SECTION 13300
CONTROLS AND INSTRUMENTATION GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, devices, equipment, appurtenances, and incidentals required for a complete electrical system as hereinafter specified and/or shown on the Contract Drawings. This work may necessarily include interfacing with and/or completely installing devices and/or equipment furnished under other sections of these Specifications.

B. The Contractor shall provide the services of a SYSTEMS INTEGRATOR to provide programming of any/all Programmable Logic Controllers (PLCs). The Contractor shall also provide the services of a Citect Certified SCADA Engineer (CCSE) for the required SCADA modifications. The SYSTEMS INTEGRATOR may be but is not required to be the same firm as the CCSE.

B. It is the intent of these Specifications that the electrical systems required for the SCADA System's new Inputs and Outputs (I/O) be suitable in every way for the service required. All materials and all work/labor which may be reasonably implied as being incidental to the requirements of this Section shall be furnished at no additional cost to the County.

C. All interruptions to the existing control system shall be at the County's convenience. Each interruption shall have prior approval. Request(s) for control system interruption(s) shall be made at least forty-eight (48) hours in advance.

D. The work shall include complete testing of all electrical components, including wiring.

E. All workmanship shall be of the highest quality. Substandard work will be rejected and it shall be replaced entirely at the Contractor's expense with no cost to the County.

F. It shall be the responsibility of each bidder or his authorized representative to physically visit the job site in order that he may be personally acquainted with the area(s), buildings and/or structures intended for use in the installation/construction under this Specification. The submittal of a proposal/bid by a bidder shall be considered evidence that he has complied with this requirement and accepts all responsibility for a complete knowledge of all factors governing his work. Therefore, failure to comply with this requirement of the Specifications will NOT be grounds for the successful bidder (Contractor) to request approval of change orders and/or additional monetary compensation.

1.02 DIVISION OF WORK

A. The Electrical Contractor shall be responsible for, and his/her scope of work shall include:

1. Providing and installing all conduit, fittings, conductors, and raceways as indicated on the drawings and as defined in Division 16 Specifications.

2. Termination of control and power wiring to supplied control panels, existing control panels and field elements. The electrical subcontractor shall mark on the record drawings the field wire numbers used for each termination point.

3. Physical installation of manufacturer supplied Septage Receiving and Grease Receiving control panels, Hauler Access Control Panels, PLC Control Cabinet and Fiber Optic Panels. This installation shall include all conduit, fittings, conductors and structural rack(s) as required.

4. Physical installation of manufacturer supplied tank level transmitters. This installation shall include all conduit, fittings, conductors, structural rack(s) and sun shields as required.

5. Providing the PLC input/output modules as indicated on the drawings and the physical installation of the cards provided.

6. Providing conduit, fittings and conductors as required to accommodate the new flow meters, float switches, pH sensors and any/all new field devices that are supplier or installed by others.

7. Providing accessory devices including furnishing and installation of interposing relays, surge protection devices, terminal blocks, etc. necessary to perform the intent as described by the control strategies and services necessary to achieve a fully integrated and. and operational system as shown on the Contract Drawings and defined in the Specifications.

8. Coordinating all interface requirements with mechanical and electrical system suppliers and furnish any devices that might be required in order to insure compatibility between all equipment.

9. Calibration of all field instruments.

10. Obtaining, in writing, a final acceptance from the SYSTEMS INTEGRATOR to indicate that all conductors and their terminations, as well as, all field devices and their associated I/O are in proper working order. The Electrical Contractor shall make any corrections necessary, at no charge to the County, for items identified as unsatisfactory by the SYSTEMS INTEGRATOR.

B. The Mechanical Contractor shall be responsible for, and his/her scope of work shall include:

1. Included within the mechanical subcontractor's scope installation of any in-line instrumentation. This instrumentation shall include the devices required at the Septage Receiving and Grease Receiving stations.

C. The SYSTEM INTEGRATOR (under a separate Manatee County contract) shall be responsible for, and his/her scope of work shall include:

1. Programming of any/all PLC's and the modification of the SCADA System's Human Machine Interface (HMI) screens as required.

1.03 SUBMITTALS

A. Furnish, as prescribed under the General Requirements, all required submittals covering the items included under this section and its associated sections of the work.

B. Submit complete, neat, orderly, and indexed submittal packages. Handwritten diagrams are not acceptable and all documentation submittals shall be made using CADD generated utilities as specified herein.

C. Partial submittals or submittals that do not contain sufficient information for complete review or are unclear will not be reviewed and will be returned by the ENGINEER as not approved.

D. Provide all shop-drawing submittals on disk in AutoCad format.

E. Design Related Submittals: Provide individual shop drawing submittals as further defined in each specification section defining the SCADA System. Provide the following additional submittals covering the complete system:

1. Loop diagrams, consisting of complete wiring and/or plumbing diagrams for each control loop showing all terminal numbers, the location of the dc power supply, surge arrestors, etc. The loop diagrams shall meet the minimum requirements of ISA S5.4 plus divide each loop diagram into four areas for identification of element locations: SCADA System I/O point(s), panel face, back-of-panel, and field, respectively. On each diagram present a tabular summary of:

a. The output capability of the transmitting instruments

b. The input impedance of each receiving instrument

2. System interconnect diagram that shows all connections required between component parts of the items covered in this section and between the various other systems specified in this Contract. Number all electrical

terminal blocks and field wiring. Identify each line at each termination point with the same number. Do not use this number again for any other purpose in the complete control scheme.

3. Test Procedures: Submit the procedures proposed to be followed during all system testing. Procedures shall include test descriptions, forms, and check lists to be used to control and document the required tests.

F. Instrument Installation Details Submittal

1. The Electrical Contractor shall develop and submit for review, complete installation details for each field mounted device and panel furnished prior to shipment and installation. Common details may be referenced by an index showing the complete instrument tag number, service, location, and device description. Installation details shall be provided as required to adequately define the installation of the components. Drawings may be included in the Control Panel Submittal when only a few are required.

G. System Calibration and Test Documentation Submittal

1. The Electrical Contractor shall submit an example of each type of Instrument Calibration Report and Loop Functional Test Report that will be used to verify that all preliminary calibration and testing has been performed and the system is considered, by the supplier, to be ready for testing.

2. After approval of the examples, the Electrical Contractor shall prepare Loop Functional Test Report(s) for each loop and an Instrument Calibration Sheet for each active element (except simple hand switches, lights, etc.). These sheets shall be completed and submitted to the Engineer after completion of the operational availability field tests.

3. An Instrument Calibration report shall be used to certify that each instrument requiring calibration has been calibrated to its published specified accuracy shall be submitted to the Engineer. This report shall include all applicable data as listed below plus an area to identify any defects noted, corrective action required, and corrections made. This report shall include:

   a. Facility identification (Name, location, etc.)

   b. Loop identification (Name or function)

   c. Scale ranges and units

   d. Actual readings at 0, 10, 25, 50, 75, 90 and 100 percent of span

   e. Tester's certification with name and signature

4. Upon completion of all preliminary calibration and functional testing, the Electrical Contractor, shall submit a certified report for each control panel and its associated field instruments certifying that the equipment (1) had been properly installed under his or her supervision, (2) is in accurate calibration, (3) was placed in operation, (4) has been checked, inspected, calibrated, and adjusted as necessary, (5) has been operated under maximum power variation conditions and operated satisfactorily, and (6) is fully covered under the terms of the warranty.

1.04 STANDARDS

A The design, testing, assembly, and methods of installation of the wiring materials, electrical equipment and accessories proposed under this Contract shall conform to the National Electrical Code and to applicable state and local requirements. UL listing and labeling shall be adhered to under this Contract.

B Any equipment that does not have a UL, FM CSA, or other approved testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that the equipment famished has been manufactured in accordance with the National Electric Code and OSHA requirements.

C Any additional work needed resulting from any deviation from codes or local requirements shall be at no additional cost to the OWNER.

D Instrument Society of America (ISA) and National Electrical Manufacturers Association (NEMA) standards shall be used where applicable in the design of the Control System.

E All equipment used on this project to test and calibrate the installed equipment shall be in calibration at the time of use. Calibration shall be traceable to National Institute of Standards (NIS - formally NBS) calibration standards.

1.05 TESTS

A. The Contractor shall test all items individually and as a system for proper operation.

B. The Contractor shall, at his expense, make all the requisite repairs, adjustments and/or alterations to correct any shortcomings found as a result of the tests performed under Item 1.02.A.10 above.

C. A representative of the County shall be present during all testing. The County shall be notified at least two (2) days prior to any testing.

1.06 GUARANTEES AND WARRANTIES

A. All items furnished under the Electrical Specifications shall be guaranteed and/or

warranted, in writing, against defects in materials, construction and workmanship as specified under Section 01740 of these Specifications.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. All SCADA System equipment shall produce or be activated by signals, which are established standards for the water and wastewater industries. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission. No zero based signals will be allowed.

B. All equipment and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The System shall contain products of a single MANUFACTURER, insofar as possible, and shall consist of equipment models that are the latest design currently in production.

C. All equipment shall be designed to operate on a 60-Hertz alternating current power source at a normal 120 volts, plus or minus 10 percent, except where specifically noted. All regulators and power supplies required for compliance with the above shall be provided between power supply and interconnected instrument loop. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.

D. Materials and equipment used shall be U.L. approved wherever such approved equipment and materials are available.

E. All SCADA System equipment shall be designed and constructed so that in the event of a power interruption, the equipment shall resume normal operation without manual resetting when power is restored.

2.02 MATERIALS

A. PLC HARDWARE

1. The existing programmable logic controllers are as manufactured by Allen Bradley (1746 SLC System) all new components shall be of the same type manufacturer. The required I/O modules include : one (1) digital AC input module (1746-IA16), one (1) analog output module (1746-NO4I) and one (1) analog input module (1746-NI8). NO SUBSTITUTIONS!

B. All other products required shall be as specified in other sections of the specifications.

PART 3 EXECUTION

3.01 PRODUCT HANDLING

A. Store and protect equipment until installation following the storage and handling instructions recommended by the equipment manufacturers. Place special emphasis on proper anti-static protection of sensitive equipment.

B. Protection During Construction: Throughout this Contract, provide protection for materials and equipment against loss or damage and from the effects of weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions. Provide covers for panels and other elements that may be exposed to dusty construction environments.

C. Corrosion Protection: Protect all consoles, panels, enclosures, and other equipment containing electrical or instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules. Prior to shipment, include capsules in the shipping containers, and equipment as recommended by the capsule manufacturer. During the construction period, periodically replace the capsules in accordance with the capsule manufacturer's recommendations. Replace all capsules just prior to Final Acceptance.

D. ESD Protection: Provide for the proper handling, storage, and environmental conditions required for the components deemed static sensitive by the equipment manufacturer. The components of the SCADA System shall be protected in particular. Utilize anti-stat wrist straps and matting during installation of these items to prevent component degradation.

E. Adequately pack manufactured material to prevent damage during shipping, handling, storage and erection. Pack all material shipped to the project site in a container properly marked for identification. Use blocks and padding to prevent movement.

F. Ship materials that must be handled with the aid of mechanical tools in wood-framed crates.

G. Ship all materials to the project site with at least one layer of plastic wrapping or other approved means to make it weatherproof. Anti-stat protection shall be provided for all sensitive equipment.

H. Inspect the material prior to removing it from the carrier. Do not unwrap equipment until it is ready to be installed. If any damage is observed, immediately notify the carrier so that a claim can be made. If no such notice is given, the material shall be assumed to be in undamaged condition, and any subsequent damage that is discovered shall be repaired and replaced at no additional expense to the OWNER.

I. The Contractor shall be responsible for any damage charges resulting from the handling of the materials.

3.02 INSTALLATION

A. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work, which has a neat and finished appearance. Coordinate work with the OWNER and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the existing plant during construction.

B. Provide finish on instruments and accessories that protects against corrosion by the elements in the environment in which they are to be installed. Finish both the interior and exterior of enclosures. Provide extra paint of each color used in the material from the manufacturer for touch-up purposes.

C. Ground each analog signal shield on one end at the receiver end only. Properly ground all surge and transient protection devices. Coordinate grounding system with Division 16, Electrical.

D. For the purposes of uniformity and conformance to industry standard, provide analog signal transmission modes of electronic 4-20 ma DC. No other signal characteristics are acceptable.

E. Fully isolate outputs for transmitted electronic signals between transmitters and receivers, equipment of different manufacturers and between control panels to conform to ISA Standard S 50. 1.

F. Discrete signal are two-state logic signals. Use 120V ac sources on all discrete signals unless otherwise noted or shown.

G. Surge Protection: Provide appropriately sized electrical transient protection devices for all electrical elements of the system to protect the SCADA System equipment and equipment which interfaces with the SCADA System from transient surges in power and signal wiring (from lightning and other ground potential differences). Locate and properly ground surge suppressors at: any connection between power sources and electrical equipment including panels, assemblies, and field devices; and at both ends of all analog signal circuits.

3.03 TESTING

A. All elements of the SCADA System shall be tested to demonstrate that the total system satisfies all of the requirements of the Contract Documents

B. As a minimum, the testing shall include shop tests, operational check-out tests, and Demonstration Tests.

C. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system producing the correct result (effect), the specific test requirements will have been satisfied.

D. All tests shall be conducted in accordance with, and documented on, prior approved procedures, forms, and checklists. Each specific test to be performed shall be described and a space provided after it for signoff by the appropriate party after its satisfactory completion. Copies of these signoff test procedures, forms, and checklists will constitute the required test documentation.

E. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation. Define these simulation techniques in the test procedures.

F. The Electrical Contractor shall coordinate all of their testing with the SYSTEMS INTEGRATOR, the ENGINEER, all affected suppliers, and the OWNER.

G. The SYSTEMS INTEGRATOR shall reserve the right to test or retest any and all specified functions whether or not explicitly stated in the approved test procedures. The SYSTEM INTEGRATOR's decision shall be final regarding the acceptability and completeness of all testing.

END OF SECTION

ATTACHMENT A

BIDDER'S QUESTIONNAIRE

(Submit in Duplicate)

ADDENDUM # 2

The bidder warrants the truth and accuracy of all statements and answers herein contained. (Attach additional pages if necessary.)

THIS QUESTIONNAIRE MUST BE COMPLETED AND SUBMITTED WITH YOUR BID

1. Contact Information:

   FEIN #: _____

   License #: _____

   License Issued to: _____

   Date License Issued (MM/DD/YR): _____

   Company Name: _____

   Physical Address: _____

   City: _____ State of Incorporation: _____ Zip Code: _____

   Phone Number: ( ) _____ Fax Number: ( ) _____

   Email address: _____

2. Bidding as: an individual __; a partnership __; a corporation __; a joint venture __

3. If a partnership, list names and addresses of partners; if a corporation, list names of officers, directors, shareholders, and state of incorporation; if joint venture, list names and address of ventures' and the same if any venture are a corporation for each such corporation, partnership, or joint venture:

   _____

   _____

   _____

   _____

4. Bidder is authorized to do business in the State of Florida: ☐ Yes ☐ No

   For how many years? _____

5. Your organization has been in business (under this firm's name) as a

   _____

   Is this firm in bankruptcy? _____

6. Attach a list of projects where this specific type of Work was performed. Note: Contractor shall have a **minimum of 5 years' experience** performing this type of work.

BIDDER: _____

7. Is this firm currently contemplating or in litigation? Provide summary details.

_____

_____

_____

8. Have you ever been assessed liquidated damages under a contract during the past five (5) years? If so, state when, where (contact name, address and phone number) and why.

_____

_____

_____

9. Have you ever failed to complete Work awarded to you? Or failed to complete projects within contract time? If so, state when, where (contact name, address, phone number) and why.

_____

_____

_____

10. Have you ever been debarred or prohibited from providing a bid to a governmental entity? If yes, name the entity and describe the circumstances.

_____

_____

_____

11. Will you subcontract any part of this Work? If so, describe which portion(s) and to whom.

_____

_____

_____

12: (ADDENDUM # 2) See amended Section 13300 (Controls and Instrumentation General Provisions;
Citect Certified SCADA Engineer (CCSE) required for the SCADA modifications.
Name: _____

Physical Address: _____

Phone: _____

Copy of Current Certification must be attached to the Questionnaire. _____

BIDDER: _____

13. If any, list MBE/DBE (with Agreement amount) to be utilized:

_____

_____

_____

14. What equipment do you own to accomplish this Work? (A listing may be attached)

_____

_____

_____

15. What equipment will you purchase/rent for the Work? (Specify which)

_____

_____

_____

16. List the following in connection with the surety which is providing the bond(s):

Surety's Name: _____

Address: _____

_____

Name, address, phone number and email of surety's resident agent for service of process in Florida:

Agent's Name: _____

Address: _____

_____

Phone: _____

Email: _____

BIDDER: _____

Table 1
SPECIFICATION SECTION 15000 PIPING SYSTEMS - SCHEDULE
SEWRF Septage/Grease Receiving Station

Flow Stream	Abbreviation	Pipe Material	Pipe Lining	Operating Pressure (psig)	Field Test Pressure (psig)	Comments
Drain	DR-1	PVC	Unlined	15	25	SDR 26
Drain	DR-2	PVC	Unlined	15	25	SDR 26
Force Main	FM-1	PVC	Unlined	120	150	C900 (4-inch or greater) or Schedule 80 (2-inch)
Potable Water	PW-1	PVC	Unlined	60	100	C900 (4-inch or greater) or Schedule 80 (2-inch)
Reclaimed Water	RCW-2	PVC	Unlined	120	150	C900 (4-inch or greater) or Schedule 80 (2-inch)
Spray Water	SW-2	PVC	Unlined	120	150	C900 (4-inch or greater) or Schedule 80 (2-inch)
Storm Sewer	RCP	RCP	Unlined	0	5	