BIDDING AND CONTRACT REQUIREMENTS AND SPECIFICATIONS

DEESON ROAD LIFT STATION AND FORCE MAIN IMPROVEMENTS TECHNICAL SPECIFICATIONS 100% SUBMISSION

POLK COUNTY UTILITIES

Project No. 2021-8-30-0
Oracle No. 6843022

PCU Project Manager: **Holden Wright, PE**
Wright-Pierce Project Manager: **Chris Baggett, PE**

FEBRUARY 2024

POLK COUNTY UTILITIES DEPARTMENT

POLK COUNTY, FLORIDA

BIDDING AND CONTRACT REQUIREMENTS AND SPECIFICATIONS

FOR

DEESON ROAD LIFT STATION AND FORCE MAIN IMPROVEMENTS

TECHNICAL SPECIFICATIONS

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POLK COUNTY UTILITIES
DEESON ROAD LIFT STATION AND FORCE MAIN IMPROVEMENTS
SPECIFICATIONS CERTIFICATION

PROJECT SPECIFICATIONS – GENERAL, CIVIL, MECHANICAL	CHRISTOPHER CARROLL BAGGETT LICENSE No. 56047 STATE OF FLORIDA PROFESSIONAL ENGINEER THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY CHRISTOPHER CARROLL BAGGETT, PE ON THE DATE ADJACENT TO THE SEAL. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES. CHRISTOPHER CARROLL BAGGETT PE # 56047 Christopher C Baggett 2024.02.02 11:51:10-05'00' Christopher C. Baggett, PE FL PE License No. 56047
PROJECT SPECIFICATIONS – ELECTRICAL	Willard C Hoanshelt Digitally signed by Willard C Hoanshelt DN: CN=Willard C Hoanshelt, dnQualifier=A01410D0000017ED8EAA28C0008E2FB, O=Florida, C=US Date: 2024.02.02 11:38:22-05'00' Willard C. Hoanshelt, PE FL PE License No. 42593

TABLE OF CONTENTS

END OF SECTION

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

These Supplementary Conditions amend or supplement information contained in PCU's Utilities Standards and Specifications Manual. The chapters of PCU's Utilities Standards and Specifications Manual that are applicable to this Project are denoted in the below table by a check mark. Chapters of the PCU's Utilities Standards and Specifications Manual without a check mark are not applicable to this Project. The applicable chapter of PCU's Utilities Standards and Specifications Manual remain in full force and effect except as amended.

APPLICABLE IF CHECKED	CHAPTER
✓	CHAPTER 1 GENERAL INFORMATION
	CHAPTER 2 DEVELOPMENT COORDINATION
✓	CHAPTER 3 GENERAL REQUIREMENTS
	CHAPTER 4 WATER
✓	CHAPTER 5 WASTEWATER
	CHAPTER 6 RECLAIMED WATER
✓	CHAPTER 7 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

General

1. The Contractor shall submit shop drawings for all furnished components to PCU and the Engineer for review and approval prior to construction. This requirement also applies to components that exactly match those in an "Approved Materials Checklist".
2. Where the Contractor is required to give notifications to the Owner/PCU, the Contractor shall also give same notifications to the ENGINEER.
3. Exclusions granted to Owner/PCU shall also be granted to the ENGINEER.
4. Review and rejection/approval rights granted to Owner/PCU shall also granted to the ENGINEER.

Chapter 1 – General Information

Section 110, Part 1

Delete the second sentence in its entirety and replace with the following:

> The MANUAL shall be enforced and no part thereof shall be altered, except through the Supplemental Conditions and Supplemental Specification, without following the procedure contained within the Section entitled Reference Manual Revision Procedure" as established within the Polk County Utilities Code.

Section 110, Part 3, B

Delete the last two sentences.

~~The approval of plans by PCU shall not relieve the ENGINEER or DEVELOPER from required compliance with the provisions of this MANUAL, unless a specific written approval is received from PCU. All appeals shall be processed in accordance with the Section entitled "Appeal Process" as specified in the Polk County Utilities Code.~~

Section 110, Part 6

Delete title of Part 6 in its entirety and replace with the following:

Information Provided by PCU and the ENGINEER

Section 110, Part 6

Delete the text in its entirety and replace with the following:

All information provided by PCU and the ENGINEER, at any time, shall not be used for the ~~design or~~ construction of any building, development, or other improvements without field verification, including the use of ground penetrating radar and/or soft dig verification methods, by ~~the DEVELOPER, the ENGINEER, or~~ the CONTRACTOR. The ~~recipient's~~ CONTRACTOR's reliance, at any time, upon maps, data, or other record information provided by PCU and the ENGINEER shall be solely at his or her risk. PCU and the ENGINEER shall have no actual or implied liability for incorrect drawings, record drawings, or other materials that the recipient reviews and/or utilizes in preparation of making business or personal decisions.

Section 113

Delete the text in its entirety and replace with the following:

Not used.

Chapter 3 – General Requirements

Section 310, Part 1

Delete the text in its entirety and replace with the following:

Not used.

Section 310, Part 2, 2.03, A, 5

Delete the text in its entirety and replace with the following:

All information received by the ~~ENGINEER and~~ CONTRACTOR through the review of PCU record drawings and project files shall not be relied upon by the CONTRACTOR without field verification.

Section 313, Part 3, 3.03, I, 1

Delete the last sentence in its entirety and replace with the following:

Maximum deflections at pipe joints, fittings and laying radius for the various pipe lengths shall not exceed 75% of the pipe manufacturer's recommendation.

Section 313, Part 3, 3.05

Delete the text in its entirety and replace with the following:

Not used.

Section 314, Part 3, A

Delete the 2nd sentence in its entity and replace with the following:

The pipe installed by horizontal directional drilling shall have ~~a minimum 36 inches of~~cover as shown in the Drawings.

Section 314, Part 3, B

Delete the text in its entity and replace with the following:

Not used.

Section 314, Part 3, D

Delete the text in its entirety and replace with the following:

Not used.

Section 314, Part 3, E

Delete the text in its entirety and replace with the following:

Not used.

Section 314, Part 3, G

Delete the text in its entirety and replace with the following:

Compound curvatures ~~may be used, but shall not exceed the maximum deflections, as set forth by the pipe manufacturer or AWWA Standards, whichever is more stringent~~shall not be used.

Section 314, Part 3, I

Delete the text in its entirety and replace with the following:

A geotechnical subsurface report ~~certified by an ENGINEER shall be provided to PCU, when required~~ is attached to the Specifications.

Section 314, Part 5, 5.03, F

Delete the text and table in its entirety and replace with the following:

The pipeline curvature shall not ~~have a radius less than as shown in Table 314-5~~be less than shown on the Drawings.

Section 314, Part 6, 6.01, D, f

Delete the text in its entirety and replace with the following:

A safety plan, traffic control plan ~~(if applicable)~~;

Section 314, Part 6, 6.04, B

Delete the text in its entirety and replace with the following:

Pilot hole tolerances shall be as follows:

1. Horizontal tolerance: +3/-3 feet from proposed horizontal alignment
2. Vertical tolerance: +0/-3 feet for proposed vertical profile without sags

~~drilled on bore path with no deviations greater than two percent of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than two percent of depth in 100 feet, the CONTRACTOR will notify ENGINEER. The ENGINEER may require the CONTRACTOR to pull-back and re-drill from the location along bore path before the deviation.~~

Section 314, Part 6, 6.04, C

Delete the text in its entirety and replace with the following:

Upon successful completion of pilot hole, the CONTRACTOR ~~will~~ shall ream borehole. The CONTRACTOR shall select the reamer type and size (~~ to a~~ minimum size shall be~~of~~ 25 percent greater than outside diameter of pipe) ~~using the appropriate tools~~. CONTRACTOR will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

Section 315

Delete text in its entirety and replace with the following:

Not used.

Section 316

Delete text in its entirety and replace with the following:

Not used.

Section 318, Part 1, B, Table 318-1

Delete the table in its entirety and replace with the following:

Service	Type of Inspection	Timeframe (NORMAL WORKING DAYs)
~~Water~~	~~Wire Continuity for Pressurized Mains~~	~~5~~
~~Water~~	~~Walk Through for Subdivisions~~	~~5~~
~~Water~~	~~Cross Connection Control~~	~~5~~
Wastewater	CCTV Data Review	7
Wastewater	Wire Continuity for Pressurized Mains	5
~~Wastewater~~	~~Walk Through for Subdivisions~~	~~5~~
Wastewater	Informal Lift Station Start Up	2
Wastewater	Formal Lift Station Start Up	5
~~Reclaimed Water~~	~~Wire Continuity for Pressurized Mains~~	~~5~~
~~Reclaimed Water~~	~~Walk Through for Subdivisions~~	~~5~~
~~Reclaimed Water~~	~~Cross Connection Control~~	~~5~~

Section 350, Standard Drawings

Delete list in its entirety and replace with the following:

Applicable STANDARD DRAWINGS are those included directly in or by referenced from the Drawings.

Chapter 5 - Wastewater

Section 510, Part 1

Delete text in its entirety and replace with the following:

Not used.

Section 510, Part 2, A, 1

Delete text in its entirety and replace with the following:

When installed in rights-of-way, mains shall maintain ~~a consistent~~ alignments shown on the Drawings to the extent possible. Where deviations are necessary, the CONTRACTOR shall propose consistent alignments with respect to the centerline of the road to the extent possible. Deviations from the proposed alignments shall be approved by PCU and the ENGINEER. In all cases, mains shall be installed along one side of the road with crossings kept to a minimum.

Section 510, Part 2, A, 2

Delete text in its entirety and replace with the following:

When installed in easements, mains shall maintain alignments shown on the drawings to the extent possible. Where deviations are necessary, the CONTRACTOR shall propose consistent alignments with respect to the easement boundaries to the extent possible. Deviations from the proposed alignments shall be approved by PCU and the ENGINEER.

Section 510, Part 3

Delete text in its entirety and replace with the following:

Not used.

Section 510, Part 4

Delete text in its entirety and replace with the following:

Not used.

Section 510, Part 5, D

Delete text and table in its entirety and replaced with the following:

The m~~M~~anhole~~s~~ shall have an ~~minimum~~ interior diameters from the structure's base to the bottom of the top conical section as shown on the Drawings~~based on the main diameter in accordance with Table 510-3~~.

Section 510, Part 5, H

Delete text and table in its entirety and replaced with the following:

Not used.

Section 510, Part 5, M

Delete text and table in its entirety and replaced with the following:

Not used.

Section 510, Part 6

Delete text and table in its entirety and replaced with the following:

Not used.

Section 510, Part 7

Delete text and table in its entirety and replaced with the following:

Not used.

Section 510, Part 8

Delete text and table in its entirety and replaced with the following:

Not used.

Section 511, Part 1

Delete text and table in its entirety and replaced with the following:

Not used.

Section 511, Part 2

Delete text and table in its entirety and replaced with the following:

Not used.

Section 511, Part 3

Delete text and table in its entirety and replaced with the following:

Not used.

Section 511 , Part 4, B

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, C

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, E

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, G

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, H

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, I

Delete text in its entirety and replace with the following:

Not used.

Section 511 , Part 4, J. 1

Delete text in its entirety and replace with the following:

Force mains installed by open cut construction shall ~~be constructed of~~ PVC ~~pipe~~.

Section 511 , Part 4, J. 2

Delete text in its entirety and replace with the following:

Force mains installed by horizontal directional drilling shall be HDPE. ~~force main may be used in specific applications as specified in this MANUAL or as approved by PCU. Using the PCU approved hydraulic modeling standards contained within this MANUAL, the ENGINEER shall determine on a case by case basis if it is necessary for all proposed HDPE pipe installations to be increased by one pipe size above all proposed or existing adjacent PVC and Ductile Iron Pipe installations.~~

Section 511 , Part 6, A

Delete the last two sentences.

~~Valves shall be clearly delineated on the main profile in the STANDARD DRAWINGS. The ENGINEER shall submit calculations to PCU justifying the valve sizes and numbers as specified by AWWA M-51 "Air Release, Air/Vacuum, and Combination Air Valves".~~

Section 511 , Part 7, A

Delete the last sentence.

~~Valves shall be installed on private forces and located adjacent to and within public rights-of-way lines or Polk County Utilities Easement boundary lines in order to isolate private force mains and lift stations from the PCU system in case of the malfunction of such improvements.~~

Section 512, Part 1

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 2

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 3

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, A

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, B

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, C

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, D, 2

Delete the last sentence.

~~No pumps with less than five horsepower motors will be acceptable.~~

Section 512, Part 4, E, Table 512-2

Delete table in its entirety and replace with the following:

	Component	**2 Pumps**
1	Site Plan	see #1 below
2	Number of Wet Wells	1
	Wet Well Structure Type	precast
3	Piping (below or above ground)	~~below or above~~ *as shown on Drawings
4	Site Enclosure	chain link
4a	Access Gate	swing
5	Flow Meters	no
6	Odor Control System	*future
7	SCADA and Control Panel	yes
8	Generator	*no
9	A/C MCC	no

10	VFD	no
11	Wet Well / Coating/ Liner	Yes
12	Level Control	~~float ball and transducer~~radar level sensor and float ball backup system
13	Automatic Gear Actuator	~~*~~no
14	Wet Well Fall Protection System	yes

Section 512, Part 4, E, 1

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 2

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 4

Delete the third sentence in its entirety.

~~PCU may require that lift stations with more than two pumps have eight foot high concrete masonry unit perimeter walls and two offset eight foot high minimum aluminum, double hung swing gates instead of the required chain link fencing and gates.~~

Section 512, Part 4, E, 4

Delete last paragraph in its entirety.

~~Florida Friendly Landscaping may be permitted along the outside perimeter fencing of the lift station site as long as the center of all trees are no closer than fifteen feet and the center of all other non-tree type plantings are no closer than five feet. Maintenance and irrigation of the landscaping shall be the responsibility of the installing entity and not PCU.~~

Section 512, Part 4, E, 5

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 6

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 8

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 9

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 10

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 4, E, 12, Level Control

Requirements in the Section entitled "Wastewater Lift Station Electrical System Specifications" shall apply.

Section 512, Part 4, E, 13

Delete text in its entirety and replace with the following:

All wet wells and other such buried structures, including their associated lids and covers, shall be designed utilizing a H-20 traffic load bearing design.

Section 512, Part 5, 5.01, B

Delete the text in its entirety and replace with the following:

Shop drawings for all furnished products ~~components of a proposed lift station, not addressed in the appropriate "Approved Materials Checklist",~~ shall be submitted to PCU and the Engineer for review and approval prior to construction. This requirements also applies to components that exactly match those in the "Approved Materials Checklist".

Section 512, Part 5, 5.02, B. 2

Delete the last sentence in its entirety and replace with the following:

The minimum base thickness shall be ~~eight~~ twelve inches.

Section 512, Part 5, 5.02, C

Delete the text in entirety and replace with the following:

Cast-in-place bases shall not be utilized ~~only when specifically approved by PCU. Unless otherwise specified, cast-in-place bases shall be at least eight inches in thickness. Reinforcement and connection to the riser sections shall be designed by the ENGINEER and submitted to PCU for approval~~.

Chapter 5, Section 512, Part 5, 5.03, E

Delete the paragraph in its entirety and replace with the following:

~~Access doors that are not exposed to vehicular traffic shall have a load rating of 300 pounds per square foot.~~ Access doors ~~exposed to vehicular traffic~~ shall have a H-20 traffic load rating.

Section 512, Part 5, 5.04

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 5, 5.06

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 5, 5.07, B

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 5, 5.08

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 5, 5.09

Delete text in its entirety and replace with the following:

Not used.

Section 512, Part 5, 5.11, B, 6

Delete the sentence in its entirety and replace with the following:

~~Wherever practicable, a~~All wet well excavations shall be dewatered and pre-cast sections installed in the dry.

Section 512, Part 5, 5.13

Delete text in its entirety and replace with the following:

Not used.

Section 513, Part 2, 2.04, A, 8

Delete the paragraph in its entirety and replace with the following:

Joints with flanges shall be conforming to ANSI/AWWA C207 and ANSI B16.5, unless otherwise called for on the PLANS. Restrained or flanged joints shall be provided where called for on the PLANS. Flanged joints shall be fabricated to mate with ductile iron fittings in accordance with AWWA C115. All flanged joints shall have a 316 stainless steel backup ring ~~of materials identified in PLANS, either stainless steel or ductile iron~~. Dimension of ring shall conform to C906 and ANSI B16.5.

Section 513, Part 2, 2.06, B

Delete the paragraph in its entirety and replace with the following:

A. Gate valves shall be resilient seat gate valves, manufactured to meet or exceed the requirements of AWWA C509, latest revision, and in accordance with these specifications. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve. Valves shall have a minimum pressure rating of 150 psi.

B. Valves that are 16 inches and larger shall have side actuators. The valve body, bonnet and bonnet cover shall be cast iron ASTM A126, Class B. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating in accordance with AWWA C 550. A two-inch

wrench nut shall be provided for operating the valve. All valves are to be tested in strict accordance with AWWA C509.

C. Directional Opening:
All valves shall open left or counter clockwise.

D. The valves shall be non-rising stems with the stem made of cast, forged, or rolled bronze as specified in AWWA C509. Two stem seals shall be provided and shall be of the o-ring type. The stem nut must be independent of the gate.

E. The resilient sealing mechanism shall provide zero leakage at test and normal working pressure when installed with the line flow from either direction.

Section 515, Part 2, 2.02, A

Delete the second and third sentences in their entirety and replace with the following:

Pump motors shall be housed in ~~an~~ oil-filled or air-filled, watertight casings and shall be NEMA Design A or B . All pump motors shall have Class F insulated windings which shall be moisture resistant. ~~Motors shall be NEMA Design B, rated 155 degrees C maximum.~~

Section 515, Part 2, 2.02, B

Delete the last two sentences in their entirety and replace with the following:

1) Motors ~~25 horsepower and below~~ shall be rated ~~230/~~460-volt, 3-phase.

~~2) Motors greater than 25 horsepower shall be rated 460-volt, 3-phase.~~

Section 515, Part 2

After 2.03, add the following:

2.04 PUMP SCHEDULE

A. Deeson Road Lift Station

1. Location: In submerged wet well
2. Function: Pump raw, unscreened wastewater to a force main
3. Type: Solids handling, submersible
4. Number of Units: Two (SP-1, SP-2)
5. Lift Station Pumping Capacity: 190 GPM (min) with one (1) pump operating at its design conditions.
6. Design Basis Pump Manufacturer/Model: Hydromatic/S4K
7. Other Acceptable Pump Manufactures: Unless indicated otherwise, acceptable manufacturers shall be those listed in the Polk County Utilities USSM Approved Materials Checklist.
8. Pump Design Condition: 190 GPM each at 90 ft TDH with a minimum hydraulic efficiency of 46%
9. Pump Shutoff Head: 106 feet (min) TDH
10. Pump Head at Maximum Allowable Flow: 64 ft (max)
11. Minimum Continuous Stable Flow: 135 (max)
12. Maximum Allowable NPSHr: 30 ft at any point on pump curve
13. Rated RPM: 1,750

14. Drive Type: Constant speed
15. Motor: 20 HP; 460V; 3 phase; 60 hertz

Section 516, Part 1, 1.02

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 2, 2.01

Delete text in its entirety and replace with the following:

Provide products and materials as specified in the ~~appropriate "Approved Materials Checklist" and as specified herein. Provide products of the same or similar type of one manufacturer in order to achieve standardization~~Supplemental Specification Section 16000.

Section 516, Part 2, 2.02

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.03

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.04

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.05

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.06

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.07

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 2, 2.08, E

Delete text in its entirety and replace with the following:

Not Used.

Section 516, Part 2, 2.08, F

Delete text in its entirety and replace with the following:

Not Used.

Section 516, Part 2, 2.08, G

Delete text in its entirety and replace with the following:

Not Used.

Section 516, Part 2, 2.08, H

Delete text in its entirety and replace with the following:

Not Used.

Section 516, Part 2, 2.08, I

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.09

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 2, 2.10

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 2, 2.11

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 3, 3.01

Delete text in its entirety and replace with the following:

Refer to Supplemental Specification Section 16000.

Section 516, Part 3, 3.02, A

Delete text in its entirety and replace with the following:

Provide lift station startup as specified in the Section 550-B entitled "Testing and Inspection for Acceptance (Lift Stations) and specified in the Supplemental Specifications.

Section 516, Part 3, 3.02, B

Delete text in its entirety and replace with the following:

The grounding system shall be tested ~~to less than five ohms of resistance. Testing results by a certified testing agency using 3-point fall of potential testing as described by ANSI/IEEE Standard 81, or approved equivalent testing, and documented as described by NETA (International Electrical Testing Association), shall be provided to PCU during lift station startup.~~as specified in Supplemental Specification Section 16000.

Section 516, Part 3, 3.02, C

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 3, 3.02, D

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 3, 3.03

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 3, 3.04, B

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 3, 3.04, C

Delete text in its entirety and replace with the following:

Not used.

Section 516, Part 3, 3.04, D

Delete text in its entirety and replace with the following:

Not used.

Section 517, Part 1, 1.01, D

Delete the first sentence and replace with the following:

At a minimum, the following documents shall be provided for each facility ~~design and~~ construction project:

Section 517, Part 1, 1.01, E

After 4, add the following:

5. A Type 2 Control Panel shall be provided.

Section 517, Part 2, 2.02, Q

Delete text in its entirety and replace with the following:

Not used.

Section 517, Part 2, 2.02, R, 5, f

Delete text in its entirety and replace with the following:

Not used.

Section 517, Part 2, 2.05, B

Delete text in its entirety and replace with the following:

Not used.

Section 517, Part 2, 2.05, D

Delete text in its entirety and replace with the following:

Not used.

Section 518

Delete text in its entirety and replace with the following:

Not used.

Section 519

Delete text in its entirety and replace with the following:

Not used.

Section 550, STANDARD DRAWINGS

Delete list in its entirety and replace with the following:

Applicable STANDARD DRAWINGS are those included directly in or by referenced from the Drawings.

Section 550-C, Approved Material Checklist

Delete the second to last paragraph on page 1 of 36 in its entirety and replace with the following:

Shop drawings shall be required for all furnished components including those that exactly match those in the "Approved Materials Checklist"~~structures and similar items not contained on this checklist, such as manholes, wet wells, and other castings~~.

In the event that a part number is obsolete, the Contractor shall submit proof to PCU that the part number is obsolete and shall submit a revised Checklist to PCU for its review and approval.

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Location: The Work locations include, but are not limited to, locations within the below rights-of-way and easements:
   1. Deeson Road Lift Station
      a. Easement
   2. Deeson Road Force Main
      a. Deeson Road rights-of-way
      b. Fifteen foot wide platted alleyway near Lift Station 215

B. Geotechnical
   1. Please note that geotechnical borings have been performed along the route.
   2. See Appendix A for the geotechnical engineering report for information.

C. Work Included: The Work generally includes, but is not limited to, the following:
   1. Construction of the Deeson Road Lift Station, which generally includes, a precast concrete wet well and lid, two (2) submersible pumping units, pump bases, guide rails, pump panels with soft starters, instrumentation, controls, conduit, wiring, light pole, piping, valves, fittings, restraints, adapters, pipe supports, wash down assembly, concrete slab and pads, pipe penetrations, water supply well and pressure tank, receiving manhole, gravity mains, fencing, driveway, and culvert with mitered end sections.
   2. Construction of approximately 10,700 linear feet of 6-inch nominal diameter force main and associated valves and appurtenances. Approximately 1,320 of the 10,700 linear feet of 6-inch force main is to be installed by horizontal directional drill.
   3. Construction of a manhole, approximately 275 linear feet of 15-inch nominal diameter gravity main, and an access road, and modifications to an existing manhole near Lift Station No. 215
   4. Testing of pumping units, instruments and controls, force main, water supply well, and valves for proper installation and performance.
   5. Earth excavation, stripping of topsoil, installation of conduit, wiring, asphalt, concrete encasement of conduit banks, equipment pads, fine grading, landscaping, loaming and seeding
   6. Temporary power and electrical services, instrumentation and communications services.
   7. Other temporary facilities described herein including, but not limited to, sanitary and drinking water facilities.
   8. All related site work including temporary and permanent fencing, trench excavation, groundwater dewatering, protection and adjustment of existing utilities, additional fill, disposal of excess excavated materials, bedding, backfill, compaction, restoration, grading, road/drive subbase, asphalt, concrete, seed/sod, and site restoration.

9. Testing of equipment, controls, piping, and appurtenances.
10. Other miscellaneous work shown in the Drawings and Specifications for a complete and operational system.

D. Related Work Specified Elsewhere
1. Applicable Utilities Standards and Specifications Manual (USSM) Chapters Identified in Supplementary Conditions to the Construction Contract: Section 00800
2. Supplementary Conditions to the Construction Contract: Section 00800
3. Project Meetings: Section 01200
4. Construction Schedule: Section 01310
5. Safety and Health Plan: Section 01320
6. Submittals: Section 01340
7. Project Record Documents: Section 01720
8. Equipment Startup, Testing and Operator Training: Section 01800

E. Removals, Relocations and Rearrangements
1. Examine the existing site for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the general bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
2. Provide in the bid a sufficient amount to include all removals, relocations, rearrangements and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.
3. Provide in the bid a sufficient amount to include all temporary facilities required to maintain flows during the construction period, including bypass pumping, temporary piping, etc. The cost shall include the cost for all labor, tools, equipment and materials necessary.

F. All work shall meet or exceed the Owner's utility standards as specified within the applicable chapters of the USSM as identified and modified in Section 00800. USSM Chapters are located at the following link: https://www.polk-county.net/utilities/utilities-code.

G. Unless indicated otherwise, acceptable manufacturers shall be those listed in the applicable USSM Chapters and Approved Materials Checklist as identified and modified in Section 00800.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 MAINTAIN EXISTING WORKS

A. Continuous Operations Criteria:

1. The Contractor shall conduct his operations in such a manner and sequence which shall neither result in a disruption of, nor interfere with, the functional workings of Lift Station 215 or any existing utilities.
2. The Contractor's operations shall not hinder staff duties, nor disrupt utility service, nor encroach on private property during the project.
3. Lift station is located adjacent to residential properties. Contractor shall limit storage of materials onsite and keep the site clean at the end of each workday to the acceptance of the Owner.
4. The Contractor is responsible to secure the site and protect construction equipment and equipment owned by the County.
5. The Owner must have access to the Lift Station 215 at all times unless a specific exception is granted.
6. Contractor shall use means and methods of construction sequencing that provides for the least amount of time the station must be taken offline to complete the switchover to new systems.
7. Contractor's means and methods shall meet general acceptance by the Owner prior to implementation.
8. The Owner will operate and maintain all existing systems and equipment not modified or impacted by the project. The Contractor shall notify and coordinate with the Owner whenever Contractor’s temporary power and electrical services or construction will interface with existing utilities.
9. The Contractor shall be responsible for the operation and maintenance of all new and temporary power and electrical services until such time as the new systems are accepted by the Owner.

B. Minimize Interference

1. The Contractor shall at all times conduct his operations so as to interfere as little as possible with existing works. The Contractor shall develop a program, in cooperation with the Engineer and interested parties, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted.
2. Work of connecting with, cutting into and the terminal manhole near Lift Station 215 shall be planned to interfere with the operation of the existing systems for the shortest possible time and when the flows best permit such interference. It may be necessary to Work outside of normal working hours to minimize interference. Before starting Work that will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.

3. All systems shall be fully operational from 5 PM on Friday through Monday at 7 AM, unless authorized by the Owner. No shutdowns can begin on a Friday, unless authorized by the Owner.

3.2 CONSTRUCTION SEQUENCE

A. Connecting the force main to the terminal manhole near Lift Station 215 may disrupt the operations of existing wastewater system. To maintain continuous operations, the construction must be sequenced appropriately.

B. The Contractor shall provide a proposed sequence of construction plan at the pre-construction meeting for review by the Owner and the Engineer prior to commencing any work.

C. The Contractor must submit to the Owner a written request to deviate from the above sequence provided the Contractor can demonstrate to the Owner that the continuity of operations will not be adversely affected.

3.3 SCHEDULE LIMITATIONS AND WORK RESTRICTIONS / REQUIREMENTS

A. Work Hours:
   1. All Work shall be prohibited on Saturdays, Sundays, and County holidays.
   2. All Work on weekdays shall be performed between the hours of 7 AM and 6 PM, except during emergencies.
   3. The Contractor shall request permission to Work outside the work hours specified above at least three (3) working days in advance of the proposed work. The Contractor shall not commence Work outside of the Work hours specified above unless or until granted such permission from the Owner.

B. Maintain Services:
   1. Maintain all existing sanitary sewer operations except as coordinated and accepted by the Owner and the Engineer.

C. Traffic Control:
   1. Contractor shall maintain access to all residences, businesses and the lift station site at all times.

D. Tree Cutting/Clearing:
   1. Cutting, removal, and clearing of trees require written permission/ approval by the Owner.

END OF SECTION

SECTION 01045

CUTTING, CORING AND PATCHING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included - This section establishes general requirements pertaining to cutting, excavating, coring, fitting, and patching of the Work required to:
   1. Make alterations to existing structures.
   2. Make the parts fit properly.
   3. Replace work not conforming to requirements of the Contract Documents.
   4. Contractor is responsible for all cutting, coring, and rough and finish patching. Contractor shall coordinate the work of any and all subcontracting trades performing the work.
   5. Contractor is responsible for reviewing with the Owner and the Engineer and receiving permission to proceed prior to cutting and coring and patching.

B. Related Work Specified Elsewhere:
   1. Process equipment/systems are specified in appliable chapters of the USSM as identified and modified in Section 00800.
   2. Instrumentation systems are specified in appliable chapters of the USSM as identified and modified by Section 00800.
   3. Electrical systems are specified in Division 16 and applicable chapters of the USSM as identified and modified in Section 00800.

C. Quality Assurance:
   1. Perform all cutting, coring and patching in strict accordance with pertinent requirements of these Specifications, and in the event no such requirements are determined, in conformance with the Engineer's written direction.

D. Submittals:
   1. Provide a shop drawing submittal to include the following information:
      a. Identification of coring and cutting subcontractor including: Company name, business address contact information, or if by Contractor indicated as such.
      b. List of type of coring and cutting equipment proposed to be used with equipment cuts of the equipment.
      c. Schedule indicating the: location of the core or cut, size and any potential obstructions or embedded conduits and wiring.
      d. Key plan indicating the location of anticipated cores and cuts.
   2. Request for the Engineer's consent:
      a. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
      b. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Engineer and secure his written permission prior to proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials for replacement of work shall be equal to those of adjacent construction and shall comply with the pertinent sections of these Specifications.

B. Concrete and grout for rough patching shall be as specified in Division 2 and appliable chapters of the USSM as identified and modified in Section 00800.

PART 3 - EXECUTION

3.1 CONDITIONS

A. Inspection:

1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, coring, backfilling, and patching.
2. After uncovering the work, inspect conditions affecting installation of new work.

B. Discrepancies:

1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
2. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION PRIOR TO CUTTING AND CORING

A. Provide all required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the Work.

B. All cutting and coring shall be performed in such a manner as to limit the extent of patching.

C. All holes cut through concrete and masonry walls or slabs shall be core drilled unless otherwise approved. No structural members shall be cut without approval of the Engineer and all such cutting shall be done in a manner directed by the Engineer. No holes may be drilled in beams or other structural members without obtaining prior approval. All Work shall be performed by mechanics skilled in this type of work.

D. If holes are cored through floor slabs they shall be drilled from below.

E. The Contractor shall determine from Owner's information, logical deduction and field testing if there are embedded electrical conduits, wiring or piping in the coring locations and shall re-adjust locations if possible, to avoid coring through them. If concealed embedded conduit and piping are damaged, or severed, the coring contractor shall immediately notify the Owner and Owner's Construction Site Representative to determine impact of the damage and develop and implement a plan to repair the damage and reactive the lines.

3.3 CORING

A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or

mechanical seals to be installed.

B. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.

C. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

D. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.

E. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from coring operation.

3.4 CUTTING

A. Cutting shall be performed with a concrete wall saw and diamond saw blades of proper size.

B. Provide for control of slurry generated by sawing operation on both sides of wall.

C. When cutting reinforced concrete, the cutting shall be done so as not to damage bond between the concrete and reinforcing steel left in structure. Cut shall be made so that steel neither protrudes nor is recessed from face of the cut.

D. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.

E. Provide equipment of adequate size to remove cut panel.

F. Slurry or tailings resulting from cutting operations shall be vacuumed or otherwise removed from the area following drilling. Slurry or tailings shall not be allowed to enter floor drains.

G. Work area (e.g., adjacent walls, floors, ceilings, pipes, conduits, etc.) shall be cleaned to remove splash residues from cutting operation.

3.5 PERFORMANCE

A. Perform all required excavating and backfilling as required under pertinent sections of these specifications. Perform cutting, coring and demolition by methods which will prevent damage to other portions of the work and will provide proper surfaces to receive installation of repair and/or new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.

B. Coring or cutting which exposes cut surfaces of reinforcing steel or structural steel shall be coated. Coating shall be 10 mil (dry film thickness) applied in two 5 mil (dry film thickness) coats of a single component moisture cured coal tar urethane or two part coal tar epoxy corrosion barrier. Alternately the exposed steel can be cut back two inches from the surface and a non-shrink grout applied over the steel flush to the concrete core or cut surface.

C. Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown.

D. Finish patching shall match existing surfaces as approved.

END OF SECTION

SECTION 01050

COORDINATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Contractor is required to work in close proximity to PCU's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with PCU to ensure that services and existing operations are continued at the lift station site, and safe working conditions are maintained.

B. Any damage to existing structures, equipment, roadways and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or its subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 COORDINATION WITH OTHERS

A. Polk County Utilities:

1. Contractor shall coordinate all work on Owner's property with the Owner's Construction Site Representative and PCU staff.
2. Contractor shall be responsible for coordinating all work in the vicinity of utilities with the County. Contractor shall bear all costs, temporary electrical services, temporary power and other requirements.
3. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.

B. The Contractor shall provide the Engineer, County's Construction Site Representative and PCU Project Manager a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the County Construction Site Representative one-week notice before the start of any work. The Contractor shall daily communicate with the County Construction Site Representative concerning updating the schedule, job progress, delay or early starts that affect lift station operation, needed PCU staff assistance and other critical activities.

C. Coordination meetings shall be held at specific milestones between the Contractor, PCU's Chief Operator/Superintendent and the Owner's Construction Site Representative. Coordination meetings shall be held to discuss specific milestones and shall cover the following:

1. Work to be completed
2. Project Schedule
3. Shop Drawing and O&M issues
4. Outstanding RFIs and Clarifications
5. Change Orders and Field Orders
6. Review of Record Drawing Information
7. Discussion/Resolution of any old issues
8. New issues discussion
9. Contractor's Safety and Health Plan Updates

D. The Contractor shall be responsible for explicitly notifying all equipment suppliers, electrical subcontractor, and the instrumentation supplier that they are required to

coordinate their work with the instrumentation supplier by providing operating sequences, input/out specifications with wiring diagrams for all equipment, and that they shall review and comment on each other's shop drawings to insure that all interfaces are compatible.

1.3 CONTRACTOR'S USE OF PREMISES

A. Contractor shall have use of the premises within the limits shown on the Drawings and as defined in the General Conditions for the performance of the Work.
   1. Lift Station Site
      a. The Contractor shall provide laydown and material storage areas within the lift station site / easement. No additional laydown or storage areas will be provided by the County.
      b. Additional off-site vehicle parking may be required and shall be coordinated with PCU.
      c. Entrance to the site: The main entrance to the lift station site will be utilizing the gate opening off of Deeson Road.
      d. Any damages to roadways, access drives, etc shall be repaired by the Contractor at no expense to the County.

B. Contractor work hours will be limited to 7:00AM to 6:00PM, Monday through Friday. Any work outside these hours will require permission of PCU with a minimum 72-hour notice. Saturday and Sunday are excluded from the notification timeframe.

C. Contractor shall maintain access and utilities to the lift station site at all times. Whenever access is cut off in one direction, an alternative route for accessing all equipment and tankage must be maintained.

D. Contractor shall coordinate delivery schedules, site access, and other construction-related activities with any other contractors that may be hired by PCU during the course of construction.

E. Contractor shall assume full responsibility for security of all of their, and their subcontractors, materials and equipment stored on the site.

F. If directed by PCU, Contractor shall move any stored items which interfere with operations of PCU.

G. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

H. Contractor shall provide all necessary staff facilities including an eating area, toilets, etc.

I. The Contractor shall not utilize or disrupt privately owned properties without prior written authorization from the property owner. PCU shall be held harmless for any damage to property during the project duration.

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. For lump sum items, payment shall be made to the contractor in accordance with an accepted progress schedule and schedule of values based on actual work completed.

B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amounts of materials in place, as shown by final measurements.

1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
2. After the work is completed and before final payment is made, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 SCOPE OF PAYMENT

A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract Documents. Upon completion of construction, if these actual quantities show either an increase or decrease from the quantities given in the Proposal Form, the Contract Unit Prices will still prevail.

B. The Contractor shall accept in compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the Work as herein authorized.

C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PARTIAL PAYMENTS

A. Partial payments shall be made monthly as the work progresses. Partial payments shall be made subject to the provisions of the Supplemental and General Conditions.

1.4 PAYMENT FOR MATERIAL DELIVERED

A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used and have been delivered to the construction site, or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the General and Supplemental Conditions.

B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.

1.5 FINAL PAYMENT

A. After final measurements are made by the Engineer, the Contractor will prepare a final quantity invoice of the amount of the Work performed and the value of such Work.

1.6 INCIDENTAL WORK

A. Incidental work items for which separate payment will not be made includes, but is not limited to, the following items:

1. Clearing, grubbing, and stripping.
2. Dust control.
3. Dewatering.
4. Erosion control.
5. Loam, seeding, sodding, grading, liming, fertilization, mulching and watering.
6. Pipe bedding and backfill.
7. Compaction testing of backfill.
8. Clean-up and restoration of property.
9. Final cleaning of sewers, force mains and storm drains.
10. Minor Items – such as removing and resetting of existing signs, posts, bollards, guard rails, mailboxes, steps, fences, walls, non-paved brick or paved walkways, curbs, concrete pads, sod, landscaping, structures, traffic loop detectors, etc., damaged/disturbed as a result of construction activities, other than those identified on the Drawings to be replaced.
11. Raising and lowering of existing frames and covers of buried utilities to grade unless payment is otherwise provided for.
12. Cooperation and coordination with other Contractors and utility companies including related inspection costs and other costs.
13. Utility crossings and relocations, unless otherwise paid for.
14. Trench boxes, steel and/or wood sheeting as required, including that left in place.
15. Project Record Documents.
16. Materials testing.
17. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents.

18. Temporary power and electrical service to maintain continued and automatic operation of lift stations during construction.
19. Temporary construction necessary for construction sequencing and other facilities not permanently incorporated into the work.
20. Temporary Field Office, as needed.
21. Repair and replacement of water lines under 2-inches in size, culverts, underdrains, drainage systems and swales in streets and other utilities damaged by construction activities and corresponding proper disposal of removed materials unless otherwise paid for.
22. Relocation, replacement, and extension of all underground telephone, power, cable, data, gas, and all other private utility services from within the rights-of-way to structures and meters.
23. Weather protection.
24. Permits not otherwise paid for or provided by the Owner.
25. Visits to the project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
26. Onsite and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the work.
27. Test holes for the Contractor’s benefit.
28. All excavation except test holes specifically shown or ordered by the Engineer to establish sewer line and water line locations, earth excavation below grade, and rock excavation.
29. Test holes to establish in place field soils density, groundwater conditions, or requirements for dewatering.
30. Protection of existing retaining walls unless otherwise identified to be removed, relocated, or modified in the Drawings.
31. Locating and verifying the locations of water, sewer, electrical, and communication services within the limits of work.
32. Completion of the Storm Water Pollution Prevention Plan, if necessary, and required inspections, monitoring, and reporting.
33. Permits not otherwise paid for or provided by the Owner.
34. Quality assurance testing.
35. Pipe markings.
36. Earthwork.
37. Pre-Construction photographs or videos.
38. Contract administration and insurance.

1.7 DESCRIPTION OF PAY ITEMS

A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
B. Each lump-sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.
C. All bid items shall include total cost item of mobilization and demobilization which shall not exceed 5% of Total Amount of the Bid. Mobilization and demobilization

costs are those costs of initiating and ending the contract. Seventy-Five percent (75%) of the lump sum will be payable when the Contractor is operational on the site and the remaining 25% of the lump sum will be payable when the Contractor leaves the site following the completion of all contract work. For purposes of payment on this item, "Operational" shall mean the Contractor has provided all required and properly executed bonds and insurance certificates and the Owner has reviewed the following: Schedule of Values, Construction Schedule, Safety and Health Plan, Erosion Control Plan, Temporary Facilities, initial Temporary Bypass Pumping Plan, and Pre-Construction photographs/videos. Only one lump sum payment divided into the two partial payments described herein shall be made to cover all mobilization/demobilization costs throughout the entire contract.

1. Traffic Control
    a. Method of Measurement: Traffic regulation and control will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
    b. Basis of Payment: Payment for traffic regulation and control shall constitute full compensation for all traffic regulation and control efforts and including all labor, materials, equipment, signage, police presence, and supervision required to provide comprehensive and professional traffic regulation and control at all project locations. The traffic control plan, temporary pavement markings for traffic re-routing and pedestrian safety are included in this item. Payment under this item will be made for full-time dedicated flaggers only. Part-time flaggers will not be considered adequate and will be considered incidental to the Project Work. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract.

2. Utility Locates In Advance Of Construction
    a. Method of Measurement: Utility locates in advance of construction will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
    b. Basis for Payment:
        i. Payment for Utility Locates in Advance of Construction will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for the work, including call and coordination with utility location services, exploratory excavations, and all other appurtenant work needed to fully and completely locate underground utilities that may be affected by the proposed work. The lump sum shall be paid in partial payments over the course of the project, where the percentage paid is equal to the percentage of completion of the entire Contract. Contractor shall furnish all labor, materials and equipment necessary to physically locate all utilities in the immediate project area using non-destructive digging equipment, supplies and

personnel experienced in the use of subsurface utility engineering (SUE) to determine the precise horizontal and vertical positions of utilities, specified herein, and/or as directed by the Engineer. The Contractor shall perform utility locates at least 14 calendar days in advance of construction in order to request clarification if required from the engineer. The Engineer will have 7 calendar days to respond.

ii. It is the responsibility of the Contractor to officially notify "Sunshine 811," "Dig Safe," or the utilities directly prior to commencing any work. The Contractor shall coordinate all existing utility adjustments with the appropriate utility provider. Copies of the issued Sunshine locate tickets and photographs of the locates, including dates and location of the photographs shall be submitted to the County.

iii. Additional "soft dig" investigation may be required under this contract to determine existing utility elevations near all conflict areas as shown on the plans. The data from these areas must be evaluated by the Engineer prior to commencement of any existing utility diversions. It shall be the Contractor's responsibility to identify any additional conflict points following utility locates and present these to the Engineer with elevation data.

3. Geotechnical Investigation and Report In Advance Of Construction
   a. Method of Measurement: Geotechnical investigation and report will be paid for at the Lump Sum unit price as stated in the Bid Schedule.
   b. Basis for Payment:
      i. Said lump sum price shall constitute full compensation for furnishing all labor, materials, tools, and equipment necessary for performing one (1) SPT boring to a depth of 40 feet located in the center of the proposed wet well location and submission of a signed and sealed geotechnical report that defines if any subsurface improvements are needed. The Geotechnical report shall be submitted to the Engineer at least 30 calendar days prior to construction.

4. Deeson Road Lift Station
   a. Method of Measurement: Construction of the Deeson Road Lift Station shall be paid for at the Contract lump sum price stated in the Bid Schedule.
   b. Basis of Payment: Payment for Deeson Road Lift Station shall be made at the contract lump sum price, based upon the approved schedule of values and shall constitute full compensation for furnishing all labor, materials, tools and, equipment necessary for construction of the lift station, complete, operational, and satisfactorily tested, including, but not limited

to: mobilization/demobilization; site preparation; clearing and grubbing; excavation and backfill; disposal of unsuitable or excess soils; sheeting, shoring, bracing or other acceptable methods of excavation support; dewatering; construction of subsurface and above grade structures/facilities including wet well, influent manhole, on-site gravity piping; all equipment, temporary and permanent electrical work instrumentation, site work, RTU system, panels, restraints, concrete encasement(s), piping, fittings, valves, and restraints; sodding of disturbed areas; construction of lift station access drive, culvert and mitered end sections; new fence and gate; erosion control; grading; obtaining necessary non-potable well permit(s), drilling the well casing; removal and disposal of temporary casing, cuttings, and drill fluid, preparation of bore hole logs, sample handling, containers, storage, well casing materials, grout for sealing, well screen, well development, test pumping, construction of the submersible well pump and controller, hydropnuematic tank, pitless adapter, and appurtenances for an operational water supply well, and certification(s) of drilling well; construction of non-potable water wash down hydrant assembly and all ancillary components; all electrical and instrumentation of control improvements; start-up and testing, and all appurtenant work needed for complete and operational systems, as indicated on the Drawings and as specified.

5. Force Main via Open Cut
   a. Method of Measurement: Force main measured for payment shall be the number of linear feet (plan view depiction) of force main installed by open cut measured along the center line of the pipe as laid including fittings from Station 0+00 to the terminus manhole near Lift Station 215.
   b. Basis of Payment:
      i. The contract unit price per linear foot for force main pipe shall be full compensation for mobilization/demobilization, all labor, materials, and equipment necessary to complete this work including excavation, dewatering, bedding, providing suitable soils, removal & replacement of unsuitable soils (including rock), tree/stump removal, protection of trees, property, backfill, furnishing and installing polyvinyl chloride pipe and polywrapped ductile iron fittings, locating wire, mechanical restraints, making connection to manhole near Lift Station 215, installation of impervious material dams, backfill including bedding material, compaction, cleaning, testing, seeding/sodding, and all else incidental thereto for which payment is not provided under other items.
      ii. Payment for this work on interim requisitions shall be according to the following percentages:
         (1) Force main acceptably set in place and backfilled – 90

percent.

(2) Force main successfully tested – 10 percent.

6. Force Main via Directional Drilling
   a. Method of Measurement: Force main measured for payment shall be the number of linear feet (plan view depiction) of force main installed by horizontal directional drilling along the center line of the pipe as laid including fittings installed and accepted complete in place for all work to the limits of work as shown on the Drawings.
   b. Basis of Payment: The contract unit price per linear foot of accepted force main installed via Directional Drilling shall be full compensation for mobilization/demobilization, all labor, materials, tools, and equipment necessary to complete this work including providing HDPE force main, fusing the pipe, for clearing and grubbing; for providing suitable soils; removal & replacement unsuitable soils tree/stump removal, protection of trees; backfill; dewatering; for excavating and backfilling receiving and drilling pits; for furnishing and placing all temporary and/or permanent sheeting and bracing; installing HDPE force main by horizontal directional drilling; for connections to the force main at both ends of the directional drill; for all fittings (HDPE and polywrapped ductile iron) and appurtenances within the limits of work; locating wire; for cleaning and pressure testing the pipeline; seeding/sodding, and for all other work and expenses incidental thereto.

7. Buried Gate Valves
   a. Method of Measurement: The quantity of buried gate valves to be paid for under this item shall be the actual number of valves and valve boxes installed, complete in place.
   b. Basis of Payment: Gate valves shall be paid for at the unit price per each stated in the Bid Schedule. Said unit price shall be full compensation mobilization/demobilization, for furnishing all materials, labor, equipment, polywrap, and tools; for installing, setting, and jointing the valve and valve box; for restraining joints; cleaning and testing of installed force mains, locating wire and access box, for valve box extensions; for testing all valves and valve boxes; for valve pad and identification discs; seeding/sodding; and for all other work and expenses incidental thereto for which payment is not provided under other items.

8. Above Ground Combination Air/Vacuum Release Valve and Enclosure
   a. Method of Measurement: The quantity to be paid for under this item shall be the actual number of combination air/vacuum release valves with associated enclosures installed.
   b. Basis of Payment: Above ground combination air/vacuum release valve and enclosures shall be paid for at unit price per each stated in the Bid

Schedule and shall constitute full compensation for mobilization/demobilization, furnishing all labor, materials, tools, and equipment necessary for constructing each above ground air release valve and enclosure, operational and satisfactorily tested, including but not limited to, site preparation, dewatering, excavation and backfill, bedding, furnishing, and installing the vented air release valve enclosure, piping, valves, couplings, appurtenances, fittings, valve box, seeding/sodding, and all else incidental thereto for which payment is not provided under other items.

9. Gravity Main and Manhole
   a. Method of Measurement: Construction of the gravity main and manhole near Lift Station 215 shall be paid for at the Contract lump sum price stated in the Bid Schedule.
   b. Basis of Payment: Payment shall be made at the contract lump sum price, based upon the approved schedule of values and progress payments. Said per each price shall constitute full compensation for mobilization/demobilization, furnishing all labor, materials, tools, and equipment necessary to construct the polyvinyl chloride gravity main and precast manhole, connection the gravity main to an existing manhole, including but not limited to, demolition, site preparation, providing suitable soils, removal & replacement of unsuitable soils (including rock), tree/stump removal, protection of trees, property, dewatering, excavation and backfill, bedding; cleaning; testing; seeding/sodding, and all else incidental thereto for which payment is not provided under other items.

10. Temporary Bypass System and Force Main Removal
   a. Method of Measurement: Design, construction, and operation of a Temporary Bypass System, and removal of an existing force main section near Lift Station 215 shall be paid for at the Contract lump sum price stated in the Bid Schedule.
   b. Basis of Payment: Payment shall be made at the contract lump sum price, based upon the approved schedule of values and progress payments. Said per each price shall constitute full compensation for mobilization/demobilization; furnishing all labor, materials, tools, and equipment necessary to install a temporary bypass system, including line stop with bypass and temporary bypass piping with discharge to the Lift Station 215 Receiving Manhole; demolishing a portion of an existing force main including its connection to an existing manhole; tree/stump removal; protection of trees and property; dewatering; excavation and backfill; seeding/sodding, and all else incidental thereto for which payment is not provided under other items. Construction of the short 8-inch force main section from the remaining portion of the existing remaining force main to a manhole shall be include Item 5.

11. Utility Trench Repair – Full Depth Asphalt Pavement
    a. Method of Measurement:
        i. The quantity to be paid for under this item shall consist of the square yardage of asphalt pavement removed and replaced at the direction of the Engineer within the payment limits shown on the drawings.
        ii. Actual widths will be used in computing area wherever the width of asphalt pavement removed and replaced is less than the above specified limits.
    b. Basis of Pavement:
        i. Utility Trench Repair – Full Depth Asphalt Pavement shall be paid for at the Contract Unit Price per square yard of material installed, as stated in the Bid Schedule, within the construction limits or as directed by the Engineer.
        ii. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools necessary for removing existing asphalt pavement and base; furnishing and placement of full depth asphalt pavement to the depths indicated on the drawings; spreading and mixing of all stabilizing material required and any reprocessing of stabilization areas necessary to attain the specified bearing value; furnishing, placement, and compaction of rock base (Limerock, Recycled Concrete Aggregate, etc); dust abatement; correcting all defective base surface and thickness; removing cracks and checks in base; prime coat application of base; additional rock required for crack elimination; hauling off and stockpiling or otherwise disposing of the removed pavement and base; and all work specified in the referenced FDOT standard specifications.

12. Utility Trench Repair – Concrete Driveway
    a. Method of Measurement:
        i. The quantity to be paid for under this item shall consist of the square yardage of concrete pavement removed and replaced at the direction of the Engineer within the payment limits shown on the drawings.
        ii. Actual widths will be used in computing area wherever the width of asphalt pavement removed and replaced is less than the above specified limits.
    b. Basis of Pavement:
        i. Utility Trench Repair – Concrete Driveway shall be paid for at the Contract Unit Price per square yard of material installed, as stated in the Bid Schedule, within the construction limits or as directed by the Engineer.
        ii. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools necessary for removing existing concrete driveways; furnishing and placement of concrete driveways to the depths indicated on the drawings; concrete testing;

providing a concrete jointing plan; forming; excavation; subgrade compacting; placement of concrete; furnishing and placement of all joints; ensuring proper curing conditions; replacement of concrete found to be unacceptable; hauling off and stockpiling or otherwise disposing of the removed concrete.

13. Utility Trench Repair - Milling of Existing Pavement and Asphalt Overlay
    a. Method of Measurement:
        i. The quantity to be paid for under this item shall consist of the square yardage of milling of existing pavement and asphalt overlay within the payment limits shown on the drawings.
        ii. Actual widths will be used in computing area wherever the width of milling and overlay is less than the above specified limits.
    b. Basis of Pavement:
        i. Utility Trench Repair - Milling of Existing Pavement and Asphalt Overlay shall be paid for at the Contract Unit Price per square yard of milling of existing pavement and asphalt overlay installed, as stated in the Bid Schedule, within the construction limits or as directed by the Engineer.
        ii. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools necessary for milling of existing pavement and asphalt overlay to the depths indicated on the drawings; hauling off and stockpiling or otherwise disposing of the milled material; and all work specified in the referenced FDOT standard specifications.

14. Utility Trench Repair - Limerock Driveway
    a. Method of Measurement:
        i. The quantity to be paid for under this item shall consist of the square yardage of limerock driveway removed and replaced at the direction of the Engineer within the payment limits shown on the drawings.
        ii. Actual widths will be used in computing area wherever the width of limerock driveway removed and replaced is less than the above specified limits.
    b. Basis of Payment:
        i. Utility Trench Repair – Limerock Driveway shall be paid for at the Contract Unit Price per square yard of material installed, as stated in the Bid Schedule, within the construction limits or as directed by the Engineer.
        ii. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools necessary for removing existing limerock driveway; furnishing and placement of full depth limerock driveway to the depths indicated on the drawings; compacting subgrade; furnishing, placement, and compaction of

rock base: dust abatement; correcting all defective base surface and thickness; removing cracks and checks in base; additional rock required for crack elimination; hauling off and stockpiling or otherwise disposing of the base material; and all work specified in the referenced FDOT standard specifications.

15. Access Road
    a. Method of Measurement:
        i. The quantity to be paid for under this item shall consist of the square yardage of access road installed at the direction of the Engineer within the payment limits shown on the drawings.
        ii. Actual widths will be used in computing area wherever the width of access road installed is less than the above specified limits.
    b. Basis of Payment:
        i. Access Road shall be paid for at the Contract Unit Price per square yard of material installed, as stated in the Bid Schedule, within the construction limits or as directed by the Engineer.
        ii. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools necessary for furnishing and placement of full depth asphalt pavement to the depths indicated on the drawings; spreading and mixing of all stabilizing material required and any reprocessing of stabilization areas necessary to attain the specified bearing value; furnishing, placement, and compaction of rock base (Limerock, Recycled Concrete Aggregate, etc); dust abatement; correcting all defective base surface and thickness; removing cracks and checks in base; prime coat application of base; additional rock required for crack elimination; and all work specified in the referenced FDOT standard specifications.

16. As-built Survey
    a. Method of Measurement: The As-built Survey will be paid for at the lump sum unit price as stated in the Bid Schedule.
    b. Basis of Payment:
        i. Payment for the As-built Survey shall constitute full compensation for all field survey and processing, recording, and delivery of data, including all labor, materials, equipment, and supervision required to provide a complete as-built survey and complete GIS database in the specified formats.
        ii. Payment for this Lump Sum work on interim requisitions shall be according to the following proceedings:
            (1) Electronic version of the draft (ninety percent (90%) complete) survey and GIS database submitted and approved

by the Engineer - thirty percent (30%) payment.

(2) Electronic and paper versions of the final survey and GIS database submitted and approved by the Engineer – seventy percent (70%) payment.

17. Contingency

a. Method of Measurement: Measurement shall be made per the Change Order, only after authorization from the County's Project Manager, Engineer, and Utilities Director, and then in accordance with the Change Order provisions of the General Conditions. The Contingency may be used to cover unforeseen work not included in other bid items necessary for accomplishing the installation requested by the Owner.

b. Payment from the project Contingency shall be made on a Contract Unit Price for the specific unit of measurement of the item up to $100,000. Measurement shall be made per the Change Order, only after authorization from the County, and then in accordance with the change order provisions of the General Conditions.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings as needed throughout the construction period with the Owner and the Contractor.

B. Related Work described elsewhere: The Contractor's relations with his subcontractors and suppliers and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings content.

1.2 QUALITY ASSURANCE

A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.3 SUBMITTALS

A. Agenda items: To the maximum extent practicable, Contractor to advise the Owner and the Engineer regarding all items to be added to the agenda at least two business in advance of project meetings.

B. Minutes: The Engineer will compile minutes of each project meeting and will furnish a copy to the Contractor and the Owner. The Contractor may make and distribute such other copies as necessary.

PART 2 - PRODUCTS

(No products are required in this Section.)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

A. Except as noted below for the Preconstruction Meeting, project progress meetings will be coordinated and held as necessary with a mutually acceptable schedule.

3.2 MEETING LOCATION

A. To the maximum extent practicable, all project related meetings will be held at the PCU administration building or another mutually agreed location, unless the Owner and/or Engineer determine that virtual meetings are applicable and appropriate.

1. If meetings are required by Owner/Engineer to be held virtually, Engineer will host the meetings via Microsoft Teams. All required meeting attendees are responsible for providing hardware necessary to view, share, be heard and hear content of the meeting.

3.3 PRECONSTRUCTION MEETING

A. Preconstruction meeting will be scheduled after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.

B. Minimum agenda: Distribute data on, and discuss:
   1. Identification of key project personnel for the Owner, Engineer, Contractor, funding/regulatory Agencies.
   2. Identification of subcontractors and suppliers.
   3. Responsibilities of the Owner, Engineer, Owner's Construction Site Representative, Contractor.
   4. Channels and procedures for communications.
   5. Construction schedule, including sequence of critical work.
   6. Easements, permits.
   7. Major materials/equipment deliveries and priorities
   8. Contract Documents, including distribution of required copies of original documents and revisions.
   9. Procedures and processing of:
      a. Field decisions and Change Orders
      b. Proposal requests
      c. Submittals (e.g., Shop Drawings and other data submitted to the Engineer for review)
      d. Application for payment
      e. Schedule of Values
   10. Procedures for maintaining up-to-date field record documents
   11. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements and procedures for the following miscellaneous items:
      a. Use of premises
      b. Security
      c. Safety (inclement weather) and first-aid
      d. Construction facilities
      e. Quality control
      f. Housekeeping
      g. Other related matters
   12. Substantial completion
   13. Final completion and project close-out

3.4 PROJECT MEETINGS

A. Attendance: To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work. The Superintendent and Project Manager shall attend. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.

B. Minimum agenda:
   1. Review, revise as necessary, and approved minutes of previous meeting.

2. Review progress of the Work since last meeting, including status of submittals for approval.
3. Field observations, problems, and/or conflicts, and:
   a. Identify problems which impede planned progress.
   b. Develop corrective measures and procedures to regain planned schedule.
4. Review of construction schedule and any revisions to the schedule
5. Review schedule of work to be accomplished prior to next meeting.
6. Review submittal schedules; expedite as required
7. Discuss monthly partial payment request.
8. Review status of change order requests and Work Directive Changes.
9. Identify problems which impede planned progress.
10. Develop corrective measures and procedures to regain planned schedule.
11. Complete other current business.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Contractor shall submit to the Owner and the Engineer an estimated progress schedule as specified in the General and Supplementary Conditions.

B. Form of Schedules:
   1. Narrative: Completely describe the construction methods to be employed.
   2. Network Analysis System:
      a. Provide a separate horizontal schedule line for each trade or operation and show concurrent and preceding activities.
      b. Present in chronological order the beginning of each trade or operation showing duration and float time.
      c. Scale: Identify key dates and allow space for updating and revision.
   3. Mathematical Analysis:
      a. A mathematical analysis shall accompany the network diagram. A computer printout will be acceptable.
      b. Information shall be included on activity numbers, duration, early start, late start, etc. and float times.

C. Content of Schedules:
   1. Provide complete sequence of construction by activity:
      a. Shop Drawings, Project Data and Samples:
         i. Submittal dates.
         ii. Dates reviewed copies will be required.
      b. Decision dates for:
         i. Products specified by allowances.
         ii. Selection of finishes.
      c. Estimated product procurement and delivery dates.
      d. Dates for beginning and completion of each element of construction.
   2. Identify work of separate phases and logically grouped activities.
   3. Show the projected percentage of completion for each item of work as of the first day of each month.
   4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.

D. Updating:
   1. Show all changes occurring since previous submission.
   2. Indicate progress of each activity, show completion dates.
   3. Include:
      a. Major changes in scope.
      b. Activities modified since previous updating.
      c. Revised projections due to changes.
      d. Other identifiable changes.

4. Provide narrative report, including:
    a. Discussion of problem areas, including current and anticipated delay factors.
    b. Corrective action taken or proposed.
    c. Description of revisions that may affect schedules.

1.2 SUBMITTALS

A. Submit updated schedules with each progress payment request.
B. Submit 4 copies of initial and updated schedules to the Engineer.

END OF SECTION

SECTION 01320

SAFETY AND HEALTH PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work, as outlined herein and in the General and Supplementary Conditions. Within 10 days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer a Safety and Health Plan as specified herein. Refer to submittals section below.
2. Contractor shall comply with all applicable Laws and Regulations related to the safety of persons or property, or for the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
3. Contractor shall designate a qualified and experienced safety representative (OSHA defined "Competent Person") at the site whose duties and responsibilities shall be the prevention of accidents and maintaining and supervising of safety precautions and programs, including a "Job Hazards Analysis".
4. The Contractor shall be solely responsible to provide all labor, equipment, and utilities sufficient to ensure no construction noise, particulates, or odors, are allowed to accumulate to levels which adversely affect health or work in, or near the construction area.

B. Content of Safety and Health Plan:

1. Contractor shall prepare a complete safety and health plan in accordance with the requirements of CFR Title 29 Part 1926 - Safety and Health Regulations for Construction and OSHA and submit to Engineer and Owner.
    a. Provide documentation that Contractor's hazardous communication program is up to date.
    b. Provide documentation that Contractor's safety training is up to date.
    c. Prepare a project specific Safety and Health Plan addressing construction safety issues, including but not limited to excavations, fall protection and egress, as well as provisions for construction in hazardous environmental conditions at the lift station sites. The hazardous environmental conditions at the lift station sites includes, but is not limited to, confined space entry and electrically-classified spaces.
2. Safety provisions for confined space entry shall follow General Industry Standard CFR Title 29 Part 1910.146 and will be incorporated into the Safety and Health Plan.

C. Updating:

1. Contractor shall be responsible for updating the Safety and Health Plan as appropriate throughout the course of the construction period.

1.2 SUBMITTALS

A. The Safety and Health Plan is provided "for information only" to inform the Owner, Engineer and County Construction Site Representative of the project specific safety program requirements. The Contractor will overview the plan with the Owner (and staff), Engineer (and County Construction Site Representative) at the beginning of the project, and subsequently when/if the safety plan is updated.

B. Contractor's most current Safety and Health Plan shall be available at the construction site throughout the construction project.

1.3 COORDINATION AND MEETINGS

A. Contractor shall review key aspects of Safety and Health Plan at the Pre-Construction Meeting, and subsequent safety informational meeting.

B. Contractor shall report to Engineer and the Owner at each progress meeting concerning compliance with the Safety and Health Plan for the most recent construction period and new considerations and requirement for the upcoming period.

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.

B. Related Work Specified Elsewhere:
   1. Construction Schedules: Section 01310
   2. Project Record Documents: Section 01720

C. Submittals: This project shall utilize:
   1. Submittals – Electronic via Web-Based Software with Hard Copy for Record
      a. The Contractor shall utilize the web-based software provided by the Engineer for the Project Team. The Contractor shall provide contact information for its members of the Project Team for the web-based software. The Contractor shall conform to the format and workflow of the web-based software provided for the Project.
      b. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via the provided web-based software tool. The Engineer shall coordinate with the Owner on the concurrent review of the shop drawings and O&M Manuals and compile review comments from the Owner and Engineer on a combined submittal review form. Engineer shall return an electronic PDF of the submittal review comments to the Contractor through the provided web-based software tool. The electronic submittals shall serve as the electronic record of the project.
      c. In addition, completed shop drawings shall be submitted in a PDF format and completed operations and maintenance (O&M) manuals shall be provided in hard copy (paper) format, for the record, in accordance with the following requirements.
         i. Shop drawings and O&M manuals shall be considered “completed” once an action code of “0” or “1” has been attained, as specified below, unless otherwise directed by the Engineer.
         ii. Once completed, the Contractor shall provide three hard copy sets (for Owner, Engineer and County Construction Site Representative, respectively).
         iii. Hard copy submittals shall be updated on a monthly basis, for those submittals completed during the preceding month.

1.2 SHOP DRAWINGS

A. Shop Drawings are required for each and every element of the work.

B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.

C. The Contractor shall provide a completed Contractor Submittal Certification Form

(copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.

D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless otherwise permitted by the Engineer.

E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.

H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.

I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.

J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that

contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.

K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to , shall do all work necessary to make such modifications.

L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two-submission limit.

M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.

1.3 SAMPLES

A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of “samples” shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

1.4 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance (O&M) Manuals are required for certain elements of the project, as specified herein.

B. The Contractor shall provide a completed Operation and Maintenance Manual Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every Manual and signed by the Contractor and Manufacturer.

C. Each sheet of O&M manual shall clearly identify the specific products and component parts, and data applicable to installation. Inapplicable information should be crossed out or deleted.

D. Supplemental product data shall be used to illustrate relations of component parts of equipment and system, to show control and flow diagrams. The Project Record Documents shall not be used as maintenance drawings within the O&M manual.

E. Instructions and data presented in O&M manual shall be prepared by personnel experienced in maintenance and operation of described products. O&M manuals shall be prepared in the form of an instructional manual.

F. Each O&M Manual shall consist of the following:
   1. (for hard copies only) Binders: Commercial quality 8-1/2 by 11-inch, three D side ring binders with durable plastic covers; 2-inch maximum size. When multiple binders are used, correlate data into related consistent groupings.
   2. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents; Include the General Contractor's and Manufacturer's representative's contact information.
   3. Provide tabbed dividers for each separate product and system, with typed description of project and major component parts of equipment.
   4. Text: Manufacturer’s printed data, or typewritten data on 24-pound paper.
   5. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
   6. Arrange content by system under section numbers and sequence of Table of Contents of this Project Manual.
   7. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
      a. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
      b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
         i. Significant design criteria
         ii. List of equipment
         iii. Parts list for each component
         iv. Maintenance instructions for equipment and systems
         v. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents
      c. Part 3: Project documents and certificates, including the following:
         i. Shop drawings and product data
         ii. Certificates
         iii. Photocopies of warranties and bonds

G. O&M Manuals shall contain the following operational information:
   1. Safety Precautions: List personnel hazards, equipment or product safety precautions for all operating conditions.
   2. Operator Prestart: Include all procedures required to set up and prepare each system, equipment or component for use.
   3. Startup Procedures: Provide a narrative description for all startup operating procedures, include all control sequences.
   4. Shutdown Procedures: Provide a narrative description for all shutdown operating procedures, include all control sequences.
   5. Post-Shutdown Procedures: Provide a narrative description for all post-shutdown operating procedures, include all control sequences.

6. Normal Operating Procedures: Provide a narrative description of normal operating procedures. Include control diagrams with data to explain operation and control of systems and specific equipment.
7. Emergency Operations: Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.
8. Operator Service Requirements: Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, alignment, spare parts installation and gage reading or recording.
9. Environmental Conditions: Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which the equipment should not be allowed to run.

H. O&M Manuals shall contain the following maintenance information:
1. Lubrication Data: Include a table showing recommended lubricants for specific temperature ranges and applications. Also, include charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, capacities and a lubrication schedule showing service interval frequency.
2. Preventative Maintenance Plan: Include the manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation as well as to ensure minimization of corrective maintenance and repair. Provide the manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide the manufacturer's specified frequency and procedures for each separate operation.
3. Troubleshooting Guides: Include recommendations on procedures and instructions for correcting problems and making repairs. Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.
4. Wiring and Control Diagrams: Provide Wiring diagrams and control diagrams. All diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to the actual installation numbering.
5. Maintenance and Repair Procedures: Include instructions and list the tools required to restore products and/or equipment to proper conditions or operating standards.
6. Removal and Replacement Instructions: Include step-by-step procedures, list required tools/supplies for removal, replacement, disassembly, and assembly of

components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

7. Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration shall be required for facilities at remote locations. List spare parts and supplies that have a long lead times to obtain.
8. Corrective Maintenance Work Hours: Include the manufacturer's projection of corrective maintenance workhours including craft requirements by type of craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.

I. O&M Manuals shall contain the following additional information:

1. Parts Identification: Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirements to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items.
    a. When illustrations omit a part number and description, both the illustration and a separate listing shall show the index, reference, or key number which shall cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.
2. Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force. Include warranty information for all primary components included in product systems.
3. Personnel Training Requirements: Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.
4. Testing and Special Tools: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.
5. Contractor Information: Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the respective product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.
6. Written confirmation from the manufacturer that the Contractor has coordinated the equipment One Year Service Call in accordance with specification Section 01800, par. 1.1, A, 2.

1.5 MANUFACTURER'S CERTIFICATES

A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.

B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

1.6 SUBMISSION REQUIREMENTS

A. Accompany submittals with a transmittal cover sheet, containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
      a. USSM Specification Section Number followed by a comma and then the Subpart Number (when applicable) number followed by a dash and then a sequential number beginning with 01 (e.g., 512, 2.06-01).
      b. Supplemental Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
      c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 512, 2.06-01A, 16000-01A).
      d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters “OM”, another dash, and then a sequential number beginning with 01 (e.g., 512, 2.06-OM-01, 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 512, 2.06-OM-01A, 16000-OM-01A).
   5. Notification of deviations from Contract Documents.
   6. Other pertinent data.

B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
   1. Project name
   2. Specification Section and sequential number with alphabet suffix for resubmittal
   3. Description
   4. Identification of deviations from Contract Documents.
   5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
   6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
   7. Where specified, manufacturer's guarantee.

C. Additional Requirements for Electronic Submittals:
   1. Each individual shop drawing or O&M submittal shall be contained in one PDF.

2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
5. The electronic PDF shall be configured such that is fully searchable.
6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.7 RESUBMISSION REQUIREMENTS

A. Revise initial submittals as required and resubmit as specified for initial submittal.
B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal shall be indicated to assist in comparing the original and resubmitted shop drawing.
C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

1.8 ENGINEER'S REVIEW

A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
    1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
    2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
    3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review

comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**

4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which indicates how each review comment has been addressed and where to find the information in the resubmittal.
5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
6. In Review (Status 5 on shop drawing log). The shop drawing is currently under review.
7. For Information Only (Status 6 on shop drawing log). The shop drawing review was for information only.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP DRAWING NUMBER: _____ - _____

SPECIFICATION SECTION OR DRAWING NO: | SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

☐ NO DEVIATIONS

or

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS[a]:

_____
_____
_____
_____

By: _____ By: _____

Contractor[b]

Manufacturer[c]

Date: _____ Date: _____

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.
b Required on all submittals
c When required by specifications Page ___ of ___

General Contractor's Stamp

OPERATIONS AND MAINTENANCE MANUAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

O&M NUMBER: _____ SPECIFICATION SECTION OR DRAWING NO: - OM- _____ SEQUENTIAL NUMBER (& ALPHA SUFFIX FOR RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced operations and maintenance manual has been reviewed by the undersigned and I/we certify that the manual is customized as needed for this project, is suitable for mounting in a 3-ring binder, and contains the following items:

- ☐ Table of Contents
- ☐ Contractor and Manufacturer Contact Information
- ☐ Preventative Maintenance Schedule and Summary
- ☐ Removal and Replacement Instructions
- ☐ Lubrication Schedule
- ☐ Troubleshooting Information
- ☐ Warranty Information
- ☐ Rebuild Information for All Components
- ☐ Startup, Operation and Shutdown Procedures
- ☐ Normal and Emergency Operations
- ☐ Safety Procedures and Precautions
- ☐ Shop Drawings corrected to As-Built Conditions
- ☐ Personnel Training Requirements
- ☐ Project-Related Design Data
- ☐ Serial Numbers
- ☐ Maintenance and Repair Procedures
- ☐ Wiring and Control Diagrams
- ☐ Equipment Drawings & Schematics
- ☐ Equipment Performance Curves
- ☐ Parts and Service Contact Information
- ☐ Manufacturer's Contact Information
- ☐ Emergency Operations Plan
- ☐ List of All Component Part Numbers
- ☐ List of Spare Parts Supplied
- ☐ Testing Equipment & Special Tools
- ☐ Other System Specific Information

By: _____ By: _____
Contractor[a] Manufacturer[b]
Date: _____ Date: _____

[a] Contact information shall include name, address and telephone number.
[b] Required on all Operation and Maintenance Manuals.
[c] When required by Specifications. Page ___ of ___

General Contractor's Stamp

PROCESS EQUIPMENT MANUFACTURER SUBMITTAL CERTIFICATION

Owner:_____ Date: _____

_____

Project:

_____

_____

Contractor: _____

_____

Equipment Manufacturer: _____

_____

_____

Equipment: _____

As an authorized representative of the equipment manufacturer, the undersigned certifies that the equipment listed above conforms to the requirements of specifications. The undersigned authorized representative of the manufacturer further certifies that the equipment manufacturer or supplier has: reviewed the Construction Documents, the intended installation by the Contractor, and the intended functional and operational conditions; determined all conditions to be acceptable; and found no conditions which would cause the warranty to be void; or the equipment to function improperly, or not meet the performance requirements.

_____ _____

(Authorized Representative of the Manufacturer) (Date)

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Extent of Work:
   1. Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents. The breakdown shall divide the projects into its appropriate component parts together with a quantity and a unit price for each part such that the sum of the products of quantities and unit prices will equal the contract price for the item(s). Coordinate with the Engineer regarding the level of detailed warranted for the project.

B. Related Work Specified Elsewhere:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections of these Specifications.
   2. Schedule of values is required under the General Conditions.
   3. Schedule of values is required to be compatible with applications for progress payment.

1.2 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer substantiating the sums described.

1.3 SUBMITTALS

A. Prior to first application for payment, submit a proposed schedule of values to the Engineer.
   1. Secure the Engineer's approval of the schedule of values prior to submitting first application for payment.

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Pre-Construction Record: Contractor shall utilize digital photographs and video to obtain a visual record of the project area; copies of same shall be given to the Engineer and Owner.
2. Construction Record: Contractor shall utilize digital photographs to obtain a visual record of the project area at monthly intervals during the project; copies of same shall be submitted to the Engineer and Owner along with payment application. Photographs shall be taken of all underground utilities encountered during the course of construction and new underground utilities as they are installed and visible and before excavation is backfilled. Open trench installations shall be video recorded, and a description provided indicating the subject video information.
3. Post-Construction Record: Contractor shall provide digital photographs of the completed lift station site.
4. Notify Engineer at least three (3) working days prior to photographing or videoing the project area so Engineer may, at his option, observe.

1.2 QUALITY

A. Pre-Construction Record: Quality shall be such that the condition of existing pavement, curbing, driveway entrances, sidewalks, walls, doors, equipment, piping, etc. can be readily determined.

B. Construction Record: Quality shall be such that the progress of the work is satisfactorily documented.

C. Post-Construction Record: Quality shall be such that the completion of the work is satisfactorily documented.

1.3 SUBMITTAL OF PRINTS/ VIDEO

A. Pre-Construction Record: Submit electronic files on thumb drive or external drive to the Engineer and Owner prior to any construction work.

B. Construction Record: A minimum of four active site photographs shall be taken each month to document the progress of the work. Photographs shall be submitted via thumb drive to the Engineer. Each photo shall contain a label, description and direction of view (facing compass direction). Videos taken of underground utilities and trenches shall also be submitted on thumb drive or external drive for the record.

C. Post-Construction Record: Site video and digital photographs of the lift station site shall be taken after all of the work has been completed. Electronic site video and digital photographs shall be provided on thumb drive or external drive.

D. The quality of the photos and video are subject to approval by the Engineer prior to the start of construction work in the areas shown by the photos.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. General Quality Control.
B. Workmanship.
C. Manufacturer's Instructions.
D. Manufacturer's Certificates.
E. Manufacturer's Field Services.
F. Testing Laboratory Services.

1.2 RELATED REQUIREMENTS

A. General Conditions: Inspection and testing required by governing authorities
B. Section 01340 - Submittals: Submittal of Manufacturer's Instructions.
C. Earthwork as specified appliable chapters of the USSM as identified and modified in Section 00800.
D. Concrete as specified in Division 2 and appliable chapters of the USSM as identified and modified in Section 00800.

1.3 QUALITY CONTROL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.4 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
B. Perform work by persons qualified to produce workmanship of specified quality.
C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.6 MANUFACTURERS' CERTIFICATES

A. When required by individual Specifications Section, submit manufacturer's certificate that products meet or exceed specified requirements.

1.7 MANUFACTURERS' FIELD SERVICES

A. When specified in respective Specification Sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.

B. Representative shall submit written report to Engineer listing observations and recommendations.

1.8 TESTING LABORATORY SERVICES

A. Contractor will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections listed in Paragraph 1.2 above, unless otherwise indicated.

B. Services will be performed in accordance with requirements of governing authorities and with specified standards.

C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent Testing Laboratory will submit one copy of each report directly to each of the following: Engineer, Owner's Site Construction Representative, Contractor. Reports will be submitted within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or email results to Engineer, Owner's Site Construction Representative and Contractor within 24 hours.

D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

E. Contractor shall coordinate all testing work and shall notify Engineer and Independent Testing Laboratory at least 24 hours prior to performing work requiring testing services. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced by Owner to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against Owner for delay, nor will it be an acceptable basis for an extension of time.

F. Payment for Independent Testing Laboratory services shall be as follows:

1. General: Where testing is the Owner's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.
2. Initial Testing: Owner will pay for initial tests.
3. Retesting: Costs of retesting due to non-compliance will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.
4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide and pay for all temporary applicable utilities required to properly perform the Work at no additional cost to the Owner including the placement and removal of the utilities.
2. Completely remove all temporary equipment and materials upon completion of the Work and repair all damage caused by the installation of temporary utilities.
3. Make all necessary applications and arrangements for electric power, light, water and other utilities with the local utility companies. Notify the local electric power company if unusually heavy loads, such as welders, will be connected.
4. Contractor shall provide temporary ventilation during construction as required to ensure a safe working environment. The temporary ventilation systems shall address the following conditions, including but is not limited to: removal of hazardous fumes from explosion-proof rated spaces (Class 1, Division 1 rated spaces), removal of paint fumes and other potentially toxic conditions associated with the contractor's activities, and ventilation of confined spaces, in compliance with all OSHA and State safety requirements.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Obtain permits as required by local governmental authorities.
2. Obtain easements, when required, across private property other than that of the Owner.
3. Comply with the latest National Electrical Code.
4. Comply with all local, State and Federal codes, laws, and regulations.

B. All temporary utilities are subject to the approval of the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Electrical:

1. The General Contractor shall make necessary arrangements with the local power company for connection to the existing power supply and shall provide and pay for all temporary light and power requirements except as otherwise specified hereunder. In general, the temporary electrical service shall include all necessary switches, poles, wiring, cables, conduit, raceways, panelboards, fixtures, lamps and receptacles to supply construction power of adequate capacity for the project. Temporary transformers and meters shall be furnished and installed by the appropriate power authority, but paid for by the General

Contractor, who shall be responsible for making all arrangements for their installation prior to using any existing power for temporary purposes.

2. Use new or used materials adequate in capacity for the purposes intended.
3. Materials must not create unsafe conditions or violate the requirements of applicable codes.
4. Conductors:
   a. Wire, cable or busses of appropriate type, sized in accordance with the latest National Electrical Code for the applied loads.
   b. Use only UL approved wire.
5. Conduit:
   a. Rigid steel, galvanized: ANSI C80.1.
   b. Electrical metallic tubing: ANSI C80.3.
   c. Other material approved by NEC.
6. Equipment: Provide appropriate enclosures for the environment in which used in compliance with NEMA Standards.
7. Temporary power shall be based upon the following minimum requirements:
8. Lighting - 300 watt per 1,000 square feet of floor area.
9. Receptacles - One 15 ampere duplex for 1,000 square feet of floor space.
10. Special Construction Equipment - Provide one 30-amp, 2-pole fused switch for equipment connection. The cost for cables and connection from switch to the special equipment will be borne by the Sub-Contractor requiring same.
11. The General Contractor will pay for the cost of energy consumed by all trades, including cost of lamp replacement. The General Contractor and Subcontractors of all trades shall furnish their own extension cords and such additional lamps as may be required for their work, shall pay for the cost of temporary wiring of a special nature for light and power required, other than that above mentioned.
12. All temporary work shall be furnished and installed in conformity with the National Electrical Code and in accordance with local ordinances and requirements of the municipal power authority. All temporary wiring and accessories shall be removed after it has served its purpose.

B. Water and Sanitary:
   1. The General Contractor shall make necessary arrangements for connection to the localwater supply if needed and shall provide, at his own expense, any extensions as required for the operation of this project. The General Contractor shall bear all costs incurred for the temporary water services, including the costs of the water itself.
   2. All lines, temporary or permanent, shall be protected and maintained by the General Contractor. Temporary lines shall be removed by the General Contractor when the temporary service is no longer required.
   3. The General Contractor shall provide an adequate drinking water supply, satisfactorily cooled, for his employees.
   4. The General Contractor shall furnish, install, maintain and pay for adequate temporary chemical type toilet accommodations, for all persons employed on the work and located where approved by the Engineer. The accommodations shall be in proper enclosures and in accordance with Municipal Ordinances and

shall be maintained in proper, safe and sanitary conditions and suitably heated when requested.

5. Relocate temporary toilet facilities as required to facilitate the construction.
6. Remove all temporary facilities at completion of work when directed by the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Electrical:
   1. Provide electrical energy to:
      a. All necessary points on the construction site so that power can be obtained at any desired point with extension cords no longer than 100 feet.
      b. Construction site offices.
      c. Lighting as required for safe working conditions at any location on the construction site.
      d. Night security light.
      e. When applicable, Owner's present facilities during the changeover of electrical equipment.
   2. Maintain electrical energy throughout the entire construction period.
   3. Capacity:
      a. Provide and maintain adequate electrical service for construction use by all trades during the construction period at the locations necessary, as specified herein.
   4. Installation:
      a. Install all work with a neat and orderly appearance.
      b. Have all installations performed by a qualified electrician.
      c. Modify service as job progress requires.
      d. Locate all installations to avoid interference with cranes and materials handling equipment, storage areas, traffic areas and other work.

B. Water:
   1. Provide and maintain water for drinking and construction purposes as required for the proper execution of the Work.

C. Sanitary Accommodations:
      a. Provide and maintain sanitary accommodations for the use of the employees of the General Contractor, subcontractors, and Engineer.
      b. Sanitary accommodations shall meet the requirements of all local, State and Federal health codes, laws and regulations.

END OF SECTION

SECTION 01515

TEMPORARY BYPASS SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall furnish, install, operate, maintain and remove the temporary bypass system, as necessary, to complete the Work. The temporary system shall be able to reliably convey wastewater flows as presented herein and indicated in the Drawings. The temporary bypass system shall be provided in order to allow a portion of an existing force main, which discharges to an existing manhole near Lift Station 215, to be shut down. During the shutdown, a portion of the existing force main and an existing manhole shall be modified as shown in the Drawings.

B. The Contractor may convey wastewater flows to the Lift Station 215 Receiving Manhole as shown in the Drawings or directly to the Lift Station 215 wet well if approved by the Owner. Refer to the Drawing C-24.

C. The CONTRACTOR shall be responsible for monitoring and properly maintaining the bypass system operation 24 hours per day, 7 days per week.

D. All materials and Work shall be as specified within applicable appliable chapters of the USSM as identified and modified in Section 00800.

1.2 RELATED WORK

A. Section 01010 - Summary of Work

B. Section 01340 - Submittals

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01340 and as specified herein.

1. Proposed sequence of construction.
2. Coordination Drawings showing detailed layout of equipment, piping, temporary linestop with bypass, fittings, valves, supports, materials, and other appurtenances provided under this section and necessary to complete the work. Provide catalog cut sheets/ technical data for equipment and appurtenances.
3. List of equipment, piping, fittings, valves, and materials to be utilized by the Contactor for the temporary bypass system.
4. List of standby equipment and spare parts available on-site and off-site.
5. Names of individuals responsible for on-call response, 24 hours per day, 7 days per week. The Contractor is responsible for responding to emergencies related to temporary bypass systems.

B. No construction related activities requiring the need for bypass operations shall begin until the related project submittals are reviewed and all provisions of the work have been fully coordinated with the Owner, Agency, Engineer and any other parties having jurisdiction for the proposed work activities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL:

A. The temporary bypass system shall be furnished, installed, operated, maintained and removed as follows:

1. The Contractor shall coordinate all Work as specified in Paragraph 3.2.
2. The Contractor shall furnish, install, and test temporary bypass system. Piping materials shall be restrained joint ductile iron, restrained joint PVC, or HDPE pipe with butt welded joints. Aluminum "irrigation" type piping or glued PVC pipe shall not be allowed. All pipes shall be sufficiently supported in order to restrict horizontal or vertical movement.
3. The Contractor is responsible for properly restraining the existing force main that will remain in service to avoid piping/fitting joint separation during and after the bypass operations and the modifications are complete.
4. The Contractor shall test and confirm the temporary bypass system works properly and that all piping/fitting joints are properly restrained prior to the demolition and modification to the existing force main and manhole.
5. The Contractor shall maintain the bypass system until the modifications are completed, demonstration tested and accepted by the Owner and Engineer.
6. The CONTRACTOR shall immediately notify the Owner should a sanitary sewer overflow occur and take the necessary action to clean up and disinfect the spillage to the satisfaction of the Owner and/or other governmental agency.
7. Upon acceptance of the modifications by the Owner and Engineer, the Contractor shall remove the temporary bypass system, including all appurtenant piping. Contractor shall restore the area impacted by the temporary bypass system to a like-new condition.

3.2 COORDINATION OF WORK

A. Provide all labor and equipment necessary to coordinate and complete the work.

B. Notify all personnel seven days in advance of any temporary bypass work. The Owner will identify personnel to be notified in addition to those identified by the Contractor.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide and erect sign(s) at the project site to identify the project and to indicate the applicable Board of County Commissioners that are participating in approving the project.

B. Do not place or allow the placement of other advertising sign boards at the project site or along rights-of-way furnished for the project work.

PART 2 - PRODUCTS

2.1 MATERIAL AND DESIGN

A. See **Figure 1** for specific project sign requirements.

PART 3 - EXECUTION

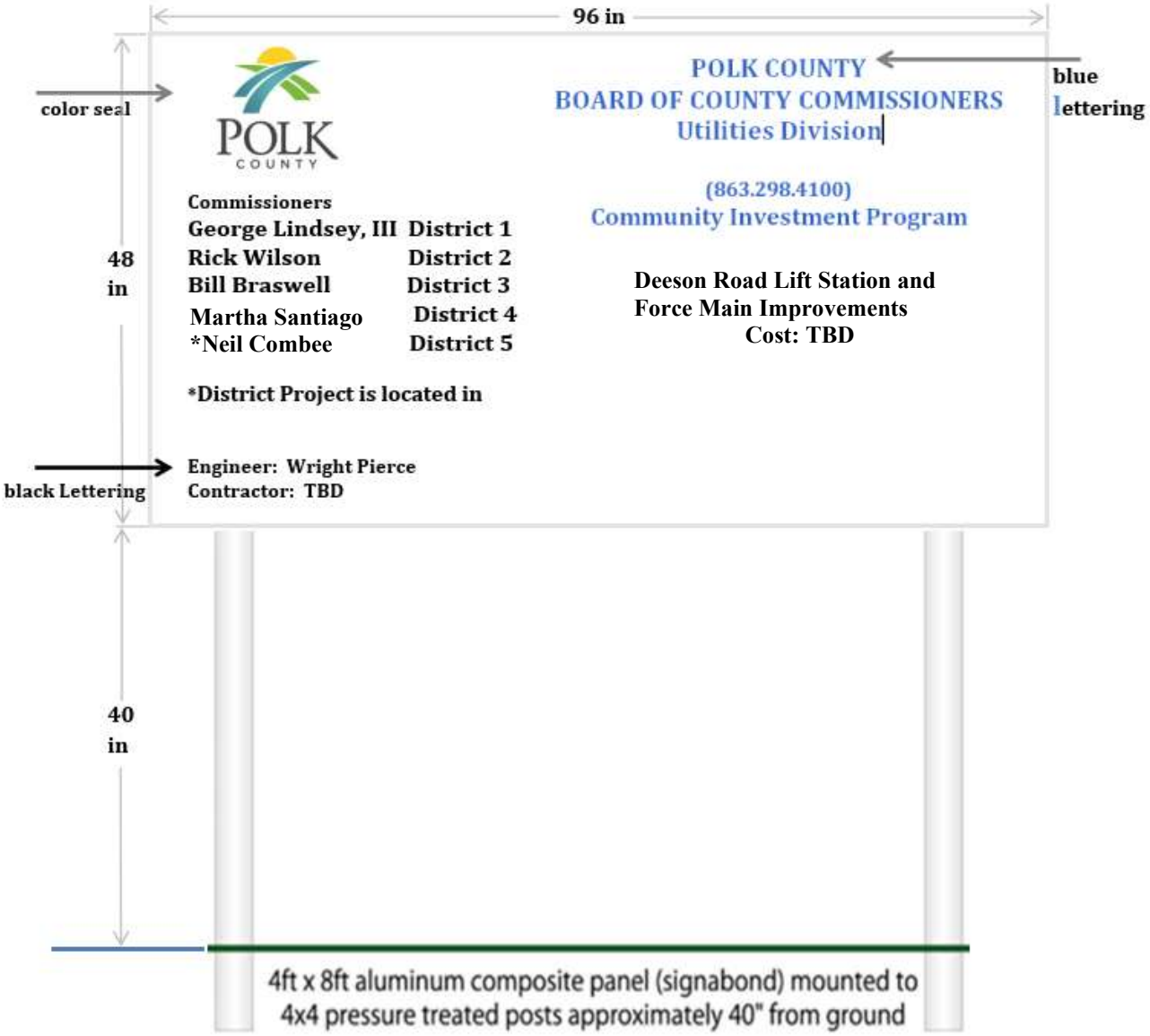
3.1 INSTALLATION

A. Erect the sign in a prominent location as approved by the Engineer.

B. Construct the sign in accordance with the following sample Drawing.

C. Remove the sign when the Work has been completed at no additional cost to the Owner.

FIGURE 1



END OF SECTION

SECTION 01600

DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies the general requirements for the delivery, handling, storage and protection for all items required in the construction of the work. An updated delivery and storage log is required with the monthly payment requisition prior to approval. An example log is included in this section.

B. Related Items:
   1. Section 01800: Equipment Start-Up, Certification and Operator Training.
   2. Site Work as specified in appliable chapters of the USSM as identified and modified in Section 00800.
   3. Equipment as specified in appliable chapters of the USSM as identified and modified in Section 00800.
   4. Mechanical as specified in appliable chapters of the USSM as identified and modified in Section 00800.
   5. –Electrical are specified in Division 16 and appliable chapters of the USSM as identified and modified in Section 00800.

1.2 TRANSPORTATION AND DELIVERY

A. Transport and handle items in accordance with manufacturer's instructions.

B. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than 120 days prior to installation without written authorization from the Engineer.

C. Ship equipment, material and spare parts complete except where partial disassembly is required by transportation regulations or for the protection of components.

D. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended, including cross reference of the applicable contract specification section.

E. Deliver spare parts at the same time as pertaining equipment. Deliver spare parts to the Owner after completion of work.

F. Deliver products to the site in manufacturer's original sealed containers or other packing system, complete with instructions for handling, storing, unpacking, protecting and installing.

G. Instructions for handling, storing, unpacking, protecting and installing equipment shall be included in the Equipment O&M Manuals, which shall be submitted prior to the equipment being shipped to the site. This information shall be filed in a dedicated three ring binder(s) on-site, in a secure location, accessible to the Owner and the Engineer. The binder(s) shall be clearly labeled, and include dividers for each specification section. The manufacturer-provided instructions for each equipment item shall be labeled with the specification number, equipment name, and equipment number. The instructions shall also be submitted to the Engineer.

H. Assume responsibility for equipment material and spare parts just before unloading

from carrier at site.

I. All items delivered to site shall be unloaded and placed in a manner which will not hamper the Contractors normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
J. Provide equipment and personnel to unload all items delivered to the site.
K. Promptly inspect shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e. Owner, other Contractors), perform inspection in the presence of the Engineer. Notify the Engineer in writing of any problems.
L. Pay all demurrage charges if failed to promptly unload items.

1.3 STORAGE AND PROTECTION

A. Store and protect products and equipment in accordance with the manufacturer's instructions, with seals and labels intact and legible. Storage instructions shall be studied by the Contractor and provided to the Engineer upon request. Instructions shall be carefully followed and a written record of this kept by the Contractor for each product and pieces of equipment.
B. Arrange storage of products and equipment to permit access for inspection. Periodically, inspect to make sure products and equipment are undamaged and are maintained under specified conditions.
C. Provide protective maintenance during storage consisting of manually exercising equipment, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer necessary for its protection and all other precautions to assure proper protection of all equipment stored and for compliance with manufactures requirements related to warranties.
D. Store loose granular materials on a solid flat surface in a well-drained area. Prevent mixing with foreign matter.
E. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous and reinforcing steel shall be stored off the ground or otherwise to prevent accumulation of dirt or grease, and in a position to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking and spalling to a minimum.
F. All mechanical and electrical equipment and instruments shall be covered with canvas and stored in a weather tight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it shall be satisfactory to the Engineer.
    1. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by manufacturer.
    2. Moving parts shall be rotated at a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Log all rotation maintenance for each piece of equipment in the written record noted above.
    3. Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use. Log all startup for each piece of equipment in the written record noted above.

4. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
5. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

G. The weather tight building shall be provided with adequate heating/cooling and ventilation as required by the manufacturer to prevent condensation. Maintain temperature and humidity within range required by manufacturer and to prevent condensation on the equipment being stored.
H. Temporary heating and cooling is acceptable. Equipment shall be protected from environmental effects as required by the manufacturer and dependent on the season. Equipment that arrives on site without coating shall be protected from environmental impacts through coating or protection at the Contractor's expense. Any equipment that displays defects or corrosion from environmental impacts will not be accepted for installation.
I. The location of all stored material and equipment shall be reviewed with the Owner and Engineer. The Owner and Engineer may request that equipment and material be moved to an alternate location to accommodate site/facility maintenance and operation, or if the location is deemed unacceptable or unsuitable.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING MONTHLY LOG

A. An updated storage and delivery log is required with the monthly payment requisition prior to approval.
B. The monthly log shall include the specification section, equipment description, equipment tagging, submittal approval date, date of equipment delivery, date of O&M submittal, contractor start-up sign-off, certified equipment testing date, operator training date, spare parts turnover date, required maintenance (activity and date), and equipment turnover (Owner's witness and date).

3.2 STORAGE AND PROTECTION

A. Equipment requires acceptance and verification of the storage from the Owner, Engineer, Manufacturer and Contractor at the Engineer's discretion.
B. Following delivery, the equipment warranty from the Manufacturer is the responsibility of the Contractor.
C. All storage and maintenance will be the responsibility of the Contractor, conducted at the Contractor's expenses and verified by the Engineer.
D. It is the Contractor's responsibility to coordinate all storage requirements on site as

required by the Manufacturer to achieve acceptance.

Section 01600 Delivery, Storage and Handling

Specification Section	Equipment Description	Equipment Tags	Submittal Approved	Date of Equipment Delivery[1]	Date of O&M Submittal	Equipment Start-Up[2]		Certified Equipment Testing	Operator Training	Spare Parts Turnover	Required Maintenance by Contractor	Equipment Turnover	
						Date	Witness	Date	Date	Date	(activity & date)	Owner's Witness	Date

1 If equiment is delivered and placed in storage, all steps for Stored Equipment shall be followed and tracked separately
2 Log weekly start-ups of installed equipment, performed by Contractor, until Equipment Turnover

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Keep accurate record documents for all additions, demolition, changes of material or equipment (from that shown on the Drawings), variations in work, and any other additions or revisions to the Contract (via Change Order, Work Change Directive, Field Order or Clarification).

B. Related Work Specified Elsewhere:
   1. Shop Drawings, Project Data, and Samples are specified in "General Conditions" and Section 01340, Submittals.

1.2 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:
   1. Contract Drawings
   2. Specifications
   3. Addenda
   4. Reviewed Shop Drawings
   5. Reviewed Operation and Maintenance Manuals
   6. Change Orders
   7. Any other modifications to the Contract
   8. Field Test Reports
   9. Specifications and Addenda - Legibly mark up each section to record:
      a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
      b. Changes made by Change Order, Field Order, or other method.

B. Store documents in files and racks specifically identified for Record Drawing use, that are apart from documents used for construction.

C. File documents in a logical manner indexed for easy reference.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by the Engineer and Owner, and by the end of the project, transmit these documents to the Engineer.

G. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests.

1.3 RECORDING

A. Each document shall be labeled "PROJECT RECORD" in large high printed letters and shall include Contractor’s name and the person’s name responsible for maintenance of current data on the document.

B. Keep record documents current and do not permanently conceal any work until required information has been recorded.

C. General Field Recording Issues:
   1. All swing ties shall be taken from existing, permanent features such as utility poles, corners of buildings and hydrants. Porches, sheds or other house additions shall be avoided as they could be torn down. A minimum of two swing ties shall be taken. Survey grade GPS coordinates are also acceptable.
   2. Stations shall be recorded to the nearest foot.
   3. Inverts shall be recorded to the nearest hundredth of a foot.
   4. Elevations shall be recorded to the nearest hundredth of a foot.
   5. Building dimensions shall be recorded to the nearest 1/4".
   6. Equipment and Piping shall be recorded to the nearest tenth of a foot, and the overall dimensions and layout of the equipment shall be adjusted to reflect the equipment provided.

D. Project Record Drawings - Legibly mark Contract Drawings to record existing utilities and actual construction of all work, including but not limited to the following (where applicable):
   1. Survey and Control Datum: As-built drawings shall be geographically oriented in Florida State Plan West Coordinate System. Horizontal Datum shall be North American Datum of 1983 (NAD 83 (2011)). Vertical Datum shall be North American Vertical Datum of 1988 (NAVD 88).
   2. Existing Utilities
      a. Water mains and services, water main gate valves, sewer mains and services, storm drains, culverts, steam lines, gas lines, tanks and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas supplemental drawings or enlargements may be required.
      b. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties shall be shown on plan. Utility shall be drawn to scale in section (horizontally and vertically) and an elevation shall be called out to the nearest hundredth of a foot.
      c. When existing utility lines are broken and repaired, ties shall be taken to these locations.
      d. If existing water lines are replaced or relocated, document the area involved and pipe materials, size, etc. in a note, and with ties.
   3. Manholes, Catch Basins, Valve Pits and other structures.
      a. Renumber structure stationing to reflect changes.
      b. Show ties to center of structure covers or hatches.
      c. In general, show inverts at center of structures. However, for manholes show inverts at face of manhole.
      d. Show inverts for other structures at the face of the structure.
      e. Draw any new structures that are added on plan and profile.
      f. Show any field or office redesigns.
      g. Redraw plan if the structure's location is moved more than 5 feet in any direction. Note: It is important to show existing utilities, as outlined in Paragraph 1 above, especially if they were one reason for relocating the sewer, manholes and other structures.
      h. Redraw profile if inverts changed by more than 6 inches.

4. Gravity Sewer Line
   a. Change sewer line slopes indicated on Drawings if inverts are changed.
   b. Draw any new gravity lines that are added on plan and profile.
   c. Show any field or office redesigns.
   d. Redraw the sewer line profile if manhole inverts are redrawn.
   e. Redraw the sewer line on plan corresponding to relocated manholes.
5. Water Mains and Force Mains
   a. Show ties to the location of all valves, bends (horizontal and vertical), tees and other fittings. The use of thrust blocks shall be recorded.
   b. Revise elevations indicated on the Drawings to reflect actual construction.
6. Yard Piping and Buried Electrical Conduit
   a. Site piping and utilities shall be drawn to reflect the installed locations, with ties and elevation of all bends (horizontal and vertical).
   b. Show routing for electrical conduits and pull boxes, especially in close proximity to buildings and when the conduits change direction or cross process piping.
7. Roads
   a. Show centerline road profile and level spot elevations.
   b. Show pavement widths.
   c. On road cross sections, show the pavement cross slope.
   d. Show any deviations from the design plans.
8. Buildings
   a. In general, small changes to structures shall not be redrawn. If any dimensional changes were made in the field, the numerical change shall be made on the Drawing and be properly labeled. Update dimensions and elevations on Drawings.
   b. Show finished concrete elevations (top of slab, top of wall, top of footing, etc.). Redraw any foundation, frost wall, etc. that was modified, deepened, or altered during construction.
   c. Adjust finished concrete horizontal dimensions that are shown on the Drawings.
   d. Adjust structural steel elevations and horizontal dimensions that are shown on the Drawings.
   e. Show location of anchors, construction and control joints, and waterstops, when they are different from those shown on Drawings.
   f. Any additions or major changes shall be shown in both plan and elevation (i.e. relocated doors, opposite door swings, change in wall location, relocation of floor drains).
   g. Show approximate location and routing of electrical conduits in walls, slabs and ceilings. Most conduits are run in groups, therefore, use range of measurements to define location for entire section of conduits.
   h. Special circuits for computers, alarms and instrumentation shall be shown.
   i. Show any changes in location and elevation of piping and equipment.
   j. If wall mounted electrical switches, control boxes, thermostats, etc. have been relocated significantly, (other side of door, or to a wall other than

indicated diagrammatically on electrical plans) make the revision accordingly.

9. Utilities
   a. When encountered, additional utilities (e.g., gas, cable, telephone, fiber optic, etc.) shall be indicated on the Record Drawings.
10. Equipment Systems and Piping
   a. Show any changes to equipment systems, whether interior or exterior, for process, instrumentation or electrical. If any dimensional changes were made in the field, the numerical change shall be made on the Drawing and be properly labeled. Update dimensions and elevations on Drawings. Record Drawings must reflect any equipment configuration and layout changes differing from that shown on the Drawings.
   b. Show any changes to piping systems, whether interior or exterior, for process and instrumentation. If any dimensional changes were made in the field, the numerical change shall be made on the Drawing and be properly labeled. Update dimensions and elevations on Drawings.

E. Contractor shall keep an accurate record of the location, size and material for all piping, and changes in equipment dimensions and other variations between the work actually provided and that shown on the Contract Drawings. The representation of such variations shall conform to standard drafting practices and shall include such supplementary notes, legends, and details as may be necessary for legibility and clear portrayal of the construction.

F. No work shall be concealed or buried until the required information is gathered and recorded.

1.4 SUBMITTALS

A. Upon completion, Contractor shall have As-built drawings and records certified as to their completeness and correctness by Contractor's Superintendent prior to submittal to Engineer.

B. At the completion of the project, and prior to the release of retainage, deliver record documents to the Engineer with claim for final Application for Payment.
   1. As-built drawings shall be signed and sealed by a professional land surveyor, registered in the State of Florida and certified by the Contractor. Evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate shall be submitted.
   2. Contractor to submit four (4) signed and sealed bound hard copies of final record documents. Provide an electronic file (pdf format) of the bound paper set, and electronic files in AutoCAD format, if applicable. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
   3. If the Contractor provides alternate or substitute equipment that requires revised arrangements from the Bidding Documents, the Contractor shall provide supplemental documentation of these items.

C. Accompany submittal with transmittal letter, in duplicate, containing:
   1. Date, project title and number.
   2. Contractor's name and address.
   3. Title and number of each record document with certification that each document is completed and accurate.

4. Signature of Contractor, or his authorized representative.

D. Failure to supply all information on the Project Record Documents as specified in Part 1.3 may result in withholding final completion and in non-approval of final payments of the Contract. If Contract Time has elapsed, this shall be grounds for imposing liquidated damages.

1.5 QUALITY ASSURANCE

A. All horizontal and vertical dimensions, swing-ties, and elevations shall be accurate to within one-tenth of a foot, unless greater accuracy is specified elsewhere in the Specifications.

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 MAINTAINING AND PROVIDING RECORDS

A. Records shall be kept current by the Contractor as the work progresses. Contractor retains full responsibility to ensure the record information is gathered and recorded as outlined in the Contract Documents.

B. Records shall be made available for review by the Owner, Engineer, Owner's Construction Representative and/or Funding Agency(s) upon request.

C. Records shall be kept current as the work progresses. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests. Failure to provide records shall also be grounds for withholding of final payment and, if beyond contract time, shall be grounds for imposing liquidated damages.

3.2 AS-BUILT SURVEY PERFORMANCE

A. From established survey control, and construction baseline as shown on the drawings, conduct surveys of the project area during construction as needed to obtain information of buried and above ground items. Surveys shall include information outlined in Section 1.3.

B. All the following shall be included in the survey:
   1. Actual road alignments
   2. Walls
   3. Fences and guardrails
   4. Existing, new, and relocated utility poles
   5. Traffic and warning sign locations
   6. Crosswalks,
   7. Parking space and stop bar locations
   8. Retaining walls and foundations drains
   9. All underground and overhead utility poles and lines within the project limits, including those installed on private property
   10. All other new features and appurtenances and those existing features and appurtenances changed as a result of this project

C. As-built or Record Survey data shall be provided as part of all projects. The data shall include the type of collection, (i.e., real time correction or post processed)

hardware and software used, and the track log file associated with the actual data collection. The as-built or record survey data and associated attributes shall be provided in an acceptable geo-database, shape file, comma separated values (csv), or Microsoft Excel spreadsheet. Attribute data associated with this data shall include:

1. X (Easting) and Y (Northing)
2. Z (Elevation), when available
3. Utility System Type (Potable Water, Wastewater, Reclaimed Water, and Raw
4. Water)
5. Type Feature (Point on Line, Valve, Bend, Meter, Manhole, Wet Well, Tee, ARV, etc.)
6. Pipe Diameters
7. Material Type

D. Electronic files shall be signed and sealed in accordance with Florida Statutes and the Florida Administrative Code.

3.3 FORMAT FOR ELECTRONIC DELIVERABLES

A. AutoCAD digital survey data for the as-built survey shall include:
   1. Copy of field notes and sketches of the survey.
   2. Paper copy of description of layers.
   3. Paper copy of base map.
   4. Provide digital information on compact disk with paper copy printout; information shall be provided in .DWG format (AutoCAD 2017 or earlier). Data shall be provided in 3D format (northing, easting, elevation, or Y, X, Z).
   5. Drawing scale: Minimum one inch = twenty feet.
   6. Layering:
      a. Repetitive symbols made into blocks and defined on layer 0.
      b. All entities shall be drawn “by layer” as opposed to individual properties.
      c. Use one linetype and one color per layer as opposed to numerous colors/linetypes on a single layer.
      d. Preface each layer with the initials of the Survey company or Contractor (example, Survey Company: SC “layername”).
      e. Database text annotation will be coordinated so the text will be right-reading.
      f. Place text on separate layers.

B. ESRI GIS digital survey data for the as-built survey shall include:
   1. All lines and points shall be accompanied by the attributes listed in Tables 1, 2, and 3 with consistent formatting and punctuation (e.g. 6, 8, 12, not 6”, 8, 10”, 12), and shall be provided in an ESRI geodatabase that may be easily imported by the Owner into their GIS System.

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Contractor's responsibility shall be to:
   1. Compile warranties and bonds, as required in the Contract Documents and as specified herein.
   2. Co-execute submittals when requested by Engineer.
   3. Review submittals to verify compliance with Contract Documents.
   4. Submit Warranties and Bonds to Engineer for review and transmittal to Owner.

1.2 IMPLEMENTATION

A. Submittal Requirements:
   1. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
   2. Submit warranties, bonds, service and maintenance contracts in accordance with Section 01340.
   3. Quantity: Two original signed copies are required.
   4. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
      a. Product of work item.
      b. Firm, with name of principal, address and telephone number.
      c. Scope.
      d. Date of beginning of warranty, bond or service and maintenance contract.
      e. Duration of warranty, bond or service maintenance contract.
      f. Contractor, name of responsible principal, address and telephone number.

B. Format of Submittals:
   1. Prepare in duplicate packets:
      a. Paper: Size 8-1/2 inches x 11 inches, punch sheets for standard three-post binder.
         i. Fold larger sheets to fit into binders.
      b. Cover: Identify each packet with typed or printed title Warranties and Bonds. List:
         i. Title of Project.
         ii. Name of Contractor.
      c. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of two inches.

C. Warranties and Bonds:
   1. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with Contractor's for at least one (1) year, unless specified otherwise in other Sections. Durations of systems' (i.e. moisture protection, conveyance, etc.) warranties shall be as specified elsewhere in the Contract Documents.
   2. In the event that the equipment manufacturer or supplier is unwilling to provide a one-year warranty concurrent with the Contractor's for one (1) year,

Contractor shall obtain from the manufacturer a two-year warranty commencing at the time of equipment delivery to the job site. This two-year warranty from the manufacturer shall not relieve Contractor of the one-year warranty.

3. Contractor shall be responsible for all costs of repairs of work which becomes defective during construction and the following warranty period.
4. Warranty shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of any or all equipment and components furnished by the manufacturer.

END OF SECTION

SECTION 01800

EQUIPMENT STARTUP, TESTING AND OPERATOR TRAINING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. General: The work included in this Section includes startup of equipment, Certified Equipment Testing and Manufacturer/Supplier-provided Operator Training of the facility personnel in the proper operations and maintenance of the furnished equipment. This shall include all equipment provided for the project, regardless of specification Division, unless specifically noted otherwise. Clean, test and adjust each piece of equipment and/or system to the complete satisfaction of the Engineer.
2. One Year Service Call: In addition to the Manufacturer's installation and startup/testing services, the Contractor shall arrange for the Manufacturer to provide one additional service call of one 8 hour working day on site upon demand of the Owner for each type of equipment within the first year of operation (commencing upon date of Substantial Completion) at no additional cost to the Owner.
   a. Equipment Systems requiring one year of service call are as follows:

Equipment System
Submersible Non-Clog Centrifugal Pumps
Instrumentation and Process Controls

B. General Definitions:

1. Equipment Startup shall be generally defined as the initial placing into service of the equipment by representatives of the Contractor, any subcontractors directly responsible for the equipment provided, and the equipment Manufacturer/Supplier. This shall include verification of all equipment protection and safety control features (e.g., motor high temperature, seal fail, hardwire interlocks, lift station load test, etc.).
2. Certified Equipment Testing shall generally be defined as the formal and scheduled demonstration of equipment/system operations in accordance with the requirements of the Contract Documents, including all required performance or acceptance testing. This formal demonstration shall be performed in the presence of the Engineer by representatives of the General Contractor, any Subcontractors directly responsible for the equipment provided, and the equipment Manufacturer/Supplier.
3. Operator Training shall generally be defined as the formal and scheduled instruction of Owner’s Construction Site Representative and other Owner designated representatives in the proper operations of provided equipment, and in the techniques, methods, schedules, etc. associated with maintenance. This formal training shall be performed in the presence of the Engineer, by

representatives of the Contractor, any subcontractors directly responsible for the equipment provided, and the equipment Manufacturer/Supplier. Operator Training shall also include remote assistance to County Construction Site Representative by Manufacturer/Supplier representatives during the initial operations of the equipment.

C. Related Work Specified Elsewhere:
   1. Process equipment/systems are specified in appliable chapters of the USSM as identified and modified in Section 00800.
   2. Instrumentation systems are specified in appliable chapters of the USSM as identified and modified by Section 00800.
   3. Electrical systems are specified in Division 16 and appliable chapters of the USSM as identified and modified in Section 00800.

D. Submittals:
   1. A minimum of ten days prior to the Pre-Startup Meeting, the Contractor shall provide a preliminary equipment start-up schedule and plan for the Certified Equipment Testing and the Operator Training for each piece of equipment to the Engineer for review. This preliminary plan will include a written outline description of the means and methods to be employed during the certified equipment test of each piece of equipment. The schedule and means and methods of testing will be discussed with the Engineer at the pre-startup meeting for acceptance.
   2. Submit the name(s) and resume(s) of the duly authorized Manufacturer/Supplier representatives proposed for the project at least 30 days prior to the need for such services. The qualifications of duly authorized representatives of the Manufacturer/Supplier are identified in Paragraph 1.2 below.

E. Schedules:
   1. The pre-startup meeting shall be held at least ten working days prior to the startup of the first piece of equipment supplied under the Contract. The meeting shall be held at the PCU administration building or at a mutually agreed location. Manufacturer(s)/Supplier(s) may attend in person or via telephone/video conference. At that time, the Contractor shall present his plan as detailed in the previous Part D "Submittals" and review Engineer's comments and concerns associated with the general features of each piece of equipment which must be demonstrated.
   2. Contractor shall provide Engineer with at least three (3) working days' notice of his desire to perform Certified Equipment Testing and/or training to allow necessary coordination with Owner representatives. Contractor shall be responsible for any and all coordination necessary with the daily operations of the facility to accommodate his testing schedule. Actual date and time for testing and/or training will be the first mutually acceptable date and time available to all parties subsequent to receipt of the request.
   3. Operator Training may be conducted concurrently with the Certified Equipment Testing with prior approval of the Engineer. However, under no circumstances will conditions of the testing interfere with the ability of Owner's representatives to observe necessary features, to hear and understand

instructions, or to ask questions. Under such conditions, and as deemed necessary by the Engineer, Operator Training will be conducted separately from, and subsequent to, the Certified Equipment Testing.

1.2 QUALITY ASSURANCE

A. Duly authorized representative of the Manufacturer/Supplier shall meet the following criteria:
   1. A direct employee of the Manufacturer/Supplier;
   2. Fluent in the English language;
   3. Has a minimum of 5 years of experience in the proper installation, adjustment, operation, testing, and startup of the specified model, including, but not limited to, equipment calibration, and other mechanical or electrical components of the equipment.
   4. Sales personnel, marketing personnel or local representatives will not be accepted as a duly authorized representative of the Manufacturer/Supplier unless the Manufacturer/Supplier has certified them accordingly.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 EQUIPMENT STARTUP

A. Equipment startup shall be performed by the authorized representative(s) of the Manufacturer/Supplier as identified in the Submittals. Refer to Paragraph 1.1.D above.
B. The Equipment Startup shall be performed prior to Certified Equipment Training and prior to Operator Training.
C. No form of energy shall be applied to any part of the system prior to receipt by the Engineer of a certified statement of approval of the installation from the Contractor. This certification shall contain a statement by an authorized representative of the equipment Manufacturer/Supplier that the equipment is ready for testing, as outlined below.
D. As part of the Equipment Startup, the Contractor shall:
   1. Verify that the equipment is installed properly and in accordance with Manufacturer’s/Supplier's requirements and instructions, and as such, it is appropriate to apply power to the units in question.
   2. Verify that all manual, automatic and safety control features of the equipment function properly, including all alarms, and all activation and deactivation sequences.
   3. Verify that the equipment can operate without excessive noise, vibration, overheating, overloading, jamming, etc. during specified conditions.
   4. Verify and document equipment capacity and amperage draws (on all power feeds) with equipment running under specified conditions.

5. Verify and document the noise level of equipment, drives and motors, unless otherwise noted, shall not exceed 90 dBA, as measured 3 feet from the unit under free field conditions.
    a. Each unit shall be monitored for compliance running under specified conditions with other area equipment deactivated.
    b. Contractor shall provide certified proof of calibration for instrument utilized to measure noise level.

E. Each piece of equipment shall be tested sufficiently to ensure that all features required to be demonstrated and/or verified during the equipment certification testing are within acceptable limits. The startup shall not be considered complete until the unit is fully capable of passing the equipment certification testing.

F. Where multiple units are provided, each unit shall undergo startup procedures.

G. The duly authorized representative of the Manufacturer/Supplier shall provide all specialty tools, specialty testing equipment and labor necessary for the start-up of the equipment.

H. The Contractor shall provide all power, chemical, tools, equipment, labor, water and fuel as required for Equipment Startup.
    1. The Contractor shall be responsible for all contacts and arrangements as necessary with the proper municipal departments and/or public utility companies to arrange for temporary and/or separate billing so that bills associated with testing and startup procedures can be easily identified.
    2. Contacts and arrangements with the local power company shall include, but not be limited to, all arrangements as necessary so that peak power demands incurred during testing and startup procedures will not become a part of the permanent record for determining future power demand charges for Owner.
    3. All waste materials shall be disposed of by the Contractor in an environmentally acceptable manner at no additional cost to Owner.

I. In the event of an unsuccessful equipment start-up, Manufacturer/Supplier and Contractor shall make necessary alternations, adjustments, repairs and replacements and the equipment start-up shall be repeated.

J. The Manufacturer/Supplier Representatives shall fill out the Equipment Start-Up Certification form included at the end of this Section. Startup will not be considered complete until this form has been provided to the Engineer along with the Manufacturer/Supplier Representative’s field report.

3.2 CERTIFIED EQUIPMENT TESTING

A. Certified Equipment Testing shall be performed after the Equipment Startup is completed and it has been verified that equipment functions in accordance with the requirements of the Contract Documents in all aspects. Certified Equipment Testing shall be performed by the authorized representative(s) of the Manufacturer/Supplier as identified in the Submittals. Refer to Paragraph 1.1.D above.

B. Equipment Demonstration Testing shall not be scheduled concurrently with Equipment Startup without the prior approval of the Engineer.

C. If the Engineer has arrived on-site for the scheduled Certified Equipment Testing and the equipment is not capable of demonstrating complete compliance with the Contract Documents, or if the Manufacturer's/Supplier’s representative is not present, the Contractor shall be responsible for all costs to the Engineer associated with failed

testing, including travel expenses. The importance of prior and proper equipment demonstrations to verify that the requirements of the Certified Equipment Testing will be met is stressed.

D. At a minimum during the Certified Equipment Testing, the Contractor shall demonstrate to the complete satisfaction of the Engineer the following:
   1. The equipment is installed properly and in accordance with Manufacturer's/Supplier's requirements and instructions, and as such, it is appropriate to apply power to the units in question.
   2. That all manual and all automatic equipment protection and safety control features of the equipment functions properly, including all alarm, activation and deactivation sequences.
   3. The equipment can operate without excessive noise, vibration, overheating, overloading, jamming, etc. during normal operating conditions.
   4. The full specified range of equipment operation when controlled remotely by the controls system.
   5. The noise level of equipment drives and motors, unless otherwise noted, shall not exceed 90 dBA, as measured 3 feet from the unit under free field conditions.
      a. Each unit shall be monitored for compliance independently with other area equipment deactivated.
      b. For monitoring, the equipment will be run under normal operation conditions.
      c. Contractor shall provide certified proof of calibration for instrument utilized to measure noise level.
   6. A successful test shall at a minimum include successful operation of the equipment for 24 hours without issue or shut down in accordance with manufacture recommendations.
   7. Other specific requirements as outlined within the individual specification's sections.

E. Each piece of equipment shall be tested sufficiently to ensure that all features required to be demonstrated and/or verified are within acceptable limits.

F. Where multiple units are provided, each unit shall undergo equipment certification testing procedures individually and then with multiple units on-line to verify the total systems output capacity and performance.

G. The duly authorized representative of the Manufacturer/Supplier shall provide all specialty tools, specialty testing equipment and labor necessary for the start-up and testing of the equipment.

H. The Contractor shall provide all power, chemical, equipment, labor, water and fuel as required for startup and testing.

I. All equipment provided on the project shall be demonstrated to function properly. Demonstration as a component of an overall system shall not relieve the Contractor of his responsibilities to demonstrate proper operation or verify specific requirements for each individual component.

J. Minimum Testing Requirements for Pumps:
   1. Contractor will provide water at his expense for testing.
   2. During tests, Manufacturer/Supplier shall observe and record head, output, rpm, motor input and amperage. Sufficient test points shall be obtained to develop

accurate pump system curve. If multiple operational points are specified, compliance with all points must be sufficiently demonstrated.

3. Fully demonstrate ability to operate at specified conditions without motor overload.
4. Refer to applicable USSM Chapters for additional details.

K. Minimum Testing Requirements for Electrical Systems.
   1. Refer to Division 16-Electrical.

L. In the event of unsuccessful Certified Equipment Testing, Manufacturer/Supplier and Contractor shall make necessary alternations, adjustments, repairs and replacements and the equipment testing shall be repeated.

M. The Manufacturer/Supplier Representative's shall fill out the Equipment/System Testing Certification form included at the end of this Section. Certification Testing will not be considered complete until this form has been provided to the Engineer along with the Manufacturer/Supplier representative field report.

3.3 OPERATOR TRAINING

A. Operator Training shall be performed by the authorized representative(s) of the Manufacturer/Supplier as identified in the Submittals. Video recordings of the training shall be prepared and provided to the Owner. Refer to Paragraph 1.1.D above.

B. Unless otherwise noted within the specific specification sections, provide minimum of one day (8-hour day, not including travel time) of combined training and operational assistance for County staff for each piece of equipment in the proper operations of provided equipment, and in the techniques, methods, schedules, etc. associated with maintenance.

C. The level of the training and operational assistance provided shall be as required to ensure proper understanding of the equipment's operations, maintenance and warranty conditions. Should manufacturer/supplier require time in addition to the minimums indicated herein, or within the individual specification sections, to sufficiently detail the proper operations and maintenance of the equipment, it will be provided at no additional cost to the Owner. Under absolutely no circumstances shall warrantees become void due to Owner's failure to follow operational and maintenance procedures which were not fully detailed and described to Owner's representatives during these sessions.

D. Refer to individual equipment specification sections for further requirements.

E. The manufacturer/supplier representative shall fill out the Operator Training Certification form included within this Section. Training will not be considered complete until this form has been provided to the Engineer.

EQUIPMENT START-UP CERTIFICATION

Owner: _____ Date: _____

Project _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____

Specification Number: _____

As an authorized representative of the equipment manufacturer/supplier (select one), the undersigned certifies that the equipment listed above conforms to the requirements of the Contract Documents. The undersigned authorized representative of the manufacturer/supplier further certifies that the equipment has been installed in accordance with the manufacturer's written instructions, that it is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.

_____ _____
(Manufacturer's Authorized Representative/ Signature & Printed Name) (Date)

_____ _____
(Contractor/ Signature & Printed Name) (Date)

_____ _____
(Witnessed by Engineer/ Signature & Printed Name) (Date)

** Attach Manufacturer Representative's Field Report **

OPERATOR TRAINING CERTIFICATION

Owner: _____ Date: _____

Project _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____

Specification Number: _____

I, the undersigned Manufacturer's/Supplier's Authorized Representative, have trained the Owner's personnel listed below in the proper operation and maintenance of the above listed equipment.

_____

_____

_____

_____

_____

_____ _____
(Manufacturer's/Supplier's Authorized Representative/Signature & Printed Name) (Date)

_____ _____
(Owner's Representative/ Signature & Printed Name) (Date)

_____ _____
(Witnessed by Engineer/ Signature & Printed Name) (Date)

EQUIPMENT DEMONSTRATION TESTING CERTIFICATION FORM

Owner: _____ Date: _____

Project _____

Contractor: _____

Equipment Manufacturer: _____

Equipment: _____

Specification Number: _____

This certifies that the entire equipment/system has met the requirements of the contract documents.

_____ _____
(Manufacturer's Authorized Representative/ Signature & Printed Name) (Date)

_____ _____
(Contractor/ Signature & Printed Name) (Date)

_____ _____
(Witnessed by Engineer/ Signature & Printed Name) (Date)

** Attach Manufacturer Representative's Field Report **

END OF SECTION

SECTION 02000

REFERENCED FDOT SPECIFICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section covers the Florida Department of Transportation (FDOT) standard specifications and details applicable to this project and are made part of these project document by reference herein.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.

1.3 REFERENCE STANDARDS

Reference standards and recommended practices referred to in this Specification Section shall be the latest revision of any such document in effect at the bid time, unless otherwise noted. The following documents are a part of this Section. Where this Section differs from these documents, the requirements of this Section shall apply.

A. The *FY 2024-25 FDOT Standard Specifications for Road and Bridge Construction* (Standard Specifications) and the *FY 2024-25 FDOT Standard Plans* shall be referred to for construction, workmanship, and quality control as specified with exceptions as noted in this Section. The referenced FDOT Standard Specifications that apply to this project include the following sections along with the sections referenced within these sections:
   - 100, Construction Equipment – General Requirements.
   - 104, Prevention, Control and Abatement of Erosion and Water Pollution.
   - 105, Contractor Quality Control and General Requirements
   - 107, Litter Removal and Mowing

B. Where the referenced FDOT Specifications cite "the Department," this shall be modified to “the Owner and/or Engineer” by this contract.

C. Payment for this project is in accordance with *Section 00410 Bid Form for Construction Contract and Section 01150A Measurement and Payment* and its included Bid Schedule.

D. Additional requirements superseding the applicable portions of the above FDOT Standard Specifications are provided in the subsequent sections of these Technical Specifications.

1.4 SUBMITTALS

The Contractor shall submit shop drawings in accordance with Section 01340 Submittals

1.5 WARRANTIES

A. Warranties shall be in accordance with the General Conditions and Supplementary Conditions.

PART 2 - PRODUCTS

2.1 GENERAL

A. The *FY 2024-25 FDOT Standard Specifications for Road and Bridge Construction* (Standard Specifications) and the *FY 2024-25 FDOT Standard Plans* shall be referred to for construction, workmanship, and quality control as specified with exceptions as noted in this Section. The referenced FDOT Standard Specifications that apply to this project include the following sections along with the sections referenced within these sections:

- 200, Rock Base
- 300, Prime and Tack Coats
- 327, Milling of Existing Asphalt Pavement
- 330, Hot Mix Asphalt – General Construction Requirements
- 334, Superpave Asphaltic Concrete
- 430, Pipe Culverts
- 700, Highway Signing
- 711, Thermoplastic Pavement Markings

B. Where the referenced FDOT Specifications cite "the Department," this shall be modified to “the Owner and/or Engineer” by this contract.

C. Payment for this project is in accordance with *Section 01150 Measurement and Payment* and its included Bid Schedule.

D. Additional requirements superseding the applicable portions of the above FDOT Standard Specifications are provided in the subsequent sections of these Technical Specifications.

PART 3 - EXECUTION

3.1 GENERAL

A. The *FY 2024-25 FDOT Standard Specifications for Road and Bridge Construction* (Standard Specifications) and the *FY 2024-25 FDOT Standard Plans* shall be referred to for construction, workmanship, and quality control as specified with exceptions as noted in this Section. The referenced FDOT Standard Specifications that apply to this project include the following sections along with the sections referenced within these sections:

- 200, Rock Base
- 300, Prime and Tack Coats
- 327, Milling of Existing Asphalt Pavement
- 330, Hot Mix Asphalt – General Construction Requirements
- 334, Superpave Asphaltic Concrete
- 347, Portland Cement Concrete – Class NS
- 430, Pipe Culverts
- 700, Highway Signing
- 711, Thermoplastic Pavement Markings

B. Exceptions
   1. Where the referenced FDOT Specifications cite "the Department," this shall be modified to “the Owner and/or Engineer” by this Contract.
   2. Payment for this project is in accordance with *Section 00410 Bid Form for Construction Contract and Section 01150A Measurement and Payment* and its included Bid Schedule.
   3. Additional requirements superseding the applicable portions of the above FDOT Standard Specifications are provided in the subsequent sections of these Technical Specifications.

END OF SECTION

SECTION 02510

CEMENT CONCRETE PAVEMENT AND CURBS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: This work shall consist of the construction of new cement concrete pavement in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the Drawings or established by the Engineer.

1.2 QUALITY ASSURANCE

A. Materials: Use only materials furnished by a bulk cement concrete producer regularly engaged in the production of Portland cement concrete.

B. Submittals: A certificate of compliance shall be furnished to the Engineer that the materials supplied comply with the specification requirements.

C. Testing:

1. Contractor shall afford the Engineer or Owner all reasonable access, without charge, for the procurement of samples of freshly mixed concrete at the time of placement to determine compliance with the contract documents.
2. Conformance to strength requirements shall be determined by American Concrete Institute Standards 318, Sections 4.8.2.3 and 4.8.3.

1.3 SUBMITTALS

A. The concrete jointing plan shall be submitted to the Engineer for approval prior to paving. The concrete jointing plan shall display the location and type of joint to be used. Joints shall have a maximum spacing of 15 feet.

B. Furnish a delivery ticket with each batch of concrete before discharging concrete at the placement site. Ensure the delivery ticket includes material quantities incorporated into the batch, sources of materials, batch adjustments, batch size, time loaded, time discharged, and the allowable jobsite water addition. Ensure the batcher is responsible for producing the concrete signs the delivery ticket, certifying that the batch was produced in accordance with the Contract Documents. Record water added at the jobsite. Sign the delivery ticket certifying that the concrete was placed in accordance with the Contract Documents. Acceptance by the Engineer will be by certification on the delivery ticket signed by the batcher and the Contractor. Certify that the concrete meets a minimum compressive strength of 3,000 psi at 28 days. The Engineer may verify the strength of the concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Coarse Aggregate:

1. Produce all concrete using size No. 57, 67, or 78 coarse aggregates.
2. Coarse aggregate shall consist of naturally occurring materials such as gravel, or resulting from the crushing of parent rock, to include natural rock, slags, expanded clays and shales (lightweight aggregates) and other approved inert

materials with similar characteristics, having hard, strong, durable particles, conforming to the specific requirements of this Section.

3. Materials substantially retained on the No. 4 sieve, shall be classified as coarse aggregate.
4. All coarse aggregates shall be reasonably free of clay lumps, soft and friable particles, salt, alkali, organic matter, adherent coatings, and other substances not defined which may possess undesirable characteristics.
5. Coarse aggregates shall meet the following physical property requirements, except as noted herein:
    a. Los Angeles Abrasion (FM 1-T096): maximum loss 45%
    b. Soundness (Sodium Sulfate) AASHTO T 104: maximum loss 12%*
    c. Flat or elongated pieces**: maximum 10%
    d. * For source approval - aggregates exceeding soundness loss limitations will be rejected unless performance history shows that the material will not be detrimental for Portland cement concrete or other intended usages.
    e. ** A flat or elongated particle is defined as one having a ratio between the maximum and the minimum dimensions of a circumscribing prism exceeding five to one
6. Natural Stones:
    a. Coarse aggregate may be processed from gravels, granites, limestones, dolomite, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this Section.
        i. Gravels:
            (1) Gravel shall be composed of naturally occurring quartz, free from deleterious coatings of any kind. The minimum dry-rodded weight AASHTO T 19 shall be 95 pounds per cubic foot.
            (2) Crushed gravel shall consist of a minimum of 85%, by weight, of the material retained on the No. 4 sieve, having at least three fractured faces.
        ii. Granites:
            (1) Coarse aggregate produced from the crushing of granites shall be sound and durable. For granites to be used in bituminous mixtures and surface treatments, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T096). Maximum amount of mica schist permitted is 5% (FM 5-584).
        iii. Limestones, Dolomite and Sandstone:
            (1) Coarse aggregates may be produced from limestone, dolomite, sandstones, and other naturally occurring hard, durable materials meeting the requirements of this Section. When used as a friction course, crushed limestone shall have a minimum acid insoluble content of 12% (FM 5-510). Other materials must meet the approval requirements for friction course determined by Rule 14-103.005(1), Florida Administrative Code (FAC).

(2) Pre-Cenozoic limestones and dolomite shall not be used as coarse crushed stone aggregates for asphalt concrete friction courses, or any other asphalt concrete mixture or surface treatment serving as the final wearing course. This specifically includes materials from the Ketone Dolomite (Cambrian) Newala Limestone (Mississippian) geologic formations in Northern Alabama and Georgia.

7. Lightweight Aggregates:
   a. Lightweight coarse aggregate may be produced from naturally occurring materials such as tuff or from expanded clay, shale or slate fired in a rotary kiln. It shall be reasonably uniform in quality and density, and free of deleterious substances as previously mentioned.
   b. Aggregates shall not be produced from pumice and scoria.
   c. In addition, it must meet the following specific requirements:
      i. Material passing the No. 200 Sieve: maximum 3.00%, (FM 1-T011)
      ii. Dry loose weight (AASHTO T 19)*: 33-55 lb/ft3
      iii. Los Angeles Abrasion (FM 1-T096): maximum 45%
      iv. Ferric Oxide (ASTM C641): maximum 1.5 mg
      v. * Source shall maintain dry-loose unit weight within plus or minus 6% of Quality Control average. Point of use dry-loose unit weight shall be within plus or minus 10% of Source Quality Control average.
   d. Gradation shall meet the requirements of AASHTO M 195 for 3/4 inch, 1/2 inch and 3/8 inch.

B. Fine Aggregate:
1. Fine aggregate shall consist of natural silica sand.
2. All fine aggregate shall be reasonably free of lumps of clay, soft or flaky particles, salt, alkali, organic matter, loam or other extraneous substances.
3. Silica Sand:
   a. Silica sand shall be composed only of naturally occurring hard, strong, durable, uncoated grains of quartz, reasonably graded from coarse to fine, meeting the following requirements, in percent total weight.

Sieve Opening Size	Percent Retained	Percent Passing
No. 4	0 to 5%	95 to 100%
No. 8	0 to 15%	85 to 100%
No. 16	3 to 35%	65 to 97%
No. 30	30 to 75%	25 to 70%
No. 50	65 to 95%	5 to 35%
No. 100	93 to 100%	0 to 7%
No. 200	Minimum 96%	Maximum 4%

   b. Silica sand shall be subject to the colorimetric test for organic impurities. If the color produced is darker than the standard solution, the aggregate shall be rejected unless it can be shown by appropriate tests that the impurities causing the color are not of a type that would be detrimental to

Portland cement concrete. Such tests shall be in accordance with AASHTO T 21 and AASHTO T 71.

C. Water:
   1. General
      a. Water for use with cement shall be clear and free from oil, and injurious amounts of acid, alkali, chlorides, organic matter, and other deleterious substances. It shall not be salty or brackish. Water that contains quantities of substances which makes it discolored or smell unusual or objectionable, shall not be used unless approved by the Owner.
      b. Water sources permitted include potable water supplies that are approved by a public health department.

D. Admixtures:
   1. Admixtures shall comply with applicable ASTM specifications and the requirements of this Section.
   2. Admixtures shall meet the following requirements:
      a. Air-Entraining - ASTM C260
      b. Type A Water-Reducing - ASTM C494
      c. Type C Accelerating - ASTM C494
      d. Type D Water-Reducing and Retarding - ASTM C494
      e. Type E Water-Reducing and Accelerating - ASTM C494
      f. Type F High Range Water Reducing - ASTM C494
      g. Type G High Range Water-Reducing and Retarding - ASTM C494
      h. Type I - Plasticizing - ASTM C1017
      i. Type II - Plasticizing and Retarding - ASTM C1017

E. Portland Cement:
   1. Cement shall conform to the requirements of AASHTO M85 Type II with a moderate heat of hydration and with the following exceptions:
      a. The autoclave expansion shall be limited to a maximum of 0.20 percent.
      b. There will be no requirements for tensile strength.
      c. Only one brand of cement shall be used on any one contract unless otherwise permitted, in writing, to the Engineer.
   2. Supplementary Cementitious Materials shall not be used.

F. Welded Wire Fabric:
   1. The welded wire fabric for reinforcement shall conform to the requirements of AASHTO M 55/M 55, unless otherwise specified.

G. Fiber Mesh
   1. Shall comply with ASTM C 116/C 1116M, Type I, Type II or III Fiber-Reinforced Concrete.
   2. Stainless steel, alloy steel, or carbon steel fibers shall conform to ASTM A820/A820M.
   3. Alkali-resistant (AR) glass fibers shall conform to ASTM C1666/C1666M.
   4. Polyolefin fibers shall conform to ASTM D7508/D7508M.

H. The preformed expansion joint material shall be non-extruding and resilient bituminous type and shall conform to the requirements of AASHTO M213.

I. Burlap:
   1. Burlap for curing concrete shall consist either of two layers, each weighing 10 to 18 ounces/10 square feet, or of four layers, each weighing 6 to 7 ounces/10 square feet.
   2. Burlap which has been used as a container for sugar shall not be used.
   3. Burlap that is being used for the first time shall be thoroughly washed in order to remove starches used in sizing the material.
   4. Burlap shall be furnished in strips of at least 3 feet wide and shall be at least 3 feet longer than the width of surface to be covered.

2.2 PRODUCTION, MIXING, AND DELIVERY

A. The proportioning shall be in accordance with ACI Standard 318, latest edition.
B. The proportioning of fiber mesh shall be in accordance with manufacturer's recommendations.
C. Obtain concrete from a plant certified by the FDOT.
D. Trucks used to transport the concrete shall be so constructed to prohibit segregation of the mix.
E. When Volumetric Mixers are used, deliver concrete in accordance with the Volumetric Mixer Standards of the Volumetric Mixer Manufacturers Bureau (VMMB) VMMB 100-01.
F. The maximum allowable mixing, agitation, and placement time of concrete is 120 minutes.
G. Fiber-reinforced concrete shall be free of fiber balls when delivered.
H. The mixture shall contain no more water than is necessary to produce concrete which is workable and plastic. The minimum slump necessary to place the concrete satisfactorily shall be used. Slumps should be maintained so as not to exceed four and one half inches.

PART 3 - EXECUTION

3.1 EQUIPMENT

A. All equipment used in the placement of concrete pavements shall conform to Section 350-3 of the FDOT Standard Specifications.

3.2 FORMS

A. Construct forms for this work of either wood or metal. Provide forms that are straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, use flexible forms.
B. Ensure that forms have a depth equal to the plan dimensions for the depth of concrete being deposited against them.
C. The Contractor may place these items by machine methods with the approval of the Engineer provided that the Contractor consistently produces an acceptable finished product, true to line, grade, and cross section.

3.3 EXCAVATION

A. Excavation shall be to the depth and width that will permit the installation and bracing

of the forms. The foundation shall be shaped and compacted to a firm even surface conforming to the section shown on the plan. All soft and yielding material shall be removed and replaced with acceptable material.

B. The top six inches shall be composed of well drained granular soils that are predominantly sandy, mixed with no more silt or clay than required to obtain a Florida Bearing value of 35 plus or minus 5 and be compacted to 95 percent of maximum density in accordance with AASHTO T 180.

3.4 PLACING CONCRETE

A. The foundation shall be thoroughly moistened immediately prior to placing the concrete. The proportioning, mixing and placing of the concrete shall be in accordance with good construction practices.

B. Place the concrete in the forms, and tamp and spade it to prevent honeycombing, and until the top of the structure can be floated smooth and the edges rounded to the radius shown in the Plans.

3.5 FINISHING

A. Pavement:
   1. Strike-off the concrete by means of a wood or metal screed, used perpendicular to the forms, to obtain the required grade and remove surplus water and laitance.
   2. Provide a broom finish.
   3. Ensure that the surface variations are not more than 1/4 inch under a 10-foot straightedge or more than 1/8 inch on a 5-foot transverse section. Finish the outer edges of the concrete with an edging tool having a radius of 1/2 inch.
   4. Construct pavement grades as shown in the Plans. If no spot elevations are provided, match existing grade.

B. Curb:
   1. Remove the forms within 24 hours after placing the concrete, and then fill minor defects with mortar composed of one part Portland cement and two parts fine aggregate. The Engineer will not allow plastering on the face of the curb. Remove and replace any rejected curb, curb and gutter, or valley gutter without additional compensation.
   2. Finish all exposed surfaces while the concrete is still green. In general, the Engineer will only require a brush finish. For any surface areas, however, which are too rough or where other surface defects make additional finishing necessary, the Engineer may require the Contractor to rub the curb to a smooth surface with a soft brick or wood block, using water liberally. Also, if necessary to provide a suitable surface, the Engineer may require the Contractor to rub further, using thin grout or mortar.

3.6 JOINTS

A. Pavement:
   1. Joints shall be located as shown on the approved submittal.
   2. When constructed adjacent to a curb, building, retaining wall, light pole base or other fixed structure, a 1/2 inch thick preformed joint filler shall be used between the slab and the structure.

B. Curb:
   1. Contraction Joints: Except for machine placed items, the Contractor may form joints by using dummy joints (either formed or sawed) or by using sheet metal templates. If using sheet metal templates, ensure that they are of the dimensions, and are set to the lines, shown in the Plans. Hold templates firmly while placing the concrete. Leave templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Saw contraction joints, for machine placed items, unless the Engineer approves an alternate method. Saw the joints as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins. Space contraction joints at intervals of 10 feet except where closure requires a lesser interval, but do not allow any section to be less than 4 feet in length.
   2. Expansion Joints: Construct expansion joints at all inlets, at all radius points, and at other locations indicated in the Plans. Locate them at intervals of 500 feet between other expansion joints or ends of a run. Ensure that the joint is 1/2 inch in width.

3.7 CURING

A. Continuously cure the concrete for a period of at least 72 hours. Commence curing after finishing and as soon as the concrete has hardened sufficiently to permit application of the curing material without marring the surface.
B. Immediately replace any curing material removed or damaged during the 72 hour period.
C. After removing the forms, cure the surfaces exposed by the method described below, for the remainder of the 72 hour curing period.
   1. Place burlap over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches. Hold the burlap securely in place such that it will be in continuous contact with the concrete at all times, and do not allow any earth between the burlap surfaces at laps or between the burlap and the concrete. Saturate the burlap with water before placing it, and keep it thoroughly wet throughout the curing period.

3.8 REMEDIAL ACTION

A. Delineate, remove to the full depth and width, and replace, at no cost to the Owner, concrete that has:
   1. Any cracking greater than 1/4 inch in vertical displacement.
   2. Any spalling or flaking off of the surface layer that exposes the rough, pitted aggregate surface in excess of 10 square inches.
   3. Any intersecting cracks visible in the hardened concrete (regardless of size) in slab on grade, sidewalk, ditch pavement, slope pavement, traffic separator, or curb and gutter.
   4. Any uncontrolled cracks that appear during the life of the Contract unacceptable to the Engineer.
   5. Any concrete found to be unacceptable to the Engineer due to the result of Quality Control testing.

END OF SECTION

SECTION 16000

ELECTRICAL - PUMP STATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide all labor, materials, equipment, operations, methods and procedures as specifically noted herein these specifications and the applicable amended chapters of Polk County's Utilities Standards and Specifications Manual (see Section 00800) as indicated in the Contract Documents, together with all items necessary for or incidental to the completion of the work.

B. All systems or additions to existing systems indicated in the Contract Documents shall mean all necessary supervision, labor, equipment, and materials required to provide complete, properly functioning systems.

C. All systems shall be adjusted, tested, inspected and turned over to the Owner in perfect working order.

D. The words "provide", "supply", "supply and install", "install", "furnish" or "furnish and install", as used in DIVISION 16 or as indicated on the Drawings related to DIVISION 16 shall mean a complete and properly functioning Electrical installation performed by the Contractor.

E. References:

1. Refer to each individual drawing within the Contract Documents in order to coordinate material and equipment locations and electrical requirements.
2. Applicable portions of DIVISION 0, DIVISION 1, and the applicable amended chapters of Polk County's Utilities Standards and Specifications Manual are part of DIVISION 16. Refer to these sections for additional information on bidding requirements, general requirements, Section 01800 for equipment start-up, and product substitution.

F. Work Specified Herein:

1. Visit and examine the project site and become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.
2. The following scope of work is a brief generalization of the type and extent of the work specified under DIVISION 16. Detailed requirements are indicated on the Drawings and in related sections of the Specifications. The work specified under DIVISION 16 includes, but is not necessarily limited to the following:
    a. The work specified under Division 16 is inclusive of the electrical work for this project as indicated on the Drawings and in related sections of the Specifications.
    b. Provide Electrical Service and Distribution System as indicated on the "Single-Line Diagram", related drawings and schedules, and as specified herein.
    c. Contractor shall be responsible for obtaining temporary power to conduct work as required. Temporary power may be obtained from the local power

company or by a temporary generator as required in order to maintain continuous operation of the pump station during the schedule of the construction period. The generator and all required fuel are to be supplied by the electrical contractor.

G. The work shall also include, but not be limited to, the furnishing and installing of the following:
   1. Underground electrical service to the lift station and electrical equipment.
   2. Raceways and fittings.
   3. Wires and cables.
   4. Service distribution equipment.
   5. Miscellaneous electrical distribution equipment.
   6. Grounding system.
   7. SCADA telemetry system RTU equipment and connections.
   8. Power and control wiring between standby generator and service distribution equipment.
   9. Metering and service disconnect equipment.
   10. Underground power and control wiring to submersible pumps.
   11. Power conduit, wiring and equipment for connections to a portable generator as indicated on the Drawings.
   12. All required electrical work for the proposed lift station as shown on the drawings.

H. Make all required connections to the lift station and for the electric service and utilities at the lift station.

I. Request for Information:
   1. When there is a conflict or coordination issue, or if additional information is necessary for the contractor to proceed with the intended work, a Request of Information (RFI) form shall be submitted through the General Contractor to the Engineer. The specific issue shall be described in the RFI and shall be sent to the engineer for review and a response provided in an appropriate time period. RFI form shall be available via the General Contractor through the Engineer. This process shall be used as part of the work of this contract.

1.2 QUALITY ASSURANCE

A. In general, the workmanship of the electrical installation shall be as described in the N.E.C.A. Electrical Design Guidelines. All methods of construction, details of workmanship, etc., that are not specifically described therein or indicated in the Contract Documents, shall be subject to the control of the Engineer.

B. Equipment and materials shall be of the quality and manufacture indicated in their respective description within the specifications.

C. Work determined by the Engineer to be unsatisfactory according to industry standards shall be redone at the Contractor's expense, with no additional compensation.

D. Safety and care of equipment and electrical installations to remain the responsibility of the subcontractor until final acceptance by owner. Any cost associated due to damages or loss prior to owner acceptance to be covered by subcontractor.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit Shop Drawings, O&M Documentation, and manufacturer certificates in accordance with Section 01340 The requirements below are in addition to the standards therein.

B. Submittals required under this section include, but are not limited to the following for each of the locations specified:

1. Conduit
2. Wiring and Cables
3. Service distribution equipment
4. Main circuit breaker
5. Meter socket
6. Manual transfer switch.
7. Lightning arrestor and line surge protection
8. Receptacles
9. Portable Generator connections
10. Mounting hardware and materials
11. Lighting fixtures and switches
12. Electrical distribution equipment
13. Miscellaneous electrical equipment
14. Conduit seal fittings
15. Megger test results for cables and equipment prior to putting equipment into service
16. Submit all other equipment as required by the Contract

C. Operations and Maintenance Manual

1. Requirements
    a. Provide a complete bill of material for each piece of equipment.
    b. Provide a preventative maintenance section for all applicable equipment including recommended schedule and spare parts.
    c. Panels which require customized schematics shall be updated with changes made in the field and submitted on 11" x 17" size drawings. Also internal and front elevation drawings shall be included identifying all equipment.
    d. All equipment shall include a troubleshooting section with common symptoms and recommended solutions.
    e. All equipment shall include emergency operations instructions particularly to Portable Emergency Generator and Manual Transfer Switch on how to operate the equipment during a power failure.

D. Submittals:

1. Shop Drawings Shall Consist Of:
    a. Project name and location.
    b. Contractor's name.
    c. Index Sheet - Listing the equipment being submitted utilizing equipment designations, or symbols, indicated on the Contract Documents together with the proposed manufacturer, style/ type and catalog number.
    d. Manufacturer's scale or dimensioned drawings along with standard catalog "cut" sheets.

e. Equipment ratings, service clearances and configuration.
f. Listing of accessories to be furnished.
g. Single-line and schematic diagrams where applicable.
h. Refer to related sections of the specifications for special shop drawing requirements for individual equipment types.

2. Provide samples of such items as lighting fixtures and wiring devices upon request of the Engineer.
3. Standard manufacturer's catalog cut sheets are acceptable; however, they shall be modified to indicate equipment and options to be provided for this project. Any listed equipment, options, or features which are not to be provided shall be properly indicated in the submittal. Failure to properly indicate project-specific equipment, options, and features will result in the submittal being returned without being reviewed.
4. Submit test results as listed in Section 3.4

1.4 PRODUCT HANDLING

A. All materials shall be shipped, stored, handled and installed in such a manner as not to degrade quality, serviceability, or appearance.
B. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by water. Electrical equipment shall not be stored out of doors. Electrical equipment shall be stored in dry permanent shelters. If any apparatus has been damaged, such damage shall be repaired at no additional cost. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such special tests as directed by the Engineer, or shall be replaced at no additional cost to the Owner.

1.5 DESIGN CRITERIA

A. Service and Metering
1. The power company serving this project is Duke Energy. The service representative this project is as follows:
2. Service will be obtained at 277/480 volts, 3 phase, 4 wire, wye connected, solid grounded, 60 Hertz, from a pad-mounted service transformer located at the site, as shown on the drawings.
3. Extend new secondary service conduit and wires from the service transformer to the new panel rack as shown on the drawings. Installation of conduits and supports per local utility requirements. Provide number and size of conduits per local utility requirements.
4. Furnish and install the meter socket per power company requirements.
5. Coordinate all shutdowns and activations of the services with the power company as part of this work.
6. Make all arrangements with the power company for obtaining service and pay all charges and furnish all labor and material for the service. An allowance has been established for this work. Refer to General Conditions for these specifications for specific bid allowance to be carried as part of the work of this contract.
7. Provide all service disconnections and re-energizations required by the Power Company during the work of this contract and include these costs as part of the

work of this contract as part of the allowance established for this electrical service work.

B. Codes, Inspection and Fees
   1. All material and installation shall be in accordance with the latest edition of the National Electrical Code and the codes and ordinances of the Town or City of which the work is being performed.
   2. Pay all fees required for permits and inspections

C. Tests and Settings
   1. Test all systems furnished under DIVISION 16, ELECTRICAL and repair or replace all defective work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials and equipment used shall be Underwriters Laboratories, Inc. listed.

B. Refer to Drawing for specific references to NEMA ratings for equipment specified unless otherwise noted.

2.2 RACEWAYS AND FITTINGS

A. Rigid Aluminum Conduit:
   1. Provide rigid aluminum conduit above grade and where conduit sealing fittings are used. Provide aluminum sealing fittings to prevent galvanic corrosion and seizing of threaded connections. Use stainless steel Myers hub for connections to enclosures. Provide PVC-coated conduit or coat aluminum with bitumastic where in contact with concrete.
   2. Rigid aluminum conduit shall meet requirements of NEMA C80.5 and UL6A and be of Type 6063 copper-free aluminum alloy.

B. PVC Schedule 80 Conduit:
   1. Provide PVC Schedule 80 conduit below grade. PVC conduit may be extended from below to above grade where conduit sealing fittings are not required such as from the wet well to the wire tray.
   2. PVC Schedule 80 conduit shall meet the requirements of NEMA TC-2 and UL 651 and shall be furnished without factory formed bell.

C. Flexible Metal Liquid-tight Conduit:
   1. Provide flexible metal liquid-tight conduit where necessary to provide flexible connections for instrument and equipment connections.
   2. Flexible metal liquid-tight conduit shall meet the requirements of UL 360 and be constructed of galvanized steel with an extruded PVC jacket.

D. Fittings:
   1. Rigid aluminum fittings shall meet the requirement of UL 514B and be of copper-free construction.
   2. PVC fittings shall meet the requirements of NEMA TC-3.

E. Manufacturers:
   1. Crouse-Hinds.
   2. Thomas and Betts.
   3. OZ-Gedney.

2.3 WIRES AND CABLE

A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper. All conductors installed below grade shall be THHW/THHN stranded.

B. Power wiring shall be 600V, Type THHW/THHN shall be PVC insulation with nylon jacket, as manufactured by Pirelli Cable Corp., Collyer Insulated Wire Company, The Okonite Company, or equal.

C. Control wiring shall be 600V, Type THHW/THHN No. 14 AWG stranded. Type THHW/THWN shall be cross linked polyethylene, as manufactured by the Pirelli Cable Corp., Collyer Insulated Wire Company, The Okonite Company or equal.

D. Signal wiring shall be 600V, individual shielded twisted pair, No. 16 AWG stranded with polyethylene jacket. Provide Belden Catalog No. 8719, Alpha Wire & Cable, or equal.

E. Ground wires shall be THW and color-coded green.

F. Wire markers shall be "OMNI GRIP" as manufactured by W.H. Brady Company, Panduit Polyolefin heat shrink labels or equal.

G. All wires and cables specified and installed underground shall be U.L. Listed and Labeled for underground use for all installations.

H. Power conductors shall be continuously polarized and color coded throughout using the following scheme:

1. White - All neutral conductors, 208/120V systems
2. Gray - All neutral conductors, 480/277 volt systems.
3. Green - All ground conductors
4. Phase Conductors

208/120V Systems	**240/120V Systems**	**480/277V Systems**
Phase A - Black	Phase A - Black/(Red)	Phase A - Brown
Phase B - Red	Phase B - Red/(Blue)	Phase B - Orange
Phase C - Blue		Phase C - Yellow

5. Regardless of conductor size, conductor insulation color shall correspond to the color coding required in this section.

I. Control Conductors shall be continuously polarized and color coded throughout using the following scheme:

1. 120 Volts – Red
2. DC Controls – Dark Blue
3. Intrinsically Safe – Light Blue

2.4 METERING SOCKET AND METERING CABINET

A. Meter socket shall be of the type as recommended by the power company.

B. Metering cabinet shall be of the type as recommended by the power company.

C. Acceptable manufactures are Milbank, Square D, or equal.

2.5 MAIN CIRCUIT BREAKER

A. Circuit breaker shall be molded case, 600 Volts, sized as indicated on the Drawings, RMS interrupting capacity. Circuit breaker shall be installed within an enclosure with neutral and ground lug kit factory installed and provided in the enclosure. The operating handle shall be side mounted and pad lockable in the "On" and "Off"

position. The breaker should still provide overload and short circuit protection when locked in the "ON" position.

B. Circuit breaker shall be UL listed and labeled as being suitable for use as service entrance equipment.

C. Acceptable manufacturers are Square D, Cutler Hammer, ABB(GE) or equal.

2.6 GROUND ROD

A. 20 foot long by 3/4 inch diameter copper clad steel ground rods shall be provided, arranged and installed as shown on the drawings. Provide all required Cadwelds, grounding clamps and hardware as required for a complete installation per NEC and as shown on the drawings.

B. Acceptable manufacturers are Erico, AB Chance Co., or equal.

2.7 LIGHTNING AND SURGE PROTECTION

A. Lightning and surge protection units shall be Square D Model Number SDSA 3650, three phase for 600 VAC phase-to-ground voltage. Provide a separate unit at all locations shown on the drawings.

B. Lightning and surge protection units shall be Square D Model Number SDSA 1175, single phase for 250 VAC phase-to-ground voltage. Provide a separate unit at all locations shown on the drawings.

2.8 WIRING DEVICES

A. Receptacles shall be duplex, 20 Ampere, industrial grade and shall be ground fault type. Outdoor receptacles shall be provided with weatherproof, while in use type covers.

B. Light switches shall be rated 20 Ampere, single pole type.

C. Duplex receptacles shall be duplex, 20 ampere, industrial grade type.

D. Covers shall be stainless steel gasketed for exposed or concealed inside locations and weatherproof while in use covers for outdoor locations.

E. Provide 20A, 125V ENR Series dead front interlocked circuit breaking receptacles as shown on drawings. Refer to contract drawings for additional information. Crouse-Hinds Cat# ENR21201.

F. Acceptable manufacturers are Cooper, Hubbell, or equal.

2.9 LIGHT FIXTURES

A. Refer to lighting fixture schedule on the Drawings for specific requirements.

2.10 EXPANSION FITTINGS

A. Expansion fittings shall be watertight expansion type, designed to compensate for conduit movement. Expansion fittings shall be provided to allow movement of 4 inches in both directions for a total of 8 inches. Fittings shall have flexible copper braid bonding jumpers, neoprene sleeve and stainless-steel bands. Acceptable Manufacturer: O.Z./Gedney Type EX, Thomas & Betts, or equal.

2.11 PULLBOXES AND JUNCTION BOXES

A. Junction boxes shall be aluminum type and gasketed type FS series with hubs.

B. Pullboxes other than explosion proof shall be seamless weld type, 316 stainless steel

with flush type screw-on covers and no hinges or side clamps all around. Use Myers hubs for conduit termination and entry into pullboxes. Acceptable manufacturers are Rittal, Hoffman, or equal.

C. Boxes for concealed work shall be used only for concealed installations.

2.12 MOUNTING SUPPORTS AND HARDWARE

A. Provide 4" channel angle supports and stainless-steel mounting plates as shown and required for equipment mounting. All legs for stanchion mounting structures shall be channel angle support, no exceptions.

B. All bolts, washers and mounting hardware shall also be 316 stainless steel for the entire installation.

C. Acceptable manufactures are B-Line Systems, Inc., Thomas & Betts-Super Strut, Unistrut, or equal.

2.13 DISCONNECT SWITCHES

A. Furnish and install heavy duty type lockable disconnect switches as shown on the drawings. Switch NEMA ratings shall be as required and noted on the drawings. Ampacity shall be noted on the drawings and as required by NEC.

B. Acceptable manufactures are Square D, Cutler Hammer, ABB(GE) or equal.

C. Disconnect switches shall have side mounted handle operators that are lockable in both the on and off position.

D. Disconnect switch shall lock out and immediately shutdown the drive control circuit.

E. Acceptable manufactures are Square D, Cutler Hammer, ABB(GE) or equal.

2.14 MOTOR CONNECTIONS

2.15 WIRE IDENTIFICATION

A. All individual conductors shall be identified using unique numerical tags corresponding to conductor designations indicated on approved shop drawings of schematic diagrams for all terminations. This includes all process- and non-process-related wiring done as part of the work, such as fire alarm panels. Conductors shall be clearly identified at each terminal block, equipment connection and junction. Markings shall utilize the equipment designation and terminal block number in the device higher upstream in the system hierarchy.

B. For Conductors No. 6 and smaller, color coding shall correspond to the color of the conductor insulation. For color coding of wire larger than No. 6, use self-adhesive, wrap-around type markers. These markers shall be used at all panelboards, junction boxes, disconnect switches, circuit breakers, etc.

2.16 CONDUIT SEALS

A. Provide Class I, Div. 1, Groups C & D conduit seals as required by the N.E.C. and as shown on the Drawings or required by the NEC.

B. Provide Class I, Div. 2, Groups C & D conduit seals as required by the N.E.C. and as shown on the Drawings or required by the NEC.

C. Acceptable manufacturers: Appleton, Killark, O-Z/Gedney, or equal.

2.17 DRY-TYPE TRANSFORMERS

A. Furnish and install dry-type transformers with ratings as shown on the drawings.
B. Transformers shall be of the energy efficient type and shall be ventilated type only.
C. Acceptable manufactures: Cutler-Hammer, Square D, or equal.

2.18 BRANCH CIRCUIT BREAKERS

A. Provide 20 Ampere, 120 Volt circuit breakers where indicated on drawings.
B. Circuit breakers shall be thermal magnetic and maintain the UL Listing of the equipment being installed. Interrupting short circuit rating shall be equivalent or exceed to equipment housing device.
C. There are several locations where branch circuit power shall be required to be extended to serve new or existing equipment. The contractor shall be responsible to add additional circuit breakers to this existing equipment and shall meet or exceed all ratings of this equipment.
D. Where these devices are not available or replaceable the following shall be included as an alternate means of installation:
    1. Panelboard Installation - If not available then a 4 circuit sub panel shall be installed and tapped by the tap rule of NEC and installed adjacent to the existing panelboard in order to meet this requirement.
    2. Installed within existing Pump Control Panel - If not clearly enough room to add then install a DIN mounted breaker adjacent within interwiring to existing breakers.
E. The contractor shall carry the higher cost installation in the final bid price if determination of this requirement cannot be identified.

2.19 MANUAL TRANSFER SWITCH

A. Provide service entrance rated UL 1008 listed manual transfer switch for lift stations requiring portable generator systems.
B. The transfer switch shall be molded case breaker-based with safety interlocked door and interior dead-front panel construction. Transfer switch enclosure shall be NEMA 3R powder coated galvanneal steel construction.
C. Switches shall be 480V AC 3-phase, 4-wire based on available site voltage and rated for a minimum of 100A. Provide with color coded cam-lock style connectors as required for the site specific having a minimum 400A rating.
D. Must have PCU approved power monitor with dry contacts for interface to PLC. Also include pilot light on enclosure to indicate utility power is available.
E. Manufacturer: ESL Power Systems Stormswitch or approved equal.

2.20 SURGE PROTECTION

A. Provide 3-phase surge suppression on the downstream side of the transfer switch to provide surge protection on both utility and generator power. A Surge Protective Device (SPD) shall be included and wired to protect motors and control equipment from induced line surges. All SPD's shall be UL listed and installed in accordance with the respective power company requirements and manufacturer's specifications. SPD's shall be attached to the load side of the main transfer switch and mounted in a separate NEMA 4X enclosure directly attached to the transfer switch enclosure. SPD's shall meet the following minimum requirements:

1. The SPD unit shall be UL listed and labeled as per UL 1449 latest edition and have a UL 1283 listing for active sine wave tracking.
2. The unit shall meet "Testing Requirements" of IEEE 62.41 and 62.45.
3. Minimum 10-year replacement warranty.
4. Provide with Disconnect Only option.
5. Provide status indicator lights and contact relay output indicating suppressor fault.
6. Manufacturer:
    a. Eaton, SPD series.
    b. Eaton/Innovative Technology Protector, PTE series.
    c. Environmental Potentials
    d. Approved Equal.

2.21 TERMINAL JUNCTION BOXES

A. As required by NEC Code.
B. Seal conduits entering the junction box from the wet well via wire tray with duct seal, or equivalent cable glands.
C. Junction Box: Hoffman Zonex ATEX certified Type 4X, or approved equal.
D. Terminal Block: Eaton XB series, Phoenix Contact UT series, or approved equal Ex e labeled corrosion resistant screw type terminal block.

2.22 LED LIGHTING

A. Residential Lift Station Lighting Features:
    1. Two adjustable LED heads.
    2. High performance 5000K CCT LEDs with 1222 lumen output.
    3. Dual array motion sensor wired to On/Off/Motion handswitch.
    4. Power: 120Vac.
    5. Rugged aluminum housing.
    6. Mounting: Pole Mounted in accordance with manufacturer instructions.
    7. Finish: Bronze.
    8. UL listed for wet locations.
B. Manufacturer:
    1. Master Lift station: Lithonia; DSX1 series.
    2. Residential Lift Station: Lithonia OFLR 6LC 120 MO BZ
    3. Approved equal.

2.23 ALARM LIGHT

A. A vapor proof and vandal proof screw-on type red alarm light shall be mounted on top of a separate 1½ inch minimum diameter Schedule 40 aluminum riser pole located behind and connected to the bottom of the panel by a 1½ inch minimum diameter watertight flexible electrical conduit. The riser pole shall be secured to the horizontal cross member struts, not the panel, with the bottom of the light being no less than 12 inches but not more than 18 inches above the top of the enclosure.
B. Alarm Light Specification:
    1. Type: Rotating reflector or flashing bulb.
    2. Dome: Polycarbonate.
    3. Color: Red.

4. Enclosure: NEMA 4X with ½-inch threaded pipe fitting.
5. UL Listed.
6. Power: 24Vdc.
7. Manufacturer:
    a. Federal Signal, 225XST.
    b. Edwards Signaling.
    c. Approved equal.

2.24 EQUIPMENT RACK

A. The main support beams shall be minimum 6-inch structural aluminum I- Beams or H-Beams with a minimum web thickness of 0.210 inches. Two coats of bitumastic coating shall be applied where aluminum will be in contact with concrete or the ground.

B. Horizontal cross member struts shall be 12-gauge stainless steel or aluminum U-channels with a minimum nominal dimension of 1-1/2" inch by 1-inch. The ENGINEER shall review the structure's wind loading requirements and make any size increases to the main support posts as needed. All other electrical equipment support brackets and hardware shall be stainless steel. Hardware shall include, as a minimum, brackets, nuts, bolts, washers, toggle bolts, clamps, straps, etc.

C. An outdoor rated weatherproof GFCI receptacle, UL listed for wet locations, shall be mounted on the electrical equipment rack with NEMA 3R while-in- use aluminum cover. The receptacle shall be fed from a dedicated circuit.

2.25 FINAL AS-BUILT RECORD DRAWINGS

A. During the ongoing construction the contractor shall maintain a clean set of full size drawings for markup. The drawings shall be red lined and marked up with all appropriately noted changes noting the as-built condition. Upon completion of the project the set of as-built markups shall be provided to the Engineer for final AutoCAD revisions.

2.26 COMPLETE ELECTRICAL DISTRIBUTION EQUIPMENT SUPPLIER

A. All electrical distribution equipment submitted for this project shall be by a single equipment manufacturer. Multiple suppliers of this equipment shall not be acceptable. The following manufactures shall be acceptable:
    1. Square D Company
    2. Cutler-Hammer
    3. GE(ABB)

2.27 EXOTHERMIC CONNECTION

A. The contractor shall be responsible to furnish and install exothermic connections as required and shown on the contract drawings.

B. The mold shall be new and clean and shall provide all required connection molds for different required types.

C. All connections shall be industry standards in a complete, continuous, and properly installed connection. Any connections not properly installed as inspected shall be removed and re-formed at the contractor's expense.

PART 3 - INSTALLATION

3.1 UTILITY

A. Where required by the local electrical utility, an additional UL listed, NEMA 3R, lockable, non-fused, safety type switch utility service disconnect shall be installed ahead of the utility meter in accordance with local utility requirements. The disconnect shall be rated for the maximum available fault current at the point of common coupling from the utility serving the lift station.

3.2 RACEWAYS AND FITTINGS

A. Unless otherwise indicated on the Drawings, install all wiring in the following applicable raceway system:
   1. Wiring 600 volts or less in outdoor wet locations (NEMA 4X): Rigid heavy wall aluminum conduit.
   2. Underground Raceways
      a. All underground raceways shall be Schedule 80 PVC conduit.

B. No wire shall be pulled until the raceway system is complete in all details.

C. The ends of all raceways shall be tightly capped to exclude dust and moisture during the construction period. Caps shall be of a UL Listed type specifically used for this purpose. Rags, papers, etc. shall not be used.

D. Raceways terminating in gasketed enclosures shall be terminated with conduit hubs.

E. Provide conduit expansion fittings as required. Install per manufacturers recommendation.

F. Conduits that originate from slab or from below slab shall have no breaks in conduit for a minimum of 4" above finished floor.

3.3 WIRES AND CABLES

A. All conductors shall be carefully handled to avoid kinks or damage to insulation.

B. All feeder circuit wiring is to be installed within conduit and continuous from point to point without any splicing.

C. Alarm wires shall be uniquely identified at each end with wire markers. A typed list of the numbers used and their function (alarm served) shall be submitted to the Engineer by the Contractor.

D. All 600 Volt wire insulation shall be tested with a megohm meter after installation. Tests shall be made at not less than 500 Volts. A written test report of the results shall be submitted to the Engineer by the Contractor.

E. After installation of service conductors seal conduits in pump station with duct seal.

F. Grouping of Conductors
   1. Contractor may group certain wiring with the approval of the Engineer, as follows.
      a. Power 120V may be grouped with power 120V
      b. Control 120V may be grouped with control 120V
      c. Control 24V may be grouped with control 24V
      d. Instrumentation may be grouped with instrumentation
      e. Specialty wiring may be grouped with like systems
      f. Power wiring at 480V shall not be grouped
      g. Fire alarm system wiring shall not be grouped with other systems

The installation shall be installed in accordance with all requirements of the NEC (including wire ampacity derating factors), manufacturer's requirements, and the Engineer. Excessive grouping which interferes with functionality and reliability will not be allowed. The wiring configuration as shown on the drawings is the baseline requirement for the work.

3.4 GROUNDING

A. Lift stations shall be grounded in accordance with the NEC and IEEE 142- 2007, Recommended Practice for Grounding for Industrial and Commercial Power Systems. All grounding systems shall be tested by the 3-point fall of potential test in accordance with ANSI/IEEE Standard 81 or approved equivalent testing. Documentation shall include all test apparatus information and results in both tabular and graphical formats, where applicable.

B. General: Provide 5/8-inch diameter copper clad steel ground rods 10-feet in length, minimum.

C. Provide ground rods around the concrete wet well pad perimeter at all four corners. Provide additional ground rods as required to ensure ground rods have a separation of approximately 20-feet.

D. Provide ground rod box for most accessible ground rod to allow for access for testing purposes. Ground rod box shall be Christy No. G5, Lightning and Grounding Systems Inc. I-R series, Alltec Corp. TW-FL8T, or approved equal.

E. Connectors:
   1. Below grade connectors and connections to reinforcing steel shall be exothermic weld type, Erico Cadweld or Cadweld Exolon.
   2. All other connectors shall be mechanical type copper alloy as manufactured by Erico, Burndy, or Thomas and Betts.

F. Conductors:
   1. Provide grounding ring connecting all system ground rods. Ground ring conductor shall be minimum #2/0 tinned stranded copper. Install ground ring approximately 30 inches below grade and 30 inches away from the wet well.
   2. Provide #2/0 tinned stranded copper wire to equipment and structures as noted below.
   3. Provide minimum #6 AWG green XHHW insulated copper stranded ground wire to instrumentation and equipment as noted below.

G. The following outlines minimum grounding requirements:
   1. Bond wet well cover to wet well structural steel using #2/0 tinned copper wire.
   2. Bond metallic valve vault covers to ground system using #2/0 tinned copper ground wire.
   3. Bond control panel ground bus to grounding system using minimum #6 insulated copper ground.
   4. Bond generator frame and neutral to grounding system with #2/0 tinned copper ground wire in accordance with the NEC.
   5. Bond utility system neutral to grounding system with #2/0 tinned copper ground wire in accordance with the NEC.
   6. Bond metallic enclosures to grounding system with minimum #6 insulated copper ground wire.

7. Bond chain link fencing to nearest ground rod using #2/0 tinned copper ground wire.
8. Ground all surge suppression and instrumentation in accordance with manufacturer's instructions using minimum #6 insulated copper ground wire.
9. Ground electromagnetic flow meter grounding rings with #6 insulated copper ground wire.
10. Ground all analog instrumentation shielded cables at one end at the control panel ground bus.
11. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.
12. Bond all metallic railing, supports, and cable racks with minimum #2/0 tinned copper ground wire.

3.5 INSTALLATION OF GROUNDING BUSHINGS

1. Provide grounding type insulated bushings on all power conduits regardless of size.
2. Provide grounding type insulated bushings on all control conduit and signal conduit regardless of size.

3. Install cable seal bushings in conduits for all outdoor locations and NEMA 4X locations to prevent moisture from entering enclosures and equipment.
4. Install cable seals in all conduits where there is a change in temperature such as transitioning from a room to the attic.
5. Provide a bushing at each conduit termination unless fitting at box where conduit terminates has hubs designed in such a manner to afford equivalent protection to conductors.
6. Any installations not provided with these requirements shall be removed and reinstalled at no additional cost to the Owner.

3.6 MYERS HUBS

1. Myers Hubs shall be of grounding type and installed on junction boxes and enclosures which do not have cast hubs in non-classified areas. All Myers Hubs shall be capable of receiving wire bonding jumpers regardless of conduit size.

3.7 EQUIPMENT

A. The inside of all equipment and enclosures shall be checked for tools and vacuumed cleaned of any debris.
B. The Contractor shall be responsible to ensure that all connections to motors, distribution equipment, and control panels are tightened to manufacture's recommendations.

3.8 TESTS & LABELING

A. Provide arc flash labeling for all electrical enclosures in accordance with the NEC and NFPA 70E.
B. The entire grounding network resistance to be meggered and certified results

recorded and submitted with no exceptions to the Engineer. Resistance shall not exceed 25 Ohms.

C. Branch circuits shall be tested during installation for continuity and identification and shall pass operational tests to determine that all circuits perform the function for which they are designed.

D. Adjust all settings on protective equipment and verify, check and establish with the power company that the secondary voltage is within 2% of rated voltage.

E. Test and set all motor circuit protectors, motor overload heaters to the nameplate horsepower of the equipment; and all circuit breaker settings in all electrical equipment shall be tested and verified operational.

F. Three phase panelboard's line currents shall be balanced to within 10% of each other.

G. For all feeder wiring rated 600 volts or less, provide 1,000 volt "Megger" insulation test prior to energizing feeders. Use a motor-driven megger for all tests. Test voltage shall be applied until readings reach a constant value, and until three (3) equal readings, each one (1) minute apart, are obtained. Minimum megger reading shall be 45 megohms for feeder conductors. Document test results and submit to engineer. There shall be no exceptions taken by the Engineer before conductors are to be energized. See attached table at end of this section for recording data and submission to the Engineer.

H. Three phase motors shall be checked for rotation and, if necessary, reverse the connections at the starter. Single phase and DC motors at motor connection box.

I. The grounding system shall be tested to less than five ohms of resistance. Testing results by a certified testing agency using 3-point fall of potential testing as described by ANSI/IEEE Standard 81, or approved equivalent testing, and documented as described by NETA (International Electrical Testing Association), shall be provided to PCU during lift station startup.

PUMP STATION "NAME"
MEGGER TEST RESULTS

Project: _____ **Temperature:** _____
Date: _____ **Weather:** _____
Location: _____ **Test Equipment:** _____

Equipment / Feeder Under Test: _____ **Start Time:** _____ **End Time:** _____

Test Equipment: Make: _____ **Serial No.:** _____ **Test Voltage:** _____

	0.5 min	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	P.I.
ΦA-Gnd.												
ΦB-Gnd.												
ΦC-Gnd.												
ΦA-ΦB												
ΦA-ΦC												
ΦB-ΦC.												

Equipment / Feeder Under Test: _____ **Start Time:** _____ **End Time:** _____

	0.5 min	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	P.I.
ΦA-Gnd.												
ΦB-Gnd.												
ΦC-Gnd.												
NEUT -Gnd.												
ΦA-ΦB												
ΦA-ΦC												
ΦB-ΦC.												

Notes: *Megger test only should record 5 minute value*
Polarization Index (P.I.) is 10 min reading divided by 1 min reading

END OF SECTION

APPENDIX A
Geotechnical Engineering Report

Madrid CPWG

Geotechnical Engineering Report

Deeson Rd Pump Station & Force Main, Lakeland, Florida

Prepared for:

Wright-Pierce

Prepared by:

MADRID ENGINEERING GROUP, INC., dba MADRID CPWG
2030 State Road 60 East
Bartow, FL 33830
863-533-9007

Project No. 14930
November 2022

MADRID CPWG
2030 State Road 60 E
Bartow FL 33830-4268
Ph: (863) 533-9007
Fax: (863) 533-8997

November 8, 2022

Wright-Pierce
601 South Lake Destiny Road, Suite 290
Maitland, FL 32751
Attn: Dennis Davis

Re: Madrid Project No. 14930
Geotechnical Engineering Report
Deeson Rd Pump Station & Force Main
Lakeland, Florida

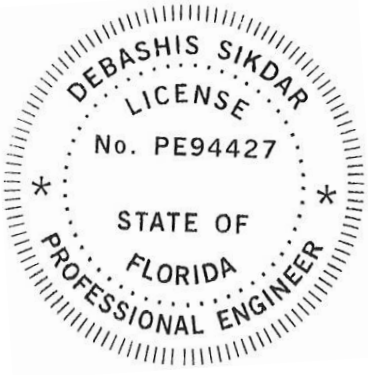
Dear Mr. Davis:

Madrid Engineering Group, Inc., dba Madrid CPWG, (Madrid) is pleased to submit this Geotechnical Engineering Report summarizing the results of our geotechnical subsurface exploration and engineering evaluation services completed for the above referenced project. The work was completed in general accordance with the authorized scope of work in our cost estimate proposal dated April 18, 2022 and provides general geotechnical recommendations regarding the proposed design and construction.

We appreciate the opportunity to be of service to you on this project and look forward to working with you on future projects. If you have any questions, please do not hesitate to contact us.

Sincerely,
Madrid Engineering Group, Inc. (EB 6509)

John Delashaw, P.E.
Principal Engineer
Florida P.E. No. 48154



11/08/2022
Debashis Sikdar, Ph.D., P.E.
Senior Geotechnical Engineer
Florida P.E. No. 94427

Attachment: Geotechnical Engineering Report

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 General

Madrid Engineering Group (Madrid) is pleased to submit this report summarizing the results from our subsurface soil exploration and geotechnical engineering evaluation for a proposed pump station abandonment and associated new force main at sites in Lakeland, Florida. We understand for this project, the force main will be 6-inch diameter, force main invert depth will correspond to a minimum of 3 feet of cover, and gravity main depths will correspond to up to 12 feet of cover. The project alignment extends from Blackwater Drive at the west to Lewellyn Road at the east. We understand the utility line will be approximately 11,000 feet long along the Deeson Road. Our conclusions and recommendations are based on the results of our field exploration, laboratory tests, and appropriate engineering analyses.

Madrid understands the following regarding the specific features:

Table 1.1

Project Features Relative to This Report	
Proposed Structure	Pump station abandonment and associated new force main

The purpose of this exploration was to collect subsurface soil and groundwater information to provide an evaluation of the existing subsurface conditions at the boring locations and to identify constraints or limitations (to the extent possible) that the subsurface conditions may impose on the planned construction. A marked-up site plan with boring locations was provided to Madrid and this was used to plan our field exploration. The scope of work for this investigation included review of existing geological data, a field exploration and laboratory testing program, evaluation of soil testing results, evaluating site suitability and providing general geotechnical recommendations for construction.

1.2 Site Location and Description

The subject site is generally located along the easement of the westbound lane of Deeson Road between Blackwater Drive at the west and Lewellyn Road at the east in Lakeland, Florida as shown on **Figure 1, Location Map**. Specifically, the property is located in Section 19 & 20, Township 27 South, Range 23 East in Polk County, Florida.

The site slopes up from Boring B-1 to B-5 (estimated elevation 107 to 119) then to estimated elevation 121 at the east side by Meadow Glen Road (**Boring B-6**) and then

slopes up to elevation 137 towards the end of the alignment (**Boring B-7**). GIS topographic information is provided on **Figure 2, USGS Topographic Map** and is in general agreement with Google Earth data. Boring/test elevations provided in this report were estimated based on Google Earth data; no surveying was completed by Madrid.

2.0 FIELD EXPLORATION

2.1 Standard Penetration Test (SPT) Borings

Between October 12 and October 13, 2022, Madrid explored subsurface conditions at the site by drilling seven (7) Standard Penetration Test (SPT) borings (SPT-1 through SPT-7) with truck mounted drilling equipment. Three borings were completed to 30 feet depth, one boring completed to 25 feet depth, and the remaining three borings were completed to 10 feet depth along the proposed utility line location. Boring locations and depths were performed in accordance with the client's recommendations. A GPS hand unit (typical accuracy of +/- 10 feet) was utilized in the field for location purposes. The boring locations are plotted on the proposed site plan (**Figure 4**) and should be considered approximate.

Disturbed samples from the SPT boring were obtained using a split-spoon sampler in general accordance with ASTM Specification D 1586, using a 1.4-inch I.D. split-spoon sampler driven with a 140-pound slide hammer (auto hammer) falling a distance of 30 inches. An engineering technician familiar with soil classification and field evaluations logged the boring in the field and placed samples in sealed containers and returned them to Madrid's laboratory for further classification. Upon completion, the borehole was backfilled in general accordance with industry standards. The soil boring log has been included with this report in **Appendix A**. Soil samples will be retained for a period of 3 months unless otherwise notified.

3.0 SUBSURFACE CONDITIONS

3.1 Soil Survey Map Review

The Natural Resources Conservation Services (NRCS) Soil Survey reports provide a general description of the typical shallow soil strata (about 6 feet) encountered within each particular soil mapping unit and reports typical depth to seasonal high water levels. The NRCS defines seasonal high water as "a zone of saturation at the highest average depth during the wettest season that is at least six inches thick, persists for more than a few weeks, and is within six feet of the soil surface." **Figure 3, NRCS/USDA Soils Map** shows the locations of the different soil types within the project limits; however, it should be noted that the borders between soil map units are very approximate. The soil survey for Polk County indicates soils at the site are comprised of **Pomona fine sand** (map unit 7), **Sparr sand, 0 to 5 percent slopes** (map unit 14), and **Hontoon Muck** (map

unit 35). The following are descriptions of each soil type listed in the soil survey manual, utilizing a soil number map unit system for easy identification on maps.

Pomona fine sand (map unit 7): *According to the NRCS, this Pomona soil is poorly drained on broad areas on flatwoods. Areas of this soil range from 5 to several hundred acres. Slopes are smooth to concave and are 0 to 2 percent. Typically, this soil has a very dark gray fine sand surface layer about 6 inches thick. The subsurface layer to a depth of about 21 inches is sand. It is light brownish gray in the upper part and light gray in the lower part. The subsoil to a depth of about 26 inches is dark reddish brown loamy fine sand. Below that is very pale brown and light gray fine sand to a depth of about 48 inches, light gray fine sandy loam to a depth of about 60 inches, and light gray sandy clay loam to a depth of about 73 inches. The underlying material is light gray loamy sand to a depth of at least 80 inches. This Pomona soil is reported to have a seasonal high water table within 12 inches of the surface for 1 to 4 months during most years. The available water capacity is low. This soil is severely limited as a site for urban development because of wetness. The absorption fields can be elevated by adding fill material. The high water table interferes with proper functioning of septic tank absorption fields. To overcome the problems caused by wetness on sites used for buildings or local roads and streets, a drainage system can be installed to lower the high water table or fill material can be added to increase the effective depth to the high water table.*

Sparr sand, 0 to 5 percent slopes (map unit 14): *According to the NRCS, this somewhat poorly drained soil is in areas of seasonally wet uplands and knolls on flatwoods. Areas of this soil range from about 10 to 40 acres. Slopes are smooth. Typically, this soil has a dark gray sand surface layer about 8 inches thick. The subsurface layer is brown to very pale brown sand to a depth of about 57 inches. The subsoil is sandy clay loam to a depth of at least 80 inches. It is very pale brown in the upper part, yellowish brown in the next part, and light gray in the lower part. This Sparr soil has a seasonal high water table at a depth of 20 to 40 inches for 1 to 4 months in most years. The available water capacity is low. Wetness is a severe limitation affecting septic tank absorption fields, sewage lagoons, and sanitary landfills and a moderate limitation affecting sites for dwellings without basements, small commercial buildings, and local roads and streets.*

Hontoon Muck (map unit 35): *According to the NRCS, Hontoon muck is very poorly drained soil in swamps and marshes. Slopes are dominantly less than 1 percent but range from 0 to 2 percent. Typically, this soil is black muck to a depth of about 11 inches and dark brown muck to a depth of about 75 inches. The underlying material is black sandy loam to a depth of at least 80 inches. This Hontoon soil has a seasonal high water table that is at or above the surface except during extended dry periods. The available water capacity is very high. Permeability is rapid. This soil has very severe limitations affecting urban and recreational uses because of the ponding and low strength.*

3.2 Subsurface Conditions

Boring B-1 encountered loose sand with varying amounts of silt and clay (SP-SM and SC) from surface to 6 feet followed by interbedded layers of clay (CH and CL) and limestone (LS) to the termination depth of the boring at 30 feet. The remaining borings encountered interbedded layers of very loose to medium dense sand with varying amounts of silt and clay (SP, SP-SM, SM, and SC) to the maximum termination depth of each of the borings. Of these last six borings, only Boring B-6 encountered organic silty sand layer from 4 to 6 feet bgs. The soils are loose near the surface with generally increasing densities with depth from the ground surface. No losses of drilling fluid circulation were reported in any of the SPT borings. The general soil profiles described above and as presented on the boring logs are based on our interpretation of subsurface conditions encountered at the boring locations only. Boundaries between soil layers are approximate and for illustration purposes only. Variations in soil conditions in both horizontal and vertical directions different from those presented are likely to exist between boring locations.

3.3 Groundwater Conditions and Seasonal High Ground Water

The water table was not always apparent in the top 10 feet of the SPT borings. When apparent, the water table was found between 2 and 8 feet bgs. Seasonal fluctuations in the groundwater level should be anticipated due to variations in rainfall. The Soil Survey for Polk County, Florida describes the seasonal high water table (SHWT) for the map units to be within 12-40 inches of the surface for most of the alignment.

3.4 Laboratory Test Results

Laboratory tests for natural water content (ASTM D2216), percent passing the No. 200 sieve (ASTM D1140), and Organic Content tests (ASTM D2974) were performed on selected samples retrieved during the field exploration from the SPT boring to verify the visual and tactile soil classifications. Laboratory test reports are included in **Appendix B**.

Table 3.4

Lab Summary	
<#200 Sieve	10.3% - 61.7%
% Moisture	11.6% - 239.0%
OC	43.2%
LL **PL** **PI**	67 24 43

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General

The following conclusions and recommendations are based on our understanding of the proposed project, the data obtained from the soil borings, experience with similar conditions, and generally accepted principles and practices of geotechnical engineering. Elevations vary gently across the project site and actual soil conditions between borings may vary. The soil conditions are generally loose sandy soils grading to medium dense around 8-10 feet bgs. The sands have varying fines content with silty and clayey fines when encountered. Clayey sands and clay may retain moisture and can be difficult to compact; clays should not be used as trench backfill.

Typically, new utility lines are assumed to be installed between depths of approximately 3 to 12 feet below existing grade. Assuming this invert depth range, and based on the results of the boring program, the bases of trench excavations will typically expose loose to medium dense, but mostly loose, variably silty sands and clayey sand (SP-SC, SP-SM, SM and SC); clean sand (SP) layers are also encountered in several borings in this depth interval. In the area of B-1 plastic clays (CH/CL) and limestone (LS) may be encountered and in the area of B-6 organic soils (in the area of the Hontoon Muck (map unit 35) soil unit) may be encountered. Dewatering systems likely will be required for much of the pipeline alignment, given the water table at relatively shallow depth. Loose clean sands may not be stable, even during the short-term, during excavations and the need for trench wall bracing or flatter than typical excavation slopes should be anticipated by the contractor; saturated loose clean and silty sands have a tendency to flow into unsupported excavations.

Prior to construction, bulk samples representative of anticipated subgrade and fill soils should be collected and subjected to Standard Proctor Maximum Dry Density (SPMDD). Existing sandy soils excavated and intended for reuse as backfill may require moisture conditioning to permit adequate compaction.

4.2 Site Preparation and Earthwork

4.2.1 Clearing and Grubbing

After clearing and grubbing, in smaller excavations, hand-operated compaction equipment will be required. Compaction should continue until a density of at least 100 percent of Standard Proctor maximum dry density (SPMDD) (ASTM D-698) is achieved over the structure areas. Any soft, rolling or otherwise suspect areas should be

investigated and any unsuitable soils and/or unstable soil conditions should be removed and replaced with structural fill as described below.

4.2.2 Excavation and Shoring

In general, the anticipated depth of trench excavations typically ranges from about 3 to 12 feet, but locally as deep as about 15 feet or more below existing grade at road crossings may be required. Trenches should be sufficiently wide to permit proper compaction along all sides of pipes and structures. The bases of trench excavations will expose loose sandy soil conditions at most locations along the pipeline route. Very Loose or yielding subgrade soils should be excavated and replaced.

Braced or shored excavations may be required for space limitations using trench boxes or other stabilization methods. Excavation stability is the responsibility of the contractor. All excavations should conform to the Occupational Safety and Health Act (OSHA) requirements for Type C soils as described Federal Register 29 CFR Part 1926. Excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth unless specific provisions for surcharge loading have been included in the design of the shoring system.

Design of a shoring system is the responsibility of the selected contractor. A number of variable factors, such as nature and strength of excavated soils, depth of excavation and groundwater, proximity of adjacent structures, and economics of construction method, etc., will affect the choice of support method. All vertical shoring or prefabricated trench lining systems should be continuous and maintained in place to assure adequate temporary stability during backfilling of the pipe trench as recommended subsequently.

For design of below grade structures or shoring, the following general design parameters are recommended:

Table 4.2.2 – Lateral Earth Pressure Design Parameters

Depth, ft.	Soil Type	Unit Weight (sat./buoy, pcf)	Phi Angle	Cohesion (psf)	Lateral Earth Pressure Parameters		
					Ko	Kp	Ka
0 to 8	Loose Sand	110 / 48	28	- - -	0.53	2.77	0.36
8 to 30	Medium Dense Sand	120 / 58	30	- - -	0.50	3.00	0.30

The earth pressure parameters in **Table 4.2.2** do not include hydrostatic pressure. We recommend that below grade retaining structures should consider water levels at potential flooded conditions and hydrostatic pressure be added for the soil layers located below the water table in addition to the lateral pressures mentioned in Table 4.2.2.

4.2.3 Dewatering

When it was apparent within 10 feet, groundwater was encountered between 2 and 8 feet below ground surface at the boring locations during the time of drilling. Depending upon the depth of excavation and time of year when construction is scheduled, groundwater control likely will need to be taken into account by the contractors.

We recommend that, where necessary, a dewatering system be designed and installed to draw the groundwater table down to a minimum depth of two feet below the final excavated grade for pipelines. If needed, for excavations up to 10 feet depth, depending on the local soil profile present, a shallow well-point system may be adequate for trenches and small excavations up to approximately 50 feet in plan dimension. Excavations in excess of 15 feet depth may require a multi-stage well-point system, deep wells or a single stage well-point installed from a reduced grade elevation to accomplish the recommended drawdown. Sump pumps may be effective, but only to locally dewater the soils; they may only be useful at very localized installations. The contractor should employ a registered professional engineer to design all shoring and dewatering systems.

4.2.4 Structural Fill and Compaction

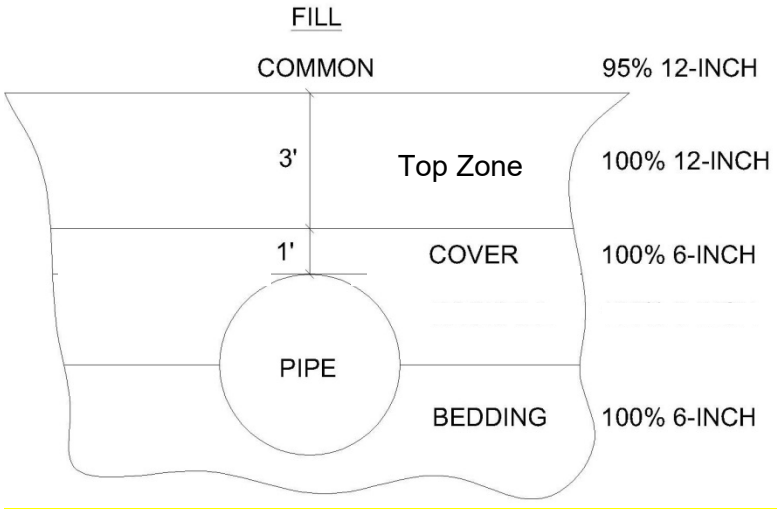
All structural soils (existing or placed) within 2 feet beneath the bottom of foundations and any other concrete slabs-on-grade should meet gradation (no more than 12 percent fines or 4 percent organics) requirements and compacted to achieve the minimum density requirement of 100% of SPMDD. This will likely require excavation and compaction below footing subgrade level for the utility line. Based on the boring logs, most of the shallower in-situ sandy soils likely meet gradation and organic content requirements but will require compaction to achieve minimum density requirements. Foundation subgrade soils should be inspected to verify that they meet the gradation and organic content requirements, compacted, and tested to verify in-place density to a depth of 24 inches below all footing bottoms.

Fill placement in large areas should be completed in lifts no greater than 12 inches in thickness and compacted to at least 100% of SPMDD. If compaction cannot be achieved at 12 inch lifts, thinner lifts may be required. It is noted that heavy vibratory compaction near other structures has the potential to cause damage. Foundation soils in smaller footing excavations where compaction must be achieved with smaller hand operated equipment should be compacted in lifts no greater than 6 inches in thickness and compacted to at least 100% of SPMDD.

Prior to construction, bulk samples representative of anticipated subgrade and fill soils should be collected and subjected to Standard Proctor testing. Existing clean sand soils excavated from footings intended for reuse as backfill may require moisture conditioning to permit adequate compaction.

4.2.5 Pipe Bedding and Backfilling

The following diagram indicates the typical pipe backfill limits and compaction requirements (6 or 12-inch lifts) that we recommend:



Clean fine sands (SP) containing less than five percent passing the U.S. standard No. 200 sieve and less than four percent organic matter (as determined by ASTM D2974) may be used as select sand pipe bedding material. Most of the soils encountered along the pipeline route should meet this criterion. Import of fill should not be necessary for the pipeline backfill. Suitable pipe bedding should be free of stones, gravel, organics, vegetation and other deleterious material, placed in uniform loose lifts not exceeding six inches thick and compacted to at least 100 percent of its maximum dry density as determined by ASTM D698 (Standard Proctor-SPMDD). Bedding material within the middle 1/3 of the pipe diameter should be loosened for better seating of the pipe in the bedding soil and shaped to allow for bell joints if applicable. Pipe bedding material should be placed from one foot below to at least half-way up the pipe. Particular care needs to be exercised during pipe bedding placement and compaction around pipe haunches, elbows, and curves. Loose bedding materials may subsequently compact in-service, if subjected to dynamic or vibrational loading due to surge pressures, resulting in excessive pipe deflections and possibly failure. Soils in the cover zone (from half-way up the pipe to 1-foot over the pipe, as shown on the graphic above) should consist of clean to relatively clean sand (SP) or slightly silty sand (SP-SM) with no more than 12% silty fines passing the No. 200 sieve and less than 4% organic content, and also compacted to 100% of the SPMDD in lifts no greater than 6-inch compacted thickness. Compaction to 100% of the SPMDD should be performed at the base of all excavations prior to placing the first layer of backfill.

Excavation backfill material more than 1 foot above the pipe top zone should consist of granular soils with less than 15 percent fines content passing the No. 200 sieve

and an organic content of not more than 4 percent generally conforming to USCS soil types SP to SP-SM and SM; use of Clayey Sand (SC) may present moisture conditioning problems and is not recommended. It appears that nearly all of the excavated soils will meet these requirements. Organic soils, if encountered, are not suitable backfill soils in any location and should be replaced with suitable fill. Excavation backfill typically should be placed in lifts no greater than 12 inches in compacted thickness and compacted to 100 percent of SPMDD. Common fill used more than 3 feet above the top of pipe and outside of structure or pavement areas can have up to 20% fines and be compacted to 90 percent of SPMDD unless under structures or roadways which must maintain a minimum compaction of 95% of SPMDD or as otherwise required for structure or roadway backfill requirements. Excavated spoil material intended for reuse as backfill will likely require moisture conditioning to permit adequate compaction.

4.2.6 Unsuitable Materials

In general, highly organic soils or clayey sand or clay should not be re-used as backfill as it is generally difficult to compact and subject to long term settlement/decay. Classification of soils as suitable for use as backfill should be monitored continuously during construction because the limited exploration performed for this study will not have identified all areas with unsuitable soils. The soils are intermittent and very heterogenous and some measure of clayey sands were encountered in the anticipated depth of excavation at most locations. The poorest soils were encountered at boring B-1 where clay (CH/CL) and limestone (LS) was encountered down to 13 feet bgs and at B-6 where an organic layer was encountered between 4 to 6 ft depth.

4.3 Directional Drilling

Directional drilling or jack-and-bore techniques may be used at roadway crossings to avoid open-cutting the roadway. The borings completed indicate that a loose to medium dense sandy soil profile dominates the pipeline alignment; however, it is likely that a variable soil type and density will be encountered at the drill head (mixed face condition). Actual soil conditions between borings will vary. Most of these sandy soils will be loose but occasional very loose soil pockets will be encountered. Stability of directional boreholes can be problematic under these conditions. Similarly, excavation walls for directional bore pits may be unstable if sloped too steeply.

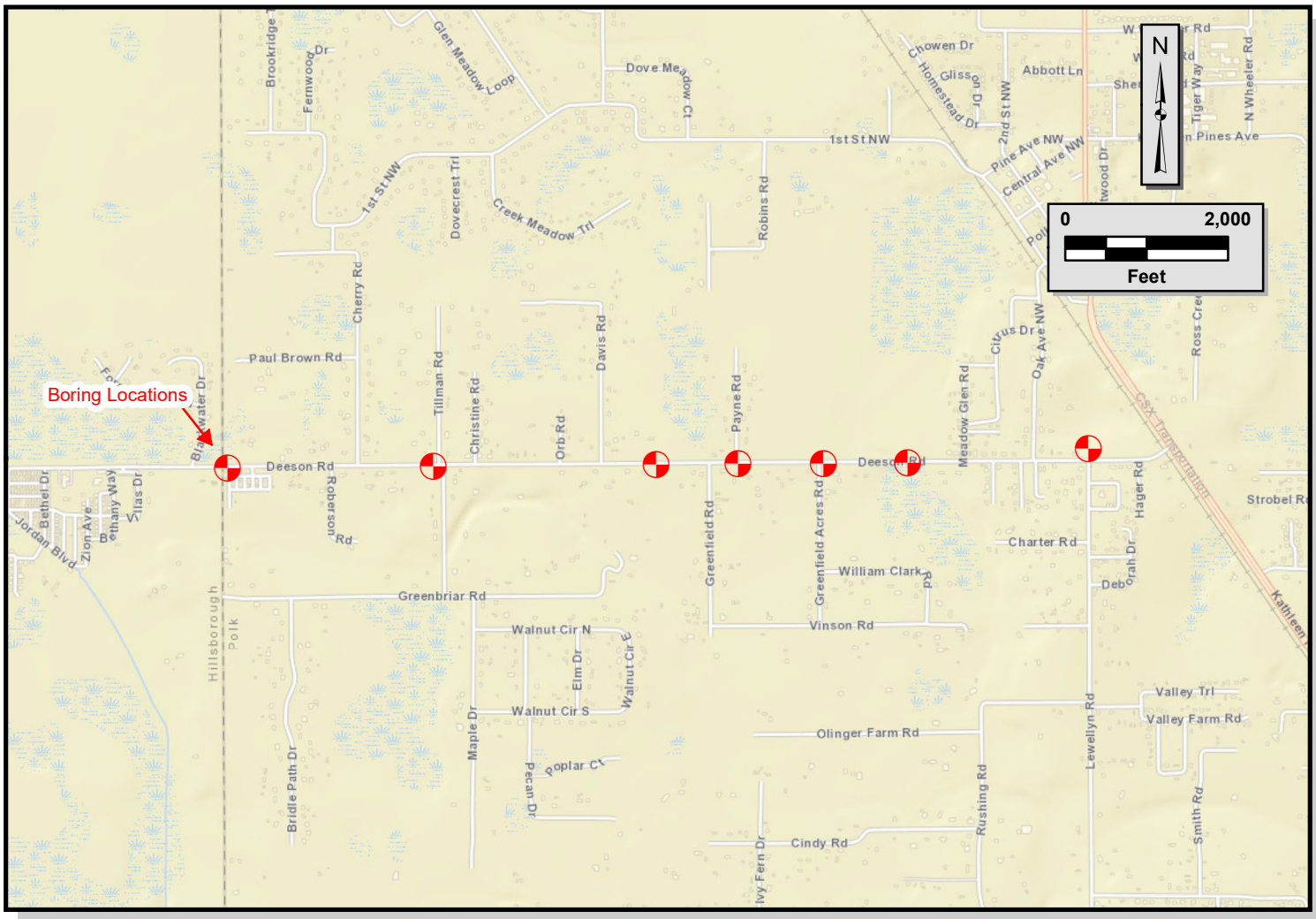
4.4 Quality Assurance

We recommend implementing a comprehensive quality assurance program to verify that all site preparation and foundation construction is conducted in accordance with the recommendations herein and the appropriate plans and specifications. It is strongly recommended that Madrid be retained to perform materials testing and inspection services to observe that the subsurface conditions are as we have discussed herein and that pipe bedding, ground densification, organics removal and fill placement

is in accordance with our recommendations. Madrid cannot accept responsibility for any conditions which deviate from those described in this report if not engaged to provide construction observation and testing for this project. An on-site engineering technician should monitor all site preparation to verify that all deleterious materials have been removed and should observe earthwork activities to verify that the utility line backfill soils conform to the recommendations herein. In-situ density tests should be conducted during filling activities to verify that the required densities have been achieved. In-situ density values should be compared to laboratory Proctor moisture-density results for natural and fill soils to confirm they meet minimum compaction requirements.

5.0 LIMITATIONS

This report has been prepared for Wright-Pierce for the proposed Deeson Road Water Main Improvements project. The recommendations presented herein are based on Madrid's interpretation and understanding of site conditions and proposed development. This report is intended for use by the designers of this project; it is not a specification document and is not intended for use as a part of the specifications. Varying degrees of non-uniformity of the horizontal and vertical soil conditions may exist between boring locations. The study reported herein has been conducted in accordance with the generally accepted standards, principles and practices in the geotechnical engineering profession. No other warranty, expressed or implied, is made. Madrid is not responsible for the independent conclusions, opinions, and/or recommendations made by others based on the field investigation and laboratory testing data presented in this report. Any variations in structure location or anticipated loading from those indicated in this report should be brought to Madrid's attention as such changes may affect Madrid conclusions and recommendations. If Madrid is not retained to perform these functions, Madrid will not be responsible for the impact of those conditions. This study is based on a relatively shallow and widely-spaced geotechnical exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.



Sources: GIS Information (ESRI)

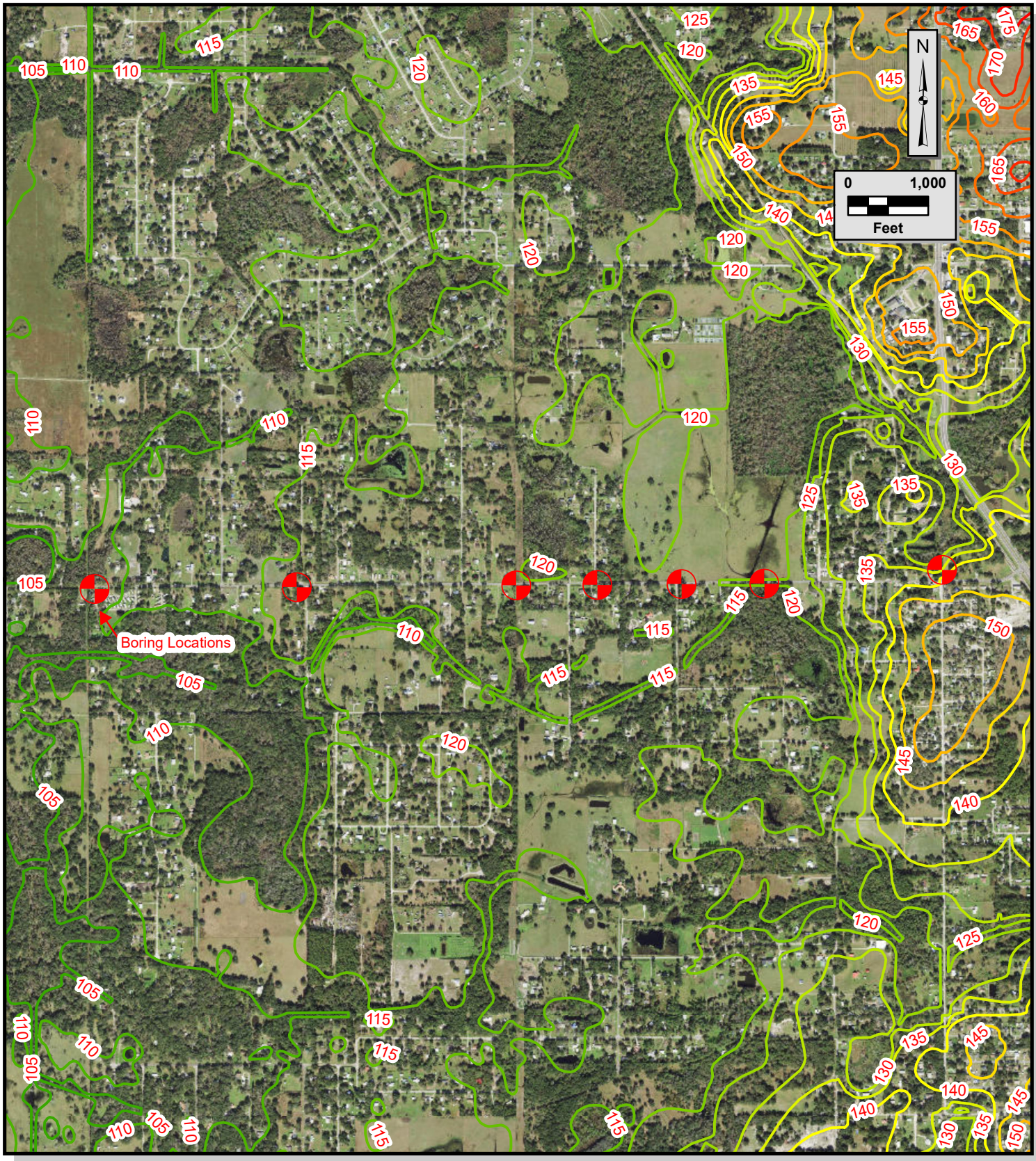
MADRID CPWG
2030 State Road 60 East
Bartow, Florida 33830
863 533-9007 Fax: 863 533-8997
EB-0006509

Wright-Pierce

FIGURE 1
Site Location Map
Deeson Rd Pump Station & Force Main
Lakeland, Florida

Project Number:
14930

Notes:	Drawn By: CJ	Checked By: DeS



Source: GIS Information (ESRI), Topographic Information (USGS)

MADRID CPWG
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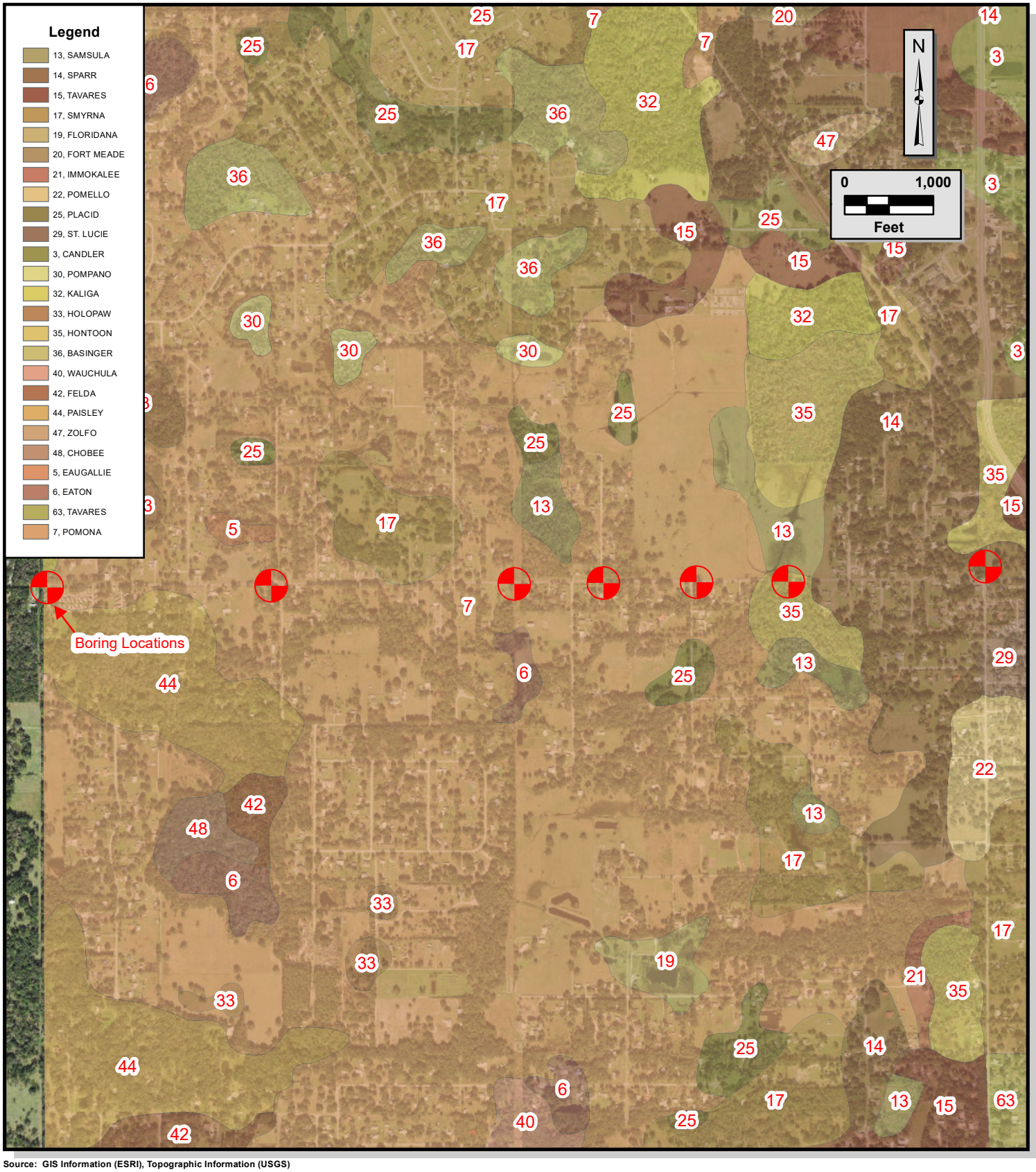
Bartow, Florida 33830
863 533-9007 Fax: 863 533-8997
EB-0006509

Wright-Pierce

FIGURE 2
USGS Topographic Map
Deeson Rd Pump Station & Force Main
Lakeland, Florida

Drawn By: CJ	Checked By: DeS	Project Number: 14930



Source: GIS Information (ESRI), Topographic Information (USGS)

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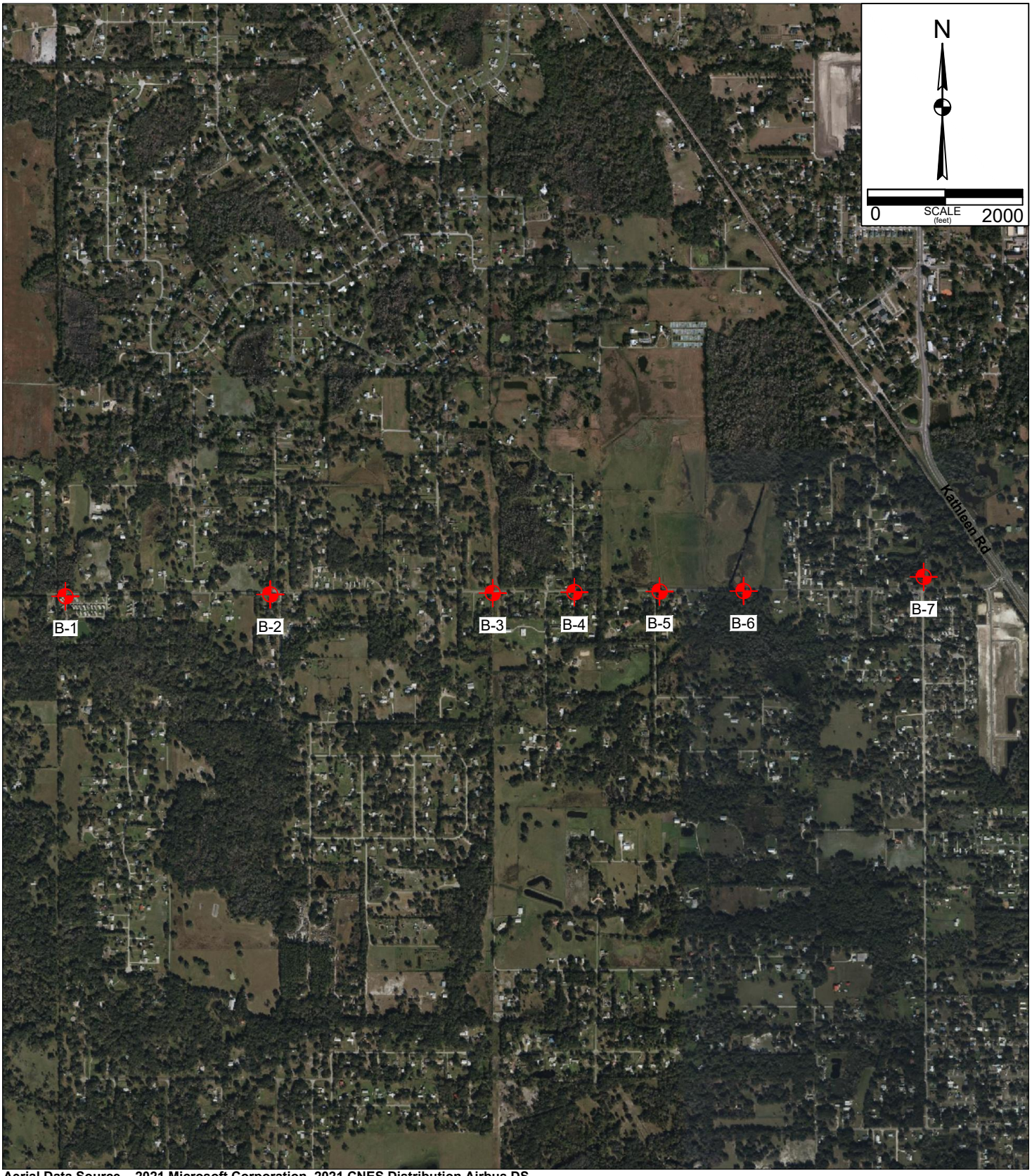
FIGURE 3
NRCS/USDA Soils Map
Deeson Rd Pump Station & Force Main
Lakeland, Florida

Drawn By: CJ	Checked By: DeS	Project Number: 14930



Aerial Data Source – 2021 Microsoft Corporation, 2021 CNES Distribution Airbus DS.

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Wright-Pierce

FIGURE 4
Boring Location Plan
Deeson Rd Pump Station & Force Main
Lakeland, Florida

Project Number:
14930

Notes: Base map provided by Client.	Drawn By: CJ	Checked By: DeS

Appendix A

BORING NO. B-1

DATE DRILLED 10/12/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table not apparent within 10' bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value
	Gray slightly silty sand (SP-SM)	0			
2	Brown clayey sand (SC) <#200 = 25.9%		105		
	Medium dense yellow	5		2-2-5-8	7
6	Stiff yellow highly plastic clay (CH) <#200 = 61.7% LL = 67 PL = 24 PI = 43		100	4-6-7-5	13
8	Medium dense light gray limestone (LS)			7-7-4-17	11
		10			
12	Soft light gray clay with limestone (CL)		95		
				7-2-1	3
		15			
17	Very dense light gray limestone (LS)		90		
				12-50/4	Refusal
		20			
			85		
				19-37-50/2	Refusal
		25			
			80		
				22-36-50/2	Refusal
		30			

● STANDARD PENETRATION TEST

0 10 20 30 40 60 80 100

BORING LOCATION: 28.113201°,-82.055992°

MADRID CPWG STANDARD LOG W/ LAB 14930 BORING LOGS.GPJ NEW MEG TEMPLATE.GDT 10/28/22

BORING NO. B-2

DATE DRILLED 10/12/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table not apparent within 10' bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value	● STANDARD PENETRATION TEST (0 10 20 30 40 60 80 100)
	Medium dense grayish brown slightly clayey sand (SP-SC)	0		2-3-6-7	9	
2	Loose dark grayish brown slightly silty sand (SP-SM) <#200 = 10.3%		110	1-1-2-2	3	
	Very loose pale brown	5		1-1-1-2	2	
6	Medium dense gray clayey sand (SC) <#200 = 20.6%			2-3-6-9	9	
8	Very dense very pale brown sand (SP)		105	9-11-50/5	Refusal	
		10				

BORING LOCATION: 28.113266°,-82.048165°

BORING NO. B-3

DATE DRILLED 10/13/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table encountered at 96" bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value	● STANDARD PENETRATION TEST (0 10 20 30 40 60 80 100)
	Loose dark brown slightly silty sand (SP-SM)	0		2-4-4-2	8	
2	Medium dense pale brown sand (SP)		115	3-6-7-6	13	
	Very pale brown	5		5-6-7-5	13	
6	Loose light gray clayey sand (SC) <#200 = 19.1%			2-2-4-4	6	
8	Medium dense light gray slightly clayey sand (SP-SC)		110 ▼	5-7-10-9	17	
		10				

BORING LOCATION: 28.113322°,-82.039661°

BORING NO. B-4

DATE DRILLED 10/13/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table encountered at 72" bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value	● STANDARD PENETRATION TEST (0 10 20 30 40 60 80 100)
	Loose gray slightly silty sand (SP-SM)	0		3-3-3	6	
2	Loose gray sand (SP)		115	2-2-5	7	
	Yellowish brown	5		1-2-3	5	
6	Very loose yellowish brown silty sand (SM) <#200 = 13.3%		110	2-1-1	2	
8	Loose light gray sand (SP)			1-1-3	4	
		10				
12	Medium dense light gray clayey sand (SC)		105			
				10-10-14	24	
		15				
	Dense pale brown <#200 = 24.2%		100			
				10-14-11	25	
		20				
	Loose very pale brown		95			
				3-2-2	4	
		25				

BORING LOCATION: 28.113347°,-82.036538°

BORING NO. B-5

DATE DRILLED 10/12/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table not apparent within 10' bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value
	Loose dark gray silty sand (SM)	0		1-3-5-8	8
2	Medium dense brown slightly silty sand (SP-SM)			6-8-10-9	18
4	Loose pale brown clayey sand (SC) <#200 = 22.9%		115		
		5		4-4-4-4	8
	Medium dense very pale brown			4-6-6-7	12
8	Medium dense very pale brown slightly clayey sand (SP-SC)		110	4-6-10-11	16
		10			
	Light gray		105	6-4-6	10
		15			
17	Loose light gray clayey sand (SC)		100	2-2-3	5
		20			
	Firm light gray <#200 = 34.7%		95	2-2-2	4
		25			
	Loose light gray		90	1-2-4	6
		30			

● STANDARD PENETRATION TEST

0 10 20 30 40 60 80 100

BORING LOCATION: 28.113371°,-82.033283°

BORING NO. B-6

DATE DRILLED 10/13/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

REMARKS: Water table encountered at 24" bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Blows	N-Value
0	Medium dense brown slightly silty sand (SP-SM)	-5-6-6	11
	Loose yellowish brown	5-3-3-3	6
4	Very loose dark gray organic silty sand (OL) <#200 = 30.9% organic content = 43.2%	1-1-1-1	2
6	Medium dense light gray sand (SP)	10-9-10-12	19
		4-5-11-11	16
12	Medium dense brown slightly silty sand (SP-SM)	5-5-6	11
17	Medium dense light gray clayey sand (SC) <#200 = 27.9%	6-8-10	18
		6-11-8	19
27	Medium dense light gray slightly clayey sand (SP-SC)	8-12-10	22

Depth (ft) | Elev. (ft): 0 / 120, 5 / 115, 10 / 110, 15 / 105, 20 / 100, 25 / 95, 30

● STANDARD PENETRATION TEST
0 10 20 30 40 60 80 100

BORING LOCATION: 28.113387°,-82.030074°

BORING NO. B-7

DATE DRILLED 10/12/2022
PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main

TEST BORING RECORD
Madrid CPWG

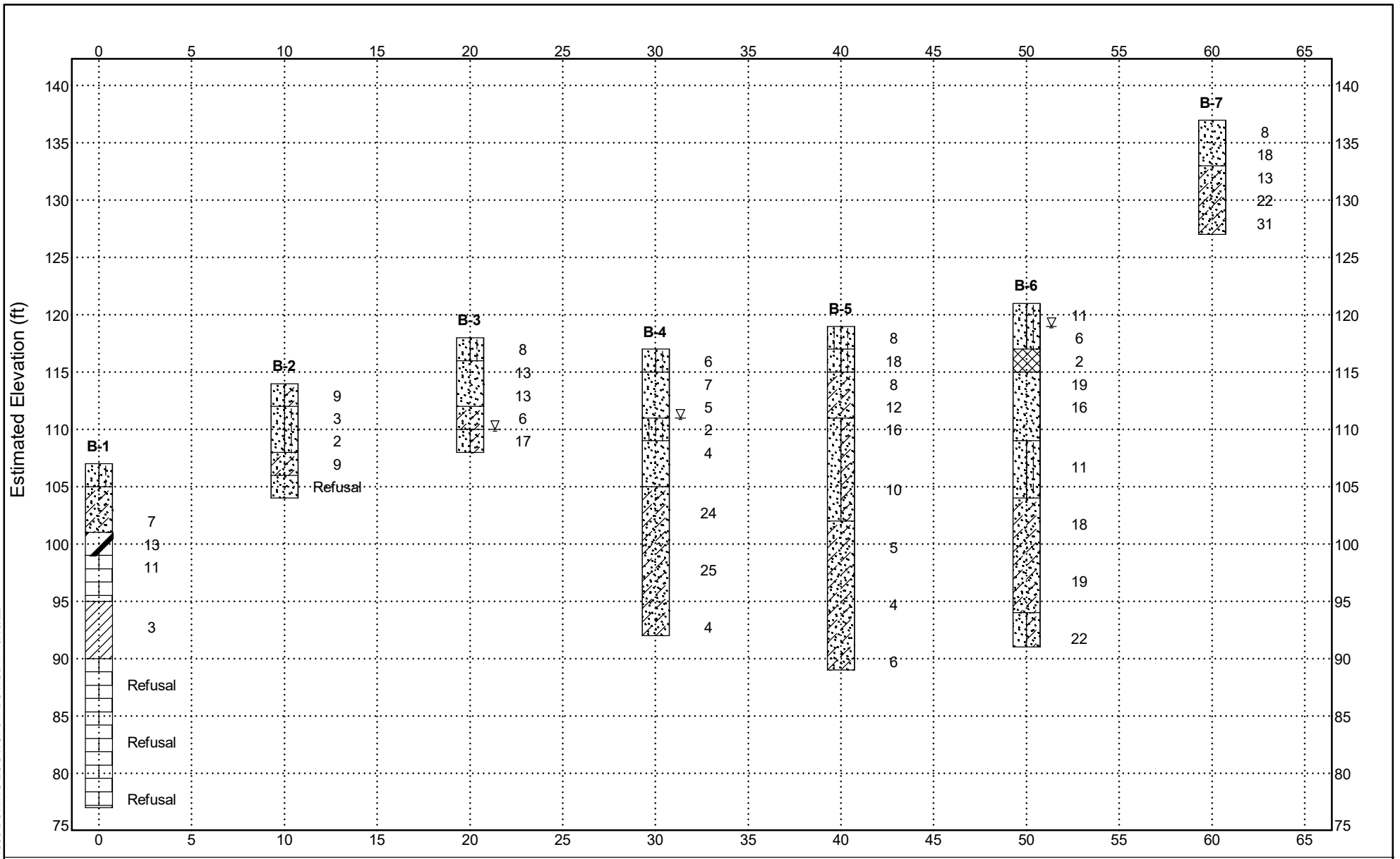
REMARKS: Water table not apparent within 10' bgs. No loss of circulation. Auto hammer used.

Depth (ft)	DESCRIPTION	Depth (ft)	Elev. (ft)	Blows	N-Value
	Loose gray sand (SP)	0		4-4-4-5	8
	Medium dense yellow		135	7-9-9-8	18
4	Medium dense yellow clayey sand (SC) <#200 = 30.5%	5		3-5-8-7	13
	Medium dense yellow		130	6-10-12-12	22
	Dense very pale brown <#200 = 24.4%	10		12-14-17-16	31

● STANDARD PENETRATION TEST

0 10 20 30 40 60 80 100

BORING LOCATION: 28.113864°,-82.023192°



TEST BORING FENCE RECORD

PROJECT NUMBER 14930
PROJECT Deeson Rd Pump Station & Force Main
PAGE 1 OF 1

Madrid CPWG

LEGEND

- Water Table
- Loss of Drilling Fluid Circulation
- USCS slightly silty sand
- USCS clayey sand
- USCS highly plastic clay
- Limestone
- USCS clay
- USCS slightly clayey sand
- USCS sand
- USCS silty sand
- USCS organic silt or clay

FENCE NO HORIZONTAL UNIT 14930 BORING LOGS.GPJ FDOT.GDT 10/19/22

Appendix B

2030 State Road 60 East
Bartow, Florida 33830
(863)533-9007

ASTM D1140 MOISTURE / PERCENT < No. 200 SIEVE

Project Number: 14930
Project Name: Deeson Rd Pump Station & Force Main
Project Location: Lakeland **Date Tested:** 10/18/2022
Client: Wright-Pierce **Tested By:** BJN

Sample	Cont. Name	W_C+S_W (g)	W_C+S_D (g)	W_C (g)	Solids Content (%)	Moisture Content (%)	W_C+S_R (g)	<#200 (%)
B-1 2-4'	113	118.92	101.52	8.17	84.3%	18.6%	77.35	25.9%
B-1 6-8'	226	87.18	67.60	8.14	75.2%	32.9%	30.93	61.7%
B-2 2-4'	223	113.76	91.94	8.17	79.3%	26.0%	83.27	10.3%
B-2 6-8'	132	120.42	104.06	8.48	85.4%	17.1%	84.34	20.6%
B-3 6-8'	117	111.90	98.17	8.21	86.8%	15.3%	80.98	19.1%
B-4 6-8'	236	121.56	104.39	8.24	84.8%	17.9%	91.62	13.3%
B-4 18.5-20'	233	117.55	101.56	8.18	85.4%	17.1%	78.93	24.2%
B-5 4-6'	234	113.99	98.24	8.18	85.1%	17.5%	77.62	22.9%
B-5 23.5-25'	218	110.79	86.54	8.19	76.4%	31.0%	59.33	34.7%
B-6 4-6'	135	76.95	36.70	8.18	41.5%	141.1%	27.90	30.9%
B-6 18.5-20'	235	110.74	97.24	8.18	86.8%	15.2%	72.36	27.9%
B-7 4-6'	209	109.12	94.71	8.16	85.7%	16.6%	68.30	30.5%
B-7 8-10'	119	100.79	91.14	8.15	89.6%	11.6%	70.90	24.4%

W_C = Weight of Container
S_W = Weight of Wet Sample
S_D = Weight of Dry Sample
S_R = Weight of Sample Retained

$$\text{Solids Content } (\%) = \frac{S_D}{S_W} * 100$$

$$\text{Moisture Content } (\%) = \frac{W_{H_2O}}{S_D} * 100$$

$$< \#200 \text{ Sieve } (\%) = \frac{(S_D - S_R)}{S_D} * 100$$

2030 State Road 60 East
Bartow, Florida 33830
(863)533-9007

AASHTO T267 ORGANIC CONTENT

Project Number: 14930
Project Name: Deeson Rd Pump Station & Force Main
Project Location: Lakeland
Date Tested: 10/18/2022
Client: Wright-Pierce
Technician: BJN

Sample	Container Name	W_C+S_W (g)	W_C+S_D (g)	W_C (g)	Solids Content (%)	Moisture Content (%)	Furnace Container Name	$W_{fC}+S_D$ (g)	$W_{fC}+S_{FD}$ (g)	W_{fC} (g)	Organic Content (%)
B-6 4-6'	19	63.86	24.25	7.68	29.5%	239.0%	2	71.85	64.66	55.21	43.2%

Average Organic Content (%): 43.2%

W_C = Weight of Container
S_W = Weight of Wet Sample
S_D = Weight of Dry Sample
W_{fC} = Weight of Furnace Container
S_{FD} = Weight of Furnace Dried Sample

$$\text{Solids Content (\%)} = \frac{S_D}{S_W} * 100$$

$$\text{Moisture Content (\%)} = \frac{(S_W - S_D)}{S_D} * 100$$

$$\text{Organic Content (\%)} = \frac{(S_D - S_{FD})}{S_D} * 100$$

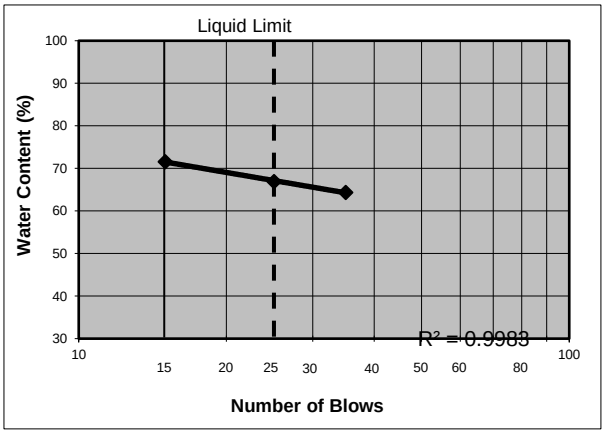
2030 State Road 60 East
Bartow, Florida 33830
(863) 533-9007

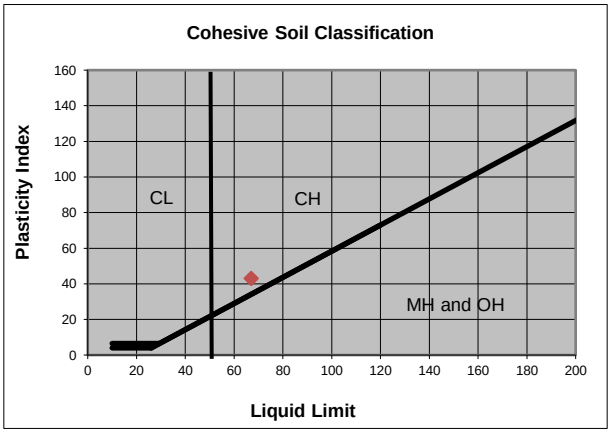
ATTERBERG LIMITS DETERMINATION AASHTO T89/90

Project Number: 14930
Project Name: Deeson Rd Pump Station & Force Main
Project Location: Lakeland
Client: Wright-Pierce
Date Tested: 10/18/2022
Technician: BJN

Sample Number: B-1
Sample Location: 6 TO 8'
Soil Description: highly plastic very sandy clay
USCS Code: CH

Liquid Limit					
Sample Number	26	37	39		
W_C+S_W (g)	23.14	22.60	23.19		
W_C+S_D (g)	19.40	18.97	19.21		
W_C (g)	13.59	13.55	13.65		
S_D (g)	5.81	5.42	5.56		
W_{H2O} (g)	3.74	3.63	3.98		
Number of Blows	35	25	15		
Moisture Content (%)	64.37	66.97	71.58		





Plastic Limit				
Sample Number	11	16	22	
W_C+S_W (g)	17.75	17.73	17.70	
W_C+S_D (g)	16.93	16.94	16.88	
W_C (g)	13.58	13.58	13.45	
S_D (g)	3.35	3.36	3.43	
W_{H2O} (g)	0.82	0.79	0.82	
Moisture Content (%)	24.48	23.51	23.91	

Summary	
% < #200 =	**61.7**
Liquid Limit =	**67**
Plastic Limit =	**24**
Plasticity Index =	**43**

W_C = Weight of Container
S_W = Weight of Wet Sample
S_D = Weight of Dry Sample

$$\text{Moisture Content (\%)} = \frac{W_{H_2O}}{S_D} * 100$$

σ = 0.40

APPENDIX B
Polk County's Latest RTU/Pump Control Panel Drawings

LIFT STATION - DRAWING LIST		
SHEET NO.	DRAWING NO.	DESCRIPTION
2	J9239-LS-LY-001	PANEL LAYOUT
3	J9239-LS-LY-002	BACK PLATE LAYOUT
4	J9239-LS-LY-003	PANEL CUTOUTS FOR ENCLOSURE
5	J9239-LS-BOM-001	BILL OF MATERIAL
6	J9239-LS-PW-001	240VAC WIRING SCHEMATIC
7	J9239-LS-PW-001A	240VAC STORM SWITCH
8	J9239-LS-PW-002	120VAC WIRING SCHEMATIC
9	J9239-LS-PW-003	24VDC WIRING SCHEMATIC
10	J9239-LS-DI-001	DIGITAL INPUTS
11	J9239-LS-DI&DO-001	DIGITAL INPUTS & OUTPUTS
12	J9239-LS-AI-001	ANALOG INPUTS
13	J9239-LS-CM-001	NETWORK COMMUNICATIONS
14	J9239-LS-NP-001	NAME PLATE

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

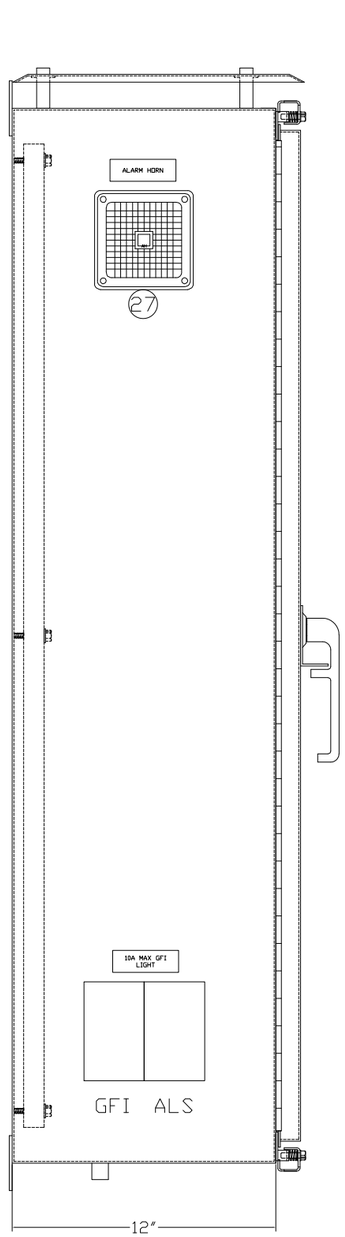
ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

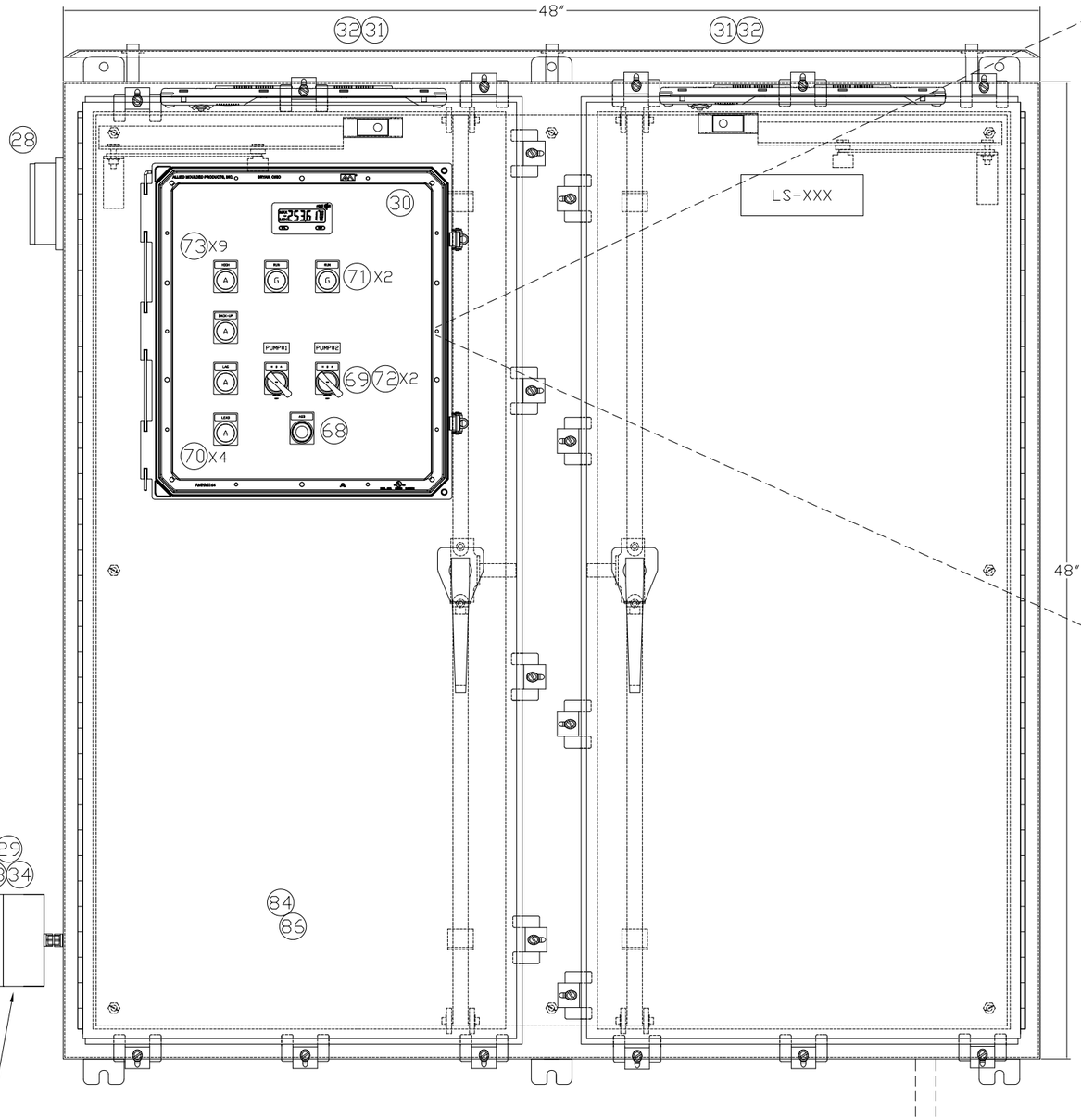
CURRYCONTROLSCOMPANY
4245 S. Pipkin Road - Lakeland- FL 33811
P.O. Drawer 5408 - Lakeland, FL 33807
(863) 646-5781 - FAX: (863) 646-3899

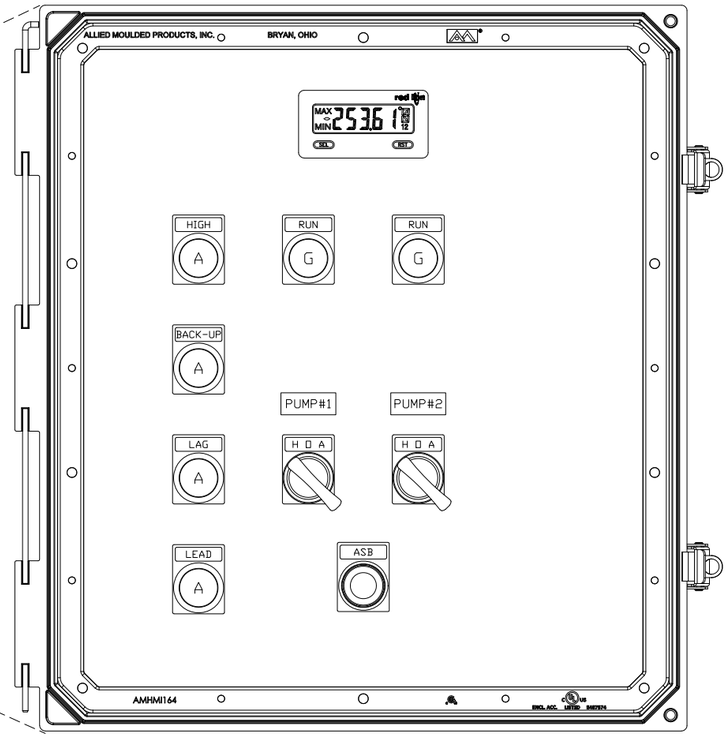
DRAWING LIST
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-DL-001







ENCLOSURE ENTRIES

USE HUBS OR FITTINGS WITH SAME ENVIONMENTAL RATING AS THE ENCLOSURE

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

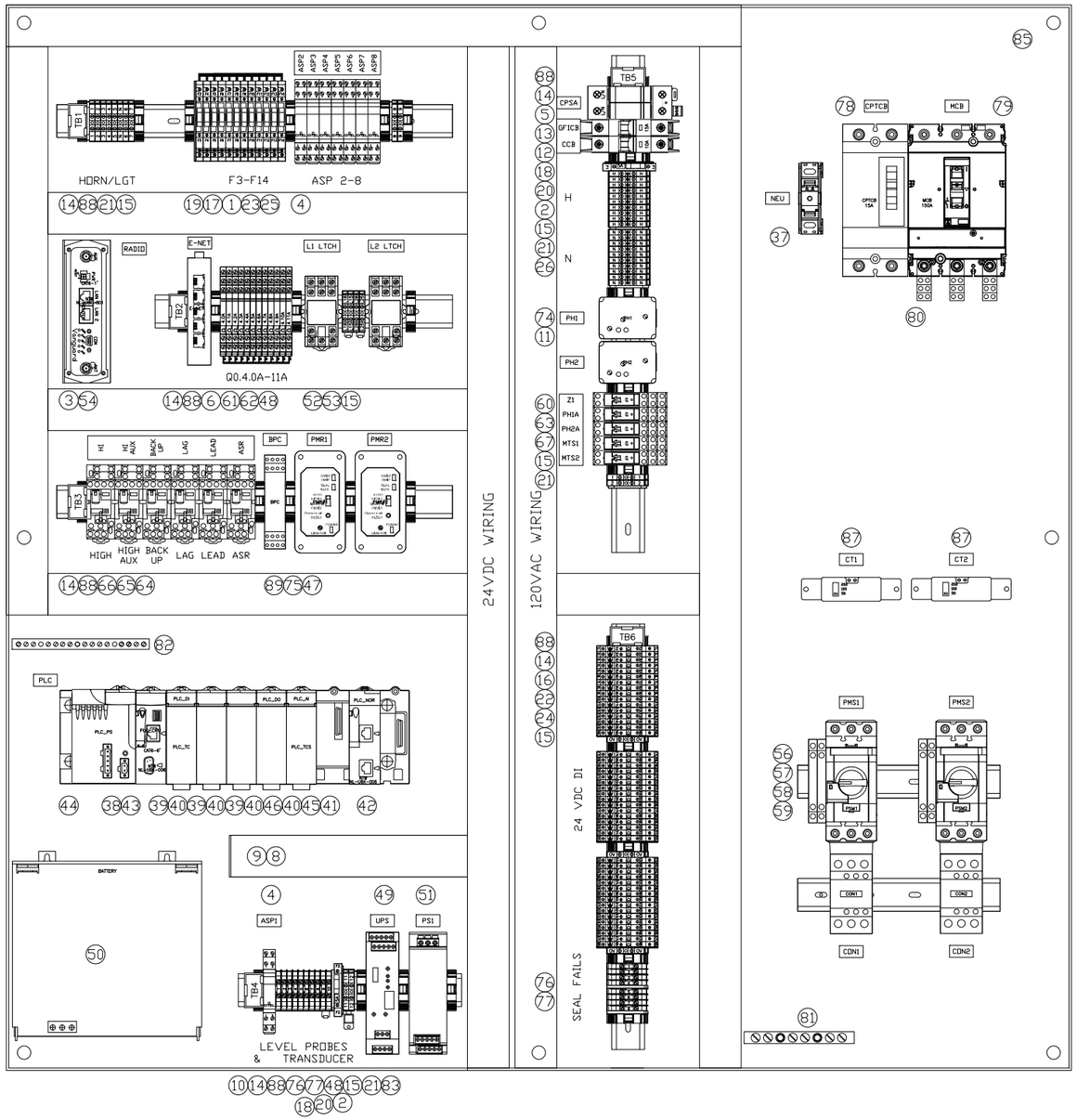
ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

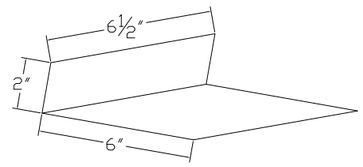
CURRYCONTROLSCOMPANY
4245 S. Pipkin Road - Lakeland- FL 33811
P.O. Drawer 5408 - Lakeland, FL 33807
(863) 646-5781 - FAX: (863) 646-3899

PANEL LAYOUT
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-LY-001





ALUMINUM SHELF ⅛" THICK BRUSHED FINISH

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

CURRYCONTROLSCOMPANY
4245 S. Pipkin Road - Lakeland- FL 33811
P.O. Drawer 5408 - Lakeland, FL 33807
(863) 646-5781 - FAX: (863) 646-3899

PANEL BACK PLATE LAYOUT
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-LY-002

ITEM	QTY	CATALOG	MFG	DESCRIPTION	USER1
1	12	GMA-3A	BUSSMANN	Fuse, 5x20mm, 3A, FAST-ACTING	
2	2	GMA-5A	BUSSMANN	Fuse, 5x20mm, 5A, FAST-ACTING	
3	1	~~VG5530-LVZ-F VZAT~~ 1102743	~~CALAMP~~ SIERRA WIRELESS AIRLINK MP70	~~VANGUARD 5530, 4G LTE CELLULAR MODEM, WITH 1/0 CONN, 24VDC POWER~~ CELLULAR ROUTER	
4	8	DLA-24D3	CITEL	SURGE PROTECTOR, WITH REPLACEABLE MODULE, 24VDC, 4-20mA, 1-PAIR	0.5 Nm
5	1	DS42S-120	CITEL	SURGE PROTECTOR, WITH REPLACEABLE MODULE, REMOTE SIGNAL LN / LN	2-2.5 Nm
6	1	TCSESU053FN0	CONNEXIUM	ETHERNET TCP/IP UNMANAGED SWITCH	
7	2	ST2	CROUSE-HINDS	3/4" MYERS HUB	
8	4	PAN0007	CURRY	WIRE DUCT; PANDUIT E1.5X3WH6, WHT, SLOTTED, 1.5"WX3"	
9	4	PAN0014	CURRY	WIRE DUCT COVER; PANDUIT C1.5WH6, WHT	
10	4	PNL0040	CURRY	DIN RAIL, ZINC CHROMATE, 7.5 MM x 35 MM x 2 M	
11	2	SUA-230-ALA	DIVERSIFIED ELECTRONICS	230V PHASE MONITOR	
12	1	FAZ-C10/1-NA-SP	EATON	CIRCUIT BREAKER, UL 489, 10A, 1P, 277/480	21 lb-in
13	1	FAZ-C15/1-NA-SP	EATON	CIRCUIT BREAKER, UL 489, 15A, 1P, 277/480	21 lb-in
14	6	0113 084.01	ENTRELEC	PEB MARKER-HOLDER WITH MARKER AND TRANSPARENT PROTECTION	
15	41	0115 116.07	ENTRELEC	TERMINAL BLOCK - M 4/6	.5-.8Nm
16	48	0115 271.22	ENTRELEC	DOUBLE DECK TERMINAL BLOCK - M 4/6.D2	.5-.8Nm
17	12	0115 650.02	ENTRELEC	INDICATING DOUBLE DECK FUSE BLOCK - M 4/8.D2.SFDJ	
18	2	0115 657.25	ENTRELEC	TERMINAL BLOCK - M 4/8.SF	
19	1	0116 913.07	ENTRELEC	END SECTION - FEM8D2S	
20	2	0116 951.15	ENTRELEC	END SECTION - FEM8S	
21	6	0118 368.16	ENTRELEC	END SECTION - FEM6	
22	3	0118 499.23	ENTRELEC	END SECTION - FEM6D	
23	1	0168 974.00	ENTRELEC	NON-IP20 JUMPER BAR BJM8-10, 10 POLES, FOR D4/8.D2, 8MM	
24	5	0173 520.22	ENTRELEC	NON-IP20 JUMPER BAR, 10 POLES	
25	2	0173 523.11	ENTRELEC	LATERAL JUMPER BAR PC81-10, 10 POLES, FOR M4/8 DR4/8 ZS4, 8MM	
26	2	0176 667.04	ENTRELEC	IP20 JUMPER BAR BJMI6-10, , 10 POLES, FOR M4/6 D1.5/6 D4/6, 6MM	
27	1	450E-024	FEDERAL SIGNAL	24VDC ALARM HORN	
28	1	K8435666A	FEDERAL SIGNAL	ALARM HORN MOUNTING GASKET KIT FOR 350 AND 450 HORNS	
29	1	3/4" CLOSE	GALVANIZED	3/4" GALVANIZED CLOSE NIPPLE	
30	1	PJHMI1614L	HAMMOND	HMI HINGED COVER KIT, POLYCARBONATE, 16"H X 14"W, SNAP LATCH	
31	2	ALFSWD	HOFFMAN	DOOR OPERATED SWITCH	
32	2	LEDA1S35	HOFFMAN	ENCLOSURE LIGHT, MANUAL SWITCH, 13"	
33	1	5885-0	HUBBEL	DIE CAST AL TWO GANG IN USE METALLIC COVER, LOCKABLE	
34	1	5341-0	HUBBELL	DIE CAST AL TWO GANG BOX	
35	1	GFTR20GYU	HUBBELL	GFCI RECEPTACLE, TR/WR, 20A, GY	
36	1	HBL1221GY	HUBBELL	TOGGLE SWITCH, SINGLE POLE, 20A, 120-277 VAC, GY	
37	1	1321580	MARATHON	POWER DISTRIBUTION BLOCK, 1 POLE 600VAC, 175A WITH COVER	
38	1	BMX CPS 2010	MODICON	M340 POWER SUPPLY MODULE - 17W	
39	3	BMX DDI 1602	MODICON	M340 DISCRETE INPUT MODULE	
40	4	BMX FTW 301	MODICON	M340 CORD SET 20 PIN TERMINAL BLOCK ONE END FLYING LEADS	
41	1	BMX FTW 308S	MODICON	M340 CORD SET 28 PIN TERMINAL BLOCK ONE END FLYING LEADS	
42	1	BMX NOR 0200 H	MODICON	M340 ETHERNET/SERIAL RTU COMMUNICATION MODULE	
43	1	BMX P34 2020	MODICON	M340 PERFORMANCE PROCESSOR MODULE	
44	1	BMX XBP 0800	MODICON	M340 RACK, 8 SLOT	
45	1	BMX AMI 0810	MODICON	M340 ANALOG INPUT MODULE - INDUSTRIAL MEASUREMENT DEVICE	
46	1	BMX DDO 1602	MODICON	M340 DISCRETE OUTPUT MODULE	
47	2	PMR1	MPE	PUMP MONITOR RELAY, 120VAC, PANEL MOUNT	
48	17	1N4001G	ON SEMICONDUCTOR	DIODE 50V,1A	
49	1	2320212	PHOENIX CONTACT	UNINTERRUPTIBLE POWER SUPPLY, INPUT 24 VDC, OUTPUT 24 VDC/5A.	
50	1	2320322	PHOENIX CONTACT	24 VDC 12Ah BATTERY	
51	1	2866750	PHOENIX CONTACT	POWER SUPPLY, QUINT-PS/1AC/24DC/5, 100-240VAC INPUT, 24VDC 5A OUTPUT	
52	2	27E893	POTTER & BRUMFIELD	RELAY BASE, BLADE STYLE, DIN RAIL MOUNT	
53	2	KUL-11D15-D24	POTTER & BRUMFIELD	POWER RELAY,DPDT,24VDC, 10A, LATCHING DUAL COIL	
54	1	RADIO SHELF 1	QUALITY	RADIO SHELF	
55	1	CUB5PB00	RED LION	PANEL METER, 5 DIGIT, LCD	
56	2	GV3P501	SCHNEIDER ELECTRIC	MANUAL STARTER, THERM-MAG, 37-50 AMPS, W/0 LOWER BLOCK	
57	2	GVAD1010	SCHNEIDER ELECTRIC	AUX CONTACTS, N.O. SHORT CIR/OVERLOAD & N.O. INST AUX, SIDE MOUNT	
58	2	GVAM11	SCHNEIDER ELECTRIC	AUX CONTACTS, N.O. & N.C. SHORT CIRCUIT FAULT, SIDE MOUNT	
59	2	LC1D65AF7	SCHNEIDER ELECTRIC	CONTRACTOR, 3P, 65 AMP, 110 VAC COIL.	
60	5	RGZE1S48M	SCHNEIDER ELECTRIC	SOCKET - SEPARATE CONTACT	
61	12	RSL1PVBU	SCHNEIDER ELECTRIC	SLIM INTERFACE RELAY, 6A SPDT	.5N.m
62	1	RSLZ2	SCHNEIDER ELECTRIC	JUMPER BAR	
63	5	RXG22F7	SCHNEIDER ELECTRIC	INTERFACE PLUG-IN RELAY - 120VAC, 5A, 2 C/O - LED	
64	6	RXM040W	SCHNEIDER ELECTRIC	DIODE, 6-250 V DC	
65	6	RXM4AB2BD	SCHNEIDER ELECTRIC	MINIATURE PLUG-IN RELAY - 24VDC - 4 C/O - LED, TEST BUTTON	
66	6	RXZE2M114	SCHNEIDER ELECTRIC	RELAY BASE - 14 BLADE, 4 C/O, MIXED CONTACT, 10A	
67	5	RZM021FP	SCHNEIDER ELECTRIC	VARISTOR, 120VAC	
68	1	XB5AA21	SCHNEIDER ELECTRIC	PUSH BUTTON N.O. CONTACT, BLACK, PLASTIC, 22mm	
69	2	XB5AJ33	SCHNEIDER ELECTRIC	3 POSITION SELECTOR SWITCH WITH LONG HANDLE, 22mm	
70	4	XB5EVB8	SCHNEIDER ELECTRIC	POLIT LIGHT, 24VDC, AMBER, 22mm	
71	2	XB5EVG3	SCHNEIDER ELECTRIC	POLIT LIGHT, 120VAC, GREEN, 22mm	
72	2	ZB5AZ902	SCHNEIDER ELECTRIC	ANTI-ROTATION PLATE FOR 22mm	
73	9	ZBZ32	SCHNEIDER ELECTRIC	BLANK NAME PLATE	
74	2	8501NR51	SQD	RELAY - SOCKET	
75	2	8501NR62	SQD	RELAY - SOCKET	
76	18	9080GM6	SQD	TERMINAL BLOCK	
77	3	9080GM6B	SQD	END BARRIER	
78	1	HGL26015	SQD	CIRCUIT BREAKER - H FRAME - 15A 2P, 600VAC/250VDC, FIELD INTER. TRIP UNIT	#8 - #3/0 120 lbf.in
79	1	HGL36150	SQD	CIRCUIT BREAKER - H-FRAME - 150A 3P, 600VAC/250VDC	#8 - #3/0 120 lbf.in
80	1	PDC6HD6	SQD	POWER DISTRIBUTION CONNECTORS, (6) #14-#6 WIRE RANGE	
81	1	PK0GTA6	SQD	GROUND STRIP, 6 BARRELS	
82	1	PK15GTA	SQD	GROUND STRIP, 15 BARRELS	2.3-4 Nm
83	1	STTH802FP	STMICROELECTRONICS	DIODE 200V, 8A	
84	1	U484812WMN4S-PC	UNIVERSAL ENCLOSURE SYS.	ENCLOSURE WITH SUN SHIELD ON TOP, 48X48X12, 304 SS	
86		UNIVERSAL #	UNIVERSAL ENCLOSURE SYS.	CUTOUTS TO BE MADE BY UNIVERSAL	
85	1	U4848P	UNIVERSAL ENCLOSURE SYS.	BACKPLATE, 48 X 48	
87	2	H721HC	VERIS	CONTROL TRANSDUCER, SOLID CORE, 4-20 = 0-50/100/200	
88	29	249-117	WAGO	SCREWLESS END STOP; 10 MM / 0.394 IN WIDE; CARRIER RAIL DIN 35	
89	1	DR1920	WILKERSON	BACK-UP PUMP CONTROLLER	

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

CURRYCONTROLSCOMPANY
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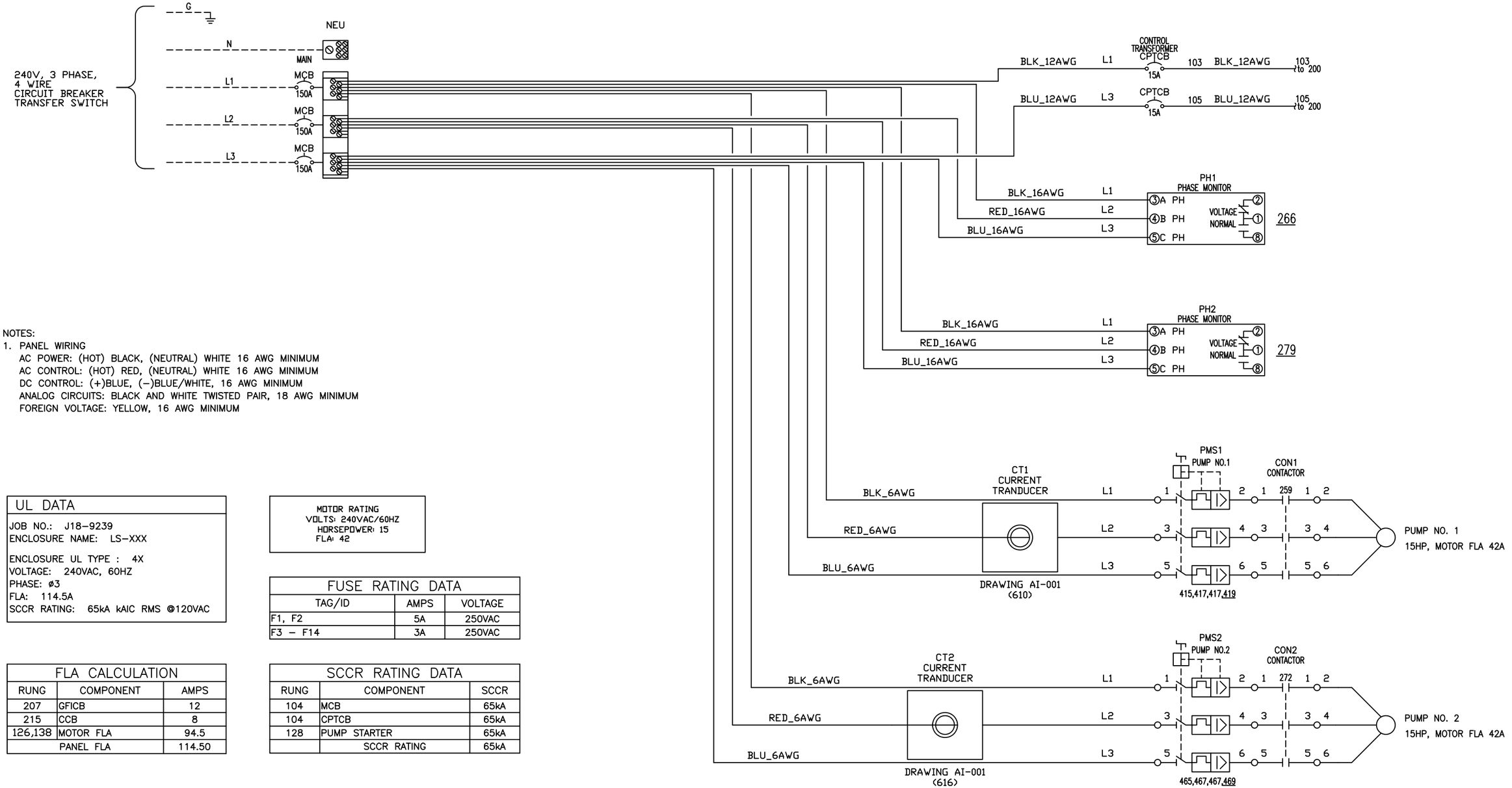
BILL OF MATERIAL
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-BOM-001



NOTES:
1. PANEL WIRING
   AC POWER: (HOT) BLACK, (NEUTRAL) WHITE 16 AWG MINIMUM
   AC CONTROL: (HOT) RED, (NEUTRAL) WHITE 16 AWG MINIMUM
   DC CONTROL: (+)BLUE, (−)BLUE/WHITE, 16 AWG MINIMUM
   ANALOG CIRCUITS: BLACK AND WHITE TWISTED PAIR, 18 AWG MINIMUM
   FOREIGN VOLTAGE: YELLOW, 16 AWG MINIMUM

UL DATA
JOB NO.: J18-9239
ENCLOSURE NAME: LS-XXX
ENCLOSURE UL TYPE : 4X
VOLTAGE: 240VAC, 60HZ
PHASE: ø3
FLA: 114.5A
SCCR RATING: 65kA kAIC RMS @120VAC

MOTOR RATING
VOLTS: 240VAC/60HZ
HORSEPOWER: 15
FLA: 42

FUSE RATING DATA		
TAG/ID	AMPS	VOLTAGE
F1, F2	5A	250VAC
F3 – F14	3A	250VAC

FLA CALCULATION		
RUNG	COMPONENT	AMPS
207	GFICB	12
215	CCB	8
126,138	MOTOR FLA	94.5
	PANEL FLA	114.50

SCCR RATING DATA		
RUNG	COMPONENT	SCCR
104	MCB	65kA
104	CPTCB	65kA
128	PUMP STARTER	65kA
	SCCR RATING	65kA

FIELD WIRING DATA			
COMPONENT NAME/ID	COMPONENT TORQUE	CONDUCTOR TYPE	CONDUCTOR TEMP RATING
CIRCUIT BREAKER	21 in-lbs	COPPER	75°C
ANALOG SURGE PROTECTOR	4.4 in-lbs	COPPER	75°C
TERMINAL BLOCK	7 in-lbs	COPPER	75°C
GROUND BUS	20 in-lbs	COPPER	75°C

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
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ENG / DRAWN GDW
LIC. #
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MANAGER ESS
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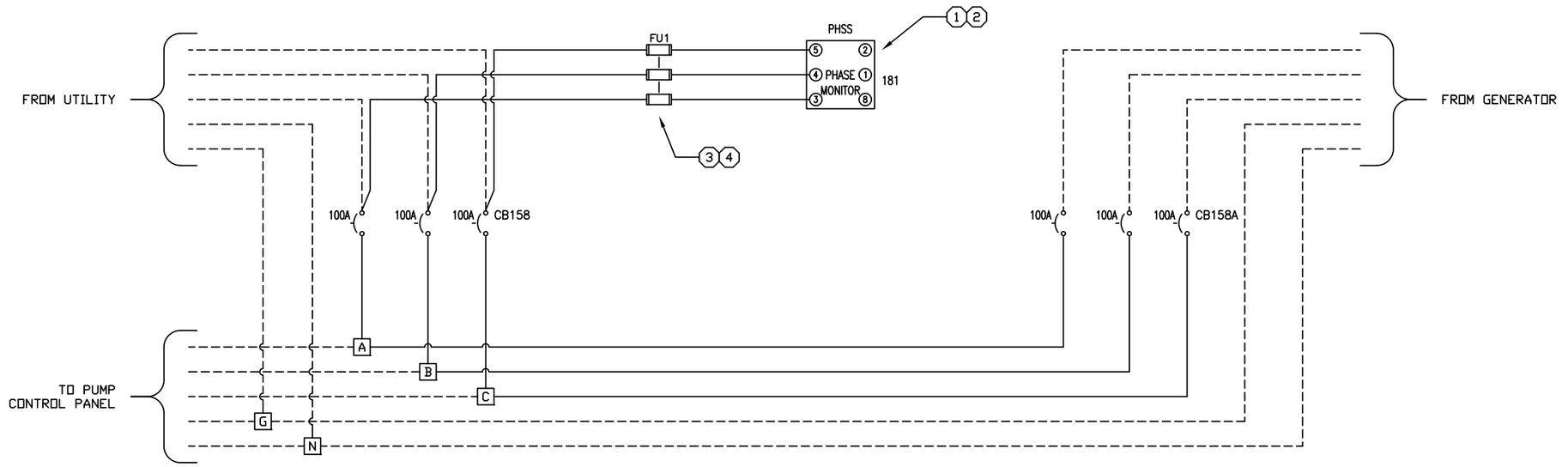
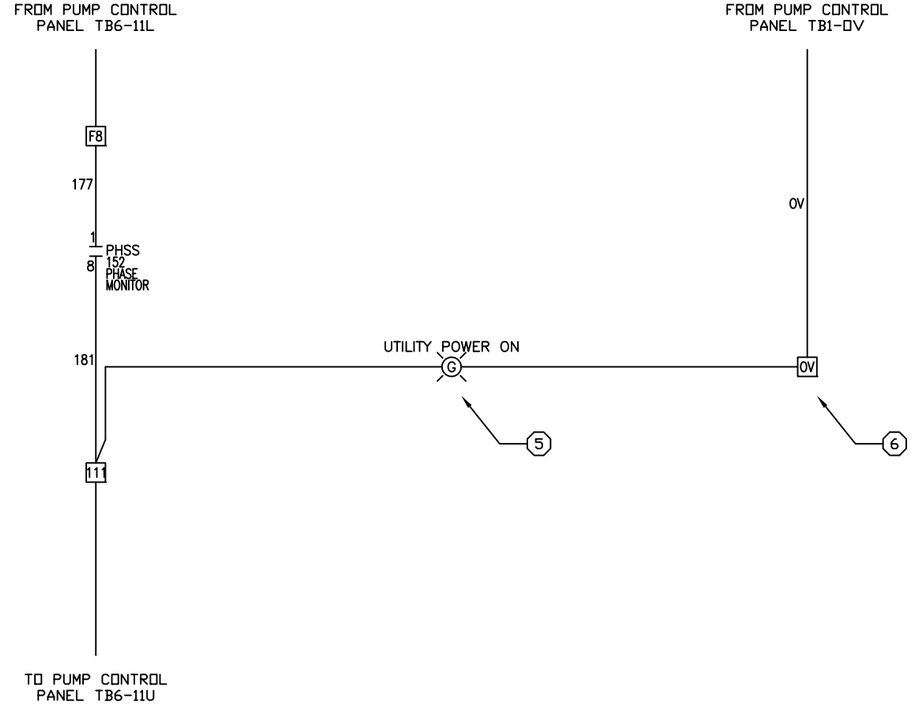
240VAC WIRING SCHEMATIC
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-PW-001





ITEM	QTY	CATALOG	MFG	DESCRIPTION
1	1	SUA-230-ASA	DIVERSIFIED	230V PHASE MONITOR
2	1	8501NR51	SQUARE D	RELAY SOCKET
3	1	DFCC3V	SCHNEIDER	TESYS FUSE-DISCONNECTOR 3P, 30A WITH BLOWN FUSE INDICATOR
4	3	ATDR1	MERSEN	1A FUES, TIME-DELAY/CLASS CC
5	1	XB5EVB8	SCHEIDER	YELLOW MONOLITHIC PILOT LIGHT 22mm
6	3	115 116.07	ENTRELEC	SINGLE TEIR TERMINAL BLOCK M4/6
7	1	118 368.16	ENTRELEC	END SECTION FOR TERMINAL BLOCK M4/6
8	2	249-117	WAGO	END STOP
9	1	SSD2-100C-100C-240-311-S-C-302071	ELS POWER SYSTEM	MANUAL TRANSFER SWITCH (STORM SWITCH)
10				

REV.	DATE	APVD.	REMARKS
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ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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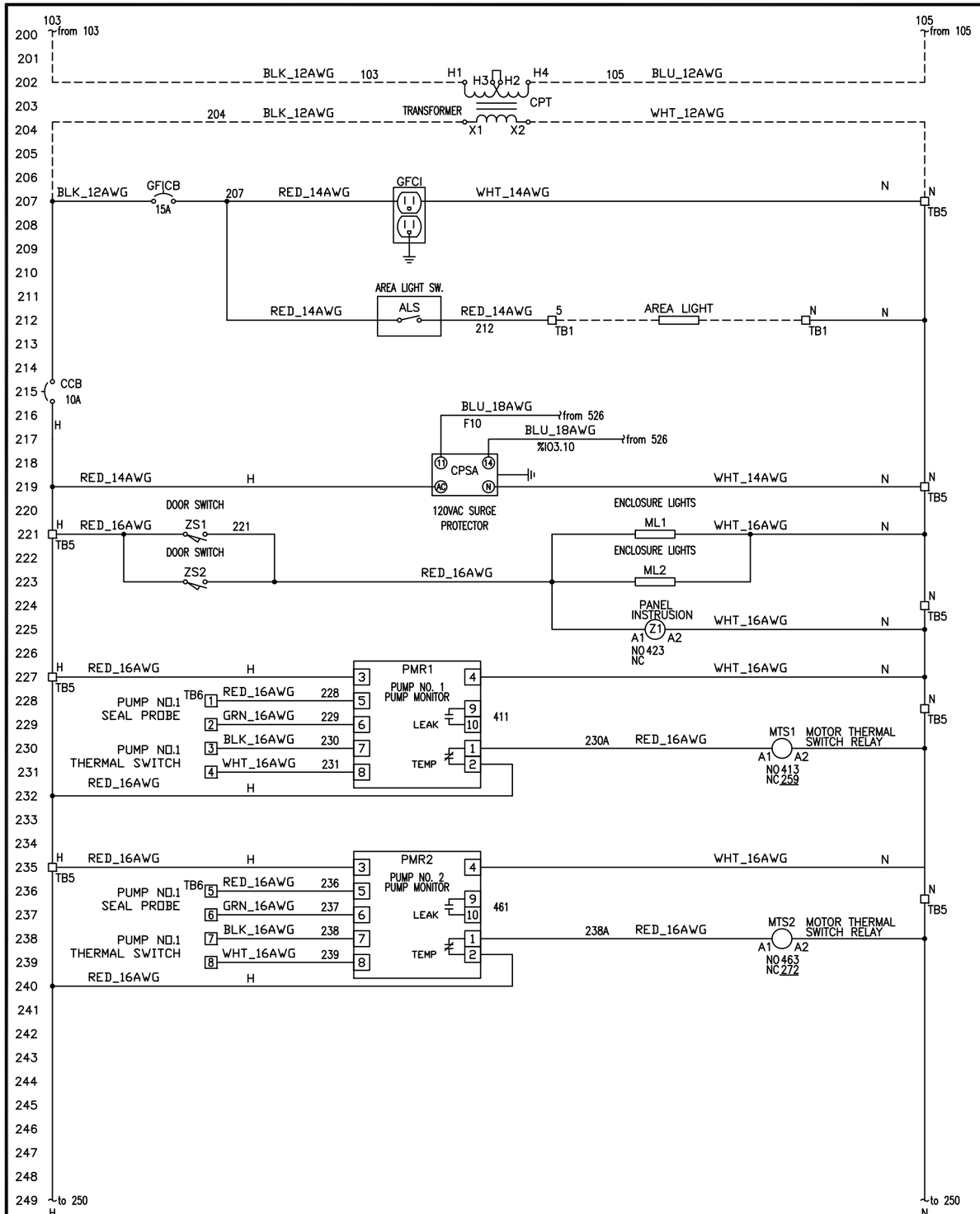
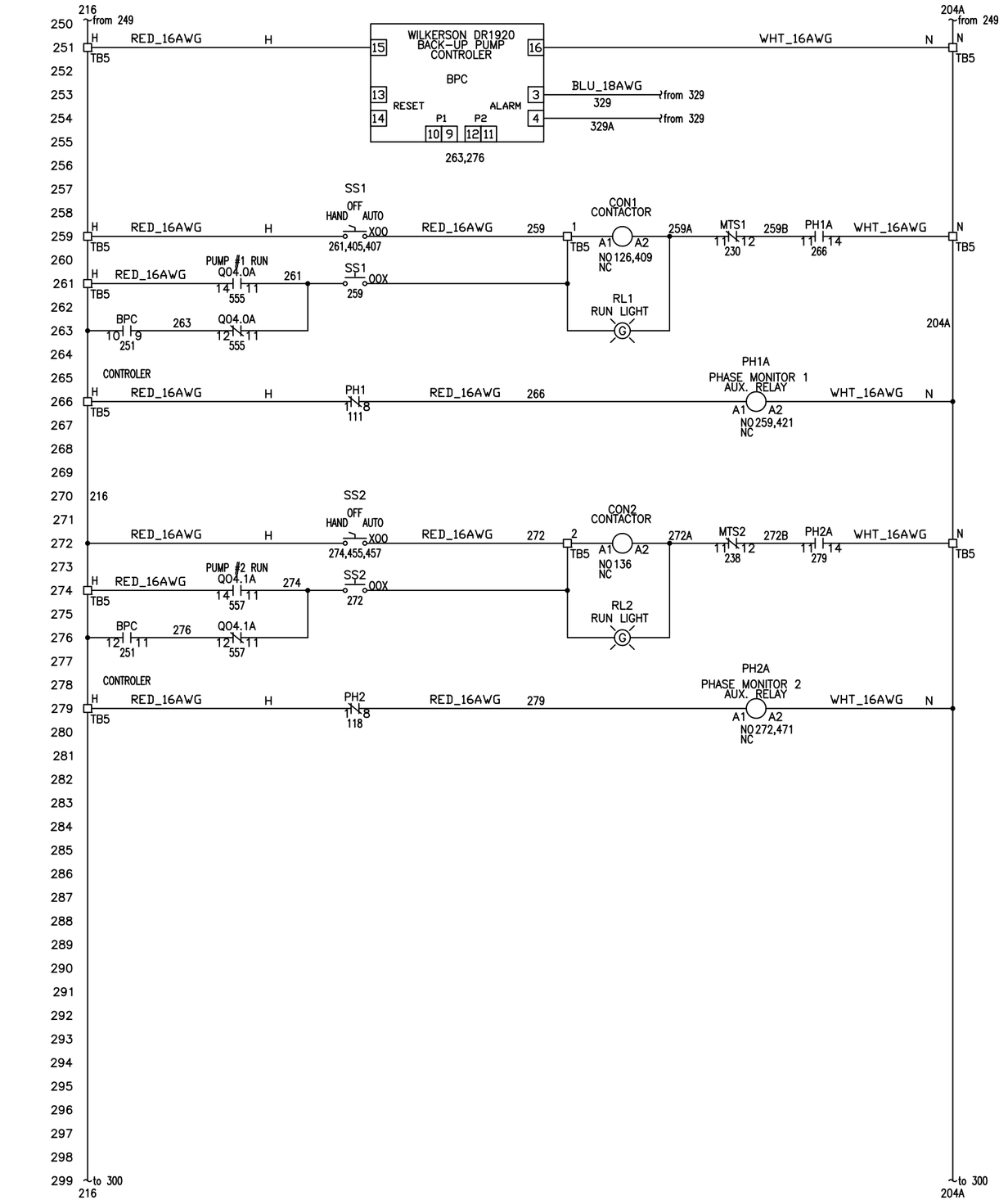
240VAC STORM SWITCH
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-PW-001A
SHEET 6 OF 13





REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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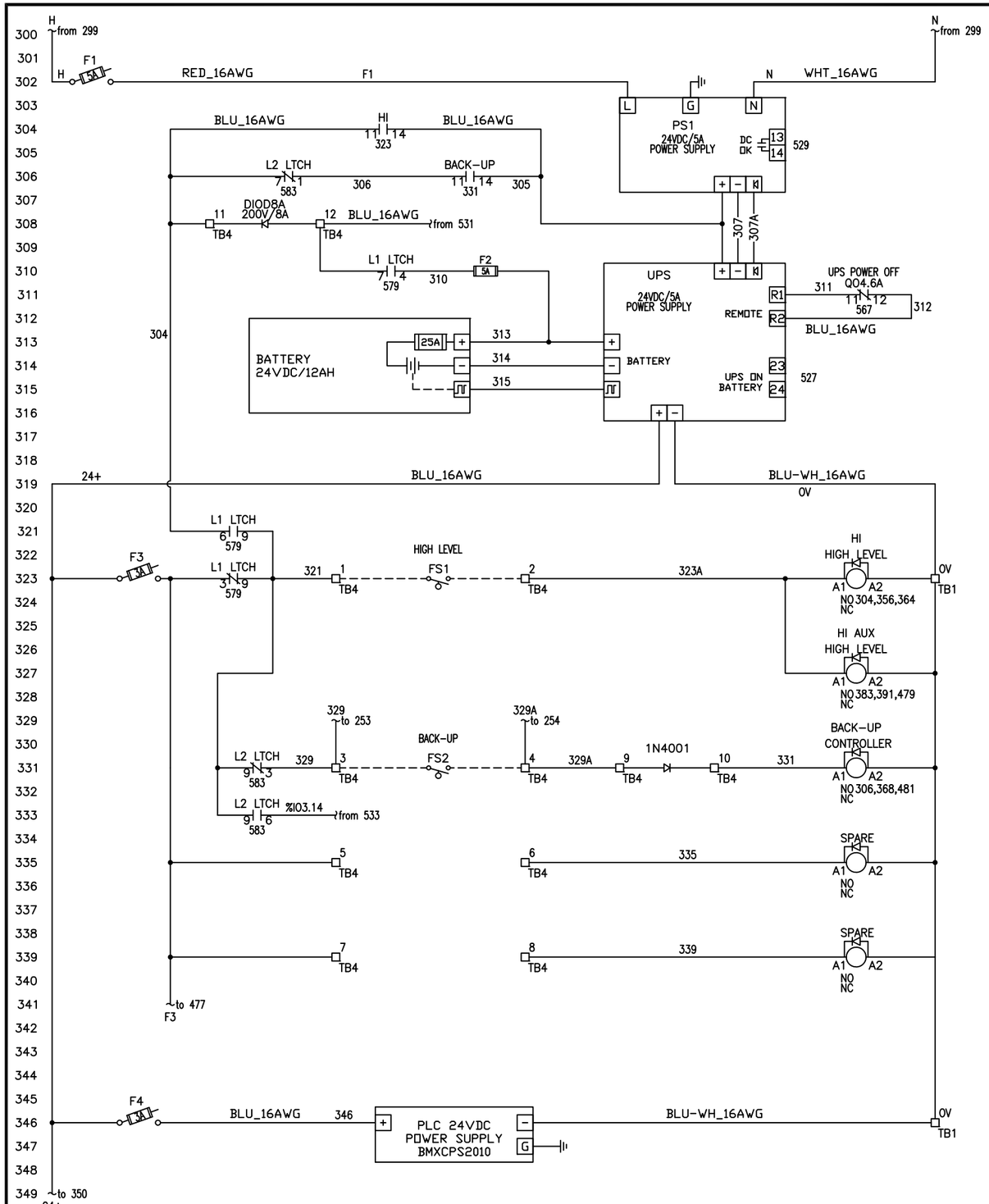
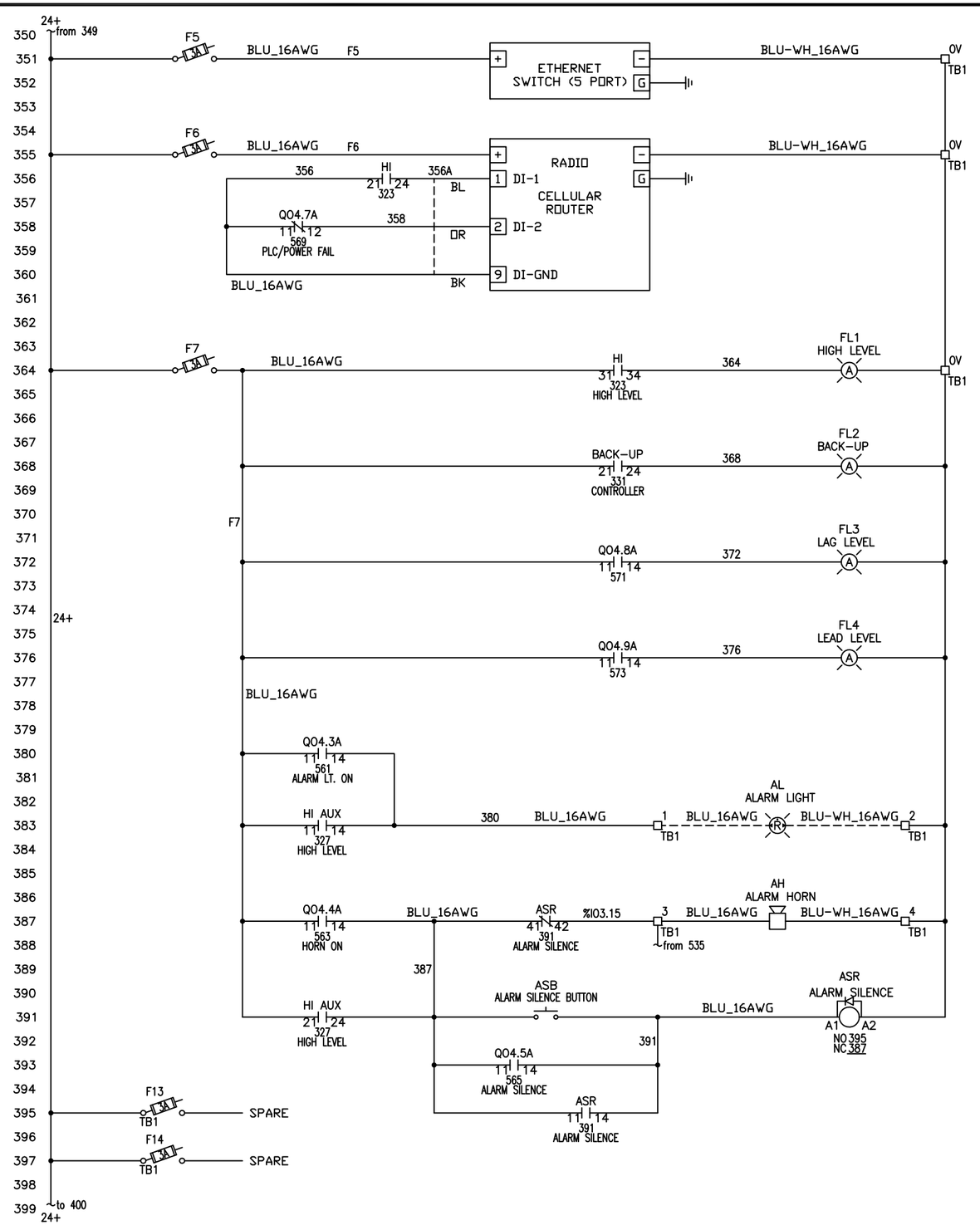
120VAC WIRING SCHEMATIC
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-PW-002





REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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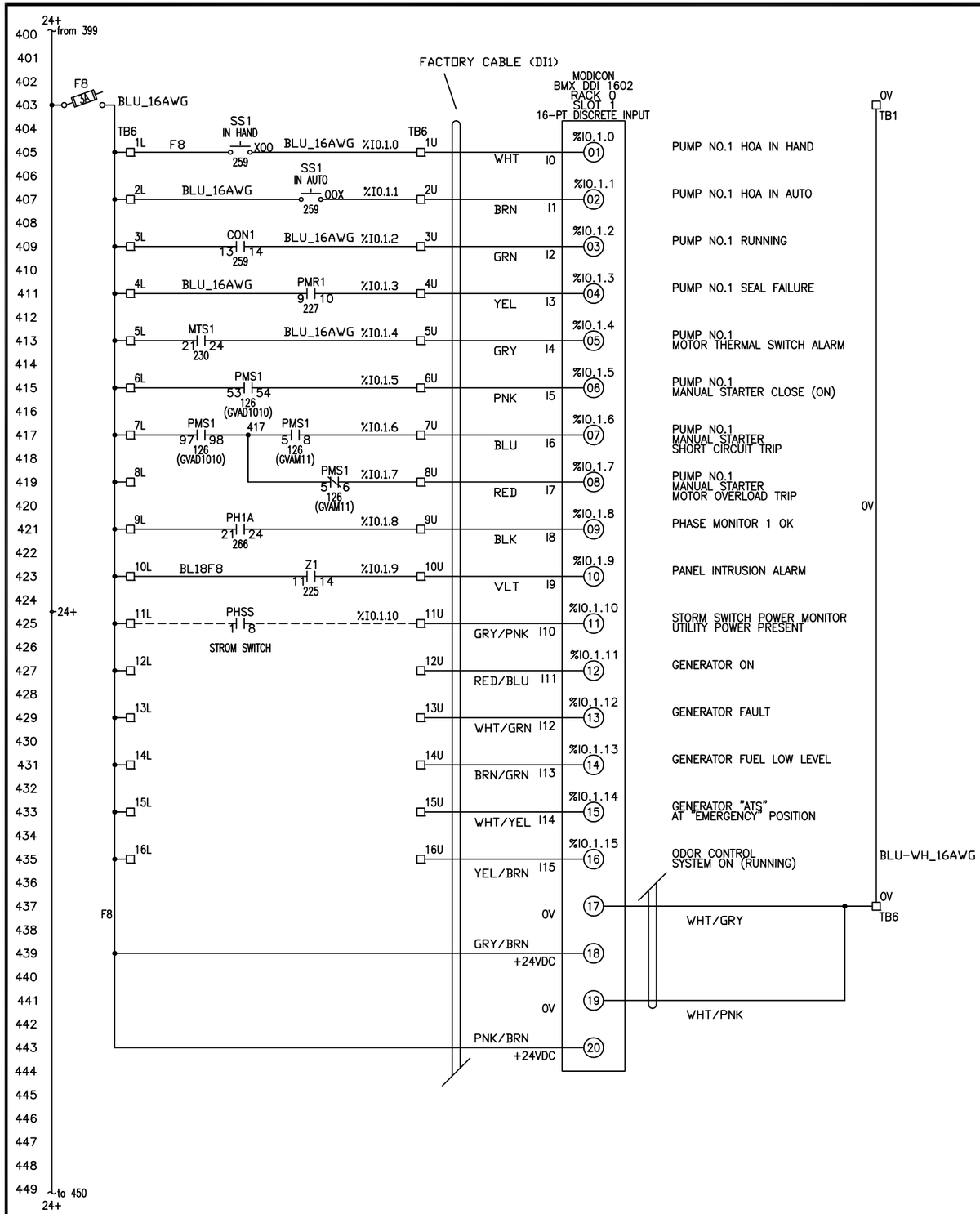
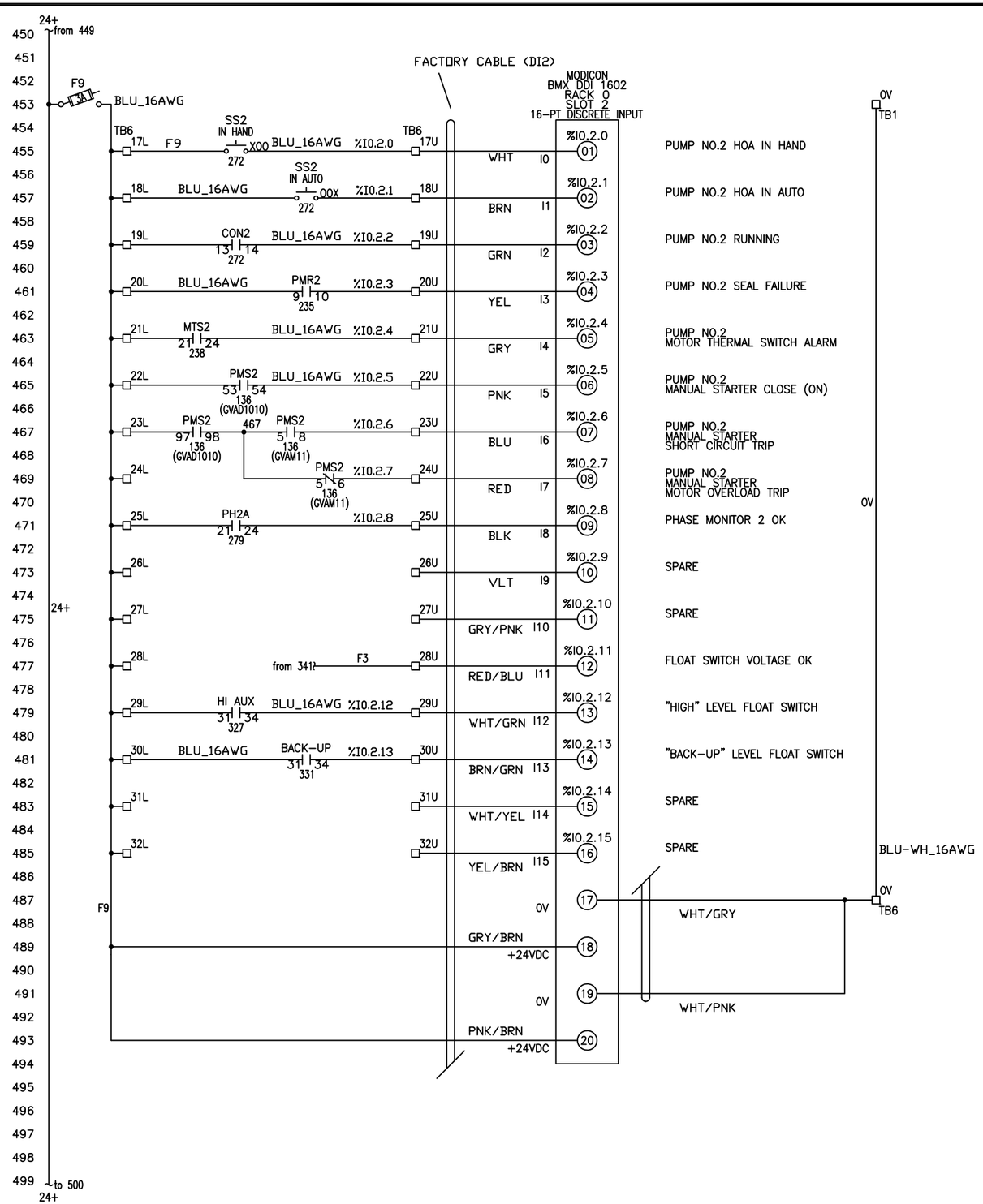
24VDC WIRING SCHEMATIC
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-PW-003





REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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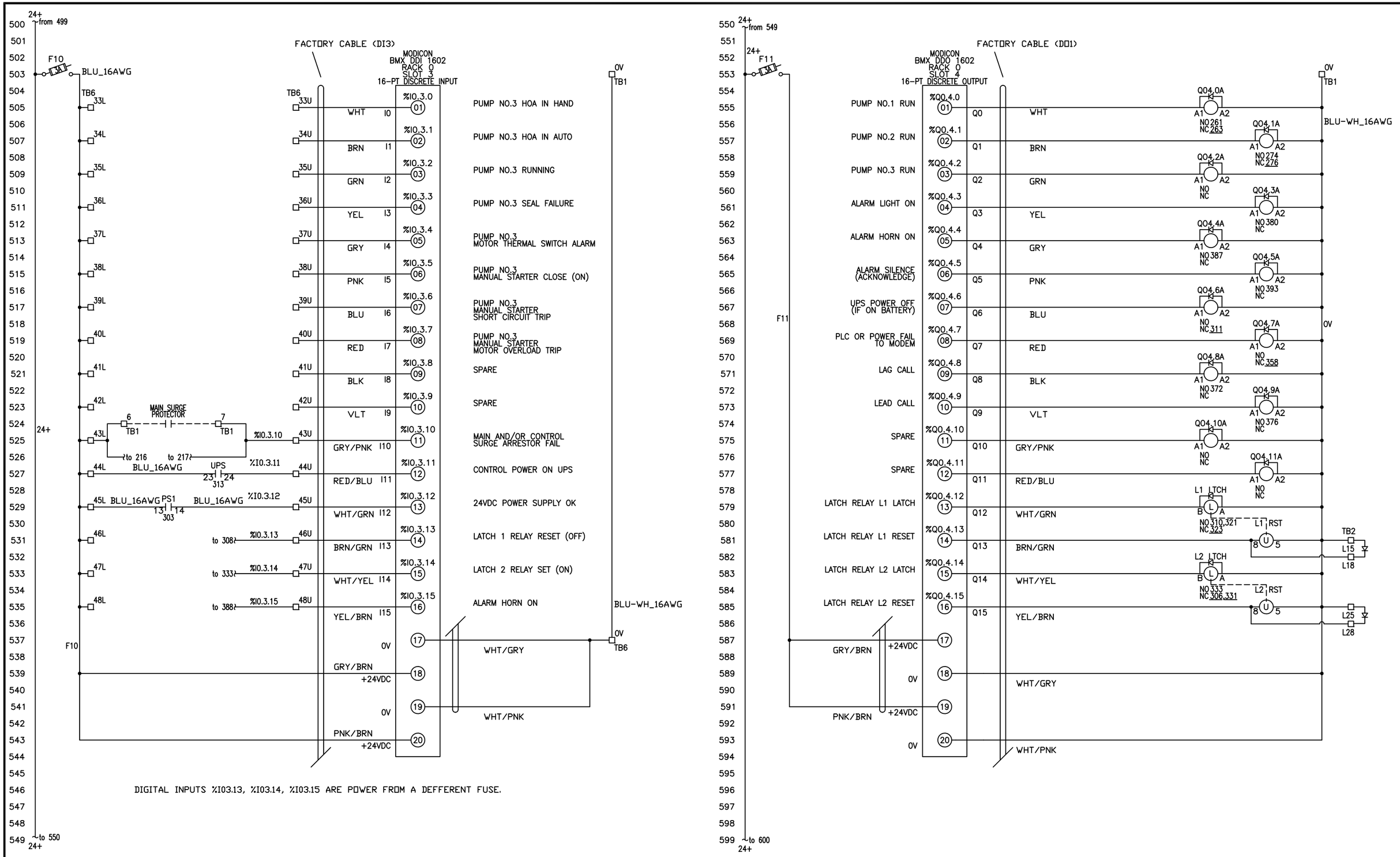
DIGITAL INPUTS
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-DI-001
SHEET 9 OF 13



REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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P.O. Drawer 5408 - Lakeland, FL 33807
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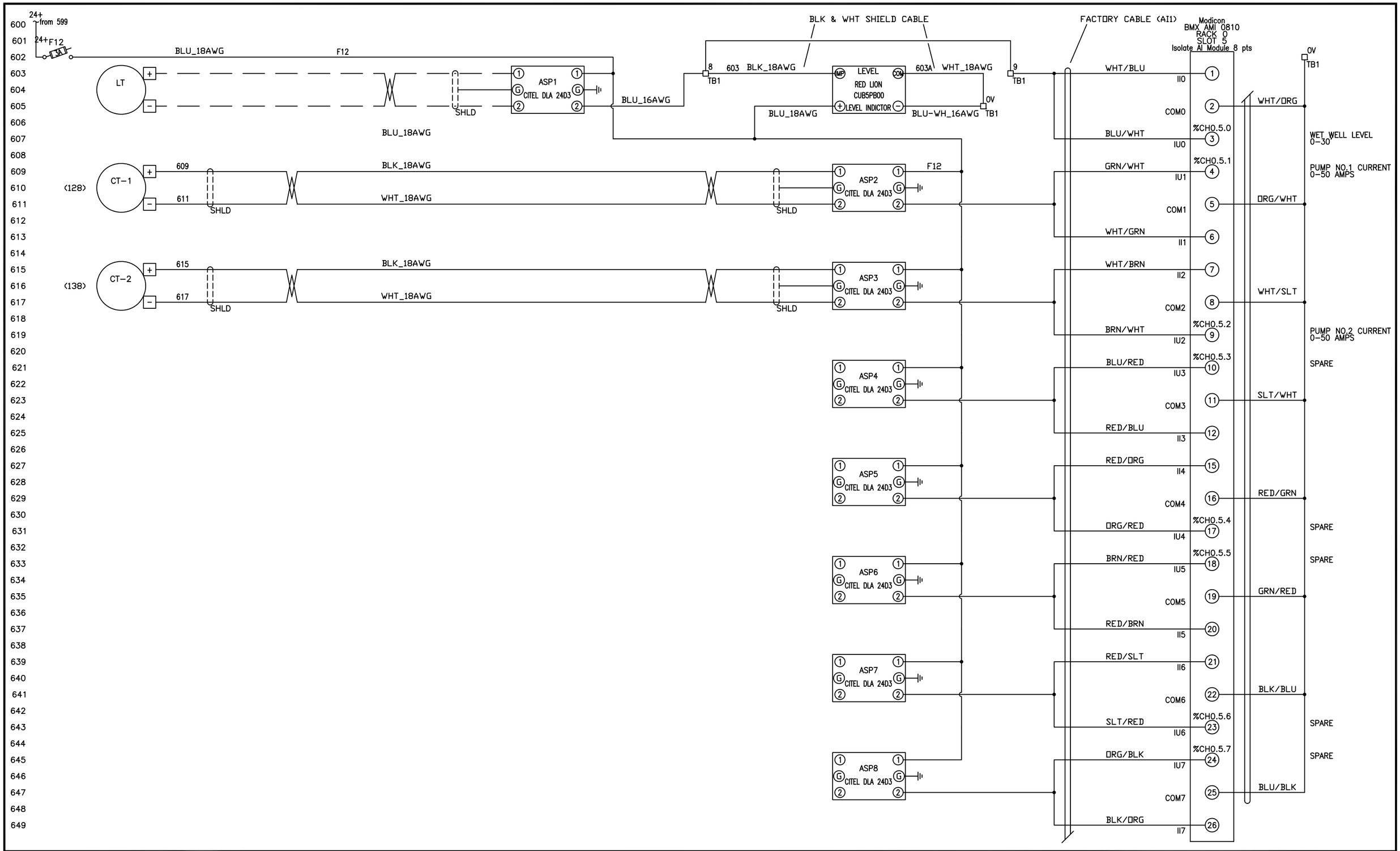
DIGITAL INPUTS & OUTPUTS
LIFT STATION
RTU/PUMP CONTROL PANEL

POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-DI&DO-001



REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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ANALOG INPUTS
LIFT STATION
RTU/PUMP CONTROL PANEL

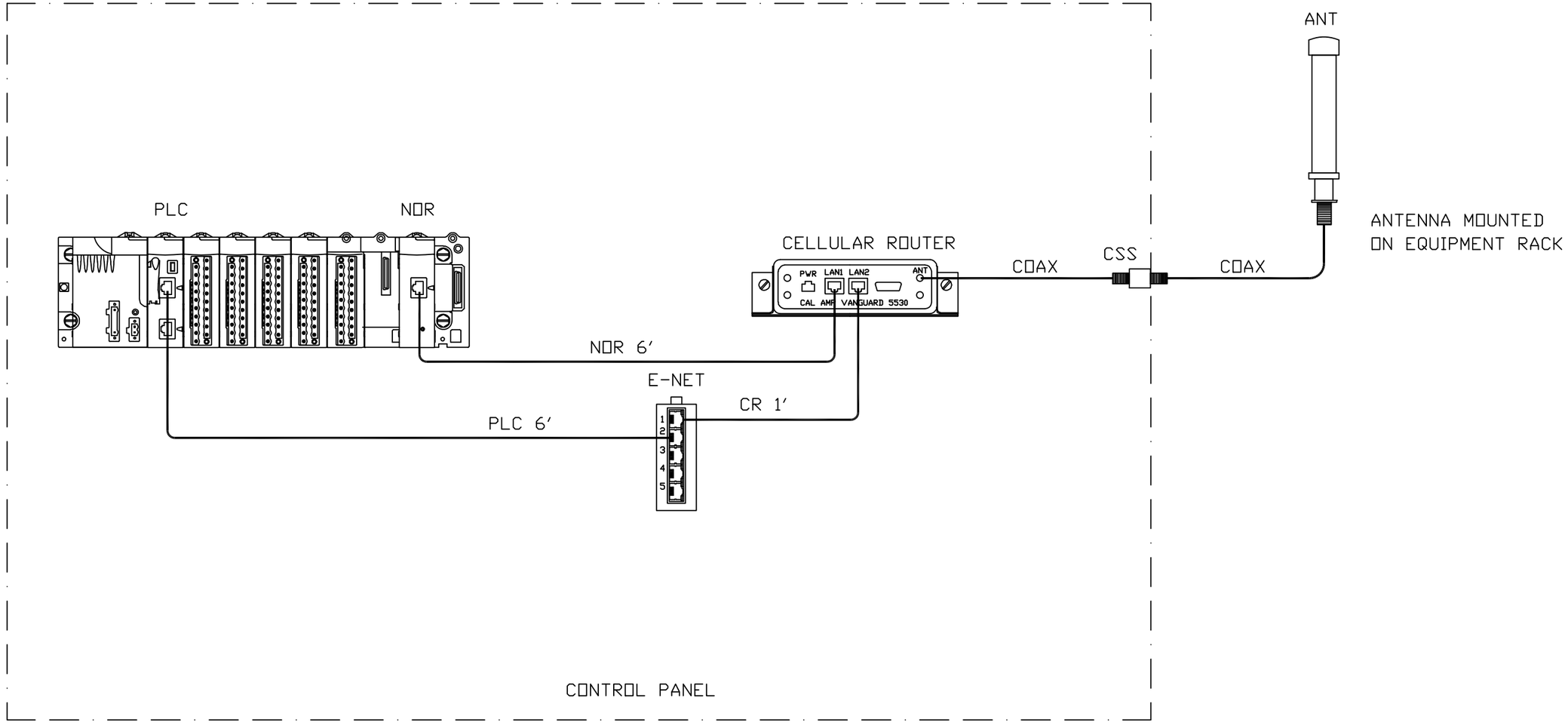
POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-AI-001

DUPLEX PUMP STATION NETWORK

IP ADDRESS LIST:

RADIO: 192.168.194.1
PLC CPU: 192.168.194.3
NOR MODULE: 192.168.194.4



REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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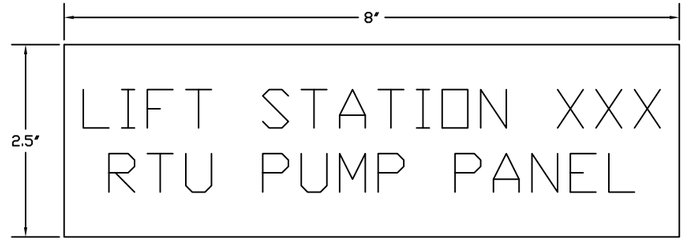
NETWORK COMMUNICATION
LIFT STATION
RTU/PUMP CONTROL PANEL

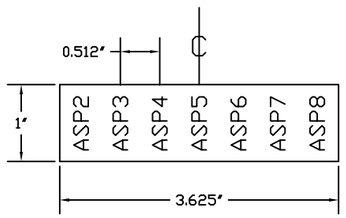
POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-CM-001

"ALL TAGS WHITE PLATE BLACK CHARACTERS"



.5" CHARACTERS



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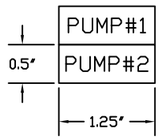

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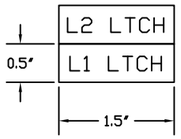

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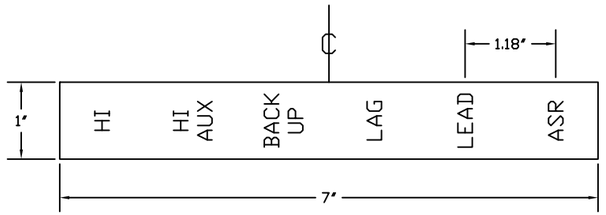

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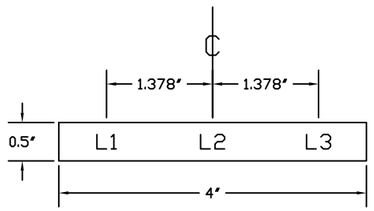

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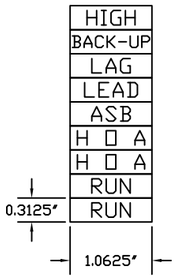
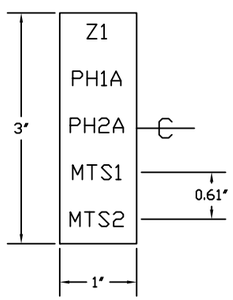


3/16" CHARACTERS
1/32 PLATE
NO ADHESIVE



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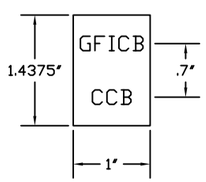

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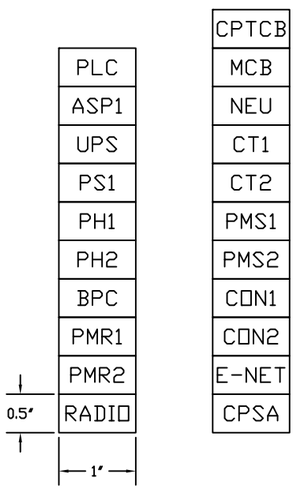

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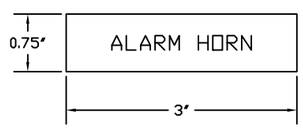

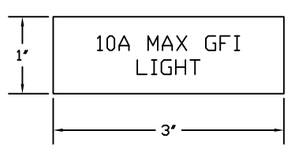

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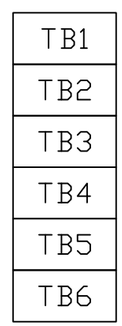

1/4" CHARACTERS
3/32 PLATE FOR MARKER HOLDERS
NO ADHESIVE

REV.	DATE	APVD.	REMARKS
B	10/24/18	ESS	AS BUILT
A	7/27/18	ESS	FOR CONSTRUCTION

ENG / DRAWN GDW
LIC. #
FIRM LIC. #
MANAGER ESS
SCALE NTS

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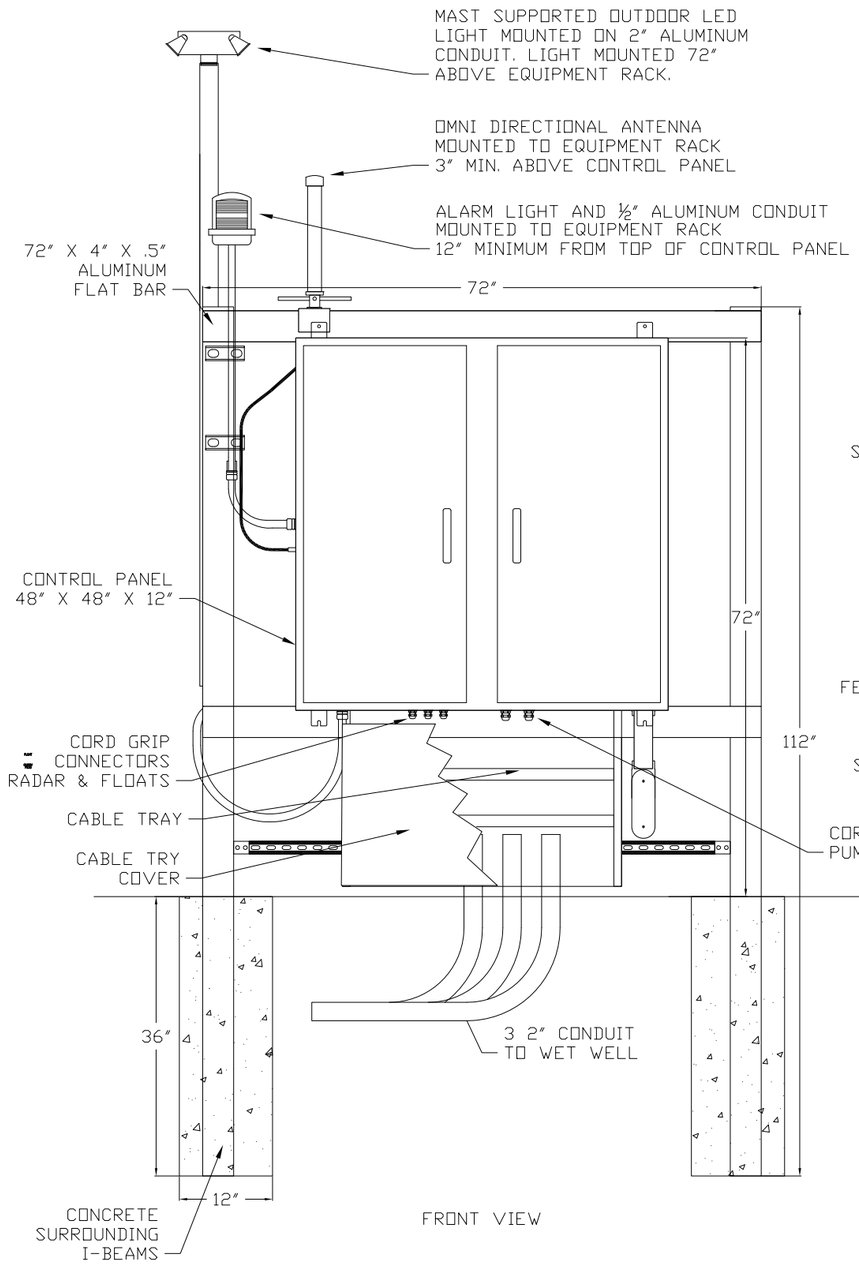
NAME PLATES
LIFT STATION
RTU/PUMP CONTROL PANEL

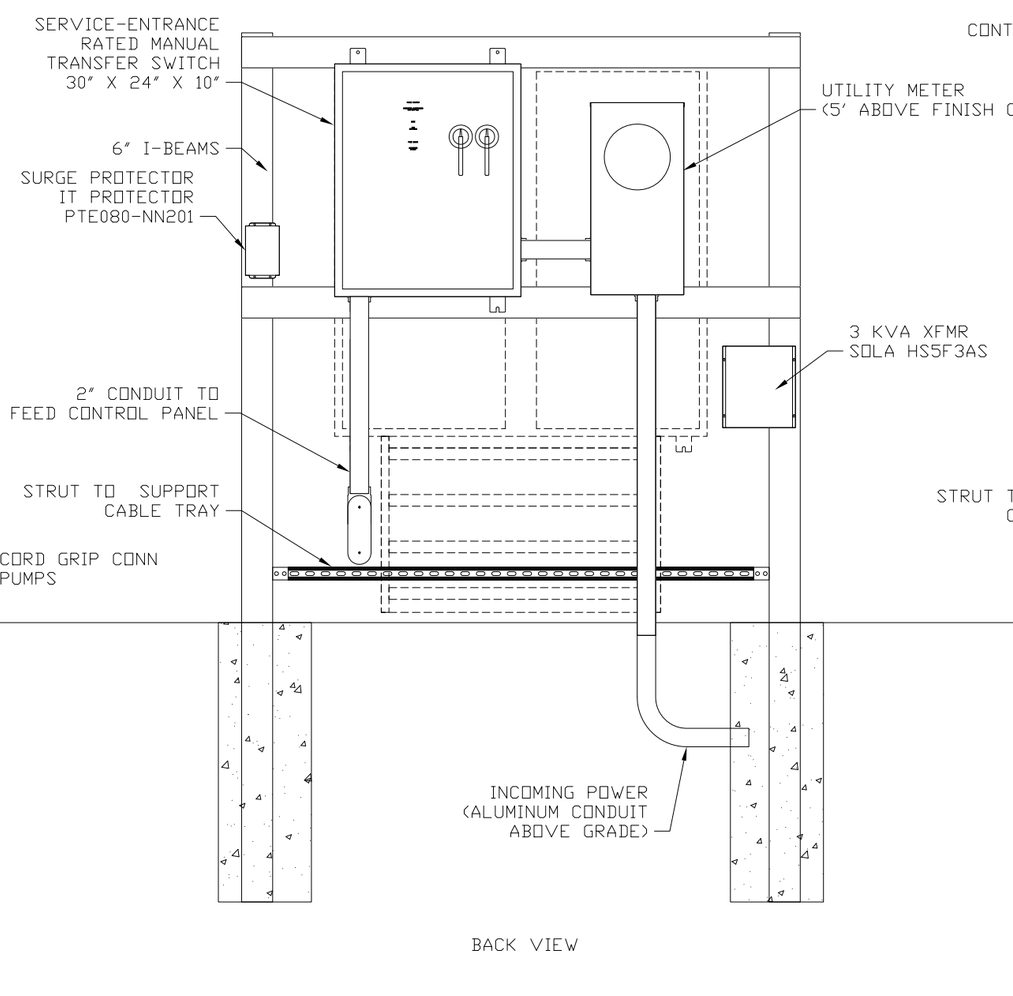
POLK COUNTY, FLORIDA
POLK COUNTY UTILITIES

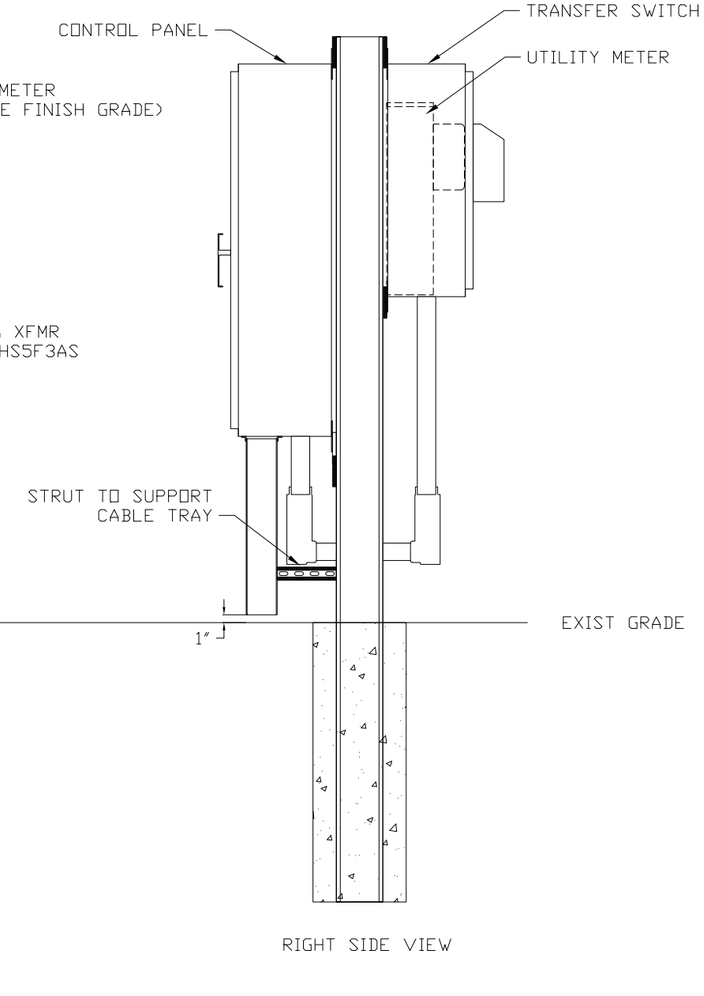
JOB # J18-9239
DIRECTORY Curry Drawings
FILE NAME J9239-LS 15HP-NP-001
SHEET 13 OF 13

APPENDIX C
Polk County's Latest Duplex Pump Control Panel Drawings

1. MOTOR PROTECTION WIRING BETWEEN WET WELL AND CONTROL PANEL SHALL BE IN THE SAME CONDUIT WITH MOTOR POWER WIRING.
2. SITE CONDITIONS ARE INTENDED TO SHOW TYPICAL LAYOUT.
3. CONTRACTOR SHALL PROVIDE LITHONIA MODEL #OFLR-6LC-120-MOBZ OUTDOOR RATED BUGEYE LIGHT WITH MOTION SENSOR AND ON/OFF CONTROL SWITCH.
4. POLK COUNTY TO PROVIDE LOCKS FOR CONTROL PANELS.
5. CONDUIT ROUTING SHOWN IS DIAGRAMMATIC. CONTRACTOR SHALL COORDINATE ACTUAL ROUTING OF CONDUITS WITH FIELD CONDITIONS TO MINIMIZE CONFLICTS.
6. COAT BELOW GRADE PORTIONS OF I-BEAMS WITH TWO COATS OF BITUMASTIC PAINT.
7. ALL CONDUIT AND CONDUIT TO BE ALUMINUM ABOVE FINNISH GRADE.
8. ALL MOUNTING HARDWARE TO BE STAINLESS STEEL.
9. A SEALING WASHER AND ONE OF THREE APPLETON CORD GRIP CONNECTORS SHALL BE USED ON PUMP CORDS: CG-62100, CG-75100, CG-87100.



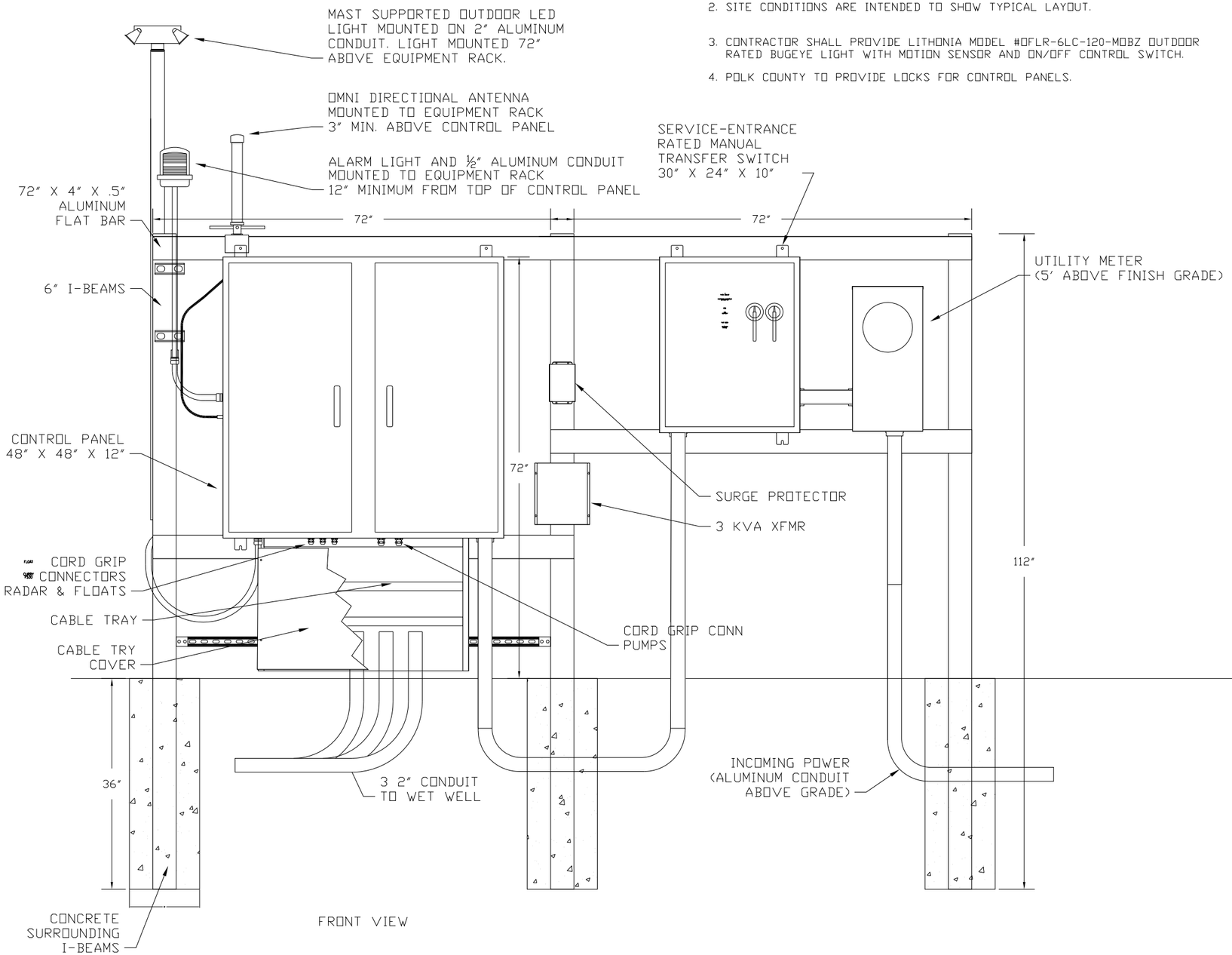




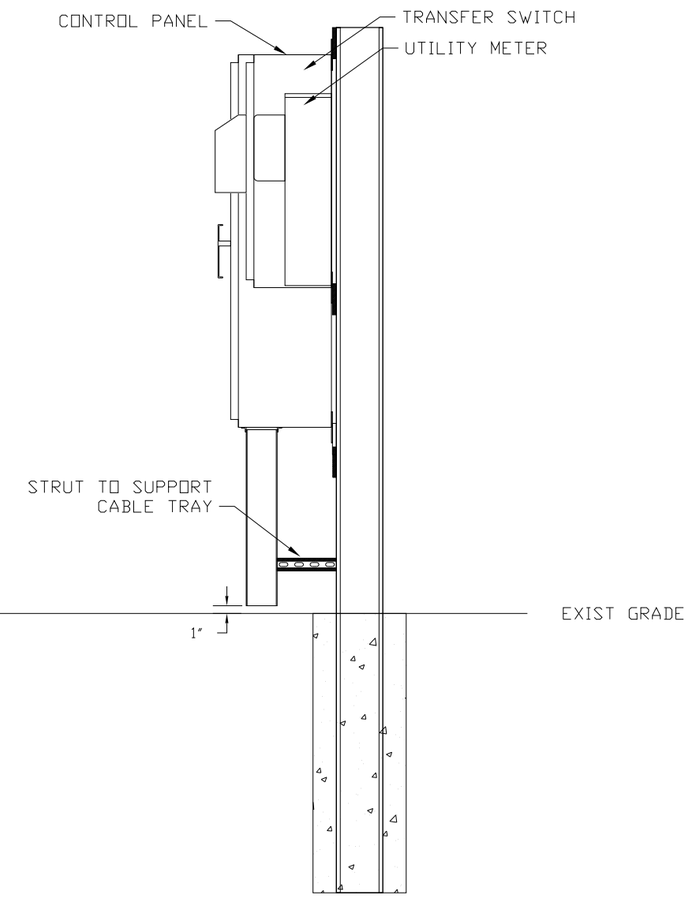
DUPLEX PUMP CONTROL PANEL TYPICAL SITE LAYOUT	FIGURE WW-20-1
POLK COUNTY UTILITIES, FLORIDA	MARCH, 2020

ITEM	QTY	CATALOG	MFG	DESCRIPTION
1	2	100NPTETS	APPLETON	SEALING WASHERS (1")
2	3	50NPTETS	APPLETON	SEALING WASHERS (1/2")
3	3	CG-3150	APPLETON	CORD GRIP CONNECTOR (1/2" HUB) CABLE RANGE .312-.437
4	2	CG-75100	APPLETON	CORD GRIP CONNECTOR (1" HUB)
5	5	STA 6	CROUSE-HINDS	2" MYERS HUB
6	1	.5 ST	CURRY	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
7	2	.5" AL BAR	CURRY	.5" X 4" X 12' ALUMINUM BAR
8	2	.5"-2"	CURRY	1/2" TO 2" REDUCING BUSHING
9	1	.5X2	CURRY	1/2" NIPPLE 2" LONG
10	1	.78 STRUT	CURRY	.875" STRUT
11	1	1.58 STRUT	CURRY	1.625" STRUT
12	2	2C	CURRY	2" ALUMINUM RIDGE CONDUIT
13	2	2LB	CURRY	2" ALUMINUM LB
14	1	2PVC	CURRY	2" SCH80 PVC
15	4	6X4IB	CURRY	6" X 4" ALUMINUM I-BEAM
16	2	FS30	CURRY	FLOAT SWITCH, NO, NC, 30'
17	1	SUA-230-ALA	DIVERSIFIED ELECTRONICS	230V PHASE MONITOR
18	1	27AST-36-144	EATON	ALUMINUM CABLE TRAY, 36" WIDE
19	1	6LE96	EATON	3/8"-16 TAMPER RESISTANT SCREW, BUTTON HEAD, SS, 5PK
20	1	807A-36-144	EATON	ALUMINUM COVER, SOLID, FLANGED
21	1	9A-1077-36	EATON	ALUMINUM FRAME TYPE BOX CONNECTOR, 7" H, 36" L
22	1	SSD2-125C-125C-240-311-S-C-30209IV	ESL POWER SYSTEMS	SERVICE-ENTRANCE RATED MANUAL TRANSFER SWITCH
23	1	141ST-024R	FEDERAL SIGNAL	24VDC ALARM LIGHT
24	1	PTE080-NN201	IT PROTECTOR	SURGE PROTECTOR DEVICE
25	1	OFLR-6LC-120-P-WH	LITHONIA	LED FLOODLIGHT 2 ADJUSTABLE HEADS
26	1	200A	MILBANKS	200A METER CAN
27	1	RAD-0005	POLYPHASER	BULKHEAD ARRESTOR, N-FEMALE TO N-FEMALE, IS-B50LN-C2
28	1	DFCC3V	SCHNEIDER	FUSEHHOLDER 600V 30AMP 3 POLE
29	1	HS5F3AS	SOLA HD	TRANSFORMER, SINGLE PHASE 240 X 480 PRIMARY, 120/240 SECONDARY, 3 KVA
30	1	8501NR51	SQD	RELAY BASE - 8-PIN
31	4	5332	THOMAS & BETTS	LIQUIDTIGHT FLEXIBLE METAL CONDUIT FITTING
32	1	LMR 400	TIMES	ANTENNA CABLE 10' LONG, N-MALE/N-MALE
33	1	LMR240	TIMES	ANTENNA CABLE 4' LONG, N-MALE CON. TO SMA RIGHT ANGLE MALE CON.
34	1	311203	WILSON	ANTENNA, OMNI DIRECTIONAL, WIDE BAND, 50 OHMS

1. MOTOR PROTECTION WIRING BETWEEN WET WELL AND CONTROL PANEL SHALL BE IN THE SAME CONDUIT WITH MOTOR POWER WIRING.
2. SITE CONDITIONS ARE INTENDED TO SHOW TYPICAL LAYOUT.
3. CONTRACTOR SHALL PROVIDE LITHONIA MODEL #DFLR-6LC-120-MOBZ OUTDOOR RATED BUGEYE LIGHT WITH MOTION SENSOR AND ON/OFF CONTROL SWITCH.
4. POLK COUNTY TO PROVIDE LOCKS FOR CONTROL PANELS.
5. CONDUIT ROUTING SHOWN IS DIAGRAMMATIC. CONTRACTOR SHALL COORDINATE ACTUAL ROUTING OF CONDUITS WITH FIELD CONDITIONS TO MINIMIZE CONFLICTS.
6. COAT BELOW GRADE PORTIONS OF I-BEAMS WITH TWO COATS OF BITUMASTIC PAINT.
7. ALL CONDUIT AND CONDUIT FITTINGS TO BE ALUMINUM ABOVE FINNISH GRADE.
8. ALL MOUNTING HARDWARE TO BE STAINLESS STEEL.
9. A SEALING WASHER AND ONE OF THREE APPLETON CORD GRIP CONNECTORS SHALL BE USED ON PUMP CORD; CG-62100, CG-75100, CG-87100.



FRONT VIEW



RIGHT SIDE VIEW

USE THIS LAYOUT WHEN MOUNTING RACK IN FRONT OF A WALL, FENCE OR OTHER OBJECTS.

DUPLEX PUMP CONTROL PANEL "FRONT MOUNT ONLY" SITE LAYOUT	FIGURE WW-20-2
POLK COUNTY UTILITIES, FLORIDA	MARCH, 2018

ITEM	QTY	CATALOG	MFG	DESCRIPTION
1	2	100NPTETS	APPLETON	SEALING WASHERS (1")
2	3	50NPTETS	APPLETON	SEALING WASHERS (1/2")
3	3	CG-3150	APPLETON	CORD GRIP CONNECTOR (1/2" HUB) CABLE RANGE .312-.437
4	2	CG-75100	APPLETON	CORD GRIP CONNECTOR (1" HUB)
5	5	STA 6	CROUSE-HINDS	2" MYERS HUB
6	1	.5 ST	CURRY	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
7	2	.5" AL BAR	CURRY	.5" X 4" X 12' ALUMINUM BAR
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24	1	PTE080-NN201	IT PROTECTOR	SURGE PROTECTOR DEVICE
25	1	OFLR-6LC-120-P-WH	LITHONIA	LED FLOODLIGHT 2 ADJUSTABLE HEADS
26	1	200A	MILBANKS	200A METER CAN
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28	1	DFCC3V	SCHNEIDER	FUSEHHOLDER 600V 30AMP 3 POLE
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31	4	5332	THOMAS & BETTS	LIQUIDTIGHT FLEXIBLE METAL CONDUIT FITTING
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33	1	LMR240	TIMES	ANTENNA CABLE 4' LONG, N-MALE CON. TO SMA RIGHT ANGLE MALE CON.
34	1	~~311203~~ 304422	WILSON	ANTENNA, OMNI DIRECTIONAL, WIDE BAND, 50 OHMS

DUPLEX PUMP CONTROL PANEL BILL OF MATERIAL

FIGURE
WW-20-2-BOM

POLK COUNTY UTILITIES, FLORIDA

MARCH, 2020

CONDUIT/CABLE SCHEDULE				
CABLE #	CONDUIT SIZE/TYPE	CABLE TYPE AND SIZE	FROM	TO
A	2" PVC SCH 80	1 – SONAR LEVEL TRANSMITTER 2 – FLOAT CABLES	CONTROL PANEL	WET WELL
B	2" PVC SCH 80	P#1 MOTOR SHIELD/THERMAL CABLE P#1 MOTOR POWER CABLE	CONTROL PANEL	WET WELL
C	2" PVC SCH 80	P#2 MOTOR SHIELD/THERMAL CABLE P#2 MOTOR POWER CABLE	CONTROL PANEL	WET WELL
D	2" RIDGE ALUMINUM	REFER TO CHART BELOW	CONTROL PANEL	TRANSFER SWITCH
E	2" RIDGE ALUMINUM	REFER TO CHART BELOW	TRANSFER SWITCH	UTILITY METER
F	2" RIDGE ALUMINUM	1–#14_RED, 1–#14_WHT, 1–#14_GRN	CONTROL PANEL	AREA LIGHT
G	1/2" RIDGE ALUMINUM	1–#16_BLU, 1–#16_BLU/WHT, 1–#16_GRN	CONTROL PANEL	ALARM LIGHT
H	3/4" RIDGE ALUMINUM	2–#12(POWER), 1–#12_GRN	CONTROL PANEL	3KVA TRANSFORMER
J	3/4" RIDGE ALUMINUM	1–#10_BLK, 1–#10_WHT, 1–#10_GRN	CONTROL PANEL	3KVA TRANSFORMER
K	1" PVC SCH 80	EMPTY CONDUIT STUBBED UP AND CAPPED FOR FUTURE PRESSURE TRANSMITTER	CONTROL PANEL	WASH DOWN ASSEMBLY

(240V) MAINS CIRCUIT BREAKER/WIRE SIZE									
HP								BREAKER SIZE	WIRE SIZE
1	1.5	2	3	5	7.5	10	15		
X	X	X	X	X				60A	6 AWG
					X	X		100A	3 AWG
							X	150A	1/0 AWG

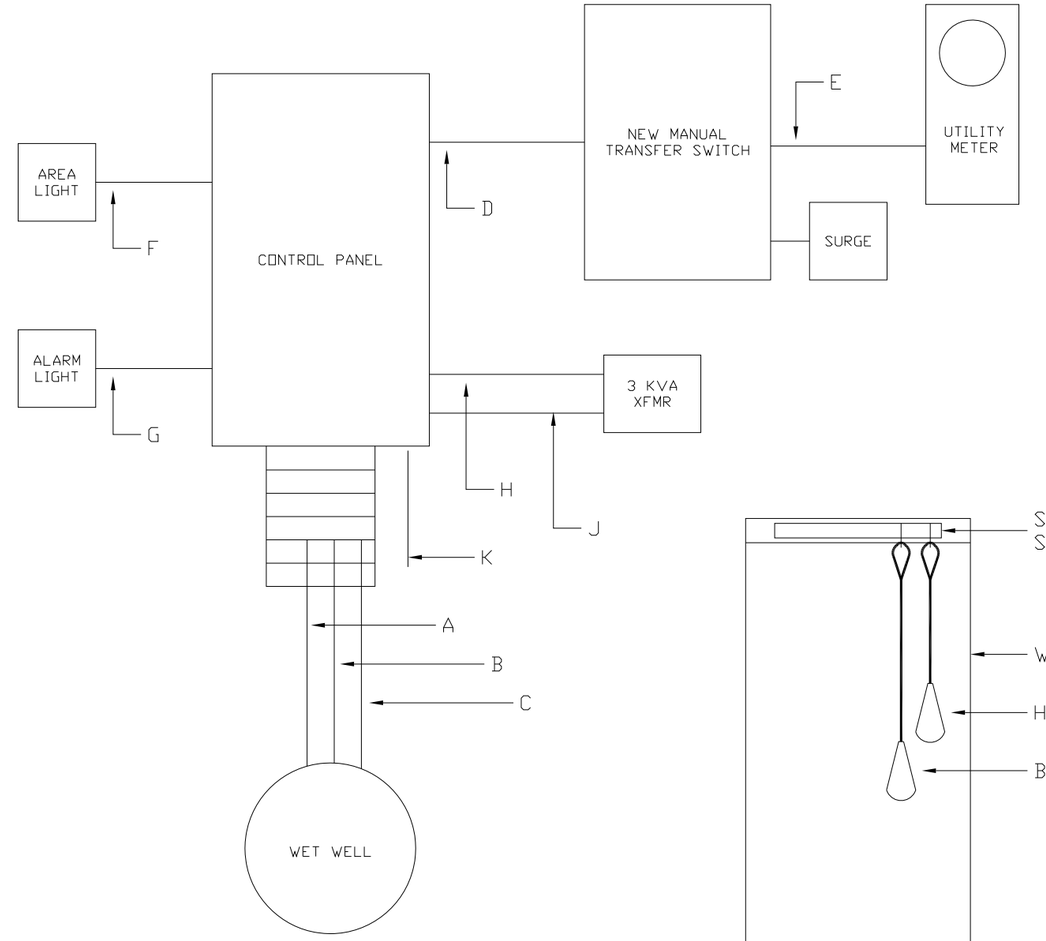
(240V) MOTOR CIRCUIT WIRE SIZE								
HP								WIRE SIZE
1	1.5	2	3	5	7.5	10	15	
X	X	X	X	X				12 AWG
					X			10 AWG
						X		8 AWG
							X	6 AWG

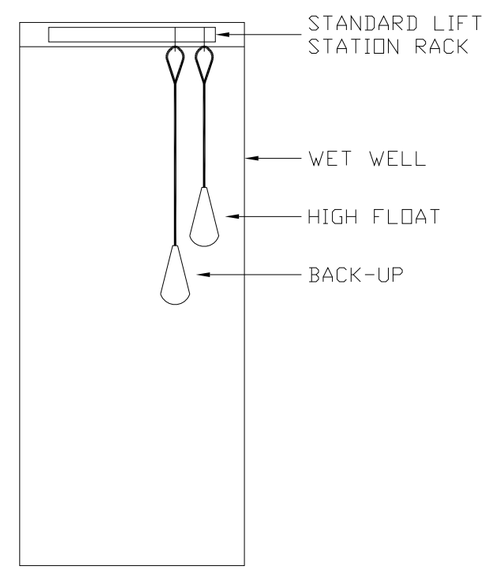
(480V) MAIN CIRCUIT BREAKER/WIRE SIZE						
HP					BREAKER SIZE	WIRE SIZE
3	5	7.5	10	15		
X	X	X	X		60A	6 AWG
				X	100A	3 AWG

(240V) MOTOR FLA RATING								
1	1.5	2	3	5	7.5	10	15	HP
4.2	6	6.8	9.6	15	22	28	42	FLA

(480) MOTOR FLA RATING					
3	5	7.5	10	15	HP
4.8	7.6	11	14	21	FLA

(480V) MOTOR CIRCUIT WIRE SIZE					
HP					WIRE SIZE
3	5	7.5	10	15	
X	X	X	X		12 AWG
				X	10 AWG





DUPLEX PUMP CONTROL PANEL SITE LAYOUT

FIGURE WW-20-3

POLK COUNTY UTILITIES, FLORIDA

MARCH, 2020

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Engineering a Better Environment