

**DUPLEX PUMP STATION
ELECTRICAL DRAWING INDEX**

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GENERAL NOTE:

SITE SPECIFIC CONDITIONS DETERMINE THE CLASSIFICATION OF PUMP STATION IN ACCORDANCE WITH FDEP STANDARDS AND MUST BE DETERMINED BY THE DESIGN ENGINEER FOR EACH SPECIFIC PROJECT.

SUBMITTAL REQUIREMENT:

LEE COUNTY UTILITIES REQUIRES PUMP STATION SUBMITTALS BE PROVIDED FOR THEIR REVIEW TO ENSURE COMPLIANCE WITH THE LCU PUMP STATION STANDARDS.

ELECTRICAL DRAWING
INDEX

E-1

NOTE:

THIS DRAWING IS A LEE COUNTY STANDARD DETAIL AND THEREFORE DOES NOT NEED TO BE SIGNED AND SEALED



LEE COUNTY
SOUTHWEST
FLORIDA
1500 MONROE STREET
LEE COUNTY
UTILITIES
ENGINEERING
FORT MYERS, FLORIDA 33901

SHEET TITLE:	DUPLEX PUMP STATION DRAWING INDEX	
TITLE:	LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	
PROJECT:	LIFT STATION DETAIL USING SUBMERSIBLE PANEL	
PROJECT NO:	FILE NAME:	SHEET NUMBER:
240V 3PH PS	LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	1 OF 7

CONTROL/ELEMENTARY SYMBOLS

	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
	LIMIT SWITCH, NORMALLY OPEN
	LIMIT SWITCH, NORMALLY CLOSED
	PRESSURE SWITCH, NORMALLY OPEN
	PRESSURE SWITCH, NORMALLY CLOSED
	FLOAT SWITCH, NORMALLY OPEN
	FLOAT SWITCH, NORMALLY CLOSED
	FLOW SWITCH, NORMALLY OPEN
	FLOW SWITCH, NORMALLY CLOSED
	TEMPERATURE SWITCH, NORMALLY OPEN
	TEMPERATURE SWITCH, NORMALLY CLOSED
	NORMALLY OPEN, TIMED TO CLOSE CONTACT
	NORMALLY CLOSED, TIMED TO OPEN CONTACT
	NORMALLY CLOSED, TIMED TO CLOSE CONTACT
	NORMALLY OPEN, TIMED TO OPEN CONTACT
	ANALYZER INDICATOR TRANSMITTER
	ALARM RELAY
	ALARM TIMER
	CONTROL RELAY
	FLOW INDICATOR TRANSMITTER (TOTALIZER)
	FLOW SWITCH HIGH/LOW
	LIQUID LEVEL SWITCH
	LEVEL INDICATOR TRANSMITTER
	LIMIT SWITCH OR LEVEL SWITCH
	MOTOR SWITCH MANUAL
	MOTOR STARTER
	PRESSURE GAUGE
	PROCESS FLOW TIMER
	PRESSURE SWITCH
	TEMPERATURE SWITCH
	TIMING RELAY
	SURGE SUPPRESSION DEVICE
	SOLENOID VALVE
	VIBRATION SWITCH
	TORQUE SWITCH
	ZERO SPEED SWITCH
	ALARM INDICATING LIGHT
	RUN INDICATING LIGHT
	MOMENTARY CONTACT PUSHBUTTON
	MOMENTARY BREAK PUSHBUTTON OR RESET KEYED SWITCH
	MAINTAINED CONTACT ON-OFF SWITCH
	START/STOP (S/S) CONTROL SWITCH
	MAINTAINED CONTACT
	FUSE
	MOLDED CASE CIRCUIT BREAKER
	CONTROL POWER TRANSFORMER
	REMOTE TERMINAL BLOCK POINT
	COPPERWELD GRD. ROD
	HAND OFF REMOTE CONTROL STATION
	HAND OFF AUTO CONTROL STATION
	MOTOR STRIP HEATER

ELECTRICAL PLAN SYMBOLS

	WALL OUTLET BOX AND 20 AMP SINGLE POLE SWITCH ('o' INDICATES SWITCHES) 48" TO CENTERLINE
	WALL OUTLET BOX AND 20 AMP 3-WAY SWITCH ('o' INDICATES SWITCHES) 48" TO CTR LINE.
	MANUAL MOTOR STARTING SWITCH WITH OVERLOADS AND PILOT LIGHT. NEMA 4X TYPICAL
	WALL OUTLET BOX AND 20 AMP SWITCH WITH WEATHERPROOF COVER OR ENCLOSURE.
	WALL OUTLET BOX AND 20 AMP DUPLEX RECEPTACLE 18" TO CENTERLINE
	WALL OUTLET BOX AND 20 AMP DUPLEX RECEPT MOUNTED 48" AFF OR AS NOTED.
	WALL OUTLET BOX AND 20 AMP GFCI DUPLEX RECEPTACLE AT 18" TO CENTERLINE. WP INDICATES WEATHERPROOF COVER PLATE.
	WALL OUTLET BOX AND 20 AMP GFCI RECEPTACLE MOUNTED 48" AFF OR AS NOTED.
	WALL OUTLET BOX AND DOUBLE 20 AMP DUPLEX RECEPTACLES 18" TO CENTERLINE
	FLUSH MOUNTED JUNCTION BOX (SURFACE IN MECH/ELEC SPACES OR ABOVE CEILINGS).
	BRANCH CIRCUIT CONDUIT AND WIRE GENERALLY SURFACE MOUNTED, CONCEALED ABOVE CEILINGS SLASH MARKS INDICATE NUMBER OF CONDUCTORS; (MARKS SHOWN TO AID CONTRACTOR IN BIDDING, THE CONTRACTOR SHALL PROVIDE THE REQUIRED CONDUCTORS UNDER THE CONTRACT SUM WHETHER OR NOT SHOWN). SHORT SLASHES INDICATE PHASE CONDUCTOR OR SWITCH LEG, LONG INDICATE NEUTRAL CONDUCTOR. GREEN GROUND CONDUCTOR NOT SHOWN; ALL CONDUITS REQUIRE COPPER GROUND CONDUCTOR. TWO CONDUCTORS PLUS GROUND REQUIRED, MINIMUM.
	CONDUIT AND WIRE CONCEALED IN FLOOR SLAB OR UNDERGROUND.
	BRANCH CIRCUIT PANELBOARD AS NOTED; SEE PANEL SCHEDULES
	DISCONNECT SWITCH SIZE PER EQUIPMENT NAME PLATE OR AS NOTED; FOR DISCONNECTS SERVING MOTOR LOADS OF 10HP OR GREATER AND FOR ALL MOTOR LOADS SERVED THROUGH VARIABLE FREQUENCY DRIVES; PROVIDE SURGE SUPPRESSION DEVICE EQUAL TO SQ.-D. SP3650 OR EQUAL AT DISCONNECT.
	MOTOR CONNECTION
	MANUAL TRANSFER SWITCH OR REVERSING SWITCH

LIGHTING FIXTURES SYMBOLS

	LED FIXTURE POLE MOUNTED SEE DETAIL
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SYSTEM SYMBOL LEGEND

	SYSTEMS CABINET AS NOTED OR MARKED.
	LIGHTNING PROTECTION AIR TERMINAL STREAMER RETARDING TYPE.
	STREAMER RETARDING AIR TERMINAL MOUNTED TO LIGHT POLE.

SINGLE LINE DIAGRAM SYMBOLS

	VOLTMETER
	POWER FACTOR METER
	KILOWATT METER
	AMMETER
	THREE PHASE VOLT SWITCH
	THREE PHASE AMP SWITCH
	CURRENT TRANSMITTER
	KILOWATT TRANSMITTER
	POWER FACTOR TRANSMITTER
	LOCAL CONTROL PANEL
	GROUND FAULT INTERRUPTER
	WATT HOUR METER
	FUSE
	CAPACITOR
	DRAW-OUT CIRCUIT BREAKER
	MOLDED CASE CIRCUIT BREAKER
	TYPICAL STARTER CONTROL. SEE SWITCHGEAR CONTROL DIAGRAMS FOR EXACT TYPE.
	ELECTRIC A.C. MOTOR, NO. INDICATES HORSEPOWER.
	ELECTRIC D.C. MOTOR, NO. INDICATES HORSEPOWER.
	SERVICE OR EQUIPMENT GROUND.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED.
	NON-FUSIBLE DISCONNECT SWITCH, 30A,3P UNLESS OTHERWISE INDICATED, WITH REMOTE CONTROL STATION AS REQUIRED BY ELEMENTARY DIAGRAMS OR SPECS.
	LIGHTING PANELBOARD
	POWER PANELBOARD
	KIRK KEY INTERLOCK
	CURRENT TRANSFORMERS
	POTENTIAL TRANSFORMERS
	MANUAL OR AUTOMATIC TRANSFER SWITCH

ABBREVIATIONS LIST

A	AMPS
AF	AMP FRAME
AIC	AMPS INTERRUPTING CURRENT
ALUM	ALUMINUM
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AVAIL	AVAILABLE
AWG	AMERICAN WIRE GAUGE
C.	CONDUIT
CAB	CABINET
CAT	CATEGORY
CONV	CONVERSION
CRCC	CELLULAR ROUTER COMMUNICATION CABINET
CU	COPPER
D.	DEPTH
DIA	DIAMETER
DRGS	DRAWINGS
ENET	ETHERNET
EXT	EXTERNAL
FOCC	FIBER OPTIC CONVERSION CABINET
FPL	FLORIDA POWER AND LIGHT
GND OR GRD. OR G.	GROUND
H.	HEIGHT
Hz	HERTZ
I&C	INSTRUMENTATION AND CONTROLS
I/O	INPUT/OUTPUT
INST	INSTRUMENT
INT	INTERNAL
KVA	KILOVOLT-AMPERES (1VA*10^-3)
LCU	LEE COUNTY UTILITIES
LT	LIGHT
MA	MILLIAMPS (1A*10^-3)
MCB	MAGNETIC CIRCUIT BREAKER
MIN	MINIMUM
NA	NOT APPLICABLE
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NTS	NOT TO SCALE
P.	POLE
PH	PHASE
P&ID	PROPORTIONAL INTEGRAL DERIVATIVE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PW	PRODUCTION WELL
MPZ	MINI POWER ZONE
SCH	SCHEDULE
SE	SERVICE ENTRANCE
SPD	SURGE PROTECTION DEVICE
SS	STAINLESS STEEL
TEMP	TEMPERATURE OR TEMPORARY
TSP	TWISTED SHIELDED PAIR
TYP	TYPICAL
U.G.	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SOURCE
V	VOLTS
VA	VOLT-AMPERES (APPARENT POWER)
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS (REAL POWER)
PCP	PUMP CONTROL PANEL
W/	WITH
XFMR	TRANSFORMER
"	INCHES
'	FEET
# OR NO.	NUMBER
E# OR I#	11"X17" SHEET
ES-#	8.5"X11" SHEET
FDEP	FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

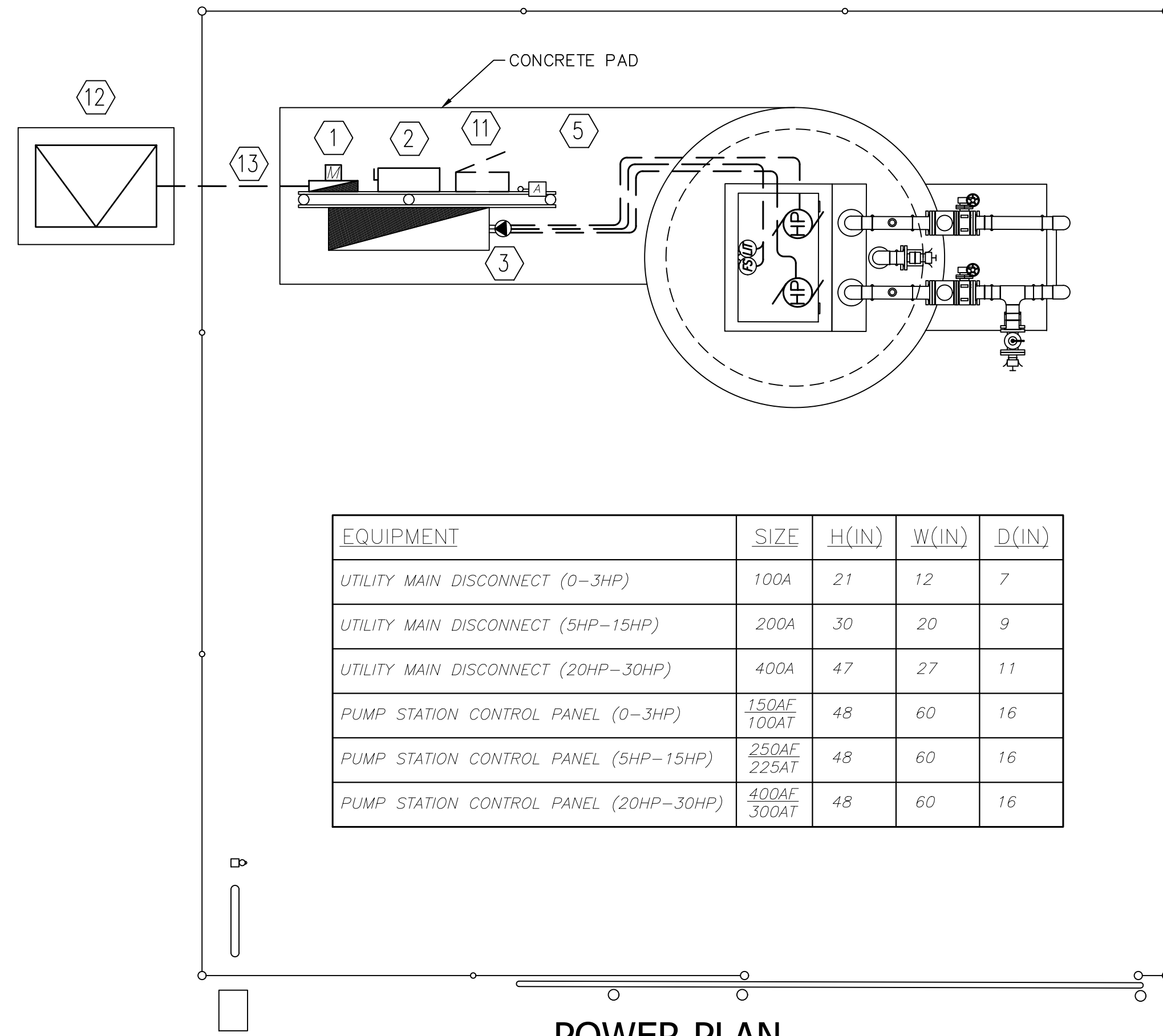
E-2

ELECTRICAL SYMBOLS LEGEND & ABBREVIATIONS

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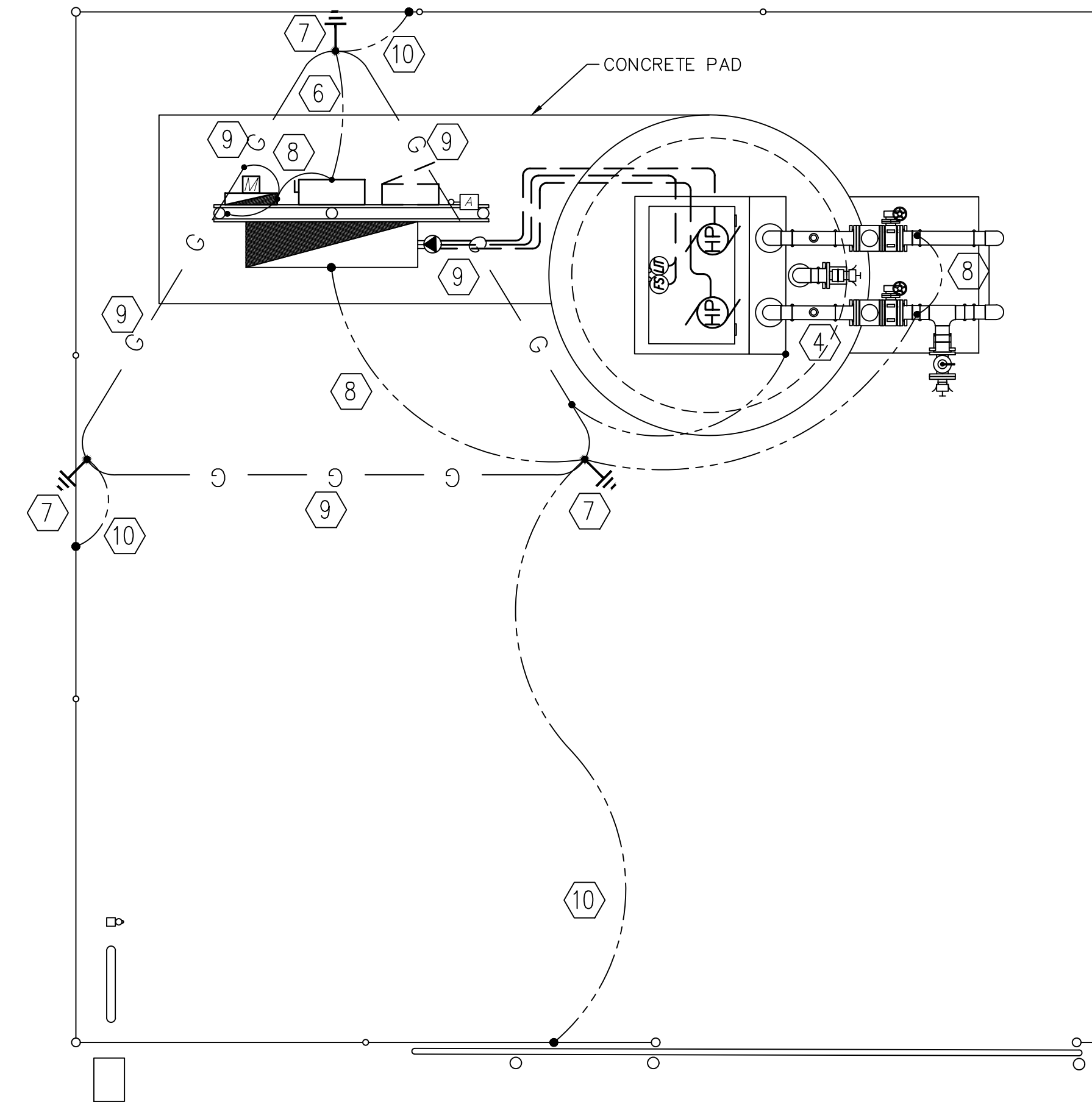
	LEE COUNTY SOUTHWEST FLORIDA 1500 MONROE STREET	LEE COUNTY UTILITIES ENGINEERING FORT MYERS, FLORIDA 33901
	SHEET TITLE: DUPLEX PUMP STATION NOTES & ABBREVIATIONS	
TITLE: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL		
PROJECT: LIFT STATION DETAIL USING SUBMERSIBLE PANEL		
PROJECT NO.: 240V 3PH PS	FILE NAME: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	SHEET NUMBER: 2 OF 7

MINIMUM EQUIPMENT RACK LAYOUT BASED ON THE FOLLOWING:
 ADJUST EQUIPMENT RATINGS AND DIMENSIONS FOR SPECIFIC PUMP STATION
 HORSEPOWER AND SERVICE SIZE (MINIMUM 100A SERVICE SIZE). IN NO CASE SHALL
 DIMENSIONS BE PERMITTED TO BE REDUCED IN SIZE.



EQUIPMENT	SIZE	H(IN)	W(IN)	D(IN)
UTILITY MAIN DISCONNECT (0-3HP)	100A	21	12	7
UTILITY MAIN DISCONNECT (5HP-15HP)	200A	30	20	9
UTILITY MAIN DISCONNECT (20HP-30HP)	400A	47	27	11
PUMP STATION CONTROL PANEL (0-3HP)	150AF 100AT	48	60	16
PUMP STATION CONTROL PANEL (5HP-15HP)	250AF 225AT	48	60	16
PUMP STATION CONTROL PANEL (20HP-30HP)	400AF 300AT	48	60	16

POWER PLAN



BONDING & GROUNDING PLAN

GENERAL NOTES

- 1.) ALL EQUIPMENT SHALL BE HUNG ON EQUIPMENT RACK. OPEN WINDOW CUTTING OF ENCLOSURE BOTTOMS IS NOT PERMITTED.
- 2.) REFERENCE SINGLE LINE DRAWING FOR CONDUIT AND WIRE SIZE.
- 3.) ALL U.G. CONNECTIONS TO BE VIA EXOTHERMIC WELD (GADWELD) UNLESS INDICATED OTHERWISE.
- 4.) ALL REQUIRED BONDS MAY NOT BE SHOWN; PROVIDE ADDITIONAL BONDS TO ALL DEVICES, INSTRUMENTS, CABINETS, CONTROL VALVES, ETC. AS REQUIRED TO COMPLY WITH UL AND NEC.

KEYNOTES

- 1.) ALUMINUM DIRECT READING UTILITY METER.
- 2.) MAIN SERVICE DISCONNECT.
- 3.) DEP COMPLIANT PUMP CONTROL PANEL WITH PORTABLE GENERATOR RECEPTACLE.
- 4.) BOND TO HINGE CORNER OF HATCH FRAME. DRILL TAP AS REQUIRED.
- 5.) (3) MINIMUM 2" CONDUITS INTO WETWELL. (2) FOR SUBMERSIBLE PUMP CABLES, (1) FOR FLOATS AND LIT CABLES. CORE DRILL NEW PENETRATIONS THROUGH WETWELL. PATCH ALL WITH HYDROCEMENT.
- 6.) TINNED STRANDED COPPER ELECTRIC SERVICE MAIN GROUNDING ELECTRODE CONDUCTOR. SIZE PER SITE SPECIFIC SERVICE REQUIREMENTS.
- 7.) 20' DRIVEN GROUND ROD WITH INSPECTION TEST WELL (SEE DETAIL). TYPICAL.
- 8.) #2 TINNED SOLID COPPER BOND. TYPICAL.
- 9.) #2/0 TINNED STRANDED COPPER COUNTERPOISE LOOP GROUND. TYPICAL.
- 10.) #2/0 TINNED SOLID BARE BOND TO GROUND GRID.
- 11.) PROVIDE SPACE FOR 120/208V 3PH-4WIRE PANELBOARD.


LIGHTNING PROTECTION LEGEND:

- LP — MAIN ROOF/DOWN CONDUCTOR TYPICAL
- G — #2/0 TINNED BARE COPPER COUNTERPOISE LOOP GROUND.
- #2 TINNED SOLID COPPER BOND TO EQUIPMENT/CABINETS ETC.

E-3

STANDARD 240V-3Ø (0-30HP) DUPLEX PUMP STATION
 POWER, BONDING & GROUNDING PLAN

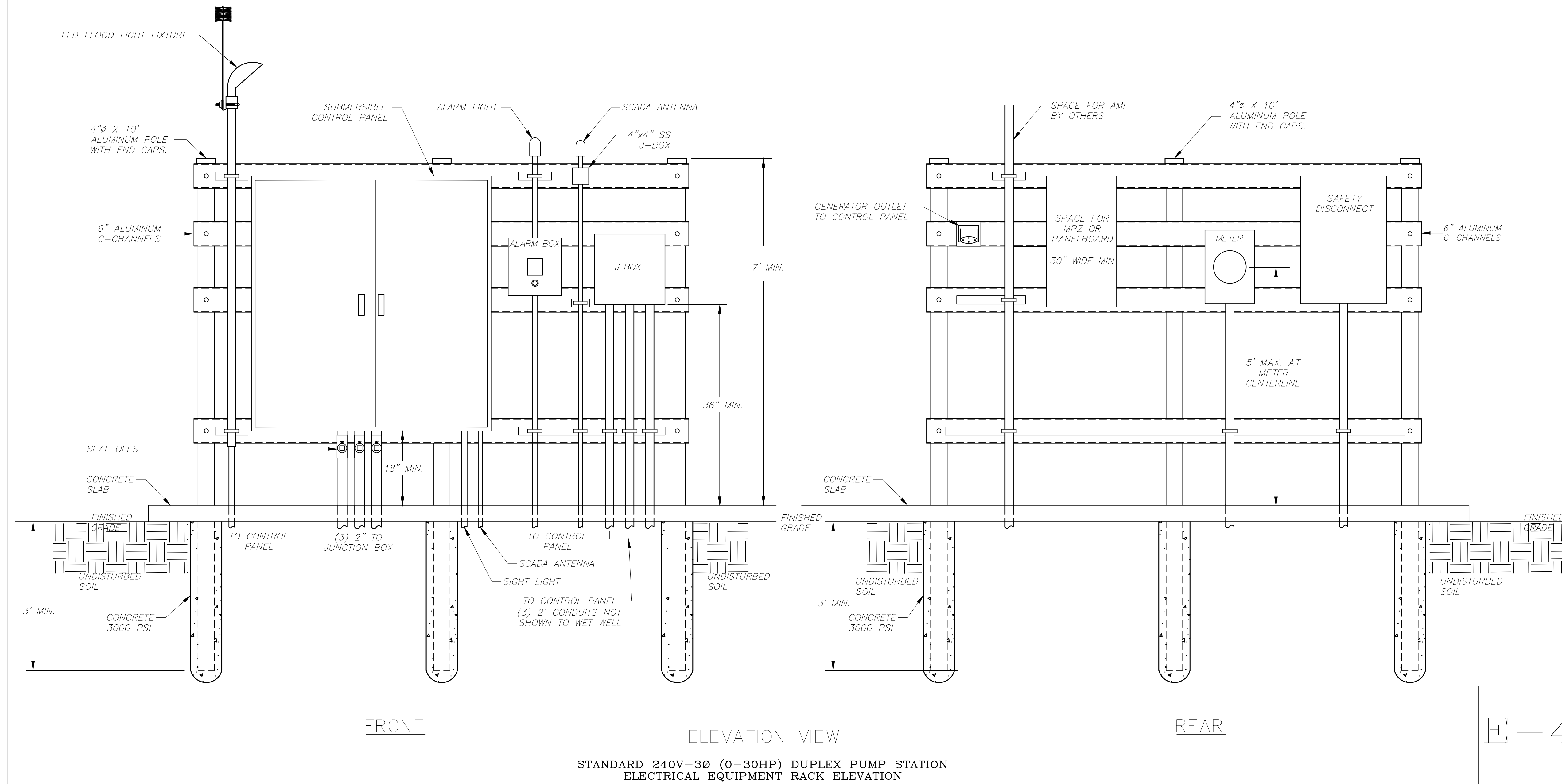
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	LEE COUNTY SOUTHWEST FLORIDA <small>1500 MONROE STREET</small>	LEE COUNTY UTILITIES ENGINEERING <small>FORT MYERS, FLORIDA 33901</small>
	SHEET TITLE: SUBMERSIBLE PANEL POWER BONDING & GROUNDING PLAN	
TITLE: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL		
PROJECT: LIFT STATION DETAIL USING SUBMERSIBLE PANEL		
PROJECT NO.: 240V 3PH PS	FILE NAME: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	SHEET NUMBER: 3 OF 7

GENERAL NOTES

- 1.) ALL CONDUIT PENETRATIONS INTO THE TOP OR SIDES OF THE ENCLOSURE ARE REQUIRED TO BE MADE USING MYERS HUBS.
- 2.) ALL CONDUIT PENETRATIONS INTO ELECTRICAL EQUIPMENT SHALL BE INSTALLED ALONG BOTTOM OF EACH ENCLOSURE.

PROVIDE SHOP DRAWINGS FROM A FLORIDA REGISTERED PROFESSIONAL ENGINEER CERTIFYING THAT THE ALUMINUM POST FOUNDATION AND RACK MEET CURRENT FLORIDA BUILDING CODE AND WIND LOAD REQUIREMENTS.



NOTE:
GROUNDING PER NATIONAL ELECTRICAL CODE

NOTE:
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LEE COUNTY UTILITIES ENGINEERING

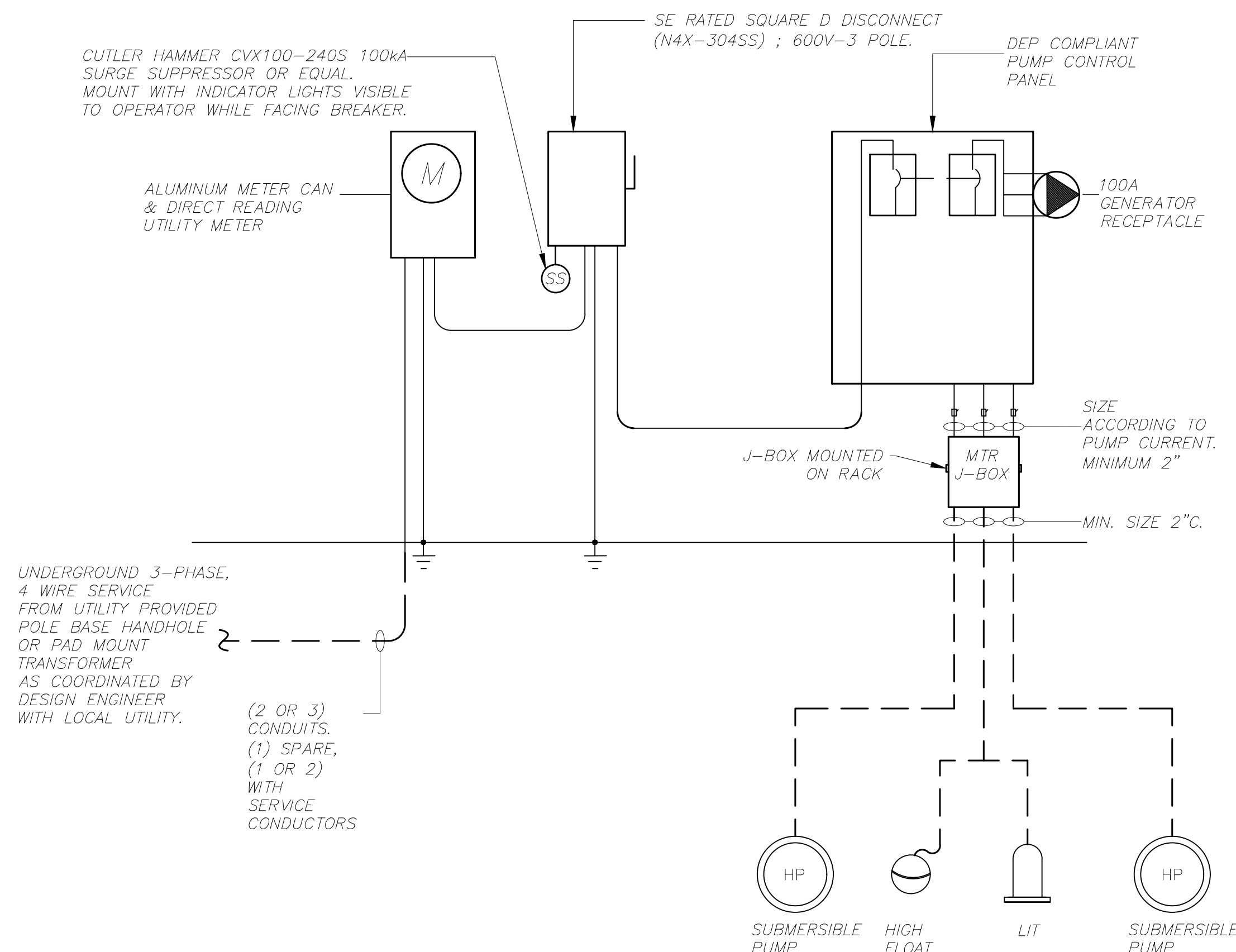
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TITLE:	LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	
PROJECT:	LIFT STATION DETAIL USING SUBMERSIBLE PANEL	
PROJECT NO:	FILE NAME:	SHEET NUMBER:
240V 3PH PS	LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	4 OF 7

PROVIDE MINIMUM SERVICES UTILITY SIZES AS FOLLOWS:

SERVICE SIZE:	CONDUIT SIZE:	CONDUCTOR SIZE:	GROUND SIZE:
100A	(1)2"	(4)#3	(1)#8
200A	(1)2.5"	(4)#3/0	(1)#3
400A	(2)2.5"	(4)#3/0 IN EACH	(1)#3 IN EACH

GENERAL NOTES:

- MINIMUM EQUIPMENT AIC RATINGS:
 240V SERVICE 35,000AIC
 480V SERVICE 65,000AIC
 EQUIPMENT AIC RATINGS SHOWN TO ESTABLISH MINIMUM ACCEPTABLE RATING. DESIGNER TO COORDINATE REQUIRED AIC RATINGS WITH SITE SPECIFIC ELECTRICAL SERVICE CHARACTERISTICS AND IN NO CASE LOWER THEN ESTABLISHED MINIMUMS.
- THIS PLAN DOES NOT INDICATE ALL CONDUIT & WIRE REQUIRED; SEE ADDITIONAL REQUIREMENTS ON ELEMENTARY & PLAN DRAWINGS.



PANEL: LP	BUS: 100A, 60A MCB	VOLTAGE: 120/240V, 1P, 3W		
MOUNTING: WALL MOUNT	POLES: 18	35,000AIC MIN		
LOCATION: EQUIPMENT RACK	NEMA 4X SS ENCLOSURE			
CIR. NO.	DESCRIPTION	TRIP	POLES	REMARKS
1	DATA COLLECTOR HUB	20	1	
2	SPARE	20	1	
3	SPARE	20	1	
4	SPARE	20	1	
5	SPARE	20	1	
6	SPARE	20	1	
7	SPARE	20	1	
8	SPARE	20	1	
9-17	SPACE	20	1	
10-12	SPACE	20	1	
14,16,18	SURGE SUPPRESSION	30	1	

PROVIDE PANEL WITH 35KAIC RATING.
 PROVIDE PANEL WITH EXTERNAL CUTLER HAMMER CVX100 SERIES SPD

PANEL SCHEDULE

N.T.S.

GENERIC SINGLE LINE DRAWING-- REVISE ACCORDINGLY TO PROVIDE SITE SPECIFIC DETAILS INCLUDING UTILITY COORDINATION, SERVICE SIZE AND GENERATOR SIZE, SIZE SERVICE, GENERATOR, CONDUIT AND WIRE PER SITE SPECIFIC WELL HORSEPOWER.

ELECTRICAL RISER DIAGRAM (240V 3-PHASE)

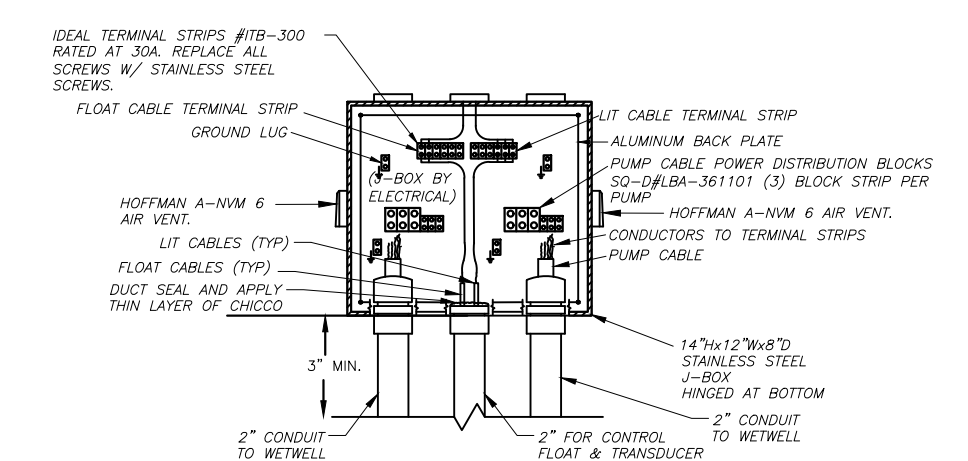
N.T.S.

STANDARD 240V-3Ø (0-30HP) DUPLEX PUMP STATION ELECTRICAL RISER DIAGRAM

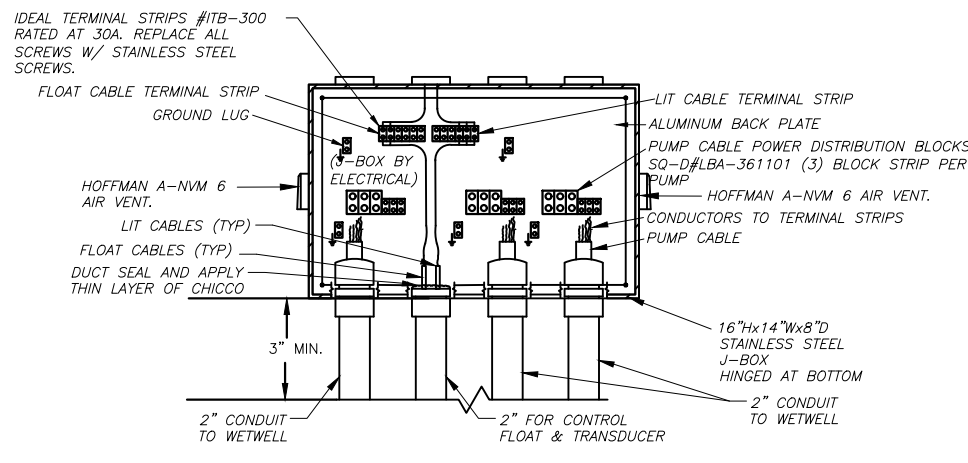
E-5

NOTE:
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	LEE COUNTY UTILITIES ENGINEERING 1500 MONROE STREET FORT MYERS, FLORIDA 33901
	SHEET TITLE: DUPLEX PUMP STATION ELECTRICAL RISER DIAGRAM
TITLE: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	PROJECT: LIFT STATION DETAIL USING SUBMERSIBLE PANEL
PROJECT NO.: 240V 3PH PS	SHEET NUMBER: 5 OF 7

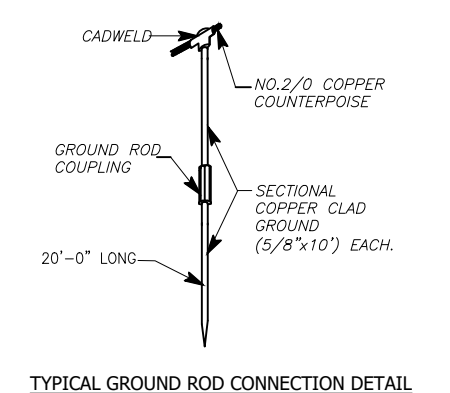


DUPLEX JUNCTION BOX
N.T.S.

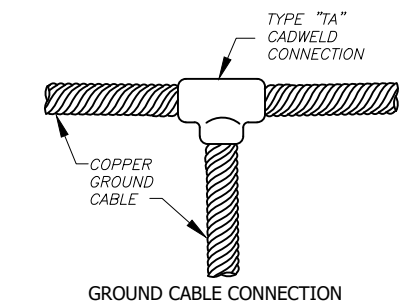


TRIPLEX JUNCTION BOX
N.T.S.

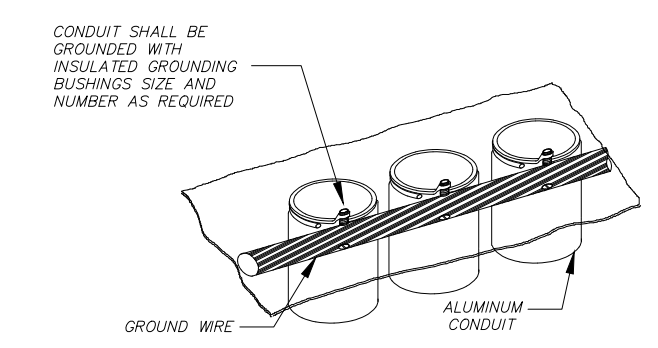
JUNCTION BOX & TERMINAL STRIP INSTALLATION AT CONTROL PANEL LOCATION



TYPICAL GROUND ROD CONNECTION DETAIL
N.T.S.

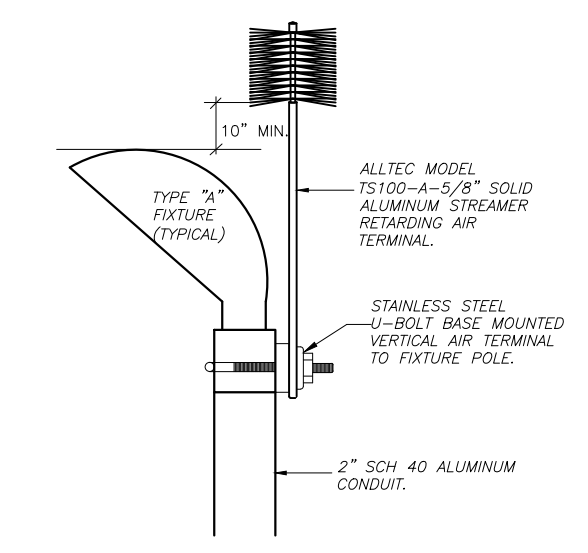


GROUND CABLE CONNECTION
N.T.S.



PANEL CONDUIT GROUNDING DETAIL
N.T.S.

GROUNDING DETAILS

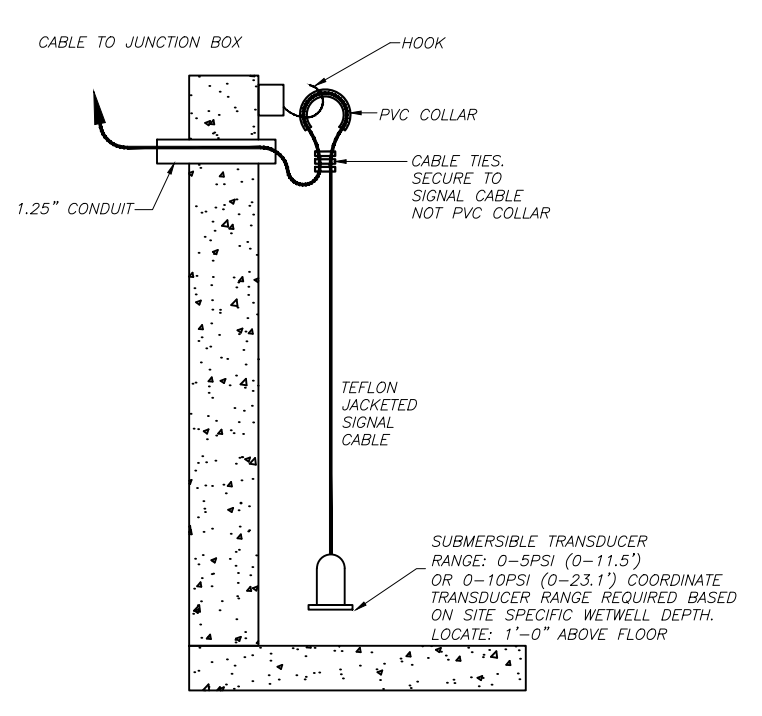


STREAMER RETARDING AIR TERMINAL FIXTURE POLE
N.T.S.

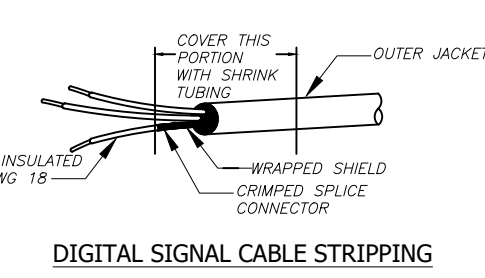
ES-1

ES-2

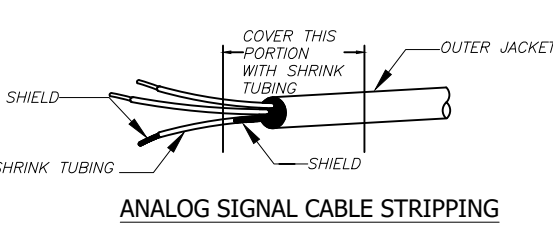
ES-3



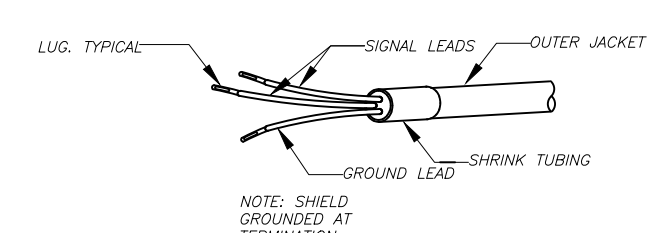
LEVEL TRANSMITTER DETAIL



DIGITAL SIGNAL CABLE STRIPPING



ANALOG SIGNAL CABLE STRIPPING

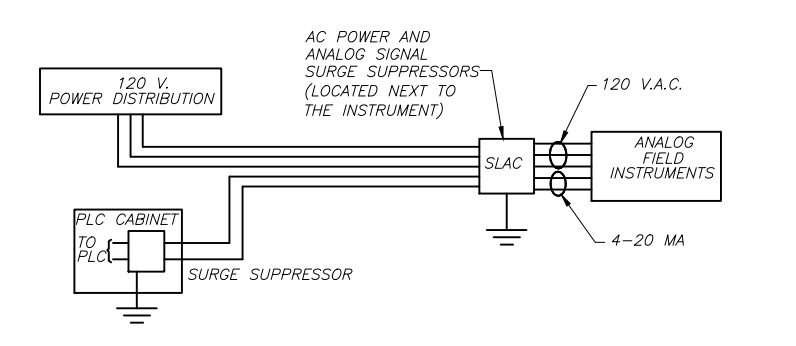


SIGNAL CABLE SHRINK TUBING

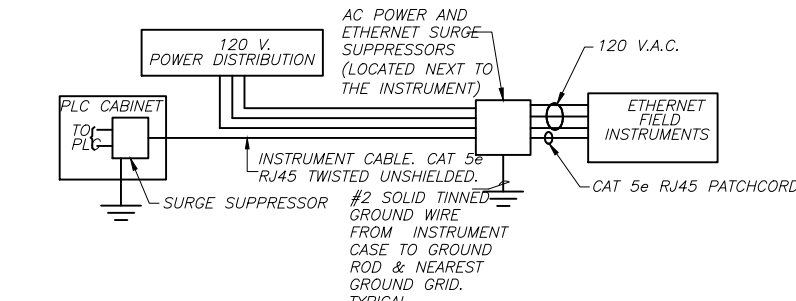
TERMINATION OF SIGNAL INSTRUMENT CONTROL CABLE DETAIL

ES-4

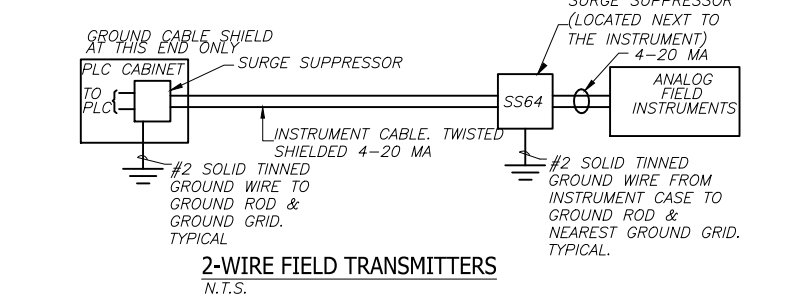
ES-5



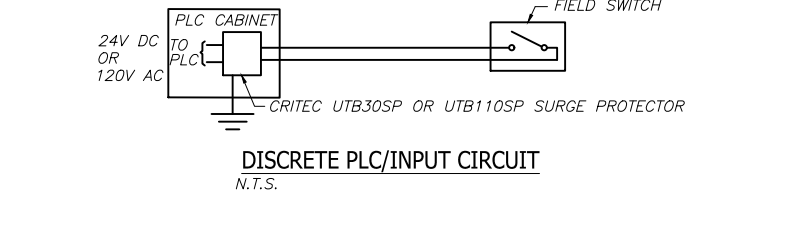
4-WIRE FIELD TRANSMITTERS
N.T.S.



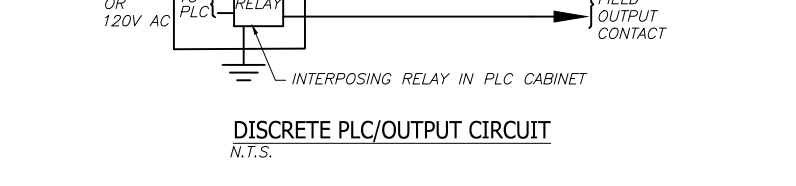
ETHERNET FIELD TRANSMITTERS
N.T.S.



2-WIRE FIELD TRANSMITTERS
N.T.S.



DISCRETE PLC/OUTPUT CIRCUIT
N.T.S.



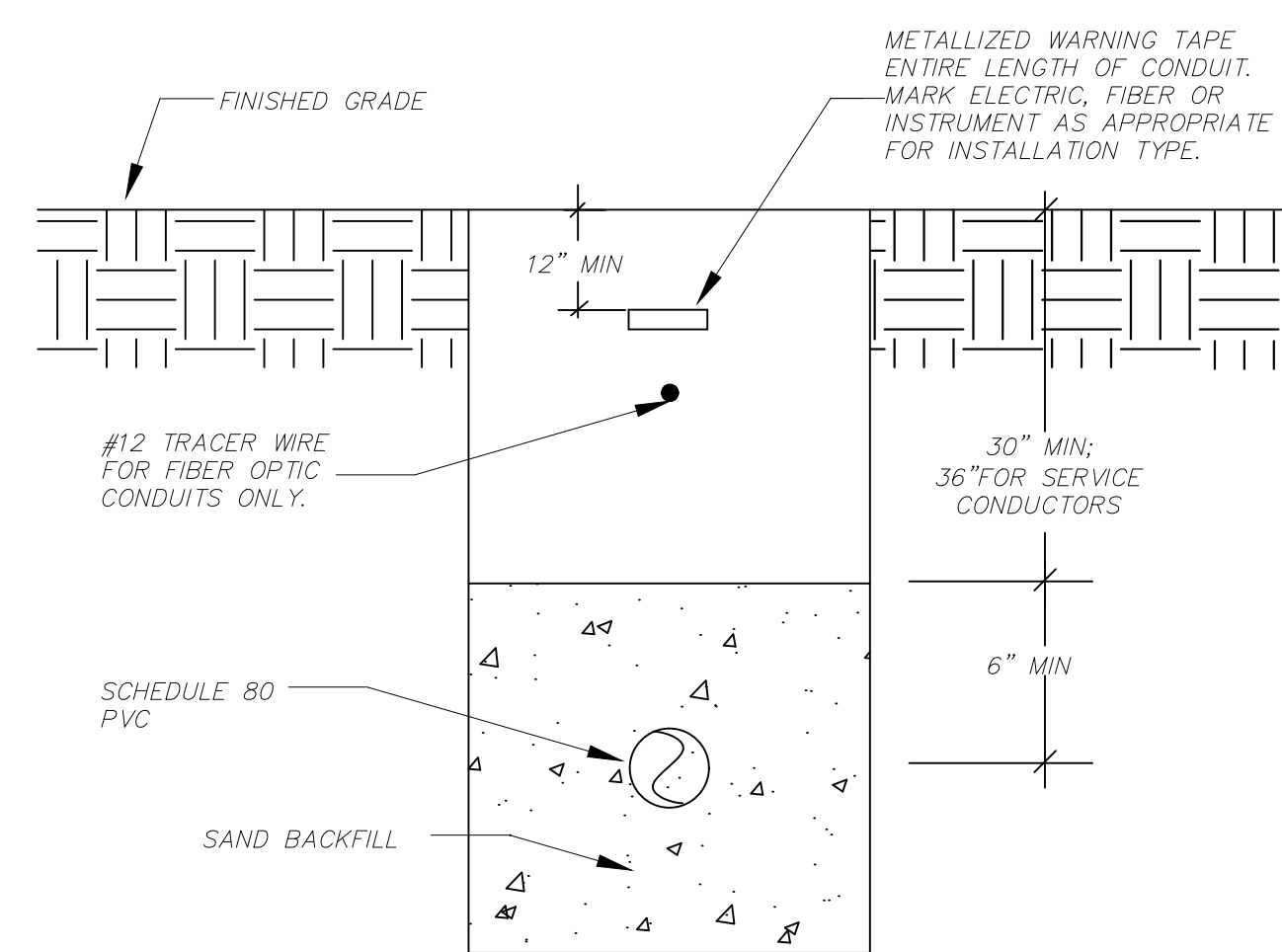
DISCRETE PLC/OUTPUT CIRCUIT
N.T.S.

INSTRUMENTATION GROUNDING & SURGE PROTECTION DETAIL

ES-6

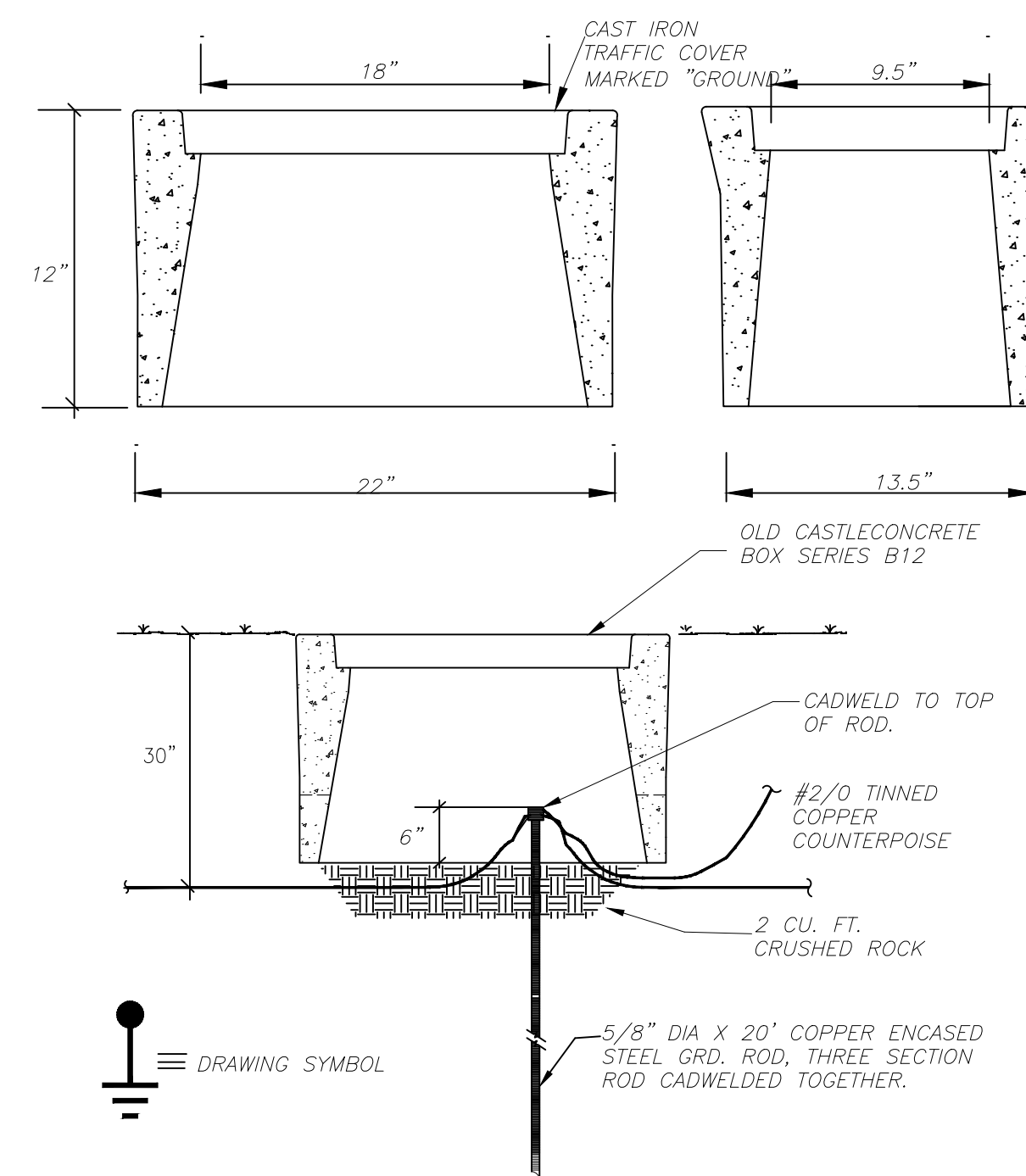
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		LEE COUNTY UTILITIES ENGINEERING 1500 MONROE STREET FORT MYERS, FLORIDA 33901
SHEET TITLE: DUPLEX PUMP STATION TYPICAL DETAILS		
TITLE: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL		
PROJECT: LIFT STATION DETAIL USING SUBMERSIBLE PANEL		
PROJECT NO: 240V 3PH PS	FILE NAME: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	SHEET NUMBER: 6 OF 7



UNDERGROUND CONDUIT INSTALLATION DETAIL


ES-7



GROUND ROD INSTALLATION DETAIL

ES-8

NOTE:
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	LEE COUNTY SOUTHWEST FLORIDA 1500 MONROE STREET	LEE COUNTY UTILITIES ENGINEERING FORT MYERS, FLORIDA 33901
	SHEET TITLE: DUPLEX PUMP STATION TYPICAL DETAILS	
TITLE: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL		
PROJECT: LIFT STATION DETAIL USING SUBMERSIBLE PANEL		
PROJECT NO: 240V 3PH PS	FILE NAME: LIFT STATION DETAIL WITH SUBMERSIBLE PANEL	SHEET NUMBER: 7 OF 7