



PURCHASING

March 13, 2026

MEMO TO: Prospective Bidders
FROM: Kimberly Toon, Purchasing Manager
SUBJECT: **Addendum #1:** Airport Lift Station #29
DUE DATE AND TIME: **MARCH 19, 2026; 2:00 p.m.**

1. The Bid Documents are hereby modified by this Addendum #1 dated March 13, 2026. To include the following:

- a. Q&A
- b. Pre-Bid Sign in Sheet
- c. As pertains to Specification 02753 Submersible Pump Lift Station:
 - i. Replace with New PWC Specification 02753 Submersible Pump Lift Station
- d. As pertains to Specification 02754 Self Priming Lift Station:
 - i. Delete this Specification from Bid Documents
- e. Add new PWC Specification:
 - i. 13446 Remote Telemetry for Lift Stations
- f. Add new PWC Specification:
 - i. 09801 Anti-Microbial Admixture
- g. As pertains to the Proposal:
 - i. Replace with new Proposal Attached (Deleted Telemetry Tower, Conduit, Wiring, Items E-14, E15, E-16, Alternate #2) (Replaced Alternate #1)

Bidder Acknowledgement:

Bidder Name (Print): _____

Bidder Signature: _____

Date of Signature: _____

ADDENDUM NO. 1

**AIRPORT LIFT STATION #29 REPLACEMENT
FAYETTEVILLE CUMBERLAND ECONOMIC
DEVELOPMENT CORPORATION
& THE CITY OF FAYETTEVILLE, NC
MARCH 11, 2026**

NOTICE TO PROSPECTIVE BIDDERS

This addendum shall become a part of the Contract Documents for the above project.

Each Contractor shall be responsible for notifying his Subcontractors, equipment and material suppliers of the contents of this Addendum. The Engineer in no way assumes any responsibility for notifying any Subcontractor, material or equipment supplier or others not having received or issued the original Bid Documents.

Where any article, division or subparagraph of the original Bid Documents or other addenda is supplemented herein, the provisions of the original documents shall remain in effect. All the supplemental provisions shall be considered as added thereto. Where any such article, division or subparagraphs are amended, voided or superseded thereby, the provisions of such article, division or subparagraph not so specifically amended, voided or superseded shall remain in effect.

Bidders are advised to note receipt of this Addendum on the Proposal form.

-
- 1) As pertains to Specification 02753 Submersible Pump Lift Station:

Replace with new PWC Specification 02753 Submersible Pump Lift Station

- 2) As pertains to Specification 02754 Self Priming Lift Station:

Delete this Specification from Bid Documents

- 3) Add new PWC Specification: **13446 Remote Telemetry for Lift Stations**

- 4) Add new PWC Specification: **09801 Anti-Microbial Admixture**

- 5) As pertains to the Proposal:

Replace with new Proposal Attached (Deleted Telemetry Tower, Conduit, Wiring, Items E-14, E-15, E-16, Alternate #2)(Replaced Alternate #1)

End Addendum No. 1

A pre-bid meeting was held on March 10, 2026 at 2:00 pm in the office of Fayetteville Cumberland Economic Development Corporation. The following questions were discussed at the meeting and/or submitted for clarification:

1. Who is responsible for the cost and coordination associated with existing utility relocations? *Contractor.*
2. What is the anticipated notice to proceed? *As soon as bidding and applicable meeting schedules allow. Anticipated to be within 30 days of the bid opening.*
3. How flexible is the start date of the project? *Will work to coordinate with material and equipment availability schedules.*
4. Is there a Geotech report available? *Not at this time.*
5. Are fittings required to be domestic or are imports acceptable? *Buy America Requirements apply due to Federal Funding.*
6. What funding sources will be used by the owner for this project and are these funds secured and available for use? *Golden Leaf, Fayetteville Airport FAA Funds*
7. Are there any deadlines associated with the project funding? *Golden Leaf funds will have to be renewed in Fall of 2026. Golden Leaf is aware of project bidding and will consider extension of funds once construction costs are known.*
8. Is there a designated lay down yard? *Grassed areas adjacent to the site.*
9. Is there an engineer's estimate? *Estimate is dated and therefore not available.*
10. Will the entire site require grubbing with complete stump removal, or is it acceptable to grind stumps located outside the excavation limits to a depth of 2"-3" below grade? *Graded areas reflected on the plans should be fully grubbed with all stumps completely removed.*
11. Is a manned bypass watchman required during operations, or would an autodialer system be considered sufficient? *Per PWC requirements and specifications,, a full time person is required to man the bypass pumping operation unless otherwise approved by PWC.*
12. Who is responsible for contracting the SCADA programmer (e.g., CITI, Piedmont Animation, or Custom Controls)? *PWC has indicated that the contractor shall be responsible for the SCADA programming. The contractor is required to coordinate with PWC staff during the installation and startup activities.*
13. Is the installation of construction fencing required around the project site? *Security fencing is not required, but would be advisable from a security standpoint for protection of equipment and materials.*
14. Will a field office be required for the duration of the project? *No.*
15. Is there a cap, expressed as a percentage of the total bid price, on the Mobilization pay item? *There is not a cap, but the project has a limited budget, so the mobilization price used should reflect the cost needed for applicable items.*

16. Are there any height restrictions applicable to this project due to airfield or aviation-related requirements? *Based on previous discussions in regards to the potential for a tower at the site (no longer needed since doing different telemetry), it was possible to go up to 40' in this location. If more height is needed, then the airport would need to be notified prior to using a crane of anything that would exceed the 40' height.*
17. Are there any special considerations or provisions that need to be accounted for during construction due to the proximity to the airport? *The project site is located outside of the controlled access area for the airport, so we are not aware of any special considerations or provisions that would be required.*
18. If sheet piling is utilized for pump station construction, can the sheets be left in place? *This would need to be coordinated with PWC to confirm that any sheet piles that remain in place do not impede future maintenance activities at the site. The preference would be to remove the piles.*
19. Please elaborate on the emergency response requirements and parameters as outlined in the special provisions. *The contractor needs to designate a 24 hour contact person in case of an emergency.*
20. Is site lighting required around barricaded excavations during construction, as outlined in the general conditions? *Site lighting is not required during construction. If any lighting is to be used, it needs to be coordinated with the airport to make sure the light does not impede flight operations.*
21. Are any special admixtures or protective coatings required for the precast concrete structures? *Yes, see Anti-microbial Admixture (Specification 09801) included with this Addendum #1 .*
22. Will precast inverts be considered acceptable for use in this project? *No*
23. What permits, licenses, and associated fees will the Contractor be responsible for obtaining? *The City of Fayetteville will be the permitting authority for this project. It is anticipated that electrical and plumbing permits will be needed at a minimum.*
24. Paragraph 4 of the Special Provisions (Page 1 of 13) appears to impose liability on the Contractor for “any additional cost, expense, liability, or damage to the Owner or any damage or additional cost or expense for which the Owner may or shall become liable.” This language suggests the potential for additional penalties beyond liquidated damages. We respectfully request that this paragraph be removed from the Special Provisions. *Do to the outside funding associated with this project, this section cannot be removed.*
25. Will the existing pump station site be available for use as a laydown/staging area for this project? *Areas adjacent to the existing lift station site can be used, but must be cleaned up and left in a condition equal to or better than existing prior to it being disturbed.*

26. What are the anticipated costs or requirements associated with the Supplemental Erosion Control Plan, as referenced in Page 18, Paragraph 3 of the General Conditions? *A supplemental plan will not be needed on this project unless the disturbed area exceeds an acre in size.*
27. Are there any other Contractors expected to be working on or adjacent to the project site concurrently with our scope of work? *No*
28. Please clarify the responsibilities and designation of the Project Expediter. This terminology suggests a multi-prime contract. *The project expediter will be the designated contractor contact for the project.*
29. If an Owner's Agent delays the Contractor's performance while also intending to seek additional damages per Special Provisions (Page 1, Paragraph 4), this could potentially conflict with NCGS 143-134.3. We respectfully request that this paragraph be removed from the Special Provisions. *Based on the outside funding source for this project, the provision cannot be removed.*
30. Page 26 of 68, Paragraph 2 ("Existing Topography") of the General Conditions states that no adjustment to the contract price will be made for discrepancies between shown and actual surface elevations at pipe centerline. If the existing conditions differ substantially from those shown in the plans, this clause places undue risk on the Contractor. We request that this paragraph be removed or modified accordingly. *The survey reflected in the plans is based off of an actual field survey of the site, so there should not be any discrepancies with this aspect of the work*
31. Are there any badging, training, safety, or other requirements related to the proximity to the airfield? *No*

**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 chopper style, 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 Barnes Sithe series or equivalent.

IMPELLER

The impeller shall be two vane one piece, single suction, enclosed, chopper style, 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 bolt onto 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 – CONTROL PANEL AND COMMUNICATION FOR 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.

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 a minimum of two - 2-inch diameter continuous stainless steel guide rail pipes and appropriate sized stainless steel cables or specific to the manufacturer's guidelines. 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 electric powered telescopic hoist assembly with manual override control. 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 wet well 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. Check valves should have connections for testing/maintenance on intake pipe and discharge pipe.

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 to cover the entire site. The lighting shall meet the requirements of the local power company and should be sited as shown on the drawings. Site lighting should be wired to the breaker panel. A second light should be over the wet well that does not conflict with the maintenance of the wet well and pumps.

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 or greater 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:

<u>Failure Within</u>	<u>Percent New Price</u>
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.

13446 CONTROL PANEL AND COMMUNICATION FOR LIFT STATIONS

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall provide, through the services of a single Control Systems Integrator, all components, system installation services, as well as all required and specified ancillary services, in connection with providing remote telemetry at lift stations as specified herein. The Contractor shall provide all materials and services necessary to provide the functions indicated, whether specifically mentioned or not.
- B. The Contractor shall be ultimately responsible for installation of the lift station remote telemetry. However, the Control System Integrator will include such services within the scope of his subcontract to provide for installation of the lift station remote telemetry as specified. The Control System Integrator shall also coordinate this work with the Contractor to ensure that the proper control system interfaces, site preparation, and equipment installation and testing services are provided.
- C. The Contractor's responsibilities, as distinct from the Control System Integrator's responsibilities, shall be to provide all additional materials and work necessary to supplement the materials and work provided by the Control System Integrator; thereby satisfying all requirements specified within this section.
- D. The Contractor shall be responsible for coordinating interfaces between Remote Telemetry System equipment provided under the Remote Telemetry System specification sections and the equipment provided under other sections of the specifications. The Contractor shall verify and coordinate space requirements, process equipment power supply and voltage, process equipment control power supply and voltage, compatibility of control signals, details of equipment installation and interconnection. Coordination shall include distribution of approved shop drawings to all vendors, subcontractors, etc., involved in the control interface. Likewise, the Contractor shall ensure that instrumentation and control devices provided under other sections of the specifications are compatible and of the same quality and characteristics as similar devices specified herein.

1.2 SCOPE

- A. Lift stations shall be provided with remote monitoring and control through the provision of Control Panels. Each lift station Control Panel shall communicate to PWC's existing remote SCADA system. RTUs shall be constructed in accordance with the specifications herein and the applicable detail drawings provided within PWC's *Permit Design Manual*. The RTU 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 Control Panel and fiber or cellular provided by the Contractor and/or PWC. Installed equipment provided by the Contractor is limited to the lift station site.
- C. A cellular survey will be conducted by PWC. Communications shall utilize the PWC's existing cellular provider.
- D. The following major items of supply shall be provided:
 - 1. Furnish and install Control Panel as specified
 - 2. Interfacing with control panels provided by other equipment suppliers under this contract
 - 3. Furnish and install PWC provided cellular modem and communications from the lift station Control Panel to PWCs existing remote SCADA system.
 - 4. Control Panel that accepts current standard PWC PLC Programming Code
 - 5. Configuration and testing of the complete system at the lift station.
- E. Software programming of new system components shall utilize the PWC's existing licensed versions of programming and configuration software.

1.3 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
 - c. Specification Section 02755 Lift Station Enclosures
- 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 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.).

1.4 CODES AND STANDARDS:

- A. The Remote Telemetry System shall comply with the following codes and standards as well as any others within the specifications and drawings. In the event of any conflict between these codes, regulations, standards, and Contract Documents, the most restrictive shall apply.
- 1. Applicable federal, state, county, and municipal code requirements.
 - 2. Applicable standards of the National Fire Protection Association (NFPA)
 - a. National Electrical Code (NEC).
 - b. National Electric Safety Code
 - 3. Applicable standards of the Underwriter's Laboratories, Inc. (U.L.)
 - a. UL 508A Industrial Control Panels

1.5 SUBMITTALS:

- A. Every submittal with any deviations or exceptions from Contract Documents 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. Provider shall utilize PWC provided 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
 - 1. The software code shall be provided by PWC and tested for acceptance with the Control Panel. The Control Panel shall pass a I/O inspection prior to implementation.
- 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. PWC will be performing the input and output inspection.
 - 2. The complete test plan should include but not be limited to the following:
 - a. 100 percent I/O point test including all spare points based upon the previously submitted System I/O list.
 - b. Functional and Control strategy tests.
 - c. Communications tests (Fiber Availability or Cellular).
 - d. 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. Where electronic documentation is available, either through the manufacture or via Internet download, it shall be organized and provided on a USB. All CAD drawings and office software type documents prepared by the Control System Integrator or one of their subcontractors shall be organized and provided on a USB and within the PWC electronic submittal portal. Electronic documentation formats shall be Adobe .pdf, AutoCAD, and Microsoft Office documents, HTML, or as approved by the Engineer or PWC.
6. All electronic media (i.e. software, electronic documentation, configuration files/reports, etc.) shall be provided with two backup copies on a USB.
7. Operation and Maintenance manuals shall include but not be limited to the following:
 - a. Manufacturer standard O&M manuals for all equipment and software 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 the equipment furnished and shall only include instructions that are applicable.
- d. Complete approved copies of all submittals required within this specification.

1.6 Control System Integrator

- A. 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.
- B. Where specific manufacturers and/or models of major hardware or software products (PLC, fiber or cellular equipment, etc.) are specified to be used on this project, the Control System Integrator shall have completed at least three projects, of similar size and scope, using that specified hardware or software.
- C. The Control System Integrator shall have field service staff located within 150 miles from the city of Fayetteville.
- D. The PWC shall have the right of access to the Control System Integrator's facilities and the facilities of their subcontractors 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.

PART 2 - PRODUCTS

2.1 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, 304 or 316 stainless steel, or as shown on the installation detail drawings.

- 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.

1. 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.

2. 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.

3. 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.

4. 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.

2.2 FUNCTIONAL REQUIREMENTS

- A. The Control Panel shall monitor and control equipment as shown on the drawings and as specified herein. RTUs shall communicate using DMP-3 protocol over fiber or cellular to PWC's existing remote SCADA system.

2.3 Control Panel

- A. Refer to applicable detail drawings contained within PWC's *Permit Design Manual* for additional requirements on the design, construction, and installation of Control Panels.
- B. Control Panel PLCs shall be provided as specified with no exceptions except as specified herein. PLC makes and model numbers are indicated on the Control Panel detail drawings. Although no model numbers are specified for the Data Flow System's PLC alternate, if provided, Data Flow Systems shall provide an RTU compatible with PWC's existing remote SCADA system meeting the applicable requirements of this specification and the RTU detail drawings. In addition, RTU's shall meet the following requirements;
 - 1. The RTU shall be capable of DMP-3 communications with the supplied radio utilizing fiber and/or cellular. An additional port shall be provided for programming and shall be Ethernet.
 - 2. The RTU shall provide the control functionality specified herein.
 - 3. The RTU shall provide the signal I/O processing of all the signals specified herein. As an acceptable PLC makes and models specified, Data Flow Systems may provide equivalent equipment that will interface with PWC's existing Data Flow System remote SCADA system.

2.4 CONTROL ENCLOSURES

- A. Control enclosures (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 that would compromise the integrity or rating of the enclosure.
- B. Enclosures shall be NEMA 4X stainless steel. All stainless steel enclosures shall be polished to a No. 4 finish.
- C. Enclosures shall be fitted with pad-lockable latch kits. Door latches shall be all stainless steel. Gaskets shall be polyurethane.
- D. Enclosures shall provide mounting for cellular antenna (if needed), 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.
- E. Enclosures shall be prefabricated cabinets and panels by Saginaw, Hoffman, Rittal, or equal.

2.5 UNINTERRUPTIBLE DC POWER SUPPLY

- A. Control Panels 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 RTU/PLC I/O to represent primary power status.
 - 4. Dry contact output for low battery, wired into the RTU/PLC I/O.
 - 5. Battery backup power shall be provided for a minimum of 4 hours.

2.6 CONTROL OPERATORS

- A. Control operators such as pushbuttons (PB), selector switches (SS), and pilot lights (PL) shall be Allen Bradley 800H, 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.

2.7 LIGHTNING PROTECTION AND/OR TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

- A. Lightning protection and TVSS shall be provided to protect all electronic equipment from multiple lightning 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 Square D, Edco, Phoenix Contact, or approved equal.

PART 3 - EXECUTION

3.1 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.
- D. The Control Panel shall be wall mounted on the exterior of the lift station pump building or on a fabricated galvanized electrical equipment rack with an aluminum hood provided by the Contractor. Refer to lift station site plan. The Contractor shall

provide a sun/rain shield for the Control Panel when building mounted or for the entire electrical equipment rack if provided. Refer to sun/rain shield and electrical equipment rack detail drawings.

- E. At a minimum, the Control Panel shall be grounded to the site grounding system by means of a #6 CU ground wire connected to a ground rod located within five (5) feet of the Control Panel mounting structure.

3.2 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 Control Panel functions shall be field tested from their primary actuation or process measurement 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.

3.3 SYSTEM ACCEPTANCE TEST (SAT)

- A. The Control System Integrator shall perform an unwitnessed site test to completely test the system's local functionality in preparation for coordinating communications with PWC and their existing remote SCADA system. After acceptable communications and interface with PWC's existing remote SCADA system has been established, another site test shall be performed for PWC and the Engineer to witness. The Control System Integrator shall submit a letter to PWC and the Engineer 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 lift 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 (control panels, starters, valves, instruments, switches, etc.)

through the wireless and other network media to the existing HMI computer screens at the PWC's facilities.

3.4 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

4.1 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 Control Panel)
 - b. DO - Discrete Output (dry contact from Control Panel with a maximum of 24 VDC 1 A applied to contact)

4.2 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 13446

**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. The ConBlock 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.

FORM OF PROPOSAL

AIRPORT LIFT STATION #29 REPLACEMENT

FAYETTEVILLE, NORTH CAROLINA

To: CITY OF FAYETTEVILLE, NC
NORTH CAROLINA

The undersigned hereby signifies that the Bidder's intention and purpose to enter into a Formal Contract with the City of Fayetteville, to furnish and perform all labor, materials, tools, equipment, apparatus, supplies, etc., required and to do all the work necessary for and because of the construction, erection, and/or installation of the proposed

AIRPORT LIFT STATION #29 REPLACEMENT

There is deposited, herewith, cash, cashier's check or a certified check in the amount of _____ dollars (\$ _____) or a Bid Bond in the amount of five percent (5%) of the total aggregate amount of this Bid for each contract (if applicable) made payable to the Owner, the same to be refunded to the undersigned under the conditions of and in accordance with the terms of the Instructions to Bidders and this Proposal which are as follows:

THAT: The undersigned carefully examined the Instruction to Bidders Special Provisions and the Specifications and Plans and this Form of Proposal and the Contract Documents and fully understands them and acknowledges receipt of all Addenda issued.

THAT: The undersigned carefully examined the site or sites of the project or projects and is familiar with the conditions under which the work, or any part of it, is to be done and the conditions which must be fulfilled in furnishing and/or installing, erecting or constructing of any or all items of the project.

THAT: The undersigned will provide all necessary tools, machinery, apparatus, and all means necessary to do all work will furnish all materials, equipment, apparatus, and all else necessary to complete such Contract as may be entered into, and in the manner prescribed in the Contract and Specifications and according to the Plans and requirements under them of the Engineer, in the first class manner.

THAT: The right of the City of Fayetteville and the recommendations of the Engineer are not to be questioned in the award of Contract.

THAT: It is the intention of the City of Fayetteville subject to the conditions set forth, to award contracts for the project on the basis of bids received at this letting and in such manner as they may decide as being in the best interest of the City.

THAT: The undersigned shall submit, in blank spaces provided, all data, guarantees and other information called for.

THAT: The undersigned shall submit, herewith, drawings, shop drawings, material submittals or samples and Specifications showing and describing in detail the equipment and/or apparatus which the undersigned proposes to furnish.

THAT: This Proposal shall be signed and submitted in the manner prescribed in the Instructions to Bidders.

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

THAT: Should this Proposal be accepted by the City and the undersigned fails or neglects to execute such Contract with the City of Fayetteville and to furnish the required bond within ten (10) days after receiving a notification from the City that such Proposal was accepted, the above amount of _____ dollars (\$ _____) deposited herewith shall be retained as liquidated damages. The City reserves the right to extend the time allowed for executing the Contract and furnishing the bond.

THAT: The City reserves the unqualified right to reject any or all proposals.

THAT: On being awarded the Contract, the undersigned will execute a Performance and Payment Bond, satisfactory to the City of Fayetteville on the form included hereinafter, equal to one hundred percent (100%) of the Contract price, as surety for the faithful performance of the Contract.

THAT: The Performance Bond and Payment Bond shall be written by a bonding firm approved by the City of Fayetteville.

THAT: A proposal made by a corporation must be signed by its proper officers in a legal manner and its official address stated herein.

THAT: A proposal made by a firm shall be signed with the name of each member of said firm and the firm name added, with the official address of said firm.

THAT: The undersigned will complete such Contract as is hereby proposed to enter into within the time stated in the Notice to Proceed and stipulated in the Contract Documents.

THAT: That the General Contractor shall be designated and act as the Project Expediter as outlined in the General Conditions.

THAT: The unit price quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to

compute the total value of charges in scope of the work all in accordance with the Contract Documents.

THAT: That quantities are estimated and are not guaranteed; they are solely for comparing Bids and establishing the total Bid amount. The Contract 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.

THAT: The undersigned proposes to enter into a contract in accordance with this Proposal and the Plans and Specifications and the Contract Documents attached together with all appurtenances, for the City of Fayetteville, NC for the following price or unit price:

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
AIRPORT LS PART "D" SANITARY SEWER UTILITIES						
D-1	G-1	Mobilization and Demobilization @ lump sum	1	LS		
D-2	G-2	Traffic Control & Traffic Plan @ lump sum	1	LS		
D-3	G-3	Borrow Excavation Select Backfill @ per cubic yard	1081	CY		
D-4	G-4	Clearing and Grubbing @ per Acre	0.33	AC		
D-5	G-5	Seeding and Mulching @ per Acre	0.36	AC		
D-6	D-1	8" Ductile Iron Sewer Main 0-6' depth @ per linear ft	4.5	LF		
D-7	D-1	8" Ductile Iron Sewer Main 6-8' Depth @ per Linear ft.	43	LF		
D-8	D-1	8" Ductile Iron sewer Main 8-10' Depth @ per Linear ft	19	LF		
D-9	D-1	8" Ductile Iron sewer Main 10-12' Depth @ per Linear ft	13	LF		
D-10	D-1	8" Ductile Iron sewer Main 12-14' Depth @ per Linear ft	16.5	LF		
D-11	D-1	8" Ductile Iron sewer Main 16-18' Depth @ per Linear ft	23	LF		
D-12	D-1	8" Ductile Iron sewer Main 18-20' Depth @ per Linear ft	34	LF		
D-13	D-1	8" Ductile Iron Sewer Main 20-22' depth @ per linear ft	43	LF		
D-14	D-1	8" Ductile Iron Sewer Main 22-24' Depth @ per Linear ft.	16	LF		

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
D-15	D-24	Pipe Bollard @	3	EA		
D-16	D-2	Connect to existing wet well -Core and boot @	1	EA		
D-17	D-10	Sanitary sewer Manhole 10-12' Depth @	2	EA		
D-18	D-10	Sanitary Sewer Manhole 18-20' Depth @	1	EA.		
D-19	D-10	Sanitary Sewer Manhole 20-22' Depth @	1	EA.		
D-20	D-4	Sanitary Sewer Testing @	1	LS		
D-21	D-8	Force Main 6" RJDI @	103	LF		
D-22	D-9	6" Force Main Bypass Assembly @	1	EA.		
D-23	D-5	Submersible Lift Station includes Base Bid Barnes Chopper Pump or Approved Equal @	1	LS		
D-24	D-7	Discharge Valve Vault @	1	LS		
D-25	D-6	Remove existing lift station and convert to manhole @	1	LS		
D-26	D-25	Remove & dispose concrete curb & gutter; replace with 30" roll back curb & gutter @	35	LF		

Item No.	Ref. No	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
D-27	D-11	Remove and Dispose existing 6" force main @	17	LF		
D-28	D-23	Extend existing 1" water service @	65	LF		
D-29	D-20	24" CL 111 RCP Storm drainage 0-6' depth @	39	LF		
D-30	D-26	SD MH 6-8' depth @	1	EA		
D-31	D-21	6" Compacted aggregate Base Course LS Site @	129	TON		
D-32	D-22	6' Chain link fencing & 15' Double gate @	191	LF		
D-33	D-12	Strip, stockpile and respread topsoil @	175	CY		
D-34	D-3	Undercut Excavation @	50	CY		
D-35	D-18	Class B Rip Rap 24" thickness (plunge pool) @	40	SY		
D-36	D-27	6" Compacted gravel (plunge pool) with filler fabric underlayment @	13.2	TN		
D-37	D-16	Straw with net matting @	660	SY		
D-38	D-15	Temporary Gravel Construction Entrance @	1	EA		
D-39	D-13	Temporary Silt Fence @	448	LF		
D-40	D-14	Temporary 5' Reinforced Silt Fence' @	4	EA		
D-41	D-28	Inlet protection @	2	EA		
D-42	D-29	12" Diameter coir log @	98	LF		
D-43	D-30	RW Diversion water bar @	2	EA		
		SUBTOTAL PART D SANITARY SEWER UTILITIES				

Item No.	Ref. No.	Item	Estimated Quantities	Unit	Unit Price	Cost Extension
AIRPORT LIFT STATION PART "E" ELECTRICAL CONSTRUCTION						
E-1	E-1	Electrical service entrance with hood and rack structure @	1	LS		
E-2	E-2	Underground Service entrance @	1	LS		
E-3	E-3	200 ampere 277/480 VAC main enclosed circuit breaker stainless steel Nema 4X @	1	LS		
E-4	E-4	200 ampere automatic transfer Switch stainless steel 4 pole @	1	LS		
E-5	E-5	200 ampere panel MDP 277/480VAC @	1	LS		
E-6	E-6	Dry Type transformer @	1	LS		
E-7	E-8	Panelboard A @	1	LS		
E-8	E-7	Miscellaneous conduit switches/outlets and area light and pole conduit labor and installation @	1	LS		
E-9	E-9	125 KW standby engine generator @	1	LS		
E-10	E-10	Fuel and Installation @	1	LS		
E-11	E-11	Packaged pump station control panel with soft start starters @	1	LS		
E-12	E-12	Surge protective Device @	1	LS		
E-13	E-13	RTU @	1	LS		
SUBTOTAL PART "E" ELECTRICAL UTILITIES						

SUMMARY

BASE BID:

SUBTOTAL PART D \$ _____
SUBTOTAL PARTE \$ _____
TOTAL PARTS D & E \$ _____

ALTERNATE #1 – BARNES PUMP MODEL 4XESCMB40044. 40HP 260 GPM @ 83' TDH WITH A 245MM IMPELLER OR APPROVED EQUAL (D-23 \$ _____)

SUBTOTAL PART D \$ _____
SUBTOTAL PARTE \$ _____
TOTAL PARTS D & E \$ _____

The undersigned hereby certifies that he is a licensed Contractor under the provisions of Several Acts of the North Carolina Legislature, as amended regulating the practice of General Contracting, and that his license number is _____ (License Number)

COMPANY _____

An individual Contractor is required to furnish his social security number and a proprietorship, partnership and corporation are required to furnish their employer identification number to the County of Cumberland. Please indicate this information on this Bid Form as Follows:

Social Security Number: _____

Federal Employer Identification Number: _____

Respectfully submitted this _____ day of _____, 20__.

(Name of Firm or Corporation making bid)

By: _____

Witness

Title: _____

(Owner, Partner, or Corp. Pres. or
Vice-Pres. only)

(Proprietorship of
Partnership)

Attest:

Address: _____

By _____

Title _____

(Corp. Sec. or
Asst. Sec. Only)

License No.: _____

(Corporate Seal)

Addenda Received and Used
in Computing Bids (Initial as appropriate)

Addenda No. 1 _____ Date _____

Addenda No. 2 _____ Date _____

Addenda No. 3 _____ Date _____

NORTH CAROLINA
CUMBERLAND COUNTY

I, _____, A Notary Public for said County and State, do hereby certify that
_____ Personally appeared before me this day and acknowledged the due
execution of the foregoing instrument.

Witness my hand and official seal, this the ____ Day of _____, 20____.

(Official Seal)

Notary Public

My commission expires _____, 20____.

PRINCIPAL SUBCONTRACTORS AND/OR SUB-BIDDERS

The Prime Contractor states that his Bid is based on quantities received from the following Subcontractors for the various categories of work listed which may exceed 5% of the Contract work; the Prime Contractor agrees that if he is the successful Bidder and if the listed Subcontractors are approved by the Designer, he shall contract with the approved listed Subcontractors for the performance of this work. The total amount of subcontracted work cannot exceed 50% of the Contract Amount.

<u>Subcontractors Name</u>	<u>Type of Work</u>	<u>% of Contract Amount</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

THIS FORM SHALL BE SUBMITTED WITH PROPOSAL

Company

Bidder's Signature

Title