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SECTION 25 50 00
PLANT SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

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SECTION 25 50 00**SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM****PART 1 – GENERAL****1.01 SCOPE OF WORK:**

- A. Attention is drawn to the requirement that the “Plant SCADA System” and the “Plant Fiber Optics Network and Instrumentation” shall be furnished by two separate vendors: the SCADA System Integrator (SSI) and the Instrumentation and Fiber Optics Network Integrator (ICSI). The specific roles of these two integrators are specified below.
- B. The SCADA System Integrator (SSI): (Emerson)
1. Shall be engaged and contracted directly by the General Contractor.
 2. Shall furnish and fully commission the plant Local Control Panels (LCPs i.e. “SCADA Panels”), all SCADA software, SCADA hardware, SCADA network configuration, and all system configuration and system integration of the equipment they furnish for the Travis Field Water Reclamation Facility. Work performed by the SCADA System Integrator (SSI) shall also include system integration of the new Travis Field WRF SCADA system data into the Owner’s existing city-wide SCADA system.
 3. Shall perform onsite startup and thorough testing of all systems while working onsite with the Contractor, various subcontractors, and the Instrumentation and Control System Integrator (ICSI).
 4. Shall furnish Record Prints for all SCADA or RTU panels they supply and/or modify under their contract with the General Contractor for this project.
 5. Shall furnish a System Diagram depicting the “As Installed” configuration of the plant SCADA system as furnished.
 6. Shall coordinate the interface to the SCADA system of data from programmable logic controllers (PLCs) supplied by various equipment suppliers such as chemical feed pump suppliers, motor control center suppliers, the MBR supplier, MBR supplier’s System Integrator, and other related equipment supplied by various vendors for this project.
 7. Shall furnish all labor, materials, equipment, and services required to install and place into correct operation the SCADA equipment and controls specified herein, as shown on the Contract Drawings and as needed to provide a fully functional and fully operational system.
 8. Shall be responsible for the satisfactory design, installation, programming, and commissioning of a complete and fully operational SCADA system that fully complies with the specifications within this document and regulatory requirements and the City of Savannah’s specific requirements.
 9. Shall provide hardware and software including firewalls, network security systems, or any other internet access security means as required to provide secure remote SCADA system access.
 10. Again, this work shall be performed, and hardware and software furnished by the SCADA System Integrator (SSI) under their contract with the GC.

- C. The Instrumentation and Fiber Network Integrator (IFNI): (MR Systems or Approved Equal)
1. Shall furnish and commission field instruments and required accessories that are not being supplied as part of vendor-furnished systems as defined herein.
 2. Shall furnish the fiber optics cable and fiber optics termination/networking panels (FOTPs) with integral networking hardware as required to meet the City of Savannah's SCADA specifications. Network hardware shall be furnished to the Instrumentation and Control System Integrator by the City of Savannah's SCADA Department.
 3. Shall perform OTDR testing of the fiber optics cable "on the reel" prior to installation by the Contractor.
 4. After the fiber optics cable has been installed by the Contractor, the Instrumentation and Fiber Network Integrator (IFNI) shall "connectorize" the fiber optics cable and perform OTDR testing to certify that the cable has not been damaged during installation. Test results shall be provided to the Engineer and Owner.
 5. Shall furnish Operations and Maintenance Manuals for the various field instruments supplied by the Instrumentation and Fiber Network Integrator (IFNI).
 6. Shall furnish a Fiber Optics System Network Diagram depicting the "As Installed" configuration of the SCADA and plant network. This network diagram shall include both fiber optics, wireless, and copper (Cat 6) networking.
 7. Shall furnish electrical elementaries for the Fiber Optics Termination/Networking Panels.
 8. Shall include a Bid Allowance amount of **\$16,000.00** for purchase of the Operators Console specified below and two (2) office chairs to be selected by the Owner.
 9. Shall include in their price, two (2) scheduled maintenance trips for inspection and calibrations of the supplied system during the warranty period. Maintenance trips shall each be one (1), 8-hour day with the first being scheduled six months after substantial completion and the second being eleven (11) months from the same date. All labor, travel and living costs associated to these two (2) days shall be included in the Contractors bid. Service shall be performed by qualified service technicians.

1.02 **QUALIFICATIONS OF SCADA SYSTEM INTEGRATOR (SSI) AND INSTRUMENTAION AND FIBER NETWORK INTEGRATOR (ICSI)**

- A. The SCADA System Integrator (SSI) and Instrumentation and Fiber Network Integrator (IFNI) shall coordinate fully with the Engineer's requirements.
- B. All control system integration designed by SCADA System Integrator (SSI) or by the Instrumentation and Fiber Network Integrator (IFNI) firm shall be performed under the direct supervision of a Registered Professional Engineer licensed in the State of Georgia.
- C. The SCADA System Integrator (SSI) and the Instrumentation and Fiber Network Integrator (IFNI) shall be regularly engaged in the type of work called for and have the resources to successfully execute the work. Resources shall be defined as capital facilities, personnel, and service. System Supplier shall have successfully

completed the installation of control systems of a similar magnitude and complexity and be able to furnish experience records and personnel contacts for each installation upon request.

- D. The SCADA System Integrator (SSI) shall be responsible for the detailed design, technical supervision for installation, field connections to equipment, and the proper functioning of the SCADA system to be furnished under these Specifications.
- E. The Instrumentation and Fiber Network Integrator (IFNI) shall have in its employ a permanent field service organization capable of providing the service and maintenance for the supplied system.
- F. The Instrumentation and Fiber Network Integrator (IFNI) must have a field service location with a full-time staff located within a 75-mile radius of the jobsite.
- G. All equipment furnished shall be of the latest proven design. The system shall be expandable to include future sites and equipment and shall be non-proprietary such that future equipment could communicate with installed equipment.
- H. Qualifications Statements: The Instrumentation and Fiber Network Integrator's (IFNI) personnel must have a minimum of ten years of experience in the design, programming, and start-up of instrumentation and control systems and SCADA systems for the municipal water and wastewater industry.
- I. The pre-approved SCADA System Integrator (SSI) is Emerson Process Management, Power and Water Solutions.
- J. The pre-approved Instrumentation and Fiber Network Integrator (IFNI) is MR Systems, Inc. of Norcross, Georgia.

1.03 SUBMITTAL REQUIREMENTS

- A. Submit proposed hardware and software for all products offered.

1.04 SPARE PARTS

- A. Spare parts shall be provided for all components so there is one spare for every five like items or part thereof.
- B. All spares shall be packed in a manner suitable for long-term storage and shall be adequately protected against corrosion, humidity and temperatures.
- C. Storage and handling instructions shall be provided with each spare part.
- D. One year's supply of calibration equipment, etc., as required for the equipment being supplied, shall be provided. Items with less than one year's shelf life shall be provided at required intervals to ensure reliable systems operation throughout the first year following system acceptance.

1.05 FUNCTIONAL DESCRIPTION OF CONTROL SYSTEM

A. General Programming Requirements:

1. All logic, data conversion, arithmetic, and control routines shall be programmed in the PLC located in the RTU itself and not in the SCADA software. The intent of this specification is that the SCADA software shall poll the PLC for all incoming data values and that minimal logic, data conversion, arithmetic, and control routines shall be programmed into the SCADA software. Any and all adjustments to operating Set points and parameters may be limited by the System Supervisor or Plant operator using the login and password security on the SCADA system, giving each operator a specific and appropriate level of control on the system.
2. Where requested by the Owner, all input, output, and data points, collected or controlled, at each SCADA panel shall also be communicated, recorded, displayed, or made available as an alarm at the SCADA server.

B. Plant Site Fiber Optic Communications Network:

1. Provide and install a multimode fiber optic network using Corning 50 micron, OM4 fiber optics cable to connect the following control panels to the plant-wide SCADA system Ethernet network.

Tag	Description & Location	SCADA Interface	Furnished By:
FOTP-IPS	Fiber Optics Termination/Network Panel at Influent Pump Station	Plant SCADA Network (Fiber Optics)	Instrumentation and Fiber Network Integrator (IFNI, MR Systems)
RTU-IPS	Existing Emerson RTU at the Influent Pump Station	FOTP-IPS - Plant SCADA Network (Fiber Optics)	This panel to be replaced or modified as required by the SCADA System Integrator (SSI, Emerson)
FOTP-HW	Fiber Optics Termination/Network Panel at Headworks, Drum Screens	Plant SCADA Network (Fiber Optics)	Instrumentation and Fiber Network Integrator (IFNI, MR Systems)
FCP-HW	Field Control Panel for Headworks Area	Hardwire I/O	Equipment Vendor (Parkson)
LCP-HW	SCADA Panel at Headworks Area	FOTP-HW - Plant SCADA Network (Fiber Optics)	SCADA System Integrator (SSI, Emerson)
FCP-VGR	Field Control Panel for Vortex Grit Removal Area	Hardwire I/O	Equipment Vendor (Hydro)
FOTP-MCCR	Fiber Optics Termination/Network Panel in MCC Room	Plant SCADA Network (Fiber Optics)	Instrumentation and Fiber Network Integrator (IFNI, MR)

Tag	Description & Location	SCADA Interface	Furnished By:
			Systems)
LCP-MCCR	SCADA Panel in MCC Room	Cat 6 (Ethernet) to Fiber Optics/Network Panel (FOTP-MCCR) in MCC Room	SCADA System Integrator (SSI, Emerson)
FOTP-MBR	Fiber Optics Termination/Network Panel in the Control Room	Plant SCADA Network (50 micron, OM4 Fiber Optics Cable)	Instrumentation and Fiber Network Integrator (IFNI, MR Systems)
FCP-MBR	MBR System Field Control Panel with SCADA Operator Interface Terminal for Control Rom	Cat 6 (Ethernet) to Network Interface Panel in Control Room	Kubota (MR Systems)
FCP-UV	Field Control Panel for UV System #1	Ethernet (Cat6) Cable to FOTP-HW	Equipment Vendor (Enaqua)
EFFL-SAMP	Effluent Sampler	4 to 20 mA Pacing Signal from LCP-HW	Equipment Supplier
VFD-PE1	VFD for Plant Effluent Pump #1 in MCC Room	Ethernet (Cat6) Cable to FOTP-MCCR	Contractor
VFD-PE2	VFD for Plant Effluent Pump #2 in MCC Room	Ethernet (Cat6) Cable to FOTP-MCCR	Contractor
VFD-PE3	VFD for Plant Effluent Pump #3 MCC Room	Ethernet (Cat6) Cable to FOTP-MCCR	Contractor
VFD-PE4	Future VFD for Plant Effluent Pump #4 MCC Room	Ethernet (Cat6) Cable to FOTP-MCCR	Future
FCP-RWPS	Field Control Panel at Plant Reuse Water Pump Station	Hardwire I/O to LCPHW Ethernet (Cat6) Cable to FOTP-HW	Equipment Vendor (SyncroFlo)
FCP-SC	Field Control Panel at Speece Cone (Effluent DO Improvement System)	Ethernet (Cat6) Cable to FOTP-HW	Equipment Vendor (ECO2)
VFD-PDP-1	Plant Drain Pump No. 1 VFD	Hardwired to LCP-MCCR and Ethernet (Cat6) Cable to FOTP-MCCR	Contractor
VFD-PDP-2	Plant Drain Pump No. 2 VFD	Hardwired to LCP-MCCR and Ethernet (Cat6) Cable to FOTP-MCCR	Contractor
FOTP-L/A	Fiber Optics	Plant SCADA	Instrumentation and

Tag	Description & Location	SCADA Interface	Furnished By:
	Termination/Network Panel at Lime/Alum Building	Network (50 micron, OM4 Fiber Optics Cable)	Fiber Network Integrator (IFNI, MR Systems)
FCP-L/A	Field Control Panel at Lime Slurry/Alum Area	Hardwired to LCP-MCCR	Equipment Vendor (Burnett Lime)
FOTP-BFP	Fiber Optics Termination/Network Panel in Belt/Filter Press Building	Plant SCADA Network (50 micron, OM4 Fiber Optics Cable)	Instrumentation and Fiber Network Integrator (IFNI, MR Systems)
LCP-BFP	SCADA Panel in Belt/Filter Press Building	Cat 6 (Ethernet) to Fiber Optics/Network Panel (FOTP-BFP)	SCADA System Integrator (SSI, Emerson)
FCP-BFP	Field Control Panel at Sludge Dewatering Building	Hardwired to LCP-MCCR	Existing Panel furnished by the City of Savannah
FCP-EG1	Field Control Panel for Generator No. 1	Cat 6 (Ethernet) to Fiber Optics/Network Termination Panel (FOTP-BFP)	Equipment Vendor
FCP-EG2	Field Control Panel for Generator No. 1	Cat 6 (Ethernet) to Fiber Optics/Network Termination Panel (FOTP-BFP)	Equipment Vendor
Operators' Console	Control Room	Not Applicable.	Instrumentation and Fiber Network Integrator (IFNI, MR Systems)

- C. Field Instruments to be Supplied by Instrumentation and Fiber Network Integrator (IFNI)
1. Where indicated, field instruments and accessories not furnished as part of vendor-furnished packages shall be supplied by the Instrumentation and Fiber Network Integrator (IFNI).
 2. Furnish each field instrument component furnish a stainless-steel nameplate with engraved Instrument Tag and calibrated instrument range. For example, an ultrasonic level transmitter and level transmitter shall be furnished with two stainless steel tags. One for the ultrasonic level transducer and one for the ultrasonic level transmitter.
 3. Each field-mounted AC Power and Analog Surge Protector shall be furnished with a stainless-steel nametag engraved with the Instrument Tag for the surge protector.

Instrument Tag	Description	Range	Comments
LE-101	Ultrasonic Level Transducer	0 to 30 ft.	Provide Submergence Shield and 30 ft. of cable.
LIT-101	Ultrasonic Level Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-101	AC Power and Analog Surge Protector	N/A	Field-mounted
LSHH-101	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
LSSL-101	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
FSP-107	AC Power and Analog Surge Protector for Existing FE/FIT-107 Magnetic Flowmeter	N/A	Field-mounted at existing Magmeter.
FE-108	24" Magnetic Flowmeter Body	0 to 24 MGD	Provide two (2) Stainless Steel Grounding Rings.
FIT-108	Magnetic Flowmeter Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-108	AC Power and Analog Surge Protector	N/A	Field-mounted
FSP-201	AC Power and Analog Surge Protector for Influent Sampler	N/A	Field-mounted
LE-403	Ultrasonic Level Transducer	0 to 30 ft.	Provide Submergence Shield and 30 ft. of cable.
LIT-403	Ultrasonic Level Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-403	AC Power and Analog Surge Protector	N/A	Field-mounted
LSHH-403	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
LSSL-403	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
FE-408	12" Magnetic Flowmeter Body	0 to 18 MGD	Provide two (2) Stainless Steel Grounding Rings.
FIT-408	Magnetic Flowmeter Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-408	AC Power and Analog Surge Protector	N/A	Field-mounted
LE-701	Ultrasonic Level Transducer	0 to 30 ft.	Provide Submergence Shield and 30 ft. of cable.
LIT-701	Ultrasonic Level Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-701	AC Power and Analog Surge	N/A	Field-mounted

	Protector		
LSHH-701	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
LSSL-701	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
AE-707	Dissolved Oxygen Sensor	0 to 10 ppm	Mounts under cover; No solar hood required. Verify Sensor type (flow-thru or Insertion.)
AIT-707	Dissolved Oxygen Analyzer/Transmitter	0 to 10 ppm	Mounts under cover; No solar hood required.
FSP-707	AC Power and Analog Surge Protector	N/A	Field-mounted
FE-708	24" Magnetic Flowmeter Body	0 to 24 MGD	Provide two (2) Stainless Steel Grounding Rings.
FIT-708	Magnetic Flowmeter Transmitter	N/A	Provide Aluminum Solar Hood.
FSP-708	AC Power and Analog Surge Protector	N/A	Field-mounted
LE-1001	Ultrasonic Level Transducer	0 to 30 ft.	Supplied by Provide Submergence Shield and 30 ft. of cable.
LIT-1001	Ultrasonic Level Transmitter	N/A	Mounts in Xylem (Flyght) Control Panel.
FSP-1001	AC Power and Analog Surge Protector	N/A	Field-mounted
LSHH-1001	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
LSSL-1001	Float Type Level Switch	3 to 30 ft.	Supply 50 ft. of Cable.
FE-1201	6" Magnetic Flowmeter Body	0 to 6 MGD	Provide two (2) Stainless Steel Grounding Rings.
FIT-1201	Magnetic Flowmeter Transmitter	N/A	Supply cable length as require. No solar hood required since transmitter mounts indoors.
FSP-1201	AC Power and Analog Surge Protector	N/A	Field-mounted

PART 2 – PRODUCTS

2.01 GENERAL

- A. SCADA hardware and programming services for this project shall be furnished by the city's SCADA System Integrator (SSI - Emerson) under a direct contract with the general contractor.

1. The SCADA System Integrator (SSI, Emerson) shall be retained by the GC to furnish all SCADA system hardware, SCADA software, and System Integration Services as required for the successful completion of this project.
2. It shall be the responsibility of the SCADA System Integrator (SSI, Emerson) to perform the following tasks:
 - a. Thoroughly review all plans and specifications to gain a complete understanding of the overall requirements for the construction of this treatment facility and the specific scope of work required to be completed by the SCADA System Integrator (SSI, Emerson).
 - b. Recommend to the City of Savannah the required SCADA I/O panels and/or Remote Telemetry Units necessary for communications with the following vendor furnished factory control panels or hardwired I/O from discrete instruments, field control panels or other systems:
 1. Plant Influent Pump Station with existing Emerson RTU (RTU-IPS). This panel is to be modified or replaced as determined by Emerson Process.
 2. Headworks Screens equipment, by Parkson, including a Field Control Panel (FCP-HW), four (4) Drum Screens, four (4) Compactors, and two (2) motor operated valves.
 3. Headworks Vortex Grit Removal system and Grit Classifier system with new Field Control Panel (FCP-VGF) by WEMCO.
 4. Plant Equalization Tank level monitoring, four (4) associated Equalization Pumps (Flight) with Variable Frequency Drives, and a Field Control Panel (FCP-EQPS).
 5. MBR System with Field Control Panel (FCP-MBR) all furnished by Kubota with SCADA by MR Systems.)
 6. UV Disinfection System including three (3) UV systems and three (3) Field Control Panels (FCP-UV1, PCP-UV2 and FCP-UV3) all furnished by Enaqua.
 7. Plant Effluent Pump Station with Wet Well, four (4) Plant Effluent Pumps (Peerless) each with a VFD, associated wet well level monitoring instrumentation, dissolved oxygen analyzer/transmitter and Plant Effluent Flowmeter.
 8. Plant Reuse Water Pump Station with two Pumps (by SynchroFlo) and associated flow metering.
 9. Effluent Dissolved Oxygen Improvement System with two (2) feed pumps, two (2) compressors, Speece Cone, and Field Control Panel (FCP-SC).
 10. Plant Drain Pump Station with Wet Well level monitoring and two (2) Flyght pumps each with a VFD.
 11. Lime and Alum chemical feed systems with Field Control Panel (FCP0Lime/Alum) all furnished by Burnett Lime.
 12. The Owner's existing Belt Filter Press system with sludge feed, water booster pump, Polymer Feed Pump, Dry Sludge Feed pump, and Field Control Panel (FCP-BFP) will be reused at this plant.
 13. Two (2) Emergency Generators, associated

transfer/switching equipment, and two (2) Field Control Panels (FCP-EG1 and FCP-EG2).

B. Communications

1. Plant Control Network Scope of Work:

- a. The plant control communications networks shall consist of an industrial Ethernet network running primarily over 50-micron (OM4) fiber optics cable using ST connectors.
- b. Ethernet fiber optics switches to be Juniper E2300 Series with 2 FX and 12 Copper Ethernet ports.
- c. The plant fiber network shall be supplied, installed, terminated, and programmed by the Instrumentation and Fiber Network Integrator (IFNI).

2. Documentation:

- a. The Instrumentation and Fiber Network Integrator (IFNI) shall submit a proposed network diagram including all nodes and links between nodes, with descriptions of proposed addressing schemes and any network or device configuration information with the system submittals. At commissioning, the Instrumentation and Fiber Network Integrator (IFNI) shall supply an As-Built network diagram providing all of the information above as well as any other pertinent network information with the system O&M manuals.

3. Components:

- a. Industrial Ethernet Switches: Ethernet switches shall be industrial type DIN-Rail mounted devices powered by an industrial 24VDC power supply. Power supply wiring shall be plug-in screw terminal type terminal blocks. Devices using plug-in transformers or pig-tail type plugs will not be acceptable. Switches may be either managed or unmanaged type store-and-forward switches. Network connection to the device shall be by standard RJ45 ports connecting to CAT5E twisted pair cable for copper connections, or by standard SC or ST duplex connectors for multimode fiber optic connections. An Ethernet switch shall be located in each panel supplied for the Plant site. All switches supplied under this contract shall be identical. All switches shall have a minimum of two duplex fiber optic ports per switch, and the sufficient RJ45 copper ports to connect all available equipment in the respective panel plus an available port for maintenance. The switch located in the Main Plant SCADA panel shall also have two connections available for SCADA computers, one for the computer supplied with his project, and one for future expansion. Switches shall be manufactured by Juniper, no exceptions allowed.
- b. Fiber Optic Cable: Fiber optic cable shall be 50-micron multimode cable (OM3) designed for indoor and outdoor use, rated for use in general purpose, riser, aerial, duct, and direct-buried applications. Fiber optic strands shall be color coded and tight-buffered within

the cable and shall not require a fan-out kit of transition splicing for termination. Fiber optic cable water blocking shall be gel-free. Maximum attenuation shall be 3.4B/km. Fiber optic cables supplied under this contract shall have a minimum of three pairs of fibers per cable and shall be terminated with ST type connectors. All network links which extend outside of a building or structure shall use fiber optic cable. Copper network cables shall not extend outside any building or structure. Careful attention shall be paid to not damage the fiber optic cable during installation; all pulling, bend, and conduit for fiber optic cable shall be per manufacturer's recommendations. Any fiber optic cable which is damaged by installation shall be removed and replaced in its entirety. No splices shall be permitted in fiber optic cables. Fiber optic cable shall be manufactured by Corning.

- c. Copper Ethernet Cable: Copper Ethernet cables shall be a minimum CAT6 twisted pair type with RJ45 connectors with snag less boots. Patch cables used within control panels shall be minimum 24 AWG, pre-terminated patch cables. Network cables extending outside of control panels (e.g. connecting the SCADA computer to the plant network) shall be minimum 24 AWG and provided with a proper strain-relief hub or bushing and may be field terminated. Under no circumstances shall copper Ethernet cables extend outside a building or structure. Copper Ethernet Cables shall be as manufactured by Belden, Black Box, Mohawk, or approved equivalent.

2.02 OPERATORS CONTROL CONSOLE

- A. The Instrumentation and Fiber Network Integrator (IFNI) shall furnish one (1) Operators Control Console to be installed by the Contractor in the Control Room of the Operations Building.
- B. The Operators Control Console shall be manufactured by Winsted Corporation of Minneapolis, Minnesota and, as a minimum, shall be constructed of the following components. The Owner shall select all colors. The Instrumentation and Control System Integrator shall include a **Bid Allowance of \$16,000.00** for the Operators Console and two (2) office chairs to be selected by the Owner.
1. Two (2) Single Bay Stringers Model # 56002.
 2. One (1) Double Bay Stringer, Model #56004.
 3. Four (4) Work Surface Support Brackets, Model #56262.
 4. Four (4) Vented Doors, Model #56302.
 5. Two (2) Single Bay Hinged Covers, Model #64042.
 6. One (1) Double Bay Hinged Covers, Model #64053.
 7. Two (2) 45 Degree Hinged Covers, Model #64053.
 8. One (1) Pair Insight End Frames, Model #64061.
 9. Four (1) Insight Intermediate Frame, Model #64062.
 10. Four (4) Bottom Shelves, Model #64082.
 11. Four (4) Lift Off Panels, Model #64100.
 12. Two (2) 45 Degree Corners, Model #64183.

13. One (1) Pair Shark Gray Side Panels, Model #64520.
14. Two (2) 1-Bay Endurance+ 20" Deep, Model #64672.
15. One (1) 2-Bay Endurance+ 20" Deep, Model #64674.
16. Two (2) 45 Degree Endurance+ Work Surface, Model #64683.
17. Three (3) Single LCD Pole Mount, Model #W6471.

2.03 Fiber Optics Termination Panels

- A. Fiber Optics Termination Panels shall be supplied and commissioned by the Instrumentation and Fiber Network Integrator (IFNI). The physical installation of these panels shall be performed by the Contractor's Electrical Subcontractor.
- B. The following Fiber Optics Termination Panels shall be supplied:

Tag	Location	Minimum Number of Ethernet Ports	Materials of Construction
FOTP-IPS	Influent Pump Station	Fiber: 2 In/2 Out Copper: 6	NEMA 4X, #316 SST (White Powder-coated finish)
FOTP-HW	Headworks	Fiber: 2 In/2 Out Copper: 10	NEMA 4X, #316 SST (White Powder-coated finish)
FOTP-MCCR	MCC Room	Fiber: 2 In/2 Out Copper: 18	NEMA 4X, #316 SST (White Powder-coated finish)
FOTP-MBR	Operators Control Room	Fiber: 2 In/2 Out Copper: 16	NEMA 4X, #316 SST (White Powder-coated finish)
FOTP-BFP	Belt Filter Press Building	Fiber: 2 In/2 Out Copper: 8	NEMA 4X, #316 SST (White Powder-coated finish)

- C. All fiber optics termination panels shall be constructed of #316 stainless steel and shall meet NEMA 4X requirements. The interior and exterior of each panel shall be of white powder-coated finish to reduce internal panel heat buildup due to sunlight. The minimum size of each Fiber Optics Termination Panel shall be 30" high by 24" wide by 12" deep.
- D. Ethernet fiber optics network switches shall be supplied by the City of Savannah to the Instrumentation and Fiber Network Integrator and shall be Juniper Networks Model EX2300 Series suitable for creating a dual counter-rotating redundant fiber optics ring running on 50 micron, OM3 fiber optics cable.
- E. Provide one (1) online UPS system for each Fiber Optics Termination Panel (FOTP). The online UPS shall be sized to provide a minimum of 30 minutes of AC power backup for each FOTP enclosure. Acceptable online UPS systems shall be manufactured by Vertiv (Liebert) or APC by Schneider Electric. Alternately, if the Juniper Networks Model EX2300 Series Ethernet switches are powered by 24 VDC, it shall be permissible to provide a Delta Electronics Battery Backup Unit and two 12 VDC, 9 amp-hour batteries.

- F. Provide two Corning SPH-01P fiber termination housings integrally mounted in each Fiber Optics Termination Panel (FOTP). One fiber optics termination housing will accommodate the incoming 12-fiber, 50 micron, OM3, multimode fiber optics cable and the second fiber optics termination housing will accommodate the outgoing 12-fiber, 50 micron, OM3, multimode fiber optics cable. Provide Corning CCH-CP12-E4 - CCH Panels with 12-fiber OM3, ST adapters for 50-micron fiber, fiber optics jumper cables, wire ties, and all other ancillary components required for a complete, professional fiber installation.
- G. Provide one (1) single phase AC power surge protector to protect the UPS system from AC power surges or transients. Raw, unfiltered AC service power shall be connected to a terminal strip, through the Edco FAS-120AC surge protector and then through a 15-amp circuit and ancillary devices to a simplex AC power receptacle. In the event the UPS fails, it shall be possible to unplug the fiber optics Ethernet switch from the UPS and plug it directly into the simplex receptacle which is protected by the Edco surge protector. This provides temporary power to the Fiber Optics Termination Panel while the UPS is being repaired or replaced.

PART 3 – SOFTWARE

3.01 GENERAL

- A. When multiple copies are provided of the same package, all versions shall be identical.
- B. The SCADA System Integrator (SSI, Emerson) shall be responsible for providing and installing the software as required.
- C. The programming and configuration of the software shall be by the Instrumentation and SCADA System Integrator (SSI, Emerson) similar to the Owners existing software.
- D. All software licenses shall be transferred to the Owner prior to system acceptance by the Owner.
- E. SCADA Software Suite: Supervisory Control and Data Acquisition (SCADA) Software shall be provided by Emerson.
 - 1. The primary server SCADA software shall include both run time and full development capabilities. The secondary server SCADA software shall include runtime capabilities at a minimum.
 - 2. The system shall include: Automatic alarm dial-out capabilities with phone, email, and text messaging capabilities.
 - 3. The system shall include a minimum of two simultaneous remote internet client connections.
 - 4. SCADA software shall be commercially available off-the-shelf and shall be non-proprietary, such that independent systems integrators are able to provide configuration and maintenance services as required.

5. Software shall be a Client/Server architecture. No Microsoft Client Access Licenses (CAL) shall be required for full installation (thick) or browser-based (thin) clients. Terminal Services shall not be required.
6. Software licenses shall be upgradable for an annual fee such that the client is able to download the current version of the product.
7. Software shall be tag-based and have an integrated development environment for creation of all aspects of the application.
8. Software shall be compatible with commercially available, off-the-shelf PC hardware running 64-bit Microsoft Windows client and server operating systems currently available at the time of installation.
9. Software shall not require dedicated server-level PC hardware for any individual system components.
10. Software shall support any computer running a thick copy of the software performing as both an application server and a user interface. Software shall support automatic server failover to an unlimited number of servers.
11. Software shall include the following integrated components. These components shall not require separate software to be installed.
 - a. I/O drivers for common industry-standard protocols.
 - b. Alarms management and alarms history.
 - c. Historian.
 - d. Real-time and historical data trend creation.
 - e. Report generation.
 - f. Application backup and version control.
 - g. Security management.
 - h. Support for networked applications.
 - i. Support for service redundancy.
 - j. An object-oriented scripting language with debugging tools.
12. The software manufacturer shall offer, at a minimum, the following optional components.
 - a. Browser-based thin clients for PCs and Mobile devices.
 - b. Alarm notification (e-mail, text message, and voice).
 - c. Interfaces for third-party software programs to access data (real-time and historical) and alarms. Such interfaces may include OPC, ODBC, and SNMP.
13. Software shall compensate for deploying the same application simultaneously on a variety of monitor resolutions, while maintaining the aspect ratios of all displays.
14. Software shall support an automatic, orderly shutdown when switching to UPS backup power and power levels drop to a predefined Set point. Software shall support automatically restart to full operation without user

intervention.

15. Software shall provide a mechanism to backup and restore the entire application configuration.
16. Software shall include an integrated security system supporting an unlimited number of user accounts, roles, and privileges. System users with appropriate account privileges shall be capable of changing the application configuration without requiring the software supplier's assistance. No lockout mechanisms or passwords shall be withheld from the final customer.
17. Integrated software help manuals shall be provided to assist operators and maintenance personnel with operation and configuration tasks.
18. SCADA software for the plant instrumentation and control system shall be the latest version compatible with the City of Savannah's existing SCADA/telemetry system as supplied by Emerson Process, Power and Water Solutions.

PART 4 – EXECUTION

4.01 INSTALLATION

A. Installation

1. The Contractor shall engage licensed electricians to install all conduits, communication cables, RTU's, FCPs, LCPs, and all vendor furnished control panels. and final terminations as required for a complete and operational system.
2. The Contractor shall engage licensed electricians to perform the final field terminations of signal and power wiring to all control panels and field instruments.
3. All equipment shall be installed according to the manufacturer's recommendations.
4. Outdoor, new installations shall be stable enough to withstand winds up to 120 miles per hour.
5. All mounting hardware shall be corrosion resistant.
6. All installation shall be in accordance with the local electrical codes.

B. Field Calibration

1. All SCADA System components shall be calibrated in the presence of the Owner in accordance with the range and accuracy specified herein.

2. No form of energy shall be turned on to any part of the SCADA System components prior to approval by the Systems Integrator and Owner.

C. SCADA System Startup

1. The SCADA System Integrator (SSI, Emerson) shall furnish the services of a qualified technical service representative to perform the supervisory service required during start-up of SCADA System components.
2. Services of a field service technician shall be provided for no less than two eight-hour days for the purpose of placing all equipment into operation.
3. The minimum days specified above do not relieve the manufacturer of providing sufficient service to place the system in satisfactory operation.

D. Training

1. The SCADA System Integrator (SSI, Emerson) shall furnish the services of a factory representative for no less than one eight-hour day for the purpose of operator training.
2. Training shall be performed on site.
3. Three months after the system has been placed into operation, the SCADA System Integrator (SSI, Emerson) shall furnish the services of a factory service representative for one eight-hour day to conduct follow-up training with the Owner's personnel. The follow-up training shall be conducted on-site and consist of reviewing the operation and maintenance of the system. The Owner shall be contacted a minimum of two weeks in advance prior to scheduling the training session to allow proper coordination.

PART 5 – WARRANTY AND SERVICE CONTRACT

5.01 WARRANTY

- A. The contractor shall provide a one-year warranty on the system. This warranty shall cover defects in material or workmanship.
- B. Warranty period shall start on the day of substantial completion and end one year from this date.

5.02 SERVICE CONTRACT

- A. The Instrumentation and Fiber Network Integrator (IFNI) shall include in their price, two scheduled maintenance trips for review and calibrations of the supplied instrumentation and fiber optics network over the warranty period. Maintenance trips shall be one, eight-hour day with the first being scheduled six months after commissioning and the second being twelve months from the final commissioning date. All costs associated to these two days shall be included in the Contractor's bid. Service shall be performed by qualified service technicians.

PART 6 – LONG-TERM SUPPORT

6.01 PHONE SUPPORT

- A. Scope of Work: Technical phone support for control system equipment: installation, configuration, maintenance, and troubleshooting.
 - 1. Real-time technical phone support by the SCADA System Integrator (SSI, Emerson) shall be available 8 AM-5 PM local time where the support specialist directly answers the call (no call attendants, no call-back). 24x7x365 coverage (includes evenings, weekends, and holidays) shall be available with same-call-access responsiveness or better.
 - a. Skill Set: Support specialists shall have knowledge of current and legacy software products and related technologies. Includes controllers, drivers, I/O, networks, programming software, communications, information, and application software.
 - 2. Electronic support shall be available to ftp a file, submit an online request, and download a software update or lookup a tech note.
 - a. Current software releases and reactivation codes shall be available for download from the Internet 24x7. Upon request, overnight shipment of update(s) or replacement media shall be available.
 - 3. Support center shall be able to seamlessly dispatch an on-site engineer if problem warrants (specific response times by region).

6.02 ONSITE SUPPORT

- A. Field support engineers are to be made available on an as needed, scheduled, or full-time basis to meet the specific user needs and system maintenance strategy.
- B. Callout services for repair and troubleshooting labor as needed for system related issues.
- C. Extended parts and labor warranty for repair labor (including local travel) and replacement parts for system control equipment and drives for up to five additional years.
- D. Preventative maintenance services to perform regular maintenance on system related equipment to prevent potential problems and extend component and system life.

6.03 TRAINING

- A. The SCADA System Integrator (SSI, Emerson) shall provide training programs for multiple job functions on the chosen process control system. These roles include

electricians, maintenance technicians, and control systems engineers. The SCADA System Integrator (SSI, Emerson) shall provide various training options including online self-directed classes, onsite instructor led training, and offsite instructor led training.

- B. The Instrumentation and Fiber Network Integrator (IFNI) shall provide two (2) 8-hour training sessions to provide instrument training for plant personnel.
- C. The Instrumentation and Fiber Network Integrator (IFNI) shall provide one (1) 4-hour training session to provide an overview of the plant fiber optics network for plant personnel.

PART 7 – TABLE OF INSTRUMENTS, LOOPS AND PANELS

7.1 TABLE OF INSTRUMENTS, LOOPS AND PANELS

Tag	Service/Function	Notes/Comments
LSHH-101	Plant Influent PS Wet Well - High-High Level	Float Switch - To be installed by General Contractor.
LSSL-101	Plant Influent PS – Wet Well Low-Low Level	Float Switch - To be installed by the General Contractor.
LE-101	Plant Influent PS - Wet Well Level	Ultrasonic Level Transducer – To be furnished and commissioned by the Instrumentation and Fiber Network Integrator (IFNI – MR Systems) and installed by the General Contractor.
LIT-101	Plant Influent PS - Wet Well Level	Ultrasonic Level Transmitter To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
FSP-101	Field-mounted AC Power and Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
Loop 102	Existing Influent Pump No. 1 Controls	New VFD No. 1
Loop 103	Existing Influent Pump No. 2 Controls	New VFD No. 2
Loop 104	Existing Influent Pump No. 3 Controls	New VFD No. 3
Loop 105	Existing Influent Pump No. 4 Controls	New VFD No. 4
Loop 106	Existing Cummins Generator	If required, the SCADA System Integrator (SSI, Emerson) to provide and install a new Communications Module to allow the Emerson SCADA

		system to communicate with this existing Generator.
FE-107	Magnetic Flowmeter Body	Existing
FIT-107	Magnetic Flow Transmitter	Existing
FSP-107	New Field-mounted AC Power & Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
FE-108	24" Magnetic Flowmeter Body	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
FIT-108	Magnetic Flow Transmitter	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
FSP-108	New Field-mounted AC Power & Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and installed by the General Contractor.
Influent Sampler (Loop 201)	Influent Sampler to be furnished per Specifications Section 23 45 00.	Flow pacing signal to be furnished and commissioned by SCADA System integrator (SSI, Emerson).
FCP-HW	Field Control Panel furnished by Parkson per Specifications Section 44 43 34.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 202	Drum Screen No. 1 to be furnished by Parkson per Specifications Section 44 43 34.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 203	Compactor No. 1 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 204	Drum Screen No. 2 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into

		SCADA System.
Loop 205	Compactor No. 2 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 206	Drum Screen No. 3 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 207	Compactor No. 3 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 208	Drum Screen No. 4 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 209	Compactor No. 4 to be furnished by Parkson per Specifications Section 44 43 34	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
MOV-210	Motor Operated Valve (To Vortex Grit Separator) to be furnished by Contractor per Specifications Section 40 29 50.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
MOV-211	Motor Operated Valve (To EQ Tank or Splitter Box) to be furnished by Contractor per Specifications Section 40 29 50.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
FCP-VGR	Field Control Panel furnished by Wemco per Specifications Section 46 23 66	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
MOV-303	Motor Operated Valve (To EQ Tank) to be furnished by Contractor per Specifications Section 40 29 50	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
MOV-304	Motor Operated Valve (To Anaerobic Basin) to be furnished by Contractor per Specifications Section 40 29 50	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.

Loop 401	EQ Tank Mixing Pump No. 1	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 402	EQ Tank Mixing Pump No. 2	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
LSHH-403	Equalization Tank - High-High Level	Float Switch - To be installed by Electrical Subcontractor.
LSSL-403	Equalization Tank – Low-Low Level	Float Switch - To be installed by Electrical Subcontractor.
LE-403	Equalization Tank - Level	Ultrasonic Level Transducer – To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
LIT-403	Equalization Tank - Level	Ultrasonic Level Transmitter To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FSP-403	Field-mounted AC Power and Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FCP-EQPS	Field Control Panel furnished by Flyght per Specifications Section 33 32 20	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
FOTP-600	Fiber Optics Termination (and Networking) Panel by Instrumentation and Control System Integrator.	
Loop 404	Equalization Pump No. 1	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 405	Equalization Pump No. 2	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into

		SCADA System.
Loop 406	Equalization Pump No. 3	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 407	Equalization Pump No. 4	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
FE-408	12" Magnetic Flowmeter Body	New Instrument to be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FIT-408	Magnetic Flow Transmitter	New Instrument to be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI, MR Systems) and to be installed by the General Contractor.
FSP-408	New Field-mounted AC Power & Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI, MR Systems) and to be installed by the General Contractor.
Loops 500 thru 599	All instruments and controls to be furnished and commissioned by Kubota.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 601	UV System No. 1 to be furnished and commissioned by Enaqua per Specifications Section 44 44 73.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 602	UV System No. 2 to be furnished and commissioned by Enaqua per Specifications Section 44 44 73	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 603	UV System No. 3 to be furnished and commissioned by Enaqua per Specifications Section 44 44 73.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.

LSHH-701	Plant Effluent and Reuse Water Wet Well - High-High Level	Float Switch - To be installed by General Contractor.
LSLL-701	Plant Effluent and Reuse Water Wet Well - Low-Low Level	Float Switch - To be installed by General Contractor.
LE-701	Plant Effluent and Reuse Water Wet Well - Level	Ultrasonic Level Transducer – To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
LIT-701	Plant Effluent and Reuse Water Wet Well - Level	Ultrasonic Level Transmitter To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FSP-701	Field-mounted AC Power and Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
Plant Effluent Sampler (Loop 706)	Plant Effluent Sampler to be furnished per Specifications Section 25 45 00	Flow pacing signal to be furnished and commissioned by SCADA System integrator, SSI, Emerson).
AE-707	Dissolved Oxygen Sensor – Plant Effluent	Dissolved Oxygen Sensor – To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
AIT-707	Dissolved Oxygen Transmitter – Plant Effluent	Dissolved Oxygen Transmitter – To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FSP-707	Field-mounted AC Power and Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FE-708	24" Magnetic Flowmeter Body	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI)

		and to be installed by the General Contractor.
FIT-708	Magnetic Flow Transmitter	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FSP-708	New Field-mounted AC Power & Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
Loop 801	Plant Reuse Water Pump No. 1 to be furnished per Specifications Section 44 42 56	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 802	Plant Reuse Water Pump No. 2 to be furnished per Specifications Section 44 42 56	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 803	Plant Reuse Water Flow - Flowmeter to be furnished per Specifications Section 44 42 56	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 901	Effluent D.O. Improvement – Duty Feed Pump No. 1	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 902	Effluent D.O. Improvement – Duty Feed Pump No. 2	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 903	Effluent D.O. Improvement – Duty Compressor No. 1	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 904	Effluent D.O. Improvement – Duty Compressor No. 2	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.

Loop 905	Effluent D.O. Improvement System	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
LSHH-1001	Plant Drain PS Wet Well - High-High Level	Float Switch - To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
LSLL-1001	Plant Drain PS Wet Well - Low-Low Level	Float Switch - To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
LE-1001	Plant Drain PS Wet Well - Level	Ultrasonic Level Transducer – To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
LIT-701	Plant Drain PS Wet Well – Level	Ultrasonic Level Transmitter To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
FSP-1001	Field-mounted AC Power and Analog Surge Protector	To be furnished and commissioned by Instrumentation and Fiber Network Integrator (IFNI) and to be installed by the General Contractor.
Loop 1101	Lime Feed System to be furnished by Burnett Lime per Specifications Section 44 44 59	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System. Dose and pacing signals are required. Coordinate with Owner and Engineer as required.
Loop 1102	Alum Feed System to be furnished by Burnett Lime per Specifications Section 44 44 19	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System. Dose and

		pacing signals are required. Coordinate with Owner and Engineer as required.
Loop 1201	Sludge Feed Pump to be supplied by Contractor.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1202	Water Booster Pump to be supplied by Contractor.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1203	Belt Filter Press to be furnished by Owner(allowance) for installation and commissioning by Contractor. See Specifications Section 31 23 19	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1204	Polymer Feed Pump to be supplied by Contractor.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1205	Dry Sludge Feed Pump to be supplied by Contractor.	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1301	Emergency Generator No. 1 to be supplied by Contractor per Specifications Section 26 32 13	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.
Loop 1302	Emergency Generator No. 2 to be supplied by Contractor per Specifications Section 26 32 13	SCADA System Integrator (SSI, Emerson) to incorporate all available I/O signals and controls into SCADA System.

END OF SECTION