CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE
DEPARTMENT OF ENVIRONMENTAL SERVICES

June 28, 2016

ADDENDUM NO. 5

TO: ALL BIDDERS

SUBJECT: **HOOPER ROAD PUMP STATION PROJECT**
CITY-PARISH PROJECT NO. 10-PS-MS-0048

ORIGINAL BID DATE: Tuesday, June 7, 2016 at 2:00 p.m.
CURRENT BID DATE: Thursday, July 7, 2016 at 2:00 p.m.

The following revisions shall be incorporated in and take precedence over any conflicting part of the original contract document:

PART 1 – UNIFORM CONSTRUCTION BID FORMS:

1. For paper sealed bidders, with reference to page UCBF 1 of 4 of Part 1, Uniform Construction Bid Forms, the Bidder shall indicate the receipt of this addendum in the space provided. For online Bid Express bidders, an acknowledgement of this addendum will be prompted by the electronic bidding program prior to formally submitting the bid. Failure to indicate the receipt of this addendum shall be cause for the bid to be rejected.

SPECIAL CONDITIONS

SECTION 01 32 13 SCHEDULING OF WORK

DELETE subsection 1.04.A of Section 01 32 13 in its entirety and replace with the following:

A. Interim milestones for this project can be further clarified by defining the requirements in two tiers of interim sub-project completion dates:
   - Tier 1: PS 511, PS 509, PS 510AA
   - Tier 2: PS 86, PS 207, PS 231 (demo only), PS 285, and all tie ins, connections and force main abandonment

   All components within the each tier of interim sub-project completion dates shall be met in order to satisfactorily deliver Work under the terms of this Contract. Failure to meet any of Interim Sub-Project Completion Dates, individually or collectively, will result in assessment of liquidated damages for each tier event. Lack of completion of one or more components within a tier results in assessment of liquidated damages for the tier event. Liquidated damages are attached to the tier of components as an interim sub-

project completion date and are not assessed per individual pump station. Liquidated Damages amount shall be in accordance with the agreement and specifications where it is clearly defined. Liquidated Damages shall be both additive and cumulative.

SECTION 22 13 29 SUBMERSIBLE SEWER PUMPS

DELETE subsection 1.02.C.07 of Section 22 13 29-16 in its entirety and replace with the following:

7. Certification that pump(s) and motor(s) are suitable for adjustable frequency/voltage control by VFD(s), and that specific application settings are made to avoid overheating and harmonic vibrations caused by rotational speed and carrier-frequency-induced rotational "cogging". Contractor is responsible for providing VFD submittal and harmonic analysis to pump manufacturer for their review prior to VFD production.

SECTION 26 29 23 LOW-VOLTAGE VARIABLE FREQUENCY DRIVES (VFDs)

ADD the attached Section 26 29 23 LOW-VOLTAGE VARIABLE FREQUENCY DRIVES (VFDs) to the Special Conditions. Section 26 29 23 replaces any references made to Special Provision Section 805-27 for provision of VFDs in Program Stations.

CONSTRUCTION PLANS:

CHANGE NOTE FROM PLUG TO GATE VALVE

1. REPLACE Sheet P-E03R Rev 1 with attached Sheet P-E03R Rev 2
2. REPLACE Sheet P-E06R Rev 1 with attached Sheet P-E06R Rev 2
3. REPLACE Sheet Q-E03R Rev 1 with attached Sheet Q-E03R Rev 2
4. REPLACE Sheet Q-E06R Rev 1 with attached Sheet Q-E06R Rev 2
5. DELETE the call out "Req'd Plug Valve (24")" on Detail J of Sheet R-C02R and replace with "Req'd Gate Valve (24")"
6. REPLACE Sheet R-E06R Rev 1 with attached Sheet R-E06R Rev 2
7. ADD the attached Sheet 347: Standard Plan 902-02 Chain Link Fence and Gates

COMMENTS & QUESTIONS:

1. On this project ALL check valves are specified as rubber flapper check valves, even on the larger stations. Projects in the past in the SSO program have utilized rubber flapper check valves on the small diameter stations and lever and weight air cushion check valves like the APCO Series 250 on the larger diameter stations (ie. PS509, PS510AA, PS511). Are lever and weight air cushioned check valves required on the larger stations? Please advise.

All check valves should be rubber flapper type.

2. Where do you want the valves in the force main lines that are bid items, in the fm bid item or the fittings bid item?

   All valves outside of the pump station lump sum pay limits (as described in Section 804-10) are part of the scope of a tie in, which will be paid under the respective bid item for the tie in where they are required.

3. There is also approximately 800 LF of 24-30-36" Restrained Joint Piping, Fittings & Tie-Ins required for your project. Flowtite is NOT specified for this pressure pipe. We ask that you & City of Baton Rouge and Parish of East Baton Rouge please allow Flowtite to quote the 24-30-36" Restrained Joint Pressure Pipe, Fittings & Tie-Ins to your bidding contractors. Or would you please consider Flowtite as an alternate pressure pipe material if the low bidder submits Flowtite as a "Value Engineered Alternate Material" in the post phase of your project?

   Flowtite is not an approved pressure pipe material.

4. Can a conduit and wire schedule be provided showing what the conduit and wire duct bank is from the building to the first handhole on all the stations? There are some conduit variations between schedules. Example: In the "circuit schedule from the station to the TJB", 2 1/2" conduit is shown in the wiring requirements. In the "exterior conduit schedule", it shows multiple 4" conduits going to the TJB's. Please clarify what is the correct requirement.

   The connection from the control building to HH1 (HH2) for all stations (*=P for PS509, Q for PS510AA, R for PS511) shown on Site Plans (Sheets *-E01) is motor power from VFD enclosures plus Duct Section 50 (PLC I/O and power to gas monitor). Pump power requirements are defined on One-Lines and Notes (Sheets *-E02, *-E03).

   a. Circuit requirements from a VFD to associated TJB are defined in Circuit Schedule – PS* to TJB (Sheets *-E06). Conductor size is based on largest motor that might be used, and cable construction is called out in Note 2 (1st sentence); only one cable is required to each TJB. Conduit size shown is minimum for the run out to HH1 (HH2).**
      NOTE: Per Addendum 3, the type of construction for below grade conduit is now either direct buried RGS-PVC or PVC-encased.

   b. Raceway continuation from hand hole HH1 (HH2) to TJB is shown on power plans (Sheets *-E04) which refer to Cable Trench Layout – Plan (Sheets *-E05). Duct section cuts define the connection to corresponding TJB, with details given in Exterior Conduit Schedule (Sheets *-E03). Conduit size for power is 4" (based on initial concept of PVC-encased duct bank with common conduit size.)

5. In regards to the VFD cable required, <u>will one cable or two cables be required</u> in the VFD runs of conduit? Our concern is the o.d. of the VFD cable being installed in 2 1/2" or

even 4" conduit. The cable has an aluminum overall jacket which makes it difficult to install too many cables in one conduit. Please clarify what is the correct requirement.

Circuit requirements from the VFD to the TJB are defined in Circuit Schedule – PS* to TJB (Sheets *-E06). For all pump stations, conductor requirements are one per phase to the TJB. Only one cable is expected for each pump. NOTE: For shield, overlapped copper tape is acceptable alternative to corrugated aluminum.**

6. The sizes of the NOTE 2 VFD cables listed in the schedules may not be available according to two cable manufacturers. A #3/0 VFD cable is not shown in their literature. Also, the sizes #1/0 and #2/0 is not available with the proper grounds called for in the schedules. Please review the VFD cables listed and recommend what type to use.

   Phase conductor sizes shown in Circuit Schedule – PS* to TJB (Sheets *-E06) are reported available from more than one manufacturer; if size shown is not readily available, the next larger size is an acceptable alternate. The ground wire for multi-conductor cable shall be symmetrically segmented as specified in Section 26 05 00, Par. 2.03.F. Schedule WIRING REQUIREMENTS are modified to clarify the ground wire per Construction Plans notes in this addendum.**

7. We are bidding on both the Hooper Road Pump Station Project and the Multiple Pump Stations (Highway 61-Plank Road) project. At this time both are scheduled to bid on 6/28/16 at 2:00 PM. We respectfully request that some duration of time be placed between the two bids.

   The City-Parish will ensure that the two projects mentioned above do not open for bids on the same day.

8. Addendum No.2, question 9 states that the caisson method of construction can be submitted for approval for station installation. No specifications have been provided and the standard specifications do not include the Caisson Method of construction.

   Since the caisson method is at the contractor's option as to means and methods, if the contractor elects to use this method he will submit his plan for review.

9. On Station 511, Force Main Tie-In Detail J, a hot tap and a blind flange is shown. Can the existing 30" be shut-off for the placement of the blind flange? If so, is the hot-tap necessary?

   No the existing 30" line cannot be shut-off.

10. On Station 511, Force Main Tie-In Detail J, a plug valve is shown. It is unusual to hot tap through a plug valve due to the rectangular port. Is this correct?

    The call out on Detail J of Sheet R-C02R has been revised in this addendum.

11. At Pump Station 510AA, is the new 48" doghouse manhole to be absorbed in the pump station price?

Yes, the new doghouse manhole is within the pump station lump sum pay limits.

12. There is some concern about the requirement to restrain existing force mains, particularly on concrete pipe. If chipping the existing concrete diaper on the pipe is required in order to install the restraint device, the durability of the concrete pipe will be reduced, even though new concrete will be installed around the device. Please consider changing this requirement for existing concrete force mains.

    If concrete pipe is encountered in the field and is required to be restrained, the City-Parish will work with the Contractor to determine an alternate resolution in the field per Section 10-4 of the Contract Documents.

13. On P.S.511, the conduits from hh 1 and 2 to the 6 - tjb's for control conduit is 2". ps509 and ps 510aa are shown as 4". please confirm if 2" is correct on p.s. 511.

    Sizing shown for PS511 is correct. Per written descriptions above of drawing revisions, the size for control conduits from HH1(HH2) to TJB in PS509 and PS510AA shall also be 2".

14. On pe06, qe06,re06 is showing 2 1/2" conduit to hh1 and hh2, then 4" conduit from hh1 and hh2 to the tjb's for power. please confirm if the 2 1/2" should be 4".

    Conduit sizing shown from VFD to HH is an adequate minimum size. Contractor may use larger size if that better suits his means and methods. Note that conduit size for PS511 on R-E06 is 3", not 2-1/2"

15. The typical grounding detail used for lightning protection will not be approved for a ul approval per the lightning protection vendor. can a detail be provided or do we rely on the lightning protection vendor to detail it?

    For an approved installation, appropriate details by a lightning protection vendor are recommended.

16. Addendum 3 gives us 2 options for underground conduit. if coated conduit is run under the building slab, does it need to be in concrete duct bank?

    RGS-PVC coated conduit installed under a building slab shall not require encasement for horizontal runs. Risers shall be encased in accordance with Duct Details shown on Sheet EG05 added in Addendum 3.

17. If coated conduit is run under the piping/well apron does it need to be in concrete duct bank?

    As for RGS-PVC coated conduit installed under a building slab, encasement for horizontal runs shall not be required. Risers shall be encased in accordance with Duct Details shown on Sheet EG05 added in Addendum 3.

CLARIFICATIONS:

- Interim milestones for this project can be further clarified by defining the requirements in two tiers of interim sub-project completion dates:

  Tier 1: PS 511, PS 509, PS 510AA

  Tier 2: PS 86, PS 207, PS 231 (demo only), PS 285, and all tie ins, connections and force main abandonment

  All components within the each tier of interim sub-project completion dates shall be met in order to satisfactorily deliver Work under the terms of this Contract. Failure to meet any of Interim Sub-Project Completion Dates, individually or collectively, will result in assessment of liquidated damages for each tier event. Lack of completion of one or more components within a tier results in assessment of liquidated damages for the tier event. Liquidated damages are attached to the tier of components as an interim sub-project completion date and are not assessed per individual pump station. Liquidated Damages amount shall be in accordance with the agreement and specifications where it is clearly defined. Liquidated Damages shall be both additive and cumulative.

- The material type of all force main that was installed under Project 10-GS-MS-0049 as shown on Sheets AM-1 through AM-4 will have followed the requirements of Section 1016 Sewer Pipe of these contract documents.

RECOMMENDED:

STATE OF LOUISIANA
JAMES R. SMITH
License No. 19893
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

28 Jun 16

James Smith, P.E.

STATE OF LOUISIANA
HEATHER S. LAYRISSON
License No. 40542
PROFESSIONAL ENGINEER

6/28/16

Heather Layrisson, P.E.

STATE OF LOUISIANA
JUSTIN L. SHARPER
License No. 35876
PROFESSIONAL
ENGINEER
IN
CIVIL ENGINEERING

6/28/16

Justin Sharper, P.E.

APPROVED:

Justin Sharper for

Adam M. Smith, P.E.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Low-voltage variable frequency drive (VFD) designed for use on 3-phase squirrel cage induction motor in submersible pump.

1.02 RELATED REQUIREMENTS

A. Section 22 13 29-16 – Submersible Sewer Pump.

B. Section 40 96 15-14 – Control System Operational Description PS509/PS510AA.

C. Section 40 96 15-16 – Control System Operational Description PS511.

1.03 INFORMATIONAL SUBMITTALS

A. Product Data:
1. Vendor data entered on Data Sheets for each different drive provided. Identify any special accessories required to match with driven load.
2. Complete list an accompanying data for any special equipment required for operation and maintenance of VFD.
3. Receiving, storage, installation, and testing instructions.

B. Quality assurance data:
1. Submittal document index and submittal schedule.
2. Plots of typical efficiency vs. speed and torque curves.
3. Harmonic analysis calculations specific to each installation showing total harmonic voltage and current distortion at PCC. Information to demonstrate that harmonic currents generated by drives will not cause power distribution system to experience harmonic distortion exceeding limits recommended by IEEE Standard 519. Describe product features and equipment furnished to meet harmonic distortion requirements of this Specification.
4. Mean Time-to-Failure data.
5. Standard production testing procedures for drives, certified factory test data and results after completion of factory testing.
6. Provide name and address of factory authorized service and parts organization nearest to project location at time of bid.

1.04 ACTION SUBMITTALS

A. Shop Drawings:
1. Certified outline, general arrangement, assembly, and installation drawings, that includes front view, dimensions, and weight.
2. Elementary diagrams (3-line diagrams) and schematic control diagrams of complete VFD system showing terminal block terminations, device terminal numbers and internal wiring diagrams.
3. Certified drawings of cable termination compartments showing preferred locations for conduit entry/exit locations and indicating space available for cable terminations.
4. Nameplate drawing.
5. Letters of certification with shop drawings from VFD manufacturer and pump manufacturer stating that they have reviewed each application and that combination will satisfy application duties required for actual motor sizes required

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance manuals. Provide, at minimum:
1. Final copies of documents listed above.
2. Operating and maintenance procedures.
   a. Detailed service, maintenance and operation instructions for each item supplied.

b. A table listing of "as left" drive set up parameters, timing relay settings and alarm and trip setpoints, reflecting final settings at completion of project.
c. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.

3. Spare parts lists with pricing.
4. Installation field reports and Data Sheets updated to reflect field installation conditions
5. Copies of warranty.

1.06 MAINTENANCE MATERIALS

A. Provide following spare parts for each size drive in quantities specified:
1. 50% replacement fuses, all types and sizes
2. 3 control relays, each type.
3. 1 keypad display (HIM).
4. 1 main control board.
5. 1 microprocessor board.
6. 1 serial interface module.
7. 1 power semiconductor inverter assembly.
8. 1 power semiconductor rectifier assembly.

B. Spare parts shall be boxed or packaged for long term storage. Identify each item with manufacturer's name, description and part number on exterior of package

1.07 QUALITY ASSURANCE

A. Design and manufacture according to latest editions of applicable NEMA, UL, NFPA, IEEE, and ANSI standards.

B. Manufacturer shall be ISO 9001 certified and shall have produced similar electrical equipment for minimum period of 5 years.

C. When requested by Engineer, provide acceptable list of similar equipment installations complying with requirements of this specification.

D. VFDs and associated line reactors, control panels and output filters shall be supplied by one system supplier. The system supplier shall perform all work necessary in order to select, furnish, coordinate, supervise installation, test and place into operation all components of each drive system.

E. Completed drive shall be tested for at least 3 hours with induction motor connected.

1.08 DELIVERY, STORAGE, AND HANDLING

A. During delivery and storage, handle equipment to prevent damage, denting, or scoring.

B. Store equipment and components in clean, dry place. Protect from weather, dirt, water, construction debris, and physical damage in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Rockwell / Allen Bradley.

B. Schneider / Square D.

C. Siemens / Robicon.

D. Or approved equal.

2.02 SYSTEM DESCRIPTION

A. VFD shall convert incoming fixed frequency 3-phase ac power into variable frequency and voltage for controlling speed of 3-phase ac motor.

B. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for eliminating need for motor derating.

C. VFD shall be sinusoidal PWM type drive with sensor-less torque vector control capability. Control techniques other than PWM, not acceptable.

D. Components:
1. Full-wave diode rectifier to convert supply ac to fixed dc voltage.
2. Dc link capacitors.
3. Insulated Gate Bipolar Transistor (IGBT) power section, dual rated for either variable or constant torque applications.
4. VFD shall be microprocessor-based with LED and LCD display to monitor operating conditions.
5. Separate control and power terminal boards.

E. VFD shall be of modular construction for ease of access to control and power wiring, and maintenance.

F. Provide in NEMA 1 enclosure for use in normal, nonhazardous industrial environment.

G. Enclosure doors shall include electromechanical interlocking system with safety switch and electrical interlocks tied to main breaker. Whenever doors are open, safety ground switch shall connect plus, minus, and neutral dc buses to ground to ensure stored energy is discharged.

2.03 DESIGN REQUIREMENTS

A. Where manufacturer determines an input drive transformer, input filter, or output filter is required to meet installation requirements, they shall also be provided.

B. Point of Common Coupling (PCC) shall be defined as terminals on input side of circuit breaker directly feeding each individual drive.

C. Total Harmonic Distortion (THD) at each PCC shall not exceed 5%, as recommended for General Systems as listed in Table 10.2 of IEEE Standard 519.

D. Harmonic current distortion at PCC shall not exceed limits listed in Table 10.3 of IEEE Standard 519.

E. Design drive to provide 50,000 hours mean time between failures (MTBF) when specified preventative maintenance is performed.

F. Design motors furnished to meet NEMA MG1, Part 31 for VFD service.

G. Symbols shall conform to ANSI Y32.2/IEEE 315/CSA Z99.

H. Printed circuit boards shall be completely tested and burned-in, in accordance with UL347A before being assembled into completed VFD.

2.04 INPUT POWER

A. System shall be capable of maintaining rated torque and speed with bus voltage deviations of ±10% and frequency deviations of ±5%.

B. Line notching, transients, and harmonics on incoming line shall not affect VFD performance.

C. Below 70% bus voltage, motor will be allowed to coast. If bus voltage is restored within 2 seconds, system can be started, if selected. If bus voltage is not restored within 2 seconds, system shall be automatically shut down. Automatic or manual restart shall be selectable from control panel.

D. VFD shall have provisions for input line reactor to be incorporated into VFD enclosure.

E. Drive efficiency shall be 97% or higher at rated load.

2.05 OUTPUT POWER

A. Operating mode:
1. Frequency at 60 Hz and below: Constant volts per Hz mode.
2. Above 60 Hz: Selectively operate in either constant volts per Hz mode or constant voltage extended frequency mode.

B. Rated output voltage: Programmable for either 80 to 240 volts or from 320 to 480 volts depending on 3-phase motor nameplate rating.

C. VFD shall be capable of minimum of 110% of rated full-load current in continuous operation, in accordance with NEC Table 430.150.

2.06 OPERATING RANGE

A. Speed range: 60% to 100%. Both minimum and maximum speeds shall be field-adjustable.

B. VFD shall not have electrical resonance within operating speed range.

C. VFD shall be able to speed search and immediately pick up spinning motor in either forward or reverse direction.

2.07 TORSIONAL REQUIREMENTS

A. VFD, motor, and equipment load shall not develop adverse speed dependent oscillations.

2.08 NOISE

A. Drive shall not cause motor audible noise to increase more than 3 dB at 3' (1 m) above rated noise level for operation on full voltage starter.

2.09 MINIMUM DISPLACEMENT POWER FACTOR

A. PF 0.90 lagging, or higher, at any speed or load without use of power factor correction capacitors.

2.10 HARMONICS MITIGATION

A. Provide output filters, as required, such that motor insulation will not be damaged.

B. If additional equipment is necessary to meet IEEE 519 requirements, it shall be through use of one or more of following:
1. Input isolation transformer.
2. Input line reactor.
3. Input harmonic trap filter with series reactor.
4. Higher pulse rectifier.
5. Mirus filter.
6. Dc link reactor.

C. Drive manufacturer shall select and approve equipment provided.

2.11 DRIVE CONTROL

A. VFD shall use control strategy that maximizes efficiency, performance, and power factor while minimizing motor heating.

B. Drive regulator and control: Digital microprocessor design with following functions:
   1. Speed regulation.
   2. Current regulation.
   3. Load angle regulation.
   4. Drive protection.
   5. Drive diagnostics.
   6. System sequencing.

C. VFD regulator and control functions shall be stored on nonvolatile memory.

D. Drive shall have minimum of 3 programmable prohibited frequency ranges with adjustable span of 0 to 10 Hz.

E. Provide drive with local and remote controls:
   1. Locate 2-position maintained switch on front of enclosure for selection of “Local” or “Remote” control.
   2. Individual momentary buttons for “Local,” “Start,” and “Stop.”
   3. Speed reference potentiometer.

F. Following points shall be available as physical inputs and outputs to be hardwired to control system:
   1. Remote speed setpoint (0-100%): 4-20 mA input to drive.
   2. Actual speed (0-100%): 4-20 mA output from drive.
   3. Drive reset fault (Reset/Normal): Discrete input to drive.
   4. Drive fault (Fault/No Fault): Discrete output from drive
   5. Drive enabled (Enabled/Disabled): Discrete output from drive.
   6. Drive auxiliary fault (Fault/No Fault): Discrete output from drive.
   7. Drive in remote (Remote/Local): Discrete output from drive.
   8. Drive remote (Remote/Local): Discrete input to drive.
   9. Drive running (Running/Stopped): Discrete output from drive.
   10. Drive remote start (Start/Stop): Discrete input to drive.
   11. Drive Remote run (Run/Not Run): Discrete input to drive.

G. Operation:
   1. Switch in “Local” position: Drive shall operate at speed set by potentiometer when local “Start” button is pushed. “Stop” button shall stop equipment without delay.
   2. Switch in “Remote” position: Drive shall be remotely controlled. Local potentiometer, “Start” button, and “Stop” button shall have no effect on operation.
      a. Speed control shall regulate motor speed corresponding to remote speed signal.
      b. When incoming signal is varying, rate of change of motor speed shall be limited by pre-selected acceleration/ deceleration rate.
      c. Drive shall be programmable to either run at constant speed as determined by minimum speed setting, last signal, preset speed, or to shut down, upon loss of speed signal. Remote speed signal falling below lower limit of range shall also be considered as loss of speed signal. Loss of remote speed signal shall be alarmed.
      d. If remote speed signal is above range upper limit, drive shall run at speed corresponding to upper limit.
      e. Alarms and indication:
         1) Loss of remote speed signal shall be alarmed.
         2) Drive failure alarm.
         3) Drive fault alarm.
         4) Drive in remote and local control indication.
         5) Drive running indication.

H. Following shall be available locally either on control panel display or by use of readouts and LEDs, and remotely through communication interface:
   1. Drive ready.

2. Drive running.
3. Current, amps.
4. Line-line voltage, volts.
5. Output horsepower, hp.
6. Speed, rpm.
7. Frequency, Hz: Digital readout.
8. Drive alarm conditions.
   a. Missing run or start permissive.
   b. Low control voltage.
   c. Microprocessor problem.
   d. I/O addressing problem.
   e. Loss of speed reference.
   f. Common trouble alarm.
9. Drive fault conditions requiring immediate attention, and may indicate impending shutdown of drive.
   a. Source undervoltage.
   b. Source overvoltage.
   c. Source loss of phase.
   d. Source reverse phase sequence.
   e. Load overcurrent.
   f. Overspeed.
   g. Ground fault.
   h. Dc Link overvoltage.

I. Provide communications interface for remote monitoring and control of VFD using DeviceNet communications protocol.

2.12 DRIVE DIAGNOSTICS

A. Provide comprehensive diagnostics for maintenance and troubleshooting including:
   1. Self-test of microprocessor drive control system.
   2. LED indicators for status indication on control boards.
   3. Convenient maintenance test points.

2.13 COOLING

A. Provide integral filtered ambient air cooling by natural convection or forced air cooling system as required to maintain drive equipment at its full current rating.

2.14 IDENTIFICATION AND TAGGING

A. Securely attach nameplates with self-tapping stainless steel screws. Adhesive nameplates not acceptable.

B. Lettering shall be black on white background.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean interior and exterior of equipment prior to placing into service. Debris shall be removed and appropriately discarded.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s recommendations.

B. Perform manufacturer’s recommended start-up and commissioning tests prior to placing into service.

C. Correct deficiencies with VFD and other furnished equipment until system operates as required for installed equipment, at no cost to Owner.

D. Refinish marred spots to match original finish.

3.03 MANUFACTURER’S FIELD SERVICES

A. Provide factory trained technician to start up each VFD. Technician shall be present through duration of field acceptance testing of driven equipment.

B. Start-up service shall include overtime charges, travel and living expenses and replacement parts.

3.04 FIELD TESTING

A. Operation of motors and driven equipment shall be inspected as a part of test procedures to ensure that no problems with this equipment are created due to drives.

B. Problems such as overheating, excessive current, excessive motor noise, vibration, etc., attributable to drives shall be corrected at no additional cost to Owner.

C. Voltage surges at motor terminals shall be within acceptable limits of motor manufacturer.

3.05 TRAINING

A. Provide 8 hours of onsite training instructions on VFD operation for Owner's personnel.

B. Training program shall include 4 hours of classroom instruction, followed by 4 hours of hands on demonstration.

C. Training shall be conducted by personnel employed by VFD manufacturer, unless prior approval of alternate instructors has been granted by Engineer.

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS509 (*=1-4) Tag No.: VFD-509-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Manufacturer	N/a	By Vendor	
Catalog/Serial No.	N/a	By Manufacturer	
General:			
Driven Equipment	-	Submersible Pump	
Motor NEMA Design	NEMA	Design B	
Nominal Operating Voltage	V	480	
System Operating Frequency	Hz	60	
Motor Nameplate Voltage	V	460	
Motor Nameplate Horsepower	Hp	100 (maximum)	
Cable information:			
Power Cable Incoming Location	Top/Bottom	Top	
Power Cable Exit Location	Top/Bottom	Bottom	
Maximum Expected Cable Length	ft	140	
Site information:			
Maximum Ambient Temperature	°C	35	
Minimum Ambient Temperature	°C	5	
Design:			
Rectifier Type	-	PWM	
No of Pulses, Minimum	12, 18, or 24	18	
THD at Point of Common Coupling (PCC)	%	5%	
Available Short Circuit Current at PCC	kA	65	
Mean Time Between Failure (MTFB), Minimum	Hrs	50,000	
Maximum Input Voltage Variation	%	+/- 10	
Maximum Input Frequency Variation	%	+/- 5	
Drive Efficiency, Minimum	%	97	
Displacement Power Factor, minimum	pu	0.95	
Overvoltage Capability of System Voltage, Min.	%	110	
Speed Range	%	60 – 100	
Minimum Programmable Prohibited Freq. Ranges	Qty	3	
Prohibited Freq. Range Span	Hz - Hz	0 – 10	
Enclosure:			
NEMA Rating	NEMA	1	
Dimensions	L x W x H	By Manufacturer	
Weight	lbs	By Manufacturer	
Cooling Method	Air/Water	Air	
Controls:			
Local /Remote Switch	Y/N	Y	
Start and Stop Push Buttons	Y/N	Y	
Local Speed Reference Potentiometer/Adjustment	Y/N	Y	
Programmable Speed Setting	Y/N	Y	
Local LCD or LED Readout Panel	Y/N	Y	
Local and Remote Alarm Indication	Y/N	Y	
Monitoring of VFD Fault Conditions	Y/N	Y	
Communication Interface	-	DeviceNet	
Accessories:			

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS509 (*=1-4) Tag No.: VFD-509-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Input Isolation Transformer	Y/N	By Manufacturer	
Input Line Reactor	Y/N	By Manufacturer	
Input Harmonic Filter Trap with Series Reactor	Y/N	By Manufacturer	
Output Filter	Y/N	By Manufacturer	
Mirus Filter	Y/N	By Manufacturer	
DC Link Reactor	Y/N	By Manufacturer	
Special Accessories Required:	Y/N	By Manufacturer	

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS510AA (*=1-4) Tag No.: VFD-510AA-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Manufacturer	N/a	By Vendor	
Catalog/Serial No.	N/a	By Manufacturer	
General:			
Driven Equipment	-	Submersible Pump	
Motor NEMA Design	NEMA	Design B	
Nominal Operating Voltage	V	480	
System Operating Frequency	Hz	60	
Motor Nameplate Voltage	V	460	
Motor Nameplate Horsepower	Hp	110 (maximum)	
Cable information:			
Power Cable Incoming Location	Top/Bottom	Top	
Power Cable Exit Location	Top/Bottom	Bottom	
Maximum Expected Cable Length	ft	130	
Site information:			
Maximum Ambient Temperature	°C	35	
Minimum Ambient Temperature	°C	5	
Design:			
Rectifier Type	-	PWM	
No of Pulses, Minimum	12, 18, or 24	18	
THD at Point of Common Coupling (PCC)	%	5%	
Available Short Circuit Current at PCC	kA	65	
Mean Time Between Failure (MTFB), Minimum	Hrs	50,000	
Maximum Input Voltage Variation	%	+/- 10	
Maximum Input Frequency Variation	%	+/- 5	
Drive Efficiency, Minimum	%	97	
Displacement Power Factor, minimum	pu	0.95	
Overvoltage Capability of System Voltage, Min.	%	110	
Speed Range	%	60 – 100	
Minimum Programmable Prohibited Freq. Ranges	Qty	3	
Prohibited Freq. Range Span	Hz - Hz	0 – 10	
Enclosure:			
NEMA Rating	NEMA	1	
Dimensions	L x W x H	By Manufacturer	
Weight	lbs	By Manufacturer	
Cooling Method	Air/Water	Air	
Controls:			
Local /Remote Switch	Y/N	Y	
Start and Stop Push Buttons	Y/N	Y	
Local Speed Reference Potentiometer/Adjustment	Y/N	Y	
Programmable Speed Setting	Y/N	Y	
Local LCD or LED Readout Panel	Y/N	Y	
Local and Remote Alarm Indication	Y/N	Y	
Monitoring of VFD Fault Conditions	Y/N	Y	
Communication Interface	-	DeviceNet	

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS510AA (*=1-4) Tag No.: VFD-510AA-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Accessories:			
Input Isolation Transformer	Y/N	By Manufacturer	
Input Line Reactor	Y/N	By Manufacturer	
Input Harmonic Filter Trap with Series Reactor	Y/N	By Manufacturer	
Output Filter	Y/N	By Manufacturer	
Mirus Filter	Y/N	By Manufacturer	
DC Link Reactor	Y/N	By Manufacturer	
Special Accessories Required:	Y/N	By Manufacturer	

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS511 (*=1-6) Tag No.: VFD-511-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Manufacturer	N/a	By Vendor	
Catalog/Serial No.	N/a	By Manufacturer	
General:			
Driven Equipment	-	Submersible Pump	
Motor NEMA Design	NEMA	Design B	
Nominal Operating Voltage	V	480	
System Operating Frequency	Hz	60	
Motor Nameplate Voltage	V	460	
Motor Nameplate Horsepower	Hp	140 (maximum)	
Cable information:			
Power Cable Incoming Location	Top/Bottom	Top	
Power Cable Exit Location	Top/Bottom	Bottom	
Maximum Expected Cable Length	ft	400	
Site information:			
Maximum Ambient Temperature	°C	35	
Minimum Ambient Temperature	°C	5	
Design:			
Rectifier Type	-	PWM	
No of Pulses, Minimum	12, 18, or 24	18	
THD at Point of Common Coupling (PCC)	%	5%	
Available Short Circuit Current at PCC	kA	65	
Mean Time Between Failure (MTFB), Minimum	Hrs	50,000	
Maximum Input Voltage Variation	%	+/- 10	
Maximum Input Frequency Variation	%	+/- 5	
Drive Efficiency, Minimum	%	97	
Displacement Power Factor, minimum	pu	0.95	
Overvoltage Capability of System Voltage, Min.	%	110	
Speed Range	%	60 – 100	
Minimum Programmable Prohibited Freq. Ranges	Qty	3	
Prohibited Freq. Range Span	Hz - Hz	0 – 10	
Enclosure:			
NEMA Rating	NEMA	1	
Dimensions	L x W x H	By Manufacturer	
Weight	lbs	By Manufacturer	
Cooling Method	Air/Water	Air	
Controls:			
Local /Remote Switch	Y/N	Y	
Start and Stop Push Buttons	Y/N	Y	
Local Speed Reference Potentiometer/Adjustment	Y/N	Y	
Programmable Speed Setting	Y/N	Y	
Local LCD or LED Readout Panel	Y/N	Y	
Local and Remote Alarm Indication	Y/N	Y	
Monitoring of VFD Fault Conditions	Y/N	Y	
Communication Interface	-	DeviceNet	

DATA SHEETS LOW VOLTAGE VFD		Equipment Name: VFD – PS511 (*=1-6) Tag No.: VFD-511-* REV. #	
DESCRIPTION	**UNITS/ OPTIONS**	**SPEC DATA**	**VENDOR DATA**
Accessories:			
Input Isolation Transformer	Y/N	By Manufacturer	
Input Line Reactor	Y/N	By Manufacturer	
Input Harmonic Filter Trap with Series Reactor	Y/N	By Manufacturer	
Output Filter	Y/N	By Manufacturer	
Mirus Filter	Y/N	By Manufacturer	
DC Link Reactor	Y/N	By Manufacturer	
Special Accessories Required:	Y/N	By Manufacturer	

END OF SECTION

1) S. A. Warren
2) W. C. Walker

PUMP STATION NO. PS-509

DESIG.	ITEM DESCRIPTION	ITEM VALUE	UNITS
A	1-SHORT CIRCUIT RATING	22	KAIC
	2-UTILITY SERVICE VOLTAGE	480V, WYE	VOLTS
	3-UTILITY TRANSFORMER(S)	3 - 100, OH	kVA
	4-SERVING UTILITY NAME	ENTERGY	-
B	UTILITY MAIN (SERVICE) DISCONNECT / CIRCUIT BREAKER RATING	600	AMPS
C	1-AUTOMATIC TRANSFER SWITCH RATING	600	AMPS
	2-SWITCHBOARD BUS RATING	600	AMPS
D	TRANS. LT PRIMARY CIRCUIT BREAKER	65	AMPS
E	TRANS. LT SIZE (1-PHASE)	25	KVA
F	PUMP MOTOR SIZE (MAXIMUM)	100	HP
G	VFD RATING	120	KVA
H	PUMP MOTOR BREAKER SIZE (VFD)	250	AMPS
I	QUANTITY OF SMALLER MOTORS	0	EACH
J	SMALLER MOTOR SIZE (AVG)	N/A	HP
K	SMALLER MOTOR STARTER SIZE	N/A	NEMA
L	SMALLER MOTOR VFD SIZE	N/A	KVA
M	1-FEEDER 1 SPARE	30	AMPS
	2-FEEDER 2 ODOR CONTROL EQMT	30	AMPS
	3-FEEDER 3 SLIDE GATE OPERATORS	30	AMPS
	4-FEEDER 4 AC-1 (W/DISCONNECT)	20	AMPS
	5-FEEDER 5 AC-2 (W/DISCONNECT)	20	AMPS
N	1-GENERATOR RATING (NOTE G)	400	KW
	2-GENERATOR VOLTAGE & WINDING	480, WYE	VOLTS
	3-GENERATOR BREAKER RATING	600	AMPS
O	1-GENERATOR DIMENSIONS	204L x 60W x 128H	INCHES
	2-GENERATOR WET WEIGHT	11,798	LBS
P	UTILITY SHORT CIRCUIT DUTY	8.0 (EST)	KAIC

COINCIDENT LOAD SUMMARY PS-509 (480V)

LOAD	HP	KVA	AMPS
PSM509-1 (MAX. SIZE) - VFD	100	101	121
PSM509-2 (MAX. SIZE) - VFD	100	101	121
PSM509-3 (MAX. SIZE) - VFD	100	101	121
PSM509-4 VFD	100	0	0
AC-1		12	14
AC-2		12	14
BIOTOWER		9	11
TFMR. LT - BUILDING SERVICES		10	12
SUBTOTAL		346	415
+25% LARGEST MOTOR	25		30
FUTURE LOAD (20%)		69	83
TOTAL		439	528

NOTES

1. ALL DRIVES SHALL MEET IEEE 519-1992 HARMONIC DISTORTION LIMITS AT THE MCC BUS WHEN ALL DUTY PUMPS ARE RUNNING ON UTILITY OR GENERATOR. VFD SHALL MEET THE REQUIREMENTS OF THE PUMPS PROVIDED SHOULD THEY HAVE A RATING DIFFERENT THAN THAT SHOWN 2
2. AVAILABLE SHORT CIRCUIT CURRENT BASED ON TRANSFORMER PROPOSED BY THE SERVICING ELECTRIC UTILITY. WHERE KVA CAPACITY IS GREATER THAN VALUE SHOWN, NOTIFY OWNER.
3. VERIFY AVAILABLE SHORT CIRCUIT CURRENT WITH UTILITY.
4. COORDINATE WITH ELECTRIC UTILITY. PROVIDE CT ENCLOSURE WITH METER SOCKET WHERE REQUIRED.
5. FOR MAIN AND BRANCH BREAKER RATINGS. SEE PANEL SCHEDULES. EVALUATE LOAD CHANGES AGAINST PANELBOARD CAPACITY AND PROPOSE MODIFICATIONS WHEN REQUIRED.
6. FOR GENERATOR DELIVERY REQUIREMENTS, SEE SPECIFICATION SECTION 01 6400.
7. WIRE ATS SIGNALS TO PUMP CONTROL PANEL.

LEGEND

ATC = AUTOMATIC TRANSFER CONTROL
ATS = AUTOMATIC TRANSFER SWITCH, SERVICE RATED
LP = LIGHTING PANEL
LT = LIGHTING TRANSFORMER
MTS = MANUAL TRANSFER SWITCH
PFR = PHASE FAILURE RELAY
SPD = SURGE PROTECTIVE DEVICE (FORMERLY TVSS)
TJB = TERMINATION JUNCTION BOX
VFD = VARIABLE FREQUENCY DRIVE

STATE OF LOUISIANA
VERNON L. McALLISTER
License No. 28919
PROFESSIONAL ENGINEER
IN ELECTRICAL ENGINEERING
APRIL 1, 2016

PANEL: LP509 — LOCATION: ELECTRICAL BUILDING PS509

VOLTAGE (V):	120/240	PHASE:	1	WIRE SERVICE:	3	SERVICE ENTRANCE:	NO
BUS RATING (A):	150	NEUTRAL:	YES	ENCLOSURE TYPE:	NEMA 1	FEED THRU LUGS:	NO
MAIN BREAKER (A):	80	200% NEUTRAL:	NO	MOUNTING:	SURFACE	PANEL SOURCE:	LTG TFMR T1
MINIMUM AIC (kA):	14	GROUND BUS:	YES	FEED:	BOTTOM	SOURCE LOCATION:	ELEC.BLDG
		IG BUS:	NO			SPD (L-N, L-G, N-G):	YES

WIRING REQUIREMENT	BRANCH CIRCUIT LOAD DESCRIPTION	CONN. LOAD (VA)	CIRCUIT BREAKERS CB	SPACE #/PHASE			CB	CONN. LOAD (VA)	BRANCH CIRCUIT LOAD DESCRIPTION	WIRING REQUIREMENT
2-#12P,N,1#12G,3/4" C	PLC_DC POWER SUPPLY	350	20/1	1	L1	2	20/1	200	BUBBLER CONTROL PANEL	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	STATION ALARMS and INDICATORS	250	20/1	3	L2	4	20/1	2000	CONTROL PNL LGT,RECP AND HTR	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR LIGHTS - BLDG	307	20/1	5	L1	6	20/1	1000	GEN. BATTERY CHARGER	2-#12P,N,1#12G,3/4" C
2-#10P,1#12G,3/4" C	GEN. JACKET WTR HEATER	1250	30/2	7	L2	8	20/1	180	GEN. MAINT. RECEPTACLE	2-#12P,N,1#12G,3/4" C
		1250		9	L1	10	20/1	500	BUILDING LIGHTS	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR LIGHTS - YARD	900	20/1	11	L2	12	20/1	540	BUILDING RECEPTACLES	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR RECEP - PIPING PAD	180	20/1	13	L1	14	20/1	300	GAS MONITOR STATION #1	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	GAS MONITOR STATION #2	300	20/1	15	L2	16	20/1		SPARE	
	SPARE		20/1	17	L1	18	20/1		SPARE	
	SPARE		20/1	19	L2	20	20/1		SPARE	
	SPARE		20/1	21	L1	22	20/1		SPARE	
	SPARE		20/1	23	L2	24	20/1		SPARE	
				TOTAL (KVA)						
	SUB-TOTAL LEFT SIDE (KVA)	4.79		9.51				4.72	SUB-TOTAL RIGHT SIDE (KVA)	

1

EXTERIOR CONDUIT SCHEDULE

DUCT SECTION	COL/ROW	FROM	TO	SIZE/TYPE (1)	CIRCUITS
10	A1	HANDHOLE HH1	BIOTOWER PANEL, CONTROLS	2"C	9C07
	A2	HANDHOLE HH1	BIOTOWER PANEL, POWER	2"C	P1
	B1	HANDHOLE HH1	GRADE PULLBOX - GATES POSITION	2"C	9C08, 9C09, 9C19
	B2	HANDHOLE HH1	GRADE PULLBOX - GATES POWER, LTG	2"C	P2, LP509-11
	C1	HANDHOLE HH1	TJB-P3 CONTROL	2"C 2	9C48
	C2	HANDHOLE HH1	TJB-P3 POWER	4"C	P509-3A
	D1	HANDHOLE HH1	TJB-P4 CONTROL	2"C	9C15, 9C49, 9I15
	D2	HANDHOLE HH1	TJB-P4 POWER	4"C	P509-4A, LP509-15
20	A1	HANDHOLE HH2	TJB-P1 CONTROL	2"C	9C05, 9C46, 9I08
	A2	HANDHOLE HH2	TJB-P1 POWER	4"C	P509-1A, LP509-14
	B1	HANDHOLE HH2	TJB-P2 CONTROL	2"C	9C47
	B2	HANDHOLE HH2	TJB-P2 POWER	4"C	P509-2A
21	A1	HANDHOLE HH2	HANDHOLE HH3	2"C	9C05, 9I08
	A2	HANDHOLE HH2	HANDHOLE HH3	2"C	LP509-14
30	A1	HANDHOLE HH3	PLC CONTROL PNL - ANALOG	4"C	9I08, 9I13, 9I20, 9I21
	A2	HANDHOLE HH3	PLC CONTROL PNL - DISCRETE	4"C	9C05, 9C24, 9C25, 9C26, 9C27
	A3	HANDHOLE HH3	PLC CONTROL PNL	4"C	SPARE
	B1	HANDHOLE HH3	LP509	2"C	LP509-13
	B2	HANDHOLE HH3	ROOM, NORTH WALL	4"C	SPARE
40	A1	GEN BREAKER	ATS	4"C-PVC-ENC	G1
	A2	GEN AUXILIARIES	LP509 via ATS	2"C-PVC-ENC	G2 (LP509-6,7,8)
	B1	GEN BREAKER	ATS	4"C-PVC-ENC	G1
	B2	GEN CONTROL	ATS & PLC	2"C-PVC-ENC	G3 (9C10, 9C28)
50	A1	HANDHOLE HH1	PLC CONTROL PNL	2"C	9C15, 9I15
	A2	HANDHOLE HH1	LP509	2"C	LP509-15

1 (1) DIRECT-BURIED GRS/PVC OR PVC-ENCASED UNLESS OTHERWISE INDICATED.

NO.	DATE	REVISION DESCRIPTION	BY
2	06-24-16	VFD SPEC, CONTROL, CONDUIT SIZE	WCW
1	06-20-16	REVISED EXTERIOR CONDUIT SCHEDULE	

DESIGNED ACR
CHECKED WCW
DETAILED
CHECKED
DATE 06-17-2016
SHEET 086 OF 175

PARISH EAST BATON ROUGE
CITY BATON ROUGE
PROJECT 10-PS-MS-0048
SHEET NUMBER P-E03R

HOOPER ROAD PUMP STATION PROJECT
PUMP STATION 509

TYPE IIIA PROGRAM STATION
ELECTRICAL ONE-LINE VALUES - SHEET 2 OF 2

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CIRCUIT SCHEDULE - PS509 POWER DISTRIBUTION (1)

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
UI	UTILITY RISER	P-E01	METER CT CABINET	P-E02	CONDUIT ONLY: 2 - 4"C PVC-ENC
U2	CT CABINET	P-E02	ATS	P-E02	2 (4-350 KCMIL, #2/0 GND, 3"C-AL)
G1	GEN BREAKER	P-E01	ATS	P-E02	2 (4-350 KCMIL, #2/0 GND, 4"C-PVC-ENC)
G2	GEN AUXILIARIES	P-E01	LP509 via ATS	P-E03	3 (2#12AWG),#12GND POWER; 2"C-PVC-ENC
G3	GEN CONTROL	P-E01	ATS & PLC PANEL	P-E03	9C10, 9C28 CONTROL; 2"C-PVC-ENC
SWBD1	ATS	P-E02	SWITCHBOARD	P-E02	2 (3-350 KCMIL, #2/0 GND, 3"C-AL)
P1	SWBD	P-E02	BIOTOWER EQMT	P-E03	3-#8 AWG, 1-#10 AWG GND; 1"C, HH1 NOTE 1
P2	SWBD	P-E02	SLIDE GATES (3)	P-E03	3-#8 AWG, 1-#10 AWG GND; 1"C, HH1 NOTE 1
P3	SWBD	P-E02	AC-1	P-E03	3-#12 AWG, 1-#12 AWG GND; 3/4"C-AL
P4	SWBD	P-E02	AC-2	P-E03	3-#12 AWG, 1-#12 AWG GND; 3/4"C-AL
P5	SWBD	P-E02	TFMR LT	P-E03	2-#8 AWG, 1-#10 AWG GND; 3/4"C-AL
P6	TFMR LT	P-E02	PANEL LP509	P-E03	3-#2 AWG, 1-#8 AWG GND; 1"C-AL

CIRCUIT SCHEDULE - PS509 TO TJB (1) (2)

P509-1	SWBD	P-E02	VFD-05-1	P-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P509-1A	VFD-05-1	P-E05	TJB-P1	P-E05	3/C#1/0 AWG,3#10 AWG GND; 2-1/2"C, HH2 NOTES 1,2
P509-2	SWBD	P-E02	VFD-05-2	P-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P509-2A	VFD-05-2	P-E05	TJB-P2	P-E05	3/C#1/0 AWG,3#10 AWG GND; 2-1/2"C, HH2 NOTES 1,2
P509-3	SWBD	P-E02	VFD-05-3	P-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P509-3A	VFD-05-3	P-E05	TJB-P3	P-E05	3/C#1/0 AWG,3#10 AWG GND; 2-1/2"C, HH1 NOTES 1,2
P509-4	SWBD	P-E02	VFD-05-4	P-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P509-4A	VFD-05-4	P-E05	TJB-P4	P-E05	3/C#1/0 AWG,3#10 AWG GND; 2-1/2"C, HH1 NOTES 1,2
LP509-14	LP509	P-E03	TJB-P1	P-E05	2/C-#12 AWG W/GND; HH2
LP509-15	LP509	P-E03	TJB-P4	P-E05	2/C-#12 AWG W/GND; HH1

(1) NOTES:

1. CONDUIT EXTERIOR TO BUILDING SHALL BE ALUMINUM ABOVE GRADE OUTSIDE OF CORROSIVE ZONES, AND EITHER DIRECT-BURIED PVC COATED RGS-PVC OR PVC-ENCASED BELOW GRADE.
2. SPECIAL VFD MULTI-CONDUCTOR CABLE. ONE OR TWO PER MOTOR AS APPLICABLE.
3. (1) MANUFACTURER CABLE SUPPLIED WITH GAS DETECTOR.
4. FOR DUCT SECTIONS, SEE EXTERIOR CONDUIT SCHEDULE ON SHEET P-E03.

CIRCUIT SCHEDULE - PS509 CONTROLS

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS	CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
9I01	PLC CONTROL PANEL	P-I12	509-VFD-05-1	P-E07	TSP-#16, 3/4"C-AL	9C11	PLC CONTROL PANEL	P-I16	509-VFD-05-2	P-E07	2/C-#14, 3/4"C-AL
9I02	PLC CONTROL PANEL	P-I12	509-VFD-05-1	P-E07	TSP-#16, WITH 9I01	9C12	PLC CONTROL PANEL	P-I16	509-VFD-05-2-JBOX	P-E08	12/C-#14, 1"C-AL
9I03	PLC CONTROL PANEL	P-I12	509-VFD-05-3	P-E07	TSP-#16, 3/4"C-AL	9C13	PLC CONTROL PANEL	P-I16	509-VFD-05-4	P-E07	2/C-#14, 3/4"C-AL
9I04	PLC CONTROL PANEL	P-I12	509-VFD-05-3	P-E07	TSP-#16, WITH 9I03	9C14	PLC CONTROL PANEL	P-I16	509-VFD-05-4-JBOX	P-E08	12/C-#14, 1"C-AL
9I05	PLC CONTROL PANEL	P-I12	509-TT-91-3-1	P-I12	TSP-#16, 3/4"C-AL	9C15	PLC CONTROL PANEL	P-I16	509-AIT-05-17-1	P-I16	4/C-#14, DUCT 50A1, HH1, 10D1
9I06	PLC CONTROL PANEL	P-I12	509-FIT-05-7-1	P-I12	TSP-#16, 3/4"C-AL	9C16	PLC CONTROL PANEL	P-I16	509-BB-05-7	P-I16	2/C-#14, WITH 9C06
9I07	PLC CONTROL PANEL	P-I12	509-BB-05-7	P-I12	TSP-#16, 3/4"C-AL	9C17	PLC CONTROL PANEL	P-I16	509-ZS-92-1-1	P-I16	2/C-#14, 3/4"C-AL
9I08	PLC CONTROL PANEL	P-I12	509-AIT-05-16-1	P-I12	TSP-#16, DUCT 30A1, HH3, 21A1, 20A1	9C18	PLC CONTROL PANEL	P-I16	509 ATS	P-I16	12/C-#14, 1"C-AL
9I09	PLC CONTROL PANEL	P-I13	509-VFD-05-2	P-E07	TSP-#16, 3/4"C-AL	9C19	PLC CONTROL PANEL	P-I16	509-SLG-03-2	P-I16	4/C-#14, DUCT 10B1
9I10	PLC CONTROL PANEL	P-I13	509-VFD-05-2	P-E07	TSP-#16, WITH 9I09	9C20	PLC CONTROL PANEL	P-I17	509-VFD-05-1	P-E07	4/C-#14, WITH 9C01
9I11	PLC CONTROL PANEL	P-I13	509-VFD-05-4	P-E07	TSP-#16, 3/4"C-AL	9C21	PLC CONTROL PANEL	P-I17	509-VFD-05-2	P-E07	4/C-#14, WITH 9C11
9I12	PLC CONTROL PANEL	P-I13	509-VFD-05-4	P-E07	TSP-#16, WITH 9I11	9C22	PLC CONTROL PANEL	P-I17	509-VFD-05-3	P-E07	4/C-#14, WITH 9C03
9I13	PLC CONTROL PANEL	P-I13	509-PIT-05-10-1	P-I13	TSP-#16, DUCT 30A1	9C23	PLC CONTROL PANEL	P-I17	509-VFD-05-4	P-E07	4/C-#14, WITH 9C13
9I14	PLC CONTROL PANEL	P-I13	509-FIT-05-6-1	P-I13	TSP-#16, 3/4"C-AL	9C24	509-VFD-05-3-JBOX	P-E08	509-CK-05-3-1	P-E08	2/C-#14, DUCT 30A2
9I15	PLC CONTROL PANEL	P-I13	509-AIT-05-17-1	P-I13	TSP-#16, DUCT 50A1, HH1, 10D1	9C25	509-VFD-05-2-JBOX	P-E08	509-CK-05-2-1	P-E08	2/C-#14, DUCT 30A2
9I16	PLC CONTROL PANEL	P-I14	509-VFD-05-1	P-E07	TSP-#16, WITH 9I01	9C26	509-VFD-05-4-JBOX	P-E08	509-CK-05-4-1	P-E08	2/C-#14, DUCT 30A2
9I17	PLC CONTROL PANEL	P-I14	509-VFD-05-3	P-E07	TSP-#16, WITH 9I03	9C27	509-VFD-05-1-JBOX	P-E08	509-CK-05-1-1	P-E08	2/C-#14, DUCT 30A2
9I18	PLC CONTROL PANEL	P-I14	509-VFD-05-2	P-E07	TSP-#16, WITH 9I09	9C28	509 GENERATOR		509 ATS		7/C-#14, DUCT 40A1
9I19	PLC CONTROL PANEL	P-I14	509-VFD-05-4	P-E07	TSP-#16, WITH 9I11	9C29	509-VFD-05-1-JBOX	P-E08	509-VFD-05-1	P-E07	19/C-#14, 1-1/4"C-AL
9I20	509-FIT-05-6-1	P-I02	509-FE-05-6-1	P-I02	MFR CABLE, DUCT 30A1	9C30	509-VFD-05-2-JBOX	P-E08	509-VFD-05-2	P-E07	19/C-#14, 1-1/4"C-AL
9I21	509-FIT-05-7-1	P-I02	509-FE-05-7-1	P-I02	MFR CABLE, DUCT 30A1	9C31	509-VFD-05-3-JBOX	P-E08	509-VFD-05-3	P-E07	19/C-#14, 1-1/4"C-AL
9I22	509-AIT-05-16-1	P-I01	509-AE-05-16-1	P-I09	6/TSP W/SHLD, 3/4"C-AL NOTE 3	9C32	509-VFD-05-4-JBOX	P-E08	509-VFD-05-4	P-E07	19/C-#14, 1-1/4"C-AL
9I23	509-AIT-05-17-1	P-I01	509-AE-05-17-1	P-I09	6/TSP W/SHLD, 3/4"C-AL NOTE 3	9C33	509-VFD-05-2-JBOX	P-E08	509-VFD-05-1	P-E07	2/C-#14, 3/4"C-AL
						9C34	509-VFD-05-3-JBOX	P-E08	509-VFD-05-1	P-E07	2/C-#14, 3/4"C-AL
						9C35	509-VFD-05-4-JBOX	P-E08	509-VFD-05-1	P-E07	2/C-#14, 3/4"C-AL
						9C36	509-VFD-05-1-JBOX	P-E08	509-VFD-05-2	P-E07	2/C-#14, 3/4"C-AL
						9C37	509-VFD-05-3-JBOX	P-E08	509-VFD-05-2	P-E07	2/C-#14, 3/4"C-AL
						9C38	509-VFD-05-4-JBOX	P-E08	509-VFD-05-2	P-E07	2/C-#14, 3/4"C-AL
						9C39	509-VFD-05-1-JBOX	P-E08	509-VFD-05-3	P-E07	2/C-#14, 3/4"C-AL
						9C40	509-VFD-05-2-JBOX	P-E08	509-VFD-05-3	P-E07	2/C-#14, 3/4"C-AL
9C01	PLC CONTROL PANEL	P-I15	509-VFD-05-1	P-E07	2/C-#14, 3/4"C-AL	9C41	509-VFD-05-4-JBOX	P-E08	509-VFD-05-3	P-E07	2/C-#14, 3/4"C-AL
9C02	PLC CONTROL PANEL	P-I15	509-VFD-05-1-JBOX	P-E08	12/C-#14, 1"C-AL	9C42	509-VFD-05-1-JBOX	P-E08	509-VFD-05-4	P-E07	2/C-#14, 3/4"C-AL
9C03	PLC CONTROL PANEL	P-I15	509-VFD-05-3	P-E07	2/C-#14, 3/4"C-AL	9C43	509-VFD-05-2-JBOX	P-E08	509-VFD-05-4	P-E07	2/C-#14, 3/4"C-AL
9C04	PLC CONTROL PANEL	P-I15	509-VFD-05-3-JBOX	P-E08	12/C-#14, 1"C-AL	9C44	509-VFD-05-3-JBOX	P-E08	509-VFD-05-4	P-E07	2/C-#14, 3/4"C-AL
9C05	PLC CONTROL PANEL	P-I15	509-AIT-05-16-1	P-I15	4/C-#14, DUCT 30A2, HH3, 21A1, 20A1	9C45	NOT USED				(1)
9C06	PLC CONTROL PANEL	P-I15	509-BB-05-7	P-I15	4/C-#14, 3/4"C-AL	9C46	509-VFD-05-1-JBOX	P-E08	TJB-P1 MTR MNTR	P-E08	7/C-#14, 1"C, HH2 NOTE 1
9C07	PLC CONTROL PANEL	P-I15	509-OCS-30-1	P-I15	2/C-#14, DUCT 10A1	9C47	509-VFD-05-2-JBOX	P-E08	TJB-P2 MTR MNTR	P-E08	7/C-#14, 1"C, HH2 NOTE 1
9C08	PLC CONTROL PANEL	P-I15	509-SLG-03-1	P-I15	4/C-#14, DUCT 10B1	9C48	509-VFD-05-3-JBOX	P-E08	TJB-P3 MTR MNTR	P-E08	7/C-#14, 1"C, HH1 NOTE 1
9C09	PLC CONTROL PANEL	P-I15	509-SLG-03-3	P-I15	4/C-#14, DUCT 10B1	9C49	509-VFD-05-4-JBOX	P-E08	TJB-P4 MTR MNTR	P-E08	7/C-#14, 1"C, HH1 NOTE 1
9C10	PLC CONTROL PANEL	P-I15	509 GENERATOR	P-I15	12/C-#14, DUCT 40A1						

STATE OF LOUISIANA
VERNON L. McALLISTER
License No. 28919
PROFESSIONAL ENGINEER
AMERICA ENGINEERING
APRIL 1, 2016

NO.	DATE	BY	REVISION DESCRIPTION
2	06-24-16	WCW	VFD CABLE GROUNDS
1	06-20-16		CLARIFIED CONDUIT APPLICATIONS

DESIGNED ACR
CHECKED WCW
DETAILED
CHECKED
DATE 06-17-2016
SHEET 089 OF 175

PARISH: EAST BATON ROUGE
CITY: BATON ROUGE
PROJECT: 10-PS-MS-0048

SHEET NUMBER: P-E06R

HOOPER ROAD PUMP STATION PROJECT
PUMP STATION 509

TYPE IIIA PROGRAM STATION
CIRCUIT SCHEDULES

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TABLE 1

PUMP STATION NO. PS-510AA			
DESIG.	ITEM DESCRIPTION	ITEM VALUE	UNITS
A	1-SHORT CIRCUIT RATING	22	KAIC
	2-UTILITY SERVICE VOLTAGE	480V, WYE	VOLTS
	3-UTILITY TRANSFORMER(S)	1 - 300 (TBD)	kVA
	4-SERVING UTILITY NAME	DEMCO	-
B	UTILITY MAIN (SERVICE) DISCONNECT / CIRCUIT BREAKER RATING	600	AMPS
C	1-AUTOMATIC TRANSFER SWITCH RATING	600	AMPS
	2-SWITCHBOARD BUS RATING	600	AMPS
D	TRANS. LT PRIMARY CIRCUIT BREAKER	65	AMPS
E	TRANS. LT SIZE (1-PHASE)	25	KVA
F	PUMP MOTOR SIZE (MAXIMUM)	110	HP
G	VFD RATING	135	KVA
H	PUMP MOTOR BREAKER SIZE	250	AMPS
I	QUANTITY OF SMALLER MOTORS	0	EACH
J	SMALLER MOTOR SIZE (AVG)	N/A	HP
K	SMALLER MOTOR STARTER SIZE	N/A	NEMA
L	SMALLER MOTOR VFD SIZE	N/A	KVA
M	1-FEEDER 1 SPARE	30	AMPS
	2-FEEDER 2 SPARE	30	AMPS
	3-FEEDER 3 SLIDE GATE OPERATORS	30	AMPS
	4-FEEDER 4 AC-1 (W/DISCONNECT)	20	AMPS
	5-FEEDER 5 AC-2 (W/DISCONNECT)	20	AMPS
N	1-GENERATOR RATING (NOTE 6)	400	KW
	2-GENERATOR VOLTAGE & WINDING	480, WYE	VOLTS
	3-GENERATOR BREAKER RATING	600	AMPS
O	1-GENERATOR DIMENSIONS	204L x 60W x 128H	INCHES
	2-GENERATOR WET WEIGHT	11,798	LBS
P	UTILITY SHORT CIRCUIT DUTY	16.0 (NOTE 2)	KAIC

COINCIDENT LOAD SUMMARY PS-510AA (480V)			
LOAD	HP	KVA	AMPS
PSM510-1 (MAX. SIZE) - VFD	110	111	133
PSM510-2 (MAX. SIZE) - VFD	110	111	133
PSM510-3 (MAX. SIZE) - VFD	110	111	133
PSM510-4 VFD	110	0	0
AC-1		12	14
AC-2		12	14
TFMR. LT - BUILDING SERVICES		10	12
SUBTOTAL		367	439
+25% LARGEST MOTOR	28		33
FUTURE LOAD (20%)		73	88
TOTAL		466	561

NOTES

1. ALL DRIVES SHALL MEET IEEE 519-1992 HARMONIC DISTORTION LIMITS AT THE MCC BUS WHEN ALL DUTY PUMPS ARE RUNNING ON UTILITY OR GENERATOR. VFD SHALL MEET THE REQUIREMENTS OF THE PUMP PROVIDED SHOULD THEY HAVE A RATING DIFFERENT THAN THAT SHOWN. 2
2. AVAILABLE SHORT CIRCUIT CURRENT BASED ON TRANSFORMER PROPOSED BY THE SERVICING ELECTRIC UTILITY. WHERE KVA CAPACITY IS GREATER THAN VALUE SHOWN, NOTIFY OWNER.
3. VERIFY AVAILABLE SHORT CIRCUIT CURRENT WITH UTILITY.
4. COORDINATE WITH ELECTRIC UTILITY. PROVIDE CT ENCLOSURE WITH METER SOCKET WHERE REQUIRED.
5. FOR MAIN AND BRANCH BREAKER RATINGS, SEE PANEL SCHEDULES. EVALUATE LOAD CHANGES AGAINST PANELBOARD CAPACITY AND PROPOSE MODIFICATIONS WHEN REQUIRED.
6. FOR GENERATOR DELIVERY REQUIREMENTS, SEE SPECIFICATION SECTION 01 6400.
7. WIRE ATS SIGNALS TO PUMP CONTROL PANEL.

LEGEND

ATC = AUTOMATIC TRANSFER CONTROL
ATS = AUTOMATIC TRANSFER SWITCH, SERVICE RATED
LP = LIGHTING PANEL
LT = LIGHTING TRANSFORMER
MTS = MANUAL TRANSFER SWITCH
PFR = PHASE FAILURE RELAY
SPD = SURGE PROTECTIVE DEVICE (FORMERLY TVSS)
TJB = TERMINATION JUNCTION BOX
VFD = VARIABLE FREQUENCY DRIVE

PANEL: LP510AA — **LOCATION: ELECTRICAL BUILDING PS510AA**

VOLTAGE (V):	120/240	PHASE:	1	WIRE SERVICE:	3	SERVICE ENTRANCE:	NO
BUS RATING (A):	150	NEUTRAL:	YES	ENCLOSURE TYPE:	NEMA 1	FEED THRU LUGS:	NO
MAIN BREAKER (A):	80	200% NEUTRAL:	NO	MOUNTING:	SURFACE	PANEL SOURCE:	LTG TFMR T1
MINIMUM AIC (kA):	14	GROUND BUS:	YES	FEED:	BOTTOM	SOURCE LOCATION:	ELEC.BLDG
		IG BUS:	NO			SPD (L-N, L-G, N-G):	YES

WIRING REQUIREMENT	BRANCH CIRCUIT LOAD DESCRIPTION	CONN. LOAD (VA)	CIRCUIT BREAKERS CB	SPACE #/PHASE			CB	CONN. LOAD (VA)	BRANCH CIRCUIT LOAD DESCRIPTION	WIRING REQUIREMENT
2-#12P,N,1#12G,3/4" C	PLC_DC POWER SUPPLY	350	20/1	1	L1	2	20/1	200	BUBBLER CONTROL PANEL	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	STATION ALARMS and INDICATORS	250	20/1	3	L2	4	20/1	2000	CONTROL PNL LGT,RECP AND HTR	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR LIGHTS - BLDG	307	20/1	5	L1	6	20/1	1000	GEN. BATTERY CHARGER	2-#12P,N,1#12G,3/4" C
2-#10P,1#12G,3/4" C	GEN. JACKET WTR HEATER	1250	30/2	7	L2	8	20/1	180	GEN. MAINT. RECEPTACLE	2-#12P,N,1#12G,3/4" C
		1250		9	L1	10	20/1	500	BUILDING LIGHTS	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR LIGHTS - YARD	900	20/1	11	L2	12	20/1	540	BUILDING RECEPTACLES	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	EXTERIOR RECEP - PIPING PAD	180	20/1	13	L1	14	20/1	250	GAS MONITOR STATION #1	2-#12P,N,1#12G,3/4" C
2-#12P,N,1#12G,3/4" C	GAS MONITOR STATION #2	250	20/1	15	L2	16	20/1		SPARE	
	SPARE		20/1	17	L1	18	20/1		SPARE	
	SPARE		20/1	19	L2	20	20/1		SPARE	
	SPARE		20/1	21	L1	22	20/1		SPARE	
	SPARE		20/1	23	L2	24	20/1		SPARE	
				TOTAL (KVA)						
	SUB-TOTAL LEFT SIDE (KVA)	4.74		9.41				4.67	SUB-TOTAL RIGHT SIDE (KVA)	

1

EXTERIOR CONDUIT SCHEDULE					
DUCT SECTION	COL/ROW	FROM	TO	SIZE/TYPE (1)	CIRCUITS
10	A1	HANDHOLE HH1	TJB-P4 CONTROL	2"C 2	10C15, 10C49, 10I15
	A2	HANDHOLE HH1	TJB-P4 POWER	4"C	P510-4A, LP510AA-15
	B1	HANDHOLE HH1	TJB-P3 CONTROL	2"C	10C48
	B2	HANDHOLE HH1	TJB-P3 POWER	4"C	P510-3A
	C1	HANDHOLE HH1	GRADE PULLBOX - GATES POSITION	2"C	10C08, 10C09, 10C19
	C2	HANDHOLE HH1	GRADE PULLBOX - GATES POWER, LTG	2"C	P2, LP510AA-11
20	A1	HANDHOLE HH2	TJB-P2 CONTROL	2"C	10C47
	A2	HANDHOLE HH2	TJB-P2 POWER	4"C	P510-2A
	B1	HANDHOLE HH2	TJB-P1 CONTROL	2"C	10C05, 10C46, 10I08
	B2	HANDHOLE HH2	TJB-P1 POWER	4"C	P510-1A, LP510AA-14
21	A1	HANDHOLE HH2	HANDHOLE HH3	2"C	10C05, 10I08
	A2	HANDHOLE HH2	HANDHOLE HH3	2"C	LP510AA-14
30	A1	HANDHOLE HH3	PLC CONTROL PNL - ANALOG	4"C	10I08, 10I13, 10I20, 10I21
	A2	HANDHOLE HH3	PLC CONTROL PNL - DISCRETE	4"C	10C05, 10C24, 10C25, 10C26, 10C27
	A3	HANDHOLE HH3	PLC CONTROL PNL	4"C	SPARE
	B1	HANDHOLE HH3	LP510AA	4"C	LP510AA-13
	B2	HANDHOLE HH3	ROOM, SOUTH WALL	4"C	SPARE
40	A1	GEN BREAKER	ATS	4"C-PVC-ENC	G1
	A2	GEN AUXILIARIES	LP510AA via ATS	2"C-PVC-ENC	G2 (LP510-6,7,8)
	B1	GEN BREAKER	ATS	4"C-PVC-ENC	G1
	B2	GEN CONTROL	ATS & PLC	2"C-PVC-ENC	G3 (10C10, 10C28)
50	A1	HANDHOLE HH1	PLC CONTROL PNL	2"C	10C15, 10I15
	A2	HANDHOLE HH1	LP510AA	2"C	LP510AA-15

1 (1) DIRECT-BURIED GRS/PVC OR PVC-ENCASED UNLESS OTHERWISE INDICATED.

STATE OF LOUISIANA
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IN ELECTRICAL ENGINEERING
APRIL 1, 2016

NO.	DATE	
2	06-24-16	VFD SPEC. CONTROL CONDUIT SIZE
1	06-20-16	REVISED EXTERIOR CONDUIT SCHEDULE

REVISION DESCRIPTION

DESIGNED	ACR
CHECKED	WCW
DETAILED	
CHECKED	
DATE	06-17-2016
SHEET	125 OF 175
BY	WCW

PARISH: EAST BATON ROUGE
CITY: BATON ROUGE
PROJECT: 10-PS-MS-0048
SHEET NUMBER: Q-E03R

HOOPER ROAD PUMP STATION PROJECT
PUMP STATION 510AA

TYPE IIIA PROGRAM STATION
ELECTRICAL ONE-LINE VALUES – SHEET 2 OF 2

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CIRCUIT SCHEDULE - PS510AA POWER DISTRIBUTION (1)

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
U1	TFMR+METER	Q-E01	ATS	Q-E02	3 - 4"C, SCHED 40 PVC-ENC. (500 KCMIL AL BY DEMCO)
G1	GEN BREAKER	Q-E01	ATS	Q-E02	2 (4-350 KCMIL, #2/0 GND, 4"C-PVC-ENC)
G2	GEN AUXILIARIES	Q-E01	LP 510AA, PLC via ATS	Q-E03	3 (2#12 AWG),#12GND POWER; 2"C-PVC-ENC
G3	GEN CONTROL	Q-E01	ATS & PLC PANEL	Q-E03	10C10, 10C28 CONTROL; 2"C-PVC-ENC
SWBD1	ATS	Q-E02	SWITCHBOARD	Q-E02	2 (3-350 KCMIL, #2/0 AWG N, #2/0 GND, 4"C-AL)
P2	SWBD	Q-E02	SLIDE GATES (3)	Q-E03	3-#8 AWG, 1-#10 AWG GND; 1"C, HH1 NOTE 1
P3	SWBD	Q-E02	AC-1	Q-E03	3-#12 AWG, 1-#12 AWG GND; 3/4"C-AL
P4	SWBD	Q-E02	AC-2	Q-E03	3-#12 AWG, 1-#12 AWG GND; 3/4"C-AL
P5	SWBD	Q-E02	TFMR LT	Q-E03	2-#8 AWG, 1-#10 AWG GND; 3/4"C-AL
P6	TFMR LT	Q-E02	PANEL LP	Q-E03	3-#2 AWG, 1-#8 AWG GND; 1"C-AL
CIRCUIT SCHEDULE - PS510AA TO TJB					(1) (2)
P510-1	SWBD	Q-E02	VFD-05-1	Q-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P510-1A	VFD-05-1	Q-E05	TJB-P1	Q-E05	3/C#2/0 AWG,3#10 AWG GND;); 2-1/2"C, HH2 NOTES 1,2
P510-2	SWBD	Q-E02	VFD-05-2	Q-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P510-2A	VFD-05-2	Q-E05	TJB-P2	Q-E05	3/C#2/0 AWG,3#10 AWG GND;); 2-1/2"C, HH2 NOTES 1,2
P510-3	SWBD	Q-E02	VFD-05-3	Q-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P510-3A	VFD-05-3	Q-E05	TJB-P3	Q-E05	3/C#2/0 AWG,3#10 AWG GND;); 2-1/2"C, HH1 NOTES 1,2
P510-4	SWBD	Q-E02	VFD-05-4	Q-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P510-4A	VFD-05-4	Q-E05	TJB-P4	Q-E05	3/C#2/0 AWG,3#10 AWG GND;); 2-1/2"C, HH1 NOTES 1,2
LP510AA-14	LP510AA	Q-E03	TJB-P1	Q-E05	2/C-#12 AWG W/GND; HH2
LP510AA-15	LP510AA	Q-E03	TJB-P4	Q-E05	2/C-#12 AWG W/GND; HH1

CIRCUIT SCHEDULE - PS510AA CONTROLS

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS	CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
10I01	PLC CONTROL PANEL	Q-I10	510AA-VFD-05-1	Q-E07	TSP-#16, 3/4"C-AL	10C11	PLC CONTROL PANEL	Q-I14	510AA-VFD-05-2	Q-E07	2/C-#14, 3/4"C-AL
10I02	PLC CONTROL PANEL	Q-I10	510AA-VFD-05-1	Q-E07	TSP-#16, WITH 10I01	10C12	PLC CONTROL PANEL	Q-I14	510AA-VFD-05-2-JBOX	Q-E08	12/C-#14, 1"C-AL
10I03	PLC CONTROL PANEL	Q-I10	510AA-VFD-05-3	Q-E07	TSP-#16, 3/4"C-AL	10C13	PLC CONTROL PANEL	Q-I14	510AA-VFD-05-4	Q-E07	2/C-#14, 3/4"C-AL
10I04	PLC CONTROL PANEL	Q-I10	510AA-VFD-05-3	Q-E07	TSP-#16, WITH 10I03	10C14	PLC CONTROL PANEL	Q-I14	510AA-VFD-05-4-JBOX	Q-E08	12/C-#14, 1"C-AL
10I05	PLC CONTROL PANEL	Q-I10	510AA-TT-91-3-1	Q-I10	TSP-#16, 3/4"C-AL	10C15	PLC CONTROL PANEL	Q-I14	510AA-AIT-05-17-1	Q-I14	4/C-#14, DUCT 50A1, HH1, 10A1
10I06	PLC CONTROL PANEL	Q-I10	510AA-FIT-05-7-1	Q-I10	TSP-#16, 3/4"C-AL	10C16	PLC CONTROL PANEL	Q-I14	510AA-BB-05-7	Q-I14	2/C-#14, WITH 10C06
10I07	PLC CONTROL PANEL	Q-I10	510AA-BB-05-7	Q-I10	TSP-#16, 3/4"C-AL	10C17	PLC CONTROL PANEL	Q-I14	510AA-ZS-92-1-1	Q-I14	2/C-#14, 3/4"C-AL
10I08	PLC CONTROL PANEL	Q-I10	510AA-AIT-05-16-1	Q-I10	TSP-#16, DUCT 30A1, HH3, 21A1, 20B1	10C18	PLC CONTROL PANEL	Q-I14	510AA ATS	Q-I14	12/C-#14, 1"C-AL
10I09	PLC CONTROL PANEL	Q-I11	510AA-VFD-05-2	Q-E07	TSP-#16, 3/4"C-AL	10C19	PLC CONTROL PANEL	Q-I14	510AA-SLG-03-2	Q-I14	4/C-#14, DUCT 10C1
10I10	PLC CONTROL PANEL	Q-I11	510AA-VFD-05-2	Q-E07	TSP-#16, WITH 10I09	10C20	PLC CONTROL PANEL	Q-I15	510AA-VFD-05-1	Q-E07	4/C-#14, WITH 10C01
10I11	PLC CONTROL PANEL	Q-I11	510AA-VFD-05-4	Q-E07	TSP-#16, 3/4"C-AL	10C21	PLC CONTROL PANEL	Q-I15	510AA-VFD-05-2	Q-E07	4/C-#14, WITH 10C11
10I12	PLC CONTROL PANEL	Q-I11	510AA-VFD-05-4	Q-E07	TSP-#16, WITH 10I11	10C22	PLC CONTROL PANEL	Q-I15	510AA-VFD-05-3	Q-E07	4/C-#14, WITH 10C03
10I13	PLC CONTROL PANEL	Q-I11	510AA-PIT-05-10-1	Q-I11	TSP-#16, DUCT 30A1	10C23	PLC CONTROL PANEL	Q-I15	510AA-VFD-05-4	Q-E07	4/C-#14, WITH 10C13
10I14	PLC CONTROL PANEL	Q-I11	510AA-FIT-05-6-1	Q-I11	TSP-#16, 3/4"C-AL	10C24	510AA-VFD-05-3-JBOX	Q-E08	510AA-CK-05-3-1	Q-E08	2/C-#14, DUCT 30A2
10I15	PLC CONTROL PANEL	Q-I11	510AA-AIT-05-17-1	Q-I11	TSP-#16, DUCT 50A1, HH1, 10A1	10C25	510AA-VFD-05-2-JBOX	Q-E08	510AA-CK-05-2-1	Q-E08	2/C-#14, DUCT 30A2
10I16	PLC CONTROL PANEL	Q-I12	510AA-VFD-05-1	Q-E07	TSP-#16, WITH 10I01	10C26	510AA-VFD-05-4-JBOX	Q-E08	510AA-CK-05-4-1	Q-E08	2/C-#14, DUCT 30A2
10I17	PLC CONTROL PANEL	Q-I12	510AA-VFD-05-3	Q-E07	TSP-#16, WITH 10I03	10C27	510AA-VFD-05-1-JBOX	Q-E08	510AA-CK-05-1-1	Q-E08	2/C-#14, DUCT 30A2
10I18	PLC CONTROL PANEL	Q-I12	510AA-VFD-05-2	Q-E07	TSP-#16, WITH 10I09	10C28	510AA GENERATOR		510AA ATS		7/C-#14, DUCT 40B1
10I19	PLC CONTROL PANEL	Q-I12	510AA-VFD-05-4	Q-E07	TSP-#16, WITH 10I11	10C29	510AA-VFD-05-1-JBOX	Q-E08	510AA-VFD-05-1	Q-E07	19/C-#14, 1-1/4"C-AL
10I20	510AA-FIT-05-6-1	Q-I02	510AA-FE-05-6-1	Q-I02	MFR CABLE, DUCT 30A1	10C30	510AA-VFD-05-2-JBOX	Q-E08	510AA-VFD-05-2	Q-E07	19/C-#14, 1-1/4"C-AL
10I21	510AA-FIT-05-7-1	Q-I02	510AA-FE-05-7-1	Q-I02	MFR CABLE, DUCT 30A1	10C31	510AA-VFD-05-3-JBOX	Q-E08	510AA-VFD-05-3	Q-E07	19/C-#14, 1-1/4"C-AL
10I22	510AA-AIT-05-16-1	Q-I01	510AA-AE-05-16-1	Q-I09	6/TSP W/SHLD, 3/4"C-AL NOTE 3	10C32	510AA-VFD-05-4-JBOX	Q-E08	510AA-VFD-05-4	Q-E07	19/C-#14, 1-1/4"C-AL
10I23	510AA-AIT-05-17-1	Q-I01	510AA-AE-05-17-1	Q-I09	6/TSP W/SHLD, 3/4"C-AL NOTE 3	10C33	510AA-VFD-05-2-JBOX	Q-E08	510AA-VFD-05-1	Q-E07	2/C-#14, 3/4"C-AL
						10C34	510AA-VFD-05-3-JBOX	Q-E08	510AA-VFD-05-1	Q-E07	2/C-#14, 3/4"C-AL
						10C35	510AA-VFD-05-4-JBOX	Q-E08	510AA-VFD-05-1	Q-E07	2/C-#14, 3/4"C-AL
						10C36	510AA-VFD-05-1-JBOX	Q-E08	510AA-VFD-05-2	Q-E07	2/C-#14, 3/4"C-AL
						10C37	510AA-VFD-05-3-JBOX	Q-E08	510AA-VFD-05-2	Q-E07	2/C-#14, 3/4"C-AL
						10C38	510AA-VFD-05-4-JBOX	Q-E08	510AA-VFD-05-2	Q-E07	2/C-#14, 3/4"C-AL
						10C39	510AA-VFD-05-1-JBOX	Q-E08	510AA-VFD-05-3	Q-E07	2/C-#14, 3/4"C-AL
						10C40	510AA-VFD-05-2-JBOX	Q-E08	510AA-VFD-05-3	Q-E07	2/C-#14, 3/4"C-AL
10C01	PLC CONTROL PANEL	Q-I13	510AA-VFD-05-1	Q-E07	2/C-#14, 3/4"C-AL	10C41	510AA-VFD-05-4-JBOX	Q-E08	510AA-VFD-05-3	Q-E07	2/C-#14, 3/4"C-AL
10C02	PLC CONTROL PANEL	Q-I13	510AA-VFD-05-1-JBOX	Q-E08	12/C-#14, 1"C-AL	10C42	510AA-VFD-05-1-JBOX	Q-E08	510AA-VFD-05-4	Q-E07	2/C-#14, 3/4"C-AL
10C03	PLC CONTROL PANEL	Q-I13	510AA-VFD-05-3	Q-E07	2/C-#14, 3/4"C-AL	10C43	510AA-VFD-05-2-JBOX	Q-E08	510AA-VFD-05-4	Q-E07	2/C-#14, 3/4"C-AL
10C04	PLC CONTROL PANEL	Q-I13	510AA-VFD-05-3-JBOX	Q-E08	12/C-#14, 1"C-AL	10C44	510AA-VFD-05-3-JBOX	Q-E08	510AA-VFD-05-4	Q-E07	2/C-#14, 3/4"C-AL
10C05	PLC CONTROL PANEL	Q-I13	510AA-AIT-05-16-1	Q-I13	4/C-#14, DUCT 30A2, HH3, 21A1, 20B1	10C45	NOT USED				(1)
10C06	PLC CONTROL PANEL	Q-I13	510AA-BB-05-7	Q-I13	4/C-#14, 3/4"C-AL	10C46	510AA-VFD-05-1-JBOX	Q-E08	TJB-P1 MNTR TB	EG04	7/C-#14, 1"C, HH2 NOTE 1
10C07	NOT USED					10C47	510AA-VFD-05-2-JBOX	Q-E08	TJB-P2 MNTR TB	EG04	7/C-#14, 1"C, HH2 NOTE 1
10C08	PLC CONTROL PANEL	Q-I13	510AA-SLG-03-1	Q-I13	4/C-#14, DUCT 10C1	10C48	510AA-VFD-05-3-JBOX	Q-E08	TJB-P3 MNTR TB	EG04	7/C-#14, 1"C, HH1 NOTE 1
10C09	PLC CONTROL PANEL	Q-I13	510AA-SLG-03-3	Q-I13	4/C-#14, DUCT 10C1	10C49	510AA-VFD-05-4-JBOX	Q-E08	TJB-P4 MNTR TB	EG04	7/C-#14, 1"C, HH1 NOTE 1
10C10	PLC CONTROL PANEL	Q-I13	510AA GENERATOR	Q-I13	12/C-#14, DUCT 40B1						

(1) NOTES:

1. CONDUIT EXTERIOR TO BUILDING SHALL BE ALUMINUM ABOVE GRADE OUTSIDE OF CORROSIVE ZONES, AND EITHER DIRECT-BURIED PVC COATED RGS-PVC OR PVC-ENCASED BELOW GRADE.
2. SPECIAL VFD MULTI-CONDUCTOR CABLE. ONE OR TWO PER MOTOR AS APPLICABLE.
3. (1) MANUFACTURER CABLE SUPPLIED WITH GAS DETECTOR.
4. FOR DUCT SECTIONS, SEE EXTERIOR CONDUIT SCHEDULE ON SHEET Q-E03.

STATE OF LOUISIANA
VERNON L. McALLISTER
License No. 28919
PROFESSIONAL ENGINEER
ELECTRICAL ENGINEER
APRIL 1, 2016

NO.	DATE	REVISION DESCRIPTION	BY
2	06-24-16	VFD CABLE GROUNDS	WCW
1	06-20-16	CLARIFIED CONDUIT APPLICATIONS	WCW

DESIGNED ACR
CHECKED WCW
DETAILED
CHECKED
DATE 06-17-2016
SHEET 128 OF 175

PARISH: EAST BATON ROUGE
CITY: BATON ROUGE
PROJECT: 10-PS-MS-0048
SHEET NUMBER: Q-E06R

HOOPER ROAD PUMP STATION PROJECT
PUMP STATION 510AA
TYPE IIIA PROGRAM STATION
CIRCUIT SCHEDULES

PUBLIC WORKS

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CIRCUIT SCHEDULE - PS511 POWER DISTRIBUTION

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
U1	POLE RISER	R-E01	UTILITY TFMR	R-E01	3 - 3" PVC-ENC, SCHED. 40, WITH PULLROPES
U2	UTILTY TFMR	R-E01	EXIST. CT CABINET	R-E02	4#500 KCMIL, #1/0 GND, 4"PVC-ENC (TEMPORARY TO EXISTING BLDG)
U3	UTILTY TFMR	R-E01	480V SWBD-MAIN	R-E02	3 (4-350 KCMIL, #1/0 GND, 4"PVC-ENC)
G1	GEN BREAKER, 800KW	R-E01	480V SWBD-GEN	R-E02	3 (4-350 KCMIL, #1/0 GND, 4"PVC-ENC), DUCT 40A1,B1,C1
G2	GEN AUXILIARIES	R-E01	LP 511	R-E03	3 (2#12AWG),#12GND POWER; 2"C-PVC-ENC
G3	GEN CONTROL	R-E01	PLC via SWBD	R-E03	11C10, 11C40 CONTROL; 2"C-PVC-ENC
PMTS-U	480V SWBD-UTIL BUS	R-E02	MAN. TRANSFER SW	R-E02	3#2/0 AWG, 1#2 GND, 2"C-AL
PMTS-G	480V SWBD-GEN BUS	R-E02	MAN. TRANSFER SW	R-E02	3#2/0 AWG, 1#2 GND, 2"C-AL
PMTS-PP	MAN. TRANSFER SW	R-E02	PANEL PP	R-E03	3# 4 AWG, 1#8 GND, 1"C-AL
PLT-S	TFMR LT	R-E02	PANEL LP	R-E03	3#1/0 AWG, 1#8 GND, 1-1/2"C-AL
CIRCUIT SCHEDULE - PS511 TO TJB					
P511-1	480V SWBD	R-E02	VFD-05-1	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-1A	VFD-05-1	R-E05	TJB-P1	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH1 NOTES 1,2
P511-2	480V SWBD	R-E02	VFD-05-2	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-2A	VFD-05-2	R-E05	TJB-P2	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH1 NOTES 1,2
P511-3	480V SWBD	R-E02	VFD-05-3	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-3A	VFD-05-3	R-E05	TJB-P3	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH1 NOTES 1,2
P511-4	480V SWBD	R-E02	VFD-05-4	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-4A	VFD-05-4	R-E05	TJB-P4	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH2 NOTES 1,2
P511-5	480V SWBD	R-E02	VFD-05-5	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-5A	VFD-05-5	R-E05	TJB-P5	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH2 NOTES 1,2
P511-6	480V SWBD	R-E02	VFD-05-6	R-E05	3#350 KCMIL,#4 AWG GND; 2-1/2"C-AL
P511-6A	VFD-05-6	R-E05	TJB-P6	R-E05	3/C-#3/0 AWG,3#8 GND;3"C HH2 NOTES 1,2

NOTES:

1. CONDUIT EXTERIOR TO BUILDING SHALL BE ALUMINUM ABOVE GRADE OUTSIDE OF CORROSIVE ZONES, AND EITHER DIRECT-BURIED PVC COATED RGS-PVC OR PVC-ENCASED BELOW GRADE.
2. SPECIAL VFD MULTI-CONDUCTOR CABLE. ONE OR TWO PER MOTOR AS APPLICABLE.
3. MANUFACTURER CABLE SUPPLIED WITH GAS DETECTOR.
4. FOR DUCT SECTIONS, SEE EXTERIOR CONDUIT SCHEDULE ON SHEET R-E03.

CIRCUIT SCHEDULE - PS511 CONTROLS

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
11I01	PLC CONTROL PANEL	R-I15	511-VFD-05-1	R-E07	TSP-#16, 3/4"C-AL
11I02	PLC CONTROL PANEL	R-I15	511-VFD-05-1	R-E07	TSP-#16, WITH 11I01
11I03	PLC CONTROL PANEL	R-I15	511-VFD-05-3	R-E07	TSP-#16, 3/4"C-AL
11I04	PLC CONTROL PANEL	R-I15	511-VFD-05-3	R-E07	TSP-#16, WITH 11I03
11I05	PLC CONTROL PANEL	R-I15	511-TT-91-5-1	R-I15	TSP-#16, 3/4"C-AL
11I06	PLC CONTROL PANEL	R-I15	511-FIT-05-9-1	R-I15	TSP-#16, 3/4"C-AL
11I07	PLC CONTROL PANEL	R-I15	511-BB-05-7	R-I15	TSP-#16, 3/4"C-AL
11I08	PLC CONTROL PANEL	R-I15	511-AIT-05-16-1	R-I15	TSP-#16, DUCT 60A1, HH1, 10B1
11I09	PLC CONTROL PANEL	R-I16	511-VFD-05-2	R-E07	TSP-#16, 3/4"C-AL
11I10	PLC CONTROL PANEL	R-I16	511-VFD-05-2	R-E07	TSP-#16, WITH 11I09
11I11	PLC CONTROL PANEL	R-I16	511-VFD-05-4	R-E07	TSP-#16, 3/4"C-AL
11I12	PLC CONTROL PANEL	R-I16	511-VFD-05-4	R-E07	TSP-#16, WITH 11I11
11I13	PLC CONTROL PANEL	R-I16	511-PIT-05-10-1	R-I16	TSP-#16, DUCT 30A1
11I14	PLC CONTROL PANEL	R-I16	511-FIT-05-8-1	R-I16	TSP-#16, 3/4"C-AL
11I15	PLC CONTROL PANEL	R-I16	511-AIT-05-17-1	R-I16	20C1
11I16	PLC CONTROL PANEL	R-I17	511-VFD-05-1	R-E07	TSP-#16, WITH 11I01
11I17	PLC CONTROL PANEL	R-I17	511-VFD-05-3	R-E07	TSP-#16, WITH 11I03
11I18	PLC CONTROL PANEL	R-I17	511-VFD-05-2	R-E07	TSP-#16, WITH 11I09
11I19	PLC CONTROL PANEL	R-I17	511-VFD-05-4	R-E07	TSP-#16, WITH 11I11
11I20	PLC CONTROL PANEL	R-I15	511-VFD-05-5	R-E07	TSP-#16, 3/4"C-AL
11I21	PLC CONTROL PANEL	R-I15	511-VFD-05-5	R-E07	TSP-#16, WITH 11I20
11I22	PLC CONTROL PANEL	R-I16	511-VFD-05-6	R-E07	TSP-#16, 3/4"C-AL
11I23	PLC CONTROL PANEL	R-I16	511-VFD-05-6	R-E07	TSP-#16, WITH 11I22
11I24	PLC CONTROL PANEL	R-I17	511-VFD-05-5	R-E07	TSP-#16, WITH 11I20
11I25	PLC CONTROL PANEL	R-I17	511-VFD-05-6	R-E07	TSP-#16, WITH 11I22
11I26	511-FIT-05-6-1	R-I01	511-FE-05-6-1	R-I01	MFR CABLE, DUCT 30A1
11I27	511-FIT-05-7-1	R-I01	511-FE-05-7-1	R-I01	MFR CABLE, DUCT 30A1
11I28	511-AIT-05-16-1	R-I01	511-AE-05-16-1	R-I12	6/TSP W/SHLD, 3/4"C-AL NOTE 3
11I29	511-AIT-05-17-1	R-I01	511-AE-05-17-1	R-I12	6/TSP W/SHLD, 3/4"C-AL NOTE 3
11C01	PLC CONTROL PANEL	R-I18	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C02	PLC CONTROL PANEL	R-I18	511-VFD-05-1-JBOX	R-E08	12/C-#14, 1"C-AL
11C03	PLC CONTROL PANEL	R-I18	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C04	PLC CONTROL PANEL	R-I18	511-VFD-05-3-JBOX	R-E08	12/C-#14, 1"C-AL
11C05	PLC CONTROL PANEL	R-I18	511-AIT-05-16-1	R-I18	4/C-#14, DUCT 60A1, HH1, 10B1
11C06	PLC CONTROL PANEL	R-I18	511-BB-05-7	R-I18	4/C-#14, 3/4"C-AL
11C07	PLC CONTROL PANEL	R-I18	511-OCS-30-1	R-I18	2/C-#14, DUCT 30B1
11C08	PLC CONTROL PANEL	R-I18	511-SLG-03-1	R-I18	4/C-#14, DUCT 10A1
11C09	PLC CONTROL PANEL	R-I18	511-SLG-03-3	R-I18	4/C-#14, DUCT 10A1
11C10	PLC CONTROL PANEL	R-I18	511 GENERATOR	R-I18	12/C-#14, DUCT 50A1
11C11	PLC CONTROL PANEL	R-I19	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C12	PLC CONTROL PANEL	R-I19	511-VFD-05-2-JBOX	R-E08	12/C-#14, 1"C-AL
11C13	PLC CONTROL PANEL	R-I19	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C14	PLC CONTROL PANEL	R-I19	511-VFD-05-4-JBOX	R-E08	12/C-#14, 1"C-AL
11C15	PLC CONTROL PANEL	R-I19	511-AIT-05-17-1	R-I19	20C1
11C16	PLC CONTROL PANEL	R-I19	511-BB-05-7	R-I19	2/C-#14, WITH 11C06
11C17	PLC CONTROL PANEL	R-I19	511-ZS-92-1-1	R-I19	2/C-#14, 3/4"C-AL
11C18	PLC CONTROL PANEL	R-I19	511 ATS	R-I19	12/C-#14, 1"C-AL
11C19	PLC CONTROL PANEL	R-I19	511-SLG-03-2	R-I19	4/C-#14, DUCT 10A1
11C20	PLC CONTROL PANEL	R-I21	511-VFD-05-1	R-E07	4/C-#14, WITH 11C01
11C21	PLC CONTROL PANEL	R-I21	511-VFD-05-2	R-E07	4/C-#14, WITH 11C11
11C22	PLC CONTROL PANEL	R-I21	511-VFD-05-3	R-E07	4/C-#14, WITH 11C03
11C23	PLC CONTROL PANEL	R-I21	511-VFD-05-4	R-E07	4/C-#14, WITH 11C13
11C24	PLC CONTROL PANEL	R-I21	511-VFD-05-5	R-E07	4/C-#14, WITH 11C28
11C25	PLC CONTROL PANEL	R-I21	511-VFD-05-6	R-E07	4/C-#14, WITH 11C30
11C26	PLC CONTROL PANEL	R-I21	480V SWITCHBOARD	R-I21	4/C-#14, WITH 11C32
11C27	PLC CONTROL PANEL	R-I21	480V SWITCHBOARD	R-I21	4/C-#14, WITH 11C32

CABLE TAG	FROM EQUIPMENT	FROM DWG	TO EQUIPMENT	TO DWG	WIRING REQUIREMENTS
11C28	PLC CONTROL PANEL	R-I20	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C29	PLC CONTROL PANEL	R-I20	511-VFD-05-5-JBOX	R-E08	12/C-#14, 1"C-AL
11C30	PLC CONTROL PANEL	R-I20	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C31	PLC CONTROL PANEL	R-I20	511-VFD-05-6-JBOX	R-E08	12/C-#14, 1"C-AL
11C32	PLC CONTROL PANEL	R-I20	480V SWITCHBOARD	R-I20	7/C-#14, 1-1/4"C-AL
11C33	PLC CONTROL PANEL	R-I20	480V SWITCHBOARD	R-I20	7/C-#14, WITH 11C32
11C34	511-VFD-05-1-JBOX	R-E08	511-CK-05-1-1	R-E08	2/C-#14, DUCT 30A2
11C35	511-VFD-05-2-JBOX	R-E08	511-CK-05-2-1	R-E08	2/C-#14, DUCT 30A2
11C36	511-VFD-05-3-JBOX	R-E08	511-CK-05-3-1	R-E08	2/C-#14, DUCT 30A2
11C37	511-VFD-05-4-JBOX	R-E08	511-CK-05-4-1	R-E08	2/C-#14, DUCT 30A2
11C38	511-VFD-05-5-JBOX	R-E08	511-CK-05-5-1	R-E08	2/C-#14, DUCT 30A2
11C39	511-VFD-05-6-JBOX	R-E08	511-CK-05-6-1	R-E08	2/C-#14, DUCT 30A2
11C40	511 GENERATOR		511 ATS		7/C-#14, DUCT 50A1
11C41	511-VFD-05-1-JBOX	R-E08	511-VFD-05-1	R-E07	19/C-#14, 1-1/4"C-AL
11C42	511-VFD-05-2-JBOX	R-E08	511-VFD-05-2	R-E07	19/C-#14, 1-1/4"C-AL
11C43	511-VFD-05-3-JBOX	R-E08	511-VFD-05-3	R-E07	19/C-#14, 1-1/4"C-AL
11C44	511-VFD-05-4-JBOX	R-E08	511-VFD-05-4	R-E07	19/C-#14, 1-1/4"C-AL
11C45	511-VFD-05-5-JBOX	R-E08	511-VFD-05-5	R-E07	19/C-#14, 1-1/4"C-AL
11C46	511-VFD-05-6-JBOX	R-E08	511-VFD-05-6	R-E07	19/C-#14, 1-1/4"C-AL
11C47	511-VFD-05-2-JBOX	R-E08	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C48	511-VFD-05-3-JBOX	R-E08	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C49	511-VFD-05-4-JBOX	R-E08	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C50	511-VFD-05-5-JBOX	R-E08	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C51	511-VFD-05-6-JBOX	R-E08	511-VFD-05-1	R-E07	2/C-#14, 3/4"C-AL
11C52	511-VFD-05-1-JBOX	R-E08	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C53	511-VFD-05-3-JBOX	R-E08	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C54	511-VFD-05-4-JBOX	R-E08	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C55	511-VFD-05-5-JBOX	R-E08	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C56	511-VFD-05-6-JBOX	R-E08	511-VFD-05-2	R-E07	2/C-#14, 3/4"C-AL
11C57	511-VFD-05-1-JBOX	R-E08	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C58	511-VFD-05-2-JBOX	R-E08	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C59	511-VFD-05-4-JBOX	R-E08	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C60	511-VFD-05-5-JBOX	R-E08	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C61	511-VFD-05-6-JBOX	R-E08	511-VFD-05-3	R-E07	2/C-#14, 3/4"C-AL
11C62	511-VFD-05-1-JBOX	R-E08	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C63	511-VFD-05-2-JBOX	R-E08	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C64	511-VFD-05-3-JBOX	R-E08	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C65	511-VFD-05-5-JBOX	R-E08	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C66	511-VFD-05-6-JBOX	R-E08	511-VFD-05-4	R-E07	2/C-#14, 3/4"C-AL
11C67	511-VFD-05-1-JBOX	R-E08	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C68	511-VFD-05-2-JBOX	R-E08	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C69	511-VFD-05-3-JBOX	R-E08	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C70	511-VFD-05-4-JBOX	R-E08	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C71	511-VFD-05-6-JBOX	R-E08	511-VFD-05-5	R-E07	2/C-#14, 3/4"C-AL
11C72	511-VFD-05-1-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C73	511-VFD-05-2-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C74	511-VFD-05-3-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C73	511-VFD-05-2-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C74	511-VFD-05-3-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C75	511-VFD-05-4-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C76	511-VFD-05-5-JBOX	R-E08	511-VFD-05-6	R-E07	2/C-#14, 3/4"C-AL
11C77	511-VFD-05-1-JBOX	R-E08	TJB-P1 MNTR TB	R-E08	7/C-#14, 2"C, HH1 NOTE 1
11C78	511-VFD-05-2-JBOX	R-E08	TJB-P2 MNTR TB	R-E08	7/C-#14, 2"C, HH1 NOTE 1
11C79	511-VFD-05-3-JBOX	R-E08	TJB-P3 MNTR TB	R-E08	7/C-#14, 2"C, HH1 NOTE 1
11C80	511-VFD-05-4-JBOX	R-E08	TJB-P4 MNTR TB	R-E08	7/C-#14, 2"C, HH2 NOTE 1
11C81	511-VFD-05-5-JBOX	R-E08	TJB-P5 MNTR TB	R-E08	7/C-#14, 2"C, HH2 NOTE 1
11C82	511-VFD-05-6-JBOX	R-E08	TJB-P6 MNTR TB	R-E08	7/C-#14, 2"C, HH2 NOTE 1

STATE OF LOUISIANA
VERNON L. McALLISTER
License No. 28919
PROFESSIONAL ENGINEER
ELECTRICAL ENGINEER
APRIL 1, 2016

NO.	DATE	BY	REVISION DESCRIPTION
2	06-24-16	WCW	VFD CABLE GROUNDS
1	05-20-16		CLARIFIED CONDUIT APPLICATIONS

DESIGNED ACR
CHECKED WCW
DETAILED
CHECKED
DATE 06-17-2016
SHEET 173 OF 175

PARISH: EAST BATON ROUGE
CITY: BATON ROUGE
PROJECT: 10-PS-MS-0048

SHEET NUMBER R-E06R

HOOPER ROAD PUMP STATION PROJECT
PUMP STATION 511
TYPE IIIA PROGRAM STATION
CIRCUIT SCHEDULES

C:\Users\90813\Desktop\Hooper Road\23327-R-E06R.dwg [Layout1] Jun 24, 2016 - 11:21am

PROJECT NO.	SHEET
10-PS-MS-0048	

GATES

WIDTH OF GATE SINGLE OR ONE LEAF OR DOUBLE GATE	GATE FRAME O.D.(IN.)	GATE FRAME LBS/FT.	GATE POST O.D.(IN.)	GATE POST LBS/FT.
13' MAXIMUM	1.90	2.71	4.00	9.10
13' TO 18'	1.90	2.71	6.625	18.97
OVER 18'	1.90	2.71	8.625	24.70

The Contractor may substitute the following fencing materials in lieu of those materials specified:

Chain link fence posts, rails, braces and gate frame materials may be round pipe manufactured from steel conforming to ASTM A-569, cold rolled, electric welded and externally triple coated with a minimum of 0.9 ounce per square foot of high grade slab zinc conforming to ASTM B-6; a minimum of 15.0 micrograms of chromate conversion coating per square inch, and an electrostatically applied thermoplastic clear polyurethane acrylic coating having a minimum dry film thickness of not less than 0.3 mil. The interior surface shall also be protected by an application of zinc rich based organic coating (having a minimum zinc powder loading of not less than 87.0 percent by weight) to be applied after fabrication.

Posts, rails, braces and gate frame materials shall conform to the following schedule:

USE	PIPE SIZE	MINIMUM WEIGHT
End, Corner, Slope and Pull Posts:	3.50 Inches	5.71 lbs. per L.F.
Line Posts	3.00 Inches	4.64 lbs. per L.F.
Gate Posts:	3.50 Inches	5.71 lbs. per L.F.
Top Rails and Braces:	1.625 Inches	1.84 lbs. per L.F.
Frame and Stiffner for gates:	2.00 Inches	2.28 lbs. per L.F.

GENERAL NOTES:

The fence installation and details shown are typical and may vary in accordance with different manufacturers, provided that they meet the Standard Specifications.

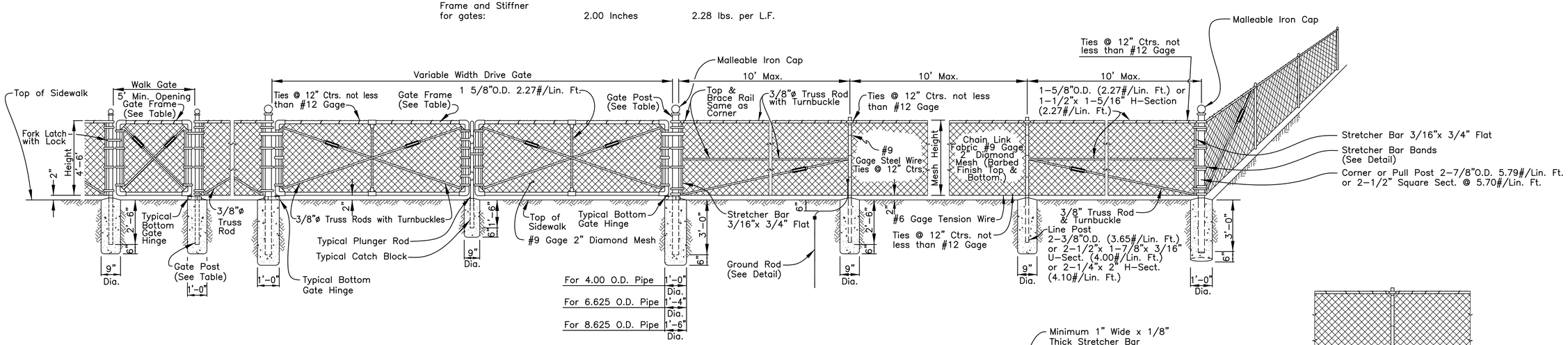
Any Galvanized Fence Item Which has its Surface Abraded Shall Be Painted With Rust-Oleum "Galvinoleum," or an Approved Equal.

Electrical grounding devices are to be installed in accordance with Subsection 902-3 of the Standard Specifications.

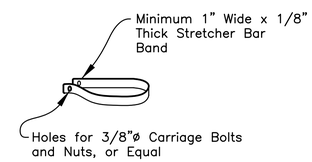
All bolts to be upset to discourage vandalism.

NOTE:

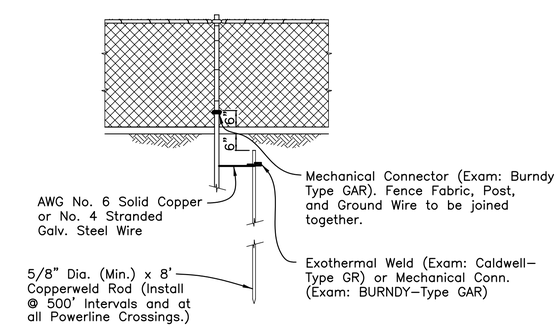
Lateral Fence to be same Construction As Frontage Fence.



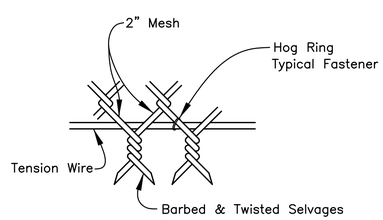
CHAIN LINK FENCE
N.T.S.



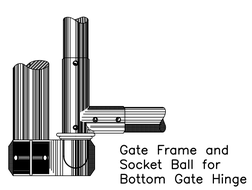
TYPICAL STRETCHER BAR BAND



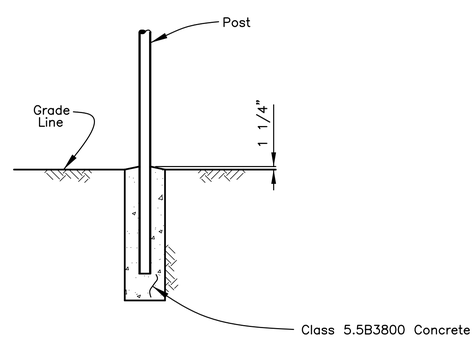
DETAIL OF GROUND WIRES FOR FENCE



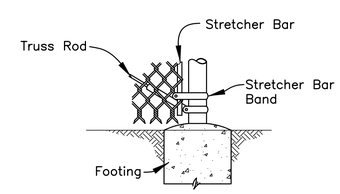
FABRIC & TENSION WIRE DETAIL
Tension Wire Req'd. on Bottom Only



TYPICAL BOTTOM GATE HINGE



DETAIL OF POST FOOTING



TERMINAL POST DETAIL

STATE OF LOUISIANA
BRYAN K. HARMON
REG. No. 22595
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
February 20, 2008

DATE	DESCRIPTION REVISIONS	BY

STANDARD PLAN NO. 902-02	DATED February 6, 2008	SHEET NO. 1 OF 1

CHAIN LINK FENCE & GATES

4' - 5' - 6' HEIGHT

ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
CITY OF BATON ROUGE & PARISH OF EAST BATON ROUGE

DESIGNED	DRAWN	CHECKED	APPROVED
R. ELLIS	G. VANNICE	R. ELLIS	B. HARMON