

ADDENDUM NO. 1

LAKENGREN WATER AUTHORITY Wastewater Treatment Plant Improvements September 27, 2018

To: Planholders

From: Mote & Associates, Inc. Phone: (937) 548-7511
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Re: Lakengren Water Authority
Wastewater Treatment Plant Improvements

This Addendum forms a part of the Contract Documents and modifies the original Contract Documents dated September 2018. Acknowledge receipt of this Addendum in the space provided on the Bid Proposal form. Failure to do so may subject the Bidder to disqualification.

CHANGES/CLARIFICATIONS TO THE BIDDING REQUIREMENTS:

1. Change to Project Substantial Completion Date

The project substantial completion date for this project has been revised from January 31, 2020 to **January 31, 2021**. This change shall be reflected in the following documents along with any other contracting documents that may include the project completion date:

- a. Section 00 11 13, Legal Advertisement
- b. Section 00 21 13, Instructions to Bidders
- c. Section 00 41 43, Bid Form
- d. Section 00 52 43, Agreement Form
- e. Section 00 55 00; Notice to Proceed

2. Section 00 41 43, BID FORM

A Contingency Allowance of 7% will be added to the Base Bid for the Contract Award for sole use by the Owner to cover unanticipated costs. This Allowance will only be utilized as directed by the Engineer and as coordinated with the Owner per Paragraph 13.02 of the General Conditions. This Allowance was misspoken at the Prebid Meeting to be 7.5% which is incorrect.

The Bidder shall insure that the Lump Sum Base Bid include amounts for all work as shown in the construction plans, technical specifications, contract documents, as well as this Addendum and any additional Addendums that may be issued. The Contingency Allowance will only be utilized for work items added to the project during the Contract time.

There is NO allowance for the Evoqua equipment included with the Base Bid. The cost for the Oxidation Ditch Equipment including all labor, material, and equipment to furnish and install the Orbal Aeration Equipment shall be included in the Base Bid.

3. Section 00 45 40, DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION REQUIREMENTS

Pages 2 and 3 of this Section contain information regarding the definition of “Good Faith Efforts” relating to following, documenting, and maintaining efforts to ensure DBE businesses have an opportunity to participate in the project. To further clarify, should the goals of 1.3% of contracts to MBE’s and 1.0% to WBE’s not be met, the Contractor can submit a narrative explaining how these steps were followed and include documentation such as, emails to subcontractors with their responses, a call log, a list of quotes received from various subcontractors and/or suppliers to indicate if any were received and the price in comparison, etc.

CHANGES/CLARIFICATIONS TO THE TECHNICAL SPECIFICATIONS

4. Additional Electrical Specifications

The following additional technical specifications relating to the electrical work shall be added to the Technical Specifications Manual and are attached hereto:

Section 26 01 20.17	Low Voltage Power Circuit Breakers
Section 26 05 19	Low Voltage Electrical Power Conductors and Cables
Section 26 05 26	Grounding and Bonding for Electrical Systems
Section 26 09 16	Relays and Pushbuttons
Section 26 24 16	Panelboards
Section 26 27 26	Wiring Devices
Section 26 56 23	Exterior LED Lighting
Section 28 33 00	Gas Detection Systems
Section 32 31 13	Chain Link Fences and Gates
Section 32 31 13.10	Chain Line Cantilever Slide Gate

5. Section 00 30 00 & 00 30 10, CAST-IN PLACE CONCRETE

As stated in the 1.04, Submittals section of the Cast-in-Place and Environmental Cast-in-Place specifications, the Contractor shall provide the layout, location, and details for construction points (joint spacing) not shown on the drawings. This submittal shall be provided in accordance with all appropriate ACI specifications and be subject to the approval of the Engineer.

6. Section 33 09 30.20, INSTRUMENTATION & COMPONENTS OF CONTROL PANELS

This technical specification is being reissued with revisions made to portions of Section 2.15, PLC – Programmable Controllers. This specification replaces the previous one included in the original Technical Specifications Manual and is attached hereto.

7. Section 40 05 71.33, TELESOPING VALVES

This technical specification is being reissued with the addition of an influent telescopic valve in Section 2.3. This specification replaces the previous one included in the original Technical Specifications Manual and is attached hereto.

8. Section 46 71 16, GRAVITY BELT THICKENER

Revise Section 1.01, A., to read as follows:

“A. Owner will provide one (1) 1.0 meter filter sludge press as described herein to be installed by the manufacturer through a separate contract which shall include all submittals. The purpose of this

evaluate and include in the Base Bid any incidental labor or materials necessary to insure installation for a resulting complete working system. Coordination will be necessary between the press manufacturer and Prime Contractor.”

CHANGES/CLARIFICATIONS TO THE DETAIL CONSTRUCTION PLANS

9. Civil Set – Sheet 32 of 42

The outer HDPE Storm Drain that is around the sludge digesters and storage building shown on this sheet should be a uniform 12” in size as reflected on Sheet 40 of 42.

10. Structural Set – Sheet S000, General Notes

Within this sheet it is referenced that 4500 psi concrete shall be used “unless noted” within the construction documents. In general, 4500 psi concrete (QC2) shall be used on environmental tankage, which includes the digester tank and the entire orbal/influent structure and also the headworks building. The use of 4000 psi concrete (QC1) is acceptable for use on the sludge press building, sidewalks, concrete pads, etc.

GENERAL CLARIFICATIONS

11. Knox Energy will be upgrading the existing gas meter to provide two pounds of natural gas on the supply side of the meter. The Contractor shall provide, install, and test the natural gas lines and regulators as shown on the attached Proposed Gas Piping site plan and the HVAC/plumbing plans for each specific structure.
12. The Engineer will be responsible for obtaining all permits which will be paid for by Owner. There is no plumbing permit anticipated for this project.
13. There is no additional local weight or time restrictions at the Wastewater Treatment Plant in regards to trucking of equipment and/or concrete. There have been past restrictions related to areas inside the gated community, but this does not apply to this project.
14. The notes and sign-in sheet from the Pre-Bid Meeting held on September 19, 2018 are attached hereto.

End of Addendum

Attachments:	Section 26 01 20.17	Low Voltage Power Circuit Breakers
	Section 26 05 19	Low Voltage Electrical Power Conductors and Cables
	Section 26 05 26	Grounding and Bonding for Electrical Systems
	Section 26 09 16	Relays and Pushbuttons
	Section 26 24 16	Panelboards
	Section 26 27 26	Wiring Devices
	Section 26 56 23	Exterior LED Lighting
	Section 28 33 00	Gas Detection Systems
	Section 32 31 13	Chain Link Fences and Gates
	Section 32 31 13.10	Chain Line Cantilever Slide Gate
	Section 33 09 30.20	Instrumentation and Components of Process Control Panels
	Section 40 05 71.33	Telescoping Valves
	Proposed Gas Piping Site Plan	
	Pre-Bid Meeting Notes & Sign-in Sheet	

LOW-VOLTAGE POWER CIRCUIT BREAKERS

26 01 20.17

PART ONE – GENERAL

1.01 Requirements Included

- A. Circuit breakers shall be drawout type electronic trip units as specified on the associated drawings. Circuit breakers shall have interrupting, close and latch, and 30-cycle withstand ratings that meet the application requirements. Interrupting rating shall be available up to 200 kAIR RMS amperes without fuses. Close and latch ratings to 65 kA available on all NW frame sizes. Thirty-cycle withstand rating available up to 100 kA to provide maximum coordination with downstream circuit breakers. An adjustable rating plug (range of 0.4-1 times the sensor plug value) and a field-replaceable sensor plug (available in standard amperage steps from 50% to 100% of the frame size) shall determine the ampere rating of the circuit breaker.
- B. Circuit breakers shall be constructed in accordance with the following standards:
 - 1. ANSI® C37.13-Low-voltage AC Power Circuit Breakers Used in Enclosures
 - 2. ANSI C37.50-Test Procedures for Low-voltage AC Power Circuit Breakers
 - 3. NEMA® SG-3-Low-voltage Power Circuit Breakers
 - 4. UL® 1066-Low-voltage AC and DC Power Circuit Breakers Used in Enclosures
- C. Circuit breakers shall be UL Listed as Low-voltage Power Circuit Breakers.

PART TWO – PRODUCTS

2.01 Products and Manufacturer

- A. Manufacture to be Square “D” / Schneider Electric or Approved Equal
- B. Circuit Breaker:
 - 1. Circuit breaker shall be drawout type manually operated.
 - 2. The case of the circuit breaker shall be a polyester thermoset material providing high dielectric strength.
 - 3. All circuit breaker operating mechanisms are to be two-step, fully- stored energy devices for quick-make, quick-break operation with a maximum of a five-cycle closing time. Open-close-open (O-C-O) cycle shall be possible without recharging. Motor operator shall automatically charge when circuit breaker is closed. Actuation of the operating handle or an operation cycle of the circuit breaker motor is to charge the closing springs (step one) and operation of a local "close" button is to close the circuit breaker contact (step two).

Closing the circuit breaker contacts shall automatically charge the opening springs.

4. Current-carrying components shall be completely isolated from the accessory mounting area and double insulated from the operator with accessory cover in place.
5. Each phase inside the circuit breaker shall be completely isolated from other phases and ground by polyester thermoset material.
6. Padlocking provisions shall be furnished to receive up to three padlocks when circuit breaker is in the disconnected position, positively preventing unauthorized closing of the circuit breaker contacts.
7. Provisions for up to two key locks shall be furnished allowing locking in the disconnected position. Provisions for locking in the connected, test and disconnected positions by padlock or key lock shall be available as an option.
8. Located on the face of the circuit breaker shall be buttons, with optional lockable clear cover, to open and close the circuit breaker and indicators to show the position of the circuit breaker contacts, status of the closing springs, and circuit breaker position in the cell. An indicator shall show "charged-not OK to close" if closing springs are charged but circuit breaker is not ready to close. Circuit breaker racking system must have positive stops at the connected, test, disconnected and withdrawn positions.
9. Circuit breaker must be equipped with an interlock to discharge the stored energy spring before the circuit breaker can be withdrawn from its cell. Circuit breaker must provide a positive ground contact check between the circuit breaker and cell when the accessory cover is removed while the circuit breaker is in the connected, test or disconnected positions.
10. Primary connectors that can be rotated to provide flexible vertical or horizontal connections shall be available as an option. Front connections shall also be available for shallow depth equipment designs.
11. Ready-to-close contact must be available to indicate remotely that the circuit breaker is "ready to close." The circuit breaker is ready to close when it is open, spring mechanism is charged, a maintained closing order is not present, a maintained opening order is not present, and the circuit breaker is in an operational position.
12. Secondary wiring shall be front accessible and available in cage clamp or ring terminal connections. Secondary wiring must not be accessible when switchgear door is closed.
13. Circuit breaker shall provide long service life. The 3200 A circuit breaker frame and those of lower ratings must be certified to perform a minimum of 10,000 operations without maintenance. The 4000 A and 5000 A frames must be certified to 5,000 operations without maintenance.

14. Circuit breaker shall be equipped with a visual contact wear indicator.
15. Low-voltage power circuit breaker arc chutes containing asbestos will NOT be accepted.

C. Accessories

1. Circuit breakers shall be equipped with accessories shown on the drawings. All accessories shall be UL Listed as field-installable and be interchangeable between frame sizes. Circuit breakers shall provide isolation from primary power when accessory cover is removed.
2. Secondary wiring shall be front accessible and available in cage clamp or ring terminal connections. Secondary wiring should not be accessible when switchgear door is closed.

End of Section

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

26 05 19

PART ONE – GENERAL

1.01 Definitions

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.02 Submittals

- A. Product Data: For each type of product indicated.

PART TWO – PRODUCTS

2.01 Conductors and Cables

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
 - 6. Or equal
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN and where specifically called for XHHW, UF, USE and SO.
- D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC use only where indicated.

2.02 Connectors and Splices

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
 2. Hubbell Power Systems, Inc.
 3. O-Z/Gedney; EGS Electrical Group LLC.
 4. 3M; Electrical Products Division.
 5. Tyco Electronics Corp.
 6. Or equal
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART THREE – EXECUTION

3.01 Conductor Material Applications

- A. Feeders: Copper. Stranded.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 Conductor Insulation and Multi-Conductor Cable Applications and Wiring Methods

- A. Service Entrance: Type XHHW, single conductors in raceway unless otherwise indicated.
- B. Feeders: Type THHN-THWN, single conductors in raceway unless otherwise indicated.
- C. Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway unless otherwise indicated.
- D. Control Circuits: Type THHN-THWN, in raceway unless otherwise indicated.
1. Argus low voltage control cabling may be installed without raceway along structural members.
- E. Conductors in raceways in wet locations: Type XHHW.

3.03 Installation of Conductors and Cables

- A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used shall not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

- C. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- D. Final routing and location of branch circuit raceways shall be determined by Design Builder.

3.04 Connections

- A. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.05 Field Quality Control

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test conductors for continuity and insulation integrity.
 - 2. Perform visual and mechanical inspection and electrical tests as described in NETA Acceptance Testing Specification.
- C. Test Reports: Prepare a written report.

End of Section

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

26 05 26

PART ONE - GENERAL

1.01 Submittals

- A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.
- B. Field quality-control test reports.

1.02 Quality Assurance

- A. Comply with UL 467 for grounding and bonding materials and equipment.

PART TWO - PRODUCTS

2.01 Conductors

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
- C. Grounding Bus: Rectangular bars of annealed copper, ¼ by 2 inches in cross section, unless otherwise indicated; with insulators.

2.02 Connectors

- A. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts. Clamp type, sized for pipe.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.03 Grounding Electrodes

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet in diameter.

PART THREE - EXECUTION

3.01 Applications

- A. Conductors: Copper.

- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
- C. Grounding Bus: Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors, except as otherwise indicated.
 - 3. Connections to Structure: Bolted connectors.

3.02 Grounding Underground Distribution System Components

- A. Comply with IEEE C2 grounding requirements.
- B. Pad-Mounted Transformers and Switches: Install ground rod at the pad. Ground pad-mounted equipment and noncurrent-carrying metal items by connecting them to underground cable and grounding electrodes.

3.03 Equipment Grounding

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Water Heater: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.04 Installation

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade. Make connections without exposing steel or damaging coating, if any.
 - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance.
 - 1. Use exothermic-welded connectors for outdoor locations, unless otherwise indicated.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors from building's main service equipment, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

3.05 Field Quality Control

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at service disconnect enclosure grounding terminal, and at individual grounding electrodes. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.

B. Report all measured ground resistances.

End of Section

RELAYS AND PUSHBUTTONS

26 09 16

PART ONE – GENERAL

1.01 Requirements Included

- A. Pushbutton and selector switches
- B. Control stations
- C. Relays
- D. Time delay relays
- E. Control power transformers
- F. Control panels

1.02 References

- A. NFPA 70 – National Electrical Code.
- B. CSA C22.2 No. 14, Industrial Control Equipment.
- C. EN/IEC 60947-1 / 61810-1
- D. NEMA ICS 1 - General Standards for Industrial Control Systems
- E. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies
- F. NEMA ICS 6 - Enclosures for Industrial Controls and Systems
- G. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type)

1.03 Submittals

- A. 01 33 00 Submittals and Substitutions
 - 1. Submit product data for each component specified

1.04 Project Record Documents

- A. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.05 Operation and Maintenance Data

- A. Include instructions for adjusting and resetting time delay relays, timers, and counters.
- B. Include recommended preventive maintenance procedures and materials.

1.06 Qualifications

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

PART TWO – PRODUCTS

2.01 Products and Manufacturer

- A. Manufactures – Square “D”, Telemecanique, Allen Bradley, Eaton or Approved Equal
- B. Control Switches and Stations
 - 1. Contacts: NEMA ICS2
 - a. Form A contact blocks shall be Square D Class 9001 Type KA. All contact blocks shall have terminals that are fingersafe, meeting VDE0106 Part 100, single screw mounting, and captive, ready-to-wire, plus/minus terminal screws. The contact blocks shall have double break silver contacts with wiping action. All contact blocks will accept #12-#24 solid or stranded wires.
 - b. Or approved equal
 - 2. Light Modules: NEMA ICS2
 - a. All light modules shall be Square D Class 9001 Type KM All light modules shall be Square D Class 9001 Type KM. All light modules shall have terminals that are fingersafe, meeting VDE0106 Part 100, single screw mounting, and captive, ready-to-wire, plus/minus terminal screws. All light modules will accept #12-#24 solid or stranded wires.
 - b. Or approved equal
 - 3. Contact Ratings: NEMA ICS2
 - a. All Control Switches shall have ac contact ratings of NEMA A600 (Inductive - 35% power factor, Resistive - 75% power factor). All Control Switches shall have dc contact ratings of NEMA A600 (Inductive and Resistive).
 - b. Or approved equal
 - 4. Selector Switch Operators: NEMA ICS 2
 - a. Two-, Three-, or Four-position rotary selector switches shall be Square D Class 9001 Type K, SK, or KX using Class 9001 Type KA contact blocks.

- b. Or approved equal
- 5. Push Button Operators: NEMA ICS 2
 - a. Unguarded, Flush, Recessed, Shrouded, Shielded, Covered, Lockable type push button operators shall be Class 9001 Type K, SK, or KX using Square D Class 9001 Type KA contact blocks.
 - b. Or approved equal
- 6. Control Stations
 - a. All standard duty control stations shall be manufactured in accordance with the latest published NEMA standards. All standard duty control stations shall be furnished in NEMA 1 general purpose enclosures unless otherwise indicated on the plans. Stations shall be available in general purpose enclosures in combinations of from 1 to 3 units. General purpose enclosures shall have non-metallic wrap-around, slip-on cover assemblies which shall be held in place by two screws.
 - b. All push button and selector switch control units used in standard duty control stations shall be of plug-in construction and shall have double break silver contacts. Contacts shall be either single-pole, single-throw or double-pole, single-throw as specified. Pilot lights used in standard duty control stations shall be able to be used on 120 volt ac or dc, using a 120 volt slide base lamp, as specified. Colored pilot light lenses shall be interchangeable.
 - c. Or approved equal
- 7. Start-Stop Push Button And 120 Volt Ac Or Dc Pilot Light Stations
 - a. Shall be Square D Class 9001 Type BG-308, standard duty, momentary contact type with general purpose enclosure or Type BF- 308 flush mounting for recessed installation, as specified.
 - b. Or approved equal
- 8. Hand-Off-Auto Selector Switch Stations
 - a. Shall be Square D Class 9001 Type BG-112, standard duty, and maintained contact type with general purpose enclosure or Type BG-112 flush mounting for recessed installation, as specified.
 - b. Or approved equal
- 9. Heavy Duty Enclosures
 - a. Shall be NEMA Types 1, 3, 13 in sheet steel (1-30 holes), NEMA Types 1, 3, 4, 13 in cast aluminum (1-16 holes), NEMA Types 1, 3, 4, 4X, 13 in

stainless steel or polymeric style (1-30 holes).

b. Hoffman, Wiegmann, Cooper or approved equal

10. Control Stations

a. Shall use Class 9001 Type K, SK, or KX push buttons, selector switches and pilot lights using Class 9001 Type KA contact blocks. All operators used shall be suitable for cover mounting in a 1-7/32 in diameter notch type cover hole and shall be held in place by the function nameplate or locking thrust washer in the event no nameplate is used. Push buttons and selector-push buttons shall have removable inserts in seven different colors for function color coding. Push button inserts and selector switch knobs shall be removable from the front of the control station without disturbing the wiring or mounting of the control units. Selector switches shall have removable knobs in nine different colors for function color coding.

11. Switches

a. Limit Switches, Pressure Switches, Temperature Switches, Flow Switches, Photocell Switches, Level Switches, Proximity Switches:

1. Manufactured by Square D Company, Telemecanique or approved equal

2.02 CONTROL RELAYS

- A. All magnetic relays shall be Class 8501 Type K. Contacts shall be silver alloy. Contacts shall be convertible from normally open to normally closed or vice versa, without removing any wiring.
- B. Contact ratings shall be NEMA A600, P300, ICS 2 and IEC I/AC-12, I/AC-15, I/DC-12, I'
- C. Coil voltages shall be available from 120 to 240 VAC and 12 to 24 VDC.
- D. Relay shall have the capability of mounting directly to a panel and also to mounting track.

2.03 TIME DELAY RELAYS

- A. All timer relays shall be Class 9050 Type JCK or equal. Contacts shall be silver alloy. Contacts shall be convertible from normally open to normally closed or vice versa, without removing any wiring.
- B. Contact Ratings: NEMA ICS 2; Class A150.
- C. Coil Voltage: 120 VAC, 60 Hz. or 24 VDC as needed per panel requirements.

- D. Time-Delay Relays: NEMA ICS 2; Class A600 solid-state, time-delay relay with 10 second time delay after energization.
 - 1. Manufactured by Square D Company
 - 2. Approved equal.
- E. Interval Timing Relay: NEMA ICS 2; Class A300, repeat cycle timer.

2.04 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
- B. Power Rating: As needed based on panel requirements.
- C. Voltage Rating: 460/240/120 VAC to 24 VDC secondary as needed.

2.05 ENCLOSURES

- A. All Control Panels to be
 - 1. NEMA 4X
 - 2. Stainless Steel, Fiberglass or Plastic
 - 3. Hinged

PART THREE – EXECUTION

3.01 Installation

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Make electrical wiring interconnections as shown on Drawings.

End of Section

PANELBOARDS

26 24 16

PART ONE – GENERAL

1.01 Requirements Included

- A. This Section includes lighting and power panelboards and associated auxiliary equipment rated 600 V or less.

1.02 Related Requirements

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Section 1 Specifications, apply to this Section.
- B. Requirements of the following of Section 26 apply to this Section.

1.03 Submittals

- A. General: Submit in accordance with the specifications.
- B. Product data for each type panelboard, accessory item, and component specified.
- C. Shop drawings from manufacturers of panelboards including dimensioned plans, sections, and elevations. Show tabulations of installed devices, major features, and voltage rating. Include the following:
 - 1. Enclosure type with details for types other than NEMA Type 1.
 - 2. Bus configuration and current ratings.
 - 3. Short-circuit current rating of panelboard.
 - 4. Features, characteristics, ratings, and factory settings of individual protective devices and auxiliary components.
- D. Report of field tests and observations certified by the testing organization.
- E. Panel schedules for installation in panelboards. Submit final versions after load balancing.

1.04 Quality Assurance

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The terms “listed” and “labeled” shall be defined as they are in the National Electrical Code, Article 100.
- B. Electrical Component Standard: Components and installation shall comply with NFPA 70, “National Electrical Code.”
- C. NEMA Standard: Comply with NEMA PB1, “Panelboards.”

- D. UL Standards: Comply with UL 61, "Panelboards," and UL 50, "Cabinets and Boxes."

PART TWO – PRODUCTS

2.01 Materials

A. Panelboards, General Requirements

1. Overcurrent Protective Devices (OCPDs): Provide type, rating, and features as indicated. Comply with Division 26 Section "Overcurrent Protective Devices," with OCPDs adapted to panelboard installation. Tandem circuit breakers shall not be used. Multiple breakers shall have common trip.
2. Enclosures: Cabinets, flush or surface mounted as indicated. NEMA Type 1 enclosure, except where the following enclosure requirements are indicated.
 - a. NEMA 3R: Raintight.
 - b. NEMA 3S: Raintight and dust tight.
 - c. NEMA 4X: Corrosion-resistant fiberglass enclosure, watertight, dust tight, and resistant to oil and coolant seepage.
 - d. NEMA 12: Dust tight, dripproof, and resistant to oil and coolant seepage.
3. Front: Secured to box with concealed trim clamps except as indicated. Front for surface-mounted panels shall be same dimensions as box. Fronts for flush panels shall overlap box except as otherwise specified.
4. Directory Frame: Metal, mounted inside each panel door.
5. Bus: Hard drawn copper of 98 percent conductivity.
6. Main and Neutral Lugs: Compression type.
7. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. Bonded to box.
8. Service Equipment Approval: Listed for use as service equipment for panelboards having main service disconnect.

B. Lighting and Appliance Branch Circuit Panelboards

1. Branch OCPDs: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

C. Distribution Panelboards

1. Doors: In panel front, omit single panelboard door in cabinet front for fusible switch panelboards except as indicated. Secure with vault-type with tumbler lock, all keyed alike.
2. Branch-Circuit Breakers: Where OCPDs are indicated to be circuit breakers, use bolt-on breakers except circuit breakers 225-ampere frame size and greater may be plug-in type where individual positive locking device requires mechanical release for removal.

D. Identification

1. Panelboard Nameplates: Engraved laminated plastic or metal nameplate for each panelboard mounted with epoxy or industrial cement or industrial adhesive.

PART THREE – EXECUTION

3.01 Installation

- A. General: Install panelboards and accessory items in accordance with NEMA PB 1.1, “General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less” and manufacturers’ written installation instructions.
- B. Ground Fault Protection: Install panelboard ground fault circuit interrupter devices in accordance with installation guidelines of NEMA 289, “Application Guide for Ground Fault Circuit Interrupters.”
- C. Mounting Heights: Top of trim 6’-2” above finished floor, except as indicated.
- D. Mounting: Plum and rigid without distortion of box. Mount flush panels uniformly flush with all finish.
- E. Circuit Directory: Typed and reflective of final circuit changes required to balance panel loads. Obtain approval before installing.
- F. Install filler plates in unused spaces.
- G. Provision for Future Circuits at Flush Panelboards: Stub four 1-inch empty conduits from panel into accessible ceiling space or space designated to be ceiling space in future.
- H. Wiring in Panel Gutters: Train conductors neatly in groups, bundle, and wrap with wire ties after completion of load balancing.
- I. Grounding
 - 1. Connections: Make equipment grounding connections for panelboards as indicated.
 - 2. Provide ground continuity to main electrical ground bus indicated.
- J. Connections
 - 1. Tighten electrical connectors and terminals, including grounding connections, in accordance with equipment manufacturer’s published torque-tightening values. Where manufacturer’s torquing requirements are not indicated, use those specified in UL 486A and UL 486B.

3.02 Field Quality Control

- A. Visual and mechanical inspection: Include the following inspections and related work.
 - 1. Inspect for defects and physical damage, labeling, and nameplate compliance with requirements of up-to-date drawings and panelboard schedules.

2. Exercise and perform operational tests of all mechanical components and other operable devices in accordance with manufacturer's instruction manual.
3. Check panelboard mounting, area clearances, and alignment and fit of components.
4. Check tightness of bolted electrical connections with calibrated torque wrench. Refer to manufacturer's instructions for proper torque values.
5. Perform visual and mechanical inspection and related work for overcurrent protective devices as specified in Division 26 Section "Overcurrent Protective Devices."

B. Commissioning

1. Balancing Loads: After substantial completion, but not more than two months after Final Acceptance, conduct load-balancing measurements and circuit changes as follows:
 - a. Perform measurements during period of normal working load as advised by the Owner.
 - b. Perform load-balancing circuit changes outside the normal occupancy/working schedule of the facility. Make special arrangements with Owner to avoid disrupting critical 24-hour services such as FAX machines and on-line data processing, computing, transmitting, and receiving equipment.
 - c. Recheck loads after circuit changes during normal load period. Record all load readings before and after changes and submit test records.
 - d. Tolerance: Difference between phase loads exceeding 20 percent at any one panelboard is not acceptable. Rebalance and recheck as required to meet this minimum requirement.

3.03 Cleaning

- A. Upon completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

End of Section

WIRING DEVICES

26 27 26

PART ONE – GENERAL

1.01 Definitions

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.
- F. UTP: Unshielded twisted pair.

1.02 Submittals

- A. Product Data: For each type of product indicated.

1.03 Quality Assurance

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer.
- B. Comply with NFPA 70.

1.04 Coordination

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

PART TWO – PRODUCTS

2.01 Manufacturers

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).

4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).
5. Or approved Equal.

2.02 Straight Blade Receptacles

A. Products: Subject to compliance with requirements, provide one of the following:

1. Cooper; 5351 (single), 5352 (duplex).
2. Hubbell; HBL5351 (single), CR5352 (duplex).
3. Leviton; 5891 (single), 5352 (duplex).
4. Pass & Seymour; 5381 (single), 5352 (duplex).
5. Or equal

2.03 GFCI Receptacles

A. General Description: Straight blade, feed and non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; XGF20.
 - b. Pass & Seymour; 2094-S.
 - c. Hubbell; GF8200A
 - d. Leviton; 8898
 - e. Or equal

2.04 Snap Switches

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
 - b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
 - e. Or equal

2.05 Wall Plates

- A. Single and combination types to match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel.
 - 3. Material for Unfinished Spaces: Galvanized steel.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weatherresistant, die-cast aluminum with lockable cover.

2.06 Finishes

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - 1. Wiring Devices Connected to Normal Power System: Almond or Ivory.
 - 2. Receptacles on Emergency Generator Backed Circuits: Red unless otherwise requested by Owner.

PART THREE – EXECUTION

3.01 Installation

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise indicated.
- B. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
- C. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

D. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles, and on horizontally mounted receptacles in the same orientation throughout building.

E. Arrangement of Devices:

1. Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top.
2. Group adjacent switches under single, multigang wall plates.

3.02 Identification

- A. Receptacles: Identify panelboard and circuit number from which served. Label inside of device plate.

3.03 Field Quality Control

- A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

- B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

End of Section

EXTERIOR LED LIGHTING
26 56 23

PART ONE – GENERAL

1.1 Summary

- A. This section contains information on LED Exterior Lighting specified within the drawings.

1.2 References

- A. Section 26 00 00 ó Electrical Sections

1.3 Submittals

- A. The following shall be submitted in accordance with section 01 33 00 ó Submittals & Substitutions.

PART TWO – PRODUCTS

2.1 Manufacturers

- A. The LED Lighting outline within this specification shall be Lithonia Lighting D-Series Size 1, LED Area Luminaire.
- B. Or approved Equal

2.2 Design Characteristics

- A. The D-Series Size 1 LED Area Luminaire shall have the characteristics detailed below:

Item	Description
Model	D-Series Size 1 LED Area Luminaire
LEDs	60C ó 60 LEDs (two engines)
Drive Current	530 ó 530 mA
Color Temperature	40k ó 4000K
Distribution	T4M ó Type IV Medium
Voltage	120V
Mounting	SPA ó Square Pole Mounting

2.3 Construction

- A. Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature

and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (1.01 ft²) for optimized pole wind loading.

2.4 Finish

- A. Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

2.5 Optics

- A. Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in standard 4000 K (70 minimum CRI) or optional 3000 K (70 minimum CRI) or 5000 K (70 CRI) configurations. The D-Series Size 1 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

2.6 Electrical

- A. Light engine configurations consist of 30, 40 or 60 high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L96/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20% and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV or 6kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

PART THREE – EXECUTION

3.1 Installation

- A. Install per manufacturer's installation instructions.

3.2 Warranty

- A. D-Series Size 1 LED Area Luminaire has a 5 year limited warranty.

GAS DETECTION SYSTEMS

28 33 00

PART ONE – GENERAL

1.1 Summary

- A. This section contains all gas detection systems required for the complete installation of the work.
- B. The contractor shall supply (1) one wall mount 4 channel gas detection controller, (1) one explosion proof tri-sensor heads (H₂S, LEL, O₂) and (1) one methane sensor head in accordance with the contract drawings and this specification.

1.2 References

- A. Section 26 00 00 - Electrical Sections

1.3 Submittals

- A. The following shall be submitted in accordance with Section 01 33 00 – Submittals & Substitutions.

PART TWO – PRODUCTS

2.01 Manufacturer

- A. The gas detection system shall be manufactured by:
 - 1. RKI Instruments
 - 1. Supplier:
Argus - Hazco
46400 Continental Drive
Chesterfield, MI 48047
 - 2. Or approved equal.

Gas Detection Controller	(1) RKI Beacon 410 Control Panel
Tri-Head Sensor Detector, diffusion	(1) Direct Connect IR LEL (CH ₄), O ₂ , H ₂ S
Sensor Detector, diffusion	(1) LEL (CH ₄) – Ceiling Mount
1 - Start – Up Service	
1 - Calibration Kit	
1 – Red Strobe Alarm	

2.02 Enclosure

- A. Wall-mounting gray polycarbonate NEMA-4X enclosure with hinged cover. Wiring access through four conduit hubs mounted to bottom of enclosure.

2.03 Display

- A. Simultaneous display of all channels on backlit LCD display with adjustable contrast control for variations in ambient lighting.

2.04 Signal input:

- A. One to four inputs, capable of either direct input from sensor or 4–20 mA signal input from remote transmitter, two or three wire format.

2.05 Audible alarm:

- A. Attached to bottom of enclosure, rated 94 db. Audible alarm can be silenced or reset using external sealed pushbutton switch, coded for low and high gas alarms (pulsing tone) or malfunction (steady tone).

2.06 Visual indicators:

- A. Color-coded LEDs, for Low alarm (yellow), high alarm (red), and Fail (yellow) conditions, green for normal (pilot) condition.

2.07 Wiring:

- A. Field wiring terminal blocks top access type capable of receiving 14 AWG wire. Separate terminal blocks for AC power, relay outputs, sensor or transmitter input, and controller wiring connections.

2.08 Input power:

- A. Operates from 115 VAC or 230 VAC, selectable by switch on power supply, or 24 VDC. 24VDC connection provides trickle charge to back-up battery (optional) while AC power is connected, and automatically switches to back-up power if AC power is lost. If backup battery option is used, the unit will display a warning message on the display in the event of low battery voltage condition, and the Fail LED will be illuminated.

2.09 Controls, external:

- A. Sealed pushbutton switch for alarm silence or reset.

2.10 Controls, internal:

- A. Four pushbutton switches for programming of controller. Toggle switch for power On/Off.

2.11 Relay Outputs:

- A. Low and high alarm relays for each channel. There are also four additional field programmable relays that can be programmed as a third level of alarm for each channel.

or as common relays. All contacts are Form C, rated for 10A 250 VAC resistive. All relay outputs (except fail) programmable using internal pushbuttons for normally de-energized or normally energized (fail-safe) operation, and latching or self-resetting. Fail relay is normally energized (fail-safe) and self-resetting only.

2.12 Analog outputs:

- A. 4-20 mA output (1000 ohms impedance maximum) for each channel, corresponding linearly to 0-100 % full scale.

2.13 Digital output:

- A. Modbus format RS-485 digital output.

2.14 Transmitter output:

- A. 24VDC, 350 mA maximum, for two or three-wire connection. Capable of operating diffusion and sample-draw transmitters without use of auxiliary power.

2.15 Min/Max Readings:

- A. Minimum and Maximum values for all active channels are stored automatically, and can be displayed as required through use of the Reset button, which is also used to reset the Min/Max readings.

2.16 Calibration:

- A. Calibration mode is entered through use of the programming buttons. Access to the calibration program is protected through use of a coded sequence of button operation to enter the calibration program. Automatic exit is provided from the calibration menu to prevent the unit from inadvertently being left in the calibration mode. Calibration mode will accommodate and automatically recognize and distinguish between direct connected sensors and remote amplifier (4-20 mA) type transmitters. If direct connect sensors are used a fresh air adjust capability is included. The unit allows selection of calibration gas concentration during the calibration sequence. A provision for aborting the calibration and retaining old calibration data is provided.

2.17 Channel setup and configuration:

- A. Channel setup and configuration mode is entered through use of the programming buttons. Access to the Channel setup and configuration program is protected through use of a coded sequence of button operation to enter the Channel setup and configuration program. Automatic exit is provided from the Channel setup and configuration mode to prevent the unit from inadvertently being left in the Channel setup and configuration mode. The setup and configuration mode allows the user to enable and disable channels, and to configure settings for alarm levels and activation type (increasing or decreasing), alarm time delay, relay logic (latching/non-latching, normally energized/normally de-energized), noise filter selection, and zero suppression selection.

2.18 Optional accessories:

- A. The following optional accessories to be used are:
 - 1. Top mounted programmable 360° viewable red strobe alarm

PART THREE – EXECUTION

3.01 Installation

- A. The gas detection system shall be installed per manufacturer's recommendations.

CHAIN LINK FENCES AND GATES

32 31 13

PART ONE – GENERAL

1.01 Work Included:

- A. Contractor shall provide all work necessary for the installation of chain link fences with gates and accessories as required and as indicated on the drawings.
- B. The project is to include the following
 - 1. Approximately of chain-link fence.
 - a. 739 LF of Treatment Plant Perimeter
 - 2. 1 of 14' wide vehicle gates.

1.02 Related Work Specified Elsewhere:

- A. Section 31 00 00 of Earthwork

1.03 Quality Assurance:

- A. Comply with the latest published editions of the American Society of Testing and Materials (ASTM) Standards and is referred to hereafter by basic designation only for a part of this specification to the extent indicated by references thereto.
- B. ODOT ITEM 607 & 710
- C. CLFMI (Chain Link Fence Manufacturers Institute) CLF-PM0610

1.04 Submittals:

- A. Contractor is required to submit the following in accordance with Section 01 33 00 herein before.
 - 1. Shop Drawings: Details of fabrication and installation.
 - 2. Manufacturer's Literature: Description data of installation methods and procedures, and standard drawings of fence and gate installation.
 - 3. Certificates: Manufacturer's certification that materials meet specification requirements.

1.05 Product Delivery, Storage and Handling:

- A. Deliver materials with manufacturer's tags and labels intact.
- B. Handle and store so as to avoid damage.

PART TWO – PRODUCTS

2.01 Steel Fabric:

- A. Conform to Zinc-Coated Steel Fabric: ASTM A392 hot dipped galvanized before or after weaving.
- B. No. 9 gauge wire woven in 2-inch mesh.
- C. Top and bottom selvages shall be knuckled top and bottom.
- D. Fabric: Galvanized coating shall be done after weaving and shall be Class II, 2.0 oz./soft, minimum.

2.02 Top Rail, Mid-Rail:

- A. ODOT 710.03, Grade 2 pipe.- OD 1.6606Ø, 1.84 lbs/ft
- B. Top rail shall pass through openings provided in post tops.
- C. Each length shall be coupled with sleeve coupling or one end of rail swaged for distance of 3-inches.

2.03 End, Corner and Pull Posts:

- A. ODOT 710.03, Grade 2 pipe.- OD 2.8756Ø, 4.64 lbs/ft
- B. Pipe posts have tops to exclude moisture.

2.04 Line Posts:

- A. ODOT 710.03, Grade 2 pipe. OD 2.3756Ø, 3.12 lbs/ft
- B. Pipe-posts shall have tops to exclude moisture.
- C. Terminal posts shall be braced to adjacent line post.

2.05 Barbed Wire:

- A. Conform to ASTM A 121, Type Z - Zinc Coated galvanized Steel.
- B. Wire strands shall be No. 12 ½, 13 ½, or 15 ½. AWS gauge galvanized steel wire with 4-point barbs.
- C. Barbed Wire Arms: barbed wire supporting arms shall be at an angle of 45 degrees and shall be fitted with clips or other suitable means for attaching three lines of barbed wire on the arm with the top outside wire approximately 12 inches horizontally from the fence line.

PART THREE – EXECUTION

3.01 Inspection:

- A. Verify that final grading in fence location is completed without irregularities which would interfere with fence installation.
- B. Do not commence work until unsatisfactory conditions have been corrected.

3.02 Preparation:

- A. Measure and lay out complete fence line.
- B. Measure parallel to surface of ground.
- C. Locate and mark position of posts.
- D. Locate line posts at equal distance spacing, not exceeding ten foot (10-foot) centers for woven wire fence.
- E. Locate corner posts at positions where fence changes direction more than ten (10) degrees.

3.03 Fence Installation:

- A. Posts:
 - 1. Set posts in concrete footings, mix to provide 3,000 psi, 28-day compressive strength.
- B. Fabric: Connect as follows:
 - 1. To line posts with #9 gauge wire clips every 12-inches.
 - 2. To top rail with #9 gauge wires every 24-inches.
 - 3. To terminal and corner posts as indicated on the drawings, tied to fabric every 14-inches with 11 gauge, 1-inch steel bands.
 - 4. Fabric shall be installed on side of posts facing away from public property.
- C. Existing Fence Connections: When new fence joins an old fence at any point, a corner or brace post shall be set at the junction and be braced and anchored the same as herein required for corner posts.

3.04 Adjust and Clean:

- A. Adjust brace rails and wires for rigid installation. Tighten hardware, fasteners, and accessories.
- B. Remove excess and waste materials from project site.

3.05 Fence Details:

- A. See sheet 38 of 42 in civil drawings.

End of Section

CHAIN-LINK CANTILEVER ELECTRIC SLIDE GATE

32 31 13.10

PART ONE – GENERAL

1.01 Requirements Included

- A. Contractor to supply all labor and materials for the complete installation on a chain-link cantilever slide-gate with key-pad and remote control openers.
- B. Work Includes:
 - 1. Chain link cantilever slide gate system.
 - 2. Pedestal mounted key-pad.

1.02 Related Sections

- A. 03 30 00 ó Cast-in-Place Concrete
- B. Division 26 ó Electrical
- C. Division 31 ó Earthwork
- D. 32 31 13 ó Chain-Link Fence and Gates

1.03 References:

- A. American Society for Testing Materials:
 - 1. B117 Practice for Operating Salt Spray (Fog) Apparatus
 - 2. D523 Test Method for Specular Gloss
 - 3. D714 Test Method for Evaluating Degree of Blistering of Paints
 - 4. F567 Standard Practice for Installation of Chain-Link Fence
 - 5. F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates.
 - 6. F2200 Standard Specification for Automated Vehicular Gate Construction
- B. Underwriters Laboratory UL-325 safety standards

1.04 Submittals:

- A. Contractor is required to submit the following in accordance with Section 01 33 00 herein before.
 - 1. Shop Drawings: Details of fabrication and installation.
 - 2. Manufactures information for each type of product indicated.

3. Manufacturer's Literature: Description data of installation methods and procedures, and standard drawings of fence and gate installation.
- B. Certificates: Manufacturer's certification that materials meet specification requirements.
- C. Product Warranty: Standard limited warranty that the cantilever slide gate system is free from defects in material and workmanship and, under normal or proper usage, will remain free from such defects for a period of three (3) years from the date of original purchase.

1.05 Quality Assurance:

- A. Comply with the latest published editions of the American Society of Testing and Materials (ASTM) Standards and is referred to hereafter by basic designation only for a part of this specification to the extent indicated by references thereto.
- B. ODOT ITEM 607 & 710
- C. CLFMI (Chain Link Fence Manufacturers Institute) CLF-PM0610
- D. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and the materials and techniques specified.
- E. Provide complete cantilever slide gate system with all components provided by a single manufacturer.
- F. Manufacturer Qualifications: Company specializing in manufacturing of cantilever slide gate systems with a minimum of 5 years documented experience.

1.06 Product Delivery, Storage and Handling:

- A. Deliver materials with manufacturer's tags and labels intact.
- B. Cantilever slide gate to be delivered to the project site pre-assembled when possible and coated. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping.
- C. Materials shall be handled and stored properly to protect against damage, weather, vandalism and theft.

PART TWO – PRODUCTS

2.01 Manufacturer

- A. Chain Link Cantilever Slide Gate
 1. Secure-Trac® Chain Link Cantilever Slide Gate

2. Or Equal

2.02 Gate Products

- A. Cantilever Slide Gates: Manufactured in accordance with ASTM F 1184 Type II Class 2, and in compliance with UL-325, and ASTM 2200 (No substitution). Gate to be made of Aluminum Alloy 6005-T61. All square members are 2" sq. weighing 0.94 lb. /ft.
- B. Complete frame welded to one piece track and 4" x 2" bottom rail weighing 1.71 lbs. /ft. Supply 2 truck assemblies that are swivel type having lubricated and sealed ball bearing wheels.
- C. Gates 31" thru 40" dual top tracks member weighing 6.36 lb./ft. The bottom rail 4" x 2" weighing 1.71 lb. /ft. Top tracks require two additional truck assemblies. Diagonal adjustable 1/4" stainless steel truss cables (2) provided inside each panel of the gate.
- D. Chain Link 9 gauge wire 2" fabric options choose one: Galvanized before Weaving (GBW), Galvanized after Weaving (GAW), Aluminized, or Thermally Fused & Adhered 2b PVC.
- E. Finish " choose one: Natural Aluminum or Polymer coated horizontal slide gates and posts shall match the coating type and color as that specified for the fence framework. Finish shall comply with Corrosion Resistance Salt Spray Test per ASTM B117, Impact Resistance per ASTM D2794, and Adhesion per ASTM D3359 Method B. All primary components shall receive a thorough cleaning and pre-treatment with a 10-step process: Hot alkaline cleaner, clear water rinse, hot iron phosphate application, clear water rinse, reverse Osmosis rinse, dry off oven heat, zinc enriched powder primer coat at 2-4 mils., gel oven heat, Ultra polyester finish T.G.I.C. powder coat at 2-4 mils., and final curing oven. Choose color: Black, Brown, Green, or Custom.
- F. Gateposts, 4" O.D. schedule 40 weighing 9.11 lb. /ft. Single gates with single tracks require 3 gate posts. (1 latch post and 2 support posts) Single gates with dual tracks require 5 gate posts. (1 latch and 2 dual support posts) Double gates require twice the number of support posts but do not have a latch post.
- G. Electrically operated horizontal slide gates must be manufactured and installed to comply with the safety requirements of ASTM F2200 and UL 325.

2.03 SETTING & ANCHORAGE MATERIALS

- A. Concrete: Minimum 28 day compressive strength of 4,000 psi.

2.04 Opener Products

- A. LiftMaster or Equal
- B. Mechanical

1. Frame: G90 Galvanized steel to prevent rusting
2. Cover: Steel cover is plated and painted
3. Primary Reduction: Single cog belt
4. Speed: Approximately 10 in/sec
5. Chain: Stainless Steel #40 roller chain, chain brackets, hardware
6. Fail-Safe Release Kit

C. Electrical

1. Automatic limit adjustment
2. Auto-close timer 1-23 sec
3. Selectable stop / reverse loop function
4. Built in On / Off switch
5. Built in alarm reset switch
6. Programming switches allow you to set desired mode of operation
7. Partial-open and anti-tailgating features
8. Two 115 VAC convenience outlets for accessory transformers
9. Automatically assumes fail-safe mode when an entrapment condition exists
10. Ports for plug-in open and reverse loop detectors.
11. DKS plug-in detectors only
12. Gate Tracker reporting output provides operator data to access control system (DKS 1833, 1835, 1837, 1838 only)

D. Miscellaneous

1. Thermostatically controlled heater kit
2. 5-year warranty

2.05 Remote Opener & Controls

1. Supply a pedestal mount Key-Pad Opener
 - a. Commercial Grade
 - b. Wireless access control keypad
 - c. 5 code capacity
 - d. Security + 2.0

- e. 5 permanent PINs and 10 unique temporary PINs
- f. Unique Temporary PINs to be set for 1 to 9 uses
- g. Allows for removal of a single PIN while maintaining full access for other users.
- h. Electronics are fully sealed and meet NEMA 4X water protection.
- i. 5-year lithium battery for cold weather (based on 25 activations per day)

2.06 Remote Portable Controllers

- 1. Supply two (2) Remote Control units for plant operator vehicles.
 - a. Completely compatible with gate opener.

PART THREE – EXECUTION

3.01 Examination

- A. Verify areas to receive fencing are completed to final grades and elevations.

3.02 FRAMEWORK INSTALLATION

- A. Install all framework per manufactures recommendations.

3.03 CANTILEVER GATE INSTALLATION

- A. Horizontal Slide Gates: Install according to manufacturer's instructions and in accordance with ASTM F567. Gates shall be plum in the closed position, installed to slide with an initial pull force no greater than 40 lbs. Ground clearance shall be 3 in, grade permitting. Electrically operated gate installation must conform to ASTM F2200 and UL 325.

3.04 ELECTRICAL

- A. Electric gate opener power supply shall come from pole barn power panel.
- B. Grounding: See Specifications Section 26 05 26 - Grounding and Bonding for Electrical Systems

3.05 CLEANING

- A. Clean up debris and remove from the site.

End of Section

INSTRUMENTATION AND COMPONENTS OF PROCESS CONTROL PANELS

33 09 30.20

PART ONE – GENERAL

1.01 General Notes:

- A. This specification section list most of the major components within the control panel within the project.
- B. Some of the components may or may not be used in any or all panels
- C. The listing of these components are for bases-of-design, other brands and manufacture may be submitted and will be reviewed for compliance.

1.02 Requirements Included

- D. 2.01, Digital Panel Meter
- E. 2.02, Contact Blocks
- F. 2.03, Pilot Light
- G. 2.04, Stack Light & Warning Devices
- H. 2.05, Multi-position Selector Switches
- I. 2.06, Push Button Operators
- J. 2.07, Control Relays
- K. 2.08, Timer Relays
- L. 2.09, Contactors & Overloads
- M. 2.10, Motor Starters
- N. 2.11, 24VDC Control Power Transformers
- O. 2.12, 24VDC Surge Protection
- P. 2.13, Paperless Videographic Recorder
- Q. 2.14, HMI - Human Machine Interface
- R. 2.15, PLC - Programmable Controllers
- S. 2.16, Managed Ethernet Switch
- T. 2.17, Panels & Enclosures

U. 2.18, Control Panel & Enclosure HVAC

1.03 References

- A. NEMA ICS 1 - General Standards for Industrial Control Systems
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type)
- E. NEMA 6 Ingress Protection Code 6IP6
- F. Underwriters Laboratory 6UL6

1.04 Related Specifications Sections

- A. 01 33 00 Submittals & Substitutions
- B. 26 00 00 Basic Electrical Requirements
- C. 33 09 30.10 Process Control Devices

1.05 Submittals

- A. Process of submittal is covered in 01 33 00 Submittals & Substitutions.
- B. Submit shop drawings indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Submit product data for each component specified.
- D. Some components are covered under other specifications sections.

1.06 Project Record Documents

- A. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.07 Operation and Maintenance Data

- A. Include instructions for all operational features of each component.
- B. Include recommended predictive & preventive maintenance procedures and materials.

1.08 Qualifications

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 10 years documented experience.

1.09 Pre-approved Manufactures *(not all products are acceptable, submit for approval as required)*

- A. ABB
- B. Allen-Bradley
- C. Direct Logic
- D. C-more
- E. Eaton ó Cutler-Hammer
- F. Federal Signal Corp
- A. ICEcube
- B. IDEC
- C. Maple Systems
- D. Omron
- E. Phoenix Contact
- F. Productivity
- G. Rhino
- H. Schneider Electric - Square D, Telemecanique

PART TWO – PRODUCTS and MANUFACTURES

2.01 Digital Panel Meters

- A. Precision Digital - (Manufacture) or approved equal
 - 1. Model - PD6000-6R7
 - a. 4-20 mA Input
 - b. 4 Output Relays
 - c. 4-20 mA Output
 - d. Purpose or Use
 - i. Pressure or Level
 - 2. Model - PD6000-6R5
 - a. 4-20 mA Input
 - b. 2 Output Relays
 - c. 4-20 mA Output
 - d. 85-265 VAC
 - e. Purpose or Use
 - i. Pressure or Level
 - 3. Model ó PD6200-7R7 or PD6300-7R7
 - a. Pulse or 4-20 mA
 - b. 4 Output Relays
 - c. 4-20 mA Output
 - d. 85-265 VAC
 - e. Purpose or Use
 - i. Pressure or Level

- 4. Contractor to supply to the operator the following Precision Digital Peripherals:

- a. 1 ó CD copy of the most current version of Meter View Pro software.
- b. 1 ó ProVu Copy Cable
- c. 1 ó ProVu to Computer USB Adapter w/Cable
- d. 1 - 25 foot, shielded CAT 6A, RJ45 x RJ45, Ethernet Cord

2.02 Contact Blocks

- A. Standards
 - 1. UL 508
 - 2. NEMA
 - 3. 30 mm
- B. Eaton, Square D or Approved Equal
 - 1. HT800
 - 2. E34
 - 3. Harmony 9001K, SK & KA
 - 4. Or Equal

2.03 Pilot Light

- A. Standards
 - 1. UL 508
 - 2. NEMA
 - 3. 30 mm
 - 4. Push-to-Test
 - 5. Light Source ó LED
 - 6. Color to Purpose
 - a. Green ó Condition Good and/or Running
 - b. Blue ó Activated, Selected to Run (*may not be running*)
 - c. Amber ó Caution, Standing-By, Ready-to-Run or Running-in-Hand
 - d. Red ó Danger, Alarm and/or Failure
- B. Eaton, Square D or Approved Equal
 - 1. HT800
 - 2. E34
 - 3. Harmony 9001KT
 - 4. Or Equal

2.04 Stack Light & Warning Devices

- A. Standards
 - 1. UL508
 - 2. IP55
 - 3. NEMA
 - 4. 25 mm, 40 mm, 50 mm and 70 mm (*depending on the application*)
 - 5. Light Source ó LED
 - 6. Color to Purpose
 - a. Green ó Condition Good and/or Running
 - b. Blue ó Activated, Selected to Run (*may not be running*)
 - c. Amber ó Caution, Standing-By, Ready-to-Run or Running-in-Hand
 - d. Red ó Danger, Alarm and/or Failure

- 7. Multi-functional audible element
 - a. Buzzer
 - b. Siren
 - 8. Strobe light option
 - 9. All associated hardware
- B. Manufactures
 - 1. Federal Signal Corp
 - 2. LED Andon
 - 3. Automation Direct - Werma
 - 4. Or Equal

2.05 Multi-position Rotary Selector Switches

- A. Standards
 - 1. UL 508
 - 2. NEMA
 - 3. 30 mm
- B. Two, Three, or Four-position rotary selector switches
 - 1. HT800
 - 2. E34
 - 3. Harmony 9001K
 - 4. Omron A30
 - 5. Or Equal

2.06 Push Button Operators

- A. Standards
 - 1. UL 508
 - 2. NEMA
 - 3. 30 mm
- B. Push Button Switches
 - 1. HT800
 - 2. E34
 - 3. Harmony 9001KR & K2
 - 4. Omron A30
 - 5. Or Equal
- C. Mushroom Push Button & Emergency Stop Switches
 - 1. HT800
 - 2. E34
 - 3. Harmony 9001KR
 - 4. Omron A30
 - 5. Or Equal

2.07 Control Relays

- A. Standards
 - 1. UL 508

2. NEMA
 3. Electromechanical
 4. Control Voltage Per Ladder Logic or other Specifications
 5. Round Pin or Spade, Socket Base Mounted
- B. General Purpose & Latching
1. SQ-D - 8501K
 2. Automation Direct - 750R Series
 3. Omron
 4. Or Equal.
- C. Other special purpose relays can be accepted based on the application.
1. PLC Relays with Metal Oxide Varistors (MOV) and Diode circuits
 - a. Automation Direct 78 Series
 - b. SQ-D RXG, 8501CT
 2. Or Equal.
- D. Alternator, Relay
1. Macromatic Industrial Controls - ARP Series
 2. Dayton
 3. Diversified Electronics
 4. Eaton D85 Series
 5. Or Equal

2.08 Timer Relays

- A. Standards
1. UL 508
 2. NEMA
 3. Control Voltage Per Ladder Logic or other Specifications
 4. Round Pin, Socket Base Mounted
 5. See Ladder Logic for Timing Requirements
 6. Or Equal.
- B. General Purpose Timer Relays
1. SQ-D 6 9050JCK
 2. Automation Direct 6 Fuji MS4 Series
 3. Omron
 4. IDEC
 5. Or Equal
- C. Digital Counter / Timer Relays
1. Koyo KT Series
 2. Automation Direct 6 CTT Series
 3. IDEC
 4. Or Equal

2.09 Contactors & Overloads

- A. Standards
1. UL 508

- 2. NEMA
 - 3. Control Voltage Per Ladder Logic or other Specifications
 - 4. See Ladder Logic for NEMA Sizing Requirements
 - 5. Non-Reversing (*unless otherwise indicated in the ladder logic*)
- B. General Purpose Contactors
- 1. SQ-D ó TeSys D
 - 2. Eaton Culter-Hammer
 - 3. Or Equal
- C. Overload Relays
- 1. SQ-D ó TeSys D
 - 2. Eaton Cutler-Hammer
 - 3. Or Equal

2.10 Motor Starters

- A. Standards
- 1. UL 508
 - 2. NEMA
 - 3. Control Voltage Per Ladder Logic or other Specifications
 - 4. See Ladder Logic for NEMA Sizing Requirements
 - 5. Non-Reversing (*unless otherwise indicated in the ladder logic*)
- B. General Purpose Starters
- 1. SQ-D ó TeSys U
 - 2. Eaton Culter-Hammer
 - 3. Or Equal

2.11 24VDC Control Power Transformers

- A. Standards
- 1. UL 508
 - 2. UL1310 Recognized for NEC Class 2 compliance
 - 3. Output capacity to be determined by the panel builder's maximum power allocation calculations + 25%.
- B. Manufactures
- 1. Rhino
 - 2. IDEC
 - 3. Or Equal

2.12 24VDC Surge Protection

- A. Standards
- 1. UL 497B
 - 2. UL1310 Recognized for NEC Class 2 compliance
- B. Products & Manufactures
- 1. Phoenix Contact ó PLUGTRAB PT-IQ
 - 2. Citel ó DLA Series

3. Or Equal

2.13 Paperless Videographic Recorder

- A. Manufactures:
 1. Endress+Hauser
 2. Honeywell
 3. Or Approved Equal
- B. Purpose or Use
 1. Collect and Store Operational Trend Data
- C. Paperless Videographic Recorder
 1. TFT 7" colour graphic display with touch panel
 2. The following are basic requirements of the recorder. The total number I/Os shall be listed within the engineering drawings
 - a. 20 Analog Inputs
 - b. 14 Digital Inputs
 - c. 2 - Analog Outputs
 - d. 12 - Relay Outputs
 3. The unit should include the following;
 - a. Internal Memory ó 256MB (min)
 - b. External data storage ó 1GB SD Card
 - c. Mounting Clamps
 - d. Programming software
 - e. Printed Start-up Guide
 - f. Required resister(s) (*one per analog input*)
 - g. Touchscreen styli~~s~~ (*if required*)
 - h. Power cord
 - i. Connectors for I/O ports
- D. See engineering drawing for I/O layout and requirements.

2.14 HMI - Human Machine Interface

- A. Standards
 1. UL508
 2. IP65
 3. NEMA 4 & 4X for exterior applications
 4. 800 x 600 (SVGA) minimum screen resolution
 5. Backlight Average Lifetime - 50,000 hours @ 25°C
- B. Manufactures:
 1. C-more
 2. Atlas Industrial Monitors
 3. Maple Systems
 4. Or Approved Equal
- C. Software and Programming
 1. Contractor/panel supplier will supply one (1) licensed copy of any/all programming software to the client and in the client name.

2. Contractor/panel supplier will supply one (1) copy of any/all programming, un-password protected to the client.
 - a. The programming is to be verified at the time of the project closeout to the client.
 - b. One (1) printed copy of all programming shall be supplied.
3. HMI's make and models shall be standardized throughout the project.
4. The only exception to this rule is for manufactures who are ultimately responsible for a specific process or piece of equipment where a PLC is used for control and the HMI is part of that system.

2.15 PLC - Programmable Controllers

- A. Standards
 1. UL508
 2. NEMA - ICS 61131
- B. Manufactures:
 1. VPAC
 2. Allen-Bradley
- C. PLC's make and models shall be standardized throughout the project.
 1. Exceptions to this requirement:
 - a. Control Panels for manufactured driven equipment such as the primary treatment, screening, grit removal and pumps.
- D. Software and Programming
 1. Contractor/panel supplier will supply one (1) licensed copy of any/all programming software to the client and in the client name.
 2. Contractor/panel supplier will supply one (1) copy of any/all programming, un-password protected to the client.
 - a. The programming is to be verified at the time of the project closeout to the client.
 - b. One (1) printed copy of all programming shall be supplied. The printed copy shall include:
 1. Passwords
 2. Rung notes
 3. Programming comments
 4. IP addresses
 5. I/O addresses
 6. As-built wiring diagrams
 3. The only exception to this rule is for manufactures who are ultimately responsible for a specific process or piece of equipment where a PLC is used for control.

4. Contractor and the primary panel integrator shall coordinate the I/O address format and distribute addresses as needed for a complete harmonious system.

2.16 Managed Ethernet Switch

- A. Standards
 1. IEEE 802
 2. IP20
- B. Manufactures
 1. Phoenix Contact, FL Switch, 3000 Series
 2. OR Equal

2.17 Control Panels & Enclosures

- C. Standards
 1. Must carry UL label and meet NEMA/EEMAC for each classification
 2. NEMA 1, 2, 3, 3R, 3S, 4, 4X, 5, 6, 6P, 12 & 13
 - a. See engineering drawings for application & purpose specifics.
- D. Material of Construction
 1. 304 Stainless Steel, 316 Stainless Steel, 5052-H32 Aluminum, Powder Coated Carbon Steel, Fiberglass Reinforced Polyester, Polycarbonate or Thermal ABS
 - a. See engineering drawings for application & purpose specifics.
- E. Panel / Enclosure Configuration
 1. Panel Builder to determine the overall dimensions required based on final interior layout design.
 - a. Height, Width & Depth
- F. Manufactures
 1. Hubbell-Wiegmann
 2. Hoffman
 3. Rittal
 4. Or Equal

2.18 Electrical Panel & Enclosure HVAC

- A. Standards
 1. Must carry UL and meet NEMA for each classification
 2. Digital temperature controller with alarm
 3. Built in condensate evaporation
 4. Easy pull-out filter
 5. Efficient and quiet
 6. Environmentally friendly refrigerant
- B. Voltage
 1. The voltage shall be of the same voltage as the incoming power to the control panel.
 - a. It shall not be powered after a step-down transformer within the panel.
 2. Maximum efficiency and performance must always be priority in unit selection.

- C. HVAC Unit Size and/or Capacity
 - 1. Unless otherwise specified, the panel builder shall select the proper size and capacity of the HVAC unit based:
 - a. Heat loading within the panel
 - b. Heating or Cooling requirements of individual components
 - c. Panel or cabinet material, type and size
- D. Manufactures
 - 1. ICEcube
 - 2. Stratus
 - 3. Thermal Edge Inc.
 - 4. Or Equal

PART THREE – EXECUTION

3.01 Installation

- A. Install all devices and equipment in accordance with manufacturer's instructions.
- B. Provide five (5) (each) of spare parts for items with expendable components such as fuses and etc.

End of Section

TELESCOPING VALVES
40 05 71.33

PART ONE – GENERAL

1.1. Summary

- A. This Section contains all telescoping valves required for the complete installation of the work.
- B. The contractor shall supply all telescoping valves as specified in the contract drawings.

1.2. References

- A. Section 03 30 00 – Cast-in-Place Concrete

1.3. Quality Assurance

- A. The material covered by these specifications shall be furnished by a reputable and qualified manufacturer of proven ability that is regularly engaged in the manufacture and installation of telescoping valves.

1.4. Submittals

- A. The following shall be submitted in accordance with section 01 33 00 – Submittals & Substitutions.

PART TWO - PRODUCTS

2.1 Manufacturers

- A. The following manufacturer is named to establish a standard of quality necessary for the Project:
 - 1. Halliday Products Series V4R Telescoping Valve
 - 2. Or approved equal

2.2 Design Criteria

- A. The telescoping valve shall be sized to fit riser pipe and penetrate the riser pipe a minimum of 9" (229mm) in the up position.
- B. The unit shall have a floor stand of 4" (102mm) square stainless steel tube with 1/8" (3mm) wall and mounted to a 1/2" (13mm) thick stainless steel base plate.

- C. The handwheel shall be 16" (406mm) diameter cast aluminum and work in conjunction with a 1 inch (25mm) square stainless steel rack, 2 inch (51mm) stainless steel spur gear and oil-impregnated sintered bronze bushings, requiring a maximum of 2 turns for one foot (305mm) of travel.
- D. The slip tube shall be a minimum of 16 ga. stainless steel and incorporate a 150 lbs. stainless steel companion flange and 1/4" (7mm) thick neoprene wipe gasket.

2.3 Telescopic Valve Schedule

Location	Quantity	Base Plate Elevation	High Travel Elevation	Low Travel Elevation	Top of Riser Pipe Elevation	Existing Riser Pipe Size
Sludge Digester*	2	1005.50±	1004.29±	1000.24±	999.92±	6"
EQ (influent Structure)*	1	1008.00±	1007.50±	1005.50±	1005.40±	8"
RAS Wetwells*	2	Replace in-kind using field measurements				6"

*Field verify all telescopic valve elevations

Location	Quantity	Scum Baffle Attachment	Intermediate Brackets ¹	Construction Material	Valve Style	Actuator	Rising Stem Type
Sludge Digester	2	✓	✓	304SS	V-Notch	2	✓
EQ (influent structure)	1		✓	304SS	V-Notch	2	✓
RAS Wetwells	2		✓	304SS	n/a	2	✓ ³

¹Contractor to provide intermediate support brackets (if necessary)

²Vertical Mount Hand Wheel or Bevel Actuator (hand crank)

³Existing RAS Wetwell Telescopic valves are of non-rising stem type, proposed telescopic valves to be of rising stem type.

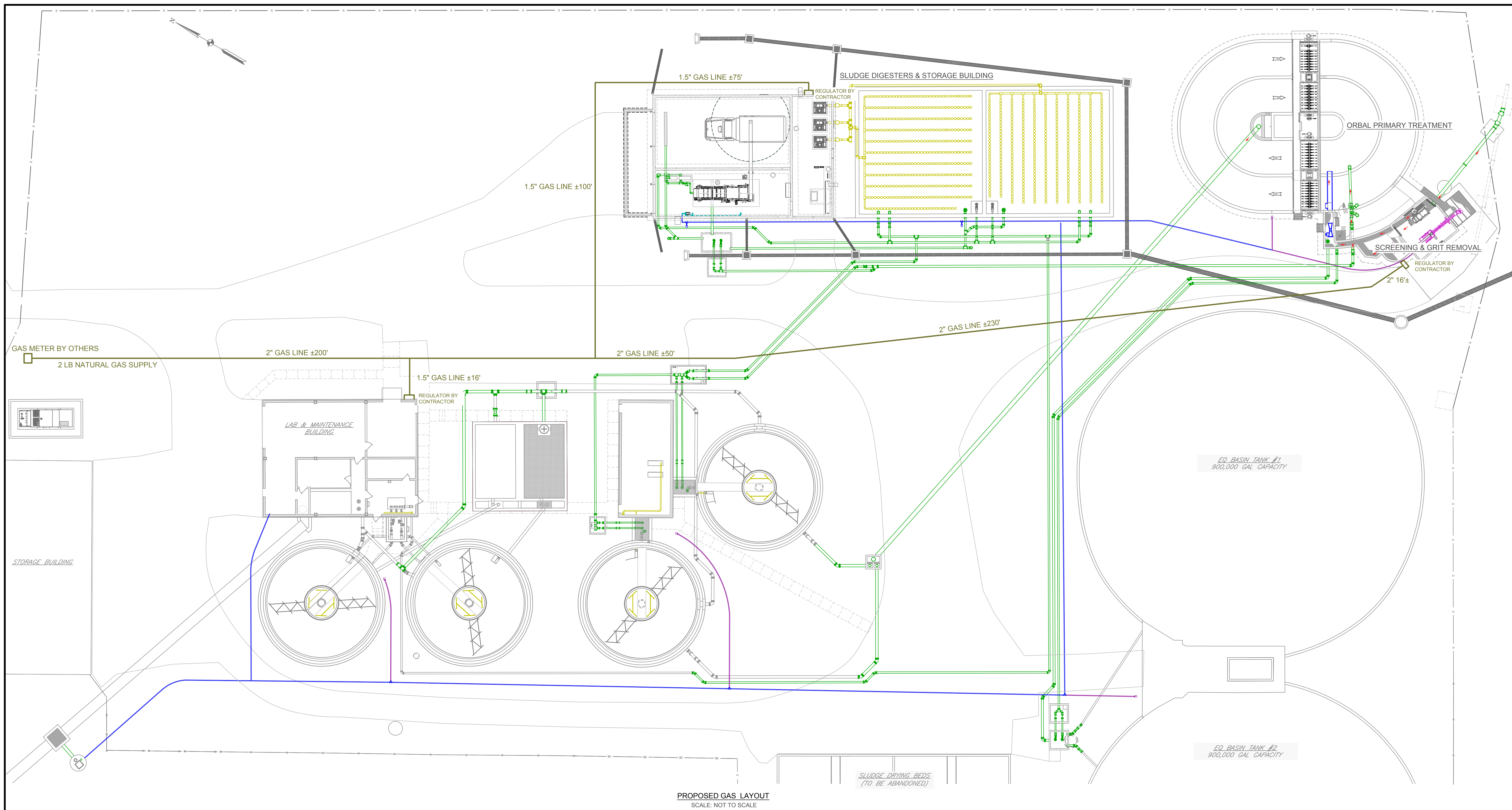
PART THREE – EXECUTION

3.1 Storage

- A. Should it be necessary to store product prior to installation, precautions should be taken to prevent cracking, twisting, warping, distortion, bending, breaking, chipping or damage of any kind to the materials.

3.2 Installation

- A. The telescoping valves shall be installed per the manufacturer's installation instructions.



Lakengren Water Authority
Wastewater Treatment Plant Improvements
Pre-Bid Meeting Notes – September 19, 2018

- I. Introductions of Utility Staff and Mote & Associates, Inc. (engineer) Personnel. The sign-in sheet is attached hereto.
- II. Project Overview
 1. Dave Mathews, Mote & Associates, Inc. reviewed the project scope and mentioned the following:
 - a. DP&L to increase service to 480 volt, 3 phase and will keep 240 volt service available at the same time during construction. Owner will pay for all aid to construction costs. The contact name & number for DP&L is shown on the plans.
 - b. A new MCC will be installed to operate all equipment both existing and new.
 - c. The project will include installation of new sludge digesters with a press building. The existing sludge drying beds will be abandoned by the Owner.
 - d. The press equipment and control panel are NOT to be included in the project bid. The Owner will directly contract for the purchase and install of the press.
 - e. The new components will be built as separate units and then connected together to put in-service to the existing plant processes.
 - f. Influent flows gravity into the system and there is no influent pump station. A manhole coming into the plant from the hill top is 20' deep with a 10' sump.
 - g. Bypass pumping will be required as the flows cannot back up into the system. There is a two (2) day turnover time.
 - h. Rock excavation is anticipated since borings have shown rock to be consistently four feet (4') deep. A specification for blasting, if needed, has been included in the Contract Documents.
 - i. All spoils shall remain on-site with a balanced cut and fill. This includes any rock.
 - j. Engineer is responsible to obtain all permits and they will be paid for by Owner.
 - k. At the end of the project, the stabilization tank shall be cleaned out by Lakengren for conversion to an equalization basin. This will occur after the new plant components are in-service.
 - l. Some additional electrical specifications will be issued with Addendum #1 which will be forwarded via email to all registered planholders next week.
 - m. The gas service is provided by Knox Energy and the site is served with a 2" main with a 1" tee that provides a 1" service to the Lab/Maintenance Building.
 - n. All VFD drive motors shall be the same brand/type/model for ease in replacement parts and service.
 - o. Instrumentation specification does not require programming and will be integrated. The master annunciation panel will provide recording and collection of data, but no controls. The Evoqua system will send data to the panel, but alarms will come from the equipment. No alarm system is included with the project.

III. Bidding Overview

1. Susan Laux of Mote & Associates, Inc. reviewed the bidding documents and requirements as follows:
 - a. The date for project completion has been extended for one year to 01/31/2021.
 - b. The Proposal Forms includes all documents that are required to be submitted in the Bid Packet. This includes a Manufacturer Equipment Declaration form.
 - c. A Contingency Allowance of 7% will be added to the Base Bid of the lowest and best Bidder for Contract Award. This Allowance will be used by the Owner for additional work items only. Any use of the Allowance will be as directed by the Owner and any remaining Allowance at the end of the project will be deducted from the Contract through a Change Order.
 - d. The project includes American Iron and Steel requirements as well as goals for use of MBE and WBE firms for materials and services.
 - e. Clarification regarding requirements for good faith efforts, if the Contractor fails to meet MBE and WBE project goals, will be included in the Addendum.

IV. Addendums/Comments

1. Susan commented that Addendum No. 1 will be distributed the week of September 24th and would include, at minimum, the following items:
 - a. Pre-Bid Meeting Sign-in Sheet and Notes
 - b. Additional technical specifications for electric items
 - c. The cost of the Plumbing Permit
 - d. An explanation of the Contingency Allowance
 - e. The project completed date change to January 31, 2021
 - f. Clarification of good faith efforts to meet MBE and WBE goals
2. All technical questions shall be asked/submitted by October 1, 2018, so any final addendum can be issued no later than October 5, 2018. No questions other than those pertaining to the bidding documents will be answered after October 1, 2018.
3. The vault shown on the plans will be moved outside of the driveway.
4. Any equipment suppliers requesting “or equal” or “approved equal” status will be reviewed. If any additional supplier equipment is approved for the project it will be duly noted in an Addendum. Otherwise, all equipment shall be based on the brand names included in the specifications and as entered by the Bidder in the Manufacturer Declaration Form.
5. Any requests for equals to the brand named generators will include analysis of fuel consumption and operational costs.
6. No tree removal is anticipated with the project. All tree removal has been completed by the Lakengren staff.

Mote & Associates

Engineering, Land Surveying

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LAKENGREN WATER AUTHORITY Wastewater Treatment Plant Improvements

Pre-Bid Meeting Sign-in Sheet

Date: September 19, 2018

Time: 10:00 A.M.

	<u>ATTENDEES:</u>	<u>REPRESENTING:</u>	<u>PHONE NUMBER:</u>
1.	<u>Sean Mondello</u>	<u>Lake Erie Electric</u>	<u>513-267-2622</u>
2.	<u>STEVE JAMES</u>	<u>BUILDING CRAFTS Inc</u>	<u>859-781-9500</u>
3.	<u>BRAD GIBSON</u>	<u>Henry P. Thompson Co.</u>	<u>513-248-3227</u>
4.	<u>Steve Gohrband</u>	<u>Kirk Bros</u>	<u>419 595 4044</u>
5.	<u>Tim Philipot</u>	<u>Kirk Bros</u>	<u>419-595-4006</u>
6.	<u>Ty Wilkinson</u>	<u>Ohio CAT - Power System</u>	<u>937-440-2910</u>
7.	<u>Alan Stobaugh</u>	<u>LWA</u>	<u>937-456-4455</u>
8.	<u>Justin Erbaugh</u>	<u>LWA</u>	<u>937-456-6556</u>
9.	<u>JARROD YOUNG</u>	<u>ULLMAN SCHUTTE</u>	<u>937-910-9900</u>
10.	<u>Guy Bulant</u>	<u>Lake Erie EI</u>	<u>513-267-2202</u>
11.	<u>Miller Burns</u>	<u>Mote & Associates</u>	<u>937-548-7511</u>
12.	<u>Dave Matthews</u>	<u>"</u>	<u>"</u>
	<u>Susan Laux</u>	<u>"</u>	<u>"</u>

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