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September 3, 2024

Project No: 100200.32

ADDENDUM NO. 1
TO THE CONTRACT DOCUMENTS AND DRAWINGS

For the construction of the
Aloe Bay Water Quality Enhancement Wastewater Treatment Facility

To All Planholders:

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents and Drawings for the **Aloe Bay Water Quality Enhancement Wastewater Treatment Facility** project for Dauphin Island Water and Sewer Authority as fully and completely as if the same were set forth therein:

SPECIFICATIONS

1. Remove Specification 11600 – Scraper Type Clarifiers and replace with attached specification 11600 – Scraper Type Clarifiers – Addendum 1.

2. Remove Specification 11520 – Liquid Polymer Blending System and replace with attached specification 11520 – Liquid Polymer Blending System – Addendum 1.

3. Remove Specification 11345 - Rotary Lobe Blowers and replace with attached specification 11345 – Rotary Lobe Blowers - Addendum 1.

4. Specification 13220 – Prestressed Concrete Tank. Add under Quality Insurance Section A. Paragraphs 1 and 3, Experience in the design and construction of ANSI/AWWA D110 Wire-wound, Circular Prestressed Concrete Tanks with Type II core walls.

5. Specification 13220 – Prestressed Concrete Tank. Add under Quality Insurance Section 2.02 Performance. Edit Paragraph A to include Prestressed Concrete Tanks with Type II core walls.

DRAWINGS

1. Remove Sheets E-0.61, E-7.0, E-98.6, I-7.0 and replace with the revised sheets E-0.61, E-7.0, E-98.6, I-7.0.

2. Remove Sheet G-7.0 and replaced with revised sheet G-7.0.

CLARIFICATIONS

1. All control panels for the project are subject to specification section 16910. In addition, any custom control panels not directly part of a vendor supplied package (such as the main control panel and lift station RTUs), shall be provided by a UL listed custom control panel manufacturer. Engineer approved equals are acceptable, however the preapproved suppliers (in no particular order) are:
    - Automation Control Service (ACS)
    - Electric Machine Control (EMC)
    - Revere
    - Southern Flow

2. All instruments not directly associated with a vendor supplied or packaged piece of equipment have been detailed in specification section 16950. In addition to the listed manufacturer (Endress & Hauser), engineer approved equals are acceptable. Instruments manufactured by ABB, Rosemount, Khrone, and Siemens are acceptable.

3. Ardurra will be performing integration for the project. The integration scope is detailed across the drawings, specifically drawings E-0.60 – E-0.62 as well as in the process loop description specification. As part of the integration scope, Ardurra will provide all servers, computers, networking equipment associated with the computers/servers, software, and configuration. All custom control panels and instrumentation (not part of a vendor supplied package) shall be supplied by others.

4. Previously demolished digestor, clarifier and trickling filter are shown on C-2.0 to be removed. These items shall be partially removed in the case of interference with new construction items (structures, piping, valves, manholes, etc.). They shall remain in-place if no interference occurs.

5. Macerator flow arrow should be reversed on sheet M-6.0. Flow direction is from the digester to the screw press.

6. Existing diesel fuel tank has already been relocated offsite by the owner. The existing slab is to be demolished. New diesel tank, pad, and bollards shown on C-3.0 and C-5.0 will not be required.

7. Relocate grit panel to headworks column at elevation of 12.0 as shown on markup of attached sheet E-2.0.

ATTACHMENTS

1. Specification 11600 – Scraper Type Clarifiers – Addendum 1

2. Specification 11520 – Liquid Polymer Blending System – Addendum 1

3. Specification 11345 – Rotary Lobe Blowers – Addendum 1

4. Revised Sheets E-0.61, E-7.0, E-98.6, I-7.0

5. Revised Sheet G-7.0

6. Sheet E-2.0 markups

REQUEST FOR EQUALS

1. Tnemec Company is an approved manufacturer for Resinous Flooring Systems

QUESTIONS

1. Current treatment plant basins once demoed the plans show rocks over the old concrete. **See as-builts in appendix C, comments in red are directional notes and clarifications of demo items and clarifications of directions for existing structures. The clarifier cones shall be filled with grout and the treatment basin area shall be leveled with aggregate as detailed on the drawings.**

2. Specification 11320 does not reference 15100. Please advise if the grit system will need to meet the requirements section in this section. The following questions are pertinent assuming section 15100 will apply.
    a. 1.PLUG VALVES.A: This DeZurik plug valve does not have a full circular port required for the application. Hydro's standard Milliken plug valve shall be supplied, cut-sheet is attached. This will be provided unless a suitable alternative is specified. **Hydro's standard plug valve shall be supplied.**

    b. 1.BALL VALVES.B: Hydro's standard bronze body ball valve is the Apollo 77 series, cut-sheet attached. Please advise if our standard ball valve will be accepted. **Hydro's standard ball valve shall be supplied.**

    c. 1PRESSURE REGULATING VALVES.E.2: Hydro's standard bronze pressure reducing valve is the Wilkins valve, cut-sheet attached. Please advise if our standard pressure regulating valve will be accepted. **Hydro's standard pressure reducing valve shall be supplied.**

3. Specification 11320 does not reference Div. 16 sections. Please advise if the grit system control panel will be need to meet the requirements section 16910. Section 16910 requires all process equipment control panels to include construction requirements and electrical components such as:

25% spare space **25% spare space will be required**

3PT latch enclosures – **3 point latch enclosures will be required**

Control panel installed outdoors to be rated for temperatures of 60C/140F with air conditioner and sunshield– **Air conditioner is not required. Sunshield will be required.**

Enclosure spacing for the terminal strip to be at least 8" from any side or bottom of enclosure – **8" enclosure spacing will be required**

Ground fault duplex receptacle – **Ground fault duplex receptacle will be required**

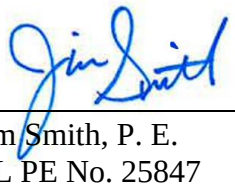
4. The drawings show a discharge channel with transition to drop pipe. Previous discussions and drawings included piped outlet. Please confirm the design has changed to a unit with discharge channel and transition to flanged connection for drop pipe.
   Design is a discharge channel with transition to a drop pipe as shown on the drawings.

5. The pump skid is found in the chlorine contact basin, shown on the attached sheets from the plan set you sent. Looking at elevations it shows an 8' sump depth. The BPS spec says sump depth is 24"-60". I assume the plans are correct but need you to make sure before we settle on TPL.
   Sump bottom is elevation 4.0'. 24" depth of water is low-water level (elevation 6').
   Normal operating level would be 66" depth of water (elevation 9.5').

6. There's another elevation callout at 10' circled in red – is that supposed to be the normal water level?
   The 10' elevation marker represents the top of weir elevation and does not apply to the water level in the pump well.

7. The chlorine contact basin/area is not shown on the plans as a classified area. Can you please confirm that is the case?
   The chlorine contact basin area is not a classified area.

Ardurra,



Jim Smith, P. E.
AL PE No. 25847

All Bidders shall acknowledge receipt and acceptance of the Addendum with the Bid Package. Proposals submitted without acknowledgement or without this Addendum will be considered informal.

Receipt acknowledged and conditions agreed to this _____ day of _____, 2024.

_____
Bidder

_____
By

SECTION 11600
SCRAPER TYPE CLARIFIERS – ADDENDUM 1

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. There shall be provided Two (2) 55′ diameter by 15.0′ Side water depth circular spiral blade cage drive clarifiers. The equipment shall include but not be limited to a center drive unit with torque control, walkway and platform with handrail, stationary center influent column, center feedwell, inlet distribution well (IDW), drive cage, rake arms and blades, scum skimmer(s), scum box, scum baffle, weir plate, anchor bolts and all other appurtenances required or shown on the drawings.

B. The mechanism shall be capable of removing settled activated sludge solids from the tank floor and delivering them to a central pocket where the sludge shall be removed through the return sludge pumps. A skimming device shall collect floating solids to the scum box to be removed through the scum pumping system.

C. Clarifier equipment shall be manufactured by:
   a. ClearStream Environmental, Inc., Sandy, UT
   b. Walker Process Equipment, Aurora, IL
   c. Westech Equipment, Salt Lake City, UT

1.2 WARRANTY

A. The mechanism shall be warranted for two year(s) from the time the mechanism is put into service.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Clarification equipment shall be the center drive type supported on a stationary influent column with the flow entering the bottom of the influent column and flowing upwards to the inlet openings at the water surface.

B. Major Components of the clarification equipment shall include but not be limited to:
   a. Center drive mechanism, gear motor and overload alarm
   b. Control panel and electrical controls
   c. Walkway support with handrail and grating
   d. Center support / influent column
   e. Center drive cage
   f. Feedwell and supports
   g. Truss rake arms with spiral rake blades and squeegees
   h. Scum skimmer
   i. Scum trough
   j. Weir plate and scum baffle
   k. Fasteners and anchor bolts

l. And all other components necessary for a complete operating system.

2.2 GENERAL DESIGN CRITERIA

A. Design flows (MGD)

a. Average Daily:	0.65
b. Normal Daily Maximum:	0.75
c. Peak:	2.0
d. Recycle Design:	0.65

B. Equipment Design Criteria:

a. Diameter (feet):	55
b. Side Water Depth (feet):	15.0
c. Floor Slope (inch/inch):	1/12
d. Freeboard (feet):	1.5
e. Influent column diameter (in):	24
f. Feedwell	
i. Diameter (feet):	14
ii. Depth (feet):	4.5
g. Influent Dispersion Well (IDW)	
i. Diameter (feet):	6
ii. Depth (feet):	1.5
h. Rake arm tip speed (feet / minute):	12 - 14
i. Torque Requirements (ft-lbs)	
i. Continuous Operating 100% (Alarm):	13,000
ii. Maximum Overload 120% (Cutout)	15,600
iii. Shear Pin Failure Backup 140%	18,200
iv. Mechanism Design Strength: 200%	26,000

C. Drive Design Requirements:

a. Mechanism design shall be such that there are no chains, sprockets or bearings below or in contact with the liquid.

b. Gearing shall be designed and rated per the current American Gear Manufactures Association (AGMA) Standards.

c. Drive shall have a minimum operating life of 20 years at the continuous torque and speed rating listed above.

D. Fabricated assemblies shall be shipped in the largest sections permitted by carrier regulations and properly match marked for ease of construction.

E. Fabricated and Structural 304 stainless steel shall be per ASTM standards for structural and fabricated stainless steel.

F. Minimum metal thickness shall be ¼″ for all submerged plate and members unless otherwise specified.

G. Submittal Requirements:

a. Mechanism

i. General arrangement drawings showing:
   1. All major tank and mechanism dimensions and elevations,
   2. Anchor bolts locations,
   3. Mechanism loadings on the tank,

ii. Engineering calculations showing the mechanism components meet the design torque requirements listed above

iii. Engineering calculations showing the walkway and platform meet the design criteria listed in the Bridge Walkway section.

b. Drive

i. Calculations shall be provided showing the drive components clearly meet the required torque requirements.

2.3 EQUIPMENT DESCRIPTION

A. DRIVE MECHANISM – Option A

a. The drive mechanism shall consist of an electrical motor, a helical type primary reduction unit, planetary type secondary reduction unit, and a final reduction unit. All components are directly coupled, eliminating chains and V-belts. The drive unit output torque shall be limited by a torque overload protection device and shear pin.

b. The primary reduction unit shall be mounted on top of the secondary gear reducer with direct shaft coupling.

i. The primary reduction unit shall use helical gearing and be permanently lubricated.

ii. The primary reduction unit shall transmit torque to the input shaft of the intermediate gear reducer through a shear pin.

iii. The L_{10} life of the primary gearbox bearings shall be in excess of 100,000 hours at continuous torque rating of the drive unit.

c. Secondary reduction unit:

i. The Secondary reduction unit shall be a planetary gearbox and permanently lubricated.

d. Electrical motor: The drive motor shall be TEFC, 1.15 Service Factor, Class F insulation.

e. Torque indication and overload protection:

i. The torque overload protection device shall be attached to the primary reduction unit, and activated by the torque reaction of the primary reduction unit.

ii. The torque load of the drive unit shall be indicated on a stainless steel 6-inch diameter torque gauge in ft-lbs

iii. The overload protection device shall have two switches, which may independently energize an alarm circuit and motor cutoff circuit when the load of the mechanism reaches the customer specified torque settings.

iv. The switches shall be enclosed in a NEMA 4X housing.

v. In addition to alarm and cutoff, the drive unit is also protected by a shear pin.

f. Corrosion prevention:

i. All fabricated steel parts will be abrasive blast cleaned to SSPC 10, near white finish.
ii. All external surfaces of fabricated parts shall be coated with one layer of zinc-rich urethane primer, 2.5 to 3.5 mils dry film thickness and one layer of moisture-cure aliphatic urethane, 2 to 3 mils dry film thickness.
iii. The standard color is gray.

g. Design and manufacturing standards: All calculations of gear and bearing life shall be made in accordance with the current AGMA 2001-C95 and ABMA standards. Welding fabrication and design are in accordance with the latest AWS standards. Power train calculations of all components are available upon request in accordance with specification details listed above.
h. All lubrication shall be of the totally enclosed oil bath design.
i. Standard housing for enclosed gear drives shall be cast iron.

DRIVE MECHANISM – Option B

a. The center drive mechanism shall consist of a motor driven primary gear reduction unit, steel roller chain drive, shear pin coupling, intermediate wormgear reduction unit, enclosed final gear reduction unit, and a torque limiting device.
b. The intermediate wormgear reduction unit and the final gear reduction unit shall be the product of the Equipment Manufacturer.

GEAR DESIGN

a. The continuous output torque rating and the allowable stress values used in the design of the intermediate wormgear reduction unit and the final gear reduction unit shall be in strict conformance with the latest revision of the following standards:
b. Worm & Wormgearing: ANSI/AGMA 6022-C93, “Design Manual for Cylindrical Wormgearing,” ANSI/AGMA 6034-B92, "Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors," and ANSI/AGMA 2011-A98, “Cylindrical Wormgearing Tolerance and Inspection Methods.”
c. Spur and Pinion Gearing: ANSI/AGMA 2001-D04, "Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth", ANSI/AGMA 2004-C08, “Gear Materials and Heat Treatment Manual”, and ANSI/AGMA 2015-1-A01, “Accuracy Classification System – Tangential Measurement for Cylindrical Gears.”
d. The continuous output torque rating of the spur and pinion gearing shall be based on the smaller of the rating values determined from the above ANSI/AGMA standards and a design life of 20 years. The drive shall be designed and rated to develop the following torque values at an approximate output speed of 0.08 rpm (14 fpm arm tip speed.)

OPERATING CONDITION	FOOT-POUNDS	NOTES
CONTINUOUS	13,000	AT 1.0 SERVICE FACTOR
ALARM	13,000	100% OF CONTINUOUS
MOTOR CUT-OFF	15,600	120% OF CONTINUOUS
MOMENTARY PEAK	26,000	200% OF CONTINUOUS
SHEAR PIN		LESS THAN 200% OF CONTINUOUS

e. The equipment manufacturer shall be a Member of the American Gear Manufacturers Association (AGMA) and shall submit calculations to the engineer for approval substantiating the continuous output torque rating and design life. Calculations shall include the spur gear, pinion, wormgear set, and all bearings used in the intermediate wormgear reduction unit and the final gear reduction unit.

f. The spur gear and pinion calculations shall clearly specify the values used for the following design parameters for surface durability and bending strength ratings:

Number of Pinions	Tooth Diametrical Pitch
Actual Face Width	Hardness Ratio Factor
Tooth Geometry Factors (I and J Factors)	Elastic Coefficient
Load Distribution Factor	Life Factor
Aspect Ratio	Application Factor
Allowable Contact Stress	Rim Thickness Factor
Allowable Bending Stress	Worm & Wormgear Grade
Pinion Pitch Diameter	Pinion & Gear Quality Number

g. Load distribution factors (Km) used in the calculations shall not exceed 1.28. For parameters that are material dependent, such as allowable contact stress, the calculations shall include a full description of the materials, quality grade, and heat treatment used. Momentary peak torque calculations shall use a maximum of 75% of yield strength.

h. The final spur gear set and intermediate wormgear set calculations shall be certified and stamped by a Licensed Professional Engineer and reviewed and certified by a Member of AGMA. All intermediate wormgear and all final spur gear reduction unit bearing calculations shall be certified and stamped by a Licensed Professional Engineer.

PRIMARY GEAR REDUCTION UNIT

a. The primary gear reduction unit shall consist of a totally enclosed, horizontal type gearmotor or gear reducer with C-face mounted drive motor mounted on top of the intermediate wormgear housing. The primary gear reduction

unit shall be a heavy-duty parallel shaft helical type. Gearmotors shall conform to ANSI/AGMA 6013-B16, "Standard for Industrial Enclosed Gear Drives," and shall have a service factor of 1.4 based upon the specified continuous running torque. Gear reducers with a C-face mounted drive motor shall conform to ANSI/AGMA 6013-B16, "Standard for Industrial Enclosed Gear Drives," and shall have a service factor of 1.25. All gearbox bearings shall be of the anti-friction type and running in oil in an cast iron housing. The totally enclosed primary reduction unit shall operate on 3 phase, 60 hertz, 460-volt power source, and shall be at least 1/2 HP. The motor shall conform to NEMA specifications for AC motors and be designed for continuous operating in humid outdoor condition.

CHAIN DRIVE

a. Power transmission between the primary gear reduction unit and the intermediate wormgear reduction unit shall be through a steel roller chain and steel sprocket assembly. The driven sprocket shall include a shear pin hub assembly to provide overload protection for the drive train. The chain drive shall be enclosed with a fiberglass or stainless steel chain guard meeting OSHA requirements. The shear pin shall be easily accessible by removal of the chain guard.

INTERMEDIATE WORMGEAR REDUCTION UNIT

a. The intermediate wormgear reduction unit shall consist of a wormgear driven by an integral straddle mounted worm and shaft supported by heavy-duty rolling element bearings running in an oil bath and cast iron housing. All bearings shall have a minimum L10 life of 20 years, based on the continuous torque rating.
b. The integral worm and shaft shall be single piece and made from AISI 8620 alloy steel, carburized and ground, and shall have a case hardness of 55-60 Rc. The wormgear shall be centrifugally cast high strength manganese bronze conforming to ASTM B271, AMS 4862F, and ANSI/AGMA 2004-C08. The wormgear shall have a minimum hardness of 200 BHN. The wormgear hub shall be keyed to the pinion shaft. The intermediate wormgear housing shall be ASTM A48 Class 40 cast iron complete with seals, oil fill, oil level sight gauge and drain plugs. The intermediate wormgear housing shall have full 360° contact and support from the final gear housing.
c. Lubrication of the wormgear teeth and worm thread mesh, wormgear bearings, and worm shaft bearings shall be accomplished by means an oil bath.

FINAL GEAR REDUCTION UNIT

a. The final gear reduction unit shall consist of a pinion, internal split spur gear, anti-friction ball bearing assembly, and housing.
b. The pinion shall be AISI 4150 steel, AGMA Grade 2 minimum, heat treated to a hardness of 321 BHN and conform to ANSI/AGMA 2004-C08. The pinion shall be single piece extending from the wormgear to the spur gear and straddle mounted between anti-friction ball or roller bearings to maintain accurate pinion to spur gear alignment and contact. All bearings shall have a minimum L10 life of 20 years based on the continuous torque. The pinion shall be manufactured to have a minimum AGMA Quality Class 8 in conformance with ANSI/AGMA 2000-A88, "Gear Classification and Inspection Handbook", or Accuracy Level 9 in conformance with ANSI/AGMA 2015-1-A01.
c. The internal spur gear shall be ductile iron austenized, quenched & tempered, conforming to ASTM A536 grade 120-90-02 ductile cast iron with a micro-structure of fine tempered pearlite, heat-treated to a hardness of 220 BHN. The internal spur gear shall be manufactured to have a minimum AGMA Quality Class 6 in conformance with ANSI/AGMA 2000-A88 or Accuracy Level 11 in conformance with ANSI/AGMA 2015-1-A01. The spur gear shall have a minimum 42 inch pitch diameter and have a minimum 4.5 inch face width. The internal spur gear shall be of split construction to provide for replacement of main bearing balls and wire race inserts without removing the access walkway or other parts of the clarifier mechanism.
d. The internal spur gear shall be mounted on a large, full complement rolling element ball bearing assembly designed to support the entire rotating clarifier mechanism. The ball bearing assembly shall consist of minimum 1-1/4" diameter, Grade 50, AISI E52100 chrome alloy steel bearing balls, hardness 60-64 Rc, conforming to ANSI/ABMA/ISO 3290 (R2000), Rolling Bearings - Balls - Dimensions and Tolerances, running in an oil bath protected from contamination by a lower industrial felt seal and an upper stainless steel labyrinth dust shield. The balls shall bear both horizontally and vertically on four (4) renewable hardened alloy steel wire race inserts with a minimum dimension of 0.5 inches wide by 0.25 inches thick, pressed into the housing and the internal spur gear. The minimum ball race diameter shall be 46.5 inches to assure stability. The wire race inserts shall be heat-treated to a hardness of 43-48 Rc to avoid fatigue or stress cracking. The race wire inserts and bearing balls shall be designed for a minimum L10 life of 20 years. Bearing life calculations shall statistically combine all horizontal and vertical loads applied to the bearing assembly.
e. Bearing race wear shall be capable of being measured without disassembly of the bearing or drive and without dewatering the collector basin.
f. The ball bearing assembly shall be mounted in an ASTM A48 Class 40 cast iron housing. The housing shall be cast as a single piece to provide a leak proof enclosure. The base of the housing shall be mounted on the top flange of the stationary center column and designed to support the internal spur gear, the rotating clarifier mechanism, and one end of the access walkway.

The housing shall be complete with seals, oil level dipstick, oil fill, and valve oil and condensation drains.

g. The upper dust and rain seal between the internal spur gear and the housing shall consist of a labyrinth seal fabricated form AISI 304 stainless steel with stainless steel seal clamps and EPDM rubber trim seal. The lower seal between the bottom of the internal spur gear and the housing shall be an industrial felt seal.
h. A positive means of removing condensation and contaminant from the lower pinion-bearing pocket shall be provided.
i. Lubrication of the gear teeth shall be accomplished by means of an oil dam and the meshing action of the pinion and the internal gear teeth that shall force lubricant up the face of the teeth.

OVERLOAD PROTECTION

a. The overload protection system shall include a totally enclosed actuator and visual load indicator plainly showing the overload points. The overload alarm and shut-off system shall consist of two (2) SPDT micro switches, one to close an alarm circuit when the load reaches the specified alarm torque of the drive assembly, and one to cut power to the motor when the load reaches the specified cut-off torque. The micro switches shall be mounted in a watertight NEMA 4X Type 304 stainless steel housing and shall be actuated by the movement of the worm shaft in the intermediate wormgear speed reducer. An acrylic window shall be mounted on the overload enclosure to allow observation of the dial position.
b. A shear pin coupling shall be included in the drive train to provide additional protection above the cut-off point.

C. CENTER DRIVE PLATFORM

a. The center drive platform shall provide access to the center drive assembly, lubrication fill and drain pipes, drive torque control and optional electrical control panel.
b. The platform shall provide 30" clearance around the drive components.
c. The platform shall consist of Aluminum grating supported by the platform members. Handrail shall be 2 – rail aluminum handrail with aluminum toe boards.

D. BRIDGE WALKWAY

a. The walkway bridge shall be constructed of structural 304 stainless steel members or two side structural trusses of welded 304 stainless steel with a 48" wide walkway consisting of Aluminum grating supported by the walkway members. Handrail shall be 2 – rail aluminum handrail.
b. The bridge shall be supported by the center drive platform and the outer tank wall.
c. The bridge shall be designed for a total dead load plus a live load of 50 lbs per square foot with the deflection no to exceed 1/360 of the span.

d. Coordinate bridge connections and interface with connecting walkways with walkway supplier/fabricator. All walkways shall have seamless connections with similar materials, excessive gaps will not be accepted. All materials shall be aluminum or 304 SST.

E. STATIONARY INFLUENT COLUMN

a. The influent column shall have a minimum ¼" wall thickness with the diameter as listed in the Equipment Design Criteria.
b. The column shall be designed to support the weight of the entire structure resting upon it and to withstand the mechanism design strength criteria.
c. Influent discharge ports shall be included at the upper end of the influent column. These ports shall diffuse the flow entering the tank and insure low velocity into the Influent Dispersion Well. Influent velocity shall not exceed 1.60 fps at the peak flow rate specified.

F. CENTER CAGE

a. The center cage shall be a 304 stainless steel box truss construction with connections for the sludge removal arms.
b. The cage top shall bolt to the main gear.
c. The cage shall be designed to withstand the mechanism's design torque.

G. SLUDGE COLLECTOR BLADES AND SUPPORT ARMS

a. The sludge collector arms shall be of 304 stainless steel truss construction with spiral-shaped 304 stainless steel scraper blades and adjustable stainless steel squeegees. Squeegees shall be fastened to the rake blade with 304 stainless steel fasteners.
b. The scraper blade shall be designed for sufficient sludge transport capacity to handle the design solids loading rate of 20.0 lbs/day/sf, with the depth of the blade varying form a minimum at the tank periphery to a maximum at the tank center. Calculations shall be provided to show the design depth and attach angle of the spiral blade.
c. Blades shall properly convey settled sludge to the sludge manifold.
d. The arms shall be adjustable to assure an even grout thickness over the tank bottom.

H. INFLUENT DISPERSION WELL

a. A rotating circular Influent Dispersion Well shall be of the size indicated in the Equipment Design Criteria. It shall be supported by the cage and diffuse the liquid into the feedwell in a tangential direction through diffusers. The bottom of the well shall extend to within 1 inch of the center column.
b. The diffusers shall:
    i. be curved at a constant radius,
    ii. not restrict the flow,
    iii. extend pass the gate opening equal to the opening size,
    iv. and have a bottom the length of the diffuser.

I. FEEDWELL

a. The feedwell shall be of the size indicated in the Equipment Design Criteria. It shall be supported by 304 stainless steel supports attached the center cage. The well shall be fabricated of ¼" 304 stainless steel plate with top and bottom reinforcing angles
b. The feedwell shall include (4) 4" by 12" scum port openings to allow escape of surface scum inside the well. A removable scum baffle shall be provide over the ports.

J. SKIMMER
a. There shall be mounted on the sludge collector arm a skimming device arranged to sweep the surface of the of the clarification compartment twice per revolution, automatically removing scum and floating material into a full radius scum trough.
b. The rotating skimmer shall consist of a 304 stainless steel channel supported and extended tangentially form the feedwell to a recessed adjustable pivoted scum scraper at the tank periphery.
c. The scum scraper shall consist of aluminum scrapper, double acting hinged connection, support arms, neoprene wipers, outer wear strip and positive means to maintain the blade against the baffle.
d. The scum scraper shall trap floating scum by the full radius tangential 304 stainless steel scum blade and efficiently deposit the solids into the full radius scum trough.
e. The scum trough shall be constructed of ¼" 304 stainless steel plate with a 4" outlet.
f. Sprayer nozzles shall provide timed and/or continuous scum wash down across the length of the scum trough and clarifier. Supply pipe and nozzles shall be Sch 80 PVC or SST construction.

K. WEIRS AND BAFFLES
a. The weirs, baffles and baffle supports shall be constructed of a minimum ¼" 304 stainless steel.
b. The contractor shall coat all joints and gaps between the walls and weirs with a silicone rubber sealant to prevent leakage.

L. ANCHOR BOLTS AND FASTENERS
a. Anchor bolts shall be 304 stainless steel and shall be furnished by the prestressed tank manufacturer and coordinated with the clarifier equipment manufacture. All fasteners to be 304 stainless steel.

M. SURFACE PREPARATION AND COATING
a. All fabricated steel to be 304SST. No coating is required.
b. Drive mechanism shall be painted with the manufacture's standard paint system

PART 3 – EXECUTION

3.1 INSTALLATION

A. Furnish, install, finish, and place into service the clarifier in accordance with the manufacture's recommendation.

B. Provide factory-trained personnel to check and certify installation and instruct the plant personnel in the operation and maintenance. A minimum of 3 trip(s) for 6 day(s) total shall be provided.

C. Coordinate all tank connections and supports with pre-stressed concrete tank supplier prior to submittals.

END OF SECTION

SECTION 11520
LIQUID POLYMER BLENDING SYSTEM – ADDENDUM 1

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Polymer Unit

1. The polymer dilution and feed system shall be capable of effectively activating and fully blending with water a homogenous polymer solution ranging from 0.1% to 1% concentration of emulsion polymers with active contents up to 75%.

2. Polymer blending system shall be supplied by the screw press manufacturer. System shall be integrated seamlessly into the screw press control systems.

1.02 WARRANTY

A. The system shall be covered by a one (1) year limited warranty against defects in materials and workmanship. The mixing chamber shall be warranted for the life of the system against failure for plugging for any reason. The warranty shall exclude failure to do over pressure or freezing.

B. If purchaser is dissatisfied with unit's performance within 30 days of start-up, the unit may be returned for a full refund, or credit against another unit, provided unit has received reasonable use and care.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide polymer activation, blending and feed system(s) as manufactured by
   a. VeloDyne of Boulder, CO;
   b. Prominent; represented by Aqua Products, Pensacola Florida
   c. preapproved equal.

B. Polymer System shall be sized by the Screw Press supplier as required to match design capacity of the system.

2.02 EQUIPMENT

A. Multi-zone Hydro-mechanical Mixing Chamber:

1. The polymer blending system is a critical part of the process and must be designed to provide optimal performance and reliability under all

operating conditions. These specifications are based on the VeloBlend technology. Other technologies shall be considered only if they are proven to provide the same level of performance and reliability under all operating conditions as the system specified herein.

2. A hydro-mechanical blending device shall be provided. The device shall be capable of operating on plant water pressure alone at 30 psid. In addition, the system shall be capable of producing its mixing energy independent of plant water pressure through a variable intensity, controllable mechanical mixer. The system shall be capable of producing high, non-damaging mixing energy at all flow rates without damage to the polymer's molecular structure.

3. The mixing chamber shall be clear to view the mixing action and blending effectiveness. Clear pipe shall not be acceptable to meet this requirement. The mixing chamber shall have a maximum rated pressure of 100 psi. All holes tapped in plastic shall have helicoil inserts for increased strength.

4. In order to handle the wide range of polymers available, independent of water pressure, a variable speed mechanical mixing impeller shall be provided. The mixer shall be designed specifically to effectively inducing high, non-damaging mixing energy over the systems full flow range. The specially designed impeller shall be controlled by an SCR or VFD controller. The impeller shall be driven by a wash-down duty motor. The mixer drive shaft shall be sealed by a mechanical seal which shall have an integrally mounted and factory plumbed seal flushing valve. A drain port behind the seal shall be provided in the mixing chamber to drain the polymer solution in case of a seal failure. A sensor shall be provided to sense a seal failure and initiate an alarm. The seal shall be easily accessible for replacement. Systems without a seal flushing system shall not be considered.

5. Systems that rely solely on plant water pressure to create mixing energy shall not be acceptable. Systems that rely solely on water pressure to create mixing energy will be considered only if provided with an integrally mounted dilution water booster pump and if the system meets the above polymer mixing criteria. A VFD motor controller shall be provided to control the pressure and therefore mixing energy generated by the booster pump. Booster pumps shall be multi-staged and of stainless steel construction. The booster pump shall be capable of generating 75 psid independent of water supply pressure which shall be verified at system start-up. In the event the booster pump cannot produce 75 psid of water pressure a properly sized booster pump shall be installed at supplier's expense. Under no circumstances shall systems that rely solely on plant water pressure to create mixing energy be acceptable.

6. Provide a neat polymer check valve specifically designed to isolate neat polymer from dilution water. The valve shall be designed with an open, unobstructed path to the valve seat. The valve body shall be constructed of Teflon with Viton seals. The valve poppet and spring shall be stainless steel and designed to prevent polymer from flowing through the spring, causing build-up and plugging. Plastic spring covers shall not be used. The valve shall be readily accessible for cleaning and shall not require tools for removal, cleaning or replacement. Conventional check valves, valves that rely on ball seals, and or check valves that are installed inside the mixing chamber, or which require mixing chamber disassembly for servicing will not be accepted. The locking pin used to hold the valve in place shall be attached to the mixing chamber with a lanyard.

B. Dilution Water Assembly

1. The dilution water flow rate shall be monitored by a Rotameter type flow meter having a range of 2 - 20 GPM. A union shall be provided on the Rotameter to allow easy removal for cleaning.

2. Unit shall have an electric solenoid valve ball valve actuated variable rate control valve to automatically proportion water flow to a process signal and for on/off control of total dilution water flow.

3. A differential pressure type low water differential pressure alarm shall be provided. The switch shall be adjustable between 10 and 25 psid.

4. Provide a 2-1/2" stainless steel liquid filled pressure gauge to monitor dilution water inlet pressure.

C. Progressive Cavity Neat Polymer Metering Pump

1. The unit shall have one (1) neat polymer metering pump(s) integrally mounted on the systems skid. The metering pump(s) shall have a range of 0.25 – 5 GPH. The pump shall be a positive displacement, progressive cavity type constructed of stainless steel and Viton. The pump seal shall be packing type. Mechanical seals shall not be used. The pump shall have a minimum of three stages to minimize slip. A TEFC or TENV 90 VDC Wash-down duty motor shall drive the pump. A right angle gear reducer shall be provided to produce a maximum pump shaft speed of not more than 600 RPM. The motor shall be controlled by an SCR motor controller located in the system control panel.

2. Provide a calibration column with two full port PVC ball valves having Viton o-rings. The column shall be calibrated for a one minute draw-down and read in GPH and milliliters.

3. Provide a pressure gauge with diaphragm isolator to monitor polymer line pressure.

4. Provide a pressure switch with diaphragm isolator to alarm on high polymer line pressure.

5. Provide a metering pump priming assembly including vacuum device and valve.

6. Provide a thermal type loss of polymer flow sensor.

D. Solution Discharge Assembly

1. Provide a post dilution water assembly. A dilution water flow meter shall be provided with a range of 2 - 20 GPM. A union shall be provided on the Rotameter to allow easy removal for cleaning.

2. Provide a static mixer for mixing primary polymer solution with post dilution water.

3. Provide a 2-1/2" stainless steel liquid filled pressure gauge to monitor system discharge pressure.

4. Provide a high discharge pressure switch

5. Provide a swing type check valve to prevent back flow. The check valve shall be sized for the total solution flow of the system, constructed of PVC and Viton.

E. Controls

1. A control panel integral to the systems frame shall be provided. The enclosure shall be rated NEMA 4X and constructed of FRP. The control panel shall consist of all digital displays, potentiometers, switches, lights, relays, and other control devices required for a complete operable system. The control panel and all components shall be industrial duty. All skid mounted electrical components interconnected to the control panel shall terminate at numbered and labeled terminal blocks. The terminal blocks shall be sized for 14 ga. wire. Wires shall be neatly run through wire race-way and numbered with adhesive type labels. The control panel shall be positioned such that there are no obstructions in front of the control panel per related NFPA requirements. Control features shall include the following:

(Series E)

1. Operator Interface – Discrete Selector Switch:

a. System ON / OFF(reset) / Remote
b. Ten-Turn Potentiometer – Metering Pump Control

2. Status / Alarm Indicators:
   a. Main Power ON
   b. LCD Display of Metering Pump Rate
   c. Low Water Differential Pressure Alarm
   d. Low Polymer Flow Alarm

3. Inputs (signals by others):
   a. Remote Start / Stop (discrete dry contact)
   b. Pacing Signal Based on Process Flow (4-20mA)
   c. Tote level high (discrete dry contact)
   d. Tote level low

2. Outputs:
   a. System Running (discrete dry contact)
   b. Remote Mode (discrete dry contact)
   c. Common Alarm (discrete dry contact)
   d. Polymer Pump Rate (4-20mA)

F. Power:

1. 120 V, 1 Ph, 60 Hz.
2. A circuit breaker on the main control circuit and on each motor shall be provided as manufactured by Allen Bradley or equal. Fuses shall not be used for circuit protection.

G. Equipment Skid

1. The system's frame shall be of rugged 304 stainless steel construction. No mild steel shall be used. All piping shall be rigidly supported.
2. The overall system dimensions shall not exceed 36″W x 24″D X 42″H.

H. Accessories:

Tote Accessories

1. Provide each unit a mixer for up to 375 gallon totes. The tote mixer shall have a 3/4 HP, 115 VAC, 350 RPM, TEFC gear motor with thermal overload protection. The mixer shaft shall be stainless steel and have a thrust bearing external from the motor for support. The bearing frame shall be stainless steel. Two 5″ impellers shall be provided. The tote mixer controls shall be integral to the motor and include an ON/OFF switch, and 0-60 minute timer and 10′ power lead. The mixer frame shall be constructed of stainless steel and have lifting handles. Moveable brackets shall be included to adjust the width of the mixer for the tote being used. A stainless steel wall mounting bracket with drip pan shall be

supplied to support the mixer and collect polymer drips while the mixer is not in use.

2. Provide each unit a polymer tote pump suction assembly. The assembly shall include quick disconnect cam-lock fittings, a 1" full port ball valve, and 15 feet of 1" braided PVC hose.

3. Provide two (2) polymer tote trucks designed to transport up to 375 gallon totes and tilt the tote when in service to drain entire contents. Polymer totes shall be positioned on tote truck using a fork-lift or overhead crane. Tote truck shall include two fixed wheels and two swivel wheels. Swivel wheels shall be lockable. The tote truck shall be constructed of powder coated steel and rated for #4000 pounds.

4. Provide each unit a tote level sensor. The level sensor shall be the non-intrusive capacitance type. Two level points shall be supplied each fully adjustable. The controls shall include an ON/OFF switch to preclude false alarm signals while probe is being transferred from empty to full tote, a high level indicating light with NO output and a low level indicating light with NO output.

55 Gallon Drum Accessories

1. Provide two (2) mixers for 55 gallon drums. The mixer shall have a ½ HP, 115 VAC, 1750 RPM, TEFC motor with thermal overload protection. The mixer shaft shall be stainless steel. One 3" collapsible impeller shall be provided. The tote mixer controls shall be integral to the motor and include an ON/OFF switch, and 0-60 minute timer and 10' power lead. A mount designed to screw into a 2" bung connection shall be constructed of stainless steel and be designed to position the mixer shaft at an angle for ideal mixing. A stainless steel wall mounting bracket with drip pan shall be supplied to support the mixer and collect polymer drips while the mixer is not in use.

2. Provide each unit a polymer drum suction assembly. The assembly shall include quick disconnect cam-lock fittings, a 3/4" full port ball valve, and 10 feet of 3/4" braided PVC hose.

3. Provide each unit a drum suction pipe constructed of clear PVC with a PVC tee at top and a polymer check valve on the bottom. The suction pipe shall include a 2" bung connection with compression fitting to allow suction pipe height adjustment in the drum.

4. Provide four (4) polymer drum truck / dispenser designed to transport up to 55 gallon totes and tilt the tote when in service to drain entire contents.

END SECTION

SECTION 11345

ROTARY LOBE BLOWERS – ADDENDUM 1

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install complete, ready for operation and field-test three (3) new rotary lobe compressors and appurtenances, as shown on the Drawings and as specified herein.

B. The entire package and its components shall comply with all applicable safety and environmental regulations.

C. Tag Numbers:

1. Blower M-700-1
2. Blower M-700-2
3. Blower M-700-3

1.02 RELATED WORK

A. Valves, except as otherwise specified herein, are included in Section 15100 - Valves and Appurtenances.

B. Instrumentation work, except as otherwise specified herein, is included in Division 16.

C. Electrical work, except as otherwise specified herein, is included in Division 16.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300, copies of all materials required to establish compliance with this Section. Submittals shall include at least the following information:

1. Certified general arrangement drawings showing materials, details of construction, dimensions and connections.
2. Complete Performance Data at the Design Point and all specified operating points including:
    a. Actual Operating Speed (RPM) and % of maximum rated speed
    b. Capacity – scfm and icfm
    c. Design inlet conditions, pressure, temperature, and relative humidity (%)
    d. Discharge pressure
    e. dB(A) noise pressure level
    f. Blower Shaft HP, Motor HP and Package HP
3. List of recommended spare parts broken down into on hand parts and long term for 2 years operation and 3 to 5 years operation.

4. Descriptive Brochures
5. Motor Data
6. Instrumentation and Wiring Diagram
7. ISO-1217 Factory Performance Test Results. Slip test results shall not be unacceptable as an alternate. Manufacturer shall provide documented results for the purchased machines. Typical or average data shall not be acceptable.
8. ISO-8573-1 Class Zero Oil Free Certificate
9. Declaration of Conformity, per Machinery Directive 2006/42/EC, Annex II, No.1 A.

B. Complete blower package operating and maintenance instructions professionally published, hard copy and electronic copy, shall be furnished for all equipment included under these specifications in accordance with Section 01730.

1.04 QUALITY ASSURANCE

A. Qualifications

1. Package shall be Aerzen Delta Hybrid Model D 76 S. Regardless of manufacturer, the package shall be produced by the manufacturer of the blower stage, to ensure single source responsibility for blower performance and compatibility of associated accessories. Packagers shall not be permitted to bid.
2. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the Drawings.
3. The rotary lobe compressors shall be covered by a warranty for 24 months from date of commissioning, or 30 months from date of shipment, whichever occurs first.

1.05 BLOWER PERFORMANCE CRITERIA

1.	Quantity of Machines	3
2.	Design Inlet Temperature	100 ˚F
3.	Site elevation	0 ft
4.	Design Inlet Pressure	14.69 psia
5.	Design Relative Humidity (%)	80 %
6.	Design Flow	2100/2330 scfm/icfm per machine
7.	Minimum Turndown	866/961 scfm/icfm per machine
8.	Design Discharge Pressure	10.0 psig
9.	Maximum Blower Speed	5250 RPM
10.	Brake Horsepower (Max)	104 bHp
11.	Motor Size (Max)	125 Hp

12. Free Field Noise Guarantee 73 dB(A) at 1 meter (at design point)

(1) Package BHP to include pressure loss through a clean inlet filter / silencer, pressure loss of the exhaust silencer and check valve.

(2) Package Performance shall be guaranteed to ISO 1217 with a tolerance is +/- 5% on volume flow and +/- 5% on package horsepower. Manufacturer of blower shall provide data for purchased machine.

(3) Sound data shall be from an ISO 2151 method of measurement, in an ISO 3745 qualified test facility. Sound data shall be compliant with a Declaration of Conformity assessment standard.

1.06 DELIVERY, STORAGE AND HANDLING

A. All equipment shall be completely factory assembled, skid mounted, crated, and delivered to protect against damage during shipment.

B. All exposed flanges shall be covered and sealed with shrink-wrap to prevent the entrance of moisture or debris. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

C. All equipment delivered to the site shall be stored as specified in accordance with the manufacturer's instructions.

1.07 MAINTENANCE

A. Spare Parts

1. Furnish the following spare parts for each blower package specified:
   a. Complete set of matched V-belts
   b. One inlet air filter element
   c. One oil filter element
   d. One volume of oil for first service interval
2. Spare parts shall be properly bound and labeled for easy identification without opening the packaging.

PART 2 - PRODUCTS

2.01 GENERAL

A. Rotary Lobe Compressor Packages shall be designed to minimize the life-cycle costs and maximize plant reliability. The design and the selection of the components shall be based on a minimum useful life of 20 years and a Mean Time Between Overhauls of 5 years of continuous operation. Bearing life shall be submitted by manufacturer of the blower stage, based on specified conditions.

B. No special foundations shall be required. The packages will be installed directly on a concrete slab without grouting the base frame. There shall only be 4 easily accessible anchor points.

C. Manufacturer shall guarantee that the rotary lobe compressor shall provide oil-free operation and be certified to ISO 8573-1 Class Zero.

D. Blower Casing:

1. The casing shall be of one-piece construction, with separate sideplates that are bolted and pinned to the housing.
2. Casing materials shall be close-grained cast iron ASTM A48 suitably ribbed to prevent distortion under the specified operating conditions.
3. Inlet and outlet shall be flanged connections, not threaded.
4. Airflow shall be vertical top to bottom with inlet and outlet connections offset so that the flow travel horizontally across the blower stage. Casings that do not utilize a horizontal internal flow shall not be allowed.
5. The vibration level as measured at the casing, in the X/Y planes of the bearings, shall not exceed 0.3 "/ sec RMS when operating at the specified operating pressure and speed. The vibration level shall be checked at start-up and documented in the field start up report.

E. Factory Testing:

1. Each rotary lobe compressor stage shall be factory performance tested in accordance with ISO 1217 standards to verify flow and brake horsepower. A slip test shall not be acceptable, nor is average data for the manufactured size.
2. The acceptance criteria are +5% tolerance on power and –5% tolerance on flow regardless of the size of the machine.
3. The manufacturer shall submit free field noise data for the complete blower package. The results have been obtained using an ISO 2151 method of measurement, in an ISO 3745 qualified test facility. The performance data shall include a Declaration of Conformity, per Machinery Directive 2006/42/EC, Annex II, No.1 A.

F. Rotors:

1. Each rotor (male and female) shall be of the "stiff" design with first lateral critical speed at least 120% of the maximum allowable operating speed.
2. The rotors shall operate without rubbing nor shall they require lubrication.
3. Rotors shall be drop forged in one single piece of AISI 1043 or equivalent, machined to final tolerance. Minimum material tensile strength shall be 620Mpa. Lesser precision cast iron rotors with surface coatings shall NOT be accepted.
4. Open rotors shall not be acceptable.
5. For maximum strength and reliability, the female rotor shall be driven by the drive motor and the male rotor shall be driven by the timing gear set. Stages that utilize a male driven rotor shall not be accepted.
6. A male and female rotor configuration with internal compression ratio and axial flow entry must be used to increase the adiabatic efficiency of the blower stage. Twisted rotor profiles applied for pulsation cancelation only shall not be allowed. Radial flow entry type rotors shall not be allowed

7. Only precision-machined rotors with sealing strips to optimize clearance and performance shall be accepted. Manufacturers using coated rotors are required to include the following additional services in their proposal, with a broken-out adder to their proposed cost:

    a. For the first 5 years of service, the manufacturer (not the packager) will visit the site. Each machine will be shut down and visually inspected for evidence of degradation. Inspection will include clearance measurement with feeler gauges. An annual report will be submitted, including photographs, for each machine.

    b. An annual performance test will be performed on site, including flow and power measurement, for each machine. The results will be compared to the original ISO-1217 test results for each machine, and a report submitted to the owner and the engineer.

    c. Any sign of performance loss or coating degradation will be monitored. If the engineer or owner determine that the results pose a threat to the reliability of the aeration system over the first five years, the manufacturer will, at their own expense (including parts and labor) replace the designated compressor stage, or overhaul and recoat the existing stage, depending on the number of units affected by the degradation.

8. Rotors shall be statically and dynamically balanced per ISO1940/ANSI S2.19 G2.5.

G. Bearings:

1. Each rotor/shaft shall be supported by anti-friction bearings and fixed to control the axial location of the rotor/shaft in the unit.

2. Regardless of theoretical bearing life calculations, the bearings shall be sized for a minimum expected life of 5 years between overhauls.

3. The applied design conditions shall yield a bearing load and minimal L-10 bearing life calculation of 100,000 hrs. Calculated bearing life shall be submitted, based on specified operating conditions.

H. Timing Gears:

1. The rotors shall be timed by a pair of single helical gears with quality equivalent to AGMA 12. Spur cut gears shall not be acceptable.

2. Gears shall have hardened and ground teeth and a minimum AGMA service factor of 1.70.

3. Gears shall be mounted via hydraulic expansion onto the shafts with a tapered interference fit and secured by a locknut. Pinned gears shall not be acceptable.

I. Seals:

1. Seals shall be designed to prevent lubricant from leaking into the air stream as well as to prevent oil from leaking out of the machine.

2. The seal shall be a cartridge type consist of two rotary slip rings mounted in a retainer on the air end, an atmospheric air gap in the center with top and bottom ventilation and a noncontact labyrinth seal with no wearing parts on the oil end. Internal lip seals shall not be permitted.

3. The rotor input shaft shall have a noncontact labyrinth seal with no wearing parts.

J. Lubrication:

1. The timing gears and the bearings shall be oil lubricated. Grease lubrication shall be not acceptable.

K. Oil Sight Glass:

1. An oil sight glass shall be provided on the exterior of the noise enclosure so the operator can easily view the oil level.
2. Sight glasses inside the enclosure or that cannot be easily viewed by the operator shall not be acceptable.

L. Painting:

1. Painting shall meet the following criteria:
   a. Except for machined sealing and machined mounting surfaces, the package shall be painted dark blue.
   b. Aluminum, stainless steel, and brass shall not be painted.
   c. The supplied motor shall not be over sprayed and will be supplied with the motor manufacturer's standard protection and paint color.
   d. Painted Cast Iron and Carbon Steel shall be Alkyd Resin Primer and Final coat with a total dry film thickness of 70□m. Surface preparation SSPC10 or better.
   e. Sound enclosure shall be powder-coated polyester base total dry film thickness 80□m.
   f. Galvanized components shall only be painted with appropriate surface preparation.
   g. Anti-corrosive C5-grade paint scheme shall be applied according to ISO 12944 for the external sound enclosure, internal blower package components and motor.

2.02 BLOWER ACCESSORIES

A. Inlet Filter / Silencer:

1. Each package shall be supplied with one combination inlet filter and silencer.
2. The inlet filter silencer shall be mounted directly to the inlet flange of the blower.
3. The filter media efficiency shall meet the requirements of ASHRAE 52.2 MERV7 50-70% @3-10 microns corresponding to EN779 G4.
4. The silencer portion shall be located upstream of the inlet filter.
5. The filter element shall be designed to trap dirt on the inside so that upon changing, dirt does not fall into the machinery. Filters where dirt accumulates on the external surface of the filter shall not be permitted.
6. Filter and silencer performance losses (clean element) shall be included in the entire package performance calculation.

B. Base Frame / Discharge Silencer:

1. Each package shall be supplied with one combination base frame / discharge silencer.
2. The silencer shall be a chamber type design for maximum sound attenuation and shall not use internally any absorption materials of any kind (fibrous or otherwise). Internal absorption material has been shown to degrade, reduce the attenuation quality of the silencer, and internally foul diffusers. Silencers that utilize internal absorption material shall not be permitted.
3. The silencer shall be fabricated of a single shell of pressure vessel quality steel with continuous welds.
4. The silencer must be subject to a pressure test for tightness and strength at a minimum of 1.65 times the maximum design pressure.
5. The silencer shall have a machined flanged inlet connection and bolt directly to the discharge flange of the rotary lobe compressor, with no intermediary or interconnecting pieces. Threaded connection between the compressor stage and the discharge silencer is subject to leakage and misalignment and shall not be permitted.
6. Discharge silencer performance losses shall be included in the entire package pressure calculation. Blower accessories shall be supplied by the manufacturer of the blower stage.
7. The base frame shall be constructed from welded carbon steel that shall be designed to maintain alignment of the blower internal components and the drive during operation.
8. The base frame shall be designed to resist distortion while being installed on vibration isolating mounts.
9. The manufacturer shall supply a stainless-steel grounding lug fully welded to the base.

C. Flexible Connectors:

1. Each package shall be provided with a flexible ANSI style discharge connector.
2. Flexible connectors shall prevent the transmission of noise and vibrations from the blower package into the piping.
3. Flexible discharge connectors shall be Proco Style 240, Type EE, EPDM, with a standard ANSI flange discharge connection, rated for 300 °F at 20 psig. Soft face range with galvanized split ring reinforcement.

D. Electric Motor:

1. Each package shall be supplied with a WEG manufactured TEFC NEMA Premium Efficiency motor that shall operate on 460 Volts, 3 Phase, 60 Hertz current, 3600 RPM. Operation of motors above 60 Hertz shall not be allowed under any circumstance.
2. Motors shall be horizontal, foot mounted, rigid base, Torque NEMA B, Temperature rise Class B, TEFC IP55, watertight and dust tight enclosure.
3. Class F, inverter rated insulation, Class H applied varnish, 3:1 constant torque VFD-duty.

4. Regreasable bearings, positive pressure lubrication system with automatic drain plugs – pressure compensated (frame sizes 254T and larger).
5. All frame sizes shall be domestic NEMA standard frame sizes, suitable for overhung belt drive and with the conduit box on top of the motor. IEC frame motors shall not be allowed.
6. The motor will be mounted on a pivoting base to provide automatic tensioning of the belts. The motor nominal rating after any corrections for ambient conditions shall be 10% above the maximum operating horsepower.
7. The motor shall have a 1.25 service factor for sizes up to 100 HP and a 1.15 service factor for sizes above 100 HP.
8. Motor windings shall be supplied with a normally closed thermostat, one per phase, wired in series to form a fail-safe motor protection circuit for the external fault circuit of the motor controller on all frame sizes at or above 324T. Thermostat shall be a Klixon Precision Thermostat by Sensata Technologies.
9. If the motor is VFD driven, the motors shall be equipped with an Aegis ring to mitigate the effects of stray motor currents. If the motor is 100 HP or greater than an insulated NDE bearing shall also be provided.
10. Blower manufacturer shall be responsible for coordinating the starting torque requirement of the blower and the motor.
11. The use of the TEFC motor to cool the blower system or circulate the enclosure air shall not be allowed.
12. Regardless of VFD supply, the manufacturer shall publish the VFD program settings in the submittal documentation to verify operation is within the intended RPM range of the motor.
13. Under no circumstances shall operation above 60Hz be permitted to achieve the required flow rate. Motor operation shall be limited to a maximum of 60Hz by the motor controller.

E. V-Belt Drive:

1. Each package shall be supplied with a V-belt drive that shall be of the high-capacity type, oil, and heat resistant.
2. Drive shall be designed for a minimum service factor of 1.4 times operating power (bHp), or 1.1 times the motor nameplate Hp, whichever is larger to allow a minimum of 1.4-service factor based on the maximum blower bHp.
3. Belt tensioning shall be automatic without the use of any spring devices or interaction on the part of the operator. Slide rails or spring tensioners shall not be used as a tensioning device.
4. Sheaves shall be dynamically balanced regardless of the operating speed and hydraulically mounted on the compressor drive shaft.
5. The automatic tensioning system shall yield a v-belt life of 16,000 hrs of operation.

F. Belt Guard:

1. The belt drive shall be guarded in compliance with OSHA regulations.

2. Portions of the guard shall be easily removable allowing for belt inspection and replacement.
3. Guard material shall be perforated galvanized carbon steel.

G. Vibration Isolators:

1. Each package shall be supplied with vibration isolating feet with a minimum efficiency of 80%.
2. The manufacturer shall be responsible for attenuating noise and vibration in the package such that no special installation base shall be required, nor shall any additional measures be required to reduce vibrations from the package being transmitted to the base or the piping.

H. Pressure Safety Valve:

1. Each package shall be supplied with a single pressure safety valve on the discharge side of the blower mounted downstream of the discharge silencer and upstream of the check valve.
2. The safety valve shall be set to protect the machine from exceeding its maximum pressure rating and shall be sized to pass 100% of the design flow.
3. The valve shall be field adjustable, spring loaded, and have a certificate of conformity to PED if operating above 15 psig.
4. If the package is supplied with a sound enclosure. The pressure safety valve shall be housed inside and attenuated by the sound enclosure. The safety valve shall relieve hot air into a segmented and sealed section of the sound enclosure so that the hot air cannot reenter the inlet of the machine. Weighted relief valves inside the enclosure shall not be permitted. Diaphragm electronically actuated relief valves shall not be permitted.
5. The valve shall be manufactured by Aerzen.

I. Check Valve & Butterfly Valve:

1. Each package shall be supplied with one check valve that shall be installed on the discharge line.
2. The check valve shall be of the full-bore low pressure-drop, flapper type design with a steel body, and steel flap embedded in EPDM with full-contact seal.
3. The valve shall be easily removable without disturbing the piping. Check valves requiring installation in the discharge piping shall not be considered unless installation cost of the external valve is included in supplier's proposal.
4. Pressure losses produced by the check valve shall be included in the entire package performance calculation. The check valve shall be manufactured by Aerzen.
5. Provide each blower with a wafer-type stainless steel discharge isolation valve.

J. Local Control Panel:

1. Each package shall be supplied with the following control functions and features:
    i. Intuitive TFT color touch screen display with NEMA 4X protective cover suitable for outdoor installation, HMI including sun cover.

ii. Display, monitoring, alarm, and shutdown of inlet pressure, discharge pressure, discharge temperature, enclosure cooling fan thermal overload, main drive motor thermal overload, oil temperature and oil pressure.

iii. Display run hours

iv. Log errors and first out indication

v. Track and log maintenance

vi. E-Stop button mounted on front of blower enclosure

vii. Operation of enclosure cooling fan motor starter and oil demister

viii. Ability to transfer measured values, fault and status messages, as well as remaining times of the service intervals to the customer control system via Modbus RTU. Controllers that use a non-industrial protocols such as CAN shall not be allowed.

ix. Permissive control function of customer start and stop signals to a motor controller

x. Digital potentiometer

i. LOCAL Operation: speed control of the VFD via the HMI screen.

ii. REMOTE Operation: transfer of VFD speed command from external controller to the VFD

iii. These signals can be communicated using either hard wire connection or the communication protocol

xi. The local control panel shall be provided with the following digital outputs:

i. Common alarm

ii. Common fault

iii. Ready to run

iv. Transfer of external start/stop command

v. Status remote

vi. Alternatively, these outputs can be obtained using the communication protocol

xii. The local control panel shall be provided with the following digital inputs:

i. Remote start/stop

ii. Motor controller fault

iii. Customer E-stop

iv. Alternatively, these inputs can be supplied using the communication protocol

2. Control Enclosure

a. NEMA 4X

b. Factory installed, integral to sound enclosure

c. Wiring done in accordance with UL508A standards

3. Control Supply Power

   a. 460 VAC, 10 Amp feed with 24 VDC transformer

4. Monitoring Sensors

   a. Inlet Pressure Transducer

   b. Discharge Pressure Transducer

   c. PT 1,000 Discharge Temperature RTD

   d. PT 1,000 Oil Temperature RTD

   a. Oil Pressure Transducer

5. Local control panel shall be the Aerzen AERtronic Digital Controller

K. Each blower shall receive its initial oil filling at the factory. Oil to be fully synthetic and rated for 16,000 hours of operation between change intervals.

L. Acoustical Sound Enclosure:

1. Each package shall be supplied with a sound enclosure covering the entire blower package.

2. The enclosure shall provide suitable protection for outdoor installation under wind loads of 150 mph and snow loads of 25lbs/ft^2.

3. Enclosure shall be designed for a nominal design wind speed (V_{asd}) of 150 mph as shown in contract documents.

4. The enclosure shall be designed so as to be able to install them side-by-side with all maintenance done from the front or back of the package.

5. Details shall be as follows:

   a. Enclosure Panels shall be made of galvanized steel sheet, powder coated in a light reflecting, blue color per RAL 5001. The skid shall be of the same color.

   b. The enclosure and the blower package shall both be mounted on a skid / oil-drip pan designed for meeting environment protection standards and for easy transportation and installation.

   c. A grounding strap shall be installed between the blower base and the package skid to bypass any vibration isolating mounts for grounding continuity.

   d. Quick release panels, each less than 50 lb (as mandated by MSHA) must provide easy and quick access for routine maintenance of the blower and the package components.

   e. Enclosure Cooling / Ventilation Fan:

      i. Ventilation fan shall be provided for cooling the sound enclosure.

      ii. The fan shall be sized for sufficient heat removal from the sound enclosure, even when the blower is operated with a VFD.

iii. The cooling fan shall be driven separately by a 460V, 3Ph, 60Hz electric motor powered by the same 460 VAC electric feed as the local control panel. A 120V single phase motor for this application will not be acceptable as the current draw and motor operating temperature are too high.

iv. The enclosure cooling fan shall be a dedicated device. The use of the TEFC drive motor to cool the blower or circulate the sound enclosure shall not be allowed.

f. To prevent possible operator damage, electrical components, instrumentation, and instrument connections shall not be mounted or interface with moving panels of the sound enclosure.

g. Both blower oil sumps shall be piped to a common fill and drain, located at the front of the package for easy maintenance. An oil level indicator shall be mounted on the outside of the enclosure, which gives an accurate oil level indication while the blower is in operation. All oil lines shall be industrial-quality hydraulic hose and fittings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The Contractor shall install the rotary lobe compressors in accordance with the manufacturer's written instructions.

B. The Contractor shall make all electrical and process connections to the blower package prior to the arrival of the manufacturer's representative.

C. Manufacturer's authorized service technician shall verify proper installation, electrical connections and equipment alignment prior to start up.

3.02 FIELD SERVICE & TESTING

A. After installation of all equipment has been completed and as soon as conditions permit, the manufacturer shall provide One (1) trip for a total of Two - (2) 8-hour days to verify the installation of blowers and conduct an acceptance test under actual operating conditions.

1. The Manufacturer shall perform a physical check of the blower installation, perform safety checks, power up the equipment and perform functional testing.

2. The functional test shall consist of 4 hours of operation of each blower with vibration, temperature, and pressure readings as well as motor amp readings taken and recorded at 60-minute intervals.

3. The Manufacturer shall provide operations and maintenance training to the plant personnel. The training shall consist of 1 hour of classroom training using the Operation and Maintenance Manual for reference and 2 hours of hands-on training at the blower package.

B. If required, Contractor shall make any changes, at his own expense, to the installation that may be necessary to assure satisfactory operation. Contractor shall be held liable for changes needed in the installation.

C. Manufacturer shall provide a written field test / start up report after completion of testing.

D. The blower manufacturer shall have rental blower packages available that can be onsite within 24 hours.

END OF SECTION

V:\PROJECT FILES\100200 - DAUPHIN ISLAND WATER & SEWER AUTHORITY\100200.32 - WWTP UPGRADES\300 DESIGN\355 PRELIMINARY DRAWINGS\07 ELECTRICAL\01 CADD\SINGLELINE DIAGRAM.DWG
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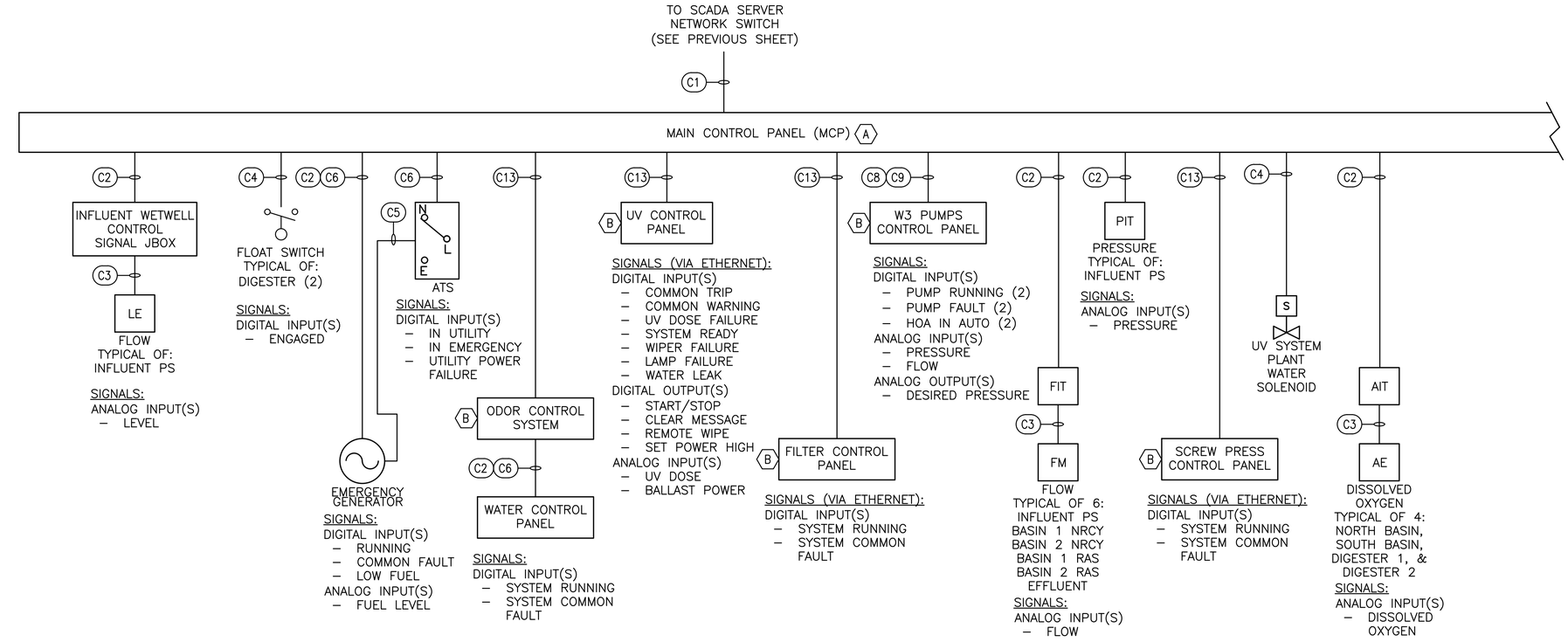

CONTROL SINGLELINE DIAGRAM
SCALE: NONE

GENERAL NOTES:

1. THE SYSTEM INTEGRATOR (ARDURRA) SHALL BE RESPONSIBLE FOR PROVIDING THE FOLLOWING:

   1.1. ALL PROGRAMMING AND CONFIGURATION ASSOCIATED WITH THE MAIN CONTROL PANEL (MCP). THE MAIN CONTROL PANEL SHALL BE PROVIDED BY THE CONTRATOR AND CONSTRUCTED BY A UL 508A PANEL SHOP.

   1.2. PC BASED SCADA SYSTEM AND HUMAN MACHINE INTERFACE (HMI) SOFTWARE. THE SOFTWARE SHALL BE GE'S iFIX OR APPROVED EQUAL. THE COMPUTER SPECS SHALL MEET THE MINIMUM REQUIREMENTS OF ALL SCADA/HMI SOFTWARE. THE PC SHALL BE CONSTRUCTED WITH COMPONENTS RATED FOR USE IN A 24/7 OPERATION. THE PC SHALL BE CONFIGURED WITH ALL REQUIRED COMPONENTS TO FACILITATE THE OPERATION OF ALL OF ITS SCADA/HISTORIAN/WEB SERVER TASKS. IT SHALL BE PROVIDED WITH KEYBOARD, MOUSE, MONITOR AND UPS.

   1.3. THE SCADA SYSTEM SOFTWARE SHALL BE INSTALLED AND CONFIGURED ON THE SCADA SERVERS TO PROVIDE MONITORING AND CONTROL CAPABILITIES FOR PLANT PERSONNEL INCLUDING:

      1.3.1. VISUALIZATION AND CONTROL OF THE ENTIRE WASTEWATER TREATMENT PLANT.

      1.3.2. WEB BASED ACCESS (IF DESIRED) FOR UP TO 5 USERS THROUGH THE INTERNET

      1.3.3. HISTORIZATION/TRENDING OF ALL ANALOG SIGNALS AND PUMP RUNNING STATUS POINTS. TRENDS SHALL BE CONFIGURED FOR ALL ASSOCIATED PROCESS AREAS (I.E. INFLUENT PUMPS SPEED & THE WETWELL LEVEL)

      1.3.4. ALL FAULTS/ALARMS SHALL BE CONFIGURED SUCH THAT THEY ARE ARCHIVED IN THE SCADA SYSTEM (FOR REVIEW AND ACKNOWLEDGEMENT BY PLANT PERSONNEL) AS WELL AS REMOTE ANNUNCIATION/NOTIFICATION VIA EMAIL/TEXT MESSAGES.

2. ALL REMOTE NODE ID'S AND IP ADDRESSES SHALL BE COORDINATED WITH THE SYSTEM INTEGRATOR.

KEY NOTES:

(A) MAIN CONTROL PANEL (MCP). SHALL BE A NEMA 4 UL 508A ASSEMBLY. THE MCP PLC SHALL BE AN ALLEN BRADLEY CONTROLLOGIX PLC WITH ALL REQUIRED I/O SHOWN ON THE PROJECT PLANS AND SPECIFICATIONS AS WELL AS 10% FULLY WIRED SPARES.

(B) PACKAGED SYSTEM. ALL IP ADDRESSES SHALL BE COORDINATED WITH THE SYSTEM INTEGRATOR (IF APPLICABLE).

RELEASE FOR BID

ENGINEER SEAL
ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34384-E DANIEL COLE STEVENS 8/27/24

NO.	DATE	REVISION	DRAWN BY:	CHECKED BY:	APPROVED BY:
1	8/27	ADDENDUM 1	DS	AB	JS
DESIGNED BY: AB			DCS	DCS	APVD

CONTROL SINGLELINE

ALOE BAY WATER QUALITY ENHANCEMENT
WASTEWATER TREATMENT FACILITY

Dauphin Island

ARDURRA
COLLABORATE. INNOVATE. CREATE.
200 CLINTON AVE. SUITE 601
HUNTSVILLE, ALABAMA 35801
(256)-203-9501

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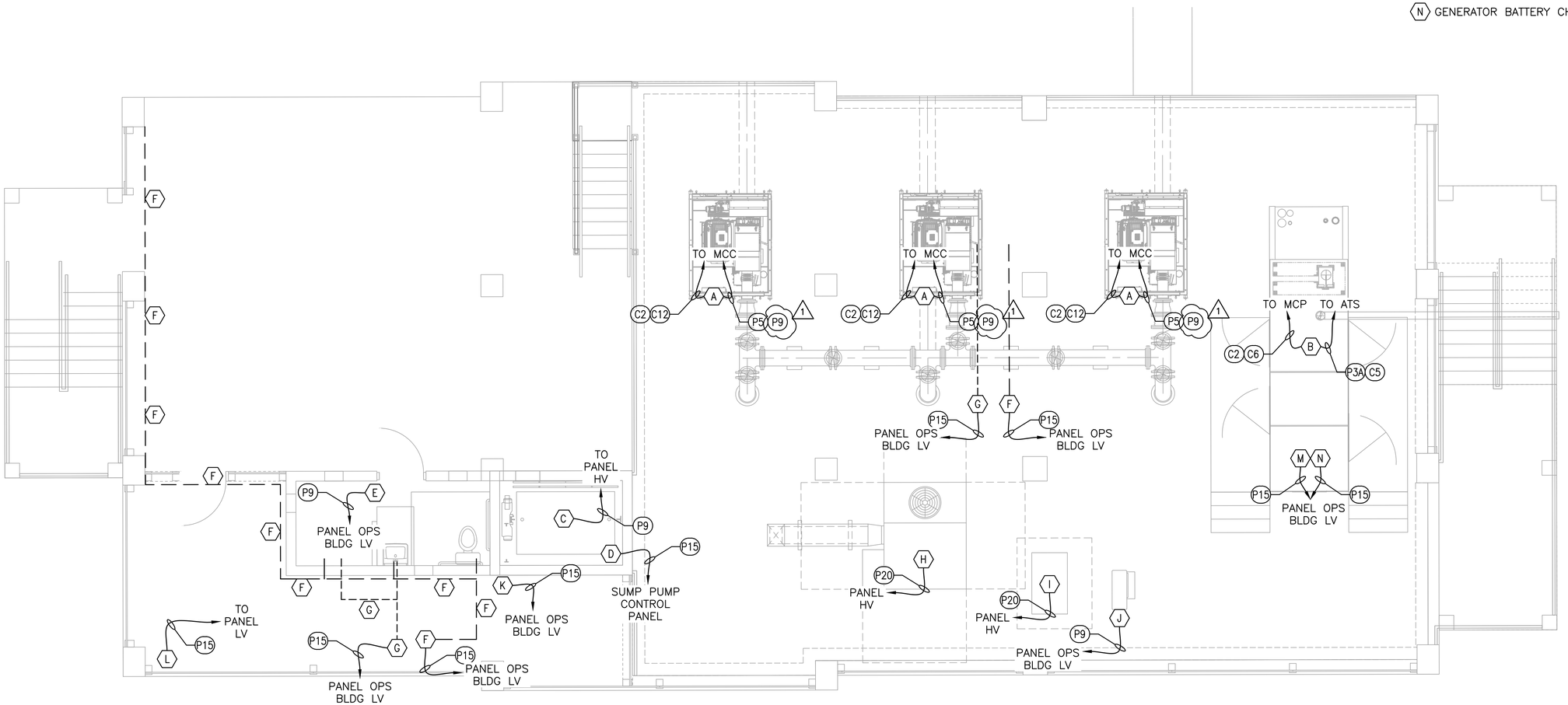
KEY NOTES:

- (A) BLOWER (TYP. OF 3)
- (B) EMERGENCY GENERATOR
- (C) ELEVATOR
- (D) ELEVATOR SHAFT SUMP PUMP. SEE E-8.0 FOR CONTROLLER LOCATION.
- (E) ELECTRIC UNIT HEATER (EUH-1)
- (F) COLD WATER LINE HEAT TRACE. SEE P-1.1 FOR DETAILS.
- (G) HOT WATER LINE WARM TRACE. SEE P-1.1 FOR DETAILS.
- (H) MAKE UP AIR UNIT 1 (MAU-1). SEE H DRAWINGS FOR DETAILS.
- (I) OUTDOOR UNIT 1 (OU-1). SEE H DRAWINGS FOR DETAILS.
- (J) SPLIT SYSTEM OUTDOOR UNIT 1 (OU-2). SEE H DRAWINGS FOR DETAILS.
- (K) IRRIGATION CONTROLLER
- (L) INFLUENT REFRIGERATED SAMPLER
- (M) GENERATOR BLOCK HEATER
- (N) GENERATOR BATTERY CHARGER



BLOWERS & GENERATOR ELECTRICAL SITE PLAN

SCALE: 1/4" = 1'

RELEASE FOR BID

ENGINEER SEAL
ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34084-E DANIEL COLE STEVENSON 8/27/24

NO.	DATE	REVISION	DRAWN BY:	CHECKED BY:	APPROVED BY:
1	8/27	ADDENDUM 1	DCS	AB	JS

DESIGNED BY: AB

BLOWERS ELECTRICAL PLAN

ALOE BAY WATER QUALITY ENHANCEMENT
WASTEWATER TREATMENT FACILITY

Dauphin Island

ARDURRA
COLLABORATE. INNOVATE. CREATE.
200 CLINTON AVE. SUITE 601
HUNTSVILLE, ALABAMA 35801
(256)-203-9501

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DWG.	E-7.0

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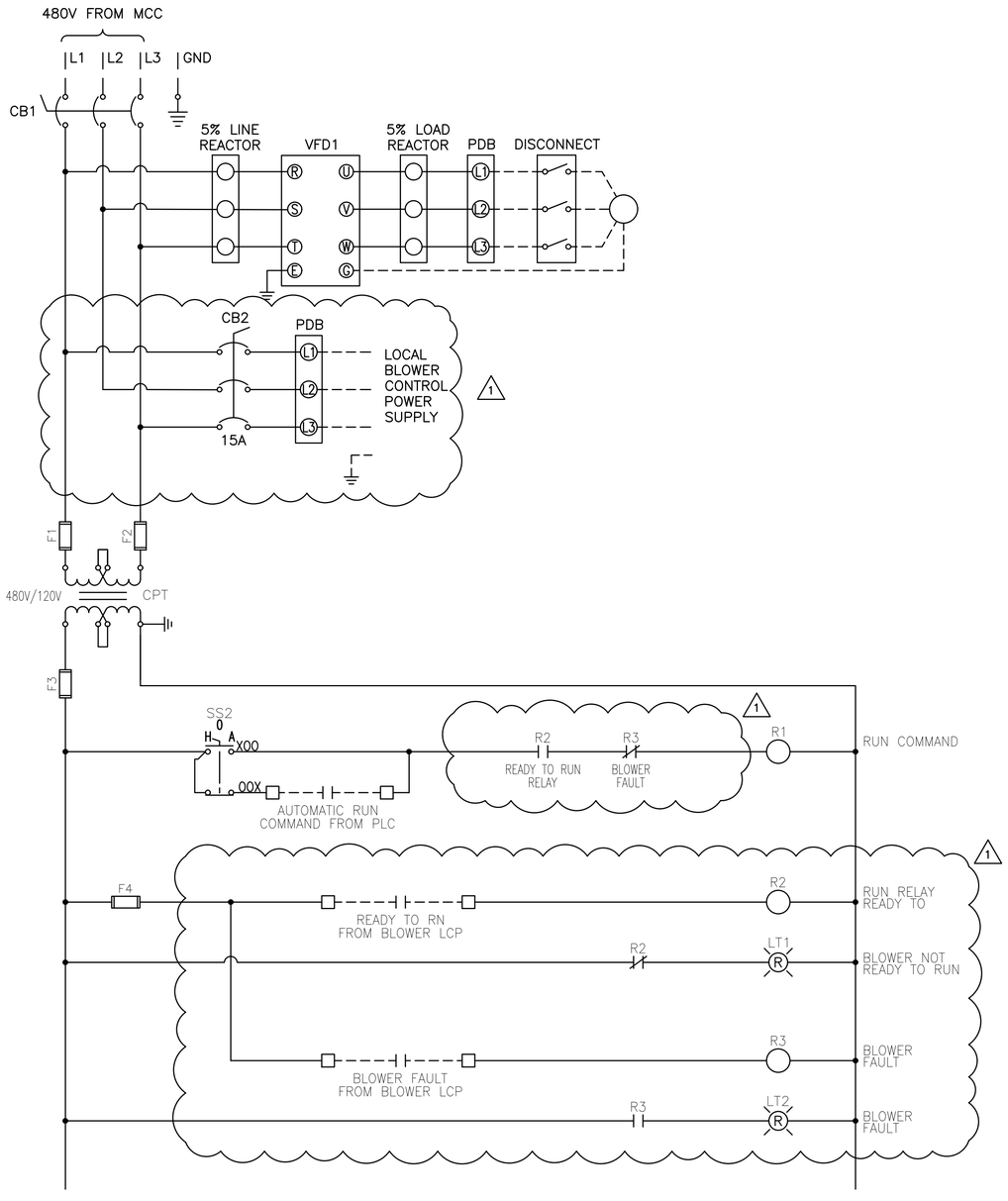

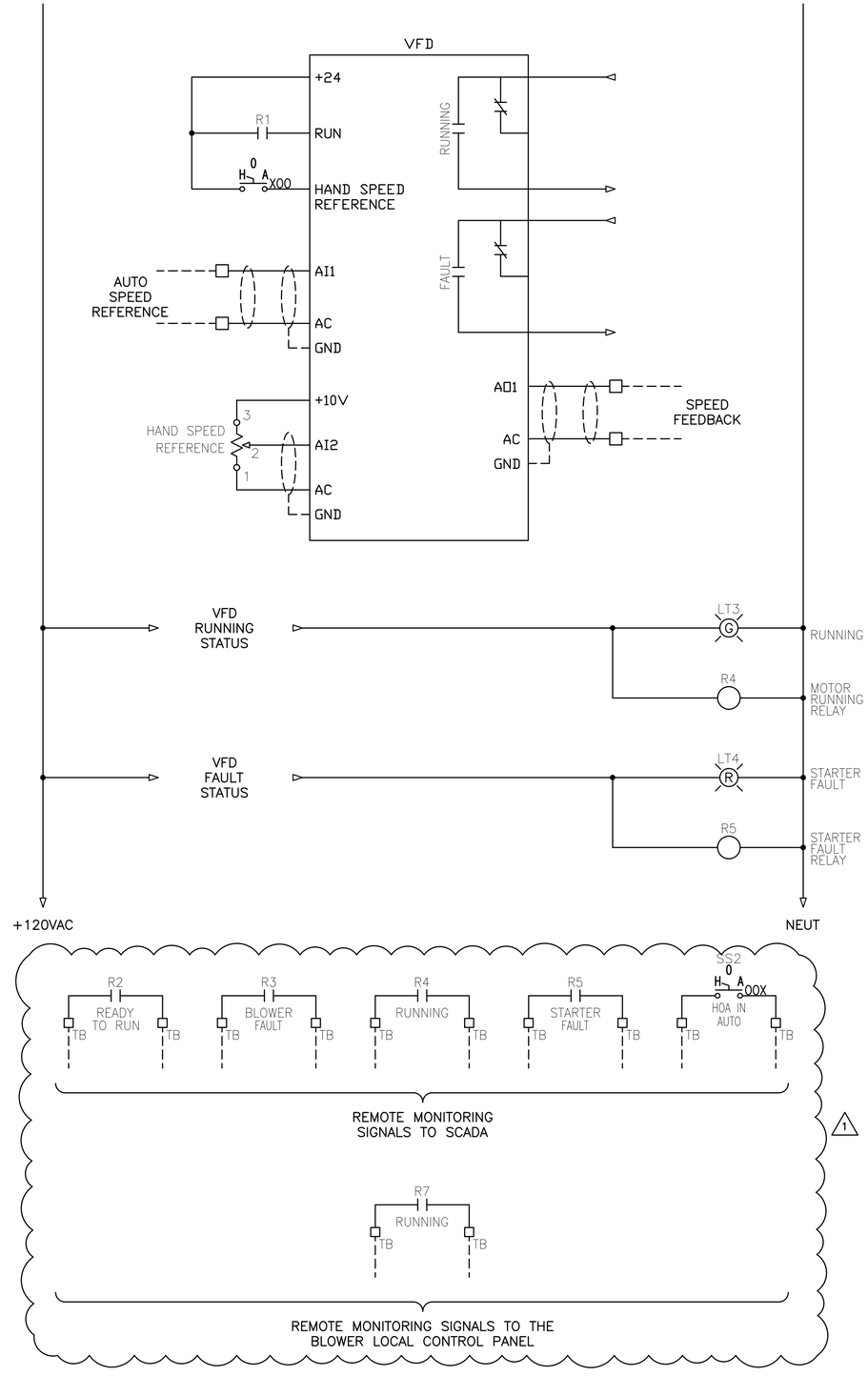

BLOWER VFD MCC CUBICLE CONTROL SCHEMATIC

SCALE: NONE

RELEASE FOR BID

ENGINEER SEAL
ALABAMA LICENSED PROFESSIONAL ENGINEER
No. 34084-E
DANIEL COLE STEVENSON
8/27/24

NO.	DATE	REVISION	DRAWN BY:	CHECKED BY:	APPROVED BY:
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DESIGNED BY: AB
DCS BY
DCS APVD BY:

TYP BLOWER MCC CUBICLE

ALOE BAY WATER QUALITY ENHANCEMENT
WASTEWATER TREATMENT FACILITY

Dauphin Island

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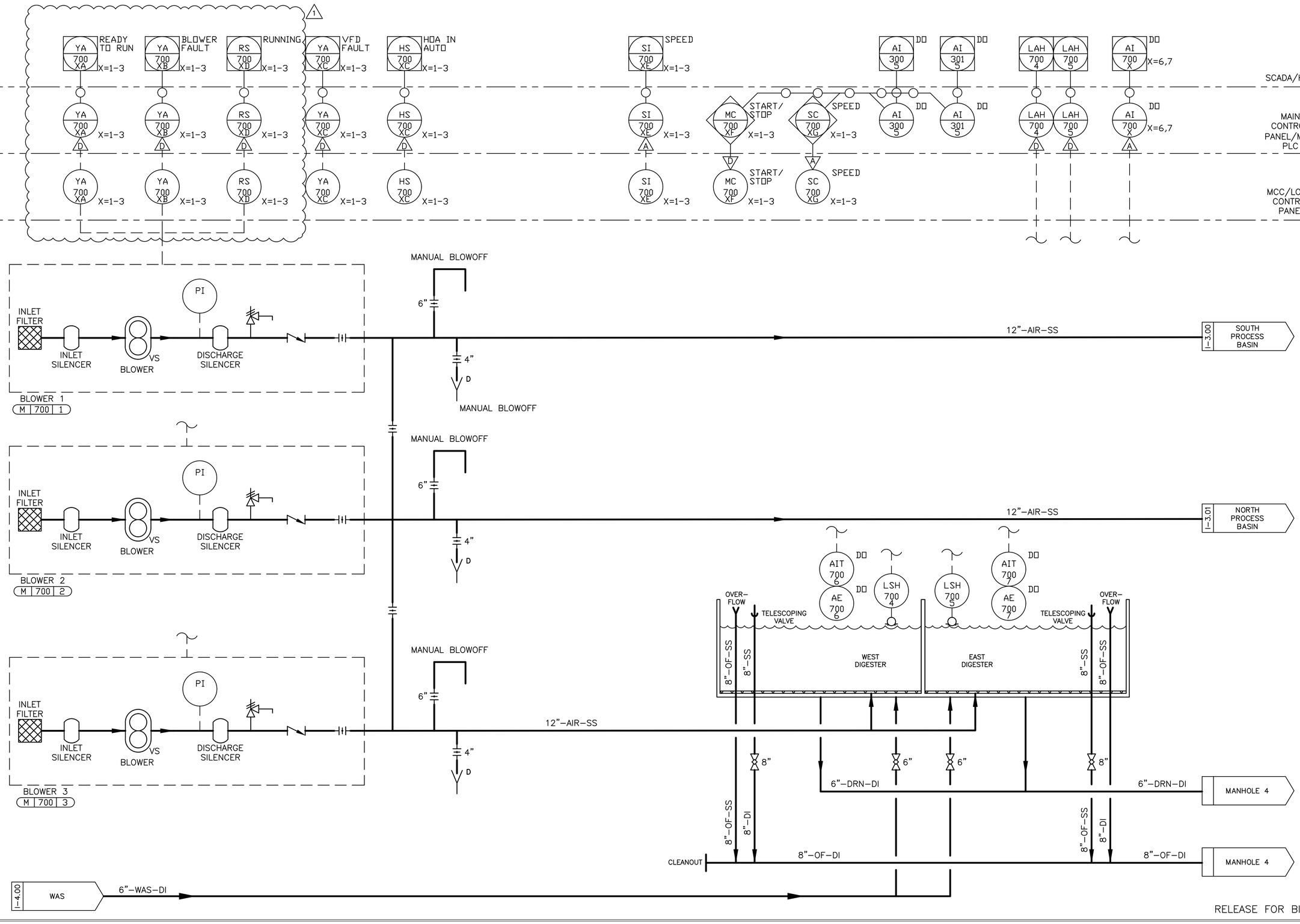

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ENGINEER SEAL
ALABAMA LICENSED PROFESSIONAL ENGINEER No. 34384-E DANIEL COLE STEVENSON

NO.	DATE	REVISION	DRAWN BY:	CHECKED BY:	APVD BY:
1	8/27	ADDENDUM 1	DCS	AB	JS
DESIGNED BY: AB			DRAWN BY: DS	CHECKED BY: AB	APPROVED BY: JS

BLOWERS & DIGESTERS

ALOE BAY WATER QUALITY ENHANCEMENT WASTEWATER TREATMENT FACILITY

ARDURRA
COLLABORATE. INNOVATE. CREATE.
200 CLINTON AVE. SUITE 601
HUNTSVILLE, ALABAMA 35801
(256)-203-9501

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DWG.	I-7.00

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GENERAL		BIOLOGICAL NUTRIENT REMOVAL				FILTRATION/DISINFECTION		DEWATERING	
Design Flows		**BNR Basin Design**		**Mixing Pumps**		**Filter Design**		**Design Conditions**	
Design Average Daily Flow (mgd)	1.3	No./Basin Geometry	2 circular basins	Manufacturer	KSB/Flygt	Manufacturer	Aqua-Aerobics	Daily Sludge Quantity (lbs/day)	1,987
Maximum Daily Flow (mgd)	1.5	Freeboard (ft)	1.5	Model	KRTD 200-316-D	Model	ADFSP-54-X-6E-PC	Sludge Feed Concentration (%)	1-2
Peak Hourly Flow (mgd)	4	Diameter of Basin (ft)	91	Number of Units	4	Type	Cloth Media Filter		
Peak Instantaneous Flow (mgd)	4	Basin Water Depth (ft)	19	Horsepower	15	Number of Units	1	**Screw Press**	
				Flow (gpm)	2,000	Number of Discs	6	Manufacturer	BDP
Influent Design Values		**Aeration**		Head (ft)	9	Total Filter Area (sf)	322.8	Model	DSP 3618
CBOD (mg/L)	215	Manufacturer	Sanataire			Average Hydraulic Loading (gpm/sf)	3.23	Number of Units	1
TSS (mg/L)	250	No. Trains	2	**NRCY Pumps**		Max. Hydraulic Loading (gpm/sf)	4.3	Design Solids Loading (lbs/hr)	331
NH3-N (mg/L)	35	Total Diffusers (per train)	600	Manufacturer	KSB/Flygt	Solids Loading Rate (Max.) (lbs TSS/day/sf)	0.78	Design Hydraulic Loading (gpm)	66
Phosphorous (mg/L)	5	SOR (lbs/day)	18,200	Model	KRTD 150-253/156XEG-D	Avg. Design Flow (mgd)	1.5	Design Weekly Operation (hrs)	30
		SOTE (%)	36.1	Number of Units	2	Peak Design Flow (mgd)	2		
Design Effluent Parameters		Total Air Rate (scfm)	1,917	Horsepower	7.5	Avg. Influent TSS (mg/L)	10	**Sludge Transfer Pump**	
BOD (mg/L)	5	Static Pressure (psig)	7.88	Flow (gpm)	900	Max. Influent TSS (mg/L)	15	Manufacturer	Seepex
NH3-N (mg/L)	1	Pressure at Top of Drop (psig)	8.57	Head (ft)	9	Influent Phosphorous (mg/L)	2	Model	BN (SCT)
TSS (mg/L)	5	Oxic Volume per Train (gal)	786,800					Number of Units	1
Phosphorous (mg/L)	1			**RAS Pumps**		**UV System**		Horsepower	7.5
		Clarifiers		Manufacturer	KSB/Flygt	Manufacturer	Aquionics	Flow (gpm)	66
Influent Pump Station		Manufacturer	Clearstream	Model	KRTD 150-253/156XEG-D	Model	IL 5000	Head (ft)	20
Manufacturer	KSB/FLYGT	Type	Spiral Blade	Number of Units	2	Number of Units	1		
Model	KRT K160-317/156XEG	Units	2	Horsepower	7.5	Kilowatts	35	**Process Water Pumps**	
Number of Units	4	Diameter (ft)	55	Flow (gpm)	1000	Avg. Design Flow (mgd)	2	Manufacturer	Clay-Greene/Goulds
Horsepower	30	Sidewater Depth (ft)	15	Head (ft)	5	Max Design Flow (mgd)	4	Type	Vertical Turbine
Flow (gpm ea pump)	950	Drive Motor (Hp)	0.5			Minimum UV Transmittance (%)	65	Numbers Of Pumps	2
Head (ft)	63	Feedwell Diameter (ft)	14			TSS (mg/l)	<10	Horsepower	15
		Feedwell Depth (ft)	4.5			Inlet Enterococci (mpn/100ml)	<35,0000	Flow (gpm)	220
Grit Removal		Average SOR (gpd/sf)	274			Effluent Enterococci (mpn/100ml)	<35	Head (ft)	160
Manufacturer	Hydro	Average SLR (lbs/sf/d)	13.76			Average UV Dose (mJ/cm2)	35		
Model	Grit King					Number of Lamps	8	**Odor Control**	
Number of Units	1	**Blowers**				Lamp Life (hrs)	10,000	Manufacturer	BioAir
Diameter (ft)	10	Manufacturer	Aerzen					Type	Biotrickling Filter
Design Flow (pdf)(mgd)	4	Model	D 76S					Model	EF81
		Number of Units	3					Air Flow CFM	950
Fine Screening		Horsepower	125					Avg. H2S Concentration (ppm)	300
Manufacturer	JWC	Air Flow per Unit (scfm)	2,115					Peak H2S Concentration (ppm)	900
Model	SHS 12042	Operating Pressure (psig)	8.6-9.0					Fan Motor HP	3
Number of Units	2							Avg. Water Consumption (gpd)	5436
Design Flow (pdf)(mgd)	4								
Screenings (cf/hr)	71								

RELEASE FOR BID

ENGINEER SEAL

NO.	DATE	REVISION	BY
1	9/3	ADDENDUM	BL

DESIGNED BY: BL | DRAWN BY: LB | CHECKED BY: – | APPROVED BY: JS | APVD BY: JS

DESIGN DATA SUMMARY

ALOE BAY WATER QUALITY ENHANCEMENT
WASTEWATER TREATMENT FACILITY

ARDURRA
COLLABORATE. INNOVATE. CREATE.
200 CLINTON AVE. SUITE 601
HUNTSVILLE, ALABAMA 35801
(256)-203-9501

FILE	SEE LEFT
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DATE	AUGUST 2024
PROJ.	100200.32
DWG.	G-7.0

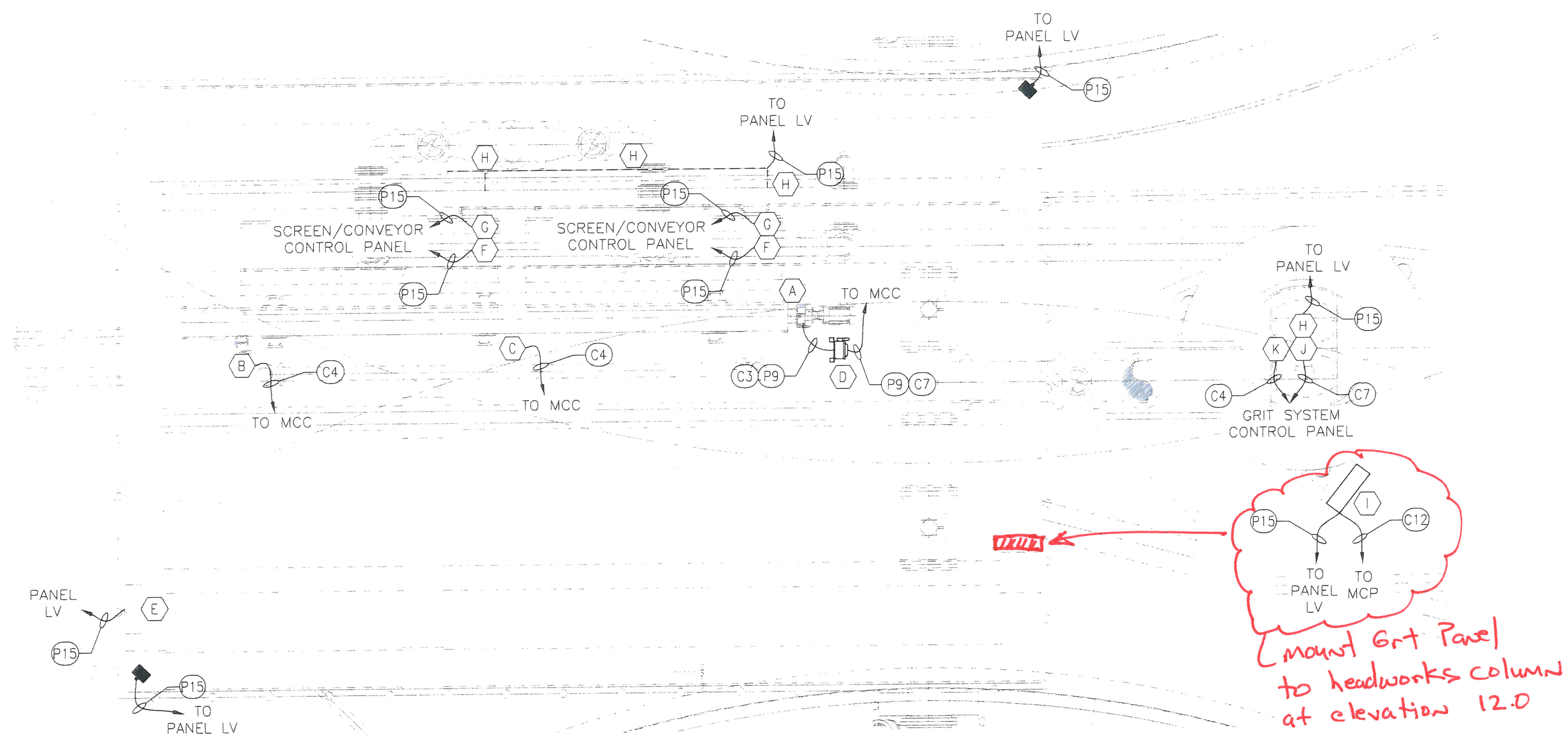
GENERAL NOTES:

1. ALL EXPOSED PLANT WATER (W3) AND POTABLE WATER (W1) PIPING WITH A DIAMETER OF LESS THAN 6" SHALL BE INSULATED AND HEAT TRACED.

2. ALL ELECTRICAL PANELS (DISCONNECTS, CONTROL PANELS, ETC.) SHALL BE MOUNTED SO THAT THE BOTTOM OF THE PANEL IS NO LOWER THAN ELEVATION 12' TO KEEP THE EQUIPMENT OUT OF THE FLOOD PLAIN. FOR THIS AREA, THAT WILL RESULT IN THE BOTTOM OF THE EQUIPMENT BEING APPROXIMATELY 5' ABOVE GRADE. FOR DISCONNECT SWITCHES AND/OR DISCONNECT HANDLES, THE HANDLE SHALL BE NO HIGHER THAN 6'7" ABOVE FINISHED GRADE OR PLATFORM. IF NECESSARY, PLATFORMS SHALL BE PROVIDED TO ALLOW THE EQUIPMENT TO REMAIN OUT OF THE FLOOD PLAIN WHILE ALSO NOT EXCEEDING A HEIGHT OF 6'7" ABOVE GRADE OR THE WORKING PLATFORM.

KEY NOTES:

- (A) MECHANICAL SCREENING CONVEYOR
- (B) SCREENING EMERGENCY CABLE SWITCH
- (C) SCREENING CONVEYOR OPERATIONAL LIMIT SWITCH
- (D) MOTOR DISCONNECT WITH 3 POSITION SELECTOR SWITCH AND RUNNING INDICATION LIGHT. SEE DRAWING E-1.0 FOR DISCONNECT DETAIL. SHALL BE A NEMA 4X SS UNIT MOUNTED TO A STAINLESS STEEL UNISTRUT EQUIPMENT RACK.
- (E) SCREEN/CONVEYOR CONTROL PANEL
- (F) WASH WATER SOLENOID. TYPICAL OF 2 – ONE FOR EACH SCREEN.
- (G) COMPRESSED AIR SOLENOID. TYPICAL OF 2 – ONE FOR EACH SCREEN.
- (H) PLANT WATER PIPING. SHALL BE INSULATED AND HEAT TRACED.
- (I) GRIT SYSTEM CONTROL PANEL. LOCATED BELOW THE HEADWORKS PLATFORM. SHALL BE MOUNTED SO THAT THE BOTTOM OF THE PANEL IS A MINIMUM ELEVATION OF 12' (OUT OF THE FLOOD PLAIN).
- (J) GRIT SYSTEM UNDER FLOW VALVE (LOCATED BELOW GRIT SYSTEM "TEA CUP")
- (K) GRIT SYSTEM FLUIDIZING SOLENOID VALVE (LOCATED BELOW GRIT SYSTEM "TEA CUP")



SCREENS/HEADWORKS UPPER ELECTRICAL PLAN

SCALE: 1/4" = 1'

ENGINEER SEAL

ALABAMA LICENSED PROFESSIONAL ENGINEER DANIEL COLE STEVENSON

NO. | DATE | REVISION | BY | APVD

DESIGNED BY: AB | DRAWN BY: DS | CHECKED BY: AB | APPROVED BY: JS

HEADWORKS ELECTRICAL

ALOE BAY WATER QUALITY ENHANCEMENT WASTEWATER TREATMENT FACILITY

Dauphin Island

ARDURRA
COLLABORATE. INNOVATE. CREATE.

FILE SEE LEFT

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