



ST. TAMMANY PARISH

MICHAEL B. COOPER
PARISH PRESIDENT

May 31, 2024

Please find the following addendum to the below mentioned BID.

Addendum No.: 3

Bid#: 24-15-2

Project Name: Meadow Lake & River Oaks New Elevated Storage Tanks

Bid Due Date: June 5, 2024

Receipt of this addendum shall be acknowledged by inserting its number in the space provided on the Proposal.

GENERAL:

The Project Classification for this project has been changed.

Bidders shall hold one of the following LA License Classifications:

- **Municipal and Public Works Construction, or**
- **Building Construction, or**
- **Steel Erection and Installation, or**
- **Tower Construction**

DRAWINGS:

1. Drawing Sheet E1:
 - a. Replace Drawing Sheet E1 with Drawing Sheet E1 – “Electrical Riser Diagram & Details – Meadow Lake – Addendum No. 3”.
2. Drawing Sheet E2:
 - a. Replace Drawing Sheet E2 with Drawing Sheet E2 – “Electrical Site Demolition Plan – Meadow Lake – Addendum No. 3”.



ST. TAMMANY PARISH

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3. Drawing Sheet E3:
 - a. Replace Drawing Sheet E3 with Drawing Sheet E3 – “New Electrical Site Plan – Meadow Lake – Addendum No. 3”.
4. Drawing Sheet E4:
 - a. Replace Drawing Sheet E4 with Drawing Sheet E4 – “Enlarged Electrical Plan – Meadow Lake – Addendum No. 3”.
5. Drawing Sheet E5:
 - a. Replace Drawing Sheet E5 with Drawing Sheet E5 – “Electrical Riser Diagram & Details – River Oaks – Addendum No. 3”.
6. Drawing Sheet E6:
 - a. Replace Drawing Sheet E6 with Drawing Sheet E6 – “Electrical Site Demolition Plan – River Oaks – Addendum No. 3”.
7. Drawing Sheet E7:
 - a. Replace Drawing Sheet E7 with Drawing Sheet E7 – “New Electrical Site Plan – River Oaks – Addendum No. 3”.
8. Drawing Sheet E8:
 - a. Replace Drawing Sheet E8 with Drawing Sheet E8 – “Enlarged Electrical Plan – River Oaks – Addendum No. 3”.

SPECIFICATIONS

1. Section 11350, Horizontal Split Case Pumps – Addendum No. 2
 - a. Delete this section and Replace with: “11350 – Horizontal Split Case Pumps – Addendum No. 3”.
2. Section 16500.
 - a. Add: Specification Section 16500 – “Pump Control Panel – Addendum No. 3”.
3. Section 16900.
 - a. Delete Specification Section 16900 – “Pump Control Panel”.

ATTACHMENTS:

Drawings E1 – E8 (8sheets).

Specification Section 11350 - "Horizontal Split Case Pumps – Addendum No. 3”.

Specification Section 16500 – “Pump Control Panel -Addendum No. 3”.

<< End of Addendum 3 >>



DEPT. OF UTILITIES
ST. TAMMANY PARISH
GOVERNMENT
620 N. TYLER STREET
COVINGTON, LA 70433

DATE:	5/30/24
DESCRIPTION OF REVISION	1 APPENDUM #3
No.	

DESIGNED BY:	JWH
CHECKED BY:	GPM
DRAWN BY:	JWH
SUBMITTED BY:	PRINCIPAL ENG.
PROJECT No.:	TUXXXXXXXXXX
ISSUE DATE:	OCT 2023
APPROVED BY:	
SHEET SIZE:	ANSI D
SCALE:	AS SHOWN

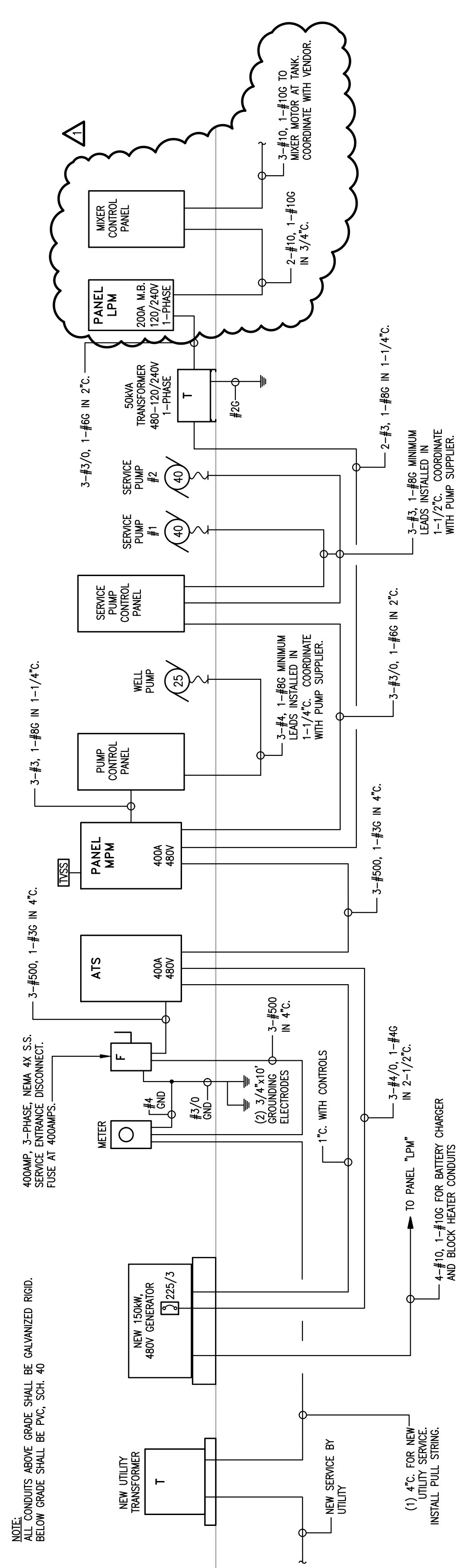


MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXXXX
ELECTRICAL RISER DIAGRAM & DETAILS

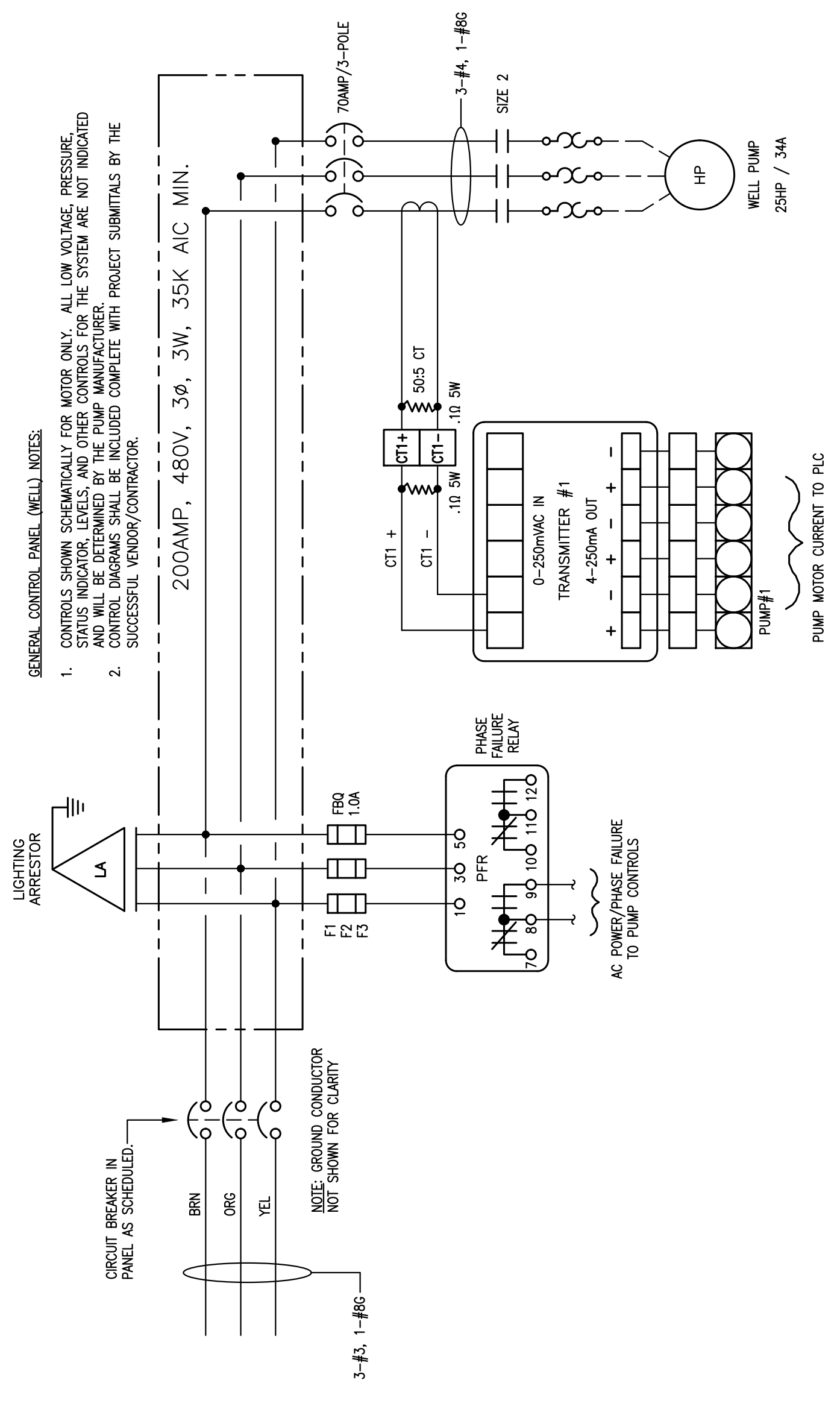
SHEET NO. E1
SHEET 42 OF 49



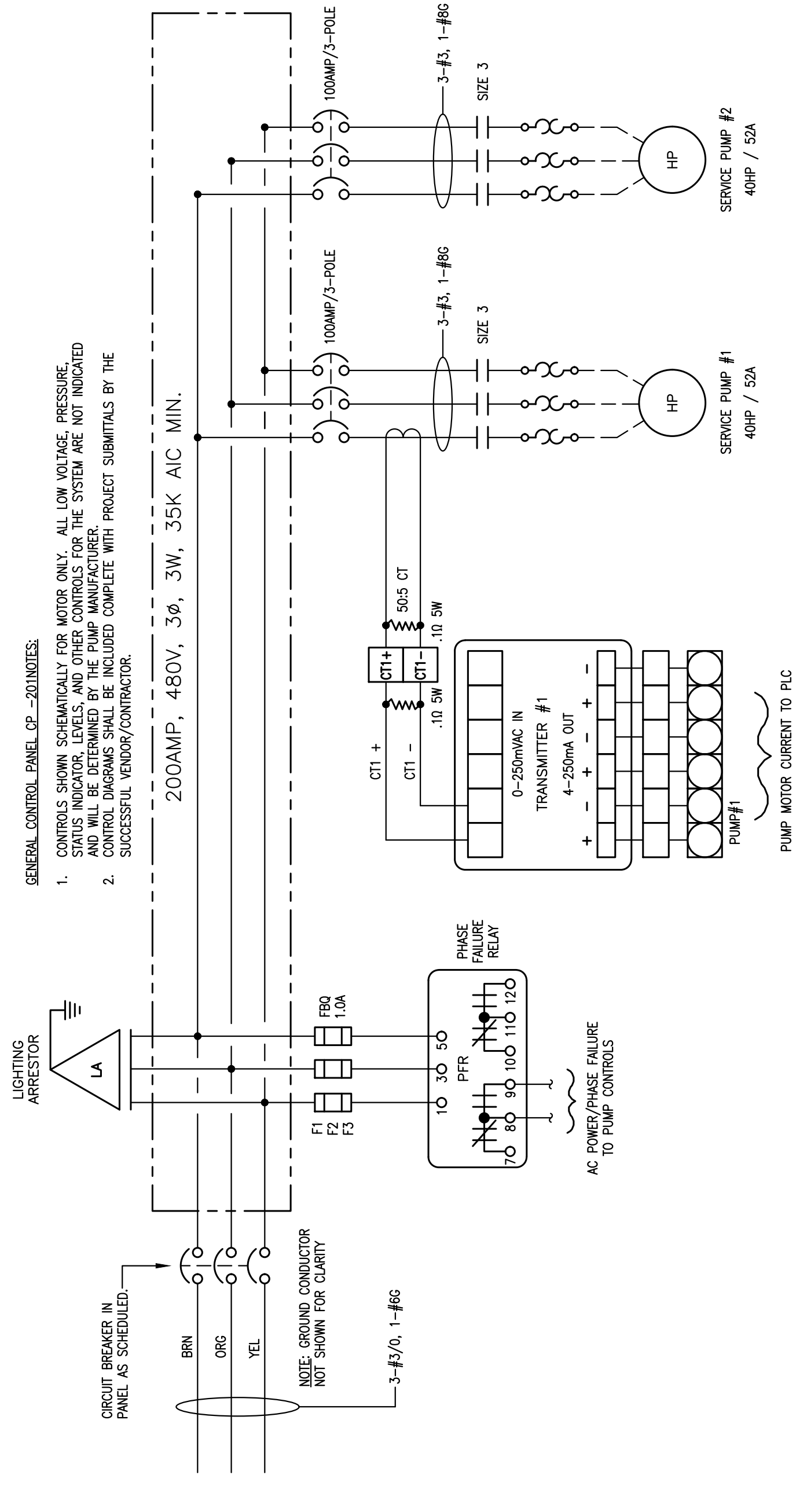
ELECTRICAL LEGEND	
LIGHTING	CONDUIT AND WIRE
<ul style="list-style-type: none"> SURFACE MOUNT, STRIP FIXTURE WALL MOUNTED FIXTURE POLE AND POLE MOUNTED FIXTURE 	<ul style="list-style-type: none"> FLEXIBLE CONDUIT, SEALANTE AT WET LOCATIONS CONDUIT CONCEALED IN WALL OR ABOVE CEILING CONDUIT BELOW FLOOR OR CONCEALED IN WALL WITH NEUTRALS CONDUIT EXPOSED CIRCUIT CONDUCTORS IN CONDUIT MULTIPLE CIRCUIT CONDUCTORS IN CONDUIT WITH NEUTRALS GROUND CONDUCTORS IN CONDUIT CIRCUIT HOMERUN TO PANEL BOARD. XX-XX DENOTES PANEL NAME AND CIRCUIT NUMBER CONTINUATION OF CONDUIT RUN
SWITCHES	DEVICES
<ul style="list-style-type: none"> SINGLE POLE SWITCH - 20A, 120/277V, 4-8" AFF, UNLESS NOTED MANUAL MOTOR STARTERS, MOUNT NEXT TO EQUIPMENT SERVED, UNLESS NOTED SINGLE POLE SWITCH W/ WEATHERPROOF COVER - 20A, 120/277V, 4-8" AFF, UNLESS NOTED 2-POLE SWITCH, MOUNT NEXT TO EQUIPMENT SERVED, UNLESS NOTED 	<ul style="list-style-type: none"> QUADRAPLEX RECEPTACLE - 20A, 120V GFI DUPLEX RECEPTACLE - 20A, 120V GFI WEATHER RESISTANT DUPLEX RECEPTACLE - 20A, 120V WITH IN-USE WEATHERPROOF COVER MOUNT ALL DEVICES AT +18" AFF, UNLESS NOTED OTHERWISE. * - DEVICES MOUNTED ABOVE COUNTER HEIGHTS SHALL BE 6" ABOVE BACKSPASH.
SWITCHGEAR	
<ul style="list-style-type: none"> JUNCTION BOX NEW FUSED SAFETY SWITCH, NEMA XX S.S. AT WET LOCATIONS FUSED SAFETY SWITCH, NEMA XX S.S. AT WET LOCATIONS LIGHT AND POWER PANELBOARD DISTRIBUTION PANELBOARD TRANSFORMER AUTOMATIC TRANSFER SWITCH METER MOTOR - HORSEPOWER NOTED SPECIAL ELECTRICAL CONNECTION WATER HEATER ELECTRICAL CONNECTION EX. FAN ELECTRICAL CONNECTION AIR-HANDLER UNIT ELECTRICAL CONNECTION PUMP 	



1 ELECTRICAL RISER DETAIL - MEADOW LAKE
SCALE: NOT TO SCALE



2 ONE-LINE DIAGRAM - MEADOW LAKE (WELL)
SCALE: NOT TO SCALE



3 ONE-LINE DIAGRAM - MEADOW LAKE (CP-201)
SCALE: NOT TO SCALE

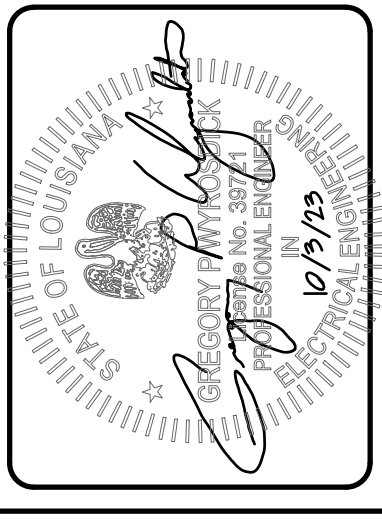




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COVINGTON, LA 70433

No.	DESCRIPTION OF REVISION	DATE:
1	ADDENDUM #3	5/30/24

DESIGNED BY: JWH	CHECKED BY: GPV	SUBMITTED BY: JWH	PROJECT No.: TUXXXXXXXX	ISSUE DATE: OCT 2023	APPROVED BY:	SHEET SIZE: ANSI D	SCALE: AS SHOWN
DRAWN BY: JWH	PRINCIPAL ENG.		TUXXXXXXXX				



MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXX
MEADOW LAKE
ELECTRICAL SITE DEMOLITION PLAN

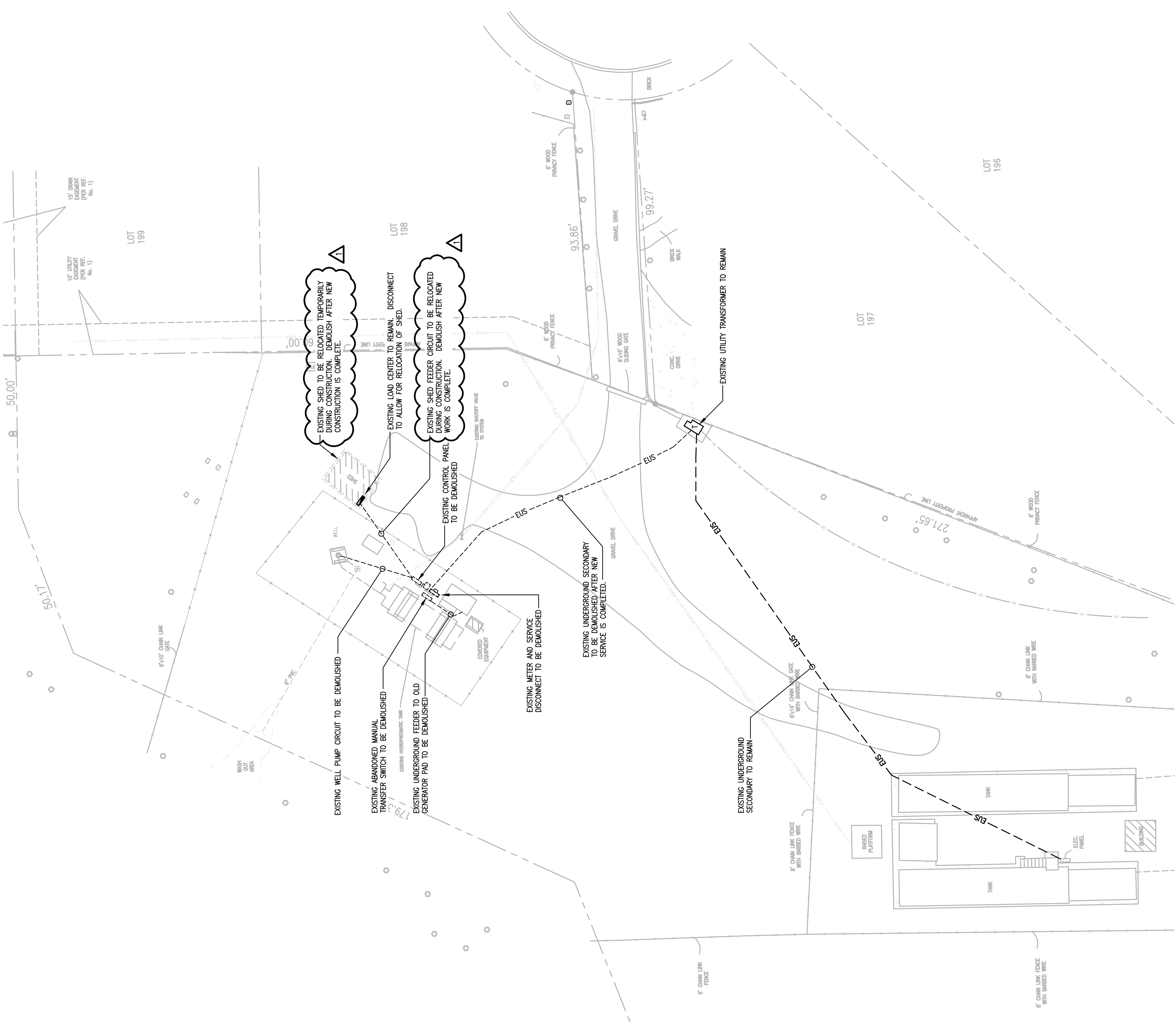
SHEET NO. E-2
SHEET 43 OF 49



GENERAL ELECTRICAL SITE NOTES:

- ALL EXISTING SYSTEMS SHALL REMAIN UNTIL NEW CONSTRUCTION IS COMPLETE.
- CONTRACTOR SHALL COORDINATE WITH CIVIL FOR PHASING OF PROJECT.
- DEMOLISH AND REMOVE EXISTING ELECTRICAL SYSTEMS ONCE NEW SYSTEMS ARE IN PLACE AND OPERATIONAL.

MEADOW LAKE DRIVE EAST



1 ELECTRICAL SITE DEMOLITION PLAN - MEADOW LAKE
E2 SCALE: 1" = 20'-0"

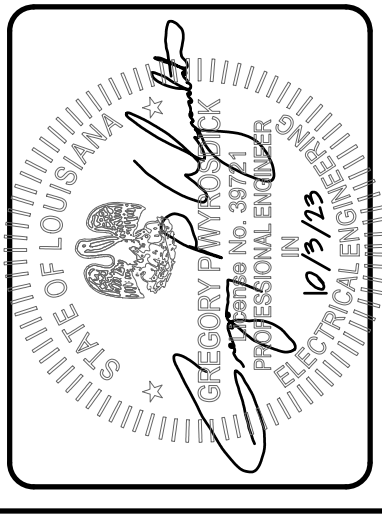




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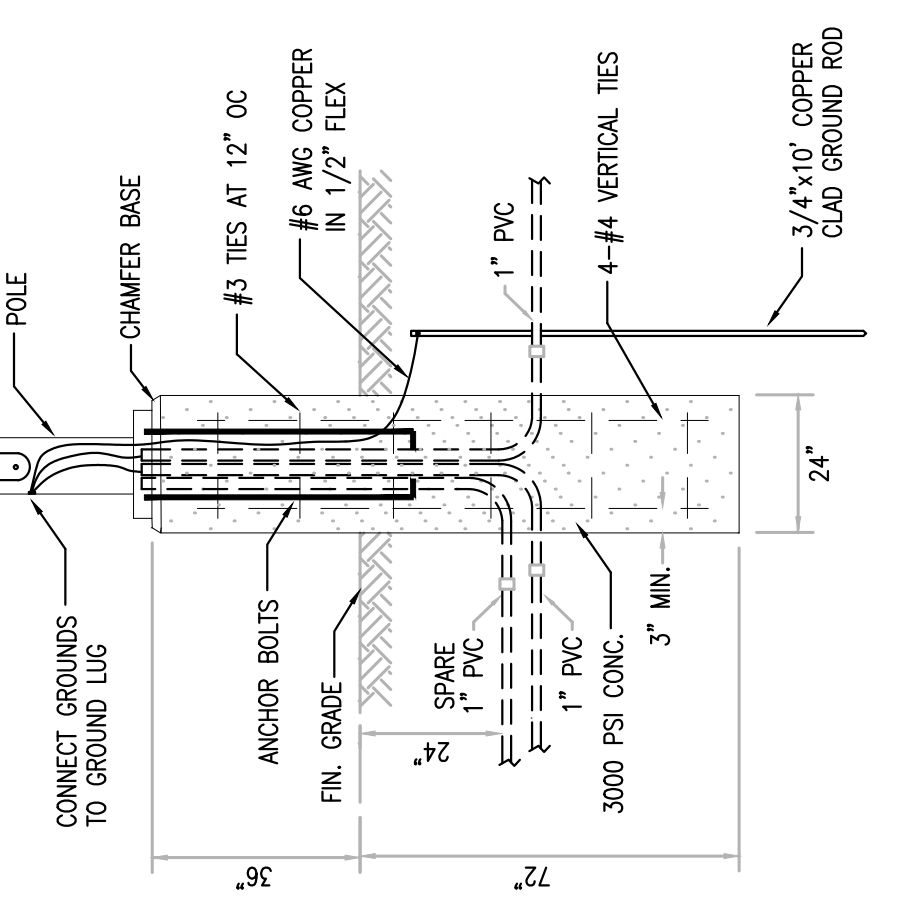
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MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXXXX
MEADOW LAKE
NEW ELECTRICAL SITE PLAN

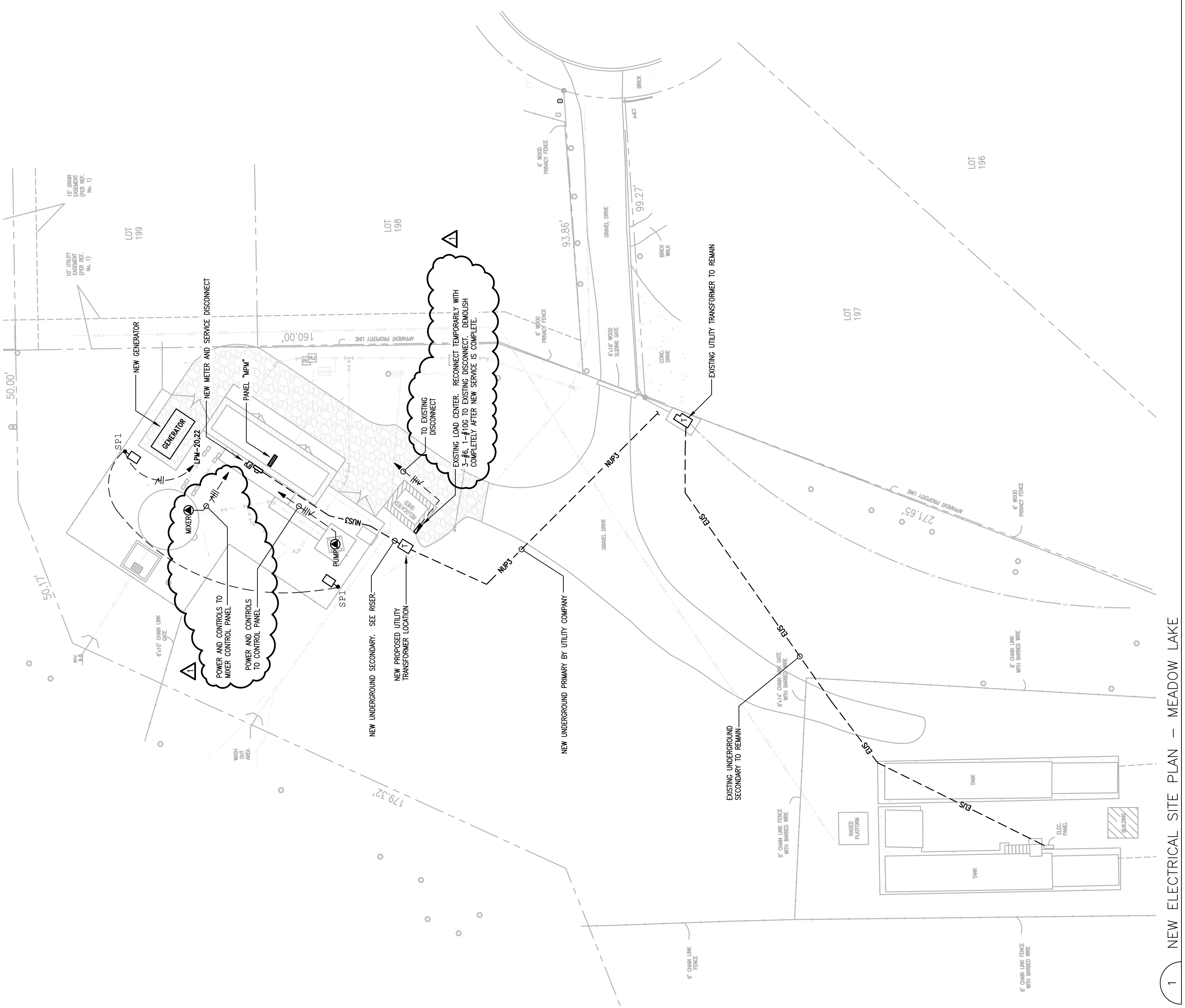
SHEET NO.
E-3
SHEET 44 OF 49



1 POLE BASE DETAIL
E3 SCALE: NOT TO SCALE

- POLE FOUNDATION NOTES:**
- INSTALL POLES LEVEL AND PLUMB. UTILIZE LEVELING NUTS ON ANCHOR BOLTS AS REQUIRED.
 - ANCHOR BOLTS TO BE SIZED PER MANUFACTURER'S RECOMMENDATION.
 - PROVIDE AND INSTALL NONSHRINK ANCHOR BOLT BASES OF POLYURETHANE OR EPOXY TYPE. PROVIDE SLOPED FINISH AT BASE OF POLE.
 - PROVIDE "RUBBED" FINISH ON ALL EXPOSED CONCRETE AT POLE FOUNDATION.
 - INSTALL ANCHOR BOLTS TO MATCH BOLT PATTERN DIAMETER GIVEN BY POLE MANUFACTURER.
 - INSTALL (1) 1" PVC SPARE CONDUIT STUBBED OUT OF POLE BASE.

MEADOW LAKE DRIVE EAST



1 NEW ELECTRICAL SITE PLAN - MEADOW LAKE
E3 SCALE: 1" = 20'-0"



LUMINAIRE SCHEDULE			
MARK	LAMPS	MOUNTING	DESCRIPTION
S1	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE
S1E	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE, W/ EMERGENCY
SP1	LED	POLE	LED, SITE POLE FIXTURE, SINGLE FIXTURE, W/ PHOTOCELL, W/ HOUSE-SIDE SHIELD
		POLE	16" SQUARE ALUMINUM POLE
W2E	LED	WALL; ABOVE DOOR	LED, EXTERIOR WALL PACK, W/ PHOTOCELL, W/ EMERGENCY

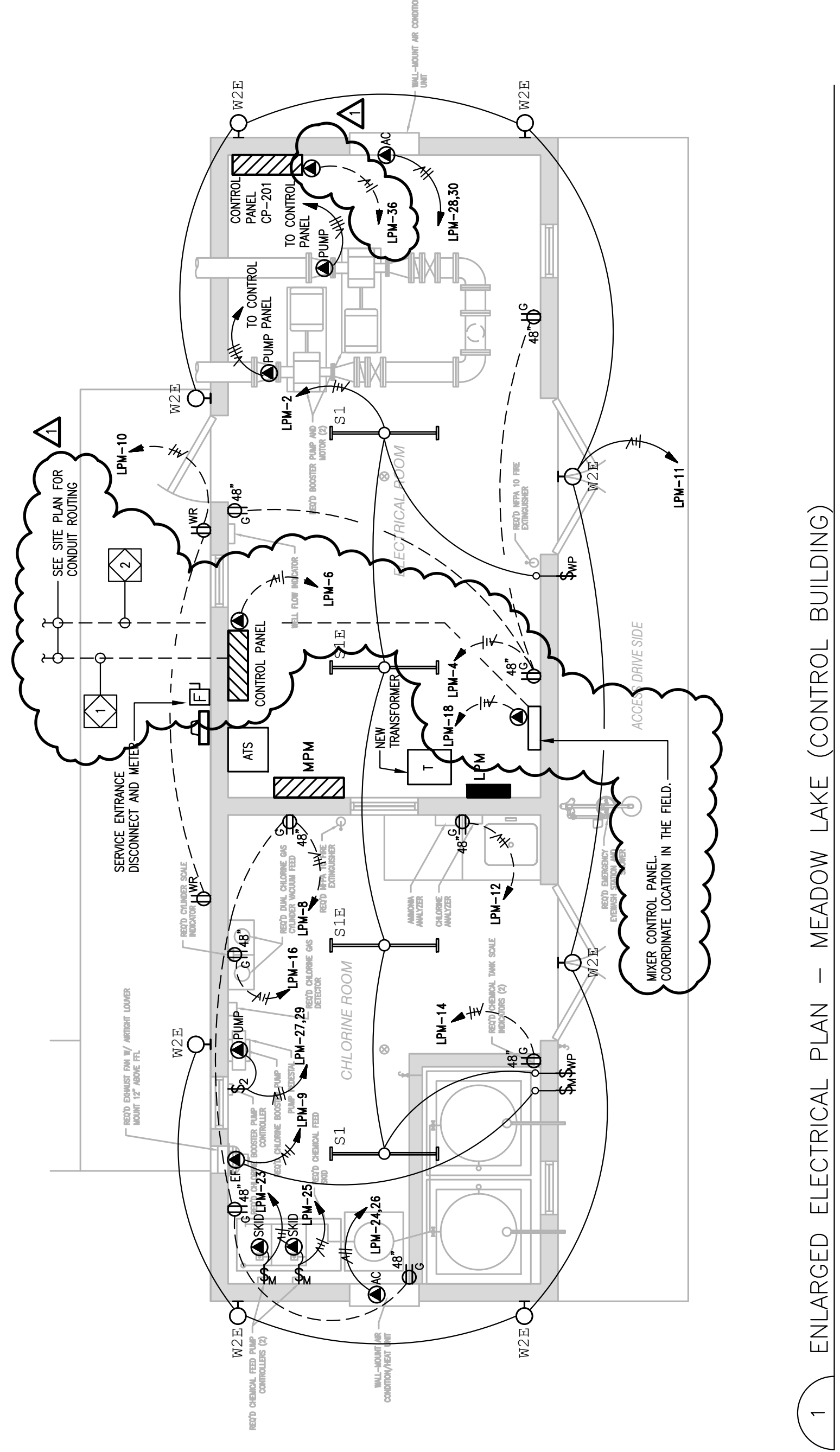
NOTE: LUMINAIRES WITH "E" DESIGNATION SHALL HAVE INTEGRAL EMERGENCY BALLAST. CONNECT EMERGENCY BALLAST ONLY AHEAD OF ANY SWITCHING. NORMAL BALLAST TO BE SWITCHED AS INDICATED. UNLESS NOTED OTHERWISE.

PANEL	BUSS: 400 AMP	MOUNT: SURFACE, NEMA 1	VOLT: 480V, 3 PHASE, 3 WIRE			AIC RATING: 22,000	LOCATION: ELEC. ROOM (MEADOW LAKE)
			FEEDER	LOAD (AMPS)	LOAD (AMPS)		
MPM	MAINS: M.L.O.	DESCRIPTION	A	B	C	FEEDER	DESCRIPTION
1	100/2	PANEL "E" THRU TRANSFORMER	51.2	40.7	34	3-3, 1-8G	PUMP CONTROL PANEL
3					34		
5					34		
7					104	3-3/0, 1-6G	SERVICE PUMP CONTROL PANEL
9					104		
11					104		
13							
15							
17							
19							
21							
23			51.2	40.7	0.0	138.0	138.0
CONNECTED LOADS PER PHASE							
A phase							188.2
B phase							178.7
C phase							138.0
CONNECTED LOADS PER PHASE							
A phase							amps
B phase							amps
C phase							amps

NOTES:
1. PROVIDE EXTERNAL TVSS

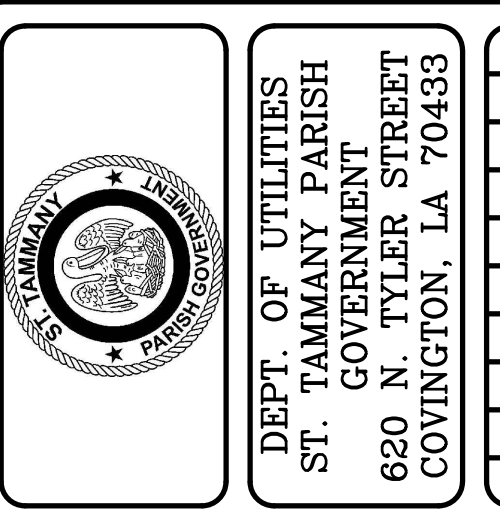
PANEL	BUSS: 200 AMP	MOUNT: SURFACE, NEMA 1	VOLT: 120/240V, 1 PHASE, 3 WIRE			AIC RATING: 10,000	LOCATION: ELEC. ROOM (MEADOW LAKE)
			FEEDER	LOAD (AMPS)	LOAD (AMPS)		
LPM	MAINS: 200A M.B.	DESCRIPTION	A	B	C	FEEDER	DESCRIPTION
1	60/2	SPARE			1.5	2-12, 1-12G	LIGHTS (CONTROL BUILDING)
3					3	2-12, 1-12G	REC. (ELEC. ROOM)
5	30/2	SPARE			6	2-12, 1-12G	CONTROL PANEL
7					6	2-12, 1-12G	REC. (ELEC. ROOM)
9	20/1	EXHAUST FAN			9.8	2-12, 1-12G	REC. (EXTERIOR)
11	20/1	LIGHTS (EXTERIOR)			3	2-12, 1-12G	CHLORINE ANALYZER (CHL RM)
13	20/1	SPARE			3	2-12, 1-12G	SCALE INDICATORS (CHL RM)
15	20/1	SPARE			6	2-12, 1-12G	CHLORINE GAS VAC FEED
17	30/1	BATT. CHARGER (GENERATOR)			15	2-10, 1-10G	WATER TANK
19	30/2	BLOCK HEATER (GENERATOR)			15	2-10, 1-10G	LIGHTS (SITE)
21					6	2-10, 1-10G	
23	20/1	CHLORINE SKD			15	2-10, 1-10G	A/C UNIT
25	20/1	CHLORINE SKD			15	2-10, 1-10G	A/C UNIT
27	20/2	BOOSTER PUMP			15	2-10, 1-10G	A/C UNIT
29					10		
31	20/1	SPARE			32		
33	20/1	SPARE			34		
35	20/1	SPARE			36		
37	20/1	SPARE			3	2-12, 1-12G	CONTROL PANEL
39	20/1	SPARE					
41	20/1	SPARE			62.5	60.0	
CONNECTED LOADS PER PHASE							
A phase							118.3
B phase							94.0
C phase							amps

MARK	LAMPS	MOUNTING	DESCRIPTION	MANUFACTURER	EQUALS
S1	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE	LITHONIA FEML48-4000LM/LPQL-MD-MVOLT-GZ10-40K-80CRI	OR APPROVED EQUAL
S1E	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE, W/ EMERGENCY	LITHONIA FEML48-4000LM/LPQL-MD-MVOLT-GZ10-40K-80CRI-E/0W/MCP	OR APPROVED EQUAL
SP1	LED	POLE	LED, SITE POLE FIXTURE, SINGLE FIXTURE, W/ PHOTOCELL, W/ HOUSE-SIDE SHIELD	LITHONIA DSX1 LED-P1-40K-T4M-20B-SPA-PER-DBLXD-G1-DLL1ZFT-1-4-JU_DSX1HS-30C U G1	OR APPROVED EQUAL
		POLE	16" SQUARE ALUMINUM POLE	LITHONIA SSA-16-4G-DM19-DBLXD	OR APPROVED EQUAL
W2E	LED	WALL; ABOVE DOOR	LED, EXTERIOR WALL PACK, W/ PHOTOCELL, W/ EMERGENCY	LITHONIA WDG22 LED-P3-40K-80CRI-VF-MVOLT-SRM-PBRW-E/0WH-PE-DBLXD	OR APPROVED EQUAL



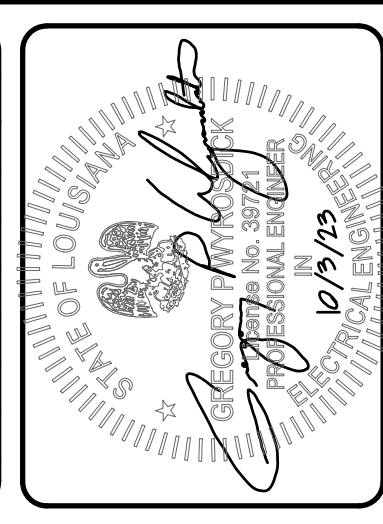
1 ENLARGED ELECTRICAL PLAN - MEADOW LAKE (CONTROL BUILDING)
E4 SCALE: 1/4" = 1'-0"

SPECIFIC ELECTRICAL NOTES (THIS SHEET):
 1. EXTEND CONDUITS TO WELL PUMP AND VALVE LOCATIONS FOR POWER AND CONTROLS. (3) 1-1/4" FOR POWER AND (6) 1" FOR CONTROLS. COORDINATE WITH CONTROLS VENDOR.
 2. EXTEND CONDUITS TO WATER TANK WATER LOCATION FOR POWER AND CONTROLS. (2) 1" FOR POWER AND (3) 1" FOR CONTROLS. WATER CONTROL PANEL REQUIRES 120VOLT, 3-PHASE OUTPUT TO MOTOR. COORDINATE WITH CONTROLS VENDOR.



DATE:	5/30/24
DESCRIPTION OF REVISION	ADDDENDUM #3
No.	1

DESIGNED BY:	JWH
CHECKED BY:	GPM
SUBMITTED BY:	PRINCIPAL ENG.
PROJECT No.:	TUXXXXXXXXXX
ISSUE DATE:	OCT 2023
APPROVED BY:	AS SHOWN
SHEET SIZE:	ANSI D
SCALE:	AS SHOWN



MEADOW LAKE & RIVER OAKS
 NEW ELEVATED STORAGE TANK
 SLIDELL, LOUISIANA
 PROJECT No.: TUXXXXXXXXXX
 ENLARGED ELECTRICAL PLAN
 MEADOW LAKE

SHEET NO. E-4
 SHEET 45 OF 49



ELECTRICAL LEGEND

LIGHTING

- SURFACE MOUNT, STRIP FIXTURE
- WALL MOUNTED FIXTURE
- POLE AND POLE MOUNTED FIXTURE

SWITCHES

- SINGLE POLE SWITCH - 20A, 120/277V, 4-8" AFF, UNLESS NOTED
- MANUAL MOTOR STARTER, MOUNT NEXT TO EQUIPMENT SERVED, UNLESS NOTED
- SINGLE POLE SWITCH W/ WEATHERPROOF COVER - 20A, 120/277V, 4-8" AFF, UNLESS NOTED
- 2-POLE SWITCH, MOUNT NEXT TO EQUIPMENT SERVED, UNLESS NOTED

SWITCHGEAR

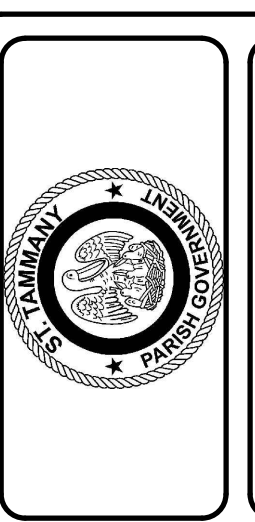
- JUNCTION BOX
- NON FUSED SAFETY SWITCH, NEMA XX S.S. AT WET LOCATIONS
- FUSED SAFETY SWITCH, NEMA XX S.S. AT WET LOCATIONS
- LIGHT AND POWER PANELBOARD
- DISTRIBUTION PANELBOARD
- TRANSFORMER
- AUTOMATIC TRANSFER SWITCH
- METER
- MOTOR - HORSEPOWER NOTED
- SPECIAL ELECTRICAL CONNECTION
- WATER HEATER ELECTRICAL CONNECTION
- EX. FAN ELECTRICAL CONNECTION
- AC
- AIR-HANDLER UNIT ELECTRICAL CONNECTION
- PUMP ELECTRICAL CONNECTION

CONDUIT AND WIRE

- FLEXIBLE CONDUIT, SEALANTE AT WET LOCATIONS
- CONDUIT CONCEALED IN WALL OR ABOVE CEILING
- CONDUIT BELOW FLOOR OR CONCEALED IN WALL
- CONDUIT EXPOSED
- CIRCUIT CONDUCTORS IN CONDUIT
- MULTIPLE CIRCUIT CONDUCTORS IN CONDUIT WITH NEUTRALS
- GROUND CONDUCTORS IN CONDUIT
- CIRCUIT HOMERUN TO PANEL BOARD.
- XX-XX DENOTES PANEL NAME AND CIRCUIT NUMBER
- CONTINUATION OF CONDUIT RUN

DEVICES

- QUADRUPLEX RECEPTACLE - 20A, 120V
 - GFI DUPLEX RECEPTACLE - 20A, 120V
 - GFL WEATHER RESISTANT DUPLEX RECEPTACLE - 20A, 120V WITH IN-LINE WEATHERPROOF COVER
- MOUNT ALL DEVICES AT +18" AFF, UNLESS NOTED OTHERWISE.
- * - DEVICES MOUNTED ABOVE COUNTER HEIGHTS SHALL BE 6" ABOVE BACKSPASH.



DEPT. OF UTILITIES
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1	APPENDUM #3	5/30/24

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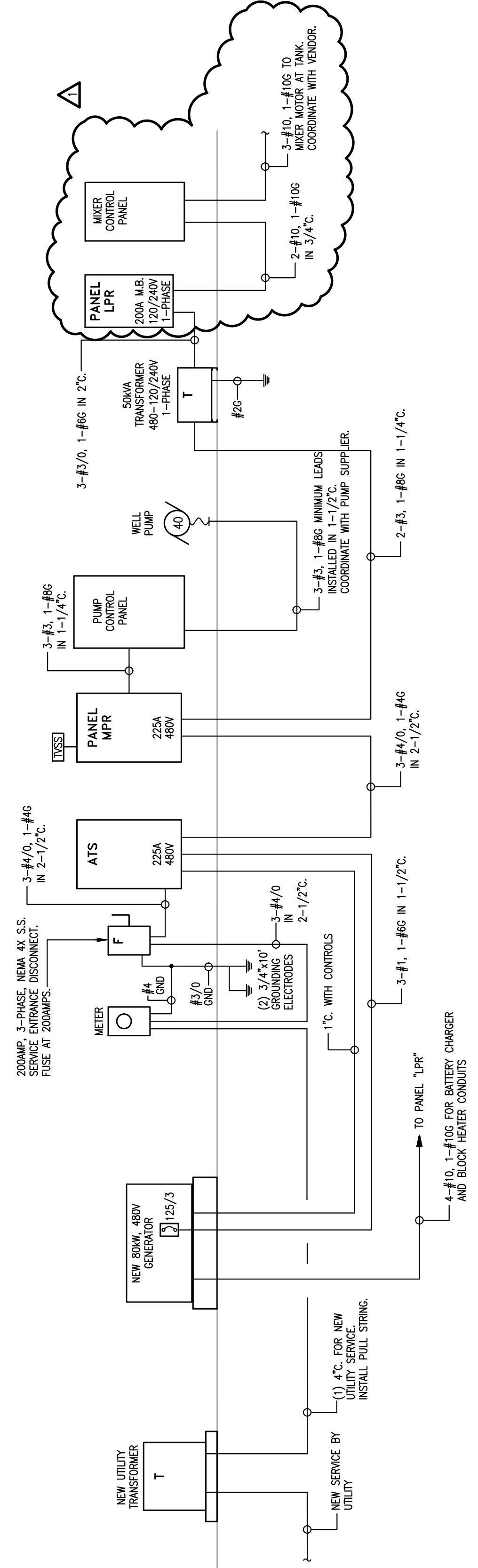


MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXXXX
ELECTRICAL RISER DIAGRAM & DETAILS

SHEET NO. E-5
SHEET 46 OF 49

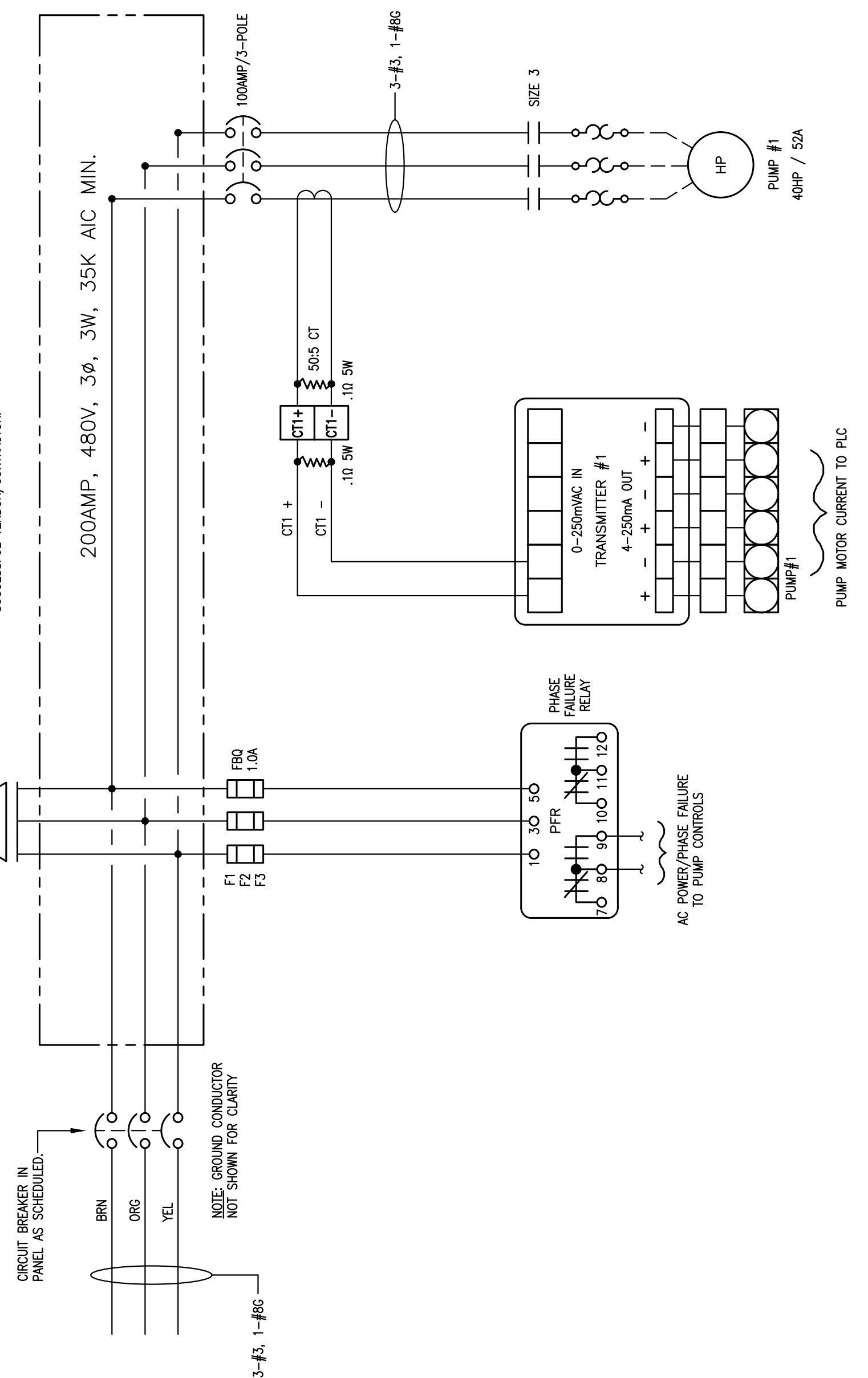


NOTE: ALL CONDUITS ABOVE GRADE SHALL BE GALVANIZED RIGID. BELOW GRADE SHALL BE PVC, SCH. 40



1 ELECTRICAL RISER DETAIL - RIVER OAKS
SCALE: NOT TO SCALE

GENERAL CONTROL PANEL NOTES:
1. CONTROLS SHOWN SCHEMATICALLY FOR MOTOR ONLY. ALL LOW VOLTAGE, PRESSURE, STATUS INDICATOR, LEVELS, AND OTHER CONTROLS FOR THE SYSTEM ARE NOT INDICATED AND WILL BE DETERMINED BY THE PUMP MANUFACTURER.
2. CONTROL DIAGRAMS SHALL BE INCLUDED COMPLETE WITH PROJECT SUBMITTALS BY THE SUCCESSFUL VENDOR/CONTRACTOR.



2 ONE-LINE DIAGRAM - RIVER OAKS
SCALE: NOT TO SCALE

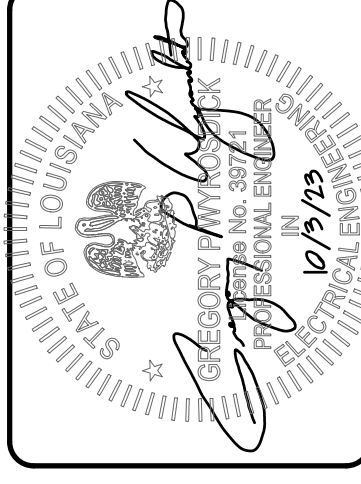




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SHEET SIZE:	ANSI D
SCALE:	AS SHOWN



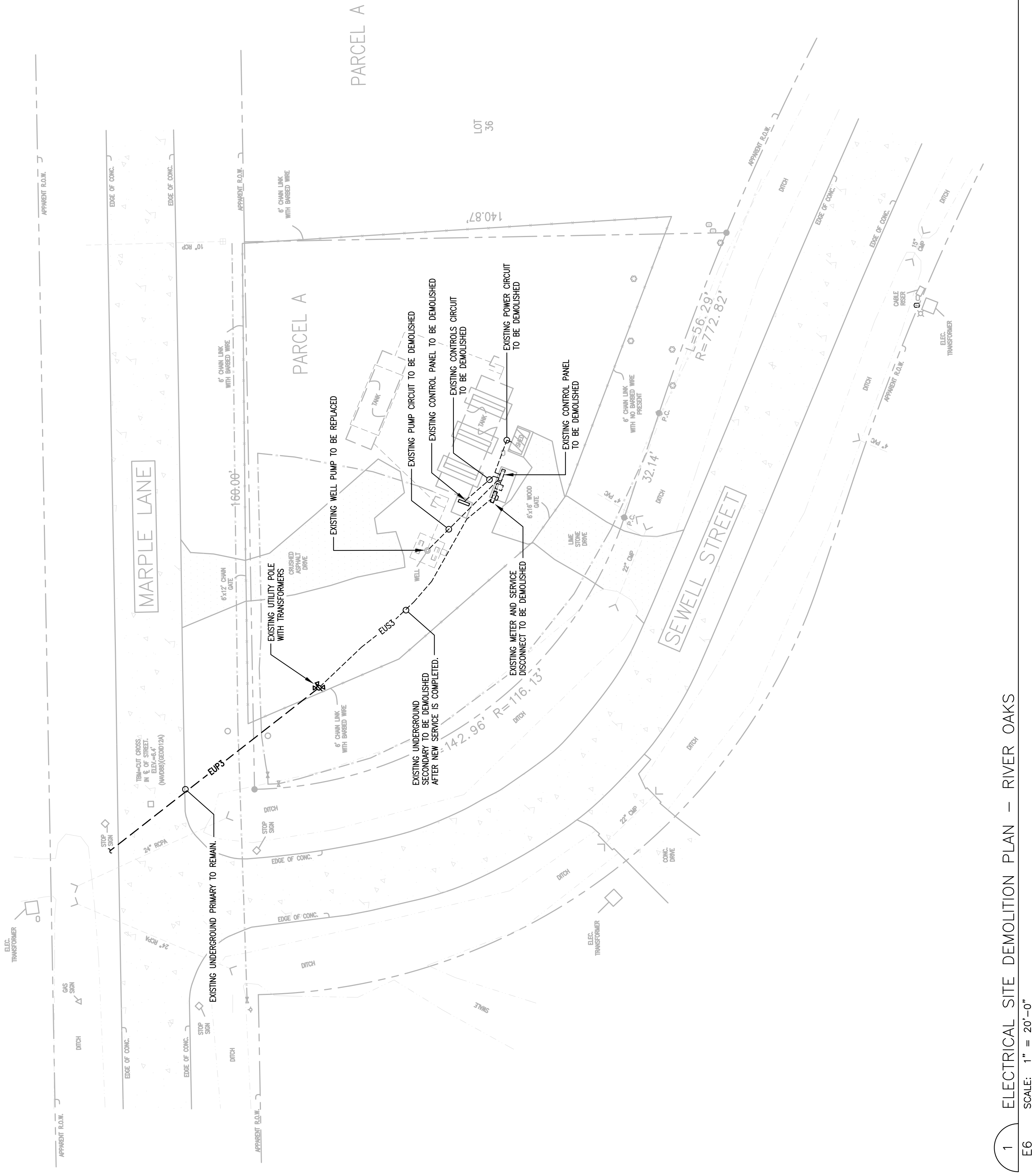
MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXXXX
ELECTRICAL SITE DEMOLITION PLAN
RIVER OAKS

SHEET NO.
E-6
SHEET 47 OF 49



GENERAL ELECTRICAL SITE NOTES:

1. ALL EXISTING SYSTEMS SHALL REMAIN UNTIL NEW CONSTRUCTION IS COMPLETE.
2. CONTRACTOR SHALL COORDINATE WITH CIVIL FOR PHASING OR PROJECT.
3. DEMOLISH AND REMOVE EXISTING ELECTRICAL SYSTEMS ONCE NEW SYSTEMS ARE IN PLACE AND OPERATIONAL.



1 ELECTRICAL SITE DEMOLITION PLAN - RIVER OAKS
E6 SCALE: 1" = 20'-0"





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MEADOW LAKE & RIVER OAKS
NEW ELEVATED STORAGE TANK
SLIDELL, LOUISIANA
PROJECT No.: TUXXXXXXXXXX
ENLARGED ELECTRICAL PLAN
RIVER OAKS

SHEET NO. E-8
SHEET 49 OF 49

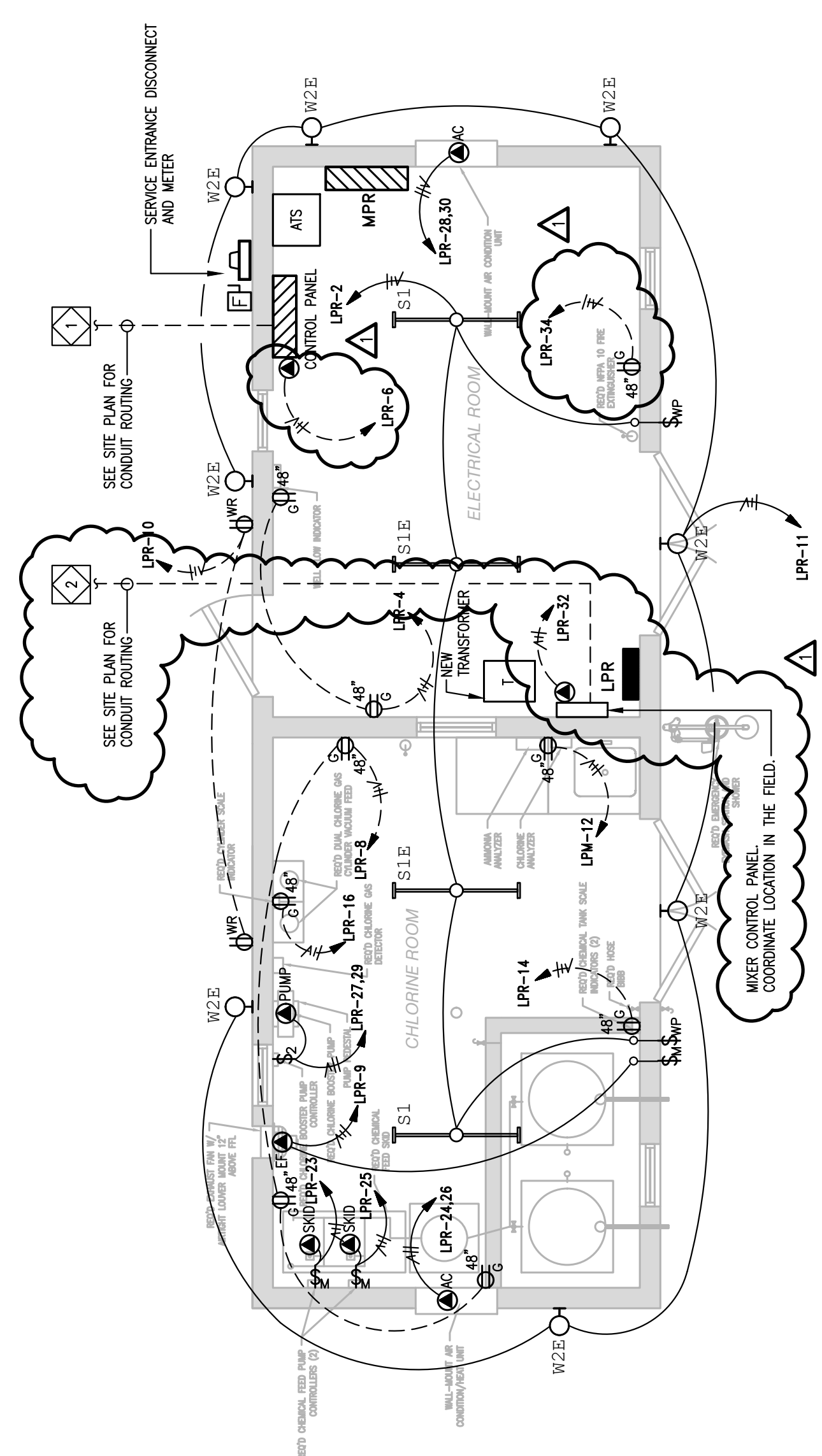


MARK	LAMPS	MOUNTING	DESCRIPTION	MANUFACTURER	EQUALS
S1	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE	LITHONIA FEML48-4000LM/PPQL-MD-MVOLT-GZ10-40K-80CRI	OR APPROVED EQUAL
S1E	LED	SURFACE/STRUCTURE	LED, 4" VAPORITITE STRIP FIXTURE, W/ EMERGENCY	LITHONIA FEML48-4000LM/PPQL-MD-MVOLT-GZ10-40K-80CRI-E/0W/MCP	OR APPROVED EQUAL
SP1	LED	POLE	LED, SITE POLE FIXTURE, SINGLE FIXTURE, W/ PHOTOCELL, W/ HOUSE-SIDE SHIELD	LITHONIA DSX1 LED-P1-40K-T4M-20B-SPA-PER-DBLXD-G1-DLL1Z/F 1.4 J.U. DSX1HS 30C U G1	OR APPROVED EQUAL
		POLE	16" SQUARE ALUMINUM POLE	LITHONIA SSA-16-4G-DM19-DBLXD	OR APPROVED EQUAL
W2E	LED	WALL; ABOVE DOOR	LED, EXTERIOR WALL PACK, W/ PHOTOCELL, W/ EMERGENCY	LITHONIA WDG22 LED-P3-40K-80CRI-VF-MVOLT-SRM-PBRW-E/0WH-PE-DBLXD	OR APPROVED EQUAL

NOTE: LUMINAIRES WITH "E" DESIGNATION SHALL HAVE INTEGRAL EMERGENCY BALLAST. CONNECT EMERGENCY BALLAST ONLY AHEAD OF ANY SWITCHING. NORMAL BALLAST TO BE SWITCHED AS INDICATED. UNLESS NOTED OTHERWISE.

PANEL	MFR	BUSS: 225 AMP	VOLT: 480V, 3 PHASE, 3 WIRE	LOAD (AMPS)			AIC RATING: 22,000	LOCATION: ELEC. ROOM (RIVER OAKS)
				A	B	C		
1	100/2	PANEL "LPR" THRU TRANSFORMER	2-3, 1-8G	49.1	49	52	9-3, 1-8G	CONTROL PANEL
3								
5								
7								
9								
11								
13								
15								
17								
19								
21								
23				49.1	49.0	52.0	52.0	52.0
CONNECTED LOADS PER PHASE								
A phase								101.1
B phase								101.0
C phase								52.0
NOTES:								
1. PROVIDE EXTERNAL TVSS								

PANEL	BKR.	DESCRIPTION	FEEDER	LOAD (AMPS)			AIC RATING: 10,000	LOCATION: ELEC. ROOM (RIVER OAKS)
				A	B	C		
1	60/2	SPARE		1.5			2-12, 1-12G	LIGHTS (CONTROL BUILDING)
3							2-12, 1-12G	REC (ELEC. ROOM)
5	30/2	SPARE		3			2-12, 1-12G	CONTROL PANEL
7							2-12, 1-12G	REC (ELEC. ROOM)
9	20/1	EXHAUST FAN	2-12, 1-12G	9.8			2-12, 1-12G	REC (EXTERIOR)
11	20/1	LIGHTS (EXTERIOR)	2-12, 1-12G	3			2-12, 1-12G	CHLORINE ANALYZER (CHL RM)
13	20/1	CL2 ANALYZER (TANK)	2-10, 1-10G	6			2-12, 1-12G	SCALE INDICATORS (CHL RM)
15	20/1	AMMONIA ANALYZER (TANK)	2-10, 1-10G	6			2-12, 1-12G	CHLORINE GAS VAC FEED
17	30/1	BATT. CHARGER (GENERATOR)	2-10, 1-10G	15			2-10, 1-10G	OBSTRUCTION LIGHT (TANK)
19	30/2	BLOCK HEATER (GENERATOR)	2-10, 1-10G	15			2-10, 1-10G	LIGHTS (SITE)
21	20/1	CHLORINE SKD	2-12, 1-12G	15			2-10, 1-10G	A/C UNIT
23	20/1	CHLORINE SKD	2-12, 1-12G	6			2-10, 1-10G	A/C UNIT
25	20/1	CHLORINE SKD	2-12, 1-12G	6			2-10, 1-10G	A/C UNIT
27	20/2	BOOSTER PUMP	2-12, 1-12G	10			2-10, 1-10G	A/C UNIT
29							2-10, 1-10G	A/C UNIT
31	20/1	SPARE		15			2-10, 1-10G	MIXER
33	20/1	SPARE		3			2-12, 1-12G	REC (ELEC. ROOM)
35	20/1	SPARE						
37	20/1	SPARE						
39	20/1	SPARE						
41	20/1	SPARE		61.8	60.0	73.0		
CONNECTED LOADS PER PHASE								
A phase								113.3
B phase								113.0
C phase								



1 ENLARGED ELECTRICAL PLAN - RIVER OAKS (CONTROL BUILDING)
E4 SCALE: 1/4" = 1'-0"

SPECIFIC ELECTRICAL NOTES (THIS SHEET):

- EXTEND CONDUITS TO WELL PUMP AND VALVE LOCATIONS FOR POWER AND CONTROLS. (3) 1-1/4" FOR POWER AND (6) 1" FOR CONTROLS. COORDINATE WITH CONTROLS VENDOR.
- EXTEND CONDUITS TO WATER TANK MIXER LOCATION FOR POWER AND CONTROLS. (2) 1" FOR POWER AND (3) 1" FOR CONTROLS. MIXER CONTROL PANEL REQUIRES 120VOLT, 3-PHASE OUTPUT TO MOTOR. COORDINATE WITH CONTROLS VENDOR.



SECTION 11350 - HORIZONTAL SPLIT CASE PUMPS
Addendum No. 3

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals required to install, place in operation, and field test two (2) horizontal split case pumps, motors, and accessories, as specified herein. The pumps and motors shall be provided by an authorized representative of the pump manufacturer for system responsibility.
- B. This Section is intended to give a general description of what is required but does not cover all the details which will vary in accordance with the requirements of the equipment application. It is, however, intended to cover the furnishing, shop testing, delivery, and complete installation and field testing, of all materials, equipment, and appurtenances for the complete pumping units as herein specified, whether specifically mentioned in this Section or elsewhere.

1.02 RELATED WORK

- A. Yard piping, valves, and appurtenances shall be included within Division 2 and 15.
- B. Concrete construction for pump/motor support structures and anchor bolt installation shall be included within Division 3. Anchor bolts shall be furnished, under this Section, by the Contractor.
- C. Painting, except as specified herein, shall be included within Section 09800.
- D. Process Instrumentation shall be included within Division 16.
- E. Mechanical piping, valves, pipe hangers, and supports shall be included within Division 15.
- F. Electrical installation, wiring, and motors shall be included within Division 16.

1.03 SYSTEM DESCRIPTION

- A. Two (2) pumping units shall be required, as specified herein, to construct the proposed high service pump station. The pumping units shall be located and arranged as shown on the Drawings. Field placement shall be coordinated with the Engineer prior to the initiation of work.
- B. The pumping units shall take suction from the new ground storage tank and discharge to the distribution system. Pump discharge shall be controlled by pressure variations within

the distribution system. In addition, the pumps will turn off when the water surface in the ground storage tank drops to a set level.

1.04 QUALIFICATIONS

- A. To assure unity of responsibility, the proper selection of pump and motor shall be coordinated by and between the pump and controls manufacturer. The Contractor shall assume full responsibility for the satisfactory installation and operation of the entire pumping system including pumps, motors, and controls as specified.
- B. The equipment covered by this Section is intended to be standard units of proven ability as manufactured by a competent organization having long experience in the production of such equipment. A single manufacturer shall furnish all units specified herein. The pumps furnished shall be designed, constructed, installed, and tested in accordance with the best practice and methods, and shall operate satisfactorily, when installed. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein.
- C. All equipment furnished under this Section shall be new, unused, and shall be the standard product of manufacturers having a successful record of manufacturing horizontal split case pumps and servicing the equipment, specified herein, for a minimum of fifteen (15) years and 500 units. Certified pump tests are required for each pumping unit - see Paragraph 3.02 of this section.

1.05 SUBMITTALS

- A. Copies of all materials required to establish compliance with this Section shall be submitted in accordance with Section 01300. Submittals shall include, but are not limited to, the following:
 - 1. Certified shop drawings showing all-important details of proposed equipment including construction, dimensions, installation instructions, and anchor bolt locations,
 - 2. Descriptive literature, bulletins, and/or catalogs of the equipment,
 - 3. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual shop tests of similar units, which show that they meet the specified requirements for head, capacity, efficiency, NPSHR, and horsepower. Curves shall be submitted on 8-1/2-inch by 11-inch sheets; at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified total head. Catalog sheets showing a family of curves will not be acceptable. The minimum head system curve shall also be plotted on the submittal,
 - 4. Provide motor wiring diagrams,

5. The total weight of the equipment including the weight of the single largest item,
 6. Complete motor data, and
 7. Copies of all factory test results, as specified within this Section.
- B. Design Data
1. Complete motor performance data shall be furnished.
- C. Operation and Maintenance Data
1. Complete operating and maintenance instructions shall be furnished for all equipment included under this Section. The maintenance instructions shall include troubleshooting data, full preventative maintenance schedules, and complete spare parts lists with the required ordering information.
- D. In the event, it is impossible to conform to certain details of this Section, due to different manufacturing techniques, describe completely all non-conforming aspects.
- E. The submittal format shall be in the form of a booklet; suitably tabbed and divided to cover all areas noted above for each equipment item to be installed. The submittal booklet shall include adequate detail and information for the Engineer to determine that all of the proposed equipment meets the requirements specified herein. Incomplete or partial submittals will not be reviewed.

1.06 OPERATING INSTRUCTIONS

- A. Operating and maintenance manuals shall be furnished by the pump manufacturer. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct proper operation and maintenance of the proposed equipment. The requirements shall be as specified in Section 01730.
- B. A factory representative of all major component manufacturers, who has complete knowledge of proper operation and maintenance, shall be provided for two (2) days to instruct representatives of the Owner on proper operation and maintenance. With the Owner's permission, this work may be conducted in conjunction with the inspection of the installation and field testing. If there are difficulties in the operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner.

1.07 TOOLS AND SPARE PARTS

- A. The pump manufacturer shall provide one (1) set of all special tools (if required) for normal operation and maintenance. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.
- B. The pump manufacturer shall furnish spare parts for each component of the pumping units as specified herein.
- C. Spare Parts shall be properly bound and labeled for easy identification without opening the packaging and suitably protected for long-term storage.
- D. All working parts of the pumps, and motors, such as bearings, wearing rings, shaft, sleeves, etc., shall be standard dimensions built to limit gauges or formed to templates, such that parts will be interchangeable between like units and such that the Owner may, at any time in the future, obtain replacement and repair parts for those furnished in the original machines. All parts shall be properly stamped for identification and location to match the provided O&M Manuals.

1.08 PRODUCT HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. All equipment and parts must be properly protected against any damage during a prolonged storage period at the site.
- C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.
- D. Finished surfaces of all exposed pump openings shall be protected by wooden blanks strongly built and securely bolted thereto.
- E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust.
- F. After hydrostatic tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage, and handling.
- G. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.09 WARRANTY

- A. All equipment supplied under this section shall be warranted for a period of one (1) year by the Contractor and the pump manufacturer. The warranty period shall commence on the date of Substantial Completion of the Project.

- B. The equipment shall be warranted to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, the equipment shall be replaced, and all units restored to service, at no expense to the Owner.

PART 2 PRODUCTS

2.01 GENERAL DESCRIPTION

- A. The pumping units required under this Section shall be complete including pumps with proper alignment and balancing of the individual units. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed. Ample room for inspection, repairs and adjustment shall be provided.
- B. All necessary anchor bolts, nuts and washers shall be furnished by the Contractor for installation by the Contractor. The anchor bolts, nuts and washers shall be 316 stainless steel. A molybdenum disulfide anti-seize agent shall be supplied for use with all stainless-steel bolts.
- C. Stainless steel nameplates giving the name of the manufacturer, the rated capacity, head, speed, and all other pertinent data shall be attached to each pump, motor, starter, and control panel.
- D. The pump shall be a single-stage centrifugal horizontal split case pump, Crane Weinman Pump Model 4L1B or prior approved equal. Prior approvals must be obtained in accordance with the Instructions to Bidders.
- E. Pumps must meet the lead-free requirement as defined in the 2014 Reduction of Lead in Drinking Water Act. NSF 372 requirements.

2.02 MATERIALS OF CONSTRUCTION

Casing.....	Cast Iron (ASTM A48)
Impeller.....	Chlorine Resistant Alpha Nickel Aluminum Bronze (ASTM B62)
Shaft.....	Carbon Steel (AISI C1045)
Shaft Sleeve.....	Bronze (ASTM B62)
Case Wear Ring.....	Bronze (ASTM B62)

2.03 CASING

The casing will be of the horizontal split case design. The casing shall have tapped and plugged holes for priming, vent and drain. Removal of the upper half of the casing must allow removal of the rotating element without disconnecting the suction or discharge piping. The lower half of the casing shall be furnished with cored passageways from the high-pressure area of the volute to each seal box for positive lubrication without the use of

external flushing lines. The bearing arms shall be cast integrally with the lower half of the casing to assure positive bearing alignment. In no case will bolt on bearing arms be acceptable. Each bearing arm will provide a reservoir area for accumulation of weepage from the stuffing box, and a drilled and tapped opening will be provided at the lower portion to allow piping by the Contractor to the nearest floor drain.

2.04 IMPELLER

The impeller shall be designed to give the characteristics outlined under "Performance". It shall be of the enclosed type, vacuum cast in one piece impeller. It shall be furnished all over, the exterior being turned, and the interior being furnished smoothly and cleaned of all burrs, trimmings, and irregularities. The impeller will be dynamically balanced. It shall be held securely to the shaft by a key of ample size and shall be locked in place by threaded shaft sleeves. Nickel Aluminum Bronze materials of construction.

2.05 SHAFT SLEEVES

The shaft sleeves shall be extended from the hub of the impeller, through the seal box area, and beyond the gland. They shall be sealed at the impeller hub by a Teflon coated steel gasket to prevent pumped liquid from contacting the shaft. They shall be threaded to hold them securely in place and designed so as to lock the impeller.

2.06 CASE WEARING RING

The pump casing shall be fitted with case wear rings to minimize abrasive and corrosive wear to the casing. The wear rings shall be of the radial type, shall have a shoulder machined around the circumference to match a machined shoulder in the casing to provide two sealing faces and to locate the rings in the casing. The rings shall be securely located from rotation by means of pins to the lower casing half.

2.07 STUFFING BOX

A stuffing box shall be provided on each side of the pump casing, designed with sufficient area for incorporation of a John Crane Type 1 mechanical seal.

2.08 SHAFT

The pump shaft shall be one-piece, finished and polished on all sections. The shaft shall be of ample strength and rigidity and the shortest practicable distance between bearings shall be used to keep deflection and vibration to a minimum. The maximum allowable deflection of the shaft is 0.002" at any point of operation on the pump curve.

2.09 BEARINGS

The pump shall be supplied with a single row inboard bearing primarily for radial loads and a double row outboard bearing primarily for thrust loads. Both bearings shall be re-

greaseable lubrication ball type, designed for 250,000 hours average life. Each bearing shall be mounted in a machined housing that is moisture and dust proof. The housing shall have registered fits to assure alignment, pinned to prevent rotation, and bolted to the bearing arms. Each housing shall be supplied with a grease fitting and a plugged relief port.

2.10 COUPLING

A flexible coupling shall be provided to connect the pump shaft to the motor shaft. The coupling shall be of an all-metal type with a flexible rubber insert. The entire rotating coupling element shall be enclosed by a coupling guard.

2.11 BASEPLATE

The pump and motor shall be mounted on a steel base plate. The base shall be sufficiently rigid to support the pump and motor without the use of additional support or members.

2.12 MOTOR

The motor shall be horizontal and in accordance with the latest NEMA standards, and shall have the following characteristics:

Enclosure.....TEFC
Number of Phases....Three
Cycles.....60 Hz.
Voltages.....230/460 Volt
Speed.....1775 RPM
Horsepower.....40

Each motor shall have a sufficient horsepower rating to operate the pump at any point on the pump's head-capacity curve without overloading the nameplate horsepower rating of the motor, regardless of service factor. The motor shall have a service factor of at least 1.15. The service factor is reserved for variations in voltage and frequency.

PART 3 PERFORMANCE

3.01 CONDITIONS OF SERVICE

The following conditions of service shall be strictly adhered to:

Number of Units 2
Type of Drive inverter
Discharge Size, minimum .. 4 in
Suction Size, minimum 5 in
Design Capacity 500 US GPM
Design Head 154 FT
Efficiency at Design minimum68 %

Secondary Condition
Design Capacity 650 US GPM
Design Head 120 FT
Efficiency at Design (minimum)66.5 %

3.02 FACTORY INSPECTION AND TESTS

A. Pumps

1. Each pump shall be tested in the manufacturer's shop, in accordance with the applicable test code requirements of the Hydraulic Institute and as specified herein. Testing shall be conducted to a minimum Grade 2B level.
2. Preliminary testing of the pump and motor shall be done to ensure that all equipment is operating properly prior to testing.
3. Certified pump performance curves shall be submitted, including head, capacity, brake horsepower and pump efficiency for each pump supplied. All gauges and other test instruments shall be calibrated in accordance with Hydraulic Institute standards. All venturi flow meters shall be calibrated within 2 years of the scheduled test and certified calibration data shall be provided.
4. A failure of the pump meeting the operating requirements specified for any reason shall be considered an incomplete test. Upon correction of the problem causing failure, the pump shall be retested. The retesting shall be included under this Contract at no additional cost to the Owner.
5. Each pump assembly shall be submitted in the shop to a hydrostatic test. The test pressure shall be not less than 100 psig. Under this test pressure, no parts shall show undue deflection or other defects. Any defects disclosed by this test shall be corrected only by methods accepted by the Engineer.
6. Four certified copies of all factory pump test data shall be furnished to the Engineer.

3.03 INSTALLATION

- A. Inspect all concrete work to determine if all dimensions and elevations relating to these units are correct. Consult the Engineer before modifying any concrete work.
- B. Obtain sufficient copies of manufacturer's installation instructions and have them on the jobsite prior to erection.

- C. The Contractor shall install all equipment in exact accordance with the manufacturer's written instructions and as directed on site during inspection visits by the manufacturer's representative.
- D. The Contractor shall insure that the pumps and motors are properly installed with no pipe strain transmitted to the pump casing.
- E. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer's recommendations.
- F. Deviations from the manufacturer's written or verbal instructions shall be subject to approval by the Engineer.

3.04 TESTING AND START-UP

- A. The manufacturer shall furnish the services of a competent service engineer to inspect the final installation of the equipment and to place the equipment into initial operation. Service engineer shall calibrate and set the presence/absence detectors and discharge pressure switches.
- B. Manufacturer's representative shall field verify that all equipment is functioning as designed and specified.
- C. In the event any equipment or components fail or do not meet specifications, all necessary changes and corrections shall be made at no expense to the Owner. Should any equipment remain unable to meet the specifications, that equipment shall be removed and replaced at no additional cost to the Owner.
- D. The manufacturer's representative shall instruct operating personnel in the proper care and maintenance of the equipment at the time that is placed in operation.
- E. A minimum time of two (2) eight-hour days shall be included in the manufacturer's proposal and the Contractor's bid price for such service.

END OF SECTION

SECTION 16500 – PUMP CONTROL PANEL
Addendum No. 3

PART I: GENERAL

1.01 The Requirement

- A. General: The CONTRACTOR shall furnish, install, and place into service a pump control panel furnished by the System Supplier through the pump supplier.
- B. System Supplier: Due to the critical nature of the system, the complete pump system and controls panel shall be furnished and warranted by a single supplier.

One Responsible Supplier (System Supplier): The system described herein, shall be furnished by a single supplier designated as the System Supplier. The System Supplier shall be regularly engaged in the business of system integration for municipal water projects, and be familiar with all aspects of fully automated process control systems. The responsibility for performance to the specification in its entirety shall not be split up amongst individual suppliers of components comprising the system, but must be assumed solely by the supplier of the system. The System Supplier shall furnish the Owner with program implementation and customization. In addition, the System Supplier shall furnish schematics, wiring diagrams for the system components, interconnection schematics, and field point to point wiring diagrams showing all connections to each individual piece of equipment within the system. The System Supplier shall be a Certified Member of the Control Systems Integration Association (CSIA) and evidence of certification shall be provided.

1.02 Submittals

The Pump Control Panel manufacturer shall provide the following documents to the engineer for review.

- Bills of Material
- Elevation and Base Plan drawings
- Wiring diagrams
- Catalog cut-sheets
- Pump Control Panel heat calculations
- Certified Factory Test results
- Spare parts list
- 10-year Warranty for Programmable Pump Controller and printed circuit boards
- 1-year warranty for all electrical components, from date of pump station acceptance
- Certification that all printed circuit boards have conformal coating

- Certification the Programmable Pump Controller and all printed circuit boards have passed a 5-day burn-in test. Testing requirements are as noted in the PPC hardware specification
- CSIA Certified Member certification

PART II: MATERIALS

2.01 Pump Control Panel

A. General Requirements

Furnish and install all equipment as shown on drawings in a U.L. 508 listed control panel, as indicated on drawings. Doors shall be hinged on the same side and shall open to greater than 90 degrees. Enclosure exterior shall be painted "ANSI 61 Gray". Interior color including front and back of all hinged dead front doors, separation barriers and mounting backpans shall be white. The painting process shall include five stages of metal preparation using dip tanks as follows: 1) Alkaline cleaner, 2) Clear water rinse, 3) Iron phosphate application, 4) Clear water rinse, and 5) Inhibitive rinse to seal phosphated surfaces. Finish shall be polyester dry powder, electrostatically applied and baked on at 400 degrees Fahrenheit for a minimum of 15 minutes.

The enclosure shall be compartmentalized such that the Programmable Pump Controller shall be isolated from the power sections. The main circuit breaker, pump circuit breakers, and all wiring shall be located behind an interior dead front doors. Interlocks and circuit breaker operation shall be possible without opening the dead front door. Breaker cutouts for breaker toggle protrusion shall be supplied, to eliminate exposure to hazardous potentials. A physical lockout device shall be supplied on each motor circuit breaker. Lightning/surge protection and PFR power fail relay shall be furnished to protect the panel equipment from lightning, loss of power or utility power surges. Provide GFCI receptacle, intrusion switch and LED light with door activated switch in each panel section. All bussing and wire shall be copper. All wire shall be stranded with locking spade pressure connectors and labeled with clip-on permanent plastic wire markers. All circuit breakers and dead-front mounted devices (lights and switches) shall be equipped with custom engraved phenolic nameplates.

B. Terminal and Distribution Blocks

Distribution blocks shall be furnished and installed as required for "fan-out" of control power and other 120V sources within the enclosure. The blocks shall be rated 300V at a minimum of 20 amperes and sized for the conductors served.

C. Circuit Breakers

All 480 volt circuit breakers shall have minimum interrupting capacities at 35,000 amperes. All 120 volt breakers shall be minimally rated at 4,000 amperes interrupting capacity. Circuit breakers shall be of the indicating type, providing ON, OFF and TRIPPED positions of the operating handle. Circuit breakers shall be quick-make, quick-

break, with a thermal-magnetic action, except when protecting motor feeders where motor circuit protector (MCP) breakers may be used. Circuit breakers shall be the bolted on type. The use of tandem or dual circuit breakers in a normal single- pole space to provide the number of poles or spaces specified is not acceptable. All multiple-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. Circuit breakers shall meet the requirements of UL and NEMA AB 1.. All circuit breakers shall be heavy duty molded case circuit breakers conforming to Federal specification W-C-375B and shall be UL listed.

D. Motor Control

Provide each motor with a suitable controller and devices that will perform the functions as specified for their respective motors. Controllers shall conform to the applicable requirements of NEMA ICS, ANSI C19.1, the NEC, and UL. Anticipated horsepower ratings are shown on the contract documents. This information is for guidance only and does not limit the equipment size. When motors furnished differ from the expected ratings indicated, make the necessary adjustments to wiring, conduit, disconnect devices, branch circuit protection, and other affected material or equipment to accommodate the motors actually installed, at no additional cost to the Owner.

Each motor control system shall be equipped with a hand-off-auto control switch, indicating lights, elapsed time meter, motor starter and 3-phase pump current monitoring. Control switches and indicating lights shall be U.L. listed oil-tight devices rated heavy duty.

Elapsed running time meter for recording total elapsed running time for each motor shall be six digit, non-reset, recording in hours and tenths. Meters shall be mounted to dead front door with stainless steel machine screws. Sheet metal screws will not be acceptable.

E. Nameplates

Nameplates shall be black phenolic with custom white lettering. Nameplates shall be stainless steel screw mounted. Sheet metal screws will not be acceptable. Glue type will not be acceptable.

F. Control Power Transformer

Transformer shall be furnished with primary and secondary fusing. Transformer shall be encapsulated with electrical grade epoxy and silica sand to completely seal the core and coils from moisture and contaminants. Transformer shall be designed for quiet operation, 180 deg. C insulation system standard with 115 deg. C temperature rise for longer, more reliable life. Transformer shall be made in U.S.A. and meet or exceed all applicable NEMA, ANSI, OSHA, UL and CSA requirements.

G. Panelboard

Where applicable, Panelboard shall be circuit breaker type custom constructed to utilize minimum enclosure space with breakers as shown. Circuit breakers shall be bolted on

type. The panelboard shall be furnished with custom phenolic nameplates. The panelboard transformer shall be dry type construction sized as shown on the plans with primary breaker protection.

H. Panel Lights

Furnish and install push-to-test lights to indicate status and alarm conditions locally as shown on drawings. Custom engraved phenolic nameplates shall specify each light's function. Lights shall be wired as shown on drawings. Panel lights shall be full voltage.

I. Push-buttons and Selector Switches

Furnish and install push-buttons and selector switches as shown on drawings. Custom engraved phenolic nameplates shall specify each switches function. Switches shall be wired as shown on drawings. Switches shall be full voltage.

J. Receptacles, Duplex

Where applicable, Receptacles shall be of specification grade and of NEMA configuration and rated 2 pole, 3 wire grounding, 20 amperes, 125 volts. Bases shall be of ivory phenolic composition. Wire terminals shall be suitable for 10 AWG wire and shall be screw type. Receptacles shall be U.L. listed. The receptacles shall have corrosion resistant conducting parts of nickel-plated brass and other metal parts of stainless steel. All external and dead front receptacles shall be installed on ground fault interrupter circuits "GFCI".

K. Relays, Control

Control relays shall have two form-C contacts (minimum) on each relay. Provide relay energized neon lamp (inside relay case).

L. Relays, Power Fail

The power fail relay shall continuously monitor the three phases for power loss, low voltage, phase loss, phase reversal and have automatic reset. The power fail monitor shall have a drop-out voltage adjustment and a failure indicating LED.

M. Relays, Time Delay

Time delay relays shall be solid state relays with a timer adjustable over the range 1 to 60 seconds unless other ranges are indicated or required. Provide LED relay energized indicator lamp.

2.02 Programmable Pump Controller (PPC)

A. General Requirements

The Programmable Pump Controller shall have all the characteristics and features listed herein. All sites shall be similar in nature, (operator interface, configuration and options,

back pan layout, etc., except for I/O count), so all RTUs can be interchangeable with one another. The use of any third party hardware or software add-on products to meet this specification is not acceptable.

B. Manufacturer

The Programmable Pump Controller shall be procured from a manufacturer that has at least 30 years experience manufacturing its own Programmable Pump Controllers designed specifically for the water and waste water industry. The manufacturer shall not have discontinued any line of Programmable Pump Controllers manufactured. The PPC itself and support for the controller shall be available directly from the manufacturer. Programming services shall be available direct from the manufacturer as a normal practice. The PPC shall be the L3000™ by Tesco Controls.

C. Warranty

The manufacturer shall provide a factory-standard 10 year warranty with the unit. The replacement controller shall be available within 24 hours, installed and running at the station, without requiring that the original unit first be removed and returned to the factory.

D. Support

The manufacturer shall provide 24/7/365 support for questions related to any aspect of the controller, including general use, application-specific issues, programming, and use of the programming software. This support shall be available directly from the manufacturer at no extra charge with the purchase of a controller.

E. Construction

1) Operating Conditions

The Programmable or Integrated Controller shall operate correctly under an ambient temperature range of -40 to +185 degrees F. Coatings on connectors, component leads, and other materials used in the construction of the Programmable Pump Controller shall be substantially resistant to atmospheres containing significant amounts of Hydrogen Sulfide gas and Chlorine gas.

2) Other

The Pump Controller shall be provided with a complete operations and maintenance manual. At minimum, each Programmable Pump Controller shall be subjected by the manufacturer to a 5 day burn-in procedure at 165 degrees F.

F. Card Architecture

1) Processor Card

The Programmable Pump Controller shall be microcontroller-based, using a microcontroller that, at minimum, supports the following:

- a. 1GHz clock rate
- b. 512Mbytes RAM
- c. 64Gbytes secure digital Flash
- e. Watchdog timer
- f. 4 configurable timers with interrupt capability
- g. 3 serial ports with separate baudrate generators
- h. 1 10/100Mbps Ethernet port
- i. 4 USB 2.0 ports
- j. 1 HDMI Video port
- k. Write-protect enable/disable

The Programmable Pump Controller shall use a real-time, preemptive, multitasking operating system, contained in Flash memory. The Flash memory shall also contain all firmware that is not specific to a particular job or application, such as operator interface and communications firmware.

2) Input/Output Characteristics

The Programmable Pump Controller shall provide built-in digital filtering of analog inputs. The filter constants shall be adjustable from the keyboard and through the communications ports.

G. Field Wiring Terminal Blocks

The terminal blocks shall support the following listed characteristics:

- pull-apart two piece wiring blocks for fast and easy wiring/re-wiring
- separate wiring blocks for each I/O type and each wire point fully labeled
- versatile internal or external analog power source
- digital outputs have LED “ON” indicators and socketed 10A relays
- entire terminal block shall snap on/off standard track mount
- onboard passive circuit protection to protect programmable controller shall be available with a built-in isolated current loop power supply, powered from the 12V DC main power. The current loop power supply shall be capable of producing at least 24V DC and 161 mA.
- three levels of lightning/surge protection

H. Power Supply

The Programmable Pump Controller shall be powered by a 12V/5V DC power supply, with an allowed operating range of at least +/- 10%. A 12V battery backup of the 12V DC shall be available such that the 5V DC is also maintained by the 12V battery.

I. Operator Interface Unit

The Programmable Pump Controller shall be available with an operator interface that is an integral part of the unit. The same operator interface shall be remotely mountable.

1) Keyboard

The Programmable Pump Controller shall be available with either a minimal keyboard, containing no more than 4 keys, or a full 32 keyboard with keys for direct access to functions. The keyboard construction shall be sealed membrane type, using a stainless steel backing plate, and shall be impervious to wash-down environments and atmospheres containing Hydrogen Sulfide and Chlorine gases. The keys shall provide tactile feedback. Both keyboard options shall provide a menu-based operator interface, allowing the operator to perform at least these functions, without process interruption:

- a) Examine and change setpoints
- b) Examine analog input and output registers
- c) Examine and change timers and counters
- d) Examine and change analog input filter constants
- e) Calibrate analog inputs and outputs
- f) Force digital outputs on and off
- g) Override analog inputs and outputs
- h) Examine control program

2) LED Character Display

The Pump Controller shall be available with an alphanumeric LED display capable of displaying at least 8 characters at a time using at least 15 segments per character. The LED character display shall be used for showing the values of registers, inputs, outputs and other data.

3) Color Touch Screen OIT

The PPC shall have the ability to communicate Modbus to other OIT's through the Ethernet port.

4) HDMI Touch Screen

The PPC shall have the ability to interface to a HDMI OIT using the HDMI port. The HDMI Touch Screen must be rated at least with a NEMA 3 rating or better.

5) Operating Modes

The Pump Controller shall have two basic modes of operation as described below:

a) RUN:

- Actively controlling, running application-specific control program
- Sensing input signals
- Generating outputs under program control
- Peer-to-peer message initiation is enabled
- Polling is enabled

b) STANDBY:

- Not actively controlling
- Continues to sense input signals
- Analog outputs held at current level or set to zero
- Digital outputs go to off state
- Initiation of peer-to-peer messages is disabled
- Polling is disabled

J. Programming

1) Language

The Programmable Pump Controller shall be programmable using the ability to execute a higher-level BASIC-like programming language which is native to the controller. The Programmable Pump Controller must also support IEC 61131-3 for additional programming languages.

2) Registers

The Programmable Pump Controller shall have at least the following preformatted register types arranged in a global system database, with the quantity of each register type selectable to at least the numbers given:

- Setpoint (for storing constants, at least 1000)
- Analog input (physical or internal, at least 1000 total)
- Analog output (physical or internal, at least 1000 total)
- Digital input (physical or internal, at least 1000 total)
- Digital output (physical, at least 128)
- Index (for indirection and general purpose use, at least 1000)
- Timer/counter (at least 1000 total)
- Seconds timer (times in seconds with 10 mS or better resolution, up to 497 days)
- Hours timer (times in hours with 2 second or better resolution, up to 272 years)
- HMS timer (hours, minutes, seconds format, with 0.5 second or better resolution, upto 68 years)
- Event counter (integer value register supporting increment/decrement, range 0 - 4,294,967,295)

The Programmable Pump Controller shall support a pulse counting frequency of at least 1 kHz on a single input.

3) PID Function

The Programmable Pump Controller shall provide built-in PID (Proportional/Integral/Derivative) control without requiring any procedural programming or subroutine writing. The Programmable Pump Controller shall support the ability to simultaneously execute at least 16 independent PID control loops.

K. Configuration

The Programmable Pump Controller shall be configurable via a configuration table, which shall be changeable both by downloading through a communication port and through the full and limited keyboards. The configuration table shall allow the operator to change virtually all significant operating parameters of the system.

L. Web Server

The Programmable Pump Controller shall include an integrated web server for secured remote customized visualization of process data including a web server disable feature if not desired. The web server must be able to store all types of documentation and values, and all information must be available using a web browser. The web server must have colorful well designed screens that clearly show data in real time. The web server must also be able to email alarm notifications to operators and facilities.

M. Communications

The Programmable Pump Controller shall have the ability to simultaneously support at least 3 serial communication ports 1 Ethernet/IEEE 802.3 RJ45 port. Any of these serial ports shall be usable for both communications of telemetry data and control program/configuration upload/download and support baud rates of 230,400 bps or higher. The ports shall be configurable to support the following media:

- Full handshake RS-232 (at least 3 ports must be configurable this way)

In addition to the three (3) RS-232 serial ports, the Programmable Pump Controller shall have one (1) Ethernet port, for a total of four (4) communications channels. All four (4) communications channels shall have the capabilities of independent operation. Each channel shall have the following capabilities:

- Poll/Response
- Quiescent (Unsolicited)
- Master Polling
- Message Store and Forward
- Automatic Port Escalation with Recovery
- Message Retries

- Communication Statistics and Diagnostics

The Programmable Pump Controller design shall incorporate Ethernet design using 100BASE-T interface and TCP/IP industry standard network protocol with the following features:

- Redundant hot-standby Ethernet (Primary Network and Secondary Fail Over Communications)
- Standard 100BaseT Interface (100Mbps data transmission, over twisted-pair cable with RJ45 connectors)
- Complies to IEEE 802.3 Specifications (Local Area Networks or Wide Area Networks)
- Separate LED Line Status Indicators (Each port to confirm Frame Transmit, Receive, Link, Collision, and Interference)
- Individual IP Configuration (Multi Network Configurations)
- Built-in PING Response (Test connectivity and verification of IP Address)
- Multi Protocol Support (Modbus TCP/Modbus Serial, Data Express, Data Express Plus)
- Telemetry Message Routing (Communicate across all channels, i.e. RS232 to Ethernet and Ethernet to RS232)

The Programmable Pump Controller must also have USB ports to support uploading/downloading of programs, external USB Drives and the ability to configure ports for additional communications channels.

1) Protocols

The Programmable Pump Controller shall implement the Ethernet/IEEE 802.3 protocol. When the PPC wishes to transmit, it will check for activity on the LAN. When the LAN becomes silent for a specified period, the PPC will begin transmission. During transmission, the PPC will continually check for a collision on the LAN. If a collision is detected, the Programmable Controller will cease transmission. The Programmable Pump Controller will then wait a random period of time before attempting to transmit again.

The Programmable Pump Controller shall support serial communications using at least 3 different protocols. The de facto standard ModBus protocol shall be supported. These protocols shall be able to coexist simultaneously on the same port. The Programmable Pump Controller shall support poll/response, polling master, quiescent, report-by-exception and message routing communications, as described in the following sections. Any of these communications modes shall be usable alone or simultaneously in any combination.

2) Polled Slave Communications

The Programmable Pump Controller shall respond as a slave unit in response to polling messages from a master SCADA system or other unit. In this mode the Programmable Pump Controller shall only respond to requests for data and not initiate messages on its own.

3) Polling Master Communications

The Programmable Pump Controller shall initiate polls as a master unit and wait for the response from the slave device.

4) Quiescent Communications

Using quiescent (peer-to-peer) communications, the Programmable Pump Controller shall provide the ability to initiate messages transmitting register values under operator definable conditions.

5) Report by Exception Communications

The Programmable Pump Controller shall support a means of report-by-exception communications, where only those registers of interest that have changed since the last reporting are transmitted.

6) Message Routing

The Programmable Pump Controller shall provide the ability to route received messages that are destined for another unit. The routed message can be received and sent in any combination of communication ports and physical media.

7) Failure Recovery

The Programmable Pump Controller shall have the ability to switch to alternate communications paths in the event of failure of the primary path. There shall be no practical limit on the number of different paths that the Programmable Controller may try in order to deliver the information.

8) Redundant Message Elimination

The Programmable Pump Controller shall automatically provide redundant message elimination when peer-to-peer and polled communications are used in combination.

9) Other

The Programmable Pump Controller shall provide a means of enabling/disabling quiescent/polling master message initiation from the keyboard.

N. Engineering Unit Representation

The Programmable Pump Controller shall have the capability to represent all analog input and analog output values directly in engineering units. Engineering units are defined to

be "real world" IEEE 754 standard floating point numbers corresponding to physical measurements, such as level, pressure, depth and flow. Telemetry communications shall use engineering unit representation in all messages.

O. Calibration and Multipoint Calibration

A simple menu-driven procedure shall be provided that allows the operator to calibrate an analog input or output to an engineering unit measurement scale. This procedure shall be usable from both the full and minimal keyboards. The calibration information shall be uploadable and downloadable via a communication port.

P. Single and Multi-Point Test Override

The Programmable Pump Controller shall provide the ability to override I/O and register values for test and other purposes. When in override, the operator shall be able to control the register (set any value or on/off state) independent of the control program or physical input. The value seen by the control program shall be the override value. The operator shall also be able to release all override points at once. When any register is in override, there shall be a visible indication to the operator, regardless of what mode the Programmable Pump Controller is in.

Q. Alarms

The Programmable Pump Controller shall provide alarm flags to be used to indicate application-specific alarm conditions. The Programmable Pump Controller shall provide a common alarm digital output, that can be configured to be any digital output and can be displayed anywhere on the LED annunciators.

R. Fault Tolerance and Reliability Features

1) Event Logging

The Programmable Pump Controller shall provide a mechanism that reports and logs unusual events and items of interest. The Programmable Pump Controller shall also support viewing of the RAM event log data by transmission via the serial port.

2) Fault Relay

The Programmable Pump Controller shall contain a normally closed fault relay that under normal operation shall be energized by the Programmable Controller to indicate a non-fault state. The fault relay shall go to a fault condition (non-energized) under the following circumstances:

- 12 V DC power failure
- Memory error or other internal operating error

3) Power Up Self Test

The Programmable Pump Controller shall perform a brief self test upon application of power, including:

- ROM checksum
- RAM write-protection circuit check
- Write-protected RAM CRC check

4) On Going Self Test

During normal operation (run or standby modes) the Programmable Controller shall run an ongoing self test process. The frequency with which the ongoing self test performs these checks shall be configurable by the operator.

5) Diagnostic Functions

The Programmable Pump Controller shall have the capability to perform self-test diagnostic functions under operator control to verify the integrity of the RAM and ROM inside the unit.

6) Activity Monitoring

The Programmable Pump Controller shall provide a mechanism for selectively viewing activity of certain integral subsystems. Text messages indicating activity shall be directable under operator control to the LED or a communication port.

7) Power Fail/Brownout Detector

The Programmable Pump Controller shall have an integral hardware device that detects a brownout or imminent power fail condition. Upon detection of the 12V DC power supply voltage dropping below an adjustable threshold, this device shall generate an immediate interrupt signal to the microcontroller.

8) Watchdog Timer

The Programmable Pump Controller shall contain a hardware watchdog timer circuit that will reset the microcontroller within 1 second of detecting a firmware failure.

9) Security

The Programmable Pump Controller shall be capable of being configured to require password entry before access to functions that would change the control characteristics or basic operating mode (run/standby) of the Programmable Pump Controller. Multiple passwords shall be supported, with at least 100 allowed. If the operator does not operate the keyboard within a selectable time period, the Programmable Pump Controller shall log him out automatically. The Programmable Controller shall also support uploading and downloading of password configuration information via the communications ports.

10) Data Archiving

The Programmable Pump Controller shall provide a means of archiving I/O and register values into storage arrays. The Programmable Pump Controller shall also provide direct read access through any communications port to the contents of each data archive. Each sample shall consist of a date and time stamp and the register value. The Programmable Pump Controller shall also provide functions available through the communications port that allow an external SCADA or other system to reset specific archives and obtain other necessary information about the data archives in use.

11) Remote Control

The Programmable Pump Controller shall have the ability to remotely control other controllers of the same make using any of the communication ports. The operator shall be able to perform at least the following functions on the remote unit by using the local keyboard:

- Examine and change setpoints
- Examine analog input and output registers
- Examine and change timers and counters
- Force digital outputs on and off
- Override analog inputs and outputs
- Change operating mode between Run and Standby

S. Programming Software

1) General

A free copy of the necessary programming software shall be provided with each Programmable Pump Controller purchased. The software shall be produced, provided and supported directly by the Programmable Pump Controller manufacturer. No third party tools are acceptable.

2) QuickLoad Software

A fast and easy to use software program shall be available free of charge to Upload and Download from a laptop computer to the controller all calibration points, setpoints and control programming. A complete user's manual shall be provided which describes the use of all programming software. The latest version of TESCO's WinBench™ programming software shall be used.

3) OPC Communications Server Software

OPC (OLE for Process Control) communications server program shall be available to poll the programmable controller and serve real-time data values to any OPC compliant client, such as spreadsheets, databases and SCADA systems. This software shall operate on a computer and shall poll the controller through any maintenance port to gather real-time data of any type and number. Also, the program shall operate remotely to poll for any real-time data in the controller. The program shall have the

ability to operate in a multipoint controller environment, up to 100 controllers, with full hardware handshaking to the communications media. The program shall have the ability to display all telemetry message transactions for the communications port and shall utilize protocol disciplines such as retries, comm. failures and automatic comm. recovery methods.

The program shall have the ability to display all telemetry message transactions for the communications port and shall utilize protocol disciplines such as retries, comm. failures and automatic comm. recovery methods.

2.03 Battery Backup

Battery back up system shall correctly sized to power the Controller, radio and I/O system for a minimum of 8 hours. Batteries shall be sealed gel cell type lead acid.

PART III: QUALITY ASSURANCE

3.01 Pump Control Panel Supplier Responsibility

In order to assume electrical and control system responsibility, the above specified Pump Control Panel shall be furnished by the pump supplier.

3.02 Warranty

Pump Control Panel components shall carry a full one (1) year replacement warranty from date of owner acceptance. Programmable Pump Controller shall carry a ten (10) year replacement warranty.