5. Operational point(s) per pump(s): 878 gallons per minute (gpm) at 155 feet total dynamic head (TDH)

6. Summarize force main to be permitted (for this Pump Station)

Size (inches)	Length (ft)	Material
8"	1659'	DR18
8"	20'	DI

If any portion of the force main is less than 4-inches in diameter, please identify the method of solids reduction per MDCPSFM Section 2.01C.1.b. ☐ Grinder Pump ☐ Mechanical Bar Screen ☐ Other (please specify)

7. Indicate the method of power reliability in accordance with 02T.0305(h)(1):

☒ Standby power source or ☐ Standby pump
- Must have automatic activation and telemetry – 15A NCAC 02T .0305(h)(1)(B).
- Required for all pump stations with an average daily flow greater than or equal to 15,000 gallons per day
- **Must be permanent to facility** and may not be portable

Or if the pump station has an average daily flow less than 15,000 gallons per day 15A NCAC 02T .0305(h)(1)(c):

☐ Portable power source with manual activation, quick-connection receptacle and telemetry
☐ Portable pumping unit with plugged emergency pump connection and telemetry
- Include documentation that the portable source is owned or contracted by the applicant and is compatible with the station.
- If the portable power source or pump is dedicated to multiple pump stations, an evaluation of all the pump stations' storage capacities and the rotation schedule of the portable power source or pump, including travel timeframes, shall be provided as part of this permit application in the case of a multiple station power outage.

VII. Setbacks & Separations – (02B .0200 & 15A NCAC 02T .0305(f) and PWC Design Standards):

Setback Parameter	Separation Required
Storm sewers and other utilities not listed below (vertical)	24 inches
Water mains (vertical - water over sewer preferred, including in benched trenches)	18 inches
Water mains (horizontal)	10 feet
Reclaimed water lines (vertical - reclaimed over sewer)	18 inches
Reclaimed water lines (horizontal - reclaimed over sewer)	2 feet
Any private or public water supply source, including any wells, WS-I waters of Class I or Class II impounded reservoirs used as a source of drinking water, and associated wetlands	100 feet
Waters classified WS (except WS-I or WS-V), B, SA, ORW, HQW, or SB from normal high water, and wetlands associated with these waters (see item VII.2)	50 feet
Any other stream, lake, impoundment, or ground water lowering and surface drainage ditches, as well as wetlands associated with these waters or classified as WL	10 feet
Any building foundation (horizontal)	20 feet
Any basement (horizontal)	10 feet
Top slope of embankment or cuts of 2 feet or more vertical height	10 feet
Drainage systems and interceptor drains	5 feet
Any swimming pools	10 feet
Final earth grade (vertical)	36 inches

1. Does the project comply with all separations/alternatives found in.15A NCAC 02T 0305(f) & (g) ☒ Yes ☐No
   - 02T.0305(f) contains minimum separations that shall be provided for sewer systems
   - 15A NCAC 02T .0305(g) contains alternatives where separations in 02T .0305(f) cannot be achieved. Please check "yes" above if these alternatives are used and provide narrative information to explain.
   - Stream classifications can be identified using the NC Surface Water Classifications webpage
   - If noncompliance with 02T.0305(f) or (g), this project must be permitted by the North Carolina Department of Environmental Quality Division of Water Resources after review by Fayetteville PWC.
2. Does this project comply with the minimum separation requirements for water mains? ☒ Yes ☐ No ☐ N/A
   if no, please refer to 15A NCAC 18C .0906(f) for documentation requirements and submit a separate document, signed/sealed by a NC licensed PE, verifying the criteria outlined in that Rule.
3. Does the project comply with separation requirements for wetlands? ☐ Yes ☐ No ☒ N/A
   Please provide supplementary information identifying the areas of non-conformance.
   - See the Division of Environmental Quality draft separation requirements for situations where separation cannot be met
   - No variance is required if the alternative design criteria specified is utilized in design and construction
   - Record documents should reference the location of areas affected
4. Does the project require coverage/authorization under a 404 Nationwide/individual permit or 401 Water Quality Certification? ☐ Yes ☒ No
   - Please provide the permit number/permitting status in the cover letter if cover/authorization is required.
5. Does project comply with 02T.0105(c)(6) (additional permits/certifications)? ☒ Yes ☐ No
   - Per 02T.0105(c)(6), directly related environmental permits or certification applications are being prepared, have been applied for, or have been obtained. Issuance of this permit is contingent on issuance of dependent permits (erosion and sedimentation control plans, stormwater management plans, etc.).
6. Does this project include any sewer collection lines that are deemed "high-priority?" ☐ Yes ☒ No
   - Per 02T.0402, "high-priority sewer" means "any aerial sewer, sewer contacting surface waters, siphon, or sewer positioned parallel to streambanks that is subject to erosion that undermines or deteriorates the sewer." **Siphons and sewers suspended through interference/conflict boxes require a variance approval from NCDEQ.**
   - If yes, include an attachment with details for each line, including type (aerial line, size, material, and location).

VIII. Certifications

1. Longview Acres Lift Station 41 Replacement & San. Sewer Force Main

   Project Name (from I.1)

2. Does the submitted system comply with 15A NCAC 02T, the Minimum Design Criteria for the Permitting of Pump Stations and Force Mains (latest version), the Gravity Sewer Minimum Design Criteria (latest version), the PWC Design Manual, Fayetteville's City Code of Ordinances regarding PWC's Delegated Permitting Program, and other supporting materials as applicable?

   ☒ Yes ☐ No

   If No, this project must be permitted by the North Carolina Department of Environmental Quality Division of Water Resources after review by Fayetteville PWC.

3. Applicant's Certification:

   I, Kevin Howell,PE, WRE Manager , attest that this application for Longview Acres Lift Station 41 Replacement & San. Sewer Force Main **has been reviewed by me and is accurate and complete to the best of my knowledge.** I understand that if all required parts of this application are not completed and that if all required supporting documentation and attachments are not included, this application package is subject to being returned as incomplete. I understand that any discharge of wastewater from this non-discharge system to surface waters or the land will result in an immediate enforcement action that may include civil penalties, injunctive relief, and/or criminal prosecution. I will make no claim against Fayetteville Public Works Commission should a condition of this permit be violated. I also understand that if all required parts of this application package are not completed and that if all required supporting information and attachments are not included, this application package will be returned to me as incomplete.
   NOTE – In accordance with General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application package shall be guilty of a Class 2 misdemeanor, which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.

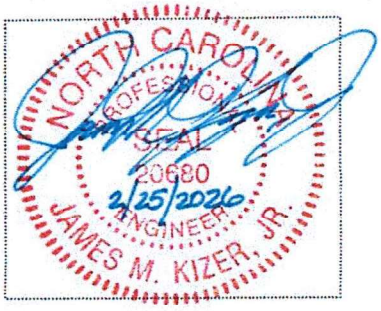
   Signature of Applicant's Signing Official (from I.2) — Date: 2/26/26

4. Professional Engineer's Certification

   I, James M. Kizer, Jr., PE 20680 , attest that this application for Longview Acres Lift Station 41 Replacement & San. Sewer Force Main **has been reviewed by me and is accurate, complete and consistent with the information supplied in the plans, specifications, engineering calculations, and all other supporting documentation to the best of my knowledge.** I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations, Gravity Sewer Minimum Design Criteria for Gravity Sewers (latest version), the Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains (latest version), the PWC Design Manual, Fayetteville's City Code of Ordinances regarding PWC's Delegated Permitting Program, and other supporting materials as applicable. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design.

   NOTE – In accordance with General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application package shall be guilty of a Class 2 misdemeanor, which may include a fine not to exceed $10,000, as well as civil penalties up to $25,000 per violation. Misrepresentation of the application information, including failure to disclose any design non-compliance with the applicable Rules and design criteria, may subject the North Carolina-licensed Professional Engineer to referral to the licensing board. (21 NCAC 56.0701)

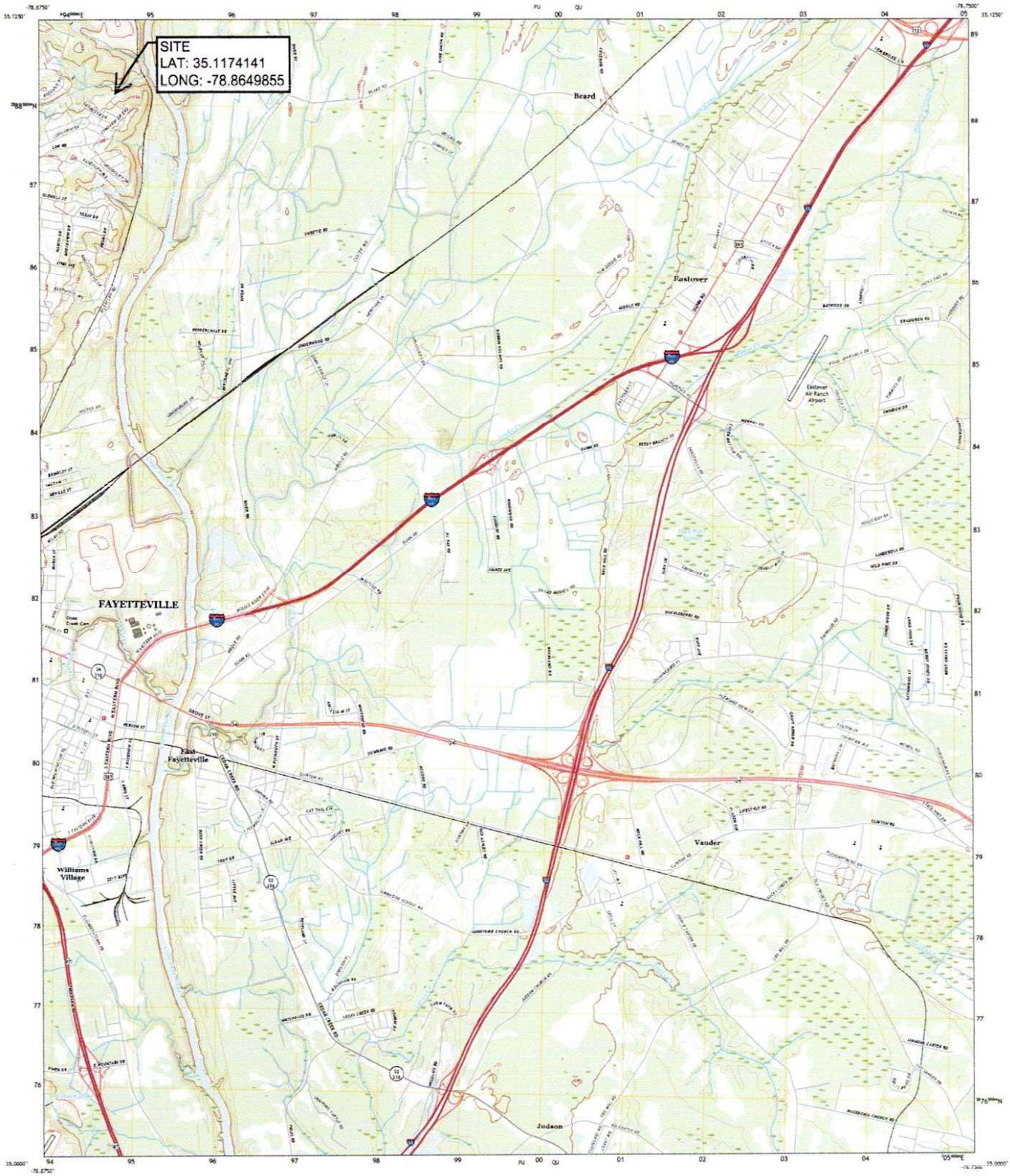
North Carolina Professional Engineer's seal, signature, and date:



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

VANDER QUADRANGLE
NORTH CAROLINA - CUMBERLAND COUNTY
7.5-MINUTE SERIES



Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 17S

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery ..... NAIP, September 2020 - September 2020
Roads ..... U.S. Census Bureau, 2018
Names ..... GNIS, 1980 - 2022
Hydrography ..... National Hydrography Dataset, 2003 - 2018
Contours ..... National Elevation Dataset, 1998
Boundaries ..... multiple sources; see metadata file, 2019 - 2021

Wetlands ..... FWS National Wetlands Inventory Not Available

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

KILOMETERS 0 0.5 1 2
METERS 1000 2000
MILES 0 0.5 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

1 Manchester
2 Slocomb
3 Wade
4 Fayetteville
5 Stedman
6 Hope Mills
7 Cedar Creek
8 Autryville

ADJOINING QUADRANGLES

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

VANDER, NC
2022

MAP ID 6145102821
MEDIA REF MEL/1/5/0/6/2/1/4/6/5/7

Duke Energy
170 Allison Page Rd
Aberdeen, NC 28315
919-440-2509
dylan.english@duke-energy.com

May 27, 2026
Moorman, Kizer & Reitzel, Inc.
Attn: Cynthia M. Smith
115 Broadfoot Avenue-P.O. Box 53774
Fayetteville, NC 28305
csmith@mkrinc.com

Re: Duke Energy Transmission Line Easement Plan Review Conditional Approval
Project: Longview Lift Station Replacement- Abandonment of Existing FM & New FM Crossing-LONO extension
Line: OL250 Fayetteville East – Ft. Bragg Woodruff St. 230KV & TL036A-2 Fayetteville Slocomb 115KV Tap Line – Structures 80-84

Dear Cynthia,

This office has reviewed the proposed "Longview Lift Station Replacement- Abandonment of Existing FM & New FM Crossing-LONO extension", plan (attached separately via email) and referred to herein as Attachment "A". We find the plans as shown on the referenced drawings to be acceptable and in compliance with the attached Use Guidelines for Encroachments involving Transmission Easements. Therefore Duke Energy Transmission ("DET") approves the referenced plans, insofar as its transmission easement rights are concerned, subject to the conditions detailed below. If this project construction has not commenced by a period of 12 months from the date of this letter, this approval by DET shall expire, and additional plan review will be required by DET at that time.

In summary, the following details DET's comments:

- Any vegetation within or outside of the transmission easement that will pose a grow-in, fall-in, or blowing together threat (typical maximum mature height greater than 15' within the transmission easement depending upon voltage), limit or block access, limit the safe and reliable operation, emergency restoration, or maintenance of the transmission facilities, or limit the full use of the easement for its intended purposes, is incompatible with the high voltage transmission power lines and therefore could be subject to removal. DET will continue to manage vegetation within or outside of the easement area and retain all rights afforded to it in its underlying easements including rights to remove vegetation that has the potential to or does cause an interference with DET's facilities and easements.
- No stockpiling or storage of materials, dirt, or equipment of any kind is permitted within the DET easement area, nor may any combustible materials be placed within the easement area.
- Contractors operating any and all equipment should be instructed not to operate within 25' of the poles, towers, or other electrical structures including guy anchors. All slopes shall be 4:1 or less. No spoil dirt is to be placed within the easement limits unless previously approved by DET.

  - Any proposed easements must not cross closer than 25' to DET's electrical structures including, but not limited to poles, towers, and guy anchors.
  - All underground facilities, such as, but not limited to, storm water pipes and domestic water line pipes, must be capable of a heavy equipment load bearing weight of 80,000 lbs. DET will not be responsible for damages to these installed facilities. No irrigation systems or signs allowed.
  - Any damage to the transmission line or its associated structures, related to this project, and/or claims due to the damage, is the responsibility of the developer/owner.

- All plats, plans, renderings and representations of lots, parcels, designated spaces and/or designated areas having and including area within a Duke Energy easement cannot represent, with setbacks or other means, buildable areas(s) within a Duke Energy easement.
- This approval by DET is subject to the paramount right of DET at all times to make use of its entire easement area for the construction, maintenance, reconstruction, and operation of electric lines.
- This letter only addresses issues related to DET's transmission line easement. Additional easements, approvals, or permits from the underlying property owner(s) or other applicable agencies may be required in order for you to proceed with this project .

DET also offers these additional comments to ensure that other potential conflicts are not created during or after construction:

- If there are design changes to any drawings that involve the transmission easements, DET must review the changes for compliance with the Use Guidelines for Encroachments involving Transmission Easements.
- Proper clearances must be maintained at all times. If any transmission line modification by DET is required to maintain proper clearances, the cost will be the responsibility of the developer/owner. Any such line modifications must be approved and scheduled, through DET well in advance of the project start date.
- All current and future property owners are required to adhere to the most current version of the DET transmission right-of-way guidelines and restrictions. (attached separately via email)
- DET heavy equipment access must not be restricted during construction of this project due to grading or any other activity.
- Please contact me prior to the start of this project to attend any pre-construction meetings.
- Underground Utilities with cathodic protection will require a study of anodic interference on existing DET structures. The developer / owner is responsible for any required remediation as determined by DET. This study shall be provided at no cost to DET for their review and acceptance before a Final Approval shall be issued by DET**.** This study must be submitted to DET prior to the commissioning of the Underground Utilities.

In not objecting to the use of the transmission easement for use as shown on the drawings, DET is not relinquishing the right to control and maintain the rights-of-way as specified in the recorded easement documents. Any damages to the transmission lines or its associated structures, and claims caused by the damage, is the responsibility of the developer/contractor/owner. It is the responsibility of the developer/contractor/owner to ensure that all work performed in the proximity of the transmission lines complies with all applicable laws and regulations, including but not limited to the National Electric Safety Code ("**NESC**"), the Overhead High-Voltage Line Safety Act ("**OHVLSA**"), and the Occupational Safety and Health Act ("**OSHA**"), and that all persons working near the electric power lines are made aware of the inherent safety hazards associated with these lines.

Please note that this approval is based in part on the accuracy of the information you have supplied on the site plans (Attachment A). You are responsible for indicating the correct location of the DET right of way and its associated electrical structures along with the correct width of the DET easement limits.

Thank you for the opportunity to work with you on this project. If you have any questions, please feel free to contact me at 919-440-2509.

Sincerely,

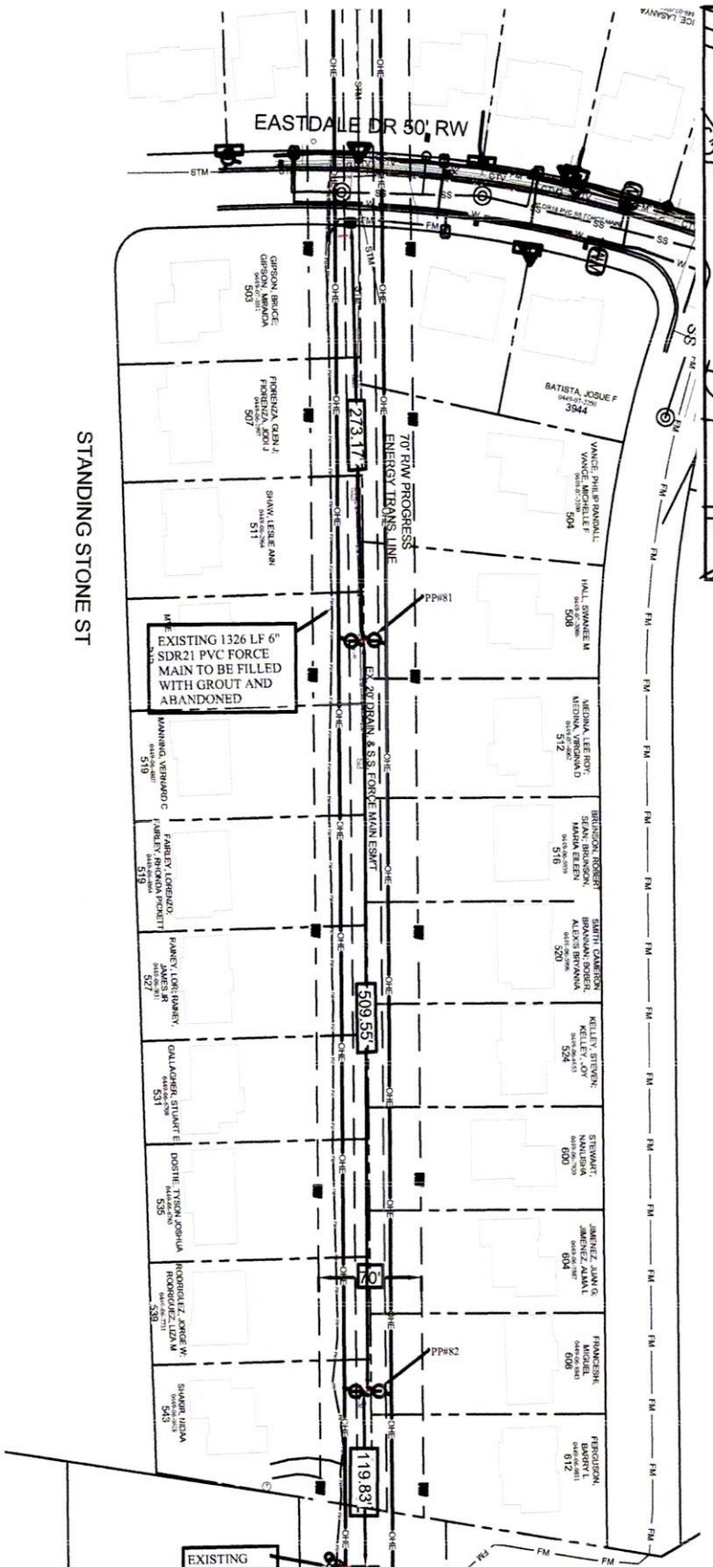
Dylan English

Dylan English
Sr. Asset Protection Program Manager
Transmission Right of Way

Attachments: Attachment "A" - Site Plans
Duke Energy Transmission Right-of-Way Guidelines & Restrictions
Duke Energy "Look Up & Live" Brochure

Attachment "A"

Longview Lift Station Replacement- Abandonment of Existing FM & New FM Crossing-LONO extension (Attached)



VICINITY MAP
NTS

NC GRID 83

NORTH CAROLINA PROFESSIONAL SEAL 20030 ENGINEER JAMES M. KIZER, JR. 3/12/2025

0' 60' 120 240'
BAR SCALE 1"=120'

PGD – ASSET PROTECTION DUKE ENERGY. APPROVED 05/27/2026 11:05am DYLAN ENGLISH

PGD – ASSET PROTECTION DUKE ENERGY. APPROVED 06/05/2025 12:06pm RIVER NORTON

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

EXHIBIT "A"

SYM	DESCRIPTION	BY

REVISIONS

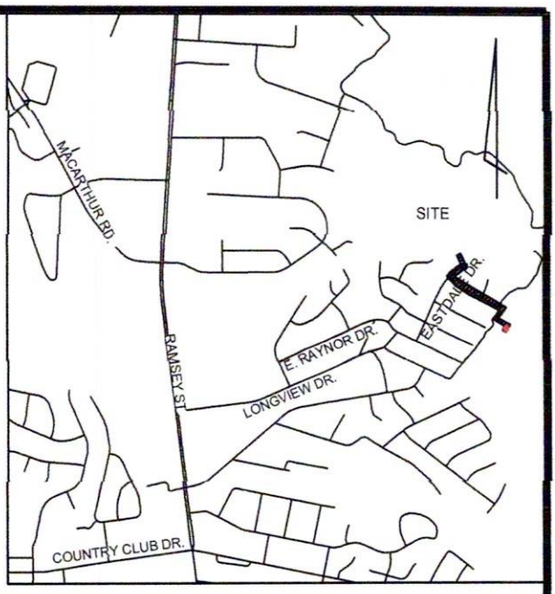
PWC PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

DRAWN BY DV	DATE	MARCH 2023
CHECKED BY DV	SCALE	1"= 120'
APPROVED BY	A	1 of 1

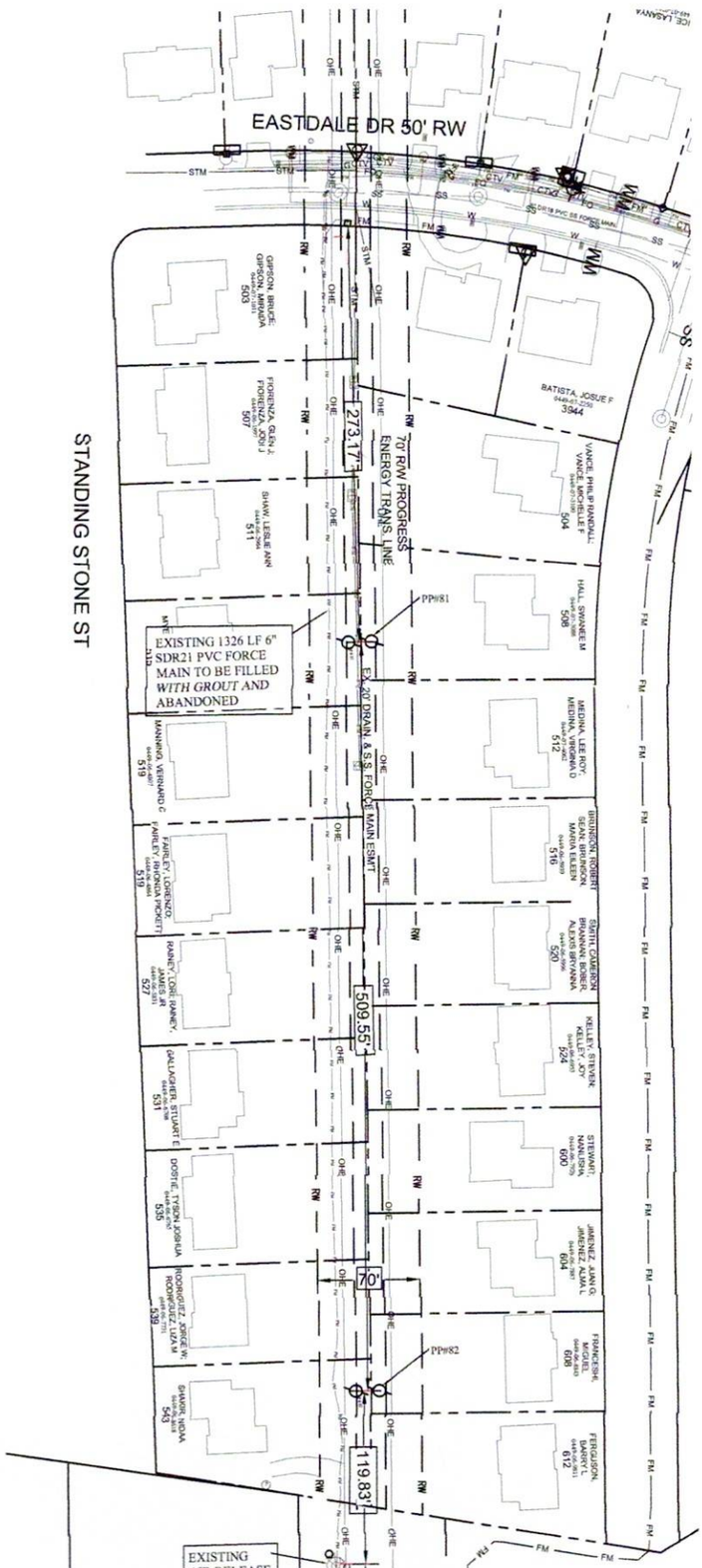
Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE.
FAYETTEVILLE, N.C. 28305
FIRM NO. F-106

G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Permit Apps\DUKE ENCR\C-8, 9 & 10 Plan Profiles.dwg, DUKE ENCROACHMENT, 3/12/2025 4:03:11 PM, csmith



VICINITY MAP
NTS

NC GRID 83



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DUKE ENERGY.
APPROVED
05/05/2025
12:06pm
RIVER NORTON

PGO – ASSET PROTECTION
DUKE ENERGY.
APPROVED
05/27/2026
11:05am
DYLAN ENGLISH

0' 60' 120 240'
BAR SCALE 1"=120'

NORTH CAROLINA PROFESSIONAL SEAL L-3233 LAND SURVEYOR JEREMY R. VANCE
3/27/2026

Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE.
FAYETTEVILLE, N.C. 28305
FIRM NO. F-106

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

EXHIBIT "A"

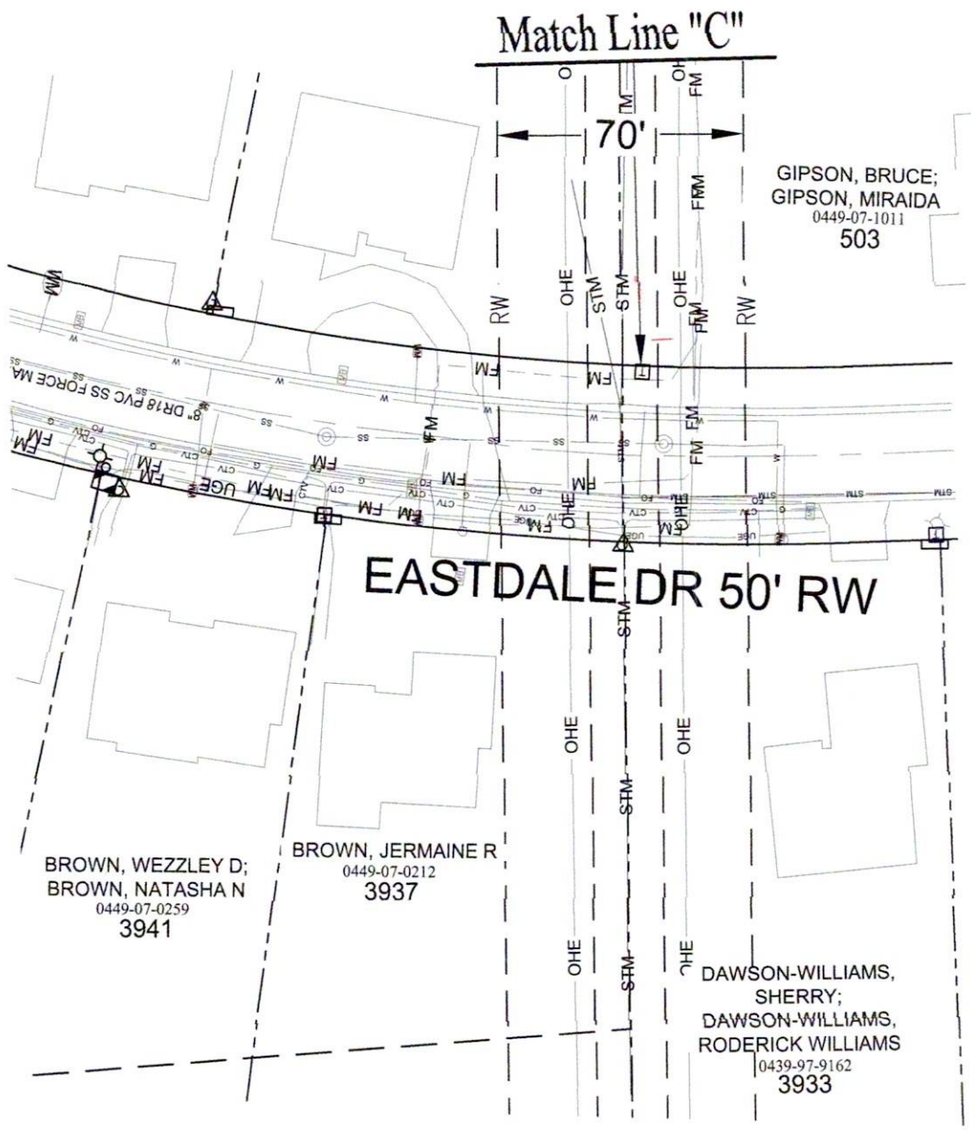
SYM	DESCRIPTION	BY

REVISIONS

PWC PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

DRAWN BY DV	DATE	MARCH 2023
CHECKED BY DV	SCALE	1"= 120'
APPROVED BY	A	1 of 1



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05/27/2026
11:05am
DYLAN ENGLISH

PGO – ASSET PROTECTION
DUKE ENERGY
APPROVED
06/05/2025
12:06pm
RIVER NORTON

50' 0' 50' 100'

NORTH CAROLINA PROFESSIONAL SEAL L-3253 LAND SURVEYOR JEFFREY B. REITZEL
4/22/25

EXHIBIT "A"

SYM	DESCRIPTION	BY

REVISIONS

PWC PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

DRAWN BY: DWM	DATE	MARCH 2025
CHECKED BY: TJG	SCALE	1"= 50'
APPROVED BY	A	1 of 1

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

ENGINEERS PLANNERS SURVEYORS
M&R
MOORMAN, KIZER & REITZEL, INC.

Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE.
FAYETTEVILLE, N.C. 28305
FIRM NO. F-106

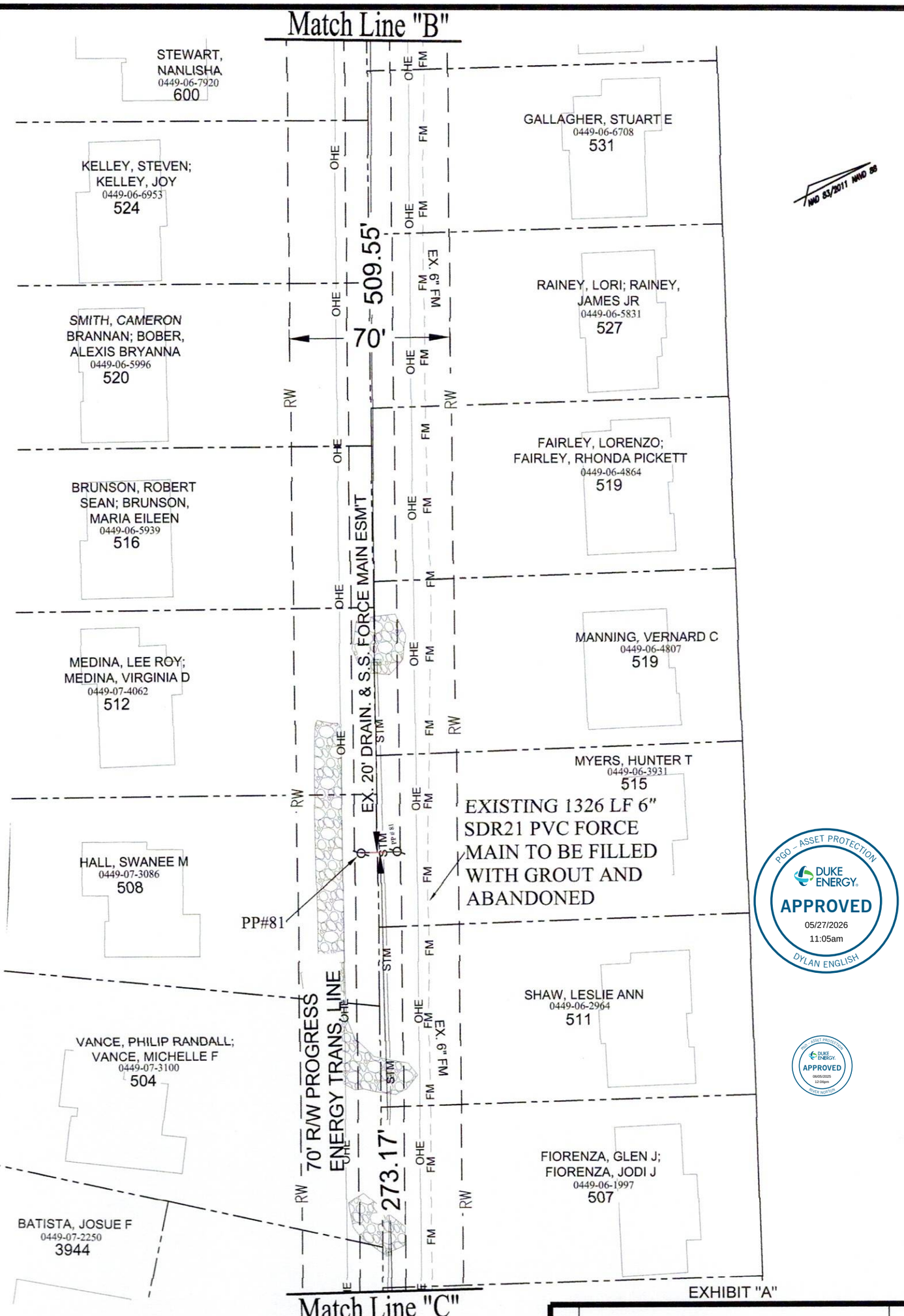


EXHIBIT "A"

SYM	DESCRIPTION	BY

REVISIONS

PUBLIC WORKS COMMISSION
OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

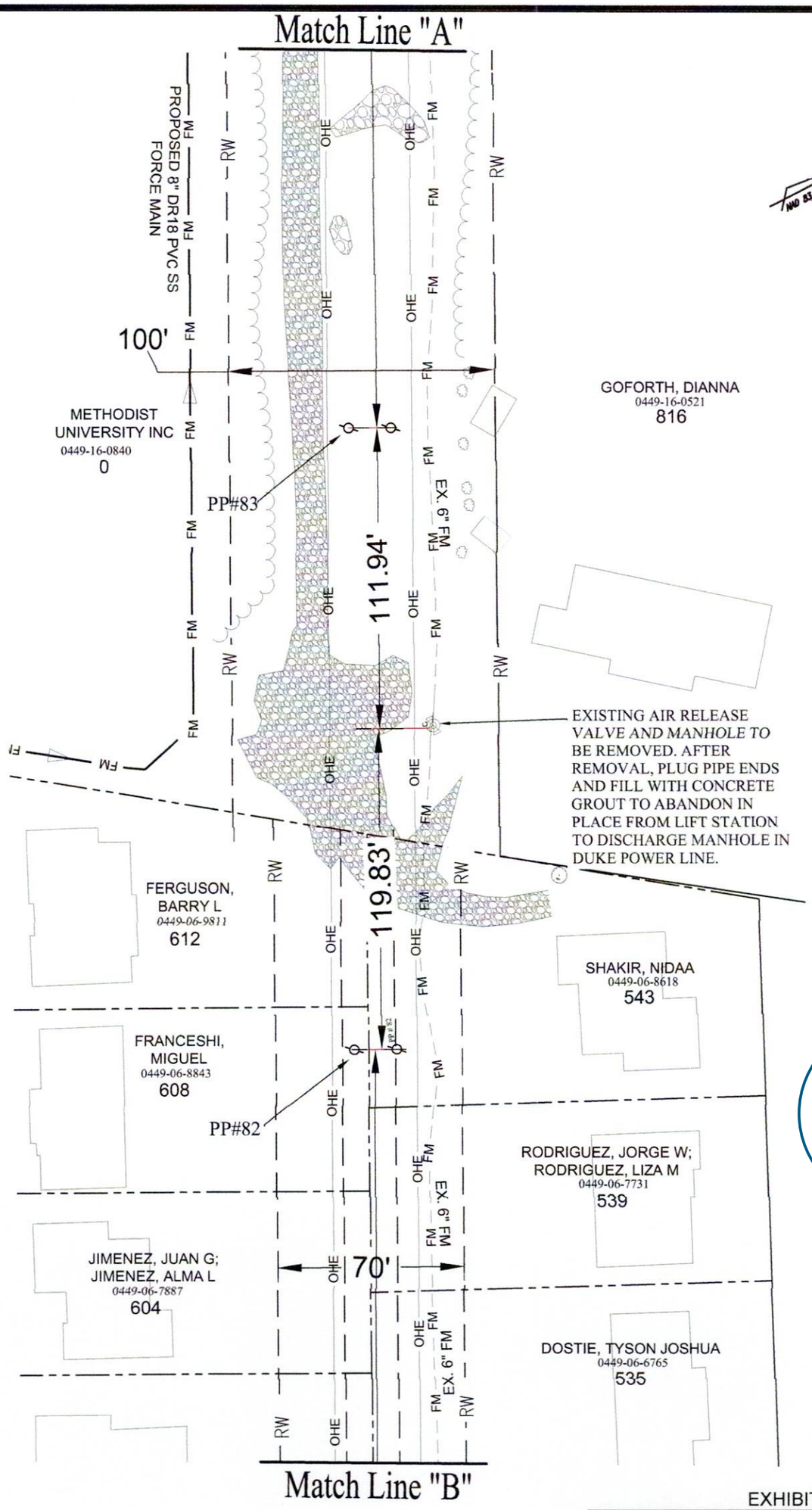
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CHECKED BY: TJG	SCALE	1"= 50'
APPROVED BY	A	1 of 1

NORTH CAROLINA PROFESSIONAL SEAL L-3253 SURVEYOR BRADLEY B. REITZEL

Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE.
FAYETTEVILLE, N.C. 28305
FIRM NO. F-106

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.



NAD 83/2011 NAVD 88

PGO – ASSET PROTECTION
DUKE ENERGY.
APPROVED
05/27/2026
11:05am
DYLAN ENGLISH

PGO – ASSET PROTECTION
DUKE ENERGY.
APPROVED
06/05/2025
12:06pm
RIVER NORTON

EXHIBIT "A"

50' 0' 50' 100'

NORTH CAROLINA PROFESSIONAL SEAL L-3253 SURVEYOR TIMOTHY B. REITZEL

Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE
FAYETTEVILLE, NC 28305
FIRM NO. F-106

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

ENGINEERS PLANNERS SURVEYORS
M&R
MOORMAN, KIZER & REITZEL, INC.

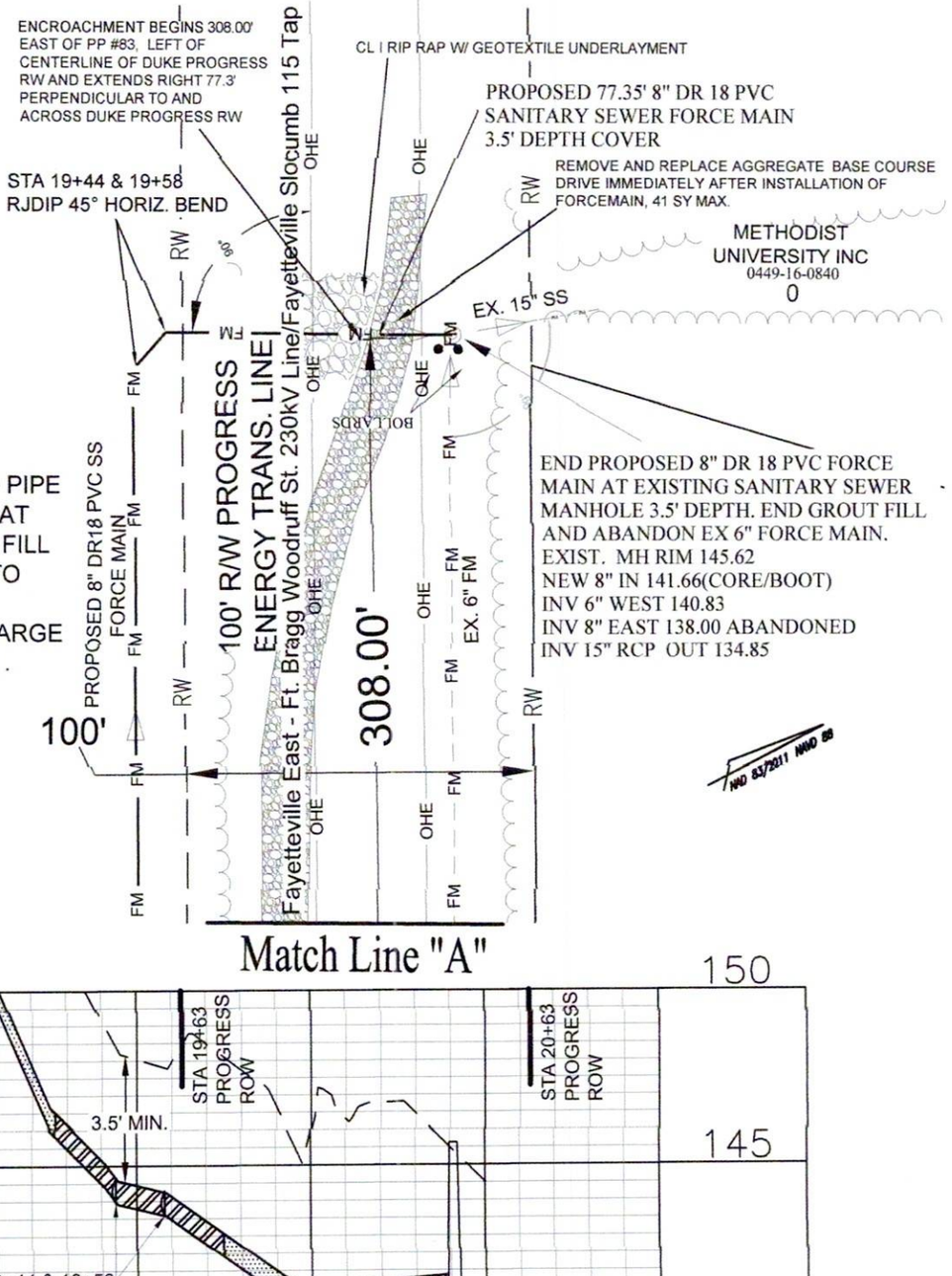
SYM	DESCRIPTION	BY

REVISIONS

PWC PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

DRAWN BY: DWM	DATE	MARCH 2025
CHECKED BY: TJG	SCALE	1"= 50'
APPROVED BY	A	1 of 1

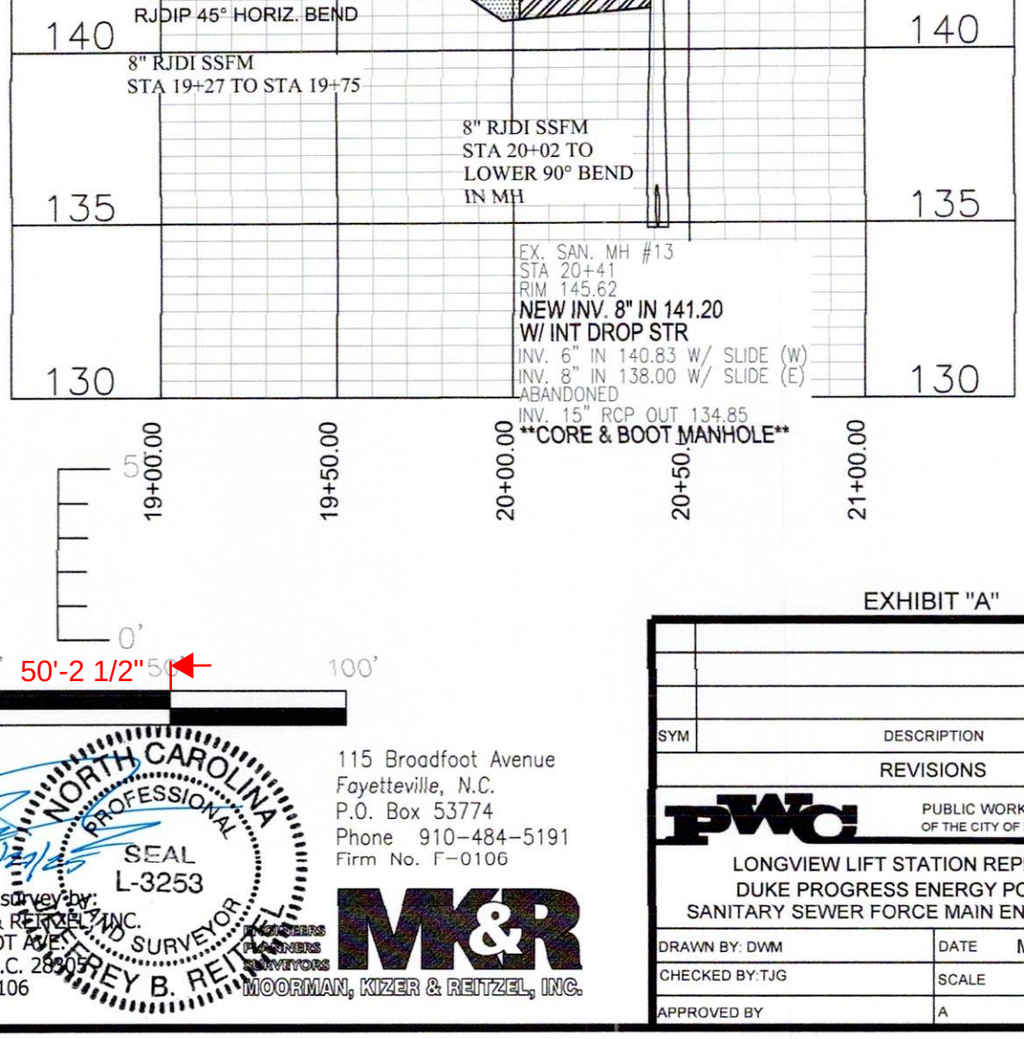


DO NOT DISTURB EXISTING FORCE MAIN UNTIL NEW FORCE MAIN IS ACCEPTED BY PWC FOR USE.
ONCE NEW FM IS ACCEPTED, REMOVE APPROX. 80 LF OF OLD PIPE INTERFERING WITH NEW WORK AT LIFT STATION, PLUG ENDS, AND FILL OLD FM W/ CONCRETE GROUT TO ABANDON IN PLACE FROM LIFT STATION COMPOUND TO DISCHARGE MANHOLE IN DUKE POWER LINE . (APPROX. 2,070 FT)

PGO – ASSET PROTECTION
DUKE ENERGY.
APPROVED
05/27/2026
11:05am
DYLAN ENGLISH

PGO – ASSET PROTECTION
DUKE ENERGY.
APPROVED
06/05/2025
12:06pm
RIVER NORTON

Match Line "A"



50' 50'-2 1/2" 100'

EXHIBIT "A"

SYM	DESCRIPTION	BY
	REVISIONS	

PUBLIC WORKS COMMISSION OF THE CITY OF FAYETTEVILLE, N.C.

LONGVIEW LIFT STATION REPLACEMENT
DUKE PROGRESS ENERGY POWERLINE
SANITARY SEWER FORCE MAIN ENCROACHMENT

DRAWN BY: DWM	DATE	MARCH 2025
CHECKED BY:TJG	SCALE	1"= 50'
APPROVED BY	A	1 of 1

NORTH CAROLINA PROFESSIONAL SEAL L-3253 REGISTERED LAND SURVEYOR JEFFREY B. REITZEL

Based on a partial survey by:
MOORMAN, KIZER & REITZEL, INC.
115 BROADFOOT AVE.
FAYETTEVILLE, N.C. 28305
FIRM NO. F-106

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Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106
M&R ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

USE GUIDELINES FOR ENCROACHMENTS INVOLVING TRANSMISSION EASEMENTS

Duke Energy has a property interest called an easement (or sometimes a right-of-way) in land that you own or are considering purchasing. This easement grants Duke Energy the right to use the easement area for purposes described in the easement document that is filed and recorded in the county's recorder office. This property interest stays with the land when it is bought and sold and generally is perpetual in duration. A series of easements often form a corridor in which the transmission facilities are located and access up and down the corridor is part of the reason Duke Energy obtains these rights.

Broadly stated, easements allow Duke Energy to use another person's property to construct, operate, maintain, repair, and replace electrical facilities for the transmission of high voltage power. The landowner may continue to use the easement area so long as the use is not inconsistent with the easement document or Duke Energy's use of the easement. Any incompatible use by the landowner is called an encroachment. Where an encroachment is under construction, Duke Energy will request that it be stopped and removed; where an encroachment is already installed, Duke Energy will request that it be removed. Where a landowner fails to cooperate, Duke Energy will seek legal recourse to remove the encroachment.

Electricity is a public service and subject to state and federal regulations with which Duke Energy must comply. Any use by the landowner that does or could create regulatory issues is an encroachment. Power lines in the transmission easement are uninsulated and electricity is a dangerous instrumentality. Any landowner use that increases the danger to the landowner, the public or Duke Energy in its use of the easement is also an encroachment.

Over years of designing, constructing, operating, repairing, upgrading and maintaining electric facilities in transmission easements, Duke Energy has developed an understanding of the types of uses by landowners that do, or potentially can, interfere with the easement's purposes and Duke Energy's ability to provide safe and reliable service. This guidance, which supersedes all prior versions, provides a brief overview of types of things that do, or can, interfere with Duke Energy's easement rights and thereby create encroachments.

This overview cannot address all possible situations and is intended to provide general guidance. Please contact the Asset Protection Specialist if you have additional questions or concerns about the use of the easements. Please discuss any proposed activity in the transmission easements with Duke Energy to avoid creating an encroachment or interference. The Asset Protection Specialist can assist and help avoid a subsequent need by the landowner to revise plans or remove obstructions from the easements. Engineering plans may be required by Duke Energy to fully understand any proposed use by the landowner.

By providing these guidelines, Duke Energy does not waive any rights it has in its easements or under the law. Duke Energy's concurrence that a proposed use does not constitute an interference with its easement rights does not mean that requirements of local, county, state or federal governments or other agencies with governing authority have been met.

The following are not permitted in Duke Energy's transmission easements as they interfere with Duke Energy's use of the easements for transmission of electricity by, among other things, interfering with full use the easement, interfering with existing facilities, interfering with access to the facilities, interfering with future expansion in the easement, increasing the danger to the public or those who may be required to work in the easement, creating regulatory violations and generally, making the transmission of electricity more dangerous, costly and/or unreliable: Examples include but are not limited to:

- Permanent or temporary structures and buildings, including for example, permanent or manufactured/mobile homes (and home additions and extensions), garages, sheds, satellite systems, intersections, cul-de-sacs, entrances, streets, swimming pools (any associated equipment and decking), playground equipment, graves, billboards, dumpsters, signs, wells, deer stands, retaining walls, septic systems or tanks (whether above or below ground).

- Mounding or stockpiling any material, such as spoils, dirt, logs, construction or building material, wrecked or disabled vehicles, (e.g. may create clearance and access issues and/or increases dangers in using the easement).

- Transformers, telephone/cable pedestals and associated equipment (unless specifically addressed in a joint use agreement), fire hydrants, manholes, water valves, water meters, backflow preventers & irrigation heads, (e.g. may increase the likelihood of safety hazards & access issues).

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- Attachments to Duke Energy structures in the easement; (unless specifically addressed in a joint use agreement).

- Streets, roads, driveways, sewer/water lines, other utility lines or any underground facilities that run in parallel to the centerline in the easement or cross in one contiguous segment from outside edge of easement to opposing outside edge of easement, at any angle that is less than 30 degrees or greater than 90 degrees as measured from the centerline. No portion of such facility shall be located within 25 feet of Duke Energy's facilities (unless specifically addressed in a joint use agreement.)

- Fences or utilities that cross the easement in multiple segments in a non-continuous alignment from outside edge of easement to opposing outside edge of easement at any angle of less than 30 degrees or greater than 90 degrees as measured from the centerline. This generally creates an interference as the ability to access and utilize the full easement and reach facilities in the easement is substantially impaired. If a fence crosses the easement at an angle greater than or equal to 30 degrees and less than or equal to 90 degrees with the centerline, a gate (16 feet wide at each crossing) shall be installed by the landowner, per Duke Energy's specifications. Duke Energy will supply a lock. The landowner is required to install the Duke Energy lock on the gate to ensure access. The lock can be interlocked with the landowner's lock. Fences and gates that exceed 10 feet in height are prohibited because they create a clearance issue and are an interference. Fences that inhibit Duke Energy's access because they lack a gate that is at least 16 feet wide, interfere with Duke Energy's easement use.

- Grading (cuts or fill) in the easement that is closer than 25 feet to transmission facilities i.e. poles, towers, guys and anchors and/or slopes greater than 4:1 no matter where located or that otherwise change clearances or topography.

- Parking or lighting facilities which affect clearances, access or Duke Energy's ability to make full use of its easement.

- Placement of combustible materials and/or the purposeful burning of anything within the easement are inconsistent with electric facilities, the transmission of power and create safety hazards and system reliability issues.

- Any water feature in the easement, such as a detention and retention pond, stream or lake. Where a structure outside the easement causes erosion or directs storm water toward the easement or the electric facilities or access to or around the electric facilities, such structure will interfere with Duke Energy's use and must be altered to eliminate that effect.

- Incompatible vegetation above ground transmission lines - Vegetation within or outside of the transmission easement that will mature to a height or size that will pose a grow-in, fall-in, or blowing-together threat to the transmission conductor (typical maximum mature height greater than 15 feet within the transmission easement depending on location and voltage).

- Incompatible vegetation underground transmission lines - Vegetation within or outside of the transmission easement that is capable of posing a threat (e.g., root systems, etc.) to the underground transmission conductor by **a)** causing damage to the underground pipes / cables or **b)** reducing the moisture in the soil, thus altering the thermal properties of the surrounding soil / backfill and thereby negatively impacting the cable ampacity rating (typical maximum mature height within the easement - greater than 3 feet depending on location and voltage).

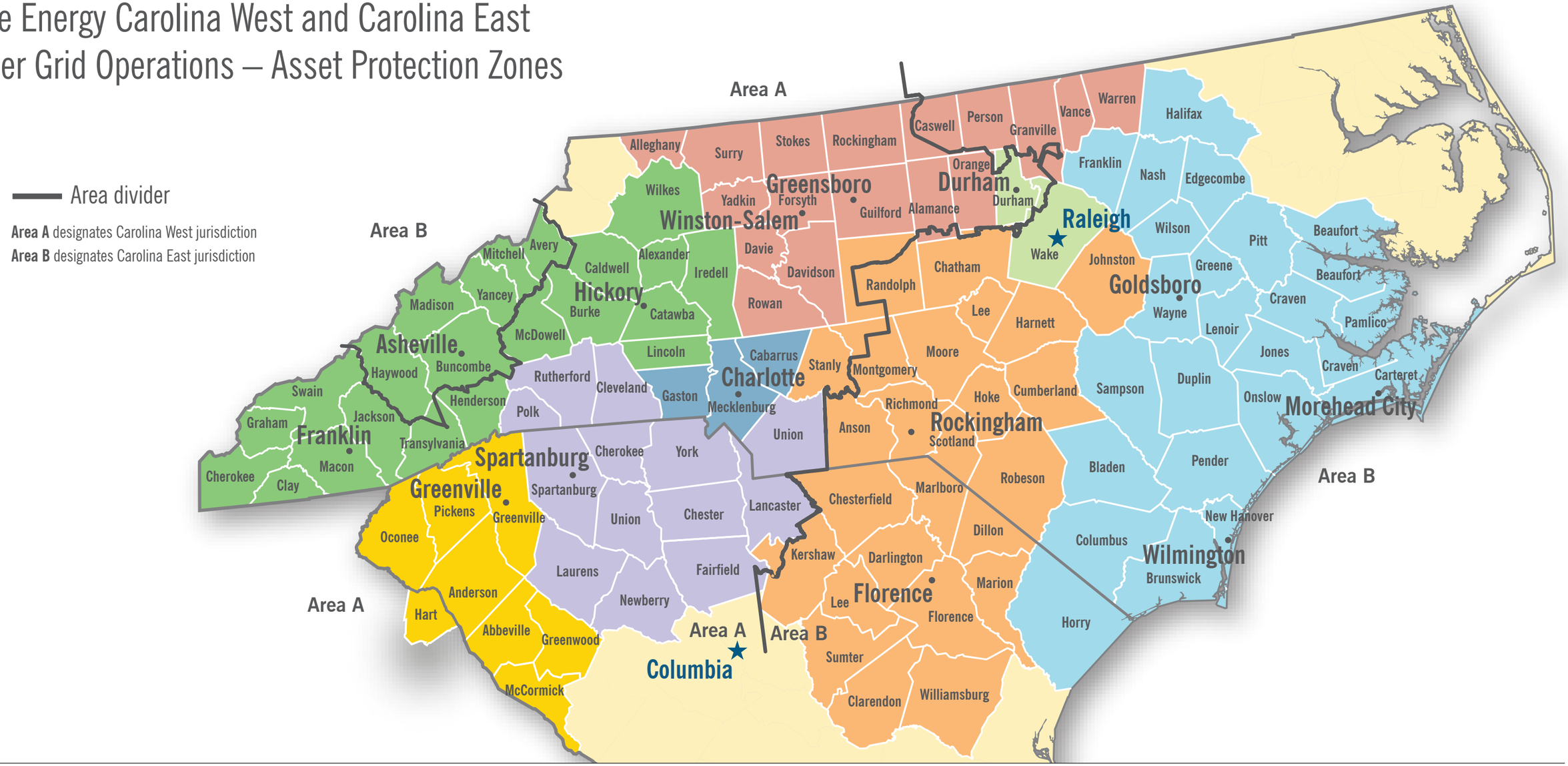
- Incompatible vegetation for safe and reliable operation and access on all transmission lines - Vegetation that will limit or block access, limit the safe and reliable operation, emergency restoration, or maintenance of the transmission facilities, limit the full use of the transmission easement for its intended purposes or vegetation which is typically within a horizontal distance of 25 feet of any Duke Energy facilities (towers, poles, guy wires, guy anchors, manholes, dip-poles, substation equipment, etc.).

As discussed, these guidelines are not exhaustive and there may be other interferences on a case-by-case basis depending on individual circumstances. Certain conditions such as line voltage, line criticality, frequency of required access and structure type may require heightened restrictions in the easements to provide safe and reliable service.

If you have additional questions or plan any activity not mentioned above, please contact customer service and ask for your local Transmission Asset Protection Specialist.

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Duke Energy Carolina West and Carolina East
Power Grid Operations – Asset Protection Zones



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DUKE ENERGY®

BUILDING A **SMARTER** ENERGY FUTURE®



Your safety is our priority

We have a goal at Duke Energy – to eliminate injury and death from needless power line contacts. We want to provide you with the information you need to stay safe at work.

Important OSHA minimum approach regulation

The following table is from OSHA 1910.333 and applies to nonqualified persons working in proximity to energized power lines. The minimum approach distance is to be maintained for nonqualified workers. When using equipment classified as a crane or derrick, OSHA 29 CFR 1926.1407-1411 must be followed.

OSHA - 1910.333 Applies to NonQualified Persons Minimum Approach Distance	
Up to 50 kV	10 Feet
50 kV up to 200 kV	15 Feet
200 kV up to 350	20 Feet
350 to 500 kV	25 Feet
500 kV to 750 kV	35 Feet

Important OSHA crane regulation

Cranes and derricks near transmission power lines – OSHA 29 CFR 1926.1407-1411

This regulation applies to power-operated equipment used in construction that can hoist, lower and horizontally move a suspended load. Such equipment includes, but is not limited to:

If any part of equipment, load line or load could get closer than 20 feet to less than 350 kV power lines or 50 feet for greater than 350 kV power lines, you must speak with a Duke Energy representative before beginning work.

Such equipment includes, but is not limited to:

- Articulating cranes (such as knuckle boom cranes)
- Floating cranes
- Locomotive cranes
- Multipurpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load
- Industrial cranes (such as carry deck cranes)
- Pedestal cranes
- Straddle cranes
- Derricks
- Overhead bridge and gantry cranes NOT permanently installed
- Crawler cranes
- Cranes on barges
- Side boom tractors
- Base-mounted drum hoists only when used with derricks
- Tower cranes
- Portal cranes
- Service/mechanic trucks with a hoisting device
- Dedicated pile drivers
- Mobile cranes (such as wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted and boom truck cranes)
- Variations of these types of equipment



DUKE ENERGY®

Contact us

For more information, please visit duke-energy.com/safety or call:

Duke Energy Carolinas
800.777.9898 or 800.POWERON

Duke Energy Indiana
800.521.2232

Duke Energy Kentucky or Ohio
800.544.6900

Duke Energy Progress
800.452.2777

Duke Energy Florida
800.700.8744

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Charlotte, NC 28202

www.duke-energy.com

DUKE ENERGY®

Look up and live.

Working around high-voltage transmission lines



Know how to protect yourself, your crew and the public when working around transmission lines.

Duke Energy cares about your safety. This brochure contains important information for:

- Anyone working around power lines
- Grading contractors
- Forklift operators
- Crane operators
- Developers (residential, commercial, industrial)
- Architects and engineers
- Dump truck operators

130695-look-up-and-live-brochure-v3.indd 1-2,4
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Know your voltage, know your clearance

Federal law requires that all contractors maintain at least a 10-foot clearance from overhead power lines up to 50 kV. Greater clearance is required for higher-voltage power lines and cranes and derricks in construction.

Contact Duke Energy at least three working days before you start working near overhead power lines and equipment so that safety recommendations can be made.

Treat all transmission lines, regardless of their operating voltage, with caution:

- 44 kV and 100 kV lines look similar.
- Never assume a voltage based on the illustration.
- Minimum clearance includes maximum sag, which must be calculated for each instance.
- Injury or death can occur without touching power lines.
- Assume all overhead power lines are energized.
- Contact Duke Energy if you are in doubt about safe operating distances.

Fact 1.

Power lines that serve your homes and businesses are not insulated like home appliance cords.

Fact 2.

Power lines carry 4,000 to 500,000 volts of electricity that can seriously injure or kill on contact.

Fact 3.

The simplest way to stay safe is to know where your power lines are located and stay away.

A planned project is a safe project

Check the job site for hazards and know the location of all overhead power lines and electric equipment, including poles and guy wires.

Consider all overhead lines as energized. Mark the work site boundaries to keep workers, vehicles, tools and equipment a safe distance from electric lines and equipment.

Hold a pre-work safety meeting, pointing out areas where overhead lines and electric equipment are located.

We can help you:

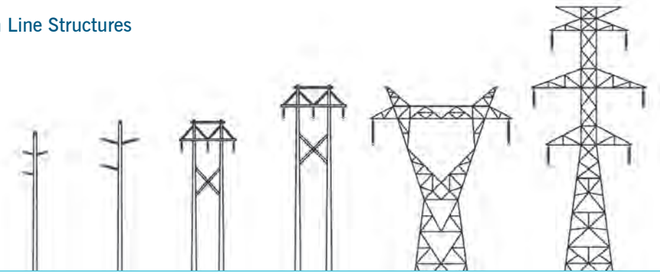
- Confirm voltage
- Confirm clearance
- Confirm wire height under peak conditions
- Provide safety guidance around power lines
- Review and approve drawings for:
  - Compliance with right-of-way restrictions
  - Compliance to National Electric Safety Code
- Identify the best, safe solution

Emergency situations

If your equipment makes contact with an overhead power line, notify Duke Energy immediately and take these precautions:

- Have someone call 911.
- Do not attempt to turn off engines or generators.
- Move equipment away from the line only if it is safe to do so.
- Remain on equipment until utility workers arrive and de-energize the line.
- Warn others to stay away. Those on the ground can be injured or killed if they make contact with the equipment.
- If you must leave the equipment because of fire or other dangers, jump off with your feet together. Never touch the ground and equipment at the same time. Keeping your feet together, shuffle or hop away until you are clear of the area.

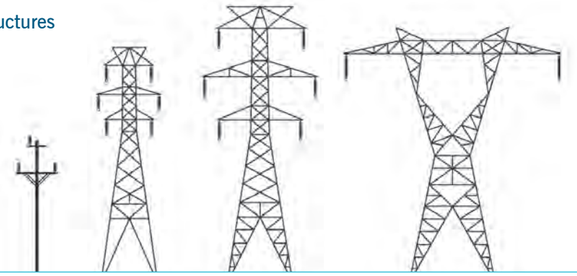
Duke Energy Midwest Transmission Line Structures



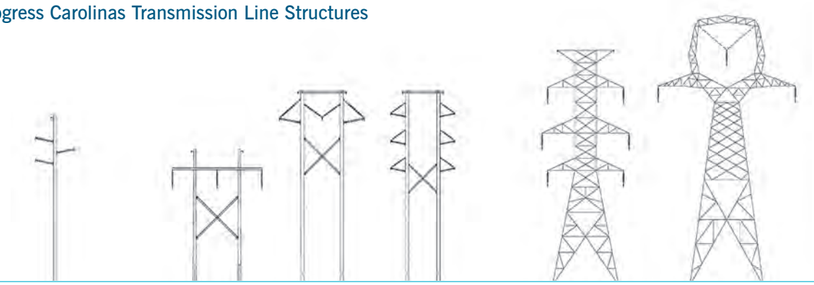
Duke Energy Florida Transmission Line Structures



Duke Energy Carolinas Transmission Line Structures



Duke Energy Progress Carolinas Transmission Line Structures



For more information, visit duke-energy.com/safety.

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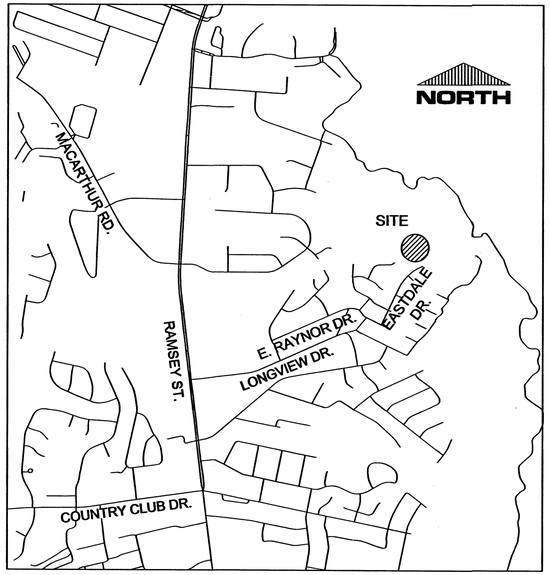
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PWC

Fayetteville's
HOME TOWN UTILITY

FAYETTEVILLE, N.C.

Longview Acres Lift Station 41 Replacement & San. Sewer Force Main



VICINITY MAP
N.T.S.

811
Know what's **below.**
Call before you dig.

SHEET INDEX

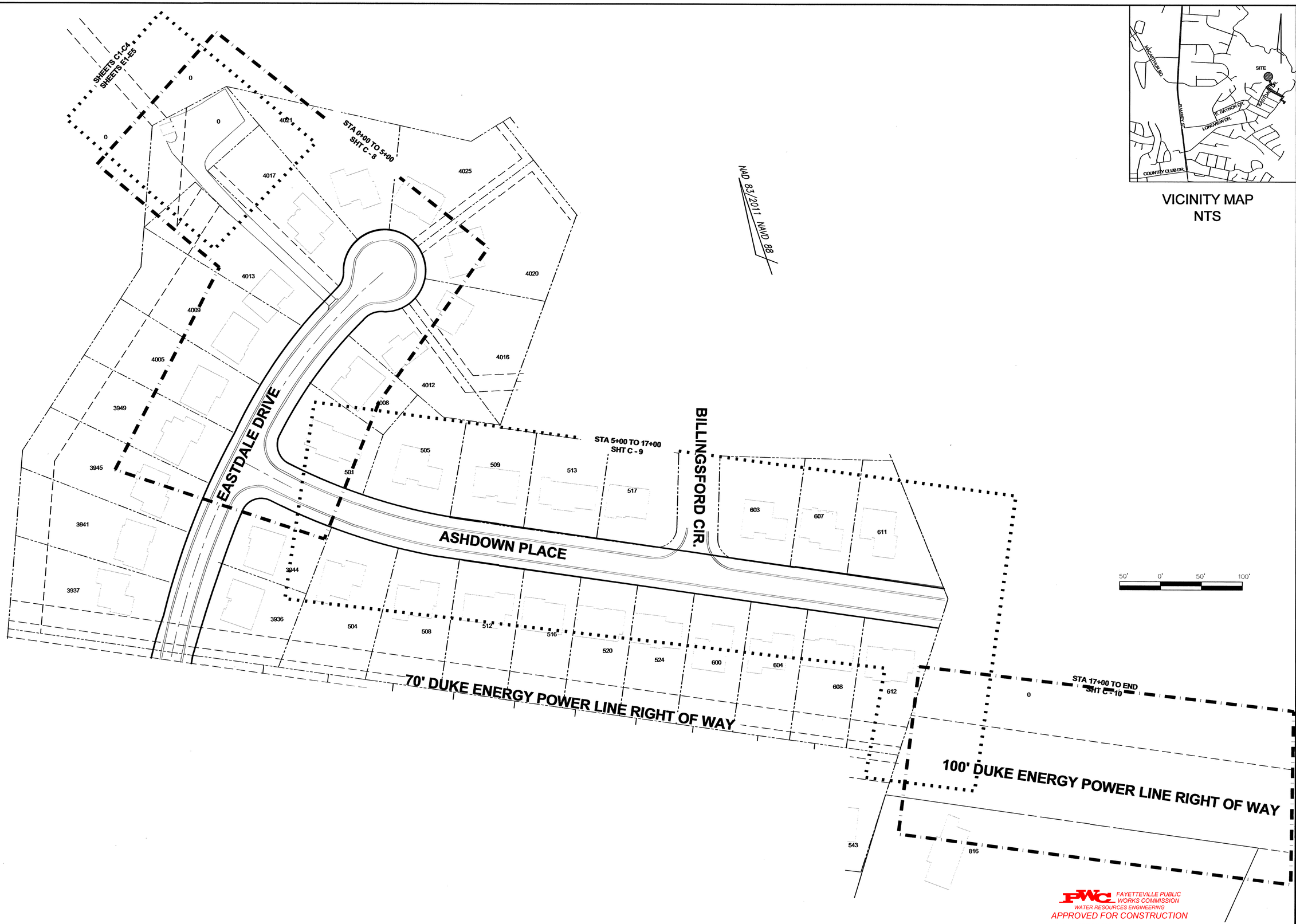
	COVER SHEET
SK-1	SHEET KEY
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C-2	LIFT STATION DEMOLITION PLAN
C-3	LIFT STATION EROSION CONTROL PLAN
C-4	LIFT STATION GRADING, UTILITY & PAVING PLAN
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PWC FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049161 GREY B. HOUSE, JR.

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DS-15615



VICINITY MAP
NTS

Drawn by
David Maples
Checked
David E. Vaughn,PE,PLS
Reviewed
Jeffrey B Reitzel,PE,PLS
Date
JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN

Sheet Key

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25



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ENGINEERS
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MOORMAN, KIZER & REITZEL, INC.

PWC FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
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Date: 02/12/2026

Scale 1" = 50'
Book no.
Sheet
SK-1

G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Plans\Construction Plans\-1 SHEET KEY.dwg, 12/11/2025 3:19:14 PM, 2022 - Canon iPF780.pc3

EX. SAN. MH #1
RIM 100.12
INV. 8" IN 91.82
INV. 8" OUT 91.81

TOP 12" DIP OVER CREEK 92.55 (N)

TOP 12" DIP OVER CREEK 92.41 (S)

STREAM

WOODLINE (TYP)

METHODIST UNIVERSITY INC
0449-16-0840
0

NAD 83/2011 NAVD 88

EX. 168' 12" DIP @ 0.41%

EX. 8" DIP
INV. 92.70
(PLUGGED)

METHODIST UNIVERSITY INC
0439-97-8855
0

EX. 12" DIP
INV. 91.10

CMU RET. WALL

TRENCH DRAIN
GRATE 105.25
INV. 104.20

EX. INV. 97.29

POWER POLE W/ LIGHT

ELEC. BOX

POWER POLE W/ LIGHT

EX. 8" DIP

L.S. #1
FF=104.48
BOTTOM 86.51

6" DI FORCEMAIN TURNED DOWN & 6" ISOLATION VALVE ON STAND PIPE

B-01

SCADA EQUIP. BOX

EX. SAN. MH #2
RIM 105.37
INV. 8" IN 101.19
INV. 8" OUT 101.12

STREAM (TYP)

EX. 8" DIP
INV. 100.95
(PLUGGED)

EQUIPMENT RACK

GRAND BASE

MAINT. HATCH

ANTENNA

TRENCH DRAIN
GRATE 105.37
INV. @ TOP OF SLIDE 104.28
INV. @ BOTTOM OF SLIDE 103.22
W/ GRAVEL WRAPPED IN HARDWARE CLOTH

CITY OF FAYETTEVILLE
0449-07-3720
0

GRASS

ASPH. PAV'T

EX. D.I. #1
GRATE 105.30
INV. IN 103.18 (TRENCH DRAIN)
12" RCP INV. OUT 102.98

EX. 12" RCP

12" RCP FES
INV. OUT 101.49

DAY,SHONDEMEL
0449-07-4673
4021

WETLANDS (DO NOT DISTURB)

EX. 6" SS FM

EX. 711' 8" SS @ 1.10%

POWER POLE

EX. SAN. MH #3
RIM 110.33
INV. 8" IN 104.29 W/ SLIDE (S)
INV. 8" IN 101.94 (W)
INV. 8" OUT 101.97

SHED

EX. SILT FENCE

EX. 40' DRAIN. ESM'T

4' CHAIN LINK FENCE

6' WOOD PRIVACY FENCE

6' WOOD PRIVACY FENCE

MIZELL, CHRISTOPHER L; NGUYEN, TUYET V.
0449-07-4509
4017

DELGADO, ANGEL F; DELGADO, TAHIRI HERNANDEZ VELZQUEZ
0449-07-3515
4013

EX. SAN. MH #1
RIM 117.27
INV. 8" OUT 106.65

EX. 30' DRAIN. ESM'T

EX. 370' SS

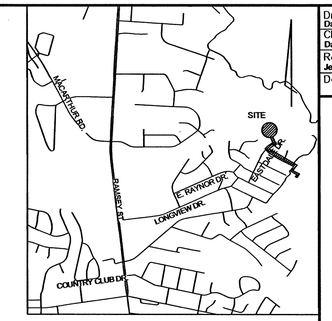
ASPHALT PATCH

ASPH. PAV'T

△ TBM 106.79 RR SPIKE IN 18" PINE TREE

10' 0' 10' 20'

FOR NOTES AND LEGEND SEE SHEET UTIL-3



VICINITY MAP
NTS

GENERAL NOTES:

1.) ALL UNDERGROUND UTILITY LOCATIONS ARE BASED UPON FIELD MARKINGS BY UTILITY OWNERS.
2.) NO WATERCOURSE OR 100 YEAR FLOOD PLAIN AS MAPPED BY FEMA OR AS DEFINED BY ANY FEDERAL, STATE, OR LOCAL AUTHORITY IS LOCATED ON THIS PROPERTY. 100 YEAR FLOOD ELEV. 87.17
3.) VISIBLE OBJECTS WERE FIELD LOCATED AND INDICATED ON THIS SURVEY.

LEGEND

- DROP INLET
- CATCH BASIN
- GATE VALVE
- FIRE HYDRANT
- WATER METER
- CABLE TV PEDESTAL
- ELECTRIC PANEL
- ELECTRIC TRANSFORMER
- POWER POLE W/ LIGHT
- GUY ANCHOR
- POWER POLE
- TELEPHONE PEDESTAL
- BORE HOLE
- PROP. CORNER
- SANITARY SEWER MANHOLE
- SIGN
- POLE MOUNTED TRANSFORMER
- CONC. SURVEY MONUMENT
- STORM DRAIN INLET PROT.
- DECIDUOUS TREE
- SHRUB
- WOOD LINE
- OVERHEAD ELECT.
- UNDERGROUND ELECT.
- SEWER FORCE MAIN
- GRAVITY SEWER
- STORM DRAIN
- FIBER OPTIC
- SILT FENCE
- CHAIN LINK FENCE
- WOOD FENCE
- PROPERTY LINE
- EASEMENT LINE
- STREAM
- MINOR CONTOUR
- MAJOR CONTOUR
- TRENCH DRAIN
- WETLANDS
- RIP RAP
- TELEMETRY ANTENNA

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

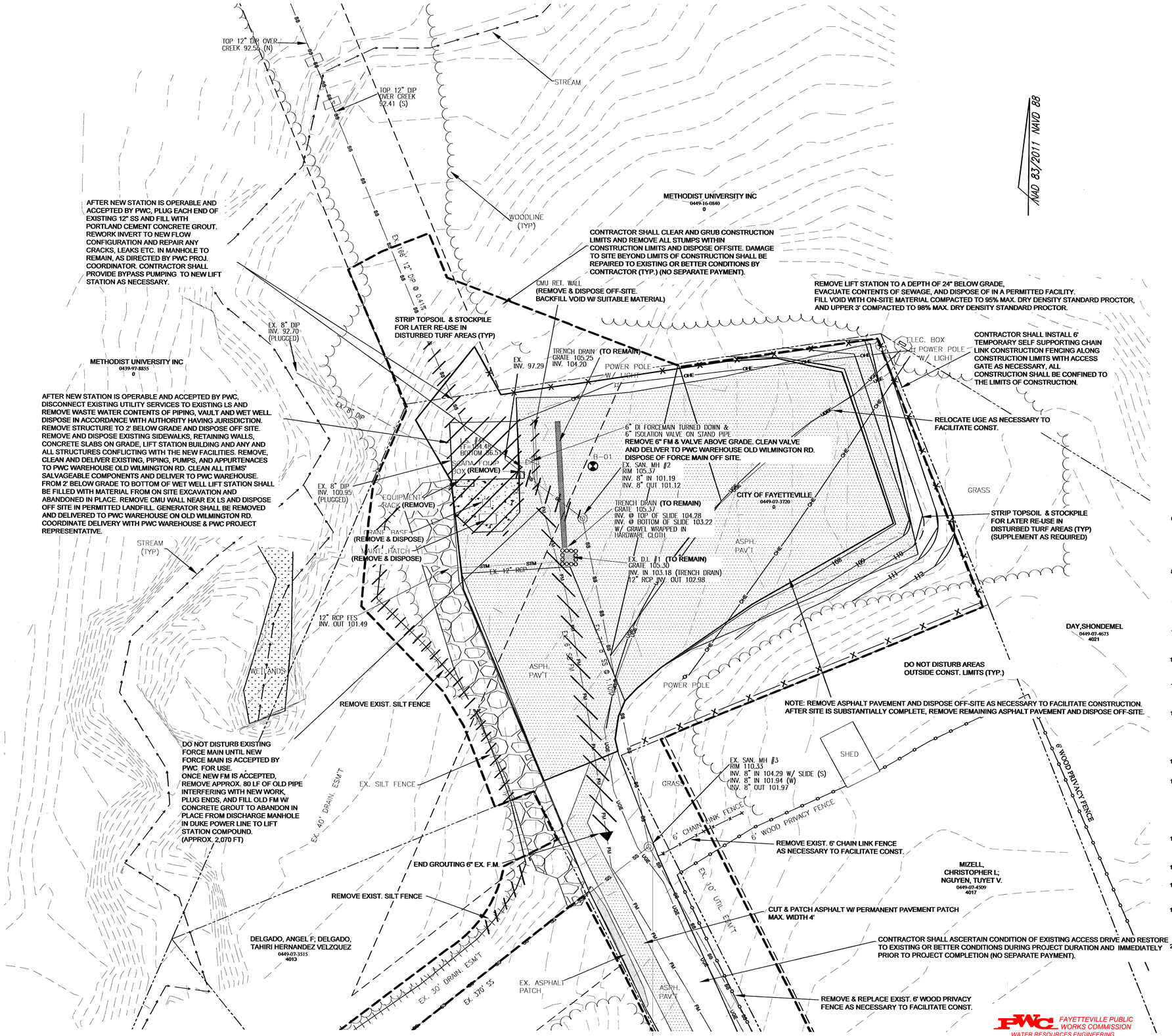
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
Lift Station Ex. Topographical Survey

Revision	By	Date
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Scale 1" = 10'
Book no.
Sheet C-1



DEMOLITION LEGEND

PWC GRAVITY SANITARY SEWER

LIMITS OF CONSTRUCTION

PWC OVERHEAD ELECTRIC (AS INDICATED)

GATE VALVE (AS INDICATED)

SANITARY SEWER MANHOLE AS INDICATED

PWC LS #41

CMU WALL

ASPH PAVEMENT (TO BE REMOVED AND REPLACED/PATCHED)

SILT FENCE

DEMOLITION NOTES (TYPICAL ALL SHEETS)

1. CONTRACTOR SHALL ASCERTAIN OWNERSHIP OF UTILITIES AND ENSURE THAT ALL SERVICES THAT ARE TO BE DEMOLISHED HAVE BEEN TERMINATED AND PLUGGED BY THE APPROPRIATE UTILITY OWNER. CONTRACTORS DEMOLITION OPERATIONS SHALL NOT CAUSE DISRUPTION OF UTILITY SERVICES.
2. CONTRACTOR SHALL VERIFY LOCATION OF EXIST. UTILITIES PRIOR TO BEGINNING CONSTRUCTION. CONTRACTOR SHALL REMOVE ALL UTILITIES AS INDICATED AND DISPOSE OFF-SITE. EXCAVATIONS SHALL BE FILLED WITH CONTRACTOR FURNISHED SELECT BACK FILL OR SUITABLE MATERIAL FROM ON-SITE AND COMPACTED TO 98% MAX. DRY DENSITY ASTM D698. ALL UNCHARTED UTILITIES THAT REQUIRE REMOVAL BEYOND THAT INDICATED SHALL BE BROUGHT TO THE OWNERS ATTENTION PRIOR TO COMPLETING THE REMOVAL OF THE UTILITY.
3. CONTRACTOR SHALL REMOVE DEBRIS AND RUBBISH PROMPTLY AS DEMOLITION PROCEEDS TO ELIMINATE THE ACCUMULATION OF DEBRIS AT THE DEMOLITION SITE. MATERIALS THAT CANNOT BE REMOVED DAILY SHALL BE STOCKPILED IN AREAS DESIGNATED ON-SITE ACCEPTABLE TO THE OWNER AND ONLY WITH THE OWNERS APPROVAL. REMOVAL SHALL BE ACCOMPLISHED AS SOON AS POSSIBLE
4. THE CONTRACTOR SHALL SUBMIT PROPOSED PROCEDURES FOR THE ACCOMPLISHMENT OF THE WORK FOR INFORMATION PURPOSES ONLY. PROCEDURES SHALL INCLUDE OBTAINMENT OF ALL NECESSARY DEMOLITION PERMITS AND CONSTRUCTION SCHEDULE FOR REVIEW. NO BURNING WILL BE ALLOWED TO OCCUR ON-SITE.
5. CONTRACTOR SHALL PROVIDE DUST CONTROL AT ALL TIMES THROUGHOUT THE DURATION OF THE PROJECT AND SHALL BE RESPONSIBLE FOR MAINTAINING THE CLEANLINESS OF THE SITE AND SURROUNDING HIGHWAYS & PUBLIC R/W (SOIL, TRASH ETC. SHALL NOT BE ALLOWED TO ACCUMULATE IN THESE AREAS). BROOMING AND OR SWEEPING PAVED SURFACES SHALL BE REQUIRED WEEKLY OR AS DIRECTED BY THE ENGINEER.
6. THE CONTRACTOR SHALL EMPLOY ANY AND ALL NECESSARY PRECAUTIONS AND METHODS OF CONSTRUCTION NECESSARY TO ENSURE THAT EXISTING ITEMS NOT TO BE DEMOLISHED REMAIN SERVICEABLE AND UNDISTURBED. ANY REPAIRS TO ITEMS TO REMAIN DUE TO DAMAGE FROM CONSTRUCTION SHALL BE REPAIRED TO EXISTING OR BETTER CONDITIONS AT NO SEPARATE PAYMENT.
7. THE USE OF EXPLOSIVES WILL NOT BE PERMITTED.
8. CONTRACTOR IS EXPECTED TO VISIT SITE TO ASCERTAIN EXISTING CONDITIONS & FEATURES. SUBMITTAL OF A BID PROPOSAL WILL BE CONSIDERED EVIDENCE THAT CONTRACTOR HAS DETERMINED THE EXTENT OF WORK REQUIRED.
9. EXCAVATIONS REQUIRED FOR REMOVAL OF FOOTINGS, FOUNDATIONS, UTILITIES ETC. SHALL BE BACK FILLED AND COMPACTED WITH SELECT MATERIAL OR SUITABLE MATERIAL FROM ON-SITE AS DIRECTED BY THE ENGINEER.
10. THE CONTRACTOR SHALL PERFORM HIS OPERATIONS DURING NORMAL BUSINESS HOURS MONDAY THRU FRIDAY; SATURDAY WORK WILL BE ALLOWED WITH THE OWNERS APPROVAL. WORK ON SUNDAYS AND HOLIDAYS IS PROHIBITED.
11. CONTRACTOR SHALL GRADE AREA TO DRAIN AT ALL TIMES AND SHALL INSTALL ANY AND ALL EROSION CONTROL MEASURES NECESSARY PRIOR TO BEGINNING CONSTRUCTION AND OR DEMOLITION ACTIVITIES.
12. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLAN TO THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION. CONTRACTOR SHALL MAINTAIN TRAFFIC CONTROL MEASURES AS NECESSARY .
13. THE EXISTENCE OF UNDERGROUND STORAGE TANKS (UST) ARE NOT EXPECTED. SHOULD THE CONTRACTOR ENCOUNTER A UST THE CONTRACTOR SHALL CEASE WORK IN THE IMMEDIATE AREA AND CONTACT THE OWNER IMMEDIATELY FOR DIRECTION AS TO HOW TO PROCEED WITH THE REMOVAL. ANY UST ENCOUNTERED WILL BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH LOCAL AND STATE GUIDELINES.
14. CONTRACTOR SHALL SEED AREAS DISTURBED BY CONSTRUCTION WITHIN 15 DAYS OF DISTURBANCE WITH TEMPORARY SEEDING.
15. CONTRACTOR MAY OBTAIN TEMPORARY WATER/ELECTRIC FOR CONSTRUCTION BY APPLYING THRU APPROPRIATE UTILITY SERVICE. ALL COSTS SHALL BE BORNE BY THE CONTRACTOR FOR SERVICE FEES, WATER USAGE, BACK FLOW PREVENTION AND ANY OTHER INCIDENTALS RELATED TO TEMPORARY WATER SERVICE. TEMPORARY POWER SERVICE IS ALSO AVAILABLE THRU PUBLIC UTILITY SERVICE, ALL COSTS ARE TO BE BORN BY THE CONTRACTOR.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING NECESSARY TEMPORARY FENCING, BARRICADES, TRAFFIC CONTROL DEVICES, SAFETY MEASURES AND IMPLEMENTATION VIA SIGNS, LIGHTED BARRICADES, ETC. UNTIL PROJECT ACCEPTANCE.
17. NO BURNING WILL BE ALLOWED ON SITE
18. CONTRACTOR SHALL PROVIDE DEWATERING VIA WELL POINT SYSTEM, PUMPS, ETC. AND DISCHARGE TO SILT SACK OR OTHER APPROVED SEDIMENT CONTROL DEVICE.
19. CONTRACTOR SHALL PROVIDE SHEET PILING AND/OR OTHER SUITABLE ACTIVE SHORING SYSTEM TO PROTECT ADJACENT FACILITIES AND/OR PROPERTIES FROM DAMAGE DURING EXCAVATION AND/OR TRENCHING OPERATIONS IN ACCORDANCE WITH OSHA REQUIREMENTS. SUBMIT METHODS OF SHORING TO OWNER FOR REVIEW..
20. SEE SHEET E-1 OF 5 FOR ADDITIONAL ELECTRICAL DEMOLITION.

10' 0' 10' 20'

FOR NOTES AND LEGEND SEE SHEET

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
Lift Station Demolition Plan

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25
PWC Comments	DWM	DEC 25

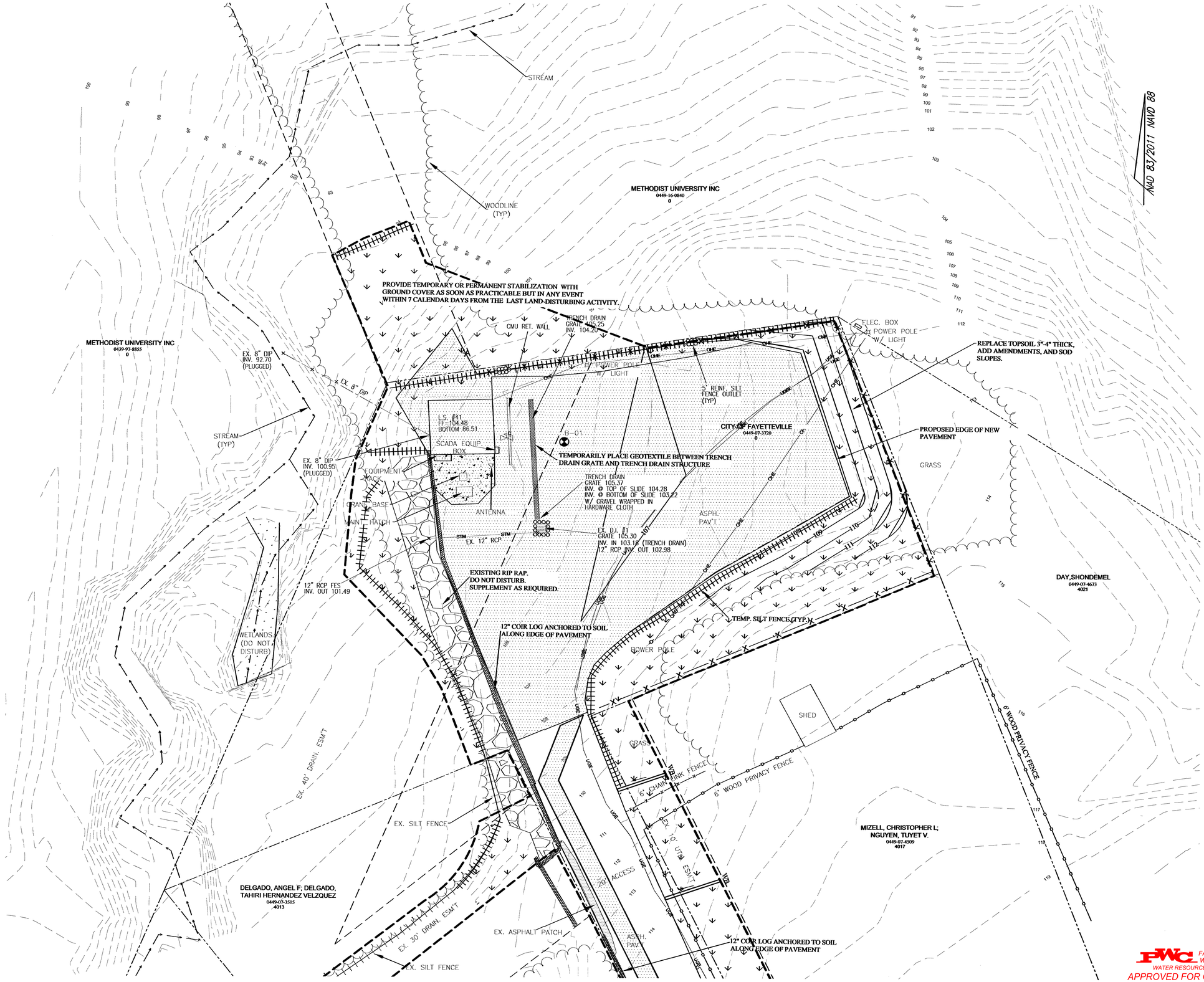
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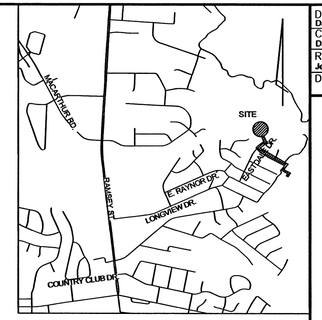
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Book no.

Sheet C-2





VICINITY MAP
NTS

LEGEND

- INSTALL TEMPORARY HIGH FLOW SILT SACK IN BASIN. (TYPICAL)
- WETLANDS
- TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
- TEMPORARY SILT FENCE
- TEMPORARY REINFORCED SILT FENCE
- SEED/SOD SYMBOL
- LIMITS OF CONSTRUCTION & AS NOTED
- RW DIVERSION (WATER BAR)
- SOIL BORING/HAND AUGER
- TEMPORARY DRAINAGE UNDER CONSTRUCTION INLET PROTECTION
- TEMPORARY OTCB INLET PROTECTION
- STORM DRAIN INLET PROTECTION
- COIR LOG
- PROPOSED EDGE OF NEW ASPH. PAVEMENT

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
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Date: 02/12/2026

DS-15615

Drawn by
David Maples
Checked
David E. Vaughn,PE.PLS
Reviewed
Jeffrey S Reitzel,PE.PLS
Date
JULY 2025

LONGVIEW ACRES LIFT STATION 41
REPLACEMENT & SAN.SEWER FORCE MAIN
Lift Station Erosion Control Plan

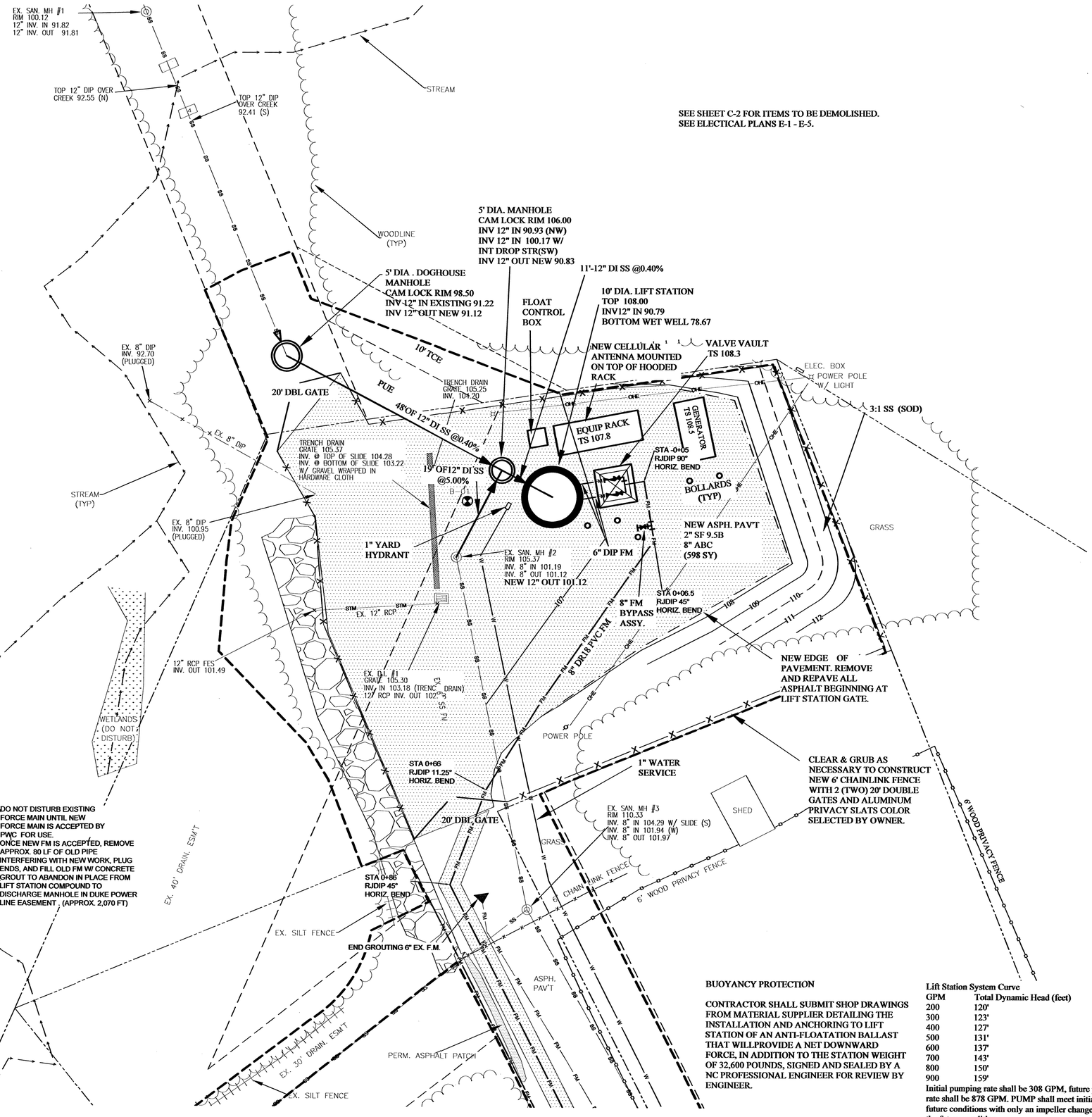
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SEE SHEET C-2 FOR ITEMS TO BE DEMOLISHED.
SEE ELECTICAL PLANS E-1 - E-5.

DO NOT DISTURB EXISTING FORCE MAIN UNTIL NEW FORCE MAIN IS ACCEPTED BY PWC FOR USE.
ONCE NEW FM IS ACCEPTED, REMOVE APPROX. 80 LF OF OLD PIPE INTERFERING WITH NEW WORK, PLUG ENDS, AND FILL OLD FM W/ CONCRETE GROUT TO ABANDON IN PLACE FROM LIFT STATION COMPOUND TO DISCHARGE MANHOLE IN DUKE POWER LINE EASEMENT . (APPROX. 2,070 FT)

NEW EDGE OF PAVEMENT. REMOVE AND REPAVE ALL ASPHALT BEGINNING AT LIFT STATION GATE.

CLEAR & GRUB AS NECESSARY TO CONSTRUCT NEW 6' CHAINLINK FENCE WITH 2 (TWO) 20' DOUBLE GATES AND ALUMINUM PRIVACY SLATS COLOR SELECTED BY OWNER.

BUOYANCY PROTECTION

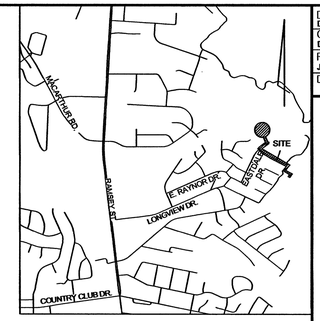
CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FROM MATERIAL SUPPLIER DETAILING THE INSTALLATION AND ANCHORING TO LIFT STATION OF AN ANTI-FLOATATION BALLAST THAT WILLPROVIDE A NET DOWNWARD FORCE, IN ADDITION TO THE STATION WEIGHT OF 32,600 POUNDS, SIGNED AND SEALED BY A NC PROFESSIONAL ENGINEER FOR REVIEW BY ENGINEER.

Lift Station System Curve

GPM	Total Dynamic Head (feet)
200	120'
300	123'
400	127'
500	131'
600	137'
700	143'
800	150'
900	159'

Initial pumping rate shall be 308 GPM, future pumping rate shall be 878 GPM. PUMP shall meet initial and future conditions with only an impeller change to meet the future condition.

NAD 83/2011 NAVD 88



VICINITY MAP
NTS

LEGEND

	EXISTING	NEW
MAIL BOX	MB	
POWER POLE W/LIGHT		
POWER POLE		
LAMP POST		
UNDERGROUND CABLE TV	CTV	
UNDERGROUND FIBER OPTIC	FO	
UNDERGROUND ELECTRIC	UGE	
OVERHEAD ELECTRIC	OHE	
POWER POLE GUY WIRE		
ELECTRIC TRANSFORMER		
ELECTRIC VAULT		
GAS LINE	G	
SANITARY SEWER W/MANHOLE		
FLOW ARROW		
CLEANOUT CENTERLINE STREET STATION APPROX. CLEANOUT TOP CAP ELEVATION (*) CLEANOUT INVERT ELEVATION		STA 28+98 TOP 189.21 INV 183.93
CLEANOUT TOP ELEVATION IS APPROXIMATE AND SHALL BE ADJUSTED BY CONTRACTOR TO CONFORM WITH P.W.C. STANDARD SEWER LATERAL DETAIL COVER REQUIREMENT. (NO SEPARATE PAYMENT)		
LIMITS OF CONSTRUCTION		
STORM DRAINAGE PIPE	STM	STM
STORM MANHOLE	SM	SM
CATCH BASIN		
JUNCTION BOX		
HEADWALL		
DROP INLET		
OTCB		
TELEPHONE PEDESTAL		
UNDERGROUND TELEPHONE	UGT	
MAIL BOX	MB	
WATER PLUG		
WATER METER	WM	
WATER VALVE		
WATER LINE (ACTIVE)	W	
CABLE BOX		
FIRE HYDRANT		
WOODS LINE		
SOD		
HEDGE		
SHRUB		
CHAIN LINK FENCE	X X	
WOOD FENCE		
CONTOUR	208	
PROPERTY LINE (ACTIVE)		
IRON PIPE		
AIR CONDITIONER/HEAT UNIT		
SOIL BORING/HAND AUGER		
FF - FINISH FLOOR @S/L - GROUND AT CLEANOUT	HOUSE W/STREET ADDRESS NUMBER	
WETLANDS		
CONCRETE DRIVEWAY		
GRAVEL DRIVEWAY		
NEW ASPHALT		

10' 0' 10' 20'

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN

Site Grading, Utility & Paving Plan

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25
PWC Comments	DWM	DEC 25

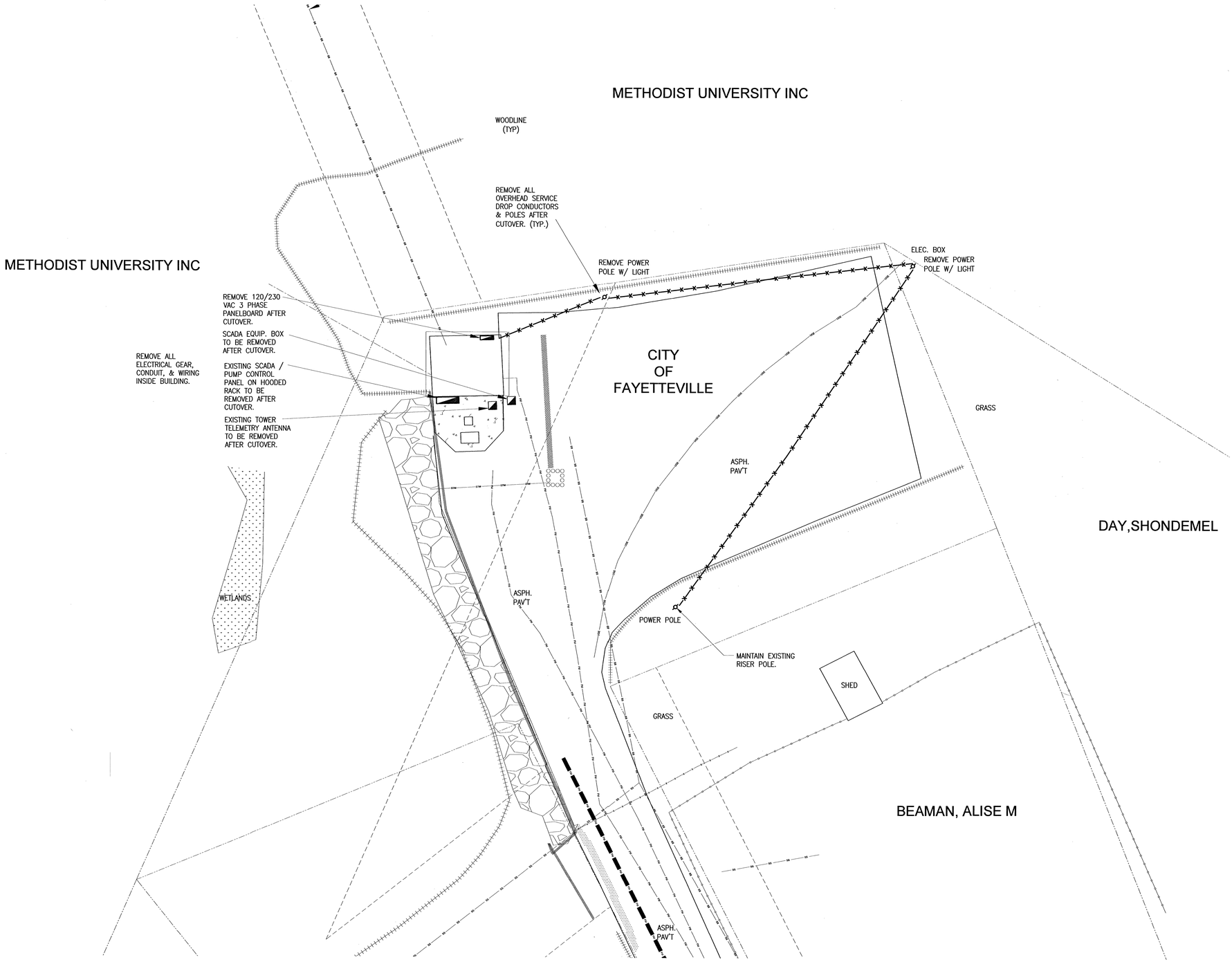
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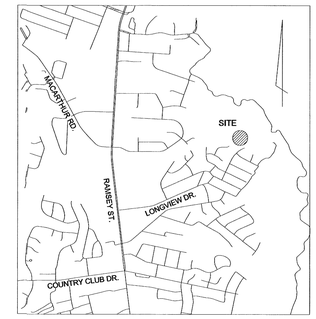
Lift Station Grading, Utility & Paving Plan



1/E-1 PUMP STATION SITE PLAN – ELECTRICAL DEMOLITION

1"=10'-0"

N



VICINITY MAP
NTS

ELECTRICAL SYMBOL SCHEDULE

	NEW EXTERIOR LIGHTING FIXTURE & POLE
	EXISTING POLE MOUNTED TRANSFORMER
	RECEPTACLE
WP GFI	RECEPTACLE – WEATHERPROOF GROUND FAULT INTERRUPTING
1	CONDUIT IDENTIFICATION
A	LIGHTING FIXTURE IDENTIFICATION
	NEW CONDUIT
	REMOVE CONDUIT & WIRE COMPLETELY
	NEW EQUIPMENT
A–20	HOMERUN AND CIRCUIT NUMBER
	LIGHT
	MOTOR
	GROUND
	SAFETY SWITCH
20	CIRCUIT BREAKER AND AMPERAGE
G.C.	GENERAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
PE	PHOTOTELECTRIC CONTROL
	PROPOSED MOTOR
WP RTWIUC	WEATHERPROOF RECEPTACLE WITH RAIN TIGHT WHILE IN USE COVER

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Ronald E. Pledger

NORTH CAROLINA REGISTERED ENGINEER SEAL C-0416 DIBBLE & PLEDGER P.A. CORPORATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 11654 RONALD E. PLEDGER

12/12/2023

Drawn by Ashley Windham
Checked Ronald E. Pledger, P.E.
Reviewed Ronald E. Pledger, P.E.
Date DEC 2023

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT
ELECTRICAL DEMO SITE PLAN
CITY OF FAYETTEVILLE
FAYETTEVILLE, NORTH CAROLINA

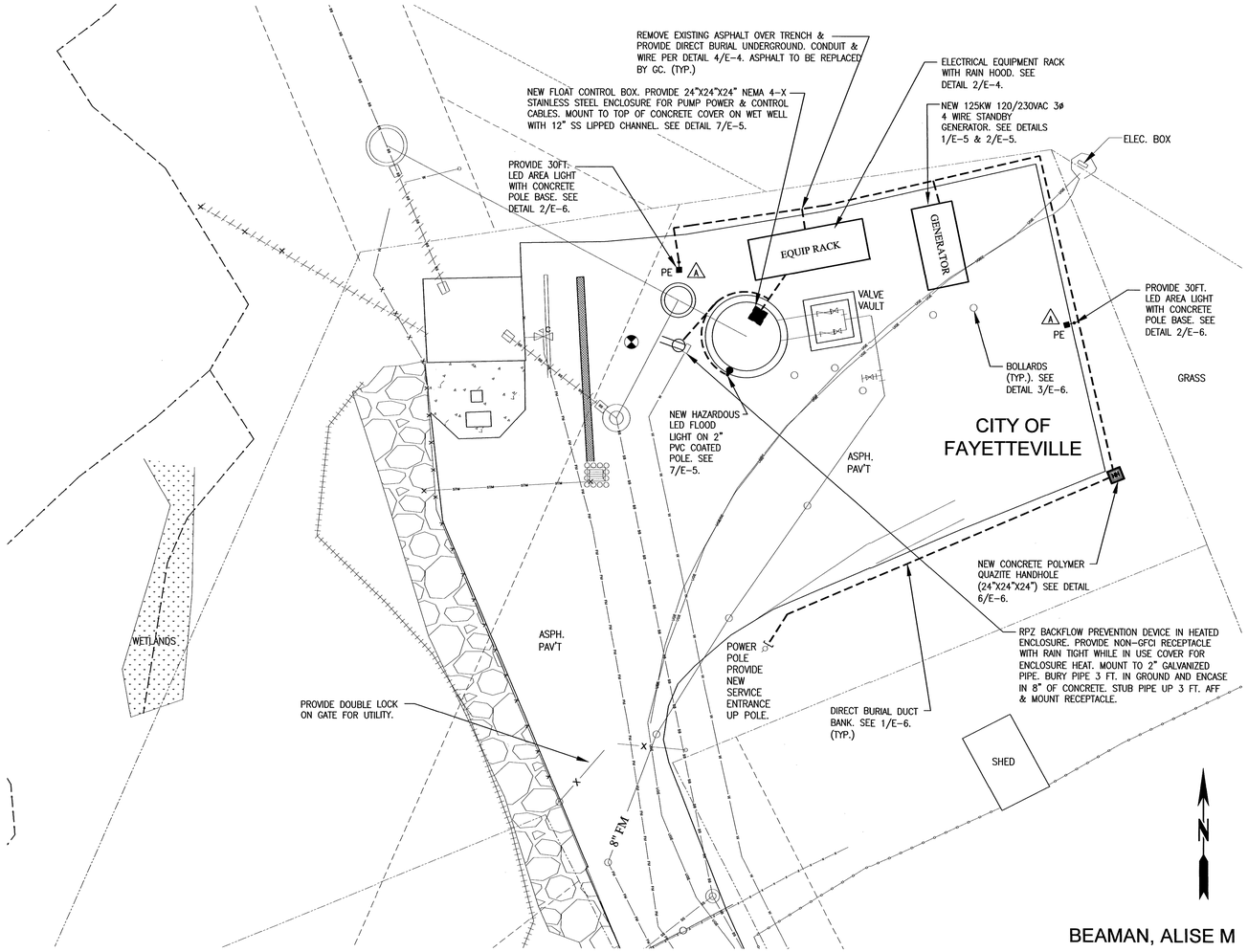
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SHEET E-1 OF 6

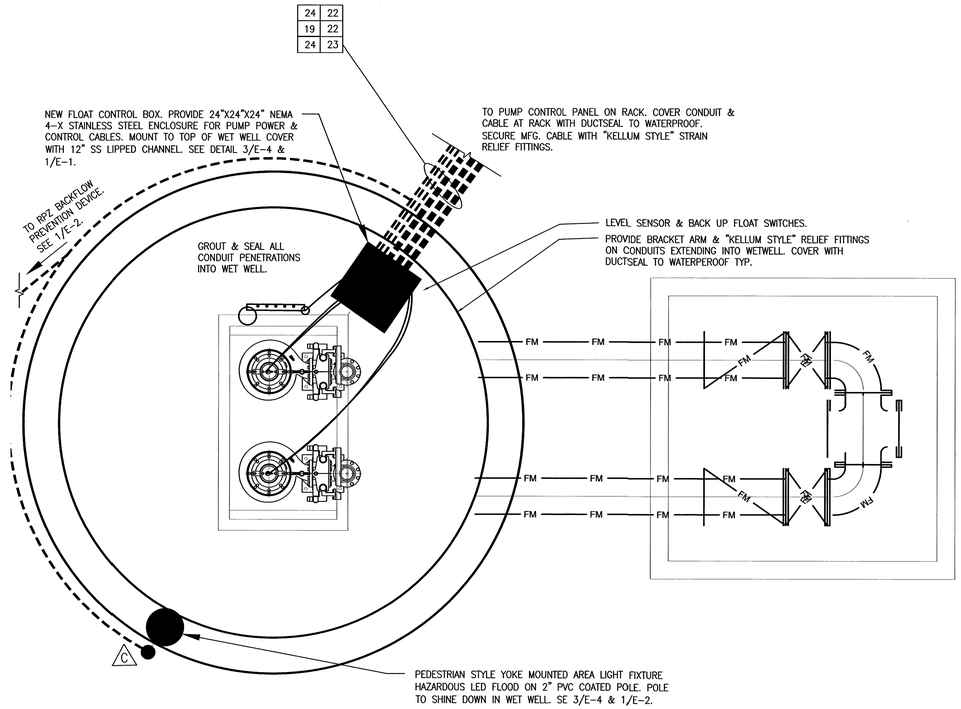
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MECH. / ELECT. PLUMB. DESIGN BY:
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222 WEST MAIN STREET, WASHINGTON N.C. 27889
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E-MAIL: rpledger@dibbleandpledger.com

DS-15615



1 E-2 PUMP STATION SITE PLAN – ELECTRICAL INSTALLATION 1"=10'-0"

BEAMAN, ALISE M



2 E-2 WET WELL DETAIL – ELECTRICAL 1/2"=1'-0"

LIGHTING FIXTURE SCHEDULE

A LED SHOEBOX SHARP CUTOFF LUMINAIRE. PROVIDE AS SINGLE HEAD LED VIPER AREA LIGHTS 4" SQUARE STRAIGHT ARM TO ATTACH TO SLIPFITTER TENON TOP. TYPE 4 WIDE LIGHT DISTRIBUTION. 160 WATTS, 21,000 LUMENS. 120 VAC 5,000K 700MA, PROVIDE SURGE PROTECTION, BLACK FINISH. PROVIDE 30FT. ROUND TAPER BLACK ALUMINUM POLE 0.250 THICKNESS 8 INCH BUTT 17 EPA. USE BEACON VP MICROSTRIKE 1 160L 160 5K7 4W UNV-B-K OR EQUAL BY HUBBELL OR KIM. PROVIDE PHOTOCELL.

B PROVIDE LED HOOD LIGHT 120 VAC. 30 WATTS. PROVIDE 4 FOOT LENGTH ACRYLIC LENS 6,200 LUMENS & WATER TIGHT HUBS. USE H.E. WILLIAMS 96-4-L62/830-H1AFR-WET1.

C PEDESTRIAN STYLE YOKE MOUNTED AREA LIGHT FIXTURE HAZARDOUS LED FLOOD. PROVIDE AS LED CL1S AREA LIGHT ATTACH TO YOKE MOUNT TENON TOP. PROVIDE WITH 120 VOLT DRIVER. 11,206 LUMENS, 112 WATTS. TYPE V LIGHT DISTRIBUTION (5000K). PROVIDE HUBBELL LBLH-48LU-120-Y-5K-W-070-WH OR EQUAL BY KIM OR AAL. ONE FIXTURE PER POLE AS INDICATED. PROVIDE 12FT. PROVIDE 2 INCH PVC COATED GALVANIZED POLE WITH BRACKET ARM TO MOUNT FIXTURE.

GENERAL ELECTRICAL NOTES

1. ALL CONDUIT ABOVE GRADE SHALL BE RIGID GALVANIZED WITH PVC JACKET.
2. COORDINATE ALL ELECTRICAL UTILITY REQUIREMENTS WITH FAYETTEVILLE PWC ELECTRIC. PAY All FAYETTEVILLE PWC ELECTRIC COST. PROVIDE DOUBLE GATE LOCK FOR FAYETTEVILLE PWC ELECTRIC.
3. ELECTRICAL WORK SHALL BEGIN AT THE NEW SERVICE ENTRANCE. PROVIDE NEW UNDERGROUND SERVICE WHERE INDICATED. RECONNECT TO EXISTING SERVICE WHERE INDICATED.
4. REFER TO SPECIFICATIONS FOR EQUIPMENT DETAILS.
5. NUMBER & SIZE OF CONDUITS INTO VAULTS SHALL BE AS REQUIRED BY EQUIPMENT MANUFACTURER AND THE NATIONAL ELECTRIC CODE, BUT NO SMALLER THAN CALLED FOR IN THE PLANS & SPECIFICATIONS.
6. ARRANGEMENT OF CONDUIT EXITING RACK & CONTROL CENTER IS SHOWN AS A SCHEMATIC ONLY. ARRANGE CONDUITS DURING INSTALLATION AS REQUIRED.
7. ALL ELECTRICAL WORK SHALL CONFORM TO THE MOST CURRENT EDITION OF THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRIC SAFETY CODE, OSHA, AND ALL APPLICABLE LOCAL AND STATE CODES.
8. ALL CONDUIT BELOW GRADE SHALL BE PVC TYPE SCHEDULE 40 DESIGNED FOR DIRECT BURIAL 30 INCH MINIMUM DEPTH PROPER TRANSITION TO RIGID GALVANIZED PRIOR TO TURNING UP ABOVE GRADE. ALL EXTERIOR CONDUIT ABOVE GRADE SHALL BE RIGID GALVANIZED CONDUIT WITH PVC JACKET.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH THE MOST CURRENT NATIONAL ELECTRIC CODE INCLUDING AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUIT RUNS. ALL METALLIC BOXES SHALL BE BONDED & GROUNDED.
10. REFER TO CIVIL DRAWINGS FOR ACTUAL STRUCTURE SIZES, DIMENSIONS, AND LAYOUTS.
11. REFER TO CIVIL DRAWINGS FOR UNDERGROUND PIPING LAYOUT. AVOID CROSSINGS OR CONFLICTS AS MUCH AS POSSIBLE. WHERE UNAVOIDABLE, ROUTE DUCT BANK UNDER PIPING PROVIDING PROPER SEPARATION AND BACKFILL.
12. ALL EXTERIOR MOUNTING HARDWARE SHALL BE 304 STAINLESS STEEL OR CAST METAL CORROSION RESISTANT. ALL BRACKETS, CHANNELS, OR PIPE TO BE STAINLESS STEEL. ROUND ALL CORNERS
13. VOLTAGE AT SITE IS 120/230 VAC 3 PHASE 4 WIRE HIGH LEG DELTA. PROVIDE WARNING LABEL "DO NOT CONNECT SINGLE PHASE UNGROUNDED CONDUCTOR TO PHASE HAVING HIGHER VOLTAGE TO GROUND."
14. REVISE AND COORDINATE SPACE REQUIREMENTS AS NECESSARY TO SUIT EQUIMPENT ACTUALLY USED.
15. CIRCUIT BREAKER INTERRUPTING RATINGS SHALL BE AS FOLLOWS:
    1. UP TO 70 AMPERES – 10,000 AIC – 230 VAC
    2. 70 TO 100 AMPERES – 10,000 AIC – 230 VAC
    3. 125 – 225 AMPERES – 10,000 AIC – 230 VAC
    4. 225 – 400 AMPERES – 18,000 AIC – 230 VAC
16. SHARP CUTOFF LED AREA LIGHTING FIXTURE, FINNED DIE CAST SOLID TOP HOUSING. BLACK POLYESTER POWDER COAT FINISH. SEE LIGHTING FIXTURE SCHEDULE.
17. ALL ELECTRICAL ENCLOSURES SHALL USE CORROSION RESISTANT SPACERS TO KEEP EQUIPMENT FROM DIRECT CONTACT WITH MOUNTING PLATES.
18. VISUAL HIGH WATER ALARM LIGHT. VAPOR TIGHT, CAST METAL, WALL BRACKET MOUNTING WITH BACK BOX. PROVIDE POLYCARBONATE LENS, GLOBE & GUARD USE CROUSE HINDS V1759 OR EQUAL. MOUNT ON HOODED RACK
19. PROVIDE WEATHERPROOF HORN 80db @ 10'. MOUNT TO DUPLEX PANEL HOOD. INTERCONNECT TO ALARM LIGHT.
20. PROVIDE LED HOOD LIGHT 120 VAC. 30 WATTS. PROVIDE 4 FOOT LENGTH ACRYLIC LENS 6,200 LUMENS & WATER TIGHT HUBS. USE H.E. WILLIAMS 96-4-L62/830-H1AFR-WET1.
21. PROVIDE NEMA 4-X RATED HUBS FOR EQUALLY RATED DEVICE TOP, BOTTOM, OR SIDE ENTRY.
22. ALL CONDUITS TO WET WELL TO BE PLUGGED WITH DUCT SEAL AT BOTH ENDS.
23. ALL WIRING FROM THE WET WELL (INCLUDING PUMP CABLE AND FLOAT CABLES SHALL BE CONTINUOUS TO CONTROL CENTER.
24. PROVIDE STRAIN RELIEF AND GRIP FITTINGS FOR TRANSITION FROM CONDUIT TO CABLES IN WET WELL.
25. MAINTAIN SEPARATION AND ISOLATE NEUTRAL AND EQUIPMENT GROUNDING CONDUCTORS BEYOND THE NEW SERVICE ENTRANCE.

CONNECTED LOAD

EQUIP.	LOAD	VOLTS/PH	KW	STARTER
PUMP #1 PUMP #2 MISC.	60 HP 60 HP	230 V/3 ø 230 V/3 ø	52.7 KW 52.7 KW 1 KW	SOLID STATE SOFT START NEMA SIZE 1 SOLID STATE SOFT START NEMA SIZE 1
TOTAL	120 HP		106.4 KW	IN CONTROL PANEL

Ronald E. Pledger
NORTH CAROLINA REGISTERED ENGINEERING CORPORATION SEAL C-0416 DIBBLE & PLEDGER, P.A.
NORTH CAROLINA PROFESSIONAL SEAL 11654 ENGINEER RONALD E. PLEDGER
12/12/2023

PWC FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Drawn by Ashley Windham
Checked Ronald E. Pledger, P.E.
Reviewed Ronald E. Pledger, P.E.
Date DEC 2023

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT
ELECT. INSTALLATION PLANS
CITY OF FAYETTEVILLE — FAYETTEVILLE, NORTH CAROLINA

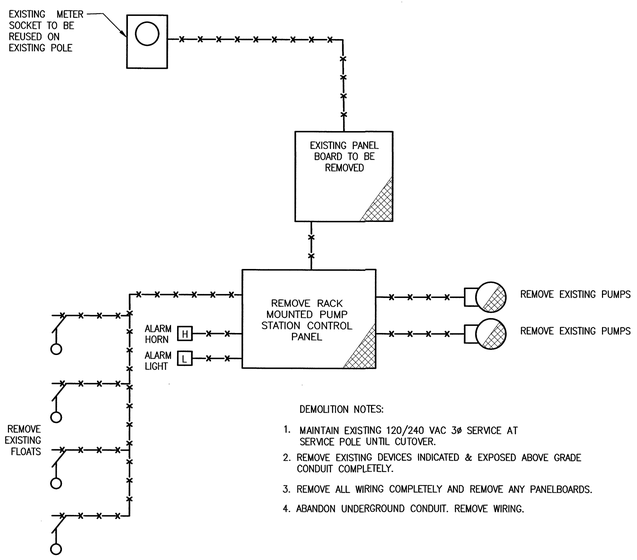
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SHEET E-2 OF 6

MECH. / ELECT. PLUMB. DESIGN BY:
DIBBLE & PLEDGER, P.A.
222 WEST MAIN STREET, WASHINGTON N.C. 27889
PHONE : (252) 946-3320 FAX: (252) 946-5160
E-MAIL: rpledger@dibbleandpledger.com

DS-15615



DEMOLITION NOTES:

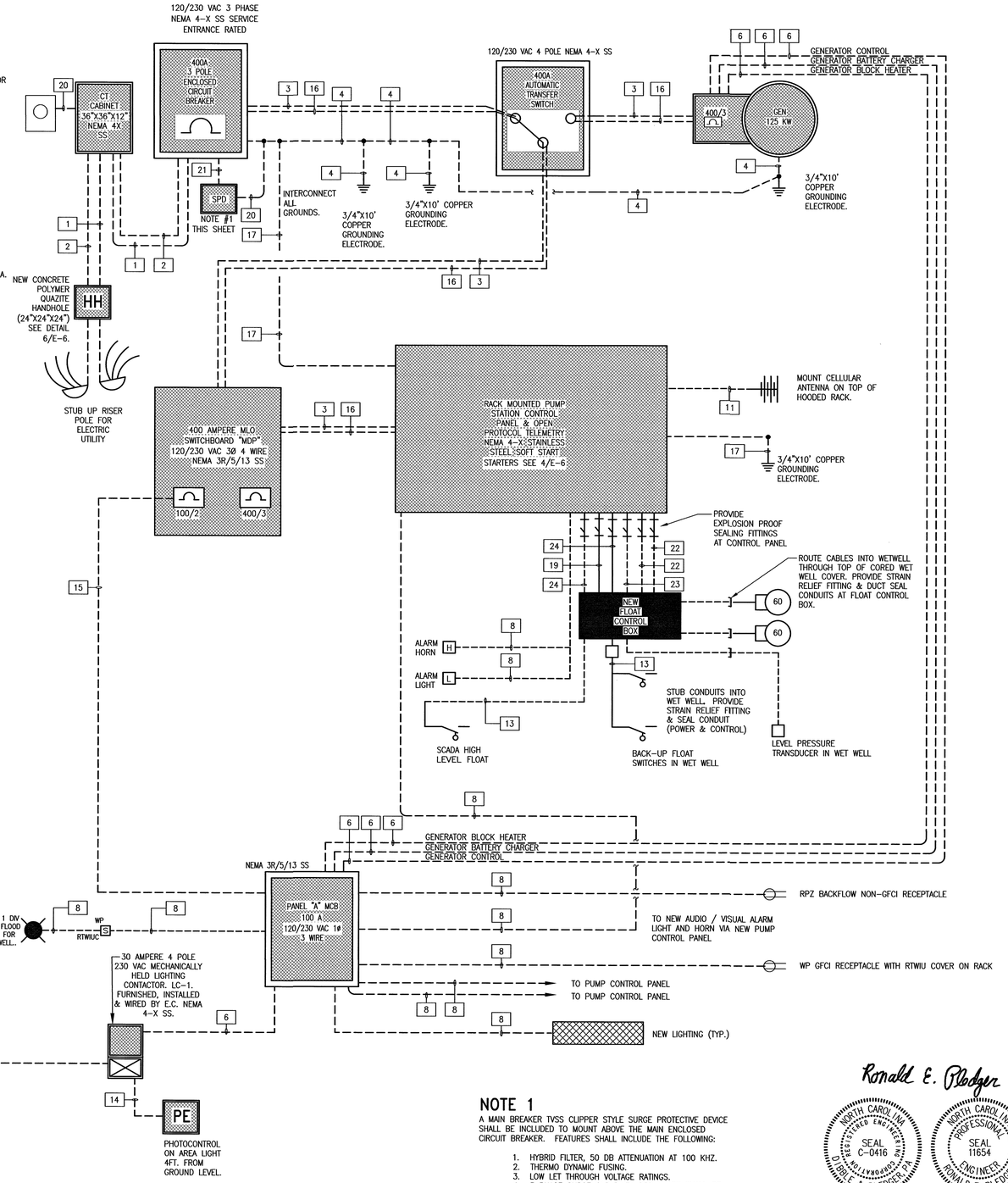
1. MAINTAIN EXISTING 120/240 VAC 3ø SERVICE AT SERVICE POLE UNTIL CUTOVER.
2. REMOVE EXISTING DEVICES INDICATED & EXPOSED ABOVE GRADE CONDUIT COMPLETELY.
3. REMOVE ALL WIRING COMPLETELY AND REMOVE ANY PANELBOARDS.
4. ABANDON UNDERGROUND CONDUIT. REMOVE WIRING.

1 / E-3 ELECTRICAL ONE LINE – LIFT STATION DEMOLITION NTS

CONDUIT & CABLE SCHEDULE

ALL CONDUCTORS TO BE COPPER

1. 3 – 3/0 AWG CU THHN/THWN UNGROUNDED CONDUCTOR
   1 – 3/0 AWG CU THHN/THWN NEUTRAL CONDUCTOR
   2–1/2" CONDUIT IN PARALLEL WITH 2
2. 3 – 3/0 AWG CU THHN/THWN UNGROUNDED CONDUCTOR
   1 – 3/0 AWG CU THHN/THWN NEUTRAL CONDUCTOR
   2–1/2" CONDUIT IN PARALLEL WITH 1
3. 3 – 3/0 AWG CU THHN/THWN UNGROUNDED CONDUCTOR
   1 – 3/0 AWG CU THHN/THWN NEUTRAL CONDUCTOR
   1 – #3 AWG CU THHN/THWN GROUNDING CONDUCTOR
   2–1/2" CONDUIT IN PARALLEL WITH CONDUIT 16.
4. 1 #3/0 AWG Cu THHN/THWN GROUNDING ELECTRODE CONDUCTOR
   3/4" CONDUIT
5. NOT USED
6. 1 #10 AWG Cu THHN/THWN UNGROUNDED CONDUCTOR
   1 #10 AWG Cu THHN/THWN NEUTRAL CONDUCTOR
   1 #10 AWG Cu THHN/THWN GROUNDING CONDUCTOR
   1" CONDUIT
7. NOT USED
8. 1 #12 AWG Cu THHN/THWN UNGROUNDED CONDUCTOR
   1 #12 AWG Cu THHN/THWN NEUTRAL CONDUCTOR
   1 #12 AWG Cu THHN/THWN GROUNDING CONDUCTOR
   3/4" CONDUIT
9. NOT USED
10. 18 – #14 AWG CU THHN/THWN UNGROUNDED CONDUCTORS
    1" CONDUIT
11. TELEMETRY COAXIAL CABLE. ROUTE UP LIGHT POLE FOR ANTENNA. TERMINATE WITH DUCT SEAL.
    1–1/2" CONDUIT
12. 2–PAIR 4–20ma TWSTED SHIELDED INSTRUMENTATION CABLE CABLE WITH DRAIN WIRE & OVERALL TAPE SHIELD.
    1" CONDUIT
13. FLOAT CONTROL CABLES CONTINUOUS NO SPLICES.
    2" CONDUIT
14. 4 #14 AWG Cu THHN/THWN UNGROUNDED CONDUCTORS
    1 #14 AWG Cu THHN/THWN NEUTRAL CONDUCTOR
    1 #14 AWG Cu THHN/THWN GROUNDING CONDUCTOR
    3/4" CONDUIT
15. 2 #2 AWG Cu THHN/THWN UNGROUNDED CONDUCTORS
    1 #2 AWG Cu THHN/THWN NEUTRAL CONDUCTOR
    1 #6 AWG Cu THHN/THWN GROUNDING CONDUCTOR
    1–1/2" CONDUIT
16. 3 – 3/0 AWG CU THHN/THWN UNGROUNDED CONDUCTOR
    1 – 3/0 AWG CU THHN/THWN NEUTRAL CONDUCTOR
    1 – #3 AWG CU THHN/THWN GROUNDING CONDUCTOR
    2–1/2" CONDUIT IN PARALLEL WITH CONDUIT 3
17. 1 #8 AWG GROUNDING CONDUCTOR FOR TELEMETRY ANTENNA
    3/4" CONDUIT
18. MANUFACTURER'S SENSOR CABLE CONTINUOUS NO SPLICES
    2" CONDUIT
19. MANUFACTURER'S POWER & CONTROL CABLE CONTINUOUS NO SPLICES
    2" CONDUIT
20. 1 – #2 AWG CU THHN/THWN GROUNDING CONDUCTOR
    1" CONDUIT
21. SURGE CABLE
    1" CONDUIT
22. MANUFACTURER'S POWER & CONTROL CABLES CONTINUOUS NO SPLICES
    2" LIQUID TIGHT FLEXIBLE CONDUIT
23. MANUFACTURER'S SENSOR CABLES CONTINUOUS NO SPLICES.
    2" LIQUID TIGHT FLEXIBLE CONDUIT
24. BACK–UP FLOAT CONTROL CABLES CONTINUOUS NO SPLICES.
    2" LIQUID TIGHT FLEXIBLE CONDUIT



2 / E-3 ONE LINE DIAGRAM – ELECTRICAL NTS

DESIGNATION TYPED ON DIRECTORY	COND (")	GRND	WIRE SIZE	BRKR RAT'G	CKT NO.
PUMP CONTROL PANEL	2–1/2"	#3	3/0	400	1
					3
					5
SPACES					7
					9
					11
					13
					15
					17
					19
					21
					23
					25
					27
					29

CKT. NO.	BRKR RAT'G	WIRE SIZE	GRND	COND (")	DESIGNATION TYPED ON DIRECTORY
2					SPACE
4					SPACE
6	100	#2	#6	1–1/2"	PANEL "A"
8					
10					SPACES
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					

S/N

A B C

400 AMPERE MAIN LUG ONLY
120/230 VAC 3 PHASE 4 WIRE DELTA 60HZ
FACTORY ASSEMBLED, BOLT–ON BREAKERS, 100%
TIN PLATED COPPER BUSSING, SEPARATE NEUTRAL
& GROUNDING BUSES, SURFACE MOUNTED
NEMA 3R,5,13 ENCLOSURE STAINLESS STEEL

B PHASE SHALL BE THE PHASE HAVING THE HIGHER VOLTAGE TO GROUND. DO NOT CONNECT UNGROUNDED CONDUCTOR TO PHASE HAVING HIGHER VOLTAGE TO GROUND. PROVIDE LABEL ON PANEL.

PANEL "MDP"

DESIGNATION TYPED ON DIRECTORY	COND (")	GRND	WIRE SIZE	BRKR RAT'G	CKT NO.
AREA LIGHT	3/4"	#12	#12	20	1
PUMP CONTROL PANEL	3/4"	#12	#12	20	3
RECEPTACLE	3/4"	#12	#12	20	5
RACK LIGHT	3/4"	#12	#12	20	7
ALARM A/V	3/4"	#12	#12	20	9
SPARE				20	11
SPARE				20	13
SPACES					15
					17
					19
					21
					23
					25
					27
					29

CKT. NO.	BRKR RAT'G	WIRE SIZE	GRND	COND (")	DESIGNATION TYPED ON DIRECTORY
2	20	#12	#12	3/4"	WETWELL HAZARDOUS LIGHT
4	20	#12	#12	3/4"	HOOD RACK LIGHTS
6	20	#12	#12	3/4"	BATTERY CHARGER
8	20	#12	#12	3/4"	CONTROLS
10	20	#12	#12	3/4"	HOOD RECEPTACLE
12	30	#10	#10	3/4"	JACKET HEATER
14	20	#12	#12	3/4"	RPZ HEAT RECEPTACLE
16	20				SPARE
18					SPACES
20					
22					
24					
26					
28					
30					

S/N

A B

100 AMPERE MAIN CIRCUIT BREAKER
120/230 VAC 1 PHASE 3 WIRE 60HZ
FACTORY ASSEMBLED, BOLT–ON BREAKERS, 100%
TIN PLATED COPPER BUSSING, SEPARATE NEUTRAL
& GROUNDING BUSES, SURFACE MOUNTED
NEMA 3R,5,13 ENCLOSURE STAINLESS STEEL

PANEL "A"

NOTE 1

A MAIN BREAKER TVSS CLIPPER STYLE SURGE PROTECTIVE DEVICE SHALL BE INCLUDED TO MOUNT ABOVE THE MAIN ENCLOSED CIRCUIT BREAKER. FEATURES SHALL INCLUDE THE FOLLOWING:

1. HYBRID FILTER, 50 DB ATTENUATION AT 100 KHZ.
2. THERMO DYNAMIC FUSING.
3. LOW LET THROUGH VOLTAGE RATINGS.
4. 3 PHASE SURGE CAPABILITY PER PHASE SHALL BE 120 KA, L–G 60 KA, L–N 60 KA.
5. PROVIDE AS THOR SYSTEMS INC. 804–355–1100 OR APPROVED EQUAL.

Ronald E. Pledger

NORTH CAROLINA REGISTERED ENGINEER SEAL C–0416 DIBBLE & PLEDGER, P.A. CORPORATE SEAL

NORTH CAROLINA PROFESSIONAL SEAL 11654 ENGINEER RONALD E. PLEDGER

12/12/2023

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Drawn by Ashley Windham
Checked Ronald E. Pledger, P.E.
Reviewed Ronald E. Pledger, P.E.
Date DEC 2023

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT
ONE LINE DIAGRAM PANEL SCH
CITY OF FAYETTEVILLE, FAYETTEVILLE, NORTH CAROLINA

no.	revision	by	date

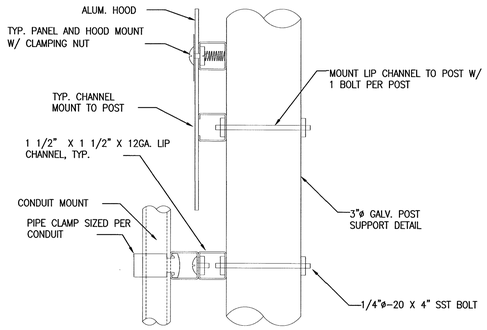
M&R ENGINEERS PLANNERS SURVEYORS MOORMAN, KIZER & REITZEL, INC.
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P.O. Box 53774
Fayetteville, N.C., 28305
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License #: F-0106

scale AS SHOWN
Field Book No. N/A
SHEET E-3 OF 6

#1587 LD6310

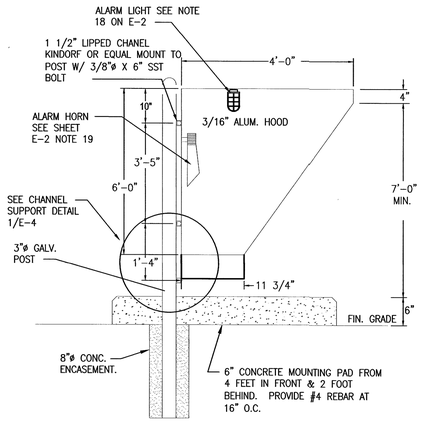
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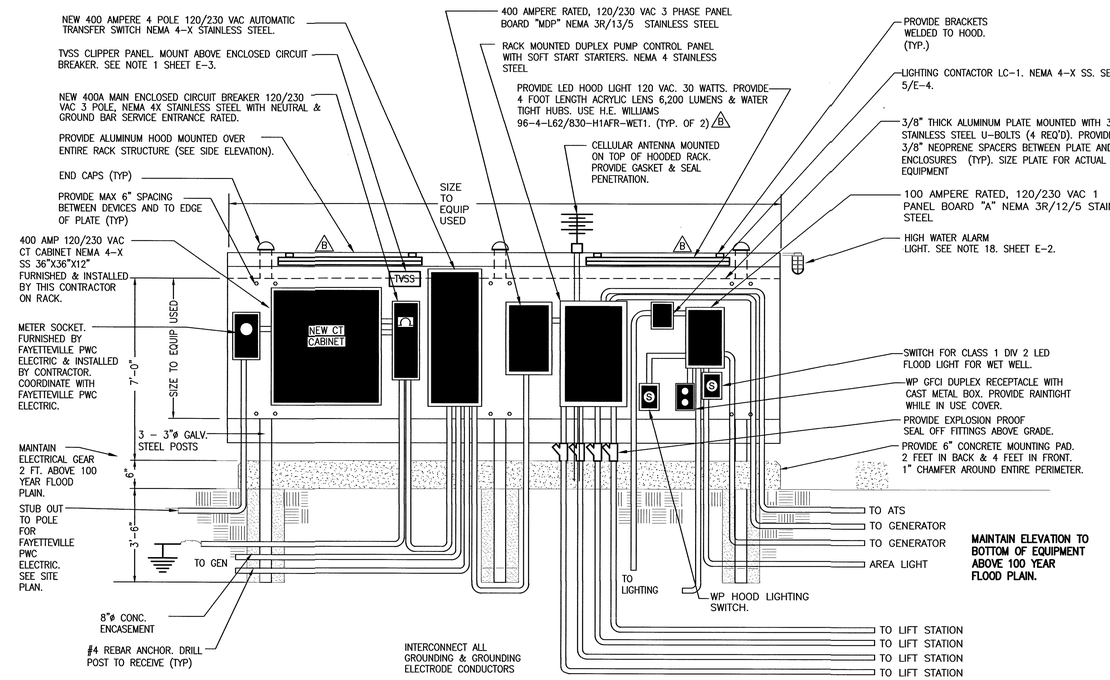


1 E-4 **CHANNEL SUPPORT DETAIL**

NTS

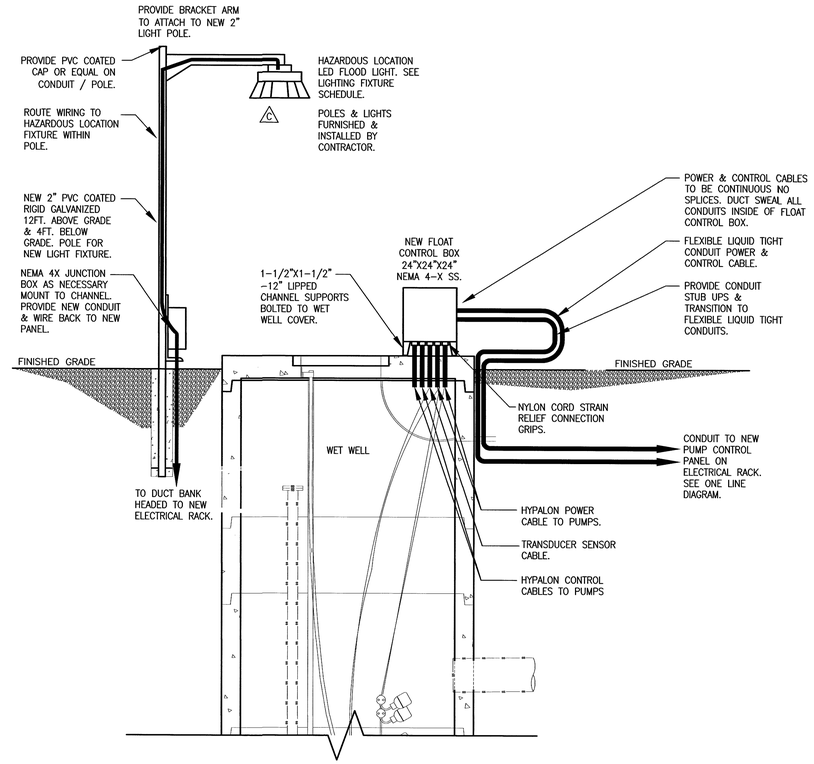


DIMENSIONS SHOWN ARE FOR REFERENCE PURPOSES ONLY. ALUMINUM COVER TO BE SIZED PER EQUIPMENT.



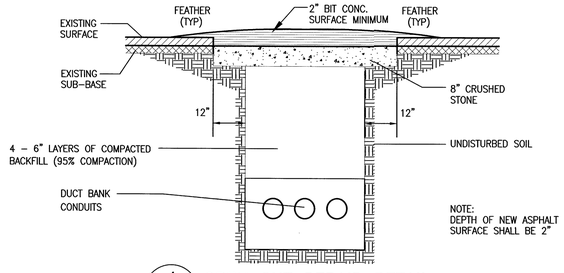
2 E-4 **ELECTRICAL RACK ELEVATION**

(REFER TO CONDUIT & CABLE SCHEDULE FOR ALL CONDUITS) NTS



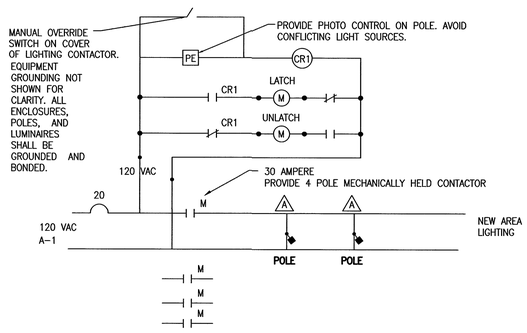
3 E-4 **WET WELL ELEVATION**

3/8"=1'0"



4 E-4 **OPEN CUT REPAIR DETAIL**

TYPICAL UNDER ASPHALT OR EARTH N.T.S.



5 E-4 **LIGHTING CONTACTOR LC-1**

N.T.S.

Ronald E. Pledger

NORTH CAROLINA REGISTERED ENGINEERING CORPORATION SEAL C-0416 DIBBLE & PLEDGER, P.A.

NORTH CAROLINA PROFESSIONAL SEAL 11654 ENGINEER RONALD E PLEDGER

12/12/2023

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
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#1587 LD6310

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Reviewed Ronald E. Pledger, P.E.
Date DEC 2023

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT
ELECTRICAL DETAILS

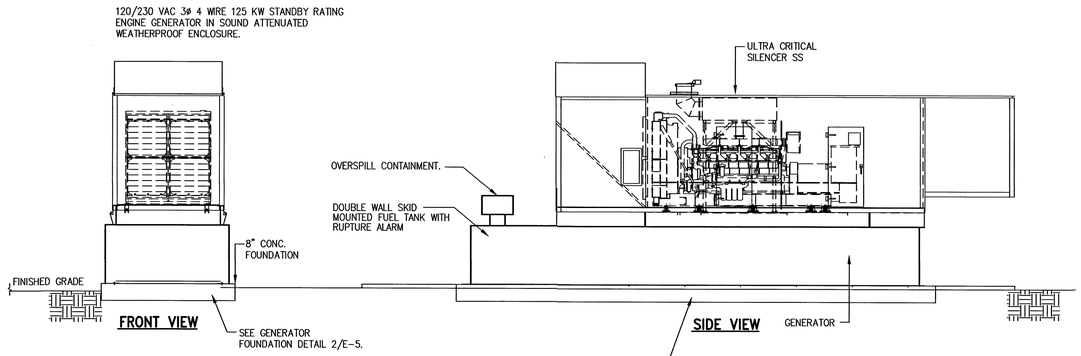
CITY OF FAYETTEVILLE, FAYETTEVILLE, NORTH CAROLINA

no.	revision	by	date

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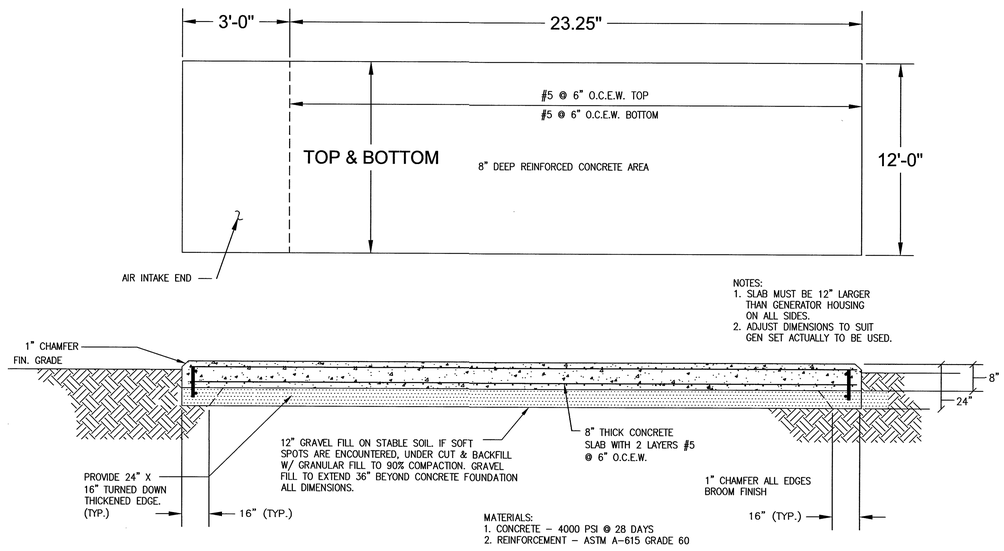
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Field Book No. N/A
SHEET E-4 OF 6

DS-15615



1. PROVIDE NEW 8" PAD.
2. PROVIDE ANCHOR BOLTS PER SPECIFICATIONS BENT OVER IN CONCRETE SLAB.
3. PROVIDE CONCRETE WORK PER DETAIL 2/E-5. USE 4000 PSI.
4. SIZE SLAB TO ACTUAL GENERATOR USED.
5. PROVIDE 12" OFFSET AROUND GENSET USED.
6. PROVIDE VIBRATION ISOLATORS.
7. PROVIDE ALL FUEL FOR TESTING & FULL TANK UPON ACCEPTANCE.
8. MAINTAIN SUBBASE FUEL TANK MAXIMUM 24" HEIGHT. EXTEND TANK OFF END OF UNIT IF NECESSARY. CROWN ANY EXPOSED PORTION OF TANK FOR WATER RUNOFF. MAXIMUM HEIGHT ABOVE SLAB FOR GENERATOR CONTROLS SHALL BE 6-1/2 FT.
9. PROVIDE OVERSPILL PROTECTION ON GENERATOR FUEL FILL PIPE.
10. PROVIDE CORROSION RESISTANT COATING FOR SUBBASE FUEL TANK. SEE SPECIFICATIONS.

1 / E-5 GENERATOR & ENCLOSURE DETAIL
125 KW — NTS



2 / E-5 GENERATOR FOUNDATION DETAIL
N.T.S.

CONCRETE NOTES:

1. CONCRETE COMPRESSIVE STRENGTH: 4000 PSI @28 DAYS
2. REINFORCING STEEL SHALL COMPLY WITH ASTM A 615 GRADE 60 OR ASTM A706 GRADE 60. BAR BENDING AND PLACEMENT SHALL COMPLY WITH LATEST ACI STANDARDS.
3. LIFTING INSERTS FOR HANDLING SHALL BE INSTALLED PER MANUFACTURERS REQUIREMENTS. (IF REQUIRED)
4. ADJUST ALL DIMENSIONS TO SUIT GENERATOR ACTUALLY SELECTED. ALSO SLAB MUST BE 12" LARGER THAN GENERATOR ON ALL SIDES.
5. 12" GRAVEL FILL ON STABLE SOIL. IF SOFT SPOTS ARE ENCOUNTERED, UNDER CUT & BACKFILL W/ GRANULAR FILL TO 90% COMPACTION. GRAVEL FILL TO EXTEND 36" BEYOND CONCRETE FOUNDATION ALL DIMENSIONS. INDEPENDENT LAB TO CHECK SOIL & CONCRETE.
6. 1" CHAMFER ALL EDGES
7. BROOM FINISH

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NORTH CAROLINA REGISTERED ENGINEER SEAL C-0416 DIBBLE & PLEDGER, P.A.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 11654 RONALD E PLEDGER

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LONGVIEW ACRES LIFT STATION 41 REPLACEMENT
ELECTRICAL GEN DETAILS
CITY OF FAYETTEVILLE — FAYETTEVILLE, NORTH CAROLINA

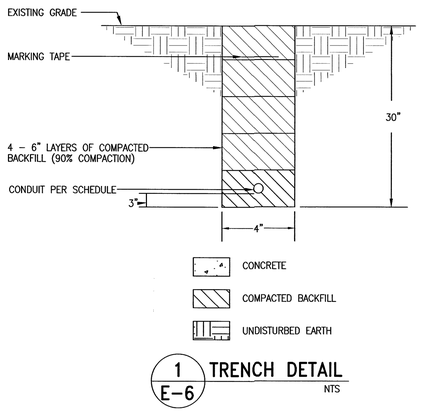
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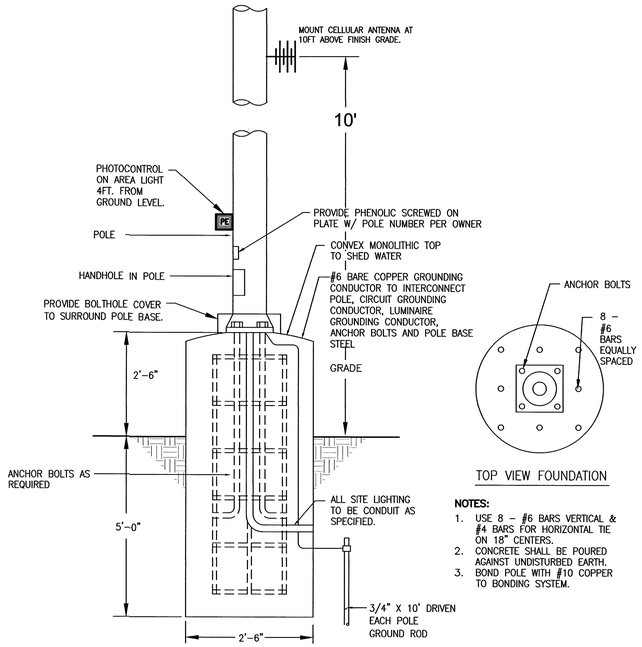
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SHEET E-5 OF 6

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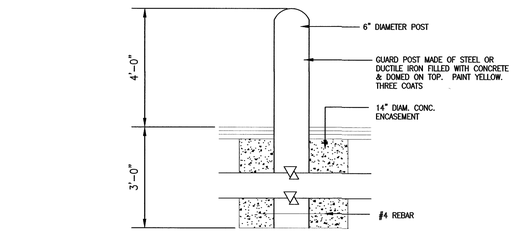
1 E-6 **TRENCH DETAIL**
NTS



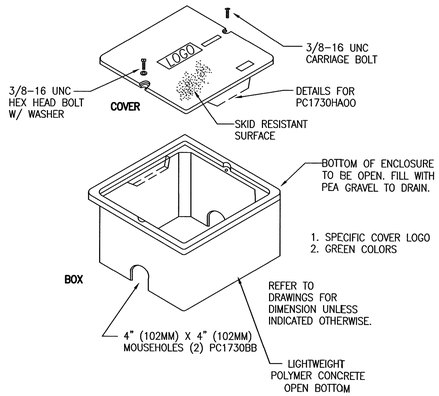
TOP VIEW FOUNDATION

NOTES:
1. USE 8 – #6 BARS VERTICAL & #4 BARS FOR HORIZONTAL TIE ON 18" CENTERS.
2. CONCRETE SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. BOND POLE WITH #10 COPPER TO BONDING SYSTEM.

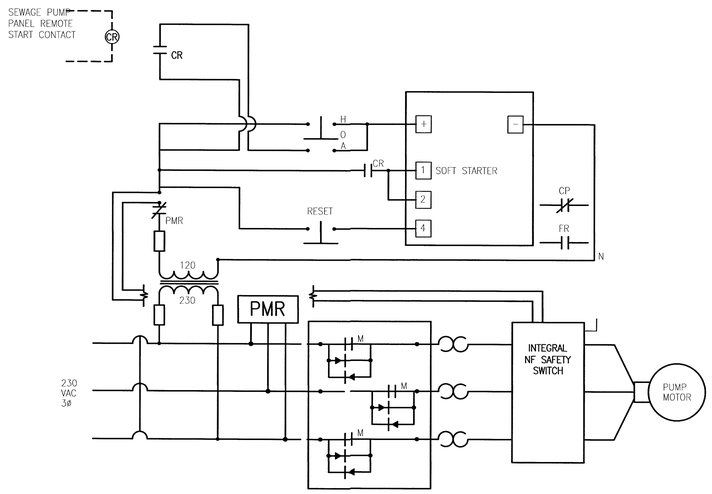
2 E-6 **AREA LIGHTING FIXTURE POLE ANCHOR DETAIL**
ABOVE TYPICAL FOR NEW POLE MOUNTED LUMINAIRES. NTS



3 E-6 **BOLLARD DETAIL**
N.T.S.

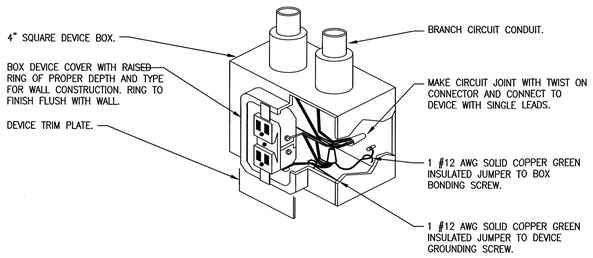


6 E-6 **CONCRETE POLYMER HANDHOLE**
24"X24"X24" NTS



4 E-6 **SEWAGE PUMP SOFT START STARTER WIRING DIAGRAM**
SCHEMATIC DIAGRAM FOR SOFT STARTS INTEGRAL TO CONTROL PANELS (TYP. SEWAGE PUMPS #1 & #2) NTS

CONTROLS
1. RUN LIGHT ON STARTER ENCLOSURE @ STARTER
2. HOA SWITCH @ STARTER ENCLOSURE
3. ELAPSED TIME METER ON STARTER ENCLOSURE
4. LOCAL 230 VAC SAFETY SWITCH W/ CONTROL INTERLOCK
5. TIME DELAY RELAY (VARIABLE (0.1–10 MIN.)
6. PROVIDE SURGE PROTECTION DEVICE ON CKTS. IN STARTER 3ø.



5 E-6 **RECEPTACLE GROUNDING DETAIL**
NTS

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NORTH CAROLINA REGISTERED ENGINEER SEAL C-0416 DIBBLE & PLEDGER, P.A. CORPORATION
NORTH CAROLINA PROFESSIONAL SEAL 11654 ENGINEER RONALD E. PLEDGER
12/12/2023

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Checked Ronald E. Pledger, P.E.
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LONGVIEW ACRES LIFT STATION 41 REPLACEMENT ELECTRICAL DETAILS

CITY OF FAYETTEVILLE, NORTH CAROLINA

no.	revision	by	date

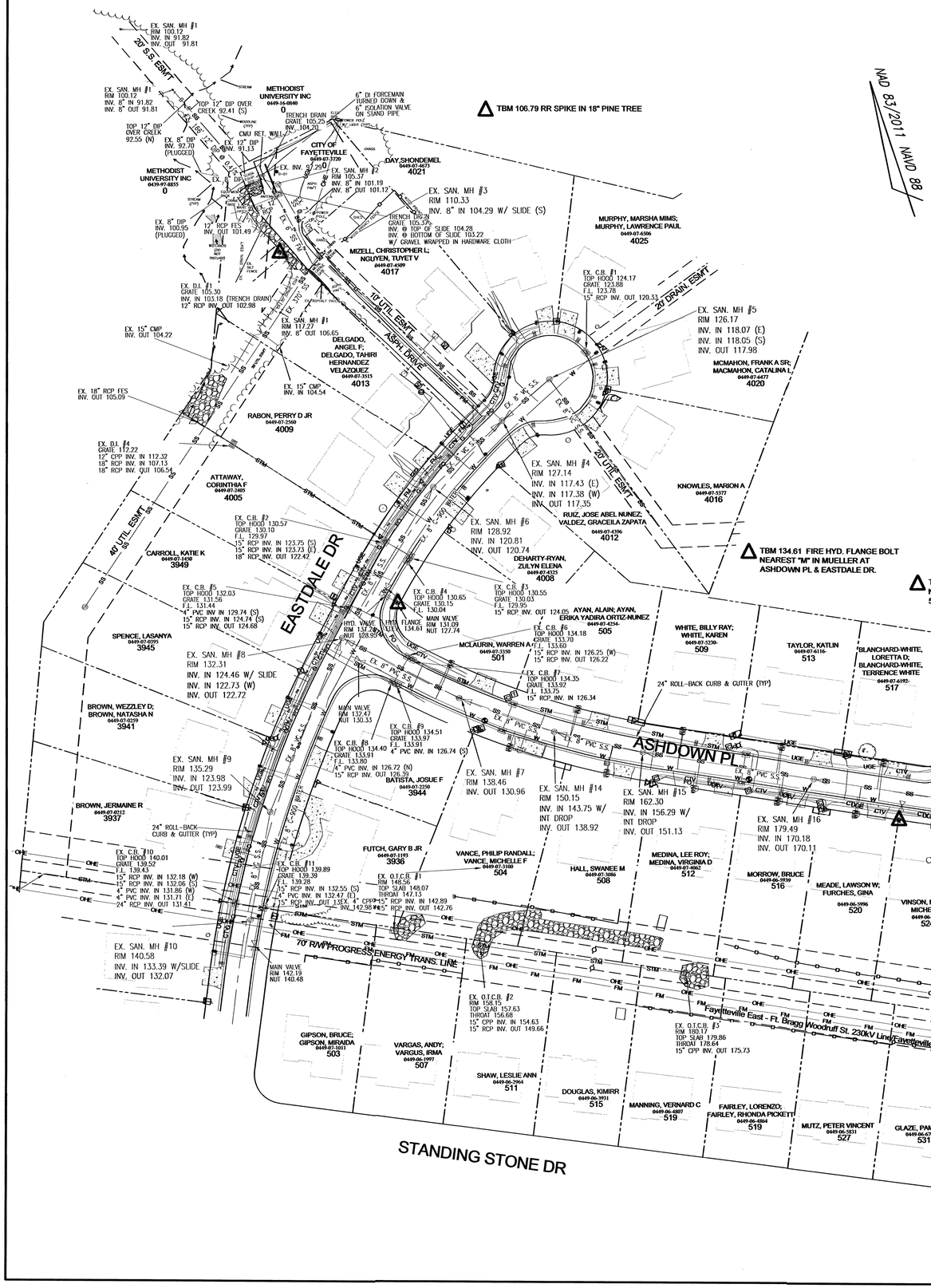
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SHEET E-6 OF 6

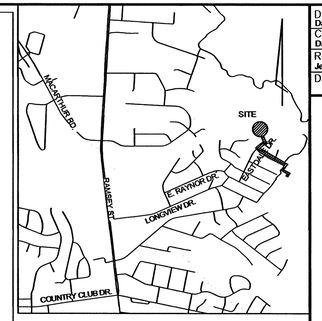
DS-15615



LEGEND

	EXISTING	NEW
MAIL BOX	MB	
POWER POLE W/LIGHT		
POWER POLE		
LAMP POST		
UNDERGROUND CABLE TV	CTV	
UNDERGROUND FIBER OPTIC	FO	
UNDERGROUND ELECTRIC	UGE	
OVERHEAD ELECTRIC	OHE	
POWER POLE GUY WIRE		
ELECTRIC TRANSFORMER		
ELECTRIC VAULT		
GAS LINE	G	
SANITARY SEWER W/MANHOLE		
FLOW ARROW		
SS FORCE MAIN	FM	FM
CLEANOUT CENTERLINE STREET STATION APPROX. CLEANOUT TOP CAP ELEVATION (*) CLEANOUT INVERT ELEVATION	STA 28+98 TOP 189.21 INV 183.93	
CLEANOUT TOP ELEVATION IS APPROXIMATE AND SHALL BE ADJUSTED BY CONTRACTOR TO CONFORM WITH P.W.C. STANDARD SEWER LATERAL DETAIL COVER REQUIREMENT. (NO SEPARATE PAYMENT)		
LIMITS OF CONSTRUCTION		
STORM DRAINAGE PIPE	STM	STM
STORM MANHOLE		
CATCH BASIN		
JUNCTION BOX		
HEADWALL		
DROP INLET		
OTCB		
TELEPHONE PEDESTAL		
UNDERGROUND TELEPHONE	UGT	
MAIL BOX	MB	
WATER PLUG		
WATER METER	WM	
WATER VALVE		
WATER LINE (ACTIVE)	W	
CABLE BOX		
FIRE HYDRANT		
WOODS LINE		
SOD		
HEDGE		
SHRUB		

CHAIN LINK FENCE — X — X —
WOOD FENCE — o — o — o —
CONTOUR 208
PROPERTY LINE (ACTIVE)
RIGHT OF WAY
IRON PIPE
AIR CONDITIONER/HEAT UNIT
SOIL BORING/HAND AUGER
FF - FINISH FLOOR @S/L - GROUND AT CLEANOUT (HOUSE W/STREET ADDRESS NUMBER)
WETLANDS
CONCRETE DRIVEWAY
GRAVEL DRIVEWAY
RIP RAP



VICINITY MAP
NTS

TBM 106.79 RR SPIKE IN 18" PINE TREE

GENERAL NOTES:
1.) ALL UNDERGROUND UTILITY LOCATIONS ARE BASED UPON FIELD MARKINGS AND MAPS BY UTILITY OWNERS.
2.) NO WATERCOURSE OR 100 YEAR FLOOD PLAIN AS MAPPED BY FEMW OR AS DEFINED BY ANY FEDERAL, STATE, OR LOCAL AUTHORITY IS LOCATED ON THIS PROPERTY. 100 YEAR FLOOD ELEV. 87.17
3.) VISIBLE OBJECTS WERE FIELD LOCATED AND INDICATED ON THIS SURVEY.

EXISTING UNDERGROUND UTILITIES WARNING
THE CONTRACTOR IS SOLELY RESPONSIBLE FOR LOCATING, PROTECTING, AND COORDINATING WITH OR ROUTING AROUND ALL EXISTING UTILITIES. EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE, BASED UPON INFORMATION PROVIDED BY THE OWNER FROM PREVIOUS PROJECT DOCUMENTATION AND A PHYSICAL SURVEY OF VISIBLE OBJECTS AND SHOULD NOT BE CONSIDERED COMPLETE OR ACCURATE. THE CONTRACTOR MUST PROVIDE ALL NECESSARY LOCATING SERVICES AT CONTRACTORS EXPENSE PRIOR TO EXCAVATION AND NOTIFY ENGINEER OF SAME PRIOR TO BEGINNING CONSTRUCTION. THE USE OF CURRENT TECHNOLOGY, EXPLORATORY EXCAVATION, GROUND PENETRATING RADAR, VACUUM EXCAVATION AND SIGNIFICANT HAND EXCAVATION IS EXPECTED AND REQUIRED. ANY UNDERGROUND ITEMS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.

SEE SHEET C-12 FOR ADDITIONAL NOTES

50' 0' 50' 100'

FOR ADDITIONAL NOTES SEE SHEETS C-11 & C-12

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

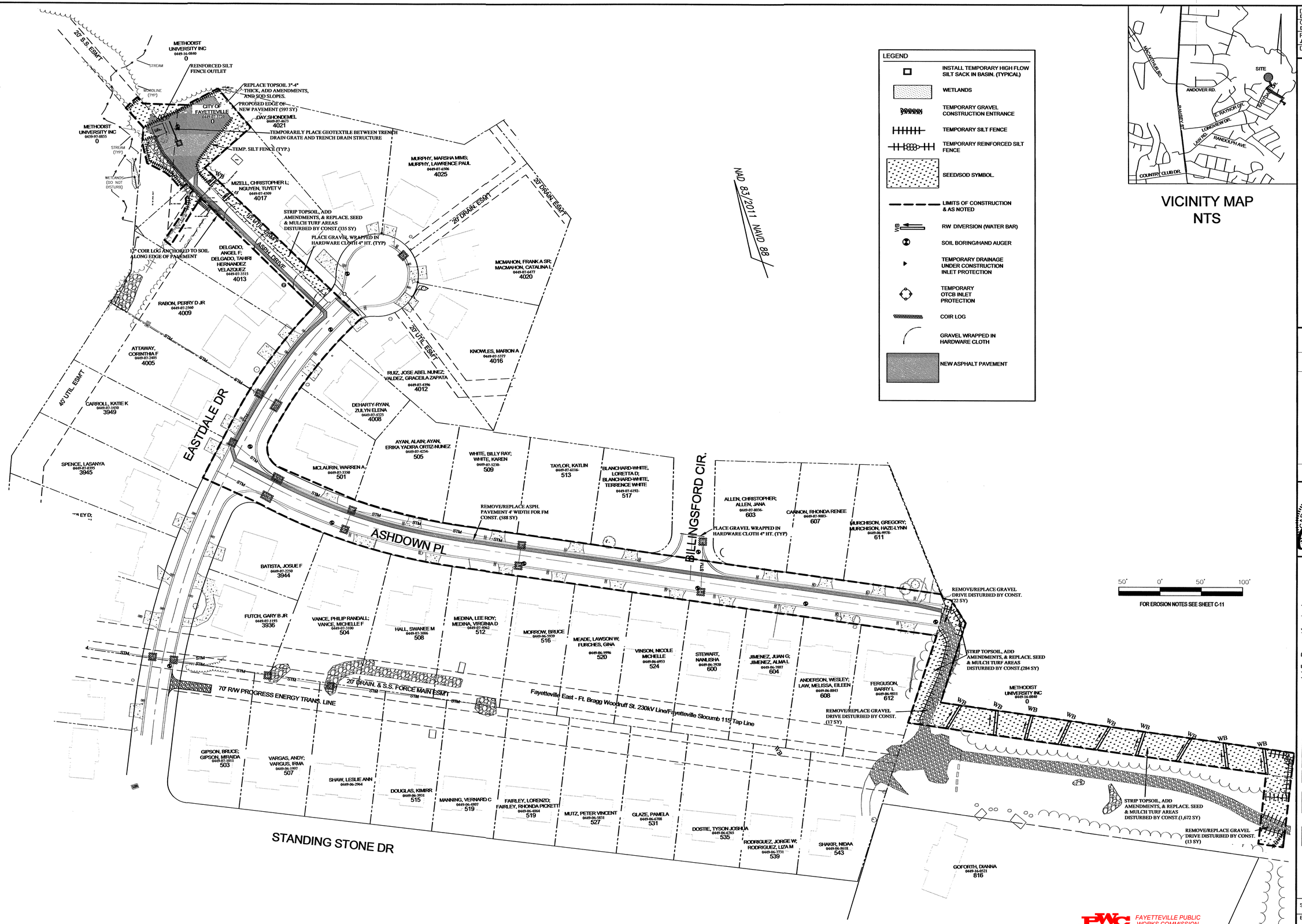
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
Force Main Ex. Topographical Survey

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25
PWC Comments	DWM	DEC 25

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R
ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale 1" = 50'
Book no.
Sheet C-5



LEGEND

- INSTALL TEMPORARY HIGH FLOW SILT SACK IN BASIN. (TYPICAL)
- WETLANDS
- TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
- TEMPORARY SILT FENCE
- TEMPORARY REINFORCED SILT FENCE
- SEED/SOD SYMBOL.
- LIMITS OF CONSTRUCTION & AS NOTED
- RW DIVERSION (WATER BAR)
- SOIL BORING/HAND AUGER
- TEMPORARY DRAINAGE UNDER CONSTRUCTION INLET PROTECTION
- TEMPORARY OTCB INLET PROTECTION
- COIR LOG
- GRAVEL WRAPPED IN HARDWARE CLOTH
- NEW ASPHALT PAVEMENT

VICINITY MAP
NTS

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
Force Main Erosion Control Plan

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25

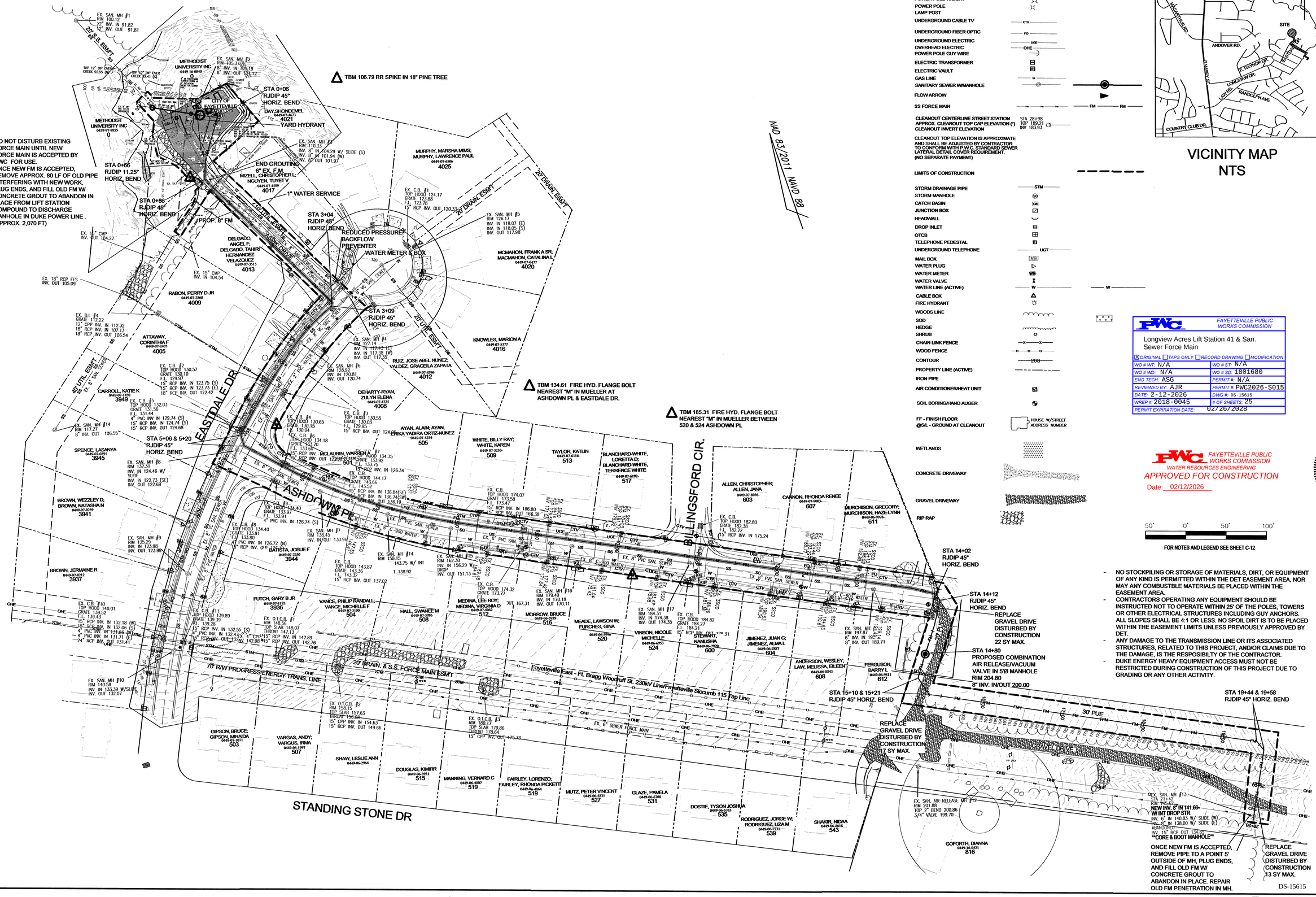
115 Broadfoot Avenue
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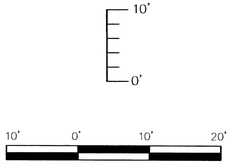
M&R
ENGINEERS
PLANNERS
SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale 1" = 50'
Book no.
Sheet C-6

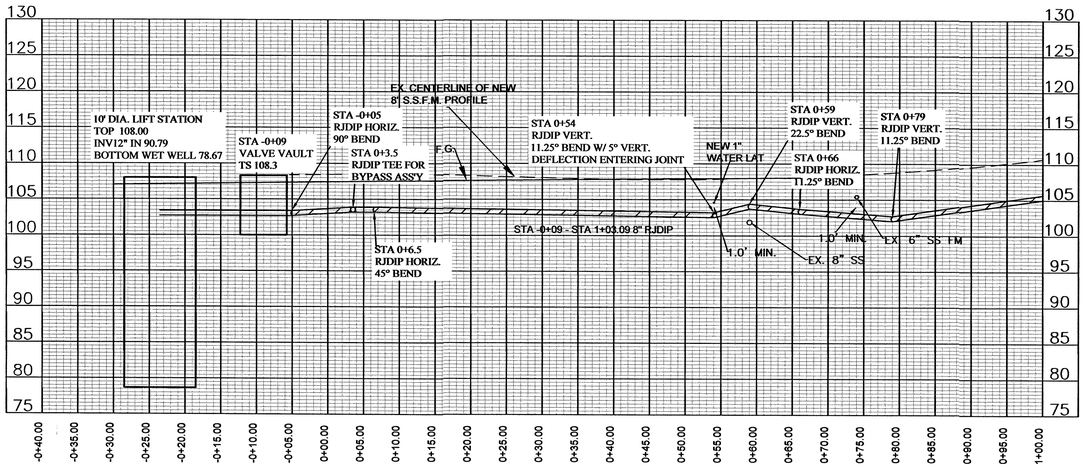
FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026
DS-15615

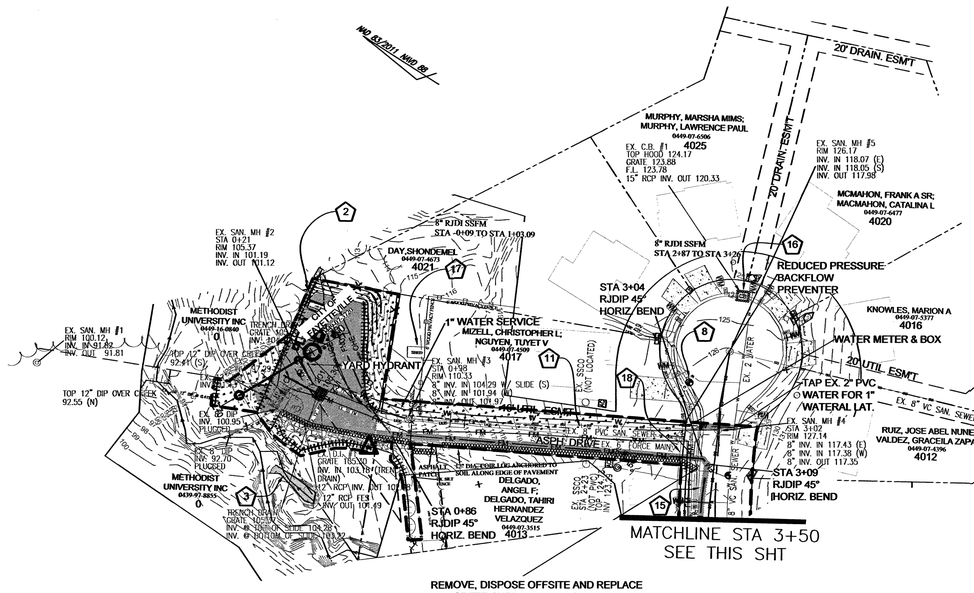
G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Plans\Construction Plans\C-6 & 11 FM EROSION & NOTES .dwg, 12/11/2025 3:44:19 PM, 2022 - Canon iPF780.pc3


DO NOT DISTURB EXISTING FORCE MAIN UNTIL NEW FORCE MAIN IS ACCEPTED BY PWC FOR USE.
ONCE NEW FM IS ACCEPTED, REMOVE APPROX. 80 LF OF OLD PIPE INTERFERING WITH NEW WORK, PLUG ENDS, AND FILL OLD FM W/ CONCRETE GROUT TO ABANDON IN PLACE FROM LIFT STATION COMPOUND TO DISCHARGE MANHOLE IN DUKE POWER LINE . (APPROX. 2,070 FT)
TBM 106.79 RR SPIKE IN 18" PINE TREE
TBM 134.61 FIRE HYD. FLANGE BOLT NEAREST "M" IN MUELLER AT ASHDOWN PL & EASTDALE DR.
TBM 185.31 FIRE HYD. FLANGE BOLT NEAREST "M" IN MUELLER BETWEEN 520 & 524 ASHDOWN PL
NAD 83/2011 NAVD 88
STA 0+06 RJDIP 45° HORIZ. BEND
STA 0+66 RJDIP 11.25° HORIZ. BEND
STA 0+86 RJDIP 45° HORIZ. BEND
STA 3+04 RJDIP 45° HORIZ. BEND
STA 3+09 RJDIP 45° HORIZ. BEND
STA 5+06 & 5+20 RJDIP 45° HORIZ. BEND
STA 14+02 RJDIP 45° HORIZ. BEND
STA 14+12 RJDIP 45° HORIZ. BEND
STA 14+80 PROPOSED COMBINATION AIR RELEASE/VACUUM VALVE IN 5'Ø MANHOLE RIM 204.80 8" INV. IN/OUT 200.00
STA 15+10 & 15+21 RJDIP 45° HORIZ. BEND
STA 19+44 & 19+58 RJDIP 45° HORIZ. BEND
END GROUTING 6" EX. F.M.
1" WATER SERVICE
PROP. 8" FM
REDUCED PRESSURES BACKFLOW PREVENTER WATER METER & BOX
EASTDALE DR
ASHDOWN PL
BILLINGSFORD CIR.
STANDING STONE DR
20' DRAIN. & S.S. FORCE MAIN ESMT
20' DRAIN ESMT
20' UTIL ESMT
40' UTIL ESMT
70' R/W PROGRESS ENERGY TRANS. LINE
Fayetteville East - Ft. Bragg Woodruff St. 230kV Line/Fayetteville Slocumb 115 Tap Line
REPLACE GRAVEL DRIVE DISTURBED BY CONSTRUCTION 17 SY MAX.
REPLACE GRAVEL DRIVE DISTURBED BY CONSTRUCTION 13 SY MAX.
METHODIST UNIVERSITY INC 0439-14-5849 0
METHODIST UNIVERSITY INC 0439-07-8355 0
CITY OF FAYETTEVILLE 0439-07-7477 0
DAY,SHONDEMEL 0449-07-2673 4021
MURPHY, MARSHA MIMS; MURPHY, LAWRENCE PAUL 0449-07-6506 4025
MIZELL, CHRISTOPHER L; NGUYEN, TUYET V 0449-07-4509 4017
DELGADO, ANGEL F; DELGADO, TAHIRI HERNANDEZ VELAZQUEZ 0449-07-3515 4013
RABON, PERRY D JR 0449-07-2560 4009
ATTAWAY, CORINTHIA F 0449-07-3405 4005
CARROLL, KATIE K 0449-07-1439 3949
SPENCE, LASANYA 0449-07-0395 3945
BROWN, WEZZLEY D; BROWN, NATASHA N 0449-07-9259 3941
BROWN, JERMAINE R 0449-07-9212 3937
BATISTA, JOSUE F 0449-07-2298 3944
FUTCH, GARY B JR 0449-07-1193 3936
VANCE, PHILIP RANDALL; VANCE, MICHELLE F 0449-07-3100 504
HALL, SWANEE M 0449-07-3886 508
MEDINA, LEE ROY; MEDINA, VIRGINIA D 0449-07-5662 512
MORROW, BRUCE 0449-06-4999 516
MEADE, LAWSON W; FURCHES, GINA 0449-06-3086 520
VINSON, NICOLE MICHELLE 0449-06-4953 524
STEWART, NANI ESHA 0449-06-7020 600
JIMENEZ, JUAN G; JIMENEZ, ALMA L 0449-06-3987 604
ANDERSON, WESLEY; LAW, MELISSA, EILEEN 0449-06-8843 608
FERGUSON, BARRY L 0449-06-9811 612
MCMAHON, FRANK A SR; MACMAHON, CATALINA L 0449-07-5477 4020
KNOWLES, MARION A 0449-07-5377 4016
RUIZ, JOSE ABEL NUNEZ; VALDEZ, GRACEILA ZAPATA 0449-07-4296 4012
DEHARTY-RYAN, ZULYN ELENA 0449-07-4323 4008
AYAN, ALAIN; AYAN, ERIKA YADIRA ORTIZ-NUNEZ 0449-07-4254- 505
WHITE, BILLY RAY; WHITE, KAREN 0449-07-3339 509
TAYLOR, KATLIN 0449-07-6116 513
BLANCHARD-WHITE, LORETTA D; BLANCHARD-WHITE, TERRENCE WHITE 0449-07-6192- 517
ALLEN, CHRISTOPHER; ALLEN, JANA 0449-07-8036- 603
CANNON, RHONDA RENEE 0449-07-9083- 607
MURCHISON, GREGORY; MURCHISON, HAZE-LYNN 0449-06-9778- 611
GIBSON, BRUCE; GIBSON, MIRANDA 0449-07-0181 503
VARGAS, ANDY; VARGAS, IRMA 0449-06-1997 507
SHAW, LESLIE ANN 0449-06-2964
DOUGLAS, KIMRR 0449-06-3931 515
MANNING, VERNARD C 0449-06-8807 519
FAIRLEY, LORENZO; FAIRLEY, RHONDA PICKETT 0449-06-4964 519
MUTZ, PETER VINCENT 0449-06-5831 527
GLAZE, PAMELA 0449-06-6708 531
DOSTIE, TYSON JOSHUA 0449-06-6765 535
RODRIGUEZ, JORGE W; RODRIGUEZ, LIZA M 0449-06-7714 539
SHAKIR, NIDAA 0449-06-8418 543
GOFORTH, DIANNA 0449-16-0531 816
EX. SAN. MH #1 RIM 100.12 12" INV. IN 91.82 12" INV. OUT 91.81
EX. SAN. MH #2 RIM 105.37 8" INV. IN 103.19 8" INV. OUT 103.12
EX. SAN. MH #3 RIM 110.33 INV. 8" IN 104.29 W/ SLIDE (S) INV. 8" IN 101.94 (W) INV. 8" OUT 101.97
EX. SAN. MH #4 RIM 127.14 INV. IN 114.43 (E) INV. IN 117.38 (W) INV. OUT 117.35
EX. SAN. MH #5 RIM 126.17 INV. IN 118.07 (E) INV. IN 118.05 (S) INV. OUT 117.98
EX. SAN. MH #6 RIM 128.92 INV. IN 120.81 INV. OUT 120.74
EX. SAN. MH #7 RIM 138.45 INV. IN/OUT 130.99
EX. SAN. MH #8 RIM 132.31 INV. IN 124.46 W/ SLIDE INV. IN 122.73 (SE) INV. OUT 122.69
EX. SAN. MH #9 RIM 135.29 INV. IN 123.98 INV. OUT 123.99
EX. SAN. MH #10 RIM 140.58 INV. IN 133.39 W/SLIDE INV. OUT 132.07
EX. SAN. MH #11 RIM 117.27 8" INV. OUT 106.55
EX. SAN. MH #12 TOP 2" BEND 200.86 3/4" VALVE 199.70
EX. SAN. MH #13 STA 21+47 RIM 7945.62 NEW INV. 6" IN 141.66 W/ INT DROP STR. INV. 6" IN 140.83 W/ SLIDE (W) INV. 8" IN 138.00 W/ SLIDE (E) ABANDONED INV. 15" RCP OUT (SOUTH) **"CORE & BOOT MANHOLE"
EX. SAN. MH #14 RIM 150.15 143.75 W/ INT T 138.92
EX. SAN. MH #15 RIM 162.30 INV. IN 156.29 W/ DROP INV. OUT 151.13
EX. SAN. MH #16 RIM 179.49 INV. IN 170.18 INV. OUT 170.11
EX. SAN. MH #17 RIM 184.31 INV. IN 174.38 INV. OUT 174.35
EX. SAN. MH #18 RIM 197.87 6" INV. IN 193.71 8" INV. OUT 189.71
EX. C.B. #1 TOP HOOD 124.17 GRATE 123.88 F.L. 123.78 15" RCP INV. OUT 120.33
EX. C.B. #2 TOP HOOD 130.57 GRATE 130.10 F.L. 129.97 15" RCP INV. IN 123.75 (S) 15" RCP INV. IN 123.73 (E) 15" RCP INV. OUT 122.42
EX. C.B. #3 TOP HOOD 130.55 GRATE 130.03 F.L. 129.95 15" RCP INV. OUT 124.05
EX. C.B. #4 TOP HOOD 130.65 GRATE 130.15 F.L. 130.04
EX. C.B. #5 TOP HOOD 132.03 GRATE 131.56 F.L. 131.44 4" PVC INV IN 129.74 (S) 15" RCP INV. IN 124.74 (S) 15" RCP INV. OUT 124.68
EX. C.B. #6 TOP HOOD 134.18 GRATE 133.70 F.L. 133.60 15" RCP INV. MCLAURIN, WARREN 0449-07-3390 501 INV. OUT 123.92
EX. C.B. #7 TOP HOOD 134.35 GRATE 133.92 F.L. 133.75 15" RCP INV. IN 126.34
EX. C.B. TOP HOOD 144.17 GRATE 143.66 F.L. 143.52 15" RCP INV. IN 136.84(SE) 15" RCP INV. IN 136.74(SW) 15" RCP INV. OUT 136.19
EX. C.B. #8 TOP HOOD 134.40 GRATE 133.91 F.L. 133.91 4" PVC INV. IN 126.74 (S)
EX. C.B. #9 TOP HOOD 134.40 GRATE 133.97 F.L. 133.91 4" PVC INV. IN 126.74 (S)
EX. C.B. #10 TOP HOOD 140.01 GRATE 139.52 F.L. 139.43 15" RCP INV. IN 132.18 (W) 15" RCP INV. IN 132.06 (S) 4" PVC INV. IN 131.86 (E) 4" PVC INV. IN 131.71 (S) 24" RCP INV. OUT 131.41
EX. C.B. #11 TOP HOOD 139.89 GRATE 139.39 F.L. 139.28 15" RCP INV. IN 132.55 (S) 4" PVC INV. IN 132.44 (E) 15" RCP INV. IN 142.89 15" RCP INV. OUT 142.76
EX. C.B. TOP HOOD 143.87 GRATE 143.56 F.L. 143.32 15" RCP INV. OUT 137.02
EX. C.B. TOP HOOD 174.32 GRATE 173.77 F.L. 173.67 15" RCP INV. IN 166.80 15" RCP INV. OUT 166.38
EX. C.B. TOP HOOD 174.07 GRATE 173.58 F.L. 173.47 15" RCP INV. IN 166.80 15" RCP INV. OUT 166.38
EX. C.B. TOP HOOD 182.80 GRATE 182.38 F.L. 182.22 15" RCP INV. IN 175.24
EX. C.B. TOP HOOD 184.82 GRATE 184.27 F.L. 184.21 15" RCP INV. OUT 179.31
EX. D.I. #4 GRATE 112.22 12" CPP INV. IN 112.32 18" RCP INV. IN 107.13 18" RCP INV. OUT 106.54
EX. O.T.C.B. #1 RIM 148.56 TOP SLAB 148.07 THROAT 147.13 15" RCP INV. IN 142.89 15" RCP INV. OUT 142.76
EX. O.T.C.B. #2 RIM 158.15 TOP SLAB 157.63 THROAT 156.66 15" CPP INV. IN 154.63 15" RCP INV. OUT 149.66
EX. O.T.C.B. #3 RIM 180.17 TOP SLAB 179.86 THROAT 178.64 15" CPP INV. OUT 175.73
EX. 18" RCP. FES INV. OUT 105.09
EX. 15" CMP INV. OUT 104.22
EX. 15" CMP. IN 104.54
EX. 8" PVC SAN. SEWER
EX. 8" PVC WATER
EX. 6" SEWER FORCE MAIN
EX. SAN. AIR-RELEASE MH #12
EX. 8" PVC SAN. SEWER
EX. 8" PVC WATER
EX. 6" PVC SAN. SEWER
EX. 8" PVC WATER
EX. 8



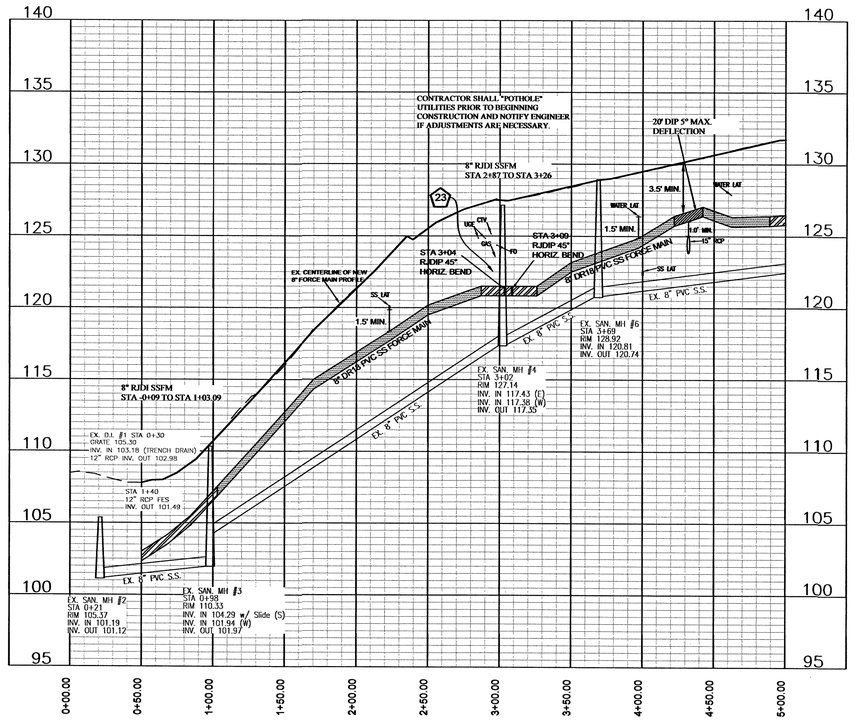
8" S.S. FORCE MAIN ENLARGED PROFILE STA 0+00 TO 1+00

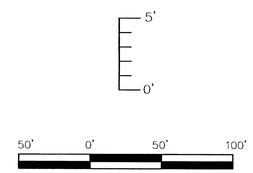




8" S.S. FORCE MAIN STA 0+00 TO 5+00

(SEE ENLARGED PROFILE TO LEFT FOR DETAILS OF F.M. BETWEEN STA -0+30 & 1+00)





FOR NOTES AND LEGEND SEE SHEET C-7 & C-12

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

Drawn by
David Maples
Checked
David E. Vaughn,PE,PLS
Reviewed
Jeffrey D Reitzel,PE,PLS
Date
JULY 2025

LONGVIEW ACRES LIFT STATION 41
REPLACEMENT & SAN. SEWER FORCE MAIN
STA 0+00 to STA 5+00 PLAN/PROFILE

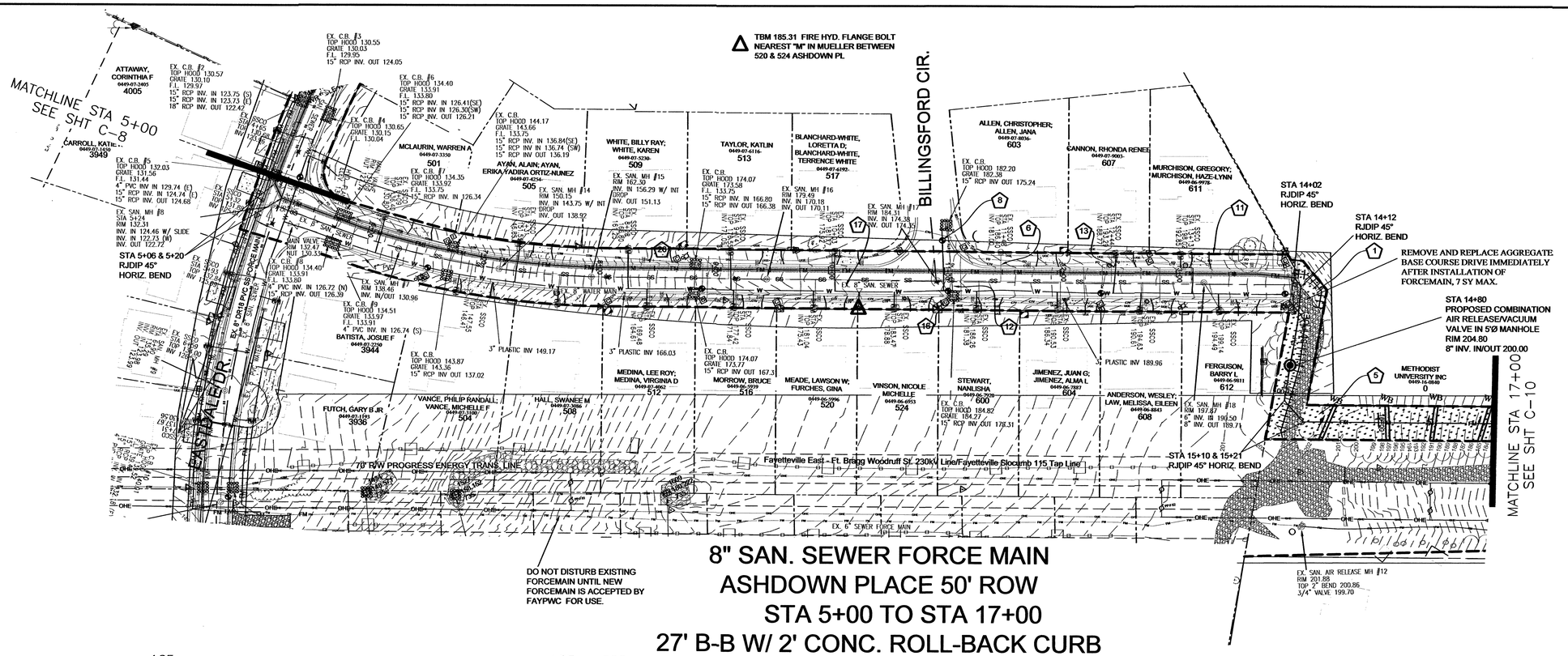
Revision	By	Date
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Firm No. F-0106

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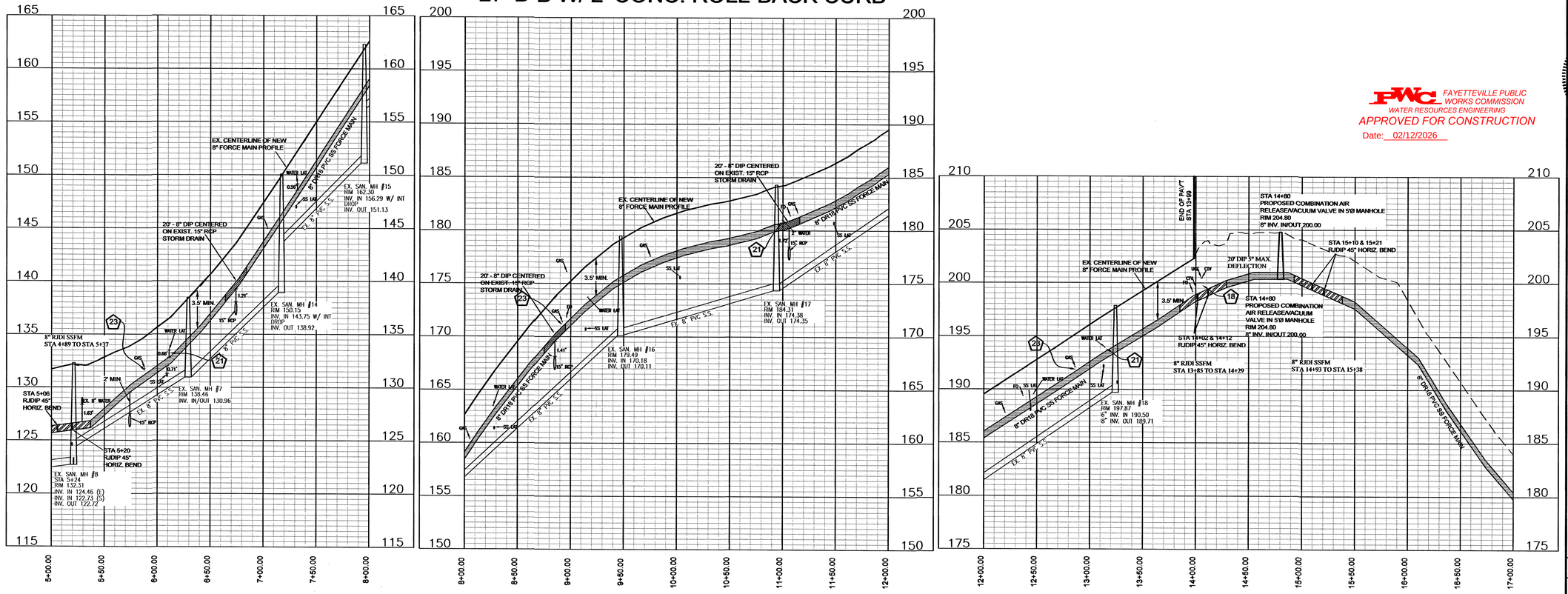
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1" = 5' V
Book no.
Sheet C-8

G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Plans\Construction Plans\C-8, 9 & 10 Plan Profiles.dwg, 12/11/2025 4:51:11 PM, 2022 - Canon iPF780.pc3



8" SAN. SEWER FORCE MAIN
ASHDOWN PLACE 50' ROW
STA 5+00 TO STA 17+00
27' B-B W/ 2' CONC. ROLL-BACK CURB

DO NOT DISTURB EXISTING FORCEMAIN UNTIL NEW FORCEMAIN IS ACCEPTED BY FAYPWC FOR USE.



FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

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STA 5+00 to STA 17+00 PLAN/PROFILE

Drawn by: David Maples
Checked: David E. Vaughn,PE,PLS
Reviewed: Jeffrey B Reitzel,PE,PLS
Date: JULY 2025

LONGVIEW ACRES LIFT STATION 41
REPLACEMENT & SAN. SEWER FORCE MAIN
STA 5+00 to STA 17+00 PLAN/PROFILE

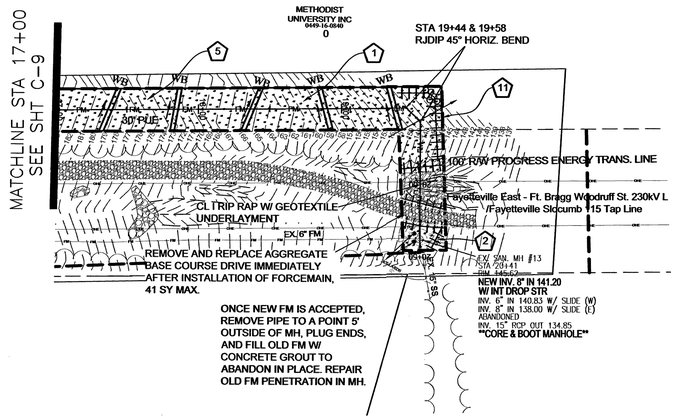
Revision	By	Date
90% Design Submittal	DWM	MAR 23
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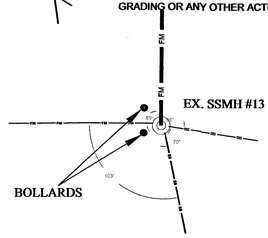
M&R
ENGINEERS
PLANNERS
SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

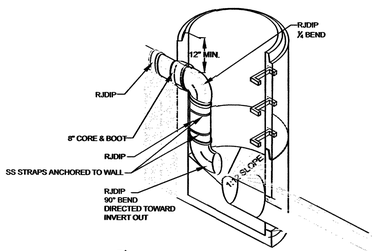
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Book no.
Sheet: C - 9

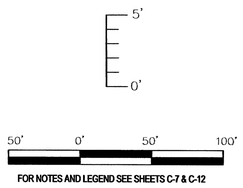
- NO STOCKPILING OR STORAGE OF MATERIALS, DIRT, OR EQUIPMENT OF ANY KIND IS PERMITTED WITHIN THE DET EASEMENT AREA, NOR MAY ANY COMBUSTBLE MATERIALS BE PLACED WITHIN THE EASEMENT AREA.
- CONTRACTORS OPERATING ANY EQUIPMENT SHOULD BE INSTRUCTED NOT TO OPERATE WITHIN 25' OF THE POLES, TOWERS OR OTHER ELECTRICAL STRUCTURES INCLUDING GUY ANCHORS. ALL SLOPES SHALL BE 4:1 OR LESS. NO SPOIL DIRT IS TO BE PLACED WITHIN THE EASEMENT LIMITS UNLESS PREVIOUSLY APPROVED BY DET.
- ANY DAMAGE TO THE TRANSMISSION LINE OR ITS ASSOCIATED STRUCTURES, RELATED TO THIS PROJECT, AND/OR CLAIMS DUE TO THE DAMAGE, IS THE RESPOSIBILTY OF THE CONTRACTOR.
- DUKE ENERGY HEAVY EQUIPMENT ACCESS MUST NOT BE RESTRICTED DURING CONSTRUCTION OF THIS PROJECT DUE TO GRADING OR ANY OTHER ACTIVITY.



NAD 83/2011 NAVD 88

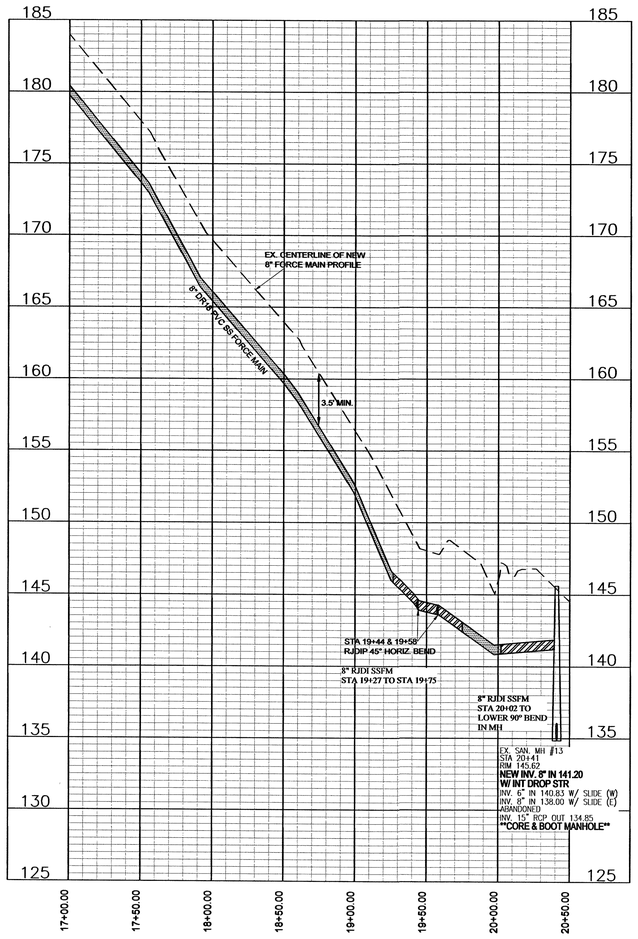




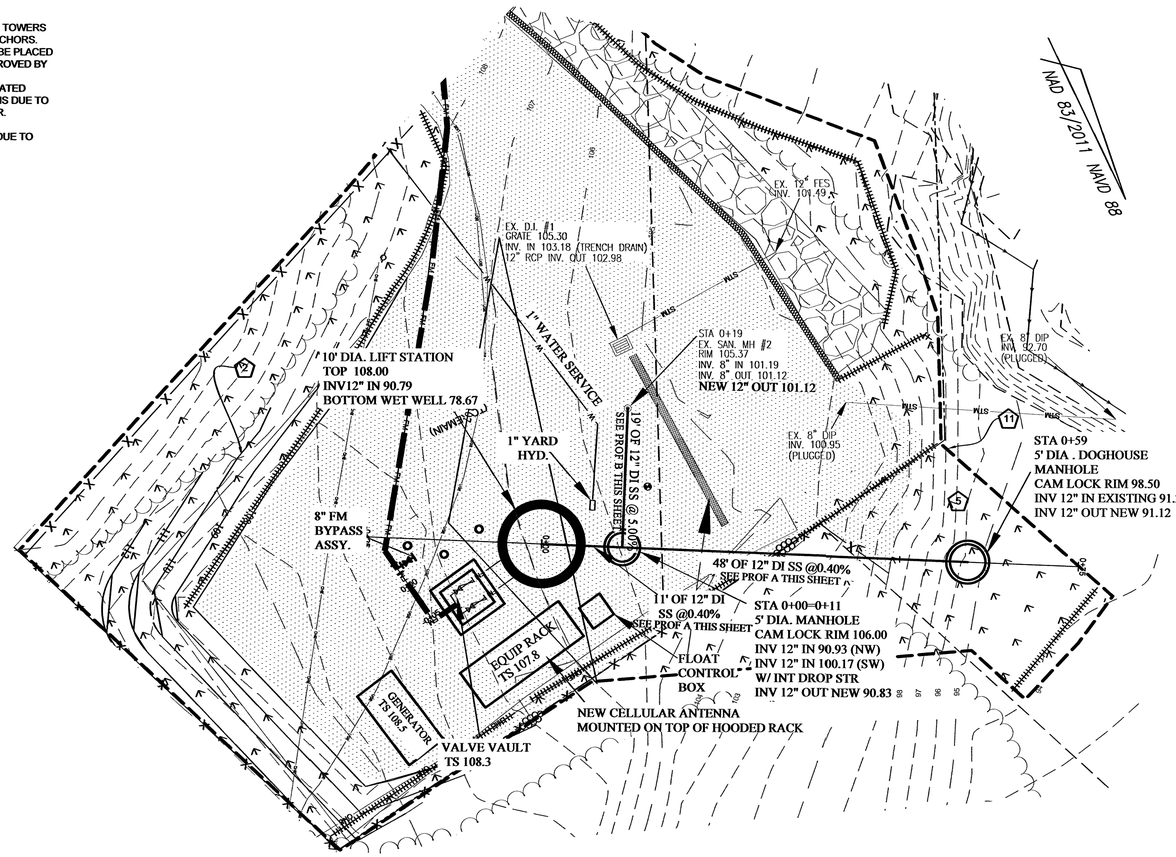


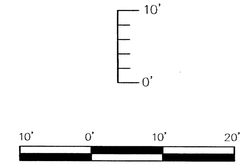
FOR NOTES AND LEGEND SEE SHEETS C-7 & C-12

8" SAN. SEWER FORCE MAIN STA 17+00 TO END

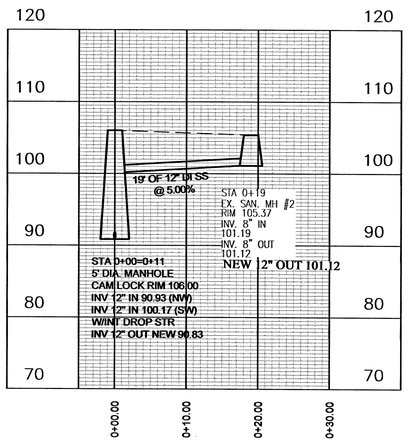


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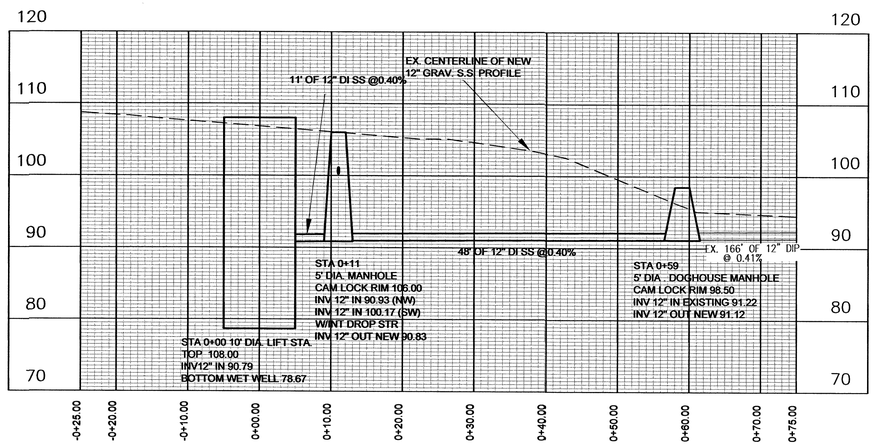




12" GRAVITY SAN. SEWER RELOCATION TO NEW LIFT STATION PROFILE B (ENLARGED FOR CLARITY - 1"=10')



12" GRAVITY SAN. SEWER RELOCATION TO NEW LIFT STATION PROFILE A (ENLARGED FOR CLARITY - 1"=10')



FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

DS-15615

Drawn by
David Maples
Checked
David E. Vaughn,PE,PLS
Reviewed
Jeffrey B Reitzel,PE,PLS
Date
JULY 2025

LONGVIEW ACRES LIFT STATION 41
REPLACEMENT & SAN. SEWER FORCE MAIN
STA 17+00 to END PLAN/PROFILE

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25
PWC Comments	DWM	DEC 25

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R
ENGINEERS
PLANNERS
SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale 1" = 50' V
1" = 5' H
Book no.
Sheet C - 10

G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Plans\Construction Plans\C-8, 9 & 10 Plan Profiles.dwg, 12/15/2025 12:51:36 PM, 2022 - Canon iPF780.pc3

GROUND STABILIZATION REQUIREMENTS		
Site Area Description	Stabilization Time Frame	Stabilization Time Frame Exceptions
Perimeter dikes, swales, ditches and slopes	7 days	None
High Quality Water (HQW) Zones	7 days	None
Slopes steeper than 3:1	7 days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed.
Slopes 3:1 or flatter	14 days	17-days for slopes greater than 50 feet in length
All other areas with slopes flatter than 4:1	14 days	None (except for perimeters and HQW Zones)
Permanent ground cover shall be established for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development		

NOTES
(TYPICAL FOR ALL SHEETS)

1. SEE THIS SHEET FOR POLLUTION CONTROL NOTES
2. TOTAL DISTURBED ACREAGE: 0.85 ACRES
3. APPROX. TOTAL AREA TO BE VEGETATIVELY STABILIZED: 0.56 ACRES
   AREA TO BE ASPHALT PERMANENTLY PATCHED: 0.25 AC
   AREA OF EXISTING GRAVEL ROAD: 0.04 AC
4a. SOIL STABILIZATION SHALL BE ACHIEVED ON ANY AREA OF A SITE WHERE LAND-DISTURBING ACITIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED ACCORDING TO THE FOLLOWING SCHEDULE:
   i) ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES AND ALL SLOPES STEEPER THAT 3 HORIZONTAL TO 1 VERTICAL (3:1) SHALL BE PROVIDED TEMPORARY OR PERMANENT STABILIZATION WITH GROUND COVER AS SOON AS PRACTICABLE BUT IN ANY EVENT WITHIN 7 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACTIVITY.
   ii) ALL OTHER DISTURBED AREAS SHALL BE PROVIDED TEMPORARY OR PERMANENT STABILIZATION WITH GROUND COVER AS SOON AS PRACTICABLE BUT IN ANY EVENT WITHIN 14 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACTIVITY.
4b. CONDITIONS - IN MEETING THE STABILIZATION REQUIREMENTS ABOVE, THE FOLLOWING CONDITIONS OR EXEMPTIONS SHALL APPLY:
   i) EXTENSIONS OF TIME MAY BE APPROVED BY THE PERMITTING AUTHORITY BASED ON WEATHER OR OTHER SITE-SPECIFIC CONDITIONS THAT MAKE COMPLIANCE IMPRACTICABLE.
   ii) ALL SLOPES 50' IN LENGTH OR GREATER SHALL APPLY THE GROUND COVER WITHIN 7 DAYS EXCEPT WHEN THE SLOPE IS FLATTER THAT 4:1. SLOPES LESS THAN 50' SHALL APPLY COVER WITHIN 14 DAYS EXCEPT WHEN SLOPES ARE STEEPER THAN 3:1, THE 7 DAY-REQUIREMENT APPLIES.
   iii) ANY SLOPED AREA FLATTER THAN 4:1 SHALL BE EXEMPT FROM THE 7-DAY GROUND COVER REQUIREMENT.
   iv) SLOPES 10' OR LESS IN LENGTH SHALL BE EXEMPT FROM THE 7-DAY GROUND COVER REQUIREMENT EXCEPT WHEN THE SLOPE IS STEEPER THAN 2:1.
   v) ALTHOUGH STABILIZATION IS USUALLY SPECIFIED AS GROUND COVER, OTHER METHODS, SUCH AS CHEMICAL STABILIZATION, MAY BE ALLOWED ON A CASE-BY-CASE BASIS.
   vi) FOR PORTIONS OF PROJECTS WITHIN THE SEDIMENT CONTROL COMMISSION-DEFINED "HIGH QUALITY WATER ZONE" (15A NCAC 04A .0105), STABILIZATION WITH GROUND COVER SHALL BE ACHIEVED AS SOON AS PRACTICABLE BUT IN ANY EVENT ON ALL AREAS OF THE SITE WITHIN 7 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACT.
   vii) PORTIONS OF A SITE THAT ARE LOWER IN ELEVATION THAN ADJACENT DISCHARGE LOCATIONS AND ARE NOT EXPECTED TO DISCHARGE DURING CONSTRUCTION MAY BE EXEMPT FROM THE TEMPORARY GROUND COVER REQUIREMENTS IF IDENTIFIED ON THE APPROVED E&SC PLAN OR ADDED BY THE PERMITTING AUTHORITY.
5. TOPSOIL SHALL BE STOCKPILED ALONG UPPER SIDE OF TRENCH WITH TRENCH SEPARATING THE TOPSOIL FROM DOWNSLOPE SIDE OF EASEMENT. FOR ADDITIONAL INFORMATION SEE SPECIFICATIONS.
6. CONTACT PERSON RESPONSIBLE FOR MAINTENANCE IS VANCE MCGOUGAN, PE OF THE CITY OF FAYETTEVILLE PUBLIC WORKS COMMISSION, PH 910-223-4730
7. SEEDING SPECIFICATIONS ARE INCLUDED ON THE EROSION CONTROL DETAILS SHEET D-2.

POLLUTION PREVENTION
(TYPICAL FOR ALL SHEETS)

1. EQUIPMENT UTILIZED DURING THE CONSTRUCTION ACTIVITY ON A SITE MUST BE OPERATED AND MAINTAINED IN A MANNER AS TO PREVENT THE POTENTIAL OR ACTUAL POLLUTION OF THE SURFACE OR GROUND WATERS. FUELS, LUBRICANTS, COOLANTS, AND HYDRAULIC FLUIDS, OR ANY OTHER PETROLEUM PRODUCTS, SHALL NOT BE DISCHARGED ON 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, AND IN ACCORDANCE WITH APPLICABLE 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 OR GROUND, STORM SEWERS, OR DRAINS ON PRIVATE OR PUBLIC (STATE) PROPERTY. THE CONTRACTOR IS REQUIRED TO PROVIDE PRIMARY AND SECONDARY CONTAINMENT SYSTEM FOR FLUID STORAGE, FUELING AND SERVICING EQUIPMENT.
2. THE CONTRACTOR, HIS SUBCONTRACTORS AND MATERIAL SUPPLIERS ARE PROHIBITED FROM DISCHARGING ANY WASTE PRODUCTS FROM CONCRETE TRUCKS TO INCLUDE WASH DOWN WATER OR FROM CONCRETE CORING AND SAWING WORK OR ANY OTHER UNSUITABLE CONSTRUCTION MATERIALS OR PRODUCTS INTO THE STORM SEWER SYSTEM OR DISCHARGE ONTO THE OWNER'S PROPERTY.
3. THE CONTRACTOR SHALL CONTROL THE MANAGEMENT AND DISPOSAL OF LITTER AND SANITARY WASTE FROM THE SITE SUCH THAT NO ADVERSE IMPACTS TO WATER QUALITY OCCUR.
4. THE CONTRACTOR SHALL PAY ALL COSTS OF THE CLEAN UP AND REMOVAL OF ANY SUCH UNAUTHORIZED DISCHARGE AND PAY ANY AND ALL FINES, PENALTIES AND/OR DAMAGES.

NOTES:

SEE SHEET D-1 & 2 FOR EROSION CONTROL DETAILS AND MAINTENANCE REQUIREMENTS.

SEE PLAN & PROFILE SHEETS FOR ADDITIONAL INFORMATION.

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

CONSTRUCTION PHASE

1. OBTAIN ALL PERMITS AND PLAN APPROVALS.
2. PRE-CONSTRUCTION CONFERENCE.
3. INSTALL GRAVEL CONSTRUCTION ENTRANCES
4. INSTALL SEDIMENT FENCING
5. INSTALL TEMPORARY HARDWARE CLOTH INLET PROTECTION.
6. INSTALL WATER BARS (R/W DIVERSIONS)
7. INSTALL HIGH FLOW SILT SACKS IN STORM DRAIN BASINS.
8. INSTALL TEMP PIPE UNDER CONST. PROTECTION.
9. CLEAR AND GRUB PERMANENT EASEMENTS AND ONLY THOSE PORTIONS OF TEMPORARY EASEMENTS NECESSARY FOR CONSTRUCTION.
10. INSTALL SEWER MAINS IN EASEMENTS. STRIP TOPSOIL DURING TRENCHING OPERATION'S AND SEPARATE FROM EXCAVATED MATERIAL. MATERIAL EXCAVATED SHALL BE PLACED ON THE UPHILL SIDE OF THE EXCAVATION WITH THE TRENCH BETWEEN THE MATERIAL AND THE SEDIMENT FENCE.
11. REMOVE ASPHALT IN STREETS ALONG SEWER MAINS 3000' MAXIMUM DISTURBANCE BY MILLING WITH ZIPPER TYPE EQUIPMENT, REPLACE CUTTINGS BACK ON ROAD AND COMPACT.
12. INSTALL SEWER MAIN 3000' MAX. DISTURBANCE. PLACE ABC STONE AS CONSTRUCTION PROGRESSES TO PAVEMENT SURFACE.
13. INSTALL SEWER LATERALS, PLACE ABC STONE AS CONSTRUCTION PROGRESSES TO SURFACE OF THE ASPHALT.
14. TEST AND INSPECT SEWER MAIN AND LATERALS.
15. PATCH DISTURBED PAVEMENT ALONG SEWER MAINS, LATERALS AND STORM DRAINAGE WITH PERMANENT ASPHALT PATCH.
16. SEED AND MULCH OR SOD ALL DISTURBED AREAS NOT OTHERWISE IMPROVED AND ESTABLISH PERMANENT GROUND COVER AS INDICATED ON THE PLANS..
17. PRE FINAL INSPECTION BY CONTRACTOR.
18. PRE FINAL INSPECTION BY OWNER AND CONTRACTOR (PUNCH LIST GENERATED).
19. FINAL INSPECTION (ALL PUNCH LIST ITEMS COMPLETED WITH NCDENR, PWC, OWNER AND DESIGNER PRESENT).
20. REMOVE TEMPORARY MEASURES.
21. CLOSEOUT PROJECT

GENERAL NOTES SEDIMENT POLLUTION CONTROL ACT

SEE SHEET D-3 FOR EROSION CONTROL DETAILS

MINIMUM REQUIREMENTS FOR EROSION CONTROL ARE SHOWN ON THE DRAWINGS, BASED ON THE DESIGNER'S ANTICIPATED CONSTRUCTION METHODS AND SEQUENCES. INDIVIDUAL CONTRACTORS SHALL SUPPLEMENT, ADJUST OR PROVIDE ADDITIONAL MEASURES TO COMPLIMENT HIS/HER TYPE OF CONSTRUCTION AND/OR PHASING AND SEQUENCING TO PREVENT TRANSMITTAL OF SILT. INDIVIDUAL CONTRACTORS ARE REQUIRED TO MAINTAIN MINIMUM STANDARDS FOR EROSION CONTROL AS APPROVED OR REQUIRED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES. ALL FEES, PENALTIES, FINES FOR NONCOMPLIANCE AND ALL CIVIL ACTIONS RESULTING THERE FROM SHALL BE THE CONTRACTORS RESPONSIBILITY AND IN NO WAY INVOLVES THE OWNER OR DESIGNER. THE CONTRACTOR MAY BE REQUIRED TO MODIFY OR SUPPLEMENT MEASURES AT NO ADDITIONAL COST TO THE OWNER. ALL EROSION CONTROL MEASURES SHALL REMAIN SERVICEABLE UNTIL THE SITE IS RESTORED AND STABILIZED, UPON SUCH TIME THE MEASURES SHALL BE REMOVED BY THE CONTRACTOR. THE SITE MUST BE RESTORED, STABILIZED AND ANY OFF SITE SEDIMENTATION MUST HAVE BEEN REMOVED AND AREAS AFFECTED RESTORED PRIOR TO THE DESIGNER'S APPROVAL FOR FINAL REQUEST FOR PAYMENT.

THE CONTRACTOR SHALL BE REQUIRED TO PREPARE AND OBTAIN AN APPROVED EROSION CONTROL PLAN AMENDING THE ORIGINAL PERMITTED PLAN SUBMITTED BY THE OWNER. THE SUPPLEMENTAL PLAN SHALL ADDRESS STAGING/STORAGE AREAS, HAUL ROADS, BORROW PIT OPERATIONS AND/OR DISPOSAL/WASTE AREAS REGARDLESS OF THE SIZE OF DISTURBANCE. THE CONTRACTOR SHALL PAY ALL FEES ASSOCIATED WITH THE SUPPLEMENTAL PLAN AND A COPY OF THE NCDENR APPROVED PLAN SHALL BE FURNISHED TO THE DESIGNER. WORK CANNOT BEGIN UNTIL THE PLAN IS APPROVED. PERMANENT AND TEMPORARY EROSION CONTROL MEASURES PROPOSED BY THE CONTRACTOR FOR STAGING AREAS, HAUL ROADS, ETC. SHALL BE AT THE CONTRACTOR'S EXPENSE AND SHALL NOT CONSTITUTE ADDITIONAL COMPENSATION.

THE CONTRACTOR SHALL BE REQUIRED TO DISPLAY AT THE JOB-SITE OFFICE (OR READILY AVAILABLE ON THE PROJECT SITE), BOTH THE OWNER'S EROSION CONTROL PERMIT AND THE CONTRACTOR'S SUPPLEMENT EROSION CONTROL PERMIT. A COPY OF THE AMENDED PERMIT OR EVIDENCE OF AN APPROVAL SHALL BE FURNISHED TO THE DESIGNER PRIOR TO BEGINNING WORK.

NPDES STORM WATER DISCHARGE PERMIT FOR CONSTRUCTION ACTIVITIES: REGULATIONS ADOPTED BY THE US ENVIRONMENTAL PROTECTION AGENCY (US EPA) AND BY THE NORTH CAROLINA DIVISION OF WATER QUALITY REQUIRE THAT A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT BE OBTAINED FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES WITH LAND DISTURBANCE OF 1 OR MORE ACRES. THIS PERMIT IS IN ADDITION TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN APPROVAL. THE DIVISION OF WATER QUALITY IS DELEGATED BY THE US EPA TO ADMINISTER THE NPDES PERMIT PROGRAM IN NORTH CAROLINA. THIS PROJECT IS SUBJECT TO THESE NPDES GENERAL PERMITTING REQUIREMENTS. THE CONTRACTOR SHALL COMPLY WITH THE APPLICATION TERMS AND CONDITIONS OF THIS GENERAL PERMIT AND IS SUBJECT TO ENFORCEMENT BY THE DIVISION OF WATER QUALITY FOR ANY VIOLATIONS OF THE GENERAL PERMIT.

THE GENERAL PERMIT IS TIED TO AN APPROVED EROSION AND SEDIMENT CONTROL PLAN ISSUED BY THE NORTH CAROLINA DIVISION OF LAND RESOURCES. ADHERENCE TO THE EROSION AND SEDIMENTATION CONTROL PLAN IS AN ENFORCEABLE COMPONENT TO THE GENERAL PERMIT. THE GENERAL PERMIT NOT ONLY REQUIRES ADHERENCE TO THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN, BUT ALSO INCLUDES OTHER LIMITATIONS AND CONTROLS. SOME OF THE MAJOR ITEMS ARE OUTLINED BELOW.

* COVERAGE: THE PERMIT COVERS PROJECTS THAT DISTURB ONE OR MORE ACRE OF LAND.
* INSPECTIONS: THE CONTRACTOR SHALL INSPECT ALL EROSION AND SEDIMENTATION CONTROL FACILITIES AND ALSO SHALL OBSERVE RUNOFF AT STORM WATER DISCHARGES IN ACCORDANCE WITH THE GENERAL PERMIT (SEE PART I BELOW FOR SPECIFIC FREQUENCIES, ETC.) DISCHARGES TO CERTAIN IMPAIRED WATERS REQUIRE MORE FREQUENT INSPECTIONS.
* RECORDS: RECORDS OF INSPECTIONS SHALL BE MAINTAINED BY THE CONTRACTOR WITH A COPY OF THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN AT THE PROJECT SITE.
* THE GENERAL PERMIT HAS OTHER PROVISIONS THAT ADDRESS AREAS THAT COULD AFFECT STORM WATER RUNOFF FROM CONSTRUCTION ACTIVITY THAT ARE NOT A PART OF AN EROSION AND SEDIMENTATION CONTROL PLAN. THESE AREAS INCLUDE MATTERS SUCH AS DEMOLITION DEBRIS, CHEMICAL USAGE, AND OIL SPILLS THAT MAY CONTAMINATE STORM WATER RUNOFF ON A CONSTRUCTION SITE.

1. MINIMUM MONITORING AND REPORTING REQUIREMENTS

* ALL SEDIMENTATION AND EROSION CONTROL OF FACILITIES SHALL BE INSPECTED AND DOCUMENTED BY THE CONTRACTOR AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN 0.5 INCHES OF RAIN PER 24 HOUR PERIOD. THE CONTRACTOR SHALL INSTALL AND MAINTAIN A RAIN GAUGE ON THE SITE AND A RECORD OF THE RAINFALL AMOUNTS AND DATES.

* STORM WATER RUNOFF DISCHARGES SHALL BE INSPECTED BY VISUAL OBSERVATION FOR COLOR, FOAM, OUTFALL, STAINING, VISIBLE SHEENS, DRY WEATHER FLOWS AND MUDDY WATER (AT THE FREQUENCY DESCRIBED ABOVE) TO EVALUATE THE EFFECTIVENESS OF THE POLLUTION CONTROL FACILITIES OR PRACTICES. IF ANY VISIBLE OFF-SITE SEDIMENTATION IS LEAVING THE SITE, CORRECTIVE ACTION SHALL BE TAKEN TO REDUCE THE DISCHARGE OF SEDIMENTS.

* THE CONTRACTOR SHALL SUBMIT WITH EACH REQUEST FOR PAYMENT, A WRITTEN REPORT OF WEEKLY INSPECTIONS. A SAMPLE REPORT LOG IS INCLUDED IN THE CONTRACT DOCUMENTS. 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. THESE RECORDS SHALL BE MADE AVAILABLE TO DEM OR AUTHORIZED AGENT UPON REQUEST.

2. MAINTENANCE AND INSPECTIONS

* THE CONTRACTOR SHALL PROVIDE THE NECESSARY OPERATION AND MAINTENANCE TO KEEP ALL EROSION CONTROL DEVICES AND MATERIALS IN GOOD REPAIR AND OPERATING AT OPTIMUM EFFICIENCY. THE OWNER RESERVES THE RIGHT, WITHIN 24 HOURS PRIOR NOTICE TO THE CONTRACTOR TO REPAIR ANY EROSION CONTROL MEASURES OR MATERIALS AS REQUIRED, AND DEDUCT THE COST OF THOSE REPAIRS FROM THE CONTRACTORS REQUEST FOR PAYMENT.

* THE OWNER, DESIGNER OR DEM REPRESENTATIVES MAY PERIODICALLY EVALUATE THE PROJECT FOR COMPLIANCE WITH THESE REQUIREMENTS.

* THE CLEAN WATER ACT PROVIDES THAT ANY PERSON WHO KNOWINGLY MAKES ANY FALSE STATEMENT, REPRESENTATION, OR CERTIFICATION IN ANY RECORD OR OTHER DOCUMENT SUBMITTED OR REQUIRED TO BE MAINTAINED UNDER THIS GENERAL PERMIT, INCLUDING MONITORING REPORTS OR REPORTS OF COMPLIANCE OR NONCOMPLIANCE SHALL, UPON CONVICTION, BE PUNISHED BY A FINE OF NOT MORE THAT $10,000 PER VIOLATION, OR BY IMPRISONMENT FOR NOT MORE THAN TWO YEARS PER VIOLATION, OR BY BOTH.

THE CONTRACTOR SHALL INSURE THAT THE STREETS CONNECTING TO THE PROJECT ARE PROTECTED FROM MUD, SAND, STONE, LITTER OR DEBRIS IN ANY FORM. ALL MUD COLLECTED ON VEHICLE WHEELS SHALL BE REMOVED OR CLEANED OFF BEFORE LEAVING THE CONSTRUCTION SITE. SHOULD ANY MUD OR DEBRIS FROM THE PROJECT COLLECT ON THE STREETS THE MUD OR DEBRIS SHALL BE REMOVED IMMEDIATELY TO PREVENT ANY HAZARDS TO VEHICULAR OR PEDESTRIAN TRAFFIC AS WELL AS FROM ENTERING THE STORM DRAINAGE SYSTEM. THE CONTRACTOR IS REQUIRED TO CLEAN THE STREETS DAILY OF CONSTRUCTION RELATED DEBRIS, DUST AND MUD AND IS REQUIRED TO CLEAN THE STORM DRAINAGE SYSTEM (AND DOWNSTREAM SYSTEMS) AFFECTED BY CONSTRUCTION RUN OFF COMPLETELY PRIOR TO FINAL ACCEPTANCE AND PAYMENT. THE OWNER RESERVES THE RIGHT TO PROCEED WITH STREET CLEANING SHOULD THE CONTRACTOR FAIL TO COMPLY WITH THIS REQUIREMENT AND DEDUCT THE COSTS FROM THE CONTRACTORS REQUEST FOR PAYMENT.

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

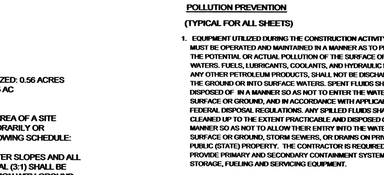
1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING | EFFECTIVE: 04/01/19

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

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

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

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

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

2. Additional Documentation to be Kept on Site

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This General Permit as well as the Certificate of Coverage, after it is received.

(b) Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

3. Documentation to be Retained for Three Years

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that Must be Reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(c) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(d) Anticipated bypasses and unanticipated bypasses.

(e) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requ

KEY SYMBOL (00) TYPICAL NOTES KEY

1. CLEAR AND GRUB PERMANENT EASEMENT DISPOSE OFF SITE – CLEAR ONLY TREES NECESSARY IN TEMPORARY EASEMENTS AND DISPOSE OFFSITE.
2. TEMPORARY SILT FENCE (TYPICAL).
3. DO NOT DISTURB WETLANDS OUTSIDE EASEMENTS (TYPICAL)
4. REMOVE EXISTING FENCE AS NECESSARY FOR CONSTRUCTION. FENCE REINSTALLATION SHALL USE ALL NEW MATERIALS (NO SEPARATE PAYMENT).
   PLACE TEMPORARY 4' TALL CHAIN-LINK FENCE AT EDGE OF EASEMENT OR TIE IN OPENING OF FENCE TO SECURE CONTENTS PREVIOUSLY SECURED BY PERMANENT FENCE REMOVED FOR CONSTRUCTION. (TYPICAL)
5. STRIP TOPSOIL IN AREAS TO BE DISTURBED, ADD AMENDMENTS AND RE-SPREAD TOPSOIL PRIOR TO INSTALLATION OF SOD. SOD SHALL BE SAME SPECIES AS EXISTING AND SHALL BE PLACED BY A LICENSED LANDSCAPE CONTRACTOR IN ALL DISTURBED AREAS NOT OTHERWISE IMPROVED. NO PAYMENT SHALL BE MADE FOR SOD REQUIRED TO RESTORE AREAS DISTURBED OUTSIDE OF AREAS INDICATED TO RECEIVE SOD. (TYPICAL).
6. SEWER LATERAL 4" DIAMETER UNLESS OTHERWISE INDICATED (TYPICAL).
7. DO NOT DISTURB STRUCTURES ETC. OUTSIDE OF EASEMENTS (TYPICAL).
8. SOIL BORING, HAND AUGER (TYPICAL)
9. REPAIR PWC WATER MAINS AND LATERALS DISTURBED BY CONSTRUCTION TO FAYPWC STANDARDS. NO SEPARATE PAYMENT.
10. CONTRACTOR SHALL REPAIR DAMAGE DUE TO CONSTRUCTION TO SEPTIC TANKS AND/OR DRAIN FIELD TO EXISTING OR BETTER CONDITIONS IMMEDIATELY UPON OCCURRENCE OF DAMAGE. CONTRACTOR SHALL OBTAIN PERMITS AND PUMP AND HAUL SEPTIC TANK CONTENTS AS NECESSARY DURING THE INTERIM BETWEEN SEPTIC SYSTEM DAMAGE AND REPAIR. NO SEPARATE PAYMENT (TYPICAL).
11. LIMITS OF CONSTRUCTION ARE EDGE OF EASEMENTS AND BOUNDARY OF EXISTING STREET RIGHT OF WAY, (TYPICAL).
12. CONTACT CITY ENGINEERING REPRESENTATIVE FOR INSPECTION OF STORM DRAIN PRIOR TO AND AFTER SD CROSSING (TYPICAL).
13. REPAIR PWC WATER LATERALS DISTURBED BY CONSTRUCTION. REPAIR REQUIRES REPLACING LATERAL FROM, BUT NOT INCLUDING, CORPORATION AT THE MAIN (ADAPTER REQUIRED) TO THE METER WITH 1" TYPE "K" SOFT COPPER PIPE AND INCLUDES INSTALLING A NEW LOCK VALVE AND NECESSARY FITTINGS TO TRANSITION FROM THE NEW LOCK VALVE TO THE METER. ALL MATERIALS SHALL BE SUBMITTED AND APPROVED BY PWC PRIOR TO INCORPORATION INTO THE WORK. NO SEPARATE PAYMENT. (TYPICAL) SEE DETAILS
14. STRIP TOPSOIL, STOCKPILE, INSTALL LATERAL, OR MAIN, ADD AMENDMENTS TO TOPSOIL. SEED AND MULCH DISTURBED TURF AREA WITH SEED MIXTURE SIMILAR TO EXISTING LAWN.
15. CONTRACTOR SHALL MILL WITH ZIPPER TYPE EQUIPMENT EXISTING PAVEMENT ALONG SEWER FORCE MAIN (6' MAXIMUM PAYMENT WIDTH). BASE BID PATCH SHALL BE PERMANENT PATCH. (NO OVERAGE ALLOWED, TYPICAL).
16. STORM BASIN INLET PROTECTION (TYPICAL)
17. MAINTAIN 10' MINIMUM HORIZONTAL SEPARATION BETWEEN SANITARY SEWER AND WATER.
18. CROSS UNDERGROUND ELECTRIC IN ACCORDANCE WITH N.E.C., TYPICAL), NO SEPARATE PAYMENT.
19. CONTRACTOR SHALL PAY ANY AND ALL COST/FEES ETC. NECESSARY TO SUPPORT UTILITY POLE AND SHALL BE RESPONSIBLE FOR REPAIR/PAYMENT TO UTILITY OWNER FOR DAMAGE DUE TO CONSTRUCTION (TYPICAL).
20. DO NOT DISTURB DRIVEWAYS; REPAIR DAMAGE DUE TO CONSTRUCTION TO EXISTING OR BETTER CONDITIONS WITH NO SEPARATE PAYMENT (TYPICAL).
21. MAINTAIN MIN 18" SEPARATION BETWEEN TOP OF SANITARY SEWER AND BOTTOM OF WATER (TYPICAL).
22. MAINTAIN MIN. 24" SEPARATION BETWEEN TOP OF SANITARY SEWER AND BOTTOM OF STORM DRAIN (TYPICAL).
23. MAINTAIN MIN. 12" SEPARATION BETWEEN TOP OF SANITARY SEWER AND BOTTOM OF GAS (TYPICAL).
24. REMOVE AND REPLACE DRIVEWAY DISTURBED BY CONSTRUCTION TO EXISTING OR BETTER CONDITION AT THE UNIT PRICE IN THE BID SCHEDULE

GENERAL NOTES:

1. ACCESS TO SITES SHALL BE BY PUBLIC RIGHT-OF-WAYS AND UTILITY EASEMENTS. OTHER ACCESS LOCATIONS REQUIRED SHALL BE SECURED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER. SUPPLEMENTAL EROSION CONTROL MEASURES SHALL BE REQUIRED TO INCLUDE CONSTRUCTION ENTRANCES, SILT FENCING, RESTORATION, ETC. ADDITIONAL MEASURES SHALL BE INCLUDED AS PART OF A SUPPLEMENTAL EROSION CONTROL PLAN PREPARED BY THE CONTRACTOR.
2. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE THE CONSTRUCTION STAGING AREA AT HIS EXPENSE, INCLUDING ENVIRONMENTAL SURVEYS.
3. THE CONTRACTOR IS EXPECTED AND REQUIRED TO COOPERATE WITH THE PROPERTY OWNERS AFFECTED BY THE WORK. PRIVATE AGREEMENTS WITH PROPERTY OWNERS MUST BE IN WRITING ON A FORM APPROVED BY THE PROJECT ENGINEER AND A COPY SHALL BE PROVIDED TO THE CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH CONSTRUCTION ACTIVITIES AFFECTED BY SAID AGREEMENT. THE AGREEMENT MUST SPECIFY THAT PWC, THE CITY, CONSTRUCTION MANAGER AND THE ENGINEER SHALL BE HELD HARMLESS AGAINST ALL CLAIMS ARISING FROM THE AGREEMENT. THE OWNER DISCOURAGES PRIVATE AGREEMENTS. BEFORE FINAL ACCEPTANCE, A RELEASE FROM EACH PROPERTY OWNER THAT THE CONTRACTOR HAS MADE AN AGREEMENT WITH SHALL BE REQUIRED. THE PROPERTY OWNER'S RELEASE IS A CONDITION OF FINAL ACCEPTANCE.
4. CONTRACTOR SHALL MAINTAIN A NEAT AND CLEAN JOB-SITE TO INCLUDE STAGING/STORAGE AREAS AS FOLLOWS:
   - PERFORM DUST CONTROL BY WATERING DAILY AS NEEDED OR AS DIRECTED BY THE PWC PROJECT COORDINATOR.
   - SWEEP STREETS A MINIMUM OF ONCE WEEKLY (FRIDAY) OR AS DIRECTED BY THE PWC PROJECT COORDINATOR.
   - BLADE, LEVEL AND RE-COMPACT ALL EXPOSED TRENCHES WEEKLY OR AS DIRECTED BY THE PWC PROJECT COORDINATOR TO PRODUCE A SMOOTH "RIDE",
   - PERFORM DAILY CLEAN-UP OF ALL DIRT, DEBRIS AND SCRAP MATERIALS.
   - REMOVE EXCESS EQUIPMENT, MATERIALS, TOOLS, ETC. NOT NEEDED.
5. EXCESS SUITABLE SOIL EXCAVATED DURING CONSTRUCTION SHALL BE STOCKPILED FOR USE ON THE PROJECT OR DISPOSED OF OFF-SITE AS DIRECTED BY THE PWC PROJECT COORDINATOR. THE CONTRACTOR SHALL NOT BE ALLOWED TO STOCKPILE MATERIALS OR EXCESS MATERIALS IN THE STREET RIGHT-OF-WAYS AT ANY TIME. THE CONTRACTOR SHALL PROVIDE A SUFFICIENT AND SUITABLE STOCKPILE AREA AND LOCATION AT THE CONTRACTOR'S EXPENSE.
6. CONTRACTOR SHALL PROVIDE MEASURES DURING CONSTRUCTION TO SECURE THE SITE AND EXCAVATION FROM THE GENERAL PUBLIC AND COMPLY WITH ALL OSHA REGULATIONS. JOB SITE SAFETY IS THE EXCLUSIVE AND SOLE RESPONSIBILITY OF THE CONTRACTOR. OPEN EXCAVATION LEFT UNATTENDED OR OVER NIGHT IS NOT ACCEPTABLE AND SHALL BE FILLED IMMEDIATELY.
7. CONTRACTOR SHALL REPAIR OR REPLACE DRIVES DISTURBED BY CONSTRUCTION TO EXISTING OR BETTER CONDITIONS. NO SEPARATE PAYMENT UNLESS OTHERWISE INDICATED.
8. CONTRACTOR SHALL PROVIDE TEMPORARY FENCING WHERE FENCES ARE REMOVED FOR CONSTRUCTION. CONTRACTOR SHALL COORDINATE FENCE REMOVAL/REINSTALLATION WITH INDIVIDUAL PROPERTY OWNERS PRIOR TO REMOVAL. CONTRACTOR SHALL REINSTALL ALL SHEDS, ETC. TO AS GOOD OR BETTER THAN EXISTING CONDITIONS UNLESS OTHERWISE INDICATED. FENCE REINSTALLATION SHALL USE ALL NEW MATERIALS. (NO SEPARATE PAYMENT).
9. CONTRACTOR SHALL REPLACE ALL DISTURBED MAILBOXES, SIGNS, ETC. DISTURBED DURING CONSTRUCTION WITHIN 24 HOURS OF DISTURBANCE. PERMANENT ROAD SIGNAGE DISTURBED SHALL BE REPLACED IMMEDIATELY AND IF NECESSARY ROADWAY SIGNS SHALL BE TEMPORARILY INSTALLED IN A LOCATION CONSISTENT WITH THE NCMUTCD TO PROVIDE CONTINUOUS TRAFFIC AWARENESS OF ROADWAY CONDITIONS. (NO SEPARATE PAYMENT).
10. CONTRACTOR SHALL PROVIDE SECURITY FENCING, SECURITY GUARD, AND ANY AND ALL OTHER MEASURES CONTRACTOR DEEMS NECESSARY TO PROTECT EQUIPMENT AND MATERIALS STORED ON THE PROJECT. (NO SEPARATE PAYMENT).
11. WHERE CONTRACTOR CEASES WORK OPERATIONS FOR A 72 HOUR PERIOD OR LONGER, SUCH AS HOLIDAYS, ETC., THE FOLLOWING SHALL BE ACCOMPLISHED PRIOR TO THE WORK STOPPAGE.
    - CONTRACTOR SHALL STORE ALL EQUIPMENT IN THE CONTRACTOR STAGING AREA OR OFF SITE.
    - THE CONTRACTOR SHALL SWEEP ALL STREETS, PERFORM GENERAL CLEANUP AND SHALL PERFORM MAINTENANCE ON ALL EXPOSED PATCHES.
12. CONTRACTOR SHALL SCHEDULE WORK AND MATERIAL DELIVERIES SO THAT STORED MATERIAL QUANTITIES ON THE JOB SITE SHALL BE MINIMIZED.
13. CONTRACTOR SHALL STORE ALL MATERIALS IN THE CONTRACTOR STAGING AREA 72 HOURS PRIOR TO INCORPORATING INTO THE WORK TO REDUCE OBSTRUCTIONS TO TRAFFIC AND INCONVENIENCE TO RESIDENTS. WHERE UTILITIES ARE BEING CONSTRUCTED IN EASEMENTS OUT OF TRAFFIC AREAS CONTRACTOR MAY STORE MATERIALS AHEAD OF CONSTRUCTION FOR A DISTANCE NOT GREATER THAN 1800 FEET UNLESS APPROVED OTHERWISE BY THE PROJECT ENGINEER.
14. AT THE PROPERTY OWNER'S REQUEST, THE CONTRACTOR SHALL DIG UP EXISTING SHRUBS AND BUSHES WITHIN UTILITY EASEMENT TO BE DISTURBED BY CONSTRUCTION AND SET OUTSIDE THE UTILITY EASEMENT AREA IN A LOCATION DETERMINED BY THE PROPERTY OWNER (NO SEPARATE PAYMENT). PROPERTY OWNER WILL BE RESPONSIBLE FOR REPLANTING SHRUBS AND BUSHES SO REMOVED, AND SHALL BE RESPONSIBLE FOR RE-ESTABLISHING GROWTH. IF NO REQUEST IS MADE BY THE PROPERTY OWNER, DISTURBED SHRUBS AND BUSHES SHALL BE REMOVED AND DISPOSED OF OFF-SITE UNLESS OTHERWISE INDICATED.
15. CLEARING AND GRUBBING SHALL BE RESTRICTED TO PERMANENT EASEMENTS ONLY. CONTRACTOR SHALL LIMIT TREE/BUSH CLEARING & GRUBBING IN THE TEMPORARY EASEMENTS, BETWEEN HOUSES AND ALONG PROPERTY LINES TO ONLY THAT WHICH IS ABSOLUTELY NECESSARY FOR CONSTRUCTION.
16. UPON COMPLETION OF CONSTRUCTION CONTRACTOR SHALL FLUSH AND CLEAN OUT STORM DRAINAGE SYSTEM TO INCLUDE DRIVEWAY PIPES, AND DISPOSE OF SPOIL MATERIAL OFFSITE. (NO SEPARATE PAYMENT)
17. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF FAYETTEVILLE, THE INSPECTION OF ALL STORM DRAINAGE TO BE IMPACTED BY CONSTRUCTION ACTIVITIES BEFORE AND AFTER ALL CONSTRUCTION ACTIVITIES HAVE TAKEN PLACE NEAR SUCH STORM DRAINAGE DEVICES (I.E. PIPE, CATCH BASINS, MANHOLES, ETC.). (NO SEPARATE PAYMENT)
18. AT LOCATIONS WHERE CONFLICTS MAY OCCUR, THE CONTRACTOR SHALL DIG UP STORM DRAINAGE PIPES PRIOR TO INSTALLING SANITARY SEWER AND ALLOW THE CITY OF FAYETTEVILLE REPRESENTATIVE TO VERIFY INVERT ELEVATIONS AND LOCATION TO ALLOW FOR ADJUSTMENT. NO SEPARATE PAYMENT.
19. THE CONTRACTOR SHALL REPAIR STORM DRAINAGE DAMAGED DUE TO CONSTRUCTION TO CITY OF FAYETTEVILLE STANDARD. NO SEPARATE PAYMENT.
20. CONTRACTOR SHALL REPAIR DAMAGE TO SEPTIC SYSTEMS DUE TO CONSTRUCTION TO EXISTING OR BETTER CONDITIONS IMMEDIATELY UPON DAMAGE. CONTRACTOR SHALL PUMP AND HAUL SEPTIC TANK CONTENTS AS NECESSARY DURING THE INTERIM BETWEEN SEPTIC SYSTEM DAMAGE AND REPAIR. NO SEPARATE PAYMENT.

GENERAL NOTES FOR RESIDENT RELATIONS (MANDATORY)

THE PROPOSED WORK WILL BE CONSTRUCTED WITHIN A FULLY DEVELOPED SUBDIVISION. THE CONTRACTOR IS REQUIRED TO DEVELOP GOOD RELATIONS WITH THE RESIDENTS WHICH INCLUDES THE FOLLOWING MANDATORY MINIMUM REQUIREMENTS:

- NO SPEEDING WITH EQUIPMENT AND/OR VEHICLES (25 MPH MAX.)
- DO NOT BLOCK DRIVEWAYS AT ANY TIME
- DO NOT LITTER AT ANY TIME
- DO NOT USE RESIDENT'S WATER WITHOUT THEIR PERMISSION (SIGNED AGREEMENT REQUIRED)
- ALL REQUIREMENTS FOR BACKFLOW PREVENTION BY THE PLUMBING CODE WILL BE ADHERED TO. PWC BULK WATER POLICY
- RESPOND TO RESIDENT'S COMPLAINTS WITHIN 24 HOURS
- DO NOT USE ABUSIVE LANGUAGE, PROFANITY OR CAT-CALLING
- WEAR PROPER PROTECTIVE CLOTHING (HARD HATS, PROPER SHOES, SHIRTS, ETC.)
- MAINTAIN PROPER SAFETY MEASURES, PARTICULARLY ALONG OPEN TRENCHES IF CONSTRUCTION IS STOPPED AND THE OPEN TRENCH IS NOT MANNED.
- PERSONNEL MUST WEAR A CITY APPROVED SAFETY VEST AT ALL TIMES WHILE WORKING IN THE CITY AND/OR NCDOT RIGHT-OF-WAY.
- ALL TRAFFIC CONTROL FLAG PERSONS AND AT LEAST ONE PERSON ON EACH WORK CREW MUST BE FLUENT IN THE ENGLISH LANGUAGE. IF THE CONTRACTOR AND/OR SUBCONTRACTORS CANNOT ADEQUATELY PERFORM AND/OR COMPLY WITH THESE REQUIREMENTS, THE INDIVIDUAL, SUBCONTRACTOR, OR EMPLOYEES MAY BE DIRECTED TO LEAVE THE PROJECT PERMANENTLY. INCONSIDERATE, NON-COOPERATIVE ATTITUDES AND ACTIONS WILL NOT BE TOLERATED.
- CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS AT ALL TIMES.

ORDER OF PRECEDENCE GENERAL NOTES/TECHNICAL SPECIFICATIONS/ PHOTOS

1. THE NOTES CONTAINED HEREIN ARE INTENDED TO SUPPLEMENT THE TECHNICAL SPECIFICATIONS AND PROVIDE EASY REFERENCE FOR THE CONTRACTOR. IN NO CASE SHALL THESE NOTES VOID ANY PART, SECTION OR REQUIREMENT OUTLINED IN THE TECHNICAL SPECIFICATIONS CONTAINED IN THE CONTRACT DOCUMENTS. IF CONFLICTS OCCUR BETWEEN THE TECHNICAL SPECIFICATIONS AND THE NOTES CONTAINED HEREIN, THE TECHNICAL SPECIFICATIONS SHALL SUPERSEDE.

NOTE: UTILITIES SHOWN ON PLAN PROFILE SHEETS

ALL SANITARY SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS & SPECIFICATIONS OF THE CITY OF FAYETTEVILLE PWC (TYP)

PROPOSED SANITARY SEWER MANHOLE RIM ELEVATIONS SHOWN ARE TO EXISTING PAVEMENT GRADES AND DO NOT REFLECT THE NEW RIM ELEVATIONS RESULTING FROM ASPHALT OVERLAY.

UTILITY OWNERS IN AREA:

WATER:	FAYETTEVILLE PUBLIC WORKS COMMISSION
SANITARY SEWER:	FAYETTEVILLE PUBLIC WORKS COMMISSION
CABLE TELEVISION:	CHARTER COMMUNICATIONS, METRONET
TELEPHONE:	CENTURY LINK
STORM DRAINAGE:	CITY OF FAYETTEVILLE
ELECTRIC:	FAYETTEVILLE PUBLIC WORKS COMMISSION DUKE ENERGY PROGRESS

EXISTING UNDERGROUND UTILITIES WARNING

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR LOCATING, PROTECTING, AND COORDINATING WITH OR ROUTING AROUND ALL EXISTING UTILITIES. EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE, BASED UPON INFORMATION PROVIDED BY THE OWNER FROM PREVIOUS PROJECT DOCUMENTATION AND A PHYSICAL SURVEY OF VISIBLE OBJECTS AND SHOULD NOT BE CONSIDERED COMPLETE OR ACCURATE. THE CONTRACTOR MUST PROVIDE ALL NECESSARY LOCATING SERVICES AT CONTRACTOR'S EXPENSE PRIOR TO EXCAVATION AND NOTIFY ENGINEER OF SAME PRIOR TO BEGINNING CONSTRUCTION. THE USE OF CURRENT TECHNOLOGY, EXPLORATORY EXCAVATION, GROUND PENETRATING RADAR, VACUUM EXCAVATION AND SIGNIFICANT HAND EXCAVATION IS EXPECTED AND REQUIRED. ANY UNDERGROUND ITEMS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.

PWC WATER LATERAL REPAIR (TYP.)

CONTRACTOR SHALL REPAIR 1" WATER LATERALS DISTURBED BY CONSTRUCTION WITH 1" COPPER FROM MAIN TO METER. IF 3/4" WATER LATERAL IS DISTURBED DUE TO CONSTRUCTION CONTRACTOR SHALL REPLACE LATERAL WITH 1" COPPER FROM MAIN TO METER IN ACCORDANCE WITH PWC STANDARDS. NO SEPARATE PAYMENT.

AQUA AMERICA WATER LATERAL REPAIR (TYP.)

CONTRACTOR SHALL REPAIR WATER LATERALS DISTURBED BY CONSTRUCTION IN ACCORDANCE WITH AQUA AMERICA WATER LATERAL STANDARDS, NO SEPARATE PAYMENT.

SURVEY NOTES

1. SURVEY WAS PERFORMED BY:
   MOORMAN, KIZER & REITZEL, INC.
   FIRM LICENSE # F-0106
   115 BROADFOOT AVE.
   FAYETTEVILLE, NC 28305
   (910) 484-5191 (OFFICE)
2. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
3. THE PRIMARY VERTICAL AND HORIZONTAL CONTROL POINTS FOR THIS PROJECT WERE GENERATED FROM SURVEYGRADE GPS OBSERVATIONS UTILIZING A SPECTRA SP80 FREQUENCY RECEIVER WITH BROADCAST CORRECTIONS FROM THE NORTH CAROLINA VIRTUAL REFERENCE SYSTEM (VRS).
4. THE HORIZONTAL DATUM IS NC GRID (NAD83/2011) IN U.S. SURVEY FEET.
5. THE VERTICAL DATUM IS (NAVD88) IN U.S. SURVEY FEET.
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES SHOWN HEREON ARE PLOTTED FROM DEEDS AND MAPS OF RECORD.
7. THIS MAP WAS PREPARED WITHOUT THE BENEFIT OF A CERTIFIED TITLE REPORT AND THEREFORE, THE PROPERTY SHOWN MAY BE SUBJECT TO RECORDED OR UN-RECORDED RIGHT-OF-WAYS, EASEMENTS, RESTRICTIONS OF RECORD, OR OTHER ENCUMBRANCES NOT OBSERVED OR SHOWN.
8. THE UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE LOCATIONS AND ARE BASED ON ABOVE GROUND FEATURES, PHYSICAL EVIDENCE, PAINT MARKINGS PROVIDED BY OTHERS, AND UTILITY PLANS. THE SURVEYOR DOES NOT GUARANTEE THAT ALL EXISTING UNDERGROUND STRUCTURES SUCH AS UTILITIES, TANKS, PIPES, ETC. ARE LOCATED EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. NO EXCAVATIONS WERE MADE BY THE SURVEYOR TO LOCATE ANY BURIED UTILITIES OR STRUCTURES.
9. NO DETERMINATION HAS BEEN MADE BY THE SURVEYOR AS TO THE FOLLOWING: WETLANDS, UNDERGROUND STORAGE FACILITIES, GRAVES, CEMETERIES OR BURIAL GROUNDS, HAZARDOUS WASTE DEPOSITS, OR MATERIALS.
10. DATE OF SURVEY: 7/2021 THRU 3/2023.

PWC FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

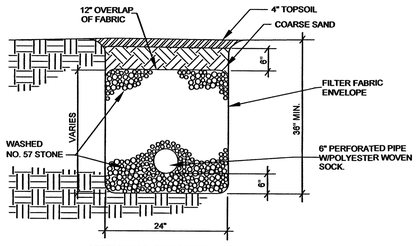
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
Utility Notes

Revision	By	Date
90% Design Submittal	DWM	MAR 23
PWC Comments	DWM	FEB 25
PWC Comments	DWM	MAY 25

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R
ENGINEERS
PLANNERS
SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale
Book no.
Sheet C - 12



GEOTECHNICAL FILTER MEDIUM GRADE DESIGNED TO FILTER

NOTES:

1. WRAP PERFORATED PIPE WITH FILTER FABRIC. PROVIDE 1.5 TIMES THE CIRCUMFERENCE.
2. PIPE SHALL BE PERFORATED WITH 1/2" DIAMETER HOLES AT 120 DEGREE ANGLES RADIAL FROM CENTER OF PIPE PLACED AT 8" ON CENTER.

FABRIC REQUIREMENTS		
PHYSICAL PROPERTIES	TEST METHOD TYP. MIN. AVG	
TENSILE STRENGTH (lb/in)	ASTM D-1682	90
TENSILE ELONGATION (%)	ASTM D-1682	60
BURST STRENGTH (PSI)	MULLEN BURST	230
ACCELERATED WEATHERING (STRENGTH RETAINED %)	FEDERAL TEST METHOD CCC-T-191 METHOD 5804 (500 HOURS EXPOSURE)	70
PERMEABILITY COEFFICIENT (cm/sec)	FALLING HEAD (75mm TO 25mm)	0.20
EQUIV. OPN'G SIZE	CW-02215, U.S. SIEVE NO. EQUIV.	70 MIN.

FRENCH DRAIN NTS

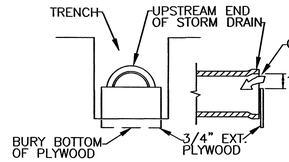


FIGURE 1: PLYWOOD PROTECTION

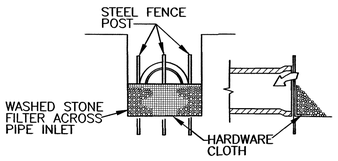


FIGURE 2: STONE FILTER PROTECTION

1. INSPECT HARDWARE CLOTH & STONE AT LEAST ONCE A WEEK, AND AFTER EACH RAINFALL. MAKE REPAIRS IMMEDIATELY.
2. REPLACE ANY DAMAGED HARDWARE CLOTH
3. REMOVE SEDIMENT FROM STONE FILTER AND REPLACE STONE FILTER AS NECESSARY.

INLET PROTECTION FOR STORM DRAINAGE UNDER CONSTRUCTION
N.T.S.

1. UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL HANDBOOK. (NO SEPARATE PAYMENT).

2. THE CONTRACTOR SHALL NOTIFY PLAN APPROVING AUTHORITY ONE WEEK PRIOR TO THE PRECONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO FINAL INSPECTION.

3. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO CLEARING AND/OR LAND DISTURBANCE.

4. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND PERMIT SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

5. PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO OFF-SITE BORROW OR WASTE AREAS, STAGING OR STORAGE AREAS), THE CONTRACTOR SHALL PREPARE AND SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND TO NCDENR REGIONAL OFFICE FOR APPROVAL. CONTRACTOR SHALL PAY ALL FEES REQUIRED AND SHALL INSTALL NECESSARY MEASURES AT NO SEPARATE PAYMENT. THE CONTRACTOR SHALL PROVIDE THE OWNER AND THE ENGINEER A COPY OF THE AMENDED PERMIT.

6. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY EITHER NCDENR OR THE ENGINEER. (NO SEPARATE PAYMENT).

7. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

8. ALL AREAS DISTURBED BY CONSTRUCTION UNLESS OTHERWISE IMPROVED SHALL BE SODDED OR SEEDED AS INDICATED AND STABILIZED.

9. DURING DEWATERING OPERATIONS, WATER SHALL BE PUMPED INTO AN APPROVED FILTERING DEVICE PRIOR TO DISCHARGE TO RECEIVING OUTLET.

10. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

11. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED BY CONTRACTOR ONCE STABILIZATION OR A SUFFICIENT GROUND COVER HAS BEEN ESTABLISHED OR AS DIRECTED BY THE ENGINEER. (NO SEPARATE PAYMENT). NCDENR'S FINAL APPROVAL IS REQUIRED.

12. TEMPORARY GRAVEL CONSTRUCTION ENTRANCE SHALL BE REQUIRED AT ALL CONSTRUCTION STAGING AREA ENTRANCES AND ALL CONSTRUCTION ACCESS LOCATIONS INTO NON-PAVED AREA. (NO SEPARATE PAYMENT).

13. WHEN CROSSING CREEK OR DRAINAGE-WAY, THE CONTRACTOR SHALL RIP-RAP WITH FABRIC DISTURBED BANKS AND CHANNEL AND RESTORE SLOPES TO ORIGINAL CONTOURS, BUT NOT STEEPER THAN 2:1 MAXIMUM. DISTURBED CREEK AREA SHALL BE STABILIZED IMMEDIATELY.

GENERAL EROSION AND SEDIMENT CONTROL NOTES

DESIGN CRITERIA:

Height: 18" Minimum from Channel Bottom to Ridge Top

Side Slope: 2:1 or flatter
3:1 or flatter where vehicles cross

Base Width of Ridge: 6' minimum

Spacing of Water Bars:

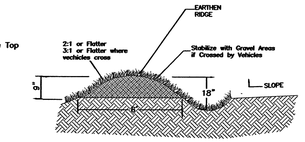
Slope(%)	Spacing(ft)
<5	125
5 to 10	100
10 to 20	75
20 to 35	50
>35	25

Grade and Angle: Crossing angle selected to provide a positive grade not to exceed 2%

Outlet: Diversions should have stable outlets, either natural or constructed. Site spacing may need to be adjusted for field conditions to use the most suitable areas for water disposal.

NOTES:

1. Install the diversion as soon as the right-of-way has been cleared and graded.
2. Disk the base for the constructed ridge before placing fill.
3. Track the ridge to compact it to the design cross section.
4. Locate the outlet on an undisturbed area. Adjust field spacing of the diversion to use the most stable outlet areas. When natural areas are not deemed satisfactory, provide outlet protection (Practices 6.40, Level Spreader, and 6.41, Outlet Stabilization Structure).
5. Immediately seed and mulch the portions of the diversions not subject to construction traffic. Stabilize with gravel areas to be crossed by vehicles.



MAINTENANCE:

Periodically inspect right-of-way diversions for wear and after every heavy rainfall for erosion damage. Immediately remove sediment from the flow area and repair dike. Check outlet areas and make timely repairs as needed. When permanent road drainage is established and the area above the temporary right-of-way diversions is permanently stabilized, remove the dike and fill the channel to blend with the natural ground, and appropriately stabilize the disturbed area.

R/W DIVERSION (WATER BAR)
NTS

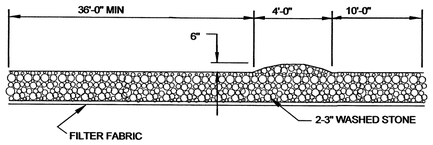
CONSTRUCTION SPECIFICATIONS

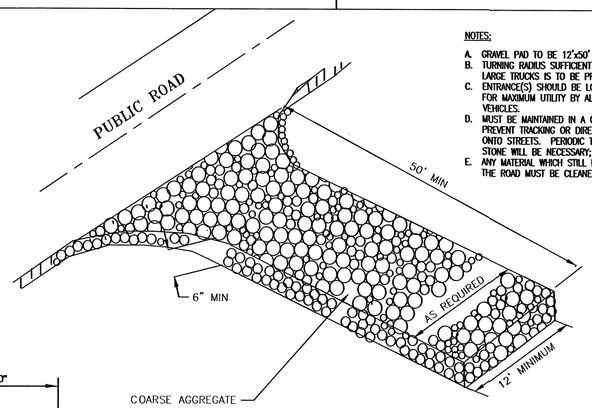
1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to a sediment trap or other suitable outlet.
4. Use geotextile fabrics because they improve stability of the foundation in locations subject to seepage or high water table.

MAINTENANCE

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

GRAVEL ENTRANCE SHALL BE 50 FEET
IN LENGTH AND 20 FEET IN WIDTH
WITH 20 FOOT RADIUS AT EXISTING
ROADWAY





NOTES:

A. GRAVEL PAD TO BE 12'x50' AND 6" THICK MINIMUM
B. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS IS TO BE PROVIDED.
C. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
D. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY; KEEP SOME HANDY.
E. ANY MATERIAL WHICH STILL MAKES IT ONTO THE ROAD MUST BE CLEANED UP IMMEDIATELY.

NOTES: APPLICABLE AT ALL POINTS OF INGRESS & EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
N.T.S.

Fayetteville Work Together — ENGINEERING & INFRASTRUCTURE DEPT. CIVIL ENGINEERING DIVISION 433 HAY ST. 28301 (910) 433-1656

GRAVEL CONSTRUCTION ENTRANCE/EXIT

DATE 4/3/08 DRAWN BY CSA
SCALE N.T.S. CK'D BY JPB

CAD FILE : ENTEXIT

EC-2

SILTSACK
SPECIFICATIONS

NOTE: THE SILTSACK ®WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK ®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

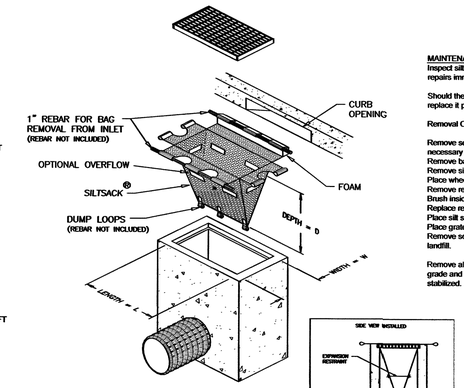
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK ®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK ®
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK® WITH A WOVEN PILLOW INSERT.



HIGH FLOW SILT SACK
NTS

MAINTENANCE:
Inspect silt sack at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a silt sack collapse, tear, decompose or become ineffective, replace it promptly.

Removal Of Accumulated Silt

Remove sediment deposits, soil on flaps and around foam at inlet opening as necessary .
Remove basin cover grate.
Remove silt sack by attaching cables to rebar for lifting
Place wheel barrow or similar device under bag.
Remove rebar from dump loops and empty bag.
Brush inside of bag to remove soil materials left after dumping operation.
Replace rebar in dump loops.
Place silt sack in basin, insure emptying flaps are flat
Place grate insure sack is properly positioned in inlet.
Remove soil from wheel barrow and haul to approved disposal area or permitted landfill.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN
EROSION CONTROL DETAILS

Revision	By	Date
PWC Comments	DWM	MAY 25

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R ENGINEERS PLANNERS SURVEYORS MOORMAN, KIZER & REITZEL, INC.

Scale AS SHOWN
Book no.
Sheet D-1

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DS-15615

Fertilizer Topdressing:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 written approval of the Engineer, a different analysis of fertilizer may be used provided grade and shall be applied at the rate of 500 pounds per acre (560kg per hectare). Upon the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre (560 kg per hectare). Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

Crimping Straw Mulch:

Crimping will be required on these project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet (2 meters) of the edge of pavement, straw is to be crimped and the immediately tacked with asphalt tack.

Crimping of straw in lieu of asphalt tack will be allowed on this project subject to the following conditions:

All areas seeded and mulched shall be crimped and/or tacked with asphalt as directed by the Engineer.

Crimping will be limited to slopes 4:1 or flatter unless the Contractor can demonstrate to the Engineer that the steeper slopes can be negotiated without altering the typical section.

Straw mulch to be of sufficient length and quality to withstand the crimping operation and provide adequate ground cover.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8 inches (200 mm).

MAINTENANCE SCHEDULE:

1. All erosion and sediment control practices will be checked for stability and operation following every storm event, but in no case less than once every week. Any repairs or cleaning necessary to maintain erosion and sediment control practices shall be completed immediately.

2. All seeded areas will be refertilized, reseeded as necessary, and mulched according to the project specifications.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined by the Engineer. All rates per acre (kilograms per hectare.)

March 1 - August 31	September 1 - February 28
50# (55kg) Tall Fescue	50# (55kg) Tall FEscue
5# (6kg) Centipede	5# (6kg) Centipede
25# (28kg) Bermudagrass (hulled)	35# (40kg) Bermudagras (unhulled)
500# (560kg) Fertilizer	500# (560kg) Fertilizer
4000# (4500kg) Limestone	4000# (4500kg) Limestone

Slopes 2:1 and Steeper and Waste and Borrow Locations:

March 1 - August 31	September 1 - February 28
75# (85kg) Tall Fescue	75# (85kg) Tall Fescue
25# (28kg) Bermudagrass (hulled)	35# (40kg) Bermudagras (unhulled)
500# (560kg) Fertilizer	500# (560kg) Fertilizer
4000# (4500kg) Limestone	4000# (4500kg) Limestone

PERMANENT SEEDING SPECIFICATION

1. All disturbed areas shall be dressed to typical sections and plowed to a depth of 5 inches. The top 2 inches shall be pulverized to provide uniform seedbed. NOTE: Lime should be applied with necessary equipment to give uniform distribution of these materials. The hand-bucket method is not acceptable. Lime and fertilizer should be incorporated into the soil prior to PER ACRE:

2. The following are rates and kinds of these materials to be applied

	RATES
Abruzzi Rye	50 lbs.
Pensacola Bahiagrass	50 lbs.
Kentucky 31 Fescue	50 lbs.
Korean Lespedeza	15 lbs.
Centipedegrass	10 lbs.
Common Bermudagrass	25 lbs.
10-20-20 Fertilizer	500 lbs.
Agricultural Limestone	4000 lbs.

3. Seeded area shall be cultipacked to firm seedbed and to cover seed.

4. Grain straw shall be applied over seeded areas as mulch. No bare ground shall be visible in the mulched area if proper applications is achieved. Thick clumps of straw are not permissible as uniform coverage is expected. Straws shall be applied at a minimum of 4000

5. The mulched area shall be tacked with liquid asphalt sufficient too hold straw in place where directed by Engineer.

6. Ditch treatment shall be used in areas where steep grades could cause ditch erosion. Use of jute mesh, excelsior matting, or fiberglass roving is acceptable. ditch treatment should be installed before mulching operation.

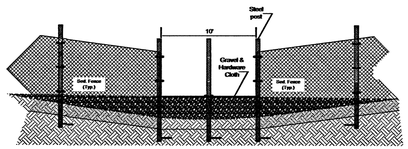
7. Builder is to provide a permanent ground cover sufficient to restrain erosion on such supposed areas within 15 working days or 90 calendar days, whichever is shorter, after completion of construction or development.

Approved Tall Fescue Cultivars:

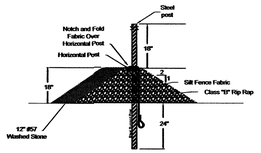
Anthem	Adventure	Adventure II	Amigo
Austin	Apache	Apache II	Arid
Chapel Hill	Brookstone	Bonanza	Bonanza II
Crossfire II	Chesapeake	Chieftain	Coronado
Falcon		Duster	Falcon
Genesis		Finelawn	Finelawn I
Jaguar		Guardian	Houndog
Monarch		Kentucky 31	Kitty Hawk
Pacer		Mustang	Olympic
Rebel		Pixie	Pyramid
Safari		Rebel II	Renegade
Tomahawk		Tempo	Titan
Wolfpack		Tribute	Vegas

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

PERMANENT SEEDING



PLAN VIEW
NTS



SECTION
NTS

CONSTRUCTION SPECIFICATIONS and MAINTENANCE

SEDIMENT FENCE:
See Sediment Fence Detail this sheet for material and installation of the sediment fence.

MAINTENANCE:
Maintain sediment fence as stated in Sediment Fence Detail.
Riprap outlet shall be clean and free of excess sediment and or debris.
Inspect fence and outlet on a weekly basis or after any significant rainfall event.

REINFORCED SEDIMENT FENCE OUTLET
NTS

TEMPORARY SEEDING

TEMPORARY SEEDING RECOMMENDATIONS (a)

Winter and Early Spring

SEEDING MIXTURE

SPECIES	RATE (LB./ACRE)
Rye (grain)	120
Annual lespedeza (kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duraton of temporary cover is not to extend beyond June.

SEEDING DATES

Mountains--Above 2500 ft. Feb. 15-May 15
Below 2500 ft. Feb. 1-May 1
Piedmont--Jan. 1-May 1
Coastal Plain--Dec. 1-Apr. 15

SOIL AMENDMENTS

Follow recommendations of soil tests or apply 2,000 lb./acre ground agriculture limestone and 750 lb./acre 10-10-10 fertilizer.

MULCH

Apply 4,000 lb./acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

MAINTENANCE

Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS (b)

Summer

SEEDING MIXTURE

SPECIES	RATE (LB./ACRE)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may by substituted at a rate of 50 lb./acre.

SEEDING DATES

Mountains--May 15-Aug. 15
Piedmont--May 1-Aug. 15
Coastal Plain--Apr. 15-Aug. 15

SOIL AMENDMENTS

Follow recommendations of soil tests or apply 2,000 lb./acre ground agriculture limestone and 750 lb./acre 10-10-10 fertilizer.

MULCH

Apply 4,000 lb./acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

MAINTENANCE

Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS (c)

Fall

SEEDING MIXTURE

Rye (grain)

SEEDING DATES	RATE (LB./ACRE)
Mountains--Aug. 15-Dec. 15	120
Coastal Plain and piedmont--Aug. 15-Dec. 30	

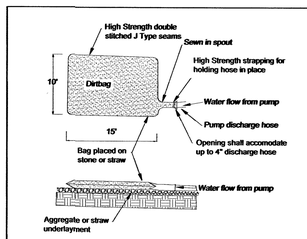
SOIL AMENDMENTS

Follow soil tests or apply 2,000 lb./acre ground agricultural limestone and 1,000 lb./acre 10-10-10 fertilizer.

Apply 4,000 lb./acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

MAINTENANCE

Repair and refertilize damaged areas immediately. Topdress with 50 lb./acre of nitrogen in march. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb./acre Kobe (Piedmont and Costal Plain) or korean (Mountains) lespedza in late February or early March.



CONSTRUCTION SPECIFICATIONS and MAINTENANCE

DIRTBAG:
Polypropylene nonwoven geotextilesewn intio a bag with a double needle matching using a high strength thread. Seams shall have an average wide width strength per ASTM D-4884 of 60 lbs. inch

Weight	ASTM D-3776 8 oz/yd
Grab Tensile	ASTM D-4632 205 lbs.
Puncture	ASTM D-4833 110 lbs.
Flow Rate	ASTM D-4491 110 GPM
Permitivity	ASTM D-4491 1.5 sec
Mullen Burst	ASTM D-3786 350 PSI

MAINTENANCE:
Inspect hoses to insure no sediment laden water is escaping prior to treatment.

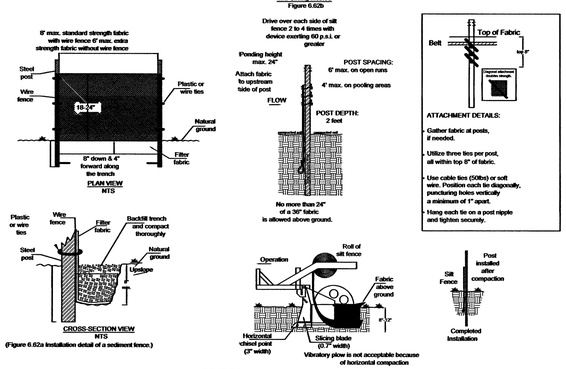
Inspect Dirt Bag to determine if any cuts etc have occurred that allow polluted water to escape untreated. Repair any cuts etc. in accordance with manufacturers recommendations.

Inspect seepage rate from Dirtbag periodically to determine if dirt bag is becoming sediment laden. When seepage rate is diminished to the point where the seepage rate is less than the pumping rate discontinue pumping operations and remove dirtbag from site and dispose of sediment in a permitted landfill or approved disposal area. Replace dirt bag and reconnect hoses, pump etc and continue operations.
Dirtbag shall be lifted with straps per manufacturer recommendations and hauled away after use.

Dirtbag® is full when it no longer can efficiently filter sediment or allow water to pass at a reason able rate. Flow rates will vary depending on the size of Dirtbag®, the type and amount of sediment discharged into Dirtbag®, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies. Under most circumstances Dirtbag® will accommodate flow rates of 750 gallons per minute. Use of excessive flow rates or overfilling Dirtbag® with sediment will cause the bag to rupture or failure of the hose attachment straps. *Must be monitored during use.

Trench Dewatering Detail

NTS



SEDIMENT FENCE
NTS

CONSTRUCTION SPECIFICATIONS

MATERIALS
1. Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or supplier as conforming to the requirements in ASTM D 6461, which is shown in part in Table 6.62b (Refer to the Erosion and Sediment Control Planning and Design Manual, Chapter 6, Section 62.2).

Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120° F.

2. Ensure that posts for sediment fences are 1.33 lb/linear ft steel with a minimum length of 5 feet. Make sure that steel posts have projections to facilitate fastening the fabric.

3. For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

CONSTRUCTION
1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.

2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)

3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.

4. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have minimum 50 pound tensile strength.

5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Support posts should be driven securely into the ground a minimum of 24 inches.

6. Extra strength filter fabric with 6 feet post spacing does not require wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have minimum 50 pound tensile strength.

7. Excavate a trench approximately 4 inches wide and 8 inches deep along the proposed line of posts and upslope from the barrier (Figure 6.62a).

8. Place 12 inches of the fabric along the bottom and side of the trench.

9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.

10. Do not attach filter fabric to existing trees.

SEDIMENT FENCE INSTALLATION USING THE SLICING METHOD
Instead of excavating a trench, placing fabric and then backfilling trench, sediment fence mayh be installed using specially designed equipment that inserts the fabric into a cut sliced in the ground with a disc (Figure 6.62b).

INSTALLATION SPECIFICATIONS
1. The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level if necessary.

2. Install posts 4 feet apart in critical areas and 6 feet apart on standard applications.

3. Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.

4. Install posts with the nipples facing away from the silt fabric.

5. Attach the fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. Also, each tie should be positioned to hang on a post nipple when tightened to prevent sagging.

6. Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.

7. No more than 24 inches of a 36 inch fabric is allowed above ground level.

8. The installation should be checked and corrected for any deviations before compaction.

9. Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the uphill section first, and then each side twice for a total of 4 trips.

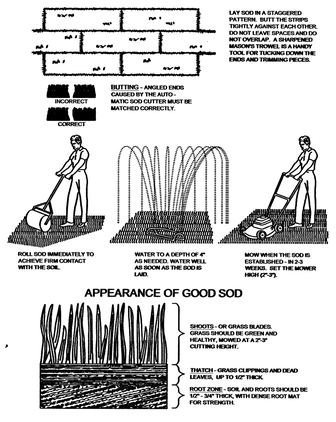
MAINTENANCE
Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

SODDING



APPEARANCE OF GOOD SOD

Figure 6-6.2

SOD INSTALLATION

1. Moistening the sod after it is unrolled helps maintain its viability. Store it in the shade during installation.

2. Rake the soil surface to break the crust just before laying sod. During the summer, lightly irrigate the soil, immediately before laying the sod to cool the soil and reduce root burning and dieback.

3. Do not sod on gravel, frozen soils, or soils that have been treated recently with sterilants or herbicides.

4. Lay the first row of sod in a straight line with subsequent rows placed parallel to and butting tightly against each other. Stagger strips in a brick-like pattern. Be sure that the sod is not stretched or overlapped and that all joints are butted tightly to prevent voids. Use a knife or sharp spade to trim and fit irregularly shaped areas.

5. Install strips of sod with their longest dimension perpendicular to the slope. On slopes 3:1 or greater, or whatever erosion may be a problem, secure sod with pegs or staples.

6. As sodding of clearly defined areas is completed, roll sod to provide firm contact between roots and soil.

7. After rolling, irrigate until the soil is wet 4 inches below the sod.

8. Keep sodded areas moist to a depth of 4 inches until the grass takes root. This can be determined by gently tugging on the sod--resistance indicates that rooting has occurred.

9. Mowing should not be attempted until the sod is firmly rooted, usually 2-3 weeks.

See Figure 6-6.2

MAINTENANCE

After the first week, water as necessary to maintain adequate moisture in the root zone and prevent dormancy of the sod.

Do not remove more than one-third of the shoot in any mowing. Grass height should be maintained between 2 and 3 inches unless otherwise specified.

After the first growing season, established sod required fertilization, and may also require lime. Follow soil test recommendations when possible.

SODDED WATERWAYS

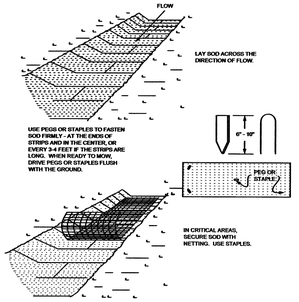


Figure 6-6.1

SODDED WATERWAYS

Sod provides a resilient channel lining, providing immediate protection from concentrated runoff and eliminating the need for installing mats or mulch. The following points apply to the use of sod in waterways:

1. Prepare the soil as described in Practice 6.30, Grass-lined Channels, of the State of North Carolina Erosion and Sediment Control Planning and Design Manual. The sod type must be able to withstand the velocity of flow specified in the channel design.

2. Lay sod strips perpendicular of flow, with the lateral joints staggered in a brick-like pattern. Edges should butt tightly together (Figure 6-6.1).

3. After rolling or tamping to created a firm contact, peg or staple individual sod strips to resist washout during establishment. Jute or other netting material may be pegged over the sod for extra protection on critical areas.

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Revision	By	Date
PWC Comments	DWM	MAY 25

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

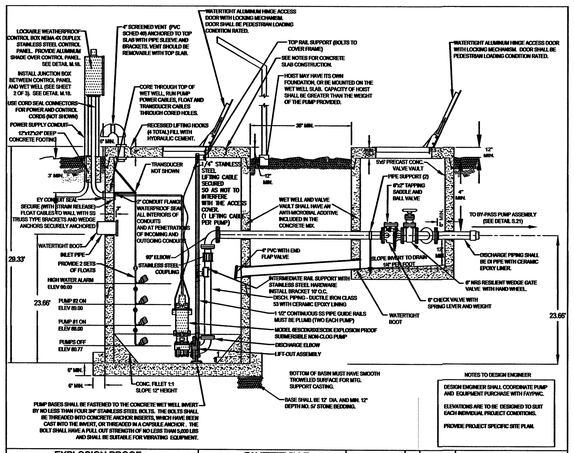
LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN

EROSION CONTROL DETAILS

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R
ENGINEERS
PLANNERS
SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale AS SHOWN
Book no.
Sheet D-2



NOTES TO DESIGN ENGINEER

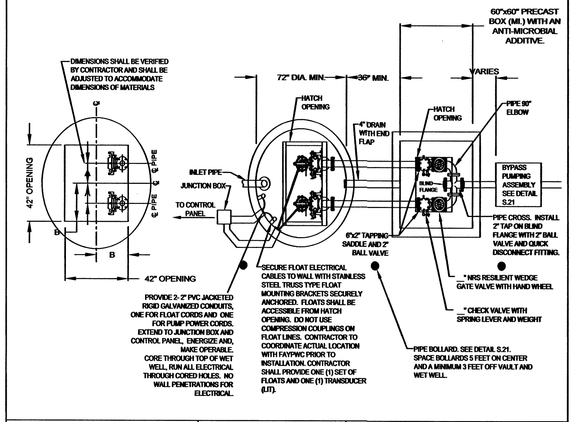
DESIGN ENGINEER SHALL COORDINATE PUMP AND EQUIPMENT PURCHASE WITH FAYPWC.

ELEVATIONS ARE TO BE DESIGNED TO SUIT EACH INDIVIDUAL PROJECT CONDITIONS.

PROVIDE PROJECT SPECIFIC SITE PLAN.

EXPLOSION PROOF SUBMERSIBLE LIFT STATION N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 3	DWG. NO. S.16	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	07/2025	NOTES ADDED & SOME CHANGED
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.			2	07/2016	UPDATED NOTES
					3	11/2007	NOTES ADDED & SOME CHANGED

S16-SUB-LIFT-STA.dwg



EXPLOSION PROOF SUBMERSIBLE LIFT STATION N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 2 OF 3	DWG. NO. S.16	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	07/2025	NOTES ADDED & SOME CHANGED
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.			2	07/2016	UPDATED NOTES
					3	11/2007	NOTES ADDED & SOME CHANGED

S16-SUB-LIFT-STA.dwg

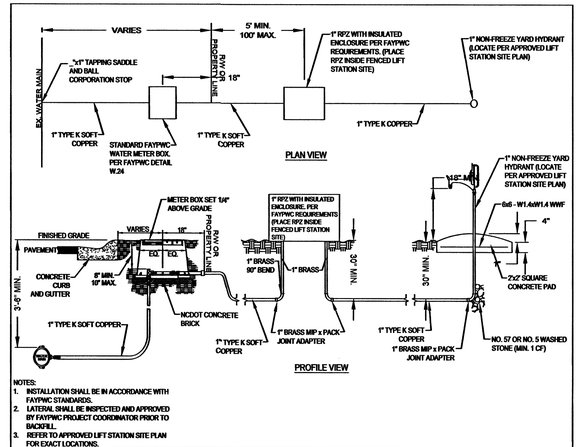
LIFT STATION NOTES:
1. CONCRETE SHALL BE 4,000PSI COMPRESSION STRENGTH. ALL CEMENTITIOUS MATERIALS SHALL HAVE AN ANTI-MICROBIAL ADDITIVE INCLUDED IN THE MIX.
2. WET WELL AND VALVE VAULT SHALL MEET REQUIREMENTS OF ASTM C-478.
3. ALL ELECTRICAL MATERIAL AND INSTALLATION SHALL BE BY A LICENSED ELECTRICIAN AND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND RULES AND REGULATIONS OF LOCAL AUTHORITIES HAVING JURISDICTION. MATERIALS SHALL BE LISTED OR LABELED BY THE UNDERWRITERS LABORATORIES STANDARDS.
4. LIFT STATION WET WELL AND VALVE VAULT CONCRETE SLAB SHALL BE MANUFACTURED TO WITHSTAND H-20 LOADING CONDITIONS.
5. SHOP DRAWINGS AND WIRING DIAGRAMS SHALL BE PROVIDED FOR ALL ELECTRICAL EQUIPMENT.
6. DESIGN ENGINEER TO APPROVE FOUNDATION BEDDING BEFORE SETTING WET WELL AND VALVE VAULT. FOUNDATION SHALL BE DVA, WITH A MINIMUM 12" DEPTH OF NO.57 STONE BEDDING.
7. CONTROL PANEL BOX SHALL BE LOCKABLE, UTILIZING HASPS. FAYPWC WILL PROVIDE LOCKS.
8. CONTRACTOR SHALL INSTALL ALL FAYPWC FURNISHED EQUIPMENT AND PROVIDE START UP SERVICE (MINIMUM 2 DAYS).
9. CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO MAKE THE LIFT STATION FULLY OPERATIONAL AND IN ACCORDANCE WITH FAYPWC STANDARDS.
10. RECESSED LIFTING HOOKS SHALL BE PLACED IN CONCRETE WET WELL COVER.
11. CONTROL PANEL BOX SHALL BE ANCHORED IN 12"x24" DEEP CONCRETE FOOTING. REFER TO STANDARD DETAIL M.18 FOR ALUMINUM SHADE.
12. CONTRACTOR SHALL PROVIDE ALL NECESSARY LUBRICANTS FOR STARTUP AND SHALL ASSIST THE EQUIPMENT MANUFACTURER AND FAYPWC WITH INITIAL STARTUP (MINIMUM 2 DAYS).
13. PIPEWORK SHALL BE ASSEMBLED, INSTALLED, AND FULLY SUPPORTED TO ELIMINATE ANY STRAIN ON THE PUMPING EQUIPMENT, PIPING, AND PIPE FITTINGS.
14. ALL THRU-THE-WALL SLEEVES AND CARRIER PIPES INTO THE WET WELL SHALL BE WATERTIGHT.
15. ENTIRE SITE SHALL BE FENCED, FENCING SHALL BE IN ACCORDANCE WITH FAYPWC REQUIREMENTS. CONTRACTOR SHALL PROVIDE FOR GATE OPENING.
16. ALL HANGERS, CLAMPS, FLANGE BOLTS, AND CONNECTIONS SHALL BE STAINLESS STEEL UNLESS OTHERWISE SPECIFIED. THESE ITEMS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
17. ALL DIMENSIONS SHALL BE VERIFIED BY CONTRACTOR AND SHALL BE ADJUSTED TO ACCOMMODATE DIMENSIONS OF MATERIALS SUPPLIED BY CONTRACTOR AND FAYPWC.
18. FLANGE FACES SHALL BE SERRATED.
19. CONSTRUCTION SHALL BE IN ACCORDANCE WITH FAYPWC TECHNICAL SPECS, ALL APPLICABLE CODES, AND THE N.E.C.

HATCH DOOR NOTES:
1. HATCH SHALL BE SINGLE LEAF, PEDESTRIAN RATED, CHANNEL FRAME, ALUMINUM DIAMOND PATTERN PLATE DOOR.
2. HATCH DOORS SHALL BE WATERTIGHT, EQUIPPED WITH NEOPRENE GASKET, HINGED WITH LOCKING MECHANISM (HASP), AND AUTOMATIC HOLD OPEN ARM.
3. ENSURE HATCH DOOR RESTS EVENLY ON FRAME ALL AROUND.
4. ALL HARDWARE SHALL BE ZINC PLATED STEEL-CHROMATE SEALED OR STAINLESS STEEL.

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

EXPLOSION PROOF SUBMERSIBLE LIFT STATION N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 3 OF 3	DWG. NO. S.16	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	07/2025	NOTES ADDED & SOME CHANGED
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.			2	07/2016	UPDATED NOTES
					3	11/2007	NOTES ADDED & SOME CHANGED

S16-SUB-LIFT-STA.dwg



NOTES:
1. INSTALLATION SHALL BE IN ACCORDANCE WITH FAYPWC STANDARDS.
2. LATERAL SHALL BE INSPECTED AND APPROVED BY FAYPWC PROJECT COORDINATOR PRIOR TO BACKFILL.
3. REFER TO APPROVED LIFT STATION SITE PLAN FOR EXACT LOCATIONS.

YARD HYDRANT INSTALLATION N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. W.27	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	07/17	REVISED NOTES
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

W27-YARD-HYDRANT-INSTALLATION.dwg

NOTES:
1. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH FAYPWC STANDARDS.
2. ALL DUCTILE IRON PIPE SHALL HAVE AN INTERIOR LINING OF CERAMIC EPOXY (PROTECTO 401) OR APPROVED EQUAL.
3. ALL BELOW GRADE FITTINGS SHALL BE MECHANICAL JOINT WITH RETAINING GLAND JOINT RESTRAINT (IE: MEGA-LUGS).

FORCE MAIN BY-PASS PUMPING ASSEMBLY N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. S.21	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT				
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

S21-FORCE-MAIN-BY-PASS-PUMPING-ASSEMBLY.dwg

NOTES:
1. HEIGHT OF FENCE SHALL BE 6 FEET, UNLESS OTHERWISE APPROVED BY FAYPWC.
2. USE OF COATED AND/OR PLASTIC COATED FABRIC MAY BE REQUIRED TO MATCH EXISTING FENCING. COLOR AND TYPE OF FABRIC TO BE APPROVED BY FAYPWC.
3. WIDTH OF FENCE AND/OR GATES SHALL BE AS APPROVED BY FAYPWC.
4. FAYPWC TO PROVIDE LOCK AND CHAIN.
5. LOCATION OF GATE WITHIN FAYPWC EASEMENT TO BE AS DIRECTED AND APPROVED BY FAYPWC.

TYPICAL CHAIN LINK GATE AND FENCING N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. M.17	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT				
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

M17-TYPICAL-CHAINLINK-GATE-AND-FENCE.dwg

NOTES:
1. CONTRACTOR SHOULD VERIFY CONTROL PANEL SIZE BEFORE CONSTRUCTION OF SUNRAIN SHIELD. SUNRAIN SHIELD MAY NEED TO BE LARGER DEPENDING ON SIZE OF CONTROL PANEL.
2. WHEN SPECIFIED OR SHOWN, ALARM STROBE SHALL BE MOUNTED ON THE SUNRAIN SHIELD. COORDINATE LOCATION WITH FAYPWC.
3. WHERE SCHEDULED OR SHOWN ON THE PLANS PROVIDE WEATHERPROOF CORROSION RESISTANT FLORESCENT FIXTURE MOUNTED UNDERNEATH SUNRAIN SHIELD, LIGHT SWITCH, AND GFI RECEPTACLE.
4. WHERE SHOWN ON PLANS PROVIDE BACK-TO-BACK RACK EQUIPMENT MOUNTING AND SUNRAIN SHIELD.
5. SUNRAIN SHIELD TO BE CONSTRUCTED OF 3/16" ALUMINUM.
6. MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 4,000PSI.

ELECTRICAL EQUIPMENT RACK AND SUNRAIN SHIELD N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. M.18	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	07/2025	ADDED FLASHING ALARM LIGHT AND HORN OR BELL NOTE
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

M.18 ELECTRICAL EQUIP RACK.dwg

IRON RETAINING GLAND M.J. RESTRAINT			
NOMINAL PIPE SIZE	WEDGES QUANTITY	BOLTS QUANTITY	PRESS RATING
6"	3	6	350
8"	4	6	350
12"	8	8	350

8" SIZE SHOWN 6" AND 12" SIMILAR

LR (MIN. LENGTH OF RESTRAINT EACH DIRECTION OF THRUST IN LINEAR FEET) Based on 200 psig pressure, Safety Factor of 2.0:1, Based DI PIPE and MJ. Ball, 3.5' cover Chart does not apply to pipes wrapped in polyethylene wrap					
PIPE SIZE	VALVES DEAD ENDS TEES	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS	REDUCER
6"	55'	31'	13'	7'	6"x2" 67'
8"	72'	40'	17'	8'	8"x6" 30'
12"	102'	57'	24'	12'	12"x8" 54'

NOTES:
1. THRUST RESTRAINT SHALL BE INSTALLED ON DUCTILE IRON WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN. SEE FAYPWC STANDARD THRUST BLOCK DETAIL W.17 FOR PVC RESTRAINT.
2. IRON RETAINING GLAND M.J. RESTRAINT OR OTHER FORMS OF IRON RESTRAINT SHALL NOT BE USED ON PVC PIPE.
3. PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINED JOINT PIPE FOR THE PROPER LENGTH.
4. COMPACT FITTINGS ARE ACCEPTABLE FOR USE WITH IRON RETAINING GLAND M.J. RESTRAINT AND OTHER FORMS OF D.I. RESTRAINT.
5. THE MINIMUM LENGTH OF RESTRAINT INDICATED SHALL REQUIRE ALL JOINTS WITHIN THE LR DISTANCE TO BE RESTRAINED.
6. RESTRAINT SYSTEM SHALL BE INSPECTED AND APPROVED BY FAYPWC PRIOR TO BACKFILLING.
7. RESTRAINT SYSTEMS MAY VARY BASED UPON THE ENGINEERS' DESIGN AS SHOWN ON THE PLAN AND PROFILE SHEETS.
8. GRIPPER RING AND FIELD LOK GASKETS ARE AN ACCEPTABLE METHOD OF RESTRAINT ON DUCTILE IRON PIPE ONLY.

ALTERNATE RESTRAINT DETAIL (DUCTILE IRON PIPE ONLY) N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. W.18	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	11/16/07	REVISED TABLE, ADDED NOTE 8
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

W18-RESTRAINT-DETAIL.dwg

NOTES:
1. SEE CROSS CONNECTION NOTES FOR ADDITIONAL INFORMATION.
2. ASSEMBLY SHALL BE HOUSED IN AN ALUMINUM INSULATED ENCLOSURE.
3. ALL PIPING SHALL BE STEEL OR DUCTILE IRON

WATTS IND. INC. SERIES 909 QT FOR THE FOLLOWING MAIN SIZES: 3/4", 1", 1 1/4", 1 1/2", & 2"

REDUCED PRESSURE PRINCIPLE ASSEMBLY (ABOVE GROUND INSTALLATION ONLY)			PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. BFP.14	DWG. BY: PWC	WATER RESOURCES ENGINEERING DEPARTMENT				
	DATE: JAN. 01, 2012	APPROVED BY: J.E.G.					

2012-BFP14 WATTS 909QT.dwg

NOTES:
1. ALL MATERIALS SHALL BE APPROVED BY FAYPWC.
2. FOR 1" WATER LATERAL INSTALLATION SEE FAYPWC DETAIL W.2 OR W.24, AS APPLICABLE.
3. COMPOSITE METER BOX TO BE USED IN PAVED AND/OR TRAFFIC AREAS.
4. COMPOSITE METER BOX SHALL BE RATED FOR INCIDENTAL TRAFFIC.
5. COMPOSITE BOX SHALL BE MEETHD AS MANUFACTURED BY SOUTHEASTERN DISTRIBUTORS, INC., OR APPROVED EQUAL.

1-INCH COMPOSITE METER BOX & COVER N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 2	DWG. NO. W.4B	DWG. BY: FAYPWC	WATER RESOURCES DEPARTMENT		1	03/10	CHANGED BOX & LID DIMENSIONS
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.			2	12/15	REPLACED CI BOX w/COMPOSITE BOX

W4B-METERBOX-LID.dwg

1-INCH COMPOSITE METER BOX & COVER N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 2 OF 2	DWG. NO. W.4B	DWG. BY: FAYPWC	WATER RESOURCES DEPARTMENT		1	12/15	REPLACED CI BOX WITH COMPOSITE BOX
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.					

W4B-METERBOX-LID.dwg

MINIMUM BEARING AREA EACH DIRECTION OF THRUST IN SQUARE FEET (based on soil supporting value of 2,000psf @ 200 psig test pressure)				
PIPE SIZE	TEES & DEADENDS	90° ELBOWS	45° ELBOW & CROSSES	22-1/2° ELBOWS
6"	4	6	3	2
8"	7	10	5	3
12"	15	21	11	6

NOTES:
1. THRUST BLOCKS SHALL BE INSTALLED ON PVC WATER DISTRIBUTION LINES 6" THRU 12" DIAMETER IN THE MANNER SHOWN. SEE FAYPWC STANDARD ALTERNATE RESTRAINING DETAIL W.18 FOR ACCEPTABLE ALTERNATE RESTRAINING SYSTEMS.
2. PIPE GREATER THAN 12 INCH DIAMETER SHALL REQUIRE RESTRAINT JOINT PIPE FOR THE PROPER LENGTH. COMPACT FITTINGS ARE NOT ACCEPTABLE. STANDARD FITTINGS SHALL BE USED WITH CONCRETE THRUST BLOCKING.
3. THRUST BLOCKS SHALL BE INSTALLED ON SEWER FORCE MAIN IN THE MANNER SHOWN.
4. IF SAC-CRETE IS USED, MIXING MUST BE ON SITE UTILIZING A MECHANICAL MIXER.
5. NO CONCRETE SHALL BE PLACED ON BOLTS. WRAP JOINT FITTINGS WITH PLASTIC.
6. CONCRETE SHALL BE A MINIMUM 3,000PSI.
7. ALL BEARING SURFACES SHALL BE AGAINST UNDISTURBED SOIL AND SHALL BE APPROVED BY FAYPWC PROJECT COORDINATOR PRIOR TO PLACEMENT OF CONCRETE.
8. USE OF RESTRAINED JOINT DUCTILE IRON WILL BE REQUIRED IF SOIL CONDITIONS DO NOT ALLOW THE USE OF THRUST BLOCKS.
9. ALL VERTICAL BENDS SHALL BE RESTRAINED USING RESTRAINED JOINT DUCTILE IRON PIPE.

CONCRETE THRUST BLOCK DETAIL N.T.S.			FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.		NO.	DATE	REVISION
SHEET NO. 1 OF 1	DWG. NO. W.17	DWG. BY: FAYPWC	WATER RESOURCES ENGINEERING DEPARTMENT		1	09/05	REVISED TABLE
	DATE: JULY 01, 2

1. ALL SEWER MAINS, LATERALS, AND APPURTENANCES SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH FAYETTEVILLE FAYPWC STANDARDS.
2. CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
3. CONSTRUCTION STAKING IS REQUIRED FOR ALL FAYPWC WATER AND SEWER UTILITY INSTALLATIONS. CUT SHEETS, SIGNED AND SEALED BY A NC PLS, SHALL BE PROVIDED TO THE FAYPWC WATER RESOURCES ENGINEERING DEPARTMENT AND THE CONTRACTOR IN ADVANCE OF CONSTRUCTION FOR FAYPWC WATER AND SEWER UTILITIES.
4. CONTRACTOR SHALL MAINTAIN A COPY OF THE SIGNED AND SEALED CUT SHEET ON THE JOB SITE. CONSTRUCTION ON FAYPWC WATER AND SEWER UTILITIES CANNOT BEGIN UNTIL THE CONTRACTOR POSSESSES, ON SITE, A SIGNED AND SEALED CUT SHEET FROM THE PROFESSIONAL LAND SURVEYOR.
5. ALL NEW WATER AND SEWER MAINS, LATERALS, AND APPURTENANCES SHALL BE TESTED AND/OR DISINFECTED IN ACCORDANCE WITH FAYETTEVILLE FAYPWC STANDARDS PRIOR TO PLACING INTO SERVICE.
6. CONTRACTOR SHALL COORDINATE TESTING AND INSPECTION WITH THE FAYETTEVILLE FAYPWC PROJECT COORDINATOR.
7. ALL DUCTILE IRON PIPE IN SANITARY SEWER SERVICE SHALL HAVE AN INTERIOR LINING OF PROTECTO 401 OR APPROVED EQUAL.
8. ALL NEW MANHOLES ARE TO BE VACUUM-TESTED IN ACCORDANCE WITH FAYETTEVILLE FAYPWC STANDARDS.
9. CONTRACTOR SHALL REPAIR ALL SEWER LATERALS AND MAINS DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY REPORT ALL SEWER MAIN AND LATERAL BREAKS TO THE FAYPWC PROJECT COORDINATOR. THE CONTRACTOR SHALL INITIATE IMMEDIATE REPAIRS IN ACCORDANCE WITH FAYPWC STANDARDS.
10. TRANSFER OF SEWER SERVICES SHALL BE ACCOMPLISHED AS FOLLOWS:
    A. INSTALL AND TEST NEW MAINS, MANHOLES, AND LATERALS. CLEANOUTS SHALL BE INSTALLED 18" INSIDE R/W UNLESS OTHERWISE DIRECTED BY FAYPWC.
    B. CONNECT EXISTING PLUMBING TO NEW LATERAL UTILIZING THE NECESSARY FITTINGS AS DIRECTED BY FAYPWC.
    C. AFTER ALL SERVICES HAVE BEEN TRANSFERRED TO THE NEW MAIN, THE EXISTING SEWER SYSTEM SHALL BE ABANDONED IN ACCORDANCE WITH FAYPWC REQUIREMENTS.
11. CONTRACTOR SHALL ABANDON ("KILL-OUT") ANY EXISTING SEWER SERVICES THAT WILL NOT BE UTILIZED BY UNCOVERING THE EXISTING LATERAL AT THE MAIN, CUT AND PLUG AT BOTH ENDS, REMOVE THE EXISTING CLEANOUT AND CONTINUATION, AND PLUG THE TAP OR TEE AT THE MAIN. FOR LATERALS THAT CONNECT TO A MANHOLE AND ARE TO BE ABANDONED ("KILLED-OUT"), THE LATERAL SHALL BE REMOVED FROM THE MANHOLE AND THE REMAINING VOID IN THE MANHOLE SHALL BE FILLED WITH BLOCK AND MORTAR.
12. SEWER PLUGS SHALL BE INSTALLED TO ELIMINATE ANY DEBRIS OR OTHER MATERIAL FROM ENTERING THE ACTIVE SEWER SYSTEM. UPON ACCEPTANCE OF THE NEW SEWER SYSTEM, THE CONTRACTOR SHALL CLEAN THE NEW MAINS, REMOVE ALL DEBRIS, AND THEN REMOVE THE PLUG.
13. ALL EXISTING UTILITIES IMPACTED BY CONSTRUCTION SHALL BE ADJUSTED TO FINISHED GRADE, IN ACCORDANCE WITH FAYPWC REQUIREMENTS.
14. ALL WORK ON FAYPWC SEWER UTILITIES (MAINS, LATERALS, ETC) SHALL BE PERFORMED BY A LICENSED UTILITY CONTRACTOR. THE FAYETTEVILLE PUBLIC WORKS COMMISSION SHALL ASSESSMENT AND APPROVE ALL WORK ON FAYPWC SEWER UTILITIES. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH FAYPWC REQUIREMENTS.
15. SEPARATION REQUIREMENTS:
    A. LATERAL SEPARATION OF SEWER AND WATER MAINS: WATER MAINS SHALL BE LAID AT LEAST 10 FEET LATERALLY FROM EXISTING OR PROPOSED SEWER MAINS/LATERAL, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENTS A 10-FOOT LATERAL SEPARATION - IN WHICH CASE:
        i. THE WATER MAIN IS LAID IN A SEPARATE TRENCH, WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18-INCHES ABOVE THE TOP OF THE SEWER MAINS/LATERAL; OR
        ii. THE WATER MAIN IS LAID IN THE SAME TRENCH AS THE SEWER MAINS/LATERAL WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18-INCHES ABOVE THE TOP OF THE SEWER MAINS/LATERAL.
    B. CROSSING A WATER MAIN OVER A SEWER: WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER MAINS/LATERAL, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18-INCHES ABOVE THE TOP OF THE SEWER MAINS/LATERAL.
    C. CROSSING WATER MAIN UNDER A SEWER: WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS UNDER A SEWER MAINS/LATERAL, A MINIMUM OF 18-INCHES OF SEPARATION SHALL BE PROVIDED. BOTH THE WATER MAIN AND THE SEWER MAINS/LATERAL SHALL BE CONSTRUCTED OF DUCTILE IRON MATERIAL AND WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10-FEET ON EACH SIDE OF THE POINT OF CROSSING. A SECTION OF WATER MAIN PIPE SHALL BE CENTERED AT THE POINT OF CROSSING.
    D. CROSSING STORM DRAINAGE LINES: A MINIMUM OF 24-INCHES OF VERTICAL CLEARANCE SHALL BE MAINTAINED BETWEEN A SEWER MAINS/LATERAL CROSSING UNDER A STORM DRAINAGE LINE UNLESS DUCTILE IRON PIPE IS USED. IF DUCTILE IRON PIPE IS USED, A MINIMUM OF SIXTEEN INCHES OF SEPARATION SHALL BE MAINTAINED, UNLESS OTHERWISE APPROVED BY FAYPWC.

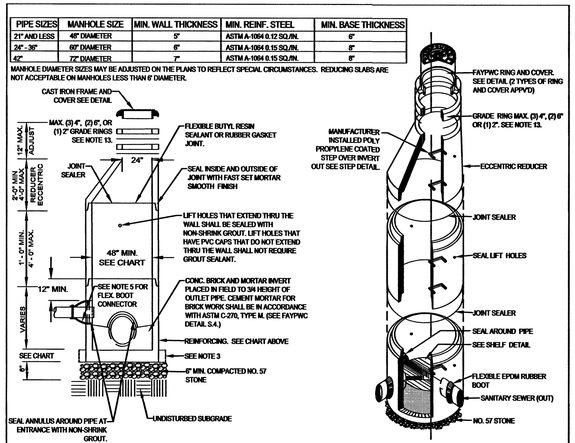
GENERAL NOTES SANITARY SEWER UTILITY		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 1	DWG. NO. S.1	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION
1	01/18	ADDED NOTES 5, 8
2	08/21	ADDED NOTES 1-8 AND RENUMBERED
3	11/23	REVISED NOTE 15

S1-SEWER-NOTES.dwg

PIPE SIZES	MANHOLE SIZE	MIN. WALL THICKNESS	MIN. REINF. STEEL	MIN. BASE THICKNESS
21" AND LESS	48" DIAMETER	5"	ASTM A-1064 0.12 SQ./IN.	6"
24" - 36"	60" DIAMETER	6"	ASTM A-1064 0.15 SQ./IN.	8"
42" - 72"	72" DIAMETER	7"	ASTM A-1064 0.15 SQ./IN.	8"

MANHOLE DIAMETER SIZES MAY BE ADJUSTED ON THE PLANS TO REFLECT SPECIAL CIRCUMSTANCES. REDUCING SLABS ARE NOT ACCEPTABLE ON MANHOLES LESS THAN 6' DIAMETER.



STANDARD MANHOLE N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 2	DWG. NO. S.2	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION
1	02/07	CREATED S.2A ADDED NOTES 13-17
2	07/13	ADDED SHEET 2 OF 2
3	01/01/24	S.2A REVISED NOTES REGARDING MORTAR FOR BENCH AND INVERT.

S2-STANDARD-MANHOLE.dwg

NOTES:
1. PRECAST REINFORCED CONCRETE MANHOLES SHALL BE IN ACCORDANCE WITH ASTM C-478.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE 4,000PSI.
3. MANHOLES GREATER THAN 12' DEPTH SHALL HAVE MINIMUM 6" EXTENDED BASE.
4. FLEXIBLE BUTYL RESIN JOINT SEALANT SHALL BE IN ACCORDANCE WITH ASTM C990. RUBBER GASKET JOINTS SHALL BE IN ACCORDANCE WITH ASTM C-443.
5. FLEXIBLE EPDM RUBBER BOOT CONNECTORS SHALL BE IN ACCORDANCE WITH ASTM C923, INSTALLED BY MANUFACTURER WITH STAINLESS STEEL COMPRESSION RING AND TAKE-UP CLAMP. THE FLEXIBLE BOOT CONNECTOR SHALL BE TIGHTENED ON THE MAIN BY MEANS OF A SINGLE STAINLESS STEEL PIPE CLAMP.
6. CONNECTIONS TO EXISTING MANHOLES SHALL BE BY CORING MANHOLE AND FIELD INSTALLING A FLEXIBLE EPDM RUBBER BOOT CONNECTOR. DO NOT ALLOW DEBRIS TO ENTER SYSTEM.
7. MORTAR USED FOR SEALING JOINTS AND LIFT HOLES SHALL BE QUICK SETTING, NON-SHRINK GROUT MIXED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MORTAR USED TO CONSTRUCT INVERTS AND SHELF SHALL BE IN ACCORDANCE WITH ASTM C-270, TYPE M, IN ACCORDANCE WITH FAYPWC SPECIFICATION SECTION 03301.
8. MANHOLE STEPS SHALL BE IN ACCORDANCE WITH ASTM C478 AND OSHA REGULATIONS. ALIGN STEPS WITH INVERT OUT.
9. PRECAST INVERTS ARE NOT ALLOWED.
10. VERTICAL DROPS BETWEEN THE INFLOW PIPES AND OUTFLOW PIPES SHALL BE REQUIRE THE FOLLOWING:
    A. GREATER THAN 2.5' SEE DROP STRUCTURE DETAIL (MIN. 5' DIAMETER MH REQUIRED).
    B. LESS THAN 2.5' SEE PIPE SLIDE DETAIL.
11. AN ECCENTRIC CONE SHALL BE UTILIZED ON ALL MANHOLES, UNLESS OTHERWISE APPROVED BY FAYPWC.
12. INVERT ON PLANS IS TO MANHOLE CENTERLINE.
13. GRADE RINGS SHALL NOT BE USED FOR ABOVE GRADE ADJUSTMENTS (IE: OUTFALL AREAS). MAXIMUM ADJUSTMENT IN YARD AREAS AND PAVEMENT, WHERE THE RING AND COVER ARE AT GROUND LEVEL. GRADE RINGS CAN BE EITHER CONCRETE OR HDPE. HDPE GRADE RINGS SHALL MEET THE REQUIREMENTS OF ASTM-4759 FOR MATERIAL, QUALITY, AND PERFORMANCE. HDPE GRADE RINGS SHALL BE MANUFACTURED BY LADTECH, INC. OR APPROVED EQUAL.
14. THE MINIMUM SLOPE ACROSS THE INVERT OF THE MANHOLE SHALL BE 1%, UNLESS OTHERWISE APPROVED BY FAYPWC. STANDING WATER IN INVERT OF MANHOLE IS NOT ACCEPTABLE.
15. THE EXTERIOR MANHOLE RISER JOINTS, INCLUDING THE JOINT AT THE CONE, SHALL BE SEALED ON THE OUTSIDE BY AN APPROVED JOINT WRAP. THE WRAP SHALL BE IN ACCORDANCE WITH FAYPWC SPECIFICATIONS.
16. MANHOLE BOOT FOR 4-INCH LATERALS, SHOULD IT BE NECESSARY TO INSTALL A 4-INCH LATERAL INTO A MANHOLE, THE RUBBER BOOT THAT THE LATERAL IS INSERTED INTO SHALL BE SECURELY ATTENDED TO THE CORE HOLE BY UTILIZING A STAINLESS STEEL BAND THAT IS TIGHTENED USING A JACK OR A TORQUE WRENCH (DIRECT DRIVE). BOTH STANDARD SIZE AND STEP DOWN BOOTS ARE ALLOWED. THE TORQUE WRENCH SHALL BE SUPPLIED BY THE MANUFACTURER. NO OTHER TYPE BANDS OR METHOD OF SECURING THE BOOT TO THE MANHOLE SHALL BE ACCEPTED.

    FOR FOUR (4) INCH SDR 26 LATERALS, THE PIPE OUTSIDE DIAMETER RANGE OF THE BOOT SHALL BE 3.5-INCHES TO 4.25-INCHES.

    FOR FOUR (4) INCH DUCTILE IRON LATERALS, THE PIPE OUTSIDE DIAMETER RANGE OF THE BOOT SHALL EITHER BE AS FOR VC OR 4.25-INCHES TO 4.81-INCHES.

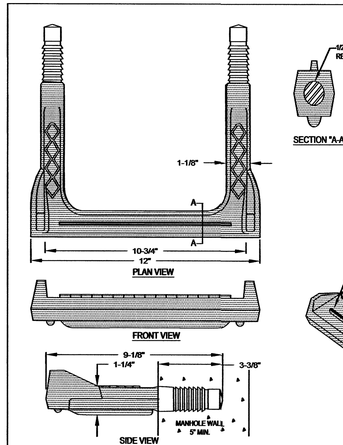
    IN ALL CASES, THE BOOT SHALL BE TIGHTENED ON THE LATERAL BY MEANS OF A SINGLE STAINLESS STEEL PIPE CLAMP.

    THE LATERAL INVERT SHALL BE AT THE TOP O F THE SHELF.
17. NO MORE THAN 4, FOUR-INCH LATERALS OR 3, SIX-INCH LATERALS SHALL ENTER A 4' DIAMETER TERMINAL MANHOLE. NO MORE THAN 2 LATERALS (REGARDLESS OF SIZE) SHALL ENTER ALL OTHER 4' DIAMETER MANHOLES. ALL LATERALS SHALL HAVE AN INDIVIDUAL TROUGH. 5' DIAMETER MANHOLES SHALL BE USED IF THE ABOVE CONDITIONS ARE NOT MET.
18. NO MORE THAN 5 LATERALS SHALL ENTER A 5' DIAMETER MANHOLE.
19. USE OF TEE-WYES ON LATERALS IS NOT ALLOWED.
20. ALL MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH FAYPWC STANDARDS.

STANDARD MANHOLE		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 2 OF 2	DWG. NO. S.2	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION
1	07/13	REVISED NOTES 9, 10, 11, 15. CONVERTED TO S.2 SHEET 2 OF 2
2	01/01/19	REVISED NOTES 10, 18
3	01/01/24	REVISED NOTES 5, 7, 16.

S2-STANDARD-MANHOLE.dwg

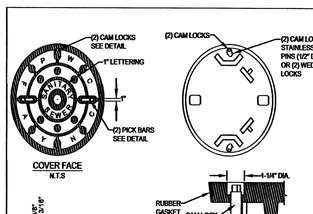


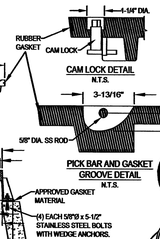
NOTES:
1. COPOLYMER POLYPROPYLENE PLASTIC STEP SHALL BE PLACED 16" OC IN ALL STRUCTURES 5' DEPTH OR GREATER.
2. STEPS SHALL BE INSTALLED BY MANUFACTURER AND SHALL BE ALIGNED OVER STRUCTURE INVERT OUT.
3. DIMENSIONS SHOWN ARE TO CONVEY THE DESIRED SIZE OF THE STEP AND CONSTRUCTION MAY BE ACCEPTABLE PROVIDED MATERIAL SUBMITTAL IS APPROVED BY FAYPWC.
4. MATERIALS OF CONSTRUCTION AND METHOD OF INSTALLATION SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND ASTM C-478.

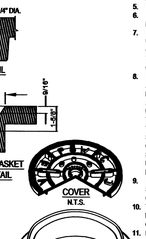
STRUCTURE STEP N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 1	DWG. NO. S.8	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION

S8-STEP.dwg





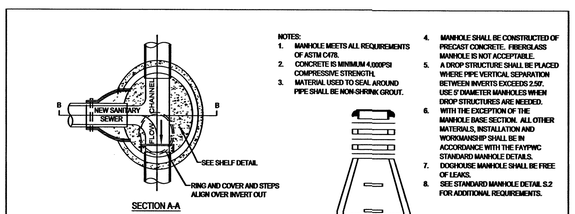


STANDARD NON-TRAFFIC AREA MANHOLE RING AND COVER WITH WIPER GASKET AND CAM LOCK N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 1	DWG. NO. S.6	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION
1	07/09	REVISED NOTES ON FRAME SECTION/REVISED NOTE 3
2	07/17	ADDED NOTE ON WEDGE CAM LOCKS
3	01/18	UPDATED NOTES 7 AND 8

S6-RING-COVER.dwg

NOTES:
1. MANHOLE FRAME AND COVER TO BE MADE OF GRAY CAST IRON CONFORMING TO ASTM SPEC. A48-83, CLASS 35, MANUFACTURED BY SAME MANUFACTURER. ALL CASTINGS SHALL CONFORM TO THE SHAPE AND DIMENSIONS SHOWN. ALL CASTINGS SHALL BE CLEAN AND FREE FROM DEFECTS.
2. CASTINGS SHALL BE UNPAINTED AND SHALL HAVE THE LETTERS "PWC-FAY-NC" AND "SANITARY SEWER" CAST INTO COVER. LETTERS SHALL BE RAISED AND CLEARLY VISIBLE.
3. MANHOLE RING AND COVER SHALL WITHSTAND H-20 VEHICULAR TRAFFIC.
4. MINIMUM AVERAGE WEIGHT: PLUS OR MINUS 5% RING 150LBS., COVER 160LBS., UNIT 310LBS.
5. PERFORATED COVERS WILL NOT BE ALLOWED.
6. SUPPLY SOCKET FOR TURNING CAM LOCK MECHANISM. ONE SOCKET PER PROJECT.
7. USE OF GRADE RINGS ARE NOT ALLOWED, UNLESS APPROVED BY THE FAYPWC PROJECT COORDINATOR. FOR MANHOLES OUTSIDE OF YARD OR LANDSCAPE AREAS, THE USE OF GRADE RINGS ARE NOT ALLOWED.
8. FOR MANHOLES IN YARD OR LANDSCAPED AREAS, THE RING AND COVER SHALL BE SET TO FINISHED GRADE. THE USE OF GRADE RINGS ARE ALLOWED TO SET THE MANHOLE TO FINISHED GRADE. FOR GRADE RINGS 4" OR LESS, THE RING AND COVER SHALL BE ANCHORED TO THE CONE USING 5/8" DIAMETER STAINLESS STEEL BOLTS WITH WEDGE ANCHORS. FOR GRADE RINGS OVER 4", THE RING AND COVER SHALL BE ANCHORED TO THE GRADE RING, USING 5/8" DIAMETER x 5-1/2" STAINLESS STEEL BOLTS WITH WEDGE ANCHORS.
9. FOR OUTFALL AREAS, THE RING AND COVER SHALL BE SET A MINIMUM OF 18" ABOVE FINISHED GRADE, UNLESS OTHERWISE APPROVED.
10. THIS DETAIL IS TO BE USED ON ALL MANHOLES LOCATED OUTSIDE OF PAVED AREAS, UNLESS OTHERWISE APPROVED.
11. REFER TO FAYPWC STANDARD DETAIL S.17 FOR INSTALLATION OF VENT STACK.

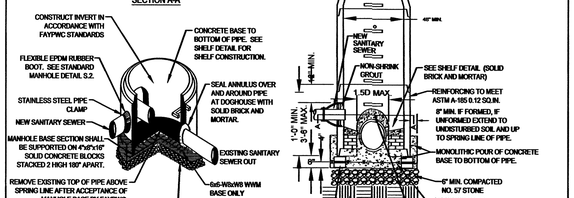


DOGHOUSE MANHOLE (MAINS 15" OR LESS) N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 2	DWG. NO. S.3	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION
1	11/23/98	MADE CHANGES TO NOTES
2	07/16	ADDED SHEET 2

S3-DOGHOUSE-MH.dwg

NOTES:
1. MANHOLE MEETS ALL REQUIREMENTS OF ASTM C478.
2. CONCRETE IS MINIMUM 4,000PSI COMPRESSIVE STRENGTH.
3. MATERIAL USED TO SEAL AROUND PIPE SHALL BE NON-SHRINK GROUT.
4. MANHOLE SHALL BE CONSTRUCTED OF PRECAST CONCRETE. FIBERGLASS MANHOLE IS NOT ACCEPTABLE.
5. A DROP STRUCTURE SHALL BE PLACED WHERE PIPE VERTICAL SEPARATION BETWEEN INVERTS EXCEEDS 2.5'. USE 5' DIAMETER MANHOLES WHEN DROP STRUCTURES ARE NEEDED.
6. WITH THE EXCEPTION OF THE MANHOLE BASE SECTION, ALL OTHER MATERIALS, INSTALLATION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE FAYPWC STANDARD MANHOLE DETAILS.
7. DOGHOUSE MANHOLE SHALL BE FREE OF LEAKS.
8. SEE STANDARD MANHOLE DETAIL S.2 FOR ADDITIONAL REQUIREMENTS.



DOGHOUSE MANHOLE (MAINS 16" OR LARGER) N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 2 OF 2	DWG. NO. S.3	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

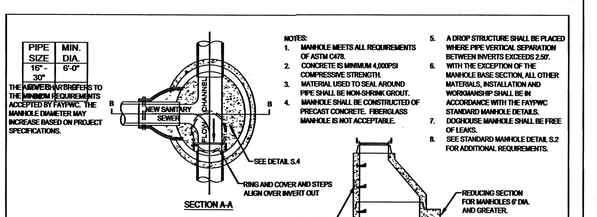
NO.	DATE	REVISION
1	11/25/98	MADE CHANGES TO NOTES
2	07/16	ADDED SHEET 2
3	01/01/19	ADDED MH CHART

S3-DOGHOUSE-MH.dwg

NOTES:
1. MANHOLE MEETS ALL REQUIREMENTS OF ASTM C478.
2. CONCRETE IS MINIMUM 4,000PSI COMPRESSIVE STRENGTH.
3. MATERIAL USED TO SEAL AROUND PIPE SHALL BE NON-SHRINK GROUT.
4. MANHOLE SHALL BE CONSTRUCTED OF PRECAST CONCRETE. FIBERGLASS MANHOLE IS NOT ACCEPTABLE.
5. A DROP STRUCTURE SHALL BE PLACED WHERE PIPE VERTICAL SEPARATION BETWEEN INVERTS EXCEEDS 2.5'.
6. WITH THE EXCEPTION OF THE MANHOLE BASE SECTION, ALL OTHER MATERIALS, INSTALLATION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE FAYPWC STANDARD MANHOLE DETAILS.
7. DOGHOUSE MANHOLE SHALL BE FREE OF LEAKS.
8. SEE STANDARD MANHOLE DETAIL S.2 FOR ADDITIONAL REQUIREMENTS.

PIPE SIZE	MIN. DIA.
16" - 36"	6'-0"

THE ABOVE MARGINS TO THE MINIMUM REQUIREMENTS ACCEPTED BY FAYPWC. THE MANHOLE DIAMETER MAY INCREASE BASED ON PROJECT SPECIFICATIONS.

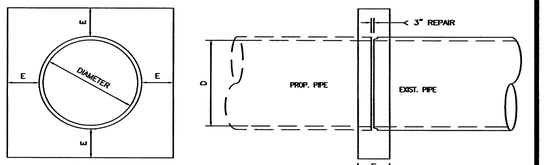


MH CONNECTION DESIGN GUIDE N.T.S.		FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
SHEET NO. 1 OF 1	DWG. NO. S.18	DWG. BY: FAYPWC
	DATE: JULY 01, 2025	APPROVED BY: K.A.H.
	WATER RESOURCES ENGINEERING DEPARTMENT	

NO.	DATE	REVISION

S18-PENETRATION-DETAIL.dwg

NOTES:
1. SUITABLE SOIL BEDDING IS DEFINED AS "NATIVE" SOIL EXCAVATED FROM THE TRENCH, FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.
2. SUITABLE BEDDING MATERIAL SHALL EXTEND TO UNDISTURBED



ELEVATION

SIDE ELEVATION

GENERAL NOTES:

1) DIMENSION "F" SHALL BE 12" + WIDTH OF DAMAGE.
2) EXISTING PIPE REMOVED SHALL BE REPLACED WITH NEW RCP.
3) COLLARS NOT TO BE USED IF DAMAGE IS 16' OR CLOSER TO EXISTING STRUCTURE. IF DAMAGE IS THIS CLOSE NEW PIPE TO BE RELAID TO NEAREST STRUCTURE.
4) ALL WORK TO BE INSPECTED BY SENIOR ENGINEER OR DESIGNATE PRIOR TO CONCRETE PLACEMENT.
5) CONSTRUCT COLLAR WITH FORMED 3000 PSI CONCRETE WITH AIR ENTRAINMENT.
6) DAMAGED PIPE WITH MORE THAN 3" OF DAMAGE SHALL BE REPLACED WITH NEW PIPE.
7) METAL FLASHING SHALL BE USED TO SEAL JOINT PRIOR TO CONCRETE PLACEMENT. GAP AT JOINT MAY NOT EXCEED 3".

D	E	F'	CU. YD.
15"	8"	12"±	.03990
18"	8"	12"±	0.4465
24"	12"	12"±	0.5526
30"	12"	12"±	0.6560
36"	12"	12"±	0.7640
42"	12"	12"±	0.8856
48"	12"	12"±	1.0126
54"	18"	18"±	2.5793
60"	18"	18"±	2.8506
66"	18"	18"±	3.1307
72"	18"	18"±	3.4176

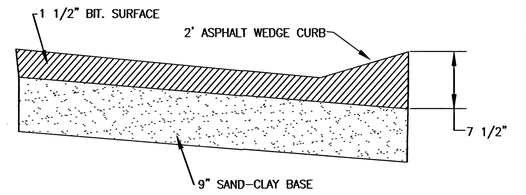
Fayetteville — ENGINEERING & INFRASTRUCTURE DEPT. CML ENGINEERING DIVISION 433 HAY ST. 28301 (910) 433-1656

CONCRETE PIPE COLLAR FOR REPAIRING STORM DRAIN PIPES ADOPTED FROM NCDOT STANDARD 840.72

DATE 3/19/2008 DRAWN BY CW
SCALE N.T.S. CK'D BY CA

CAD FILE : ConcretePipeCollar

DR-10



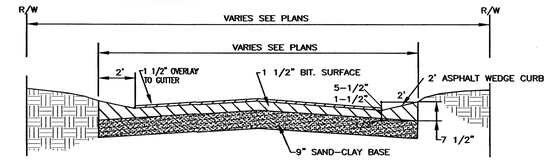
Fayetteville — ENGINEERING & INFRASTRUCTURE DEPT. CML ENGINEERING DIVISION 433 HAY ST. 28301 (910) 433-1656

ASPHALT WEDGE CURBING

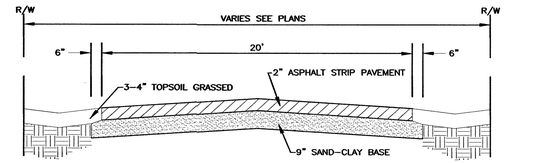
DATE 3/4/09 DRAWN BY CSA
SCALE N.T.S. CK'D BY JPB

CAD FILE : ASPHDGCRB

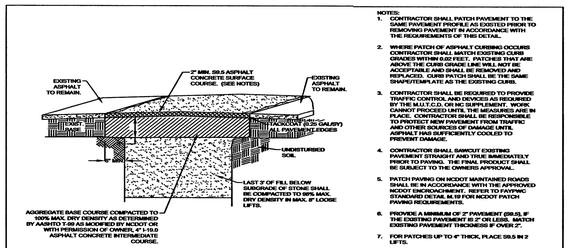
SD-17



TYPICAL EXISTING WEDGE ASPHALT STREET SECTION



TYPICAL EXISTING ASPHALT STRIP PAVEMENT STREET SECTION



NOTES:
1. CONTRACTOR SHALL PATCH PAVEMENT TO THE SAME PAVEMENT PROFILE AS EXISTED PRIOR TO REMOVING PAVEMENT IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DETAIL.
2. WHERE PATCH OF ASPHALT CURBING OCCURS CONTRACTOR SHALL MATCH EXISTING CURB GRADES WITHIN 0.02 FEET. PATCHES THAT ARE NOT TO MATCH EXISTING GRADES SHALL NOT BE ACCEPTABLE AND SHALL BE REMOVED AND REPLACED. CURB PATCH SHALL BE THE SAME SHAPE/TEMPLATE AS THE EXISTING CURB.
3. CONTRACTOR SHALL BE REQUIRED TO PROVIDE TRAFFIC CONTROL AND DEVICES AS REQUIRED BY THE M.U.T.C.D. OR NC SUPPLEMENT. WORK CANNOT PROCEED UNTIL THE MEASURES ARE IN PLACE. CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT NEW PAVEMENT FROM TRAFFIC AND OTHER SOURCES OF DAMAGE UNTIL ASPHALT HAS SUFFICIENTLY COOLED TO PREVENT DAMAGE.
4. CONTRACTOR SHALL SAWCUT EXISTING PAVEMENT STRAIGHT AND TRUE IMMEDIATELY PRIOR TO PAVING. THE FINAL PRODUCT SHALL BE SUBJECT TO THE OWNERS APPROVAL.
5. PATCH PAVING ON NCDOT MAINTAINED ROADS SHALL BE IN ACCORDANCE WITH THE APPROVED ROAD USE/ENCROACHMENT. REFER TO NCDOT PAVING CRITERIA, M.10 FOR NCDOT PATCH PAVING REQUIREMENTS.
6. PROVIDE A MINIMUM OF 2" PAVEMENT (S9.5), IF THE EXISTING PAVEMENT IS 2" OR LESS, MATCH EXISTING PAVEMENT THICKNESS IF OVER 2".
7. FOR PATCHES UP TO 4" THICK, PLACE S9.5 IN 2 LIFTS.
8. FOR PATCHES OVER 4" THICK, PLACE BINDER (I-19.0) TO 2" BELOW SURFACE. INSTALL BINDER IN 2" (MAX.) LIFTS. THE FINAL 2" SHALL BE SURFACE (S9.5).
9. ALL PATCHES SHALL HAVE A MINIMUM OF 8" ABC UNDER PAVEMENT, INCLUDING CURB AS REQUIRED.

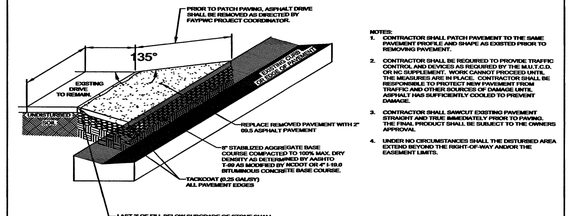
PERMANENT PAVEMENT PATCH
N.T.S.

SHEET NO. 1 OF 1 | DWG. NO. M.2 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION
1	01/07	CHANGED ASPHALT MIX
2	08/10	REVISED, DELETED NOTES

M2-PER-PATCH.dwg



NOTES:
1. CONTRACTOR SHALL PATCH PAVEMENT TO THE SAME PAVEMENT PROFILE AND SHAPE AS EXISTED PRIOR TO REMOVING PAVEMENT.
2. CONTRACTOR SHALL BE REQUIRED TO PROVIDE TRAFFIC CONTROL AND DEVICES AS REQUIRED BY THE M.U.T.C.D. OR NC SUPPLEMENT. WORK CANNOT PROCEED UNTIL THE MEASURES ARE IN PLACE. CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT NEW PAVEMENT FROM TRAFFIC AND OTHER SOURCES OF DAMAGE UNTIL ASPHALT HAS SUFFICIENTLY COOLED TO PREVENT DAMAGE.
3. CONTRACTOR SHALL SAWCUT EXISTING PAVEMENT STRAIGHT AND TRUE IMMEDIATELY PRIOR TO PAVING. THE FINAL PRODUCT SHALL BE SUBJECT TO THE OWNERS APPROVAL.
4. UNDER NO CIRCUMSTANCES SHALL THE DISTURBED AREA EXTEND BEYOND THE RIGHT-OF-WAY AND/OR THE EASEMENT LIMITS.

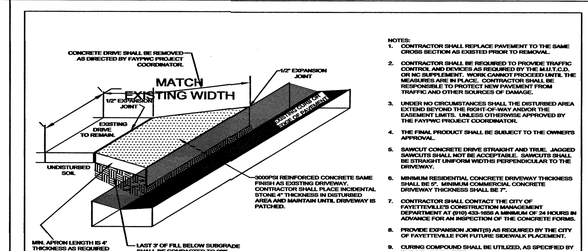
ASPHALT DRIVEWAY/ PARKING LOT PATCH
N.T.S

SHEET NO. 1 OF 1 | DWG. NO. M.4 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION
1	08/10	REVISED, DELETED NOTES

M4-ASPH-DRIVE-PATCH.dwg



NOTES:
1. CONTRACTOR SHALL REPLACE PAVEMENT TO THE SAME CROSS SECTION AS EXISTED PRIOR TO REMOVAL.
2. CONTRACTOR SHALL BE REQUIRED TO PROVIDE TRAFFIC CONTROL AND DEVICES AS REQUIRED BY THE M.U.T.C.D. OR NC SUPPLEMENT. WORK CANNOT PROCEED UNTIL THE MEASURES ARE IN PLACE. CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT NEW PAVEMENT FROM TRAFFIC AND OTHER SOURCES OF DAMAGE.
3. UNDER NO CIRCUMSTANCES SHALL THE DISTURBED AREA EXTEND BEYOND THE RIGHT-OF-WAY AND/OR THE EASEMENT LIMITS, UNLESS OTHERWISE APPROVED BY THE FAYPWC PROJECT COORDINATOR.
4. THE FINAL PRODUCT SHALL BE SUBJECT TO THE OWNERS APPROVAL.
5. SAWCUT CONCRETE DRIVE STRAIGHT AND TRUE. JAGGED SAWCUTS SHALL NOT BE ACCEPTABLE. SAWCUTS SHALL BE STRAIGHT UNIFORM WIDTHS PERPENDICULAR TO THE DRIVEWAY.
6. MINIMUM RESIDENTIAL CONCRETE DRIVEWAY THICKNESS SHALL BE 6". MINIMUM COMMERCIAL CONCRETE DRIVEWAY THICKNESS SHALL BE 7".
7. CONTRACTOR SHALL COMPACT THE TOP OF SUBGRADE TO 98% MAX. DRY DENSITY. CONTACT THE DEPARTMENT AT (910) 433-1656 A MINIMUM OF 24 HOURS IN ADVANCE FOR AN INSPECTION OF THE CONCRETE FORMS.
8. PROVIDE EXPANSION JOINT(S) AS REQUIRED BY THE CITY OF FAYETTEVILLE FOR FUTURE SIDEWALK PLACEMENT.
9. CURING COMPOUND SHALL BE UTILIZED, AS SPECIFIED BY THE CITY OF FAYETTEVILLE.
10. NEW EXPANSION JOINTS SHALL BE PLACED 4 TO 10 FEET FROM EXISTING EXPANSION JOINTS, AS SPECIFIED BY THE FAYPWC PROJECT COORDINATOR.
11. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF FAYETTEVILLE REQUIREMENTS.

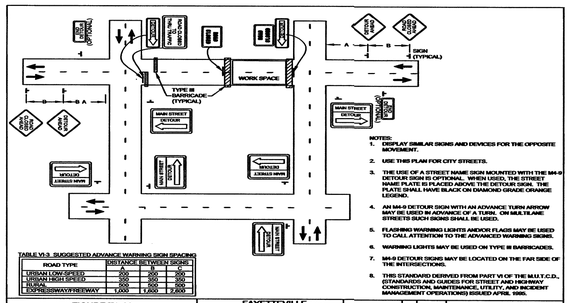
CONCRETE DRIVEWAY PATCH
N.T.S.

SHEET NO. 1 OF 1 | DWG. NO. M.5 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION

M5-CONC-DRIVE-PATCH.dwg



NOTES:
1. DISPLAY SIMILAR SIGNS AND DEVICES FOR THE OPPOSITE MOVEMENT.
2. USE THIS PLAN FOR CITY STREETS.
3. THE USE OF A STREET NAME SIGN MOUNTED WITH THE M4-9 DETOUR SIGN IS OPTIONAL. WHEN USED, THE STREET NAME PLATE IS PLACED ABOVE THE DETOUR SIGN. THE PLATE SHALL HAVE BLACK ON DIAMOND GRADE ORANGE LEGEND.
4. AN M4-9 DETOUR SIGN WITH AN ADVANCE TURN ARROW MAY BE USED IN ADVANCE OF A TURN, ON MULTILANE STREETS SUCH SIGNS SHALL BE USED.
5. FLASHING WARNING LIGHTS AND/OR FLAGS MAY BE USED TO CALL ATTENTION TO THE ADVANCED WARNING SIGNS.
6. WARNING LIGHTS MAY BE USED ON TYPE III BARRICADES.
7. M4-9 DETOUR SIGNS MAY BE LOCATED ON THE FAR SIDE OF THE INTERSECTIONS.
8. THIS STANDARD DERIVED FROM PART VI OF THE M.U.T.C.D., (STANDARDS) AND GUIDES FOR STREET AND HIGHWAY CONSTRUCTION, MAINTENANCE, UTILITY, AND INCIDENT MANAGEMENT OPERATIONS) ISSUED APRIL 1995.

TABLE VI-3 SUGGESTED ADVANCE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS		
	A	B	C
URBAN LOW SPEED	200	200	200
URBAN HIGH SPEED	350	350	350
RURAL	500	500	500
EXPRESSWAY/FREEWAY	1,000	1,000	2,000

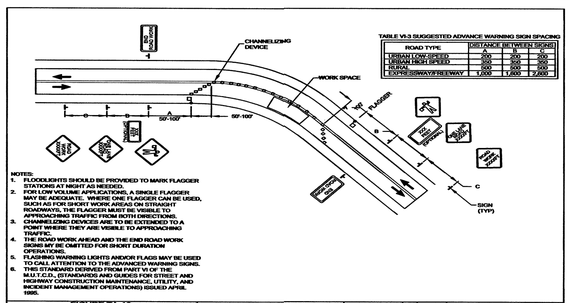
FIGURE TA-20
DETOUR FOR CLOSED STREET
N.T.S.

SHEET NO. 1 OF 1 | DWG. NO. M.7 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION

M7-DETOUR-ROAD-CLOSED.dwg



NOTES:
1. FLOODLIGHTS SHOULD BE PROVIDED TO MARK FLAGGER STATIONS AT NIGHT AS NEEDED.
2. FOR LOW VOLUME APPLICATIONS, A SINGLE FLAGGER MAY BE ADEQUATE. WHERE ONE FLAGGER CAN BE USED, SUCH AS FOR SHORT WORK AREAS ON STRAIGHT ROADWAYS, THE FLAGGER MUST BE VISIBLE TO APPROACHING TRAFFIC FROM BOTH DIRECTIONS. FLAGGING DEVICES ARE TO BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.
3. THE ROAD WORK AHEAD AND THE END ROAD WORK SIGNS MY BE OMITTED FOR SHORT DURATION OPERATIONS.
4. FLASHING WARNING LIGHTS AND/OR FLAGS MAY BE USED TO CALL ATTENTION TO THE ADVANCED WARNING SIGNS.
5. THIS STANDARD DERIVED FROM PART VI OF THE M.U.T.C.D., (STANDARDS) AND GUIDES FOR STREET AND HIGHWAY CONSTRUCTION MAINTENANCE, UTILITY, AND INCIDENT MANAGEMENT OPERATIONS) ISSUED APRIL 1995.

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RURAL	500	500	500
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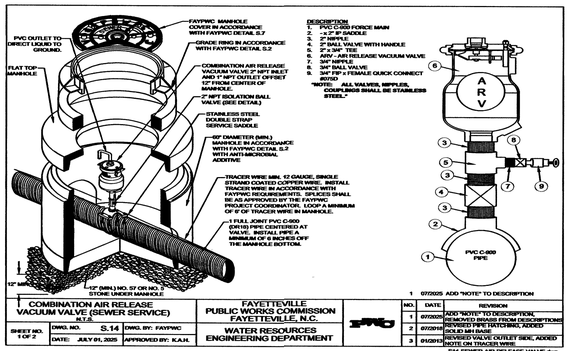
FIGURE TA-10
LANE CLOSURE ONE LANE TWO-WAY TRAFFIC
N.T.S.

SHEET NO. 1 OF 1 | DWG. NO. M.8 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION

M8-DETOUR-ROAD-CLOSED.dwg



1 07/2025 ADD "NOTE" TO DESCRIPTION

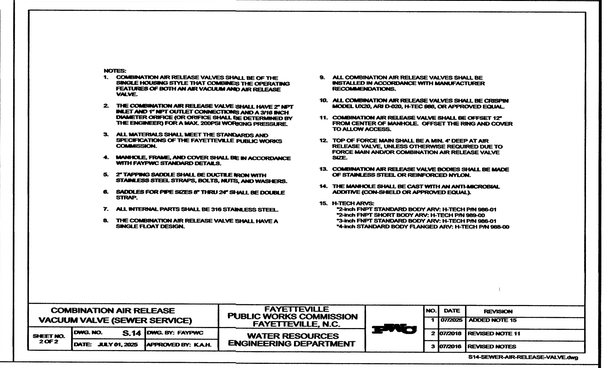
COMBINATION AIR RELEASE VACUUM VALVE (SEWER SERVICE)
N.T.S.

SHEET NO. 1 OF 2 | DWG. NO. S.14 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION
1	07/2025	ADD "NOTE" TO DESCRIPTION, REMOVED BRASS FROM DESCRIPTIONS
2	07/2018	REVISED PIPE DATCHING, ADDED NOTE ON TRACER WIRE
3	01/2013	REVISED VALVE OUTLET SIZE, ADDED NOTE ON TRACER WIRE

S14-SEWER-AIR-RELEASE-VALVE.dwg



NOTES:
1. COMBINATION AIR RELEASE VALVES SHALL BE OF THE DOUBLE HOUSING STYLE THAT COMBINES THE OPERATING FEATURES OF BOTH AIR VACUUM AND AIR RELEASE VALVE.
2. THE COMBINATION AIR RELEASE VALVE SHALL HAVE 2" NPT INLET AND 1" NPT OUTLET CONNECTIONS AND A 3/16 INCH DIAMETER ORIFICE (OR ORIFICE SHALL BE DETERMINED BY THE ENGINEER) FOR A MAX. 200PSI WORKING PRESSURE.
3. ALL MATERIALS SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE FAYETTEVILLE PUBLIC WORKS COMMISSION.
4. MANHOLE, FRAME, AND COVER SHALL BE IN ACCORDANCE WITH FAYPWC STANDARD DETAILS.
5. 2" TAPPING SADDLE SHALL BE DUCTILE IRON WITH STAINLESS STEEL STRAPS, BOLTS, NUTS, AND WASHERS.
6. SADDLES FOR PIPE SIZES 8" THRU 24" SHALL BE DOUBLE STRAP.
7. ALL INTERNAL PARTS SHALL BE 316 STAINLESS STEEL.
8. THE COMBINATION AIR RELEASE VALVE SHALL HAVE A SINGLE FLOAT DESIGN.
9. ALL COMBINATION AIR RELEASE VALVES SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
10. ALL COMBINATION AIR RELEASE VALVES SHALL BE CRISPIN MODEL UR20, ARI D-020, HI-TEC 886, OR APPROVED EQUAL.
11. COMBINATION AIR RELEASE VALVE SHALL BE OFFSET 12" FROM CENTER OF MANHOLE. OFFSET THE RING AND COVER TO ALLOW ACCESS.
12. TOP OF FORCE MAIN SHALL BE A MIN. 4' DEEP AT AIR RELEASE VALVE, UNLESS OTHERWISE REQUIRED DUE TO FORCE MAIN AND/OR COMBINATION AIR RELEASE VALVE SIZE.
13. COMBINATION AIR RELEASE VALVE BODIES SHALL BE MADE OF STAINLESS STEEL OR REINFORCED NYLON.
14. THE MANHOLE SHALL BE CAST WITH AN ANTI-MICROBIAL ADDITIVE (CON-SHIELD OR APPROVED EQUAL).
15. HI-TECH ARVS:
*2-inch FNPT STANDARD BODY ARV: HI-TECH P/N 886-01
*2-inch FNPT SHORT BODY ARV: HI-TECH P/N 886-02
*3-inch FNPT STANDARD BODY ARV: HI-TECH P/N 886-01
*4-inch STANDARD BODY FLANGED ARV: HI-TECH P/N 885-00

COMBINATION AIR RELEASE VACUUM VALVE (SEWER SERVICE)

SHEET NO. 2 OF 2 | DWG. NO. S.14 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION
1	07/2025	ADDED NOTE 15
2	07/2018	REVISED NOTE 11
3	07/2016	REVISED NOTES

S14-SEWER-AIR-RELEASE-VALVE.dwg

NOTES:
1. CONTRACTOR SHALL SAW CUT OR MILL ALL PAVEMENTS STRAIGHT AND TRUE PRIOR TO THEIR NEXT CONSTRUCTION ACTIVITY. CUT PATCH AREAS AGAIN IMMEDIATELY PRIOR TO PATCH PAVING. THE FINAL SAW CUT FOR PATCHES SHALL BE STRAIGHT WITH A NEAT SQUARE EDGE AND OF UNIFORM WIDTH PARALLEL WITH THE EDGE OF PAVEMENT/CURB LINE. THE FINAL PRODUCT SHALL BE SUBJECT TO THE OWNERS APPROVAL.
2. CONTRACTOR SHALL SWEEP STREETS AND PROVIDE DUST CONTROL AT ALL TIMES VIA WATER TRUCK, BROOMS, COMPACTORS, ETC. DEBRIS FROM SWEEPING OPERATIONS SHALL NOT BE DIRECTED TOWARD YARDS. CLEAN UP OF DEBRIS, TRASH, EXCESS MATERIALS, ETC. SHALL BE PERFORMED DAILY.
3. ANY TRENCHES OPENED FOR PAVING SHALL BE PAVED BY THE END OF THE SAME DAY, IF WEATHER CONDITIONS CHANGE, EQUIPMENT BREAKS DOWN, OR ANY OTHER OCCURRENCE THAT STOPS THE PAVING OPERATIONS OCCURS, BACKFILL ALL PREPARED AREAS SO THEY ARE PASSABLE BY TRAFFIC.
4. THE CONTRACTOR SHALL PATCH PAVE SERVICE LATERALS ON THE SAME DAY THAT MAIN LINE TRENCHES ARE PAVED. LATERALS SHALL BE PATCHED ON BOTH SIDES OF THE STREET AS PAVING PROGRESSES.
5. THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN PROPER TRAFFIC CONTROL PROVISIONS AND ANY DEVICES REQUIRED TO IDENTIFY OBSTRUCTIONS OR HAZARDS WITHIN THE RIGHT-OF-WAY TO INCLUDE; REFLECTIVE CONES AT EACH SERVICE LATERAL, REFLECTIVE BARRELS OR RAISED MANHOLES, ETC.
6. AT NO TIME SHALL THE CONTRACTOR LEAVE MAIN AND/OR LATERAL TRENCHES WITH A VERTICAL ELEVATION DROP EXCEEDING ONE INCH (1") FROM EXISTING ASPHALT TO TRENCH SUB GRADE UNATTENDED, UNSECURED, AND/OR OVERNIGHT.

PAVEMENT REPAIR NOTES

SHEET NO. 1 OF 1 | DWG. NO. M.1 | DWG. BY: FAYPWC | DATE: JULY 01, 2025 | APPROVED BY: K.A.H.

FAYETTEVILLE PUBLIC WORKS COMMISSION FAYETTEVILLE, N.C.
WATER RESOURCES ENGINEERING DEPARTMENT

NO.	DATE	REVISION
1	07/10	REVISED, DELETED NOTES

M1-PAVEMENT-REPAIR-NOTES.dwg

FAYETTEVILLE PUBLIC WORKS COMMISSION
WATER RESOURCES ENGINEERING
APPROVED FOR CONSTRUCTION
Date: 02/12/2026

Drawn by David Maples
Checked David E. Vaughn,PE,PLS
Reviewed Jeffrey B Reitzel,PE,PLS
Date JULY 2025

LONGVIEW ACRES LIFT STATION 41 REPLACEMENT & SAN. SEWER FORCE MAIN

PAVEMENT & TRAFFIC DETAILS

Revision	By	Date
PWC Comments	DWM	MAY 25

115 Broadfoot Avenue
Fayetteville, N.C.
P.O. Box 53774
Phone 910-484-5191
Firm No. F-0106

M&R
ENGINEERS PLANNERS SURVEYORS
MOORMAN, KIZER & REITZEL, INC.

Scale AS SHOWN
Book no.
Sheet D-5

G:\Current Jobs\Public Works\21-1079-02 Longview LS Replacement\Plans\Construction Plans\Details 1.dwg, 12/11/2025 5:16:01 PM, 2022 - Canon iPF780.pc3

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