

**GENERAL NOTES AND SPECIFICATIONS:**

1. THE SCOPE OF WORK IS DESCRIBED IN SPECIFICATION SECTION 16010 AND AS SHOWN ON DRAWINGS.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL THE ELECTRICAL SYSTEMS AS INDICATED ON THE DRAWINGS. ITEMS NOT SHOWN BUT OBVIOUSLY NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.
3. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA 70), ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E), ALL MANATEE COUNTY CODES AND FLORIDA BUILDING CODE WITH ALL AMENDMENT.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS AND TO INCLUDE ALL FEES AS PART OF HIS BID IF NOT OTHERWISE NOTED.
5. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE ENGINEER AND OWNER.
6. THE CONTRACTOR SHALL, BEFORE SUBMITTING HIS BID, VISIT THE SITE OF THE PROJECT AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS. NO ALLOWANCE WILL BE MADE FOR EXISTING CONDITIONS OR FAILURE OF THE CONTRACTOR TO OBSERVE THEM.
7. ALL EQUIPMENT AND MATERIAL SHALL BE NEW AND U.L. LISTED WHERE APPLICABLE.
8. THE CONTRACTOR IS RESPONSIBLE TO TEST ALL SYSTEMS INSTALLED OR MODIFIED UNDER THIS PROJECT AND REPAIR OR REPLACE ALL DEFECTIVE WORK TO THE SATISFACTION OF THE ENGINEER AND OWNER.
9. ALL EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE.
10. ALL CONDUCTORS SHALL BE COPPER. NO ALUMINUM ALLOWED UNLESS SPECIFICALLY INDICATED ON DRAWINGS.
11. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL ELECTRICAL & CONTROL EQUIPMENT AND MATERIAL.
12. ALL CONTROL PANELS SHALL BE CONSTRUCTED BY A UL 508A APPROVED PANEL VENDOR AND SHALL BEAR A UL 508A LABEL ON THE PANEL.
13. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED PRIOR TO INSTALLATIONS.
14. ALL LOCATIONS OF EQUIPMENT, PANELS ETC. ARE SHOWN FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL VERIFY AND COORDINATE EXACT LOCATION AND SIZE WITH ALL SUBCONTRACTORS AND EQUIPMENT SUPPLIERS PRIOR TO ANY INSTALLATION AND THEN INSTALL AS SUCH WITH CORRESPONDING CONDUIT STUB-UPS.
15. SEE OTHER DISCIPLINE DRAWINGS FOR COORDINATION OF ALL DRAWINGS. ANY CONFLICTS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION AND MOVEMENT OF CONDUITS OR OTHER ELECTRICAL EQUIPMENT SHALL BE ACCOMPLISHED WITHOUT ANY ADDITIONAL COST FOR THE OWNER.
16. LOCATIONS OF MANHOLES, HANDHOLES AND PULL BOXES ARE APPROXIMATE. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH EXISTING AND NEW PIPING OR CONDUIT AND ADJUST ACCORDINGLY.
17. NOT ALL CONDUITS SHOWN ON RISER AND ONE-LINE DIAGRAMS ARE SHOWN ON BUILDING LAYOUTS. CONTRACTOR SHALL SUPPLY ALL CONDUITS AND CABLES AS SHOWN ON RISER AND ONE-LINE DIAGRAMS.
18. ALL CIRCUITS SHALL BE IDENTIFIED IN JUNCTION BOXES, PULL BOXES, CONTROL PANELS, PANELBOARDS, LIGHTING POLES, CONTROLLERS AND SERVICE POINTS. IDENTIFICATION SHALL MATCH PANELBOARD SCHEDULES.
19. EXPOSED RUNS OF CONDUITS SHALL BE INSTALLED WITH RUNS PARALLEL OR PERPENDICULAR TO WALLS, STRUCTURAL MEMBERS OR INTERSECTIONS OF VERTICAL PLANES AND CEILINGS, WITH RIGHT ANGLE TURNS CONSISTING OF SYMMETRICAL BENDS OR PULL BOXES AS INDICATED ON THE DRAWINGS. BENDS AND OFFSETS SHALL BE AVOIDED WHERE POSSIBLE.
20. INSTRUMENTATION IS LOW VOLTAGE SIGNALS SUCH AS 4-20MA, TELEPHONE COMMUNICATION, FIRE ALARM COMMUNICATION. POWER CONDUIT SHALL ONLY CROSS INSTRUMENTATION CONDUIT PERPENDICULARLY AT RIGHT ANGLES WITH 6" SEPARATION.
21. CONDUCTOR PULLING TENSIONS SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL INSTALL PULL BOXES TO MEET MANUFACTURER'S REQUIREMENTS.
22. MINIMUM DISTANCE ALLOWED BETWEEN POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE:
 

VOLTAGE	DISTANCE
4160V TO INST. CONDUIT	3 FT
480V TO INST. CONDUIT	2 FT
120V TO INST. CONDUIT	1 FT
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUIT AND WIRING INSTALLATION FOR ALL VENDOR PROVIDED EQUIPMENT (PACKAGE SYSTEMS). IF THE SHOP DRAWINGS DIFFER FROM THE DESIGNED FACILITIES, THE CONTRACTOR SHALL REDESIGN THE FACILITIES AND SUBMIT THE REVISED DESIGN FOR THE ENGINEER'S APPROVAL ALONG WITH THE SHOP DRAWINGS. THERE SHALL BE NO ADDITIONAL COST TO THE OWNER FOR THE REDESIGN NOR FOR ANY ADDITIONAL CONDUITS AND WIRING. DURING SUBMITTAL THE CONTRACTOR SHALL VERIFY ALL SUPPLIED BREAKER SIZES FOR ALL PACKAGED SYSTEMS SUCH AS HVAC, EXHAUST FANS, MIXERS, CHEMICAL PUMPS ETC. AND MODIFY ALL BREAKERS IN MCC'S AND PANELBOARDS ACCORDINGLY WITHOUT ANY ADDITIONAL COST TO THE OWNER.
24. ALL EXCAVATIONS FOR CONDUITS, HANDHOLES, MANHOLES AND PULLBOXES NEAR EXISTING PIPING, CONDUIT AND EQUIPMENT SHALL BE HAND EXCAVATED AND COORDINATED WITH THE OWNER.
25. MINIMUM DEPTH FROM TOP OF DUCTBANKS OR CONDUITS TO FINISHED GRADE SHALL BE 24" UNLESS OTHERWISE NOTED.
26. COLORED WARNING TAPE 6" WIDE SHALL BE INSTALLED 8" BELOW FINISHED GRADE DIRECTLY ABOVE ALL UNDERGROUND YARD CONDUITS ACCORDING TO THE FOLLOWING SCHEDULE:  
POWER: RED  
ALL OTHER CONDUITS: GREEN
27. CONTRACTOR SHALL RESTORE SIDEWALKS, ROADWAYS, SOD AND SPRINKLER SYSTEM PIPING TO MATCH EXISTING, AFTER THE COMPLETION OF THE CONDUIT AND PULLBOX INSTALLATION.
28. GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH NEC, ARTICLE 250. THE GROUNDING SYSTEM TEST SHALL NOT EXCEED A 48 HOUR SPAN DRY RESISTANCE OF 10 OHMS. ADDITIONAL GROUNDING TO MEET THIS REQUIREMENT SHALL BE INSTALLED AT NO EXTRA COST. GROUNDING AND BONDING CONNECTIONS SHALL NOT BE PAINTED. ALL GROUNDING CONNECTIONS SHALL BE EXOTHERMIC UNLESS SPECIFICALLY INDICATED OTHERWISE.
29. AN EQUIPMENT GROUND WIRE SIZED PER NEC SHALL BE PULLED IN ALL ELECTRICAL CONDUITS, POWER AND CONTROL, WHETHER OR NOT INDICATED ON THE PLANS.
30. ALL ENCLOSURES, TJB, WIREWAY, PULL BOXES (EXCEPT IN-GROUND PULL BOXES AND MANHOLES) ETC. SHALL CONTAIN A GROUNDING BUS. CONNECT ALL RACEWAY BONDS TO THIS BUS VIA GROUNDING BUSHING AND EXTEND BONDING JUMPER FROM THIS BUS TO THE ENCLOSURE.
31. PRIMARY BUILDING GROUNDING SHALL BE AN EMBEDDED GRID OF MINIMUM #4/0 AWG WIRE INSTALLED IN THE FOUNDATION AND AROUND THE BUILDING PERIMETER TO FORM A COMPLETE LOOP. SECONDARY GROUND CONNECTIONS TO ALL METAL EQUIPMENT, HAND RAILS, STRUCTURAL STEEL, CONCRETE PADS, REBAR ETC. SHALL HAVE A MINIMUM #4 STRANDED COPPER CONDUCTOR BONDED USING APPROVED LUGS OR EXOTHERMIC CONNECTIONS. ALL EQUIPMENT GROUNDING CONDUCTORS PENETRATING CONCRETE SLABS OR FINISHED GRADE SHALL HAVE A 72" CONDUCTOR PIGTAIL AT EACH LOCATION FOR CONNECTION TO EQUIPMENT.
32. GROUND SURROUNDING YARD FENCE AND ALL YARD LIGHTING FIXTURES WITH MINIMUM #4 STRANDED COPPER CONDUCTORS BELOW GRADE TO SITE GROUNDING GRID PER NFPA 54/70.
33. ALL CONCRETE ENCASED DUCTBANKS SHALL CARRY A MINIMUM #4/0 AWG BARE COPPER GROUND WIRE, OVER THE ENTIRE LENGTH, WHICH SHALL BE CONNECTED TO THE SITE GROUNDING GRID AND GROUND RODS LOCATED CONNECTING MANHOLES, HANDHOLES OR PULL BOXES.
34. CONTRACTOR SHALL CORE DRILL EXISTING CONCRETE WALLS, FLOORS, MANHOLES, HANDHOLES AND PULL BOXES FOR CONDUIT PENETRATIONS. SEAL PENETRATIONS WITH NON-SHRINK GROUT OR APPROPRIATE FIRE RATED DEVICES WHERE APPLICABLE.
35. ALL CONDUITS PENETRATING RATED FIRE WALLS OR RATED FIRE FLOORS SHALL BE INSTALLED WITH U.L. APPROVED DEVICES TO MAINTAIN THE FIRE RATING OF THE WALL OR FLOOR PENETRATED.
36. PROVIDE CONDUIT DUCT SEAL AT ALL CONDUIT ENDS.
37. ALL SPARE CONDUITS SHALL BE SEALED WITH A CAP AT BOTH ENDS AND A PULL STRING INSTALLED WITH IDENTIFICATION ON BOTH ENDS.
38. ALL RECEPTACLES SHALL BE INSTALLED 18" AFF UNLESS OTHERWISE NOTED. LIGHT SWITCHES SHALL BE MOUNTED 48" AFF UNLESS OTHERWISE NOTED.
39. ALL RECEPTACLES WITHIN 6' OF A SINK SHALL BE GFI.
40. FLEXIBLE CONDUITS SHALL BE USED TO TERMINATE ALL MOTORS AND OTHER VIBRATING EQUIPMENT AND SHALL BE BETWEEN 18" AND 3' IN LENGTH.
41. TYPEWRITTEN PANEL SCHEDULES SHALL BE INSTALLED IN EACH PANELBOARD, AND TYPEWRITTEN TERMINAL BLOCK SCHEDULES IN EACH CONTROL CABINET.
42. ALL SPD'S SHALL BE INTEGRAL TO THE NEW EQUIPMENT SHOWN AND SUPPLIED AS ONE UNIT AND ONE U.L. ENTITY.
43. ALL MATERIAL IN DESIGNATED CORROSIVE AREAS SHALL BE NEMA 4X STAINLESS STEEL OR NON-METALLIC.
44. ALL OUTDOOR LIGHTING FIXTURES SHALL BE OF COPPER FREE CONSTRUCTION.
45. ALL REFERENCES TO SS OR STAINLESS STEEL SHALL BE 316 STAINLESS STEEL.
46. CONTRACTOR SHALL BALANCE PANELBOARD LOADS AT THE END OF THE PROJECT.
47. ALL CONDUIT CONNECTIONS TO NEMA 4X PANELS/ENCLOSURES SHALL USE MYERS HUBS (OR EQUAL) TO MAINTAIN 4X RATING.
48. PROVIDE AS-BUILT DRAWINGS AND MANUALS IN ACCORDANCE WITH THE FLORIDA BUILDING CODE 13-413.ABC.2.1 & 13-413.ABC.2.2

**NOTE:**

THE EXISTING ELECTRICAL INFORMATION IS OBTAINED FROM "RECORD DRAWINGS" AND OTHER "AS-BUILT DRAWINGS". CONTRACTOR SHALL VERIFY THE INFORMATION PROVIDED IN THESE DRAWINGS AND ADJUST ACCORDINGLY. ANY CONFLICTS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION BEFORE SUBMITTING HIS BID.

LAST SAVED BY: WTW

				DESIGNED TW		<b>HILLERS ELECTRICAL ENGINEERING, INC.</b> 23257 STATE ROAD 7, SUITE 100 BOCA RATON, FLORIDA 33428 <small>(561) 451-9185 (561) 451-4886 FAX LICENSE NO: EB 0006877</small>				<b>MANATEE COUNTY</b> <b>SWWRF HEADWORKS REHABILITATION</b> ELECTRICAL <b>ELECTRICAL GENERAL NOTES</b>	VERIFY SCALES <small>BAR IS ONE INCH ON ORIGINAL DRAWING</small> 0  1" <small>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</small>	JOB NO. 7880K10 DRAWING NO. <b>E-2</b>							
				DRAWN DEU															
				CHECKED PFH															
				DATE SEPTEMBER 2012															
								THEIN WIN, P.E. No. 65722											
REV	DATE	BY	DESCRIPTION																
				PROJECT NO: 7880K10 FILENAME: 7880K10-E-02.dwg															

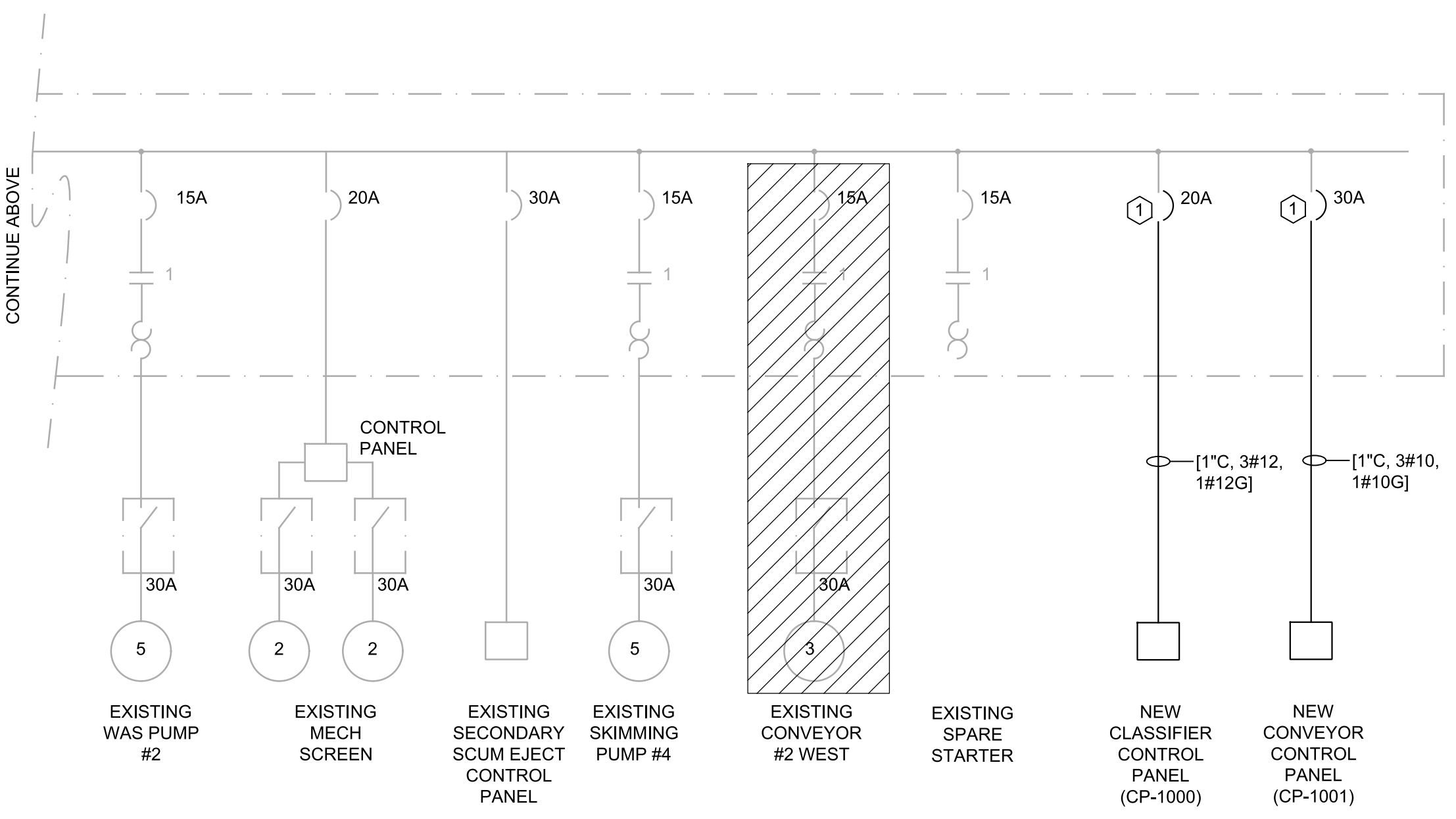
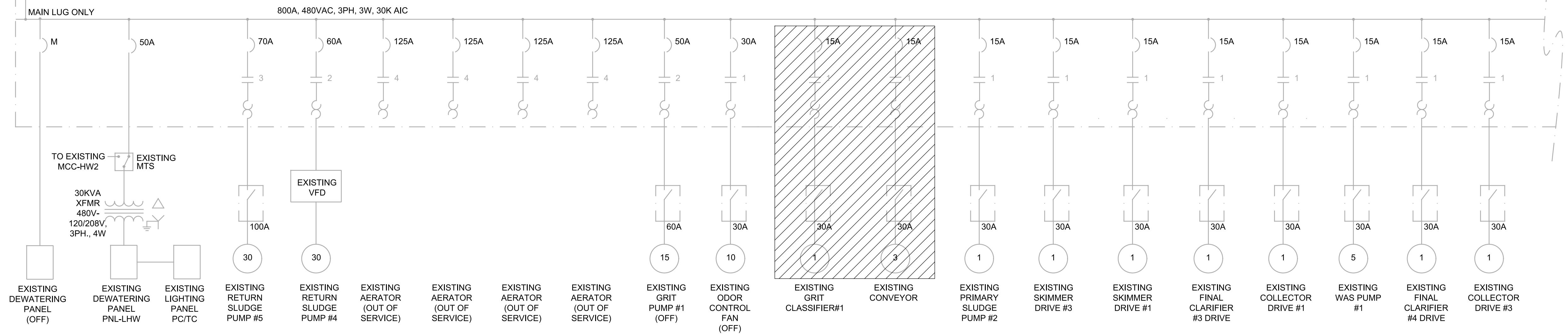
EXISTING 800A BREAKER  
AT UNIT SUBSTATION#3  
(LOCATION: HEADWORKS  
ELECTRICAL ROOM)

### LOAD SUMMARY MCC-HW1 (480V)

LOAD	CONNECTED LOAD (A)	RUNNING LOAD (A)
EXISTING LOADS	262.8 A	198.1 A
REMOVED LOADS	-11.7 A	-11.7 A
NEW CLASSIFIER CP (CP-1000)	4.2 A	4.2 A
NEW CONVEYOR CP (CP-1001)	15.2 A	15.2 A
TOTALS	270.5 A	205.8 A
KVA:	224.9 KVA	171.1 KVA

### EXISTING MOTOR CONTROL CENTER- HW1

LOCATION: HEADWORKS ELECTRICAL ROOM

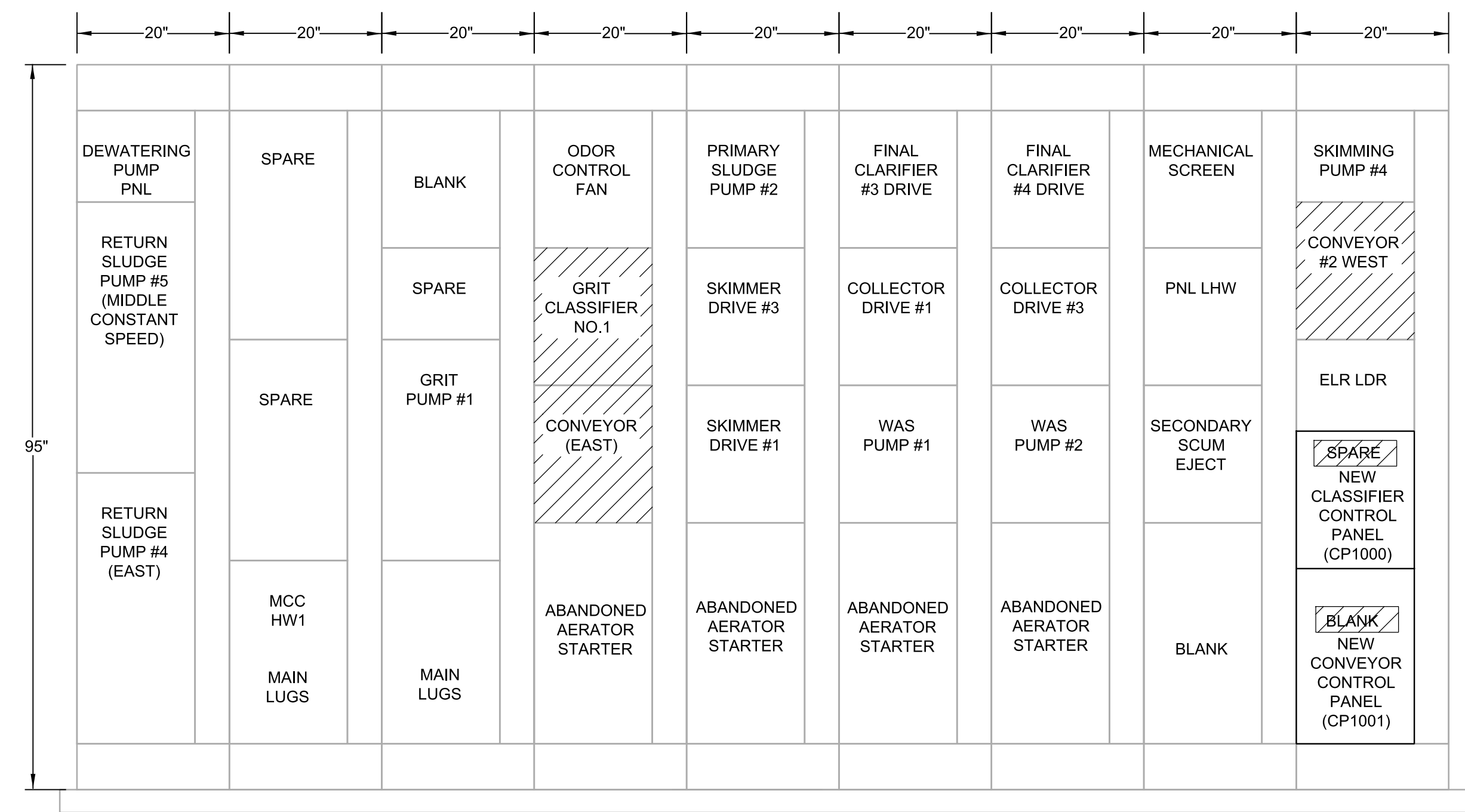


### EXISTING MCC- HW1 ONE LINE

SCALE: NONE

### KEY NOTE

Ⓛ PROVIDE AND INSTALL NEW BREAKERS IN EXISTING MCC-HW1 FOR NEW CLASSIFIER CONTROL PANEL AND NEW CONVEYOR CONTROL PANEL. NEW BREAKER SHALL MATCH THE STYLE AND AIC RATING WITH EXISTING BREAKERS. MAKE ALL NECESSARY CONNECTIONS, TERMINATIONS, ETC. FOR A COMPLETE AND WORKING MCC SYSTEM IN PLACE.



### MCC- HW1 FRONT ELEVATION

SCALE: NONE

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

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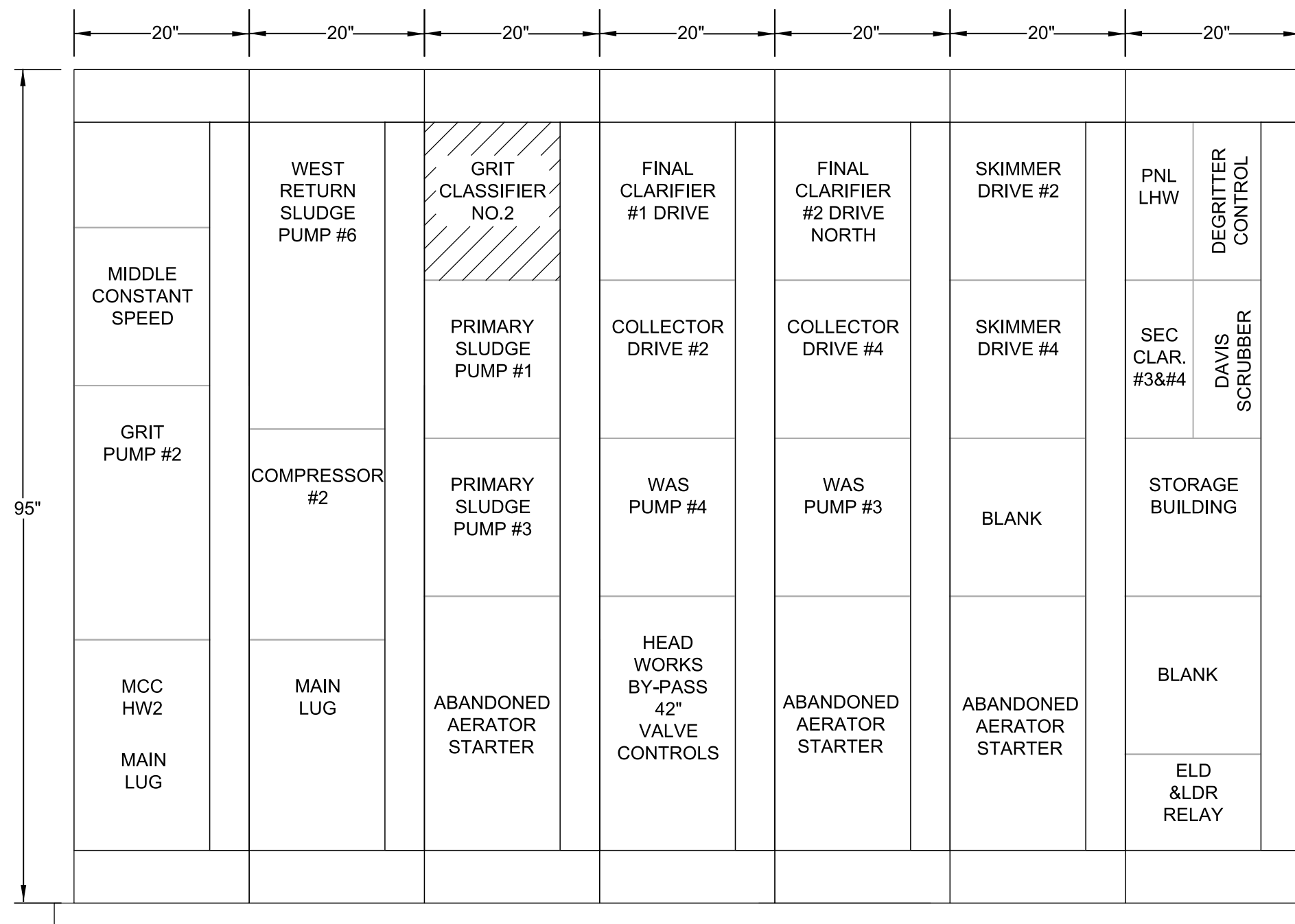
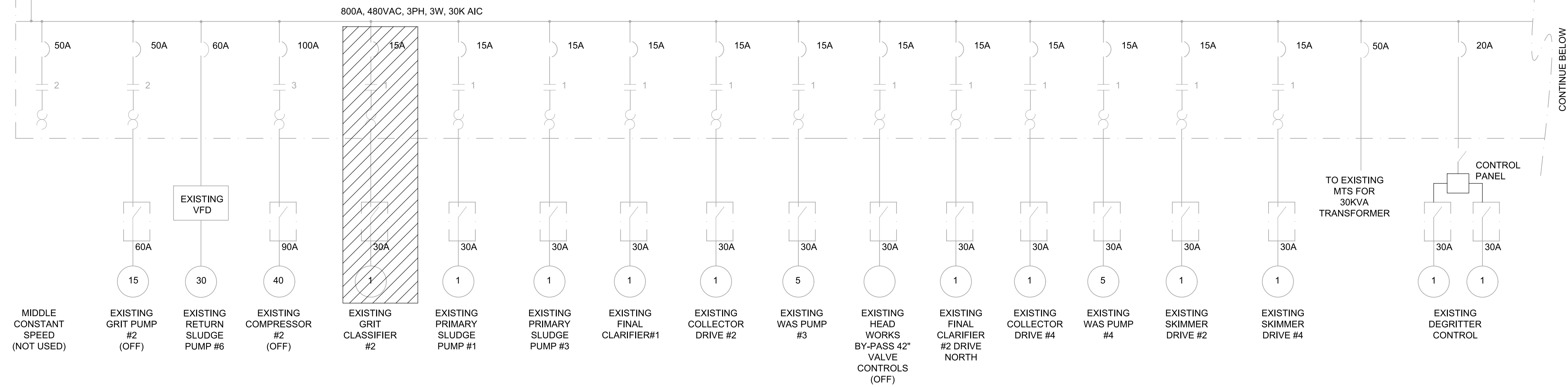
MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
EXISTING MCC-HW1 ONE LINE

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-3
0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

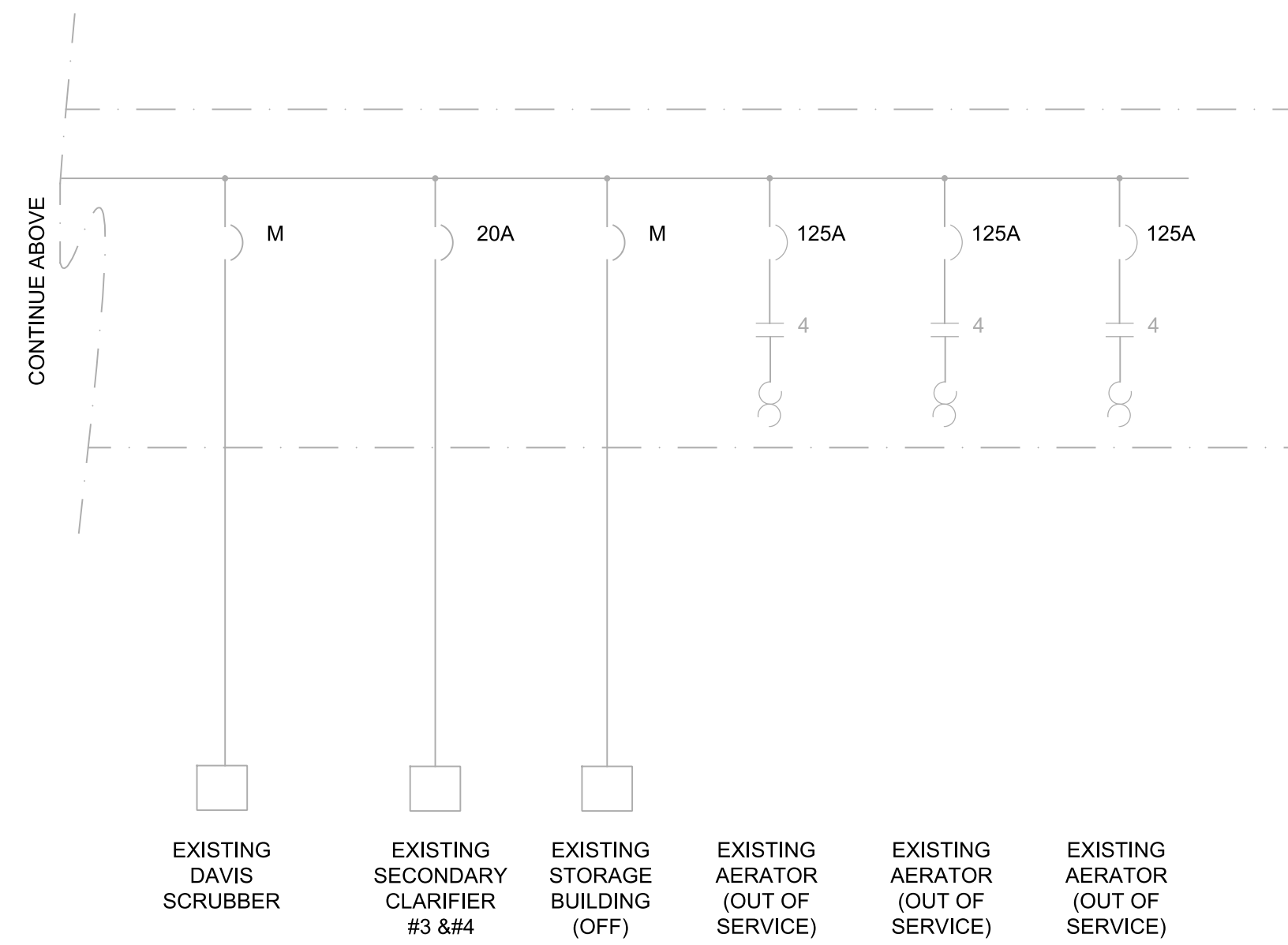
EXISTING 800A BREAKER  
AT UNIT SUBSTATION#4  
(LOCATION: HEADWORKS  
ELECTRICAL ROOM)

EXISTING 2 SET [3 1/2" C,  
3-500KCM, 1#1/0 G]

**EXISTING MOTOR CONTROL CENTER- HW2**  
LOCATION: HEADWORKS ELECTRICAL ROOM



**MCC- HW2 FRONT ELEVATION**  
SCALE: NONE



**EXISTING MCC- HW2 ONE LINE -  
DEMOLITION**  
SCALE: NONE

LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

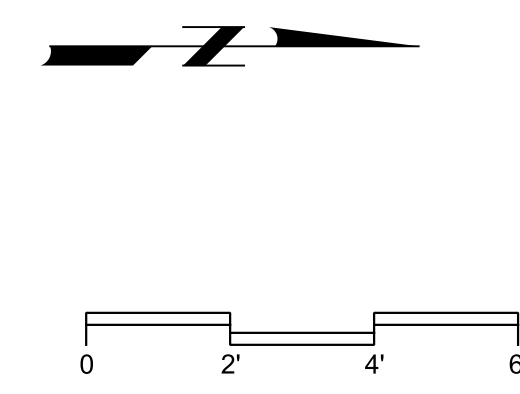
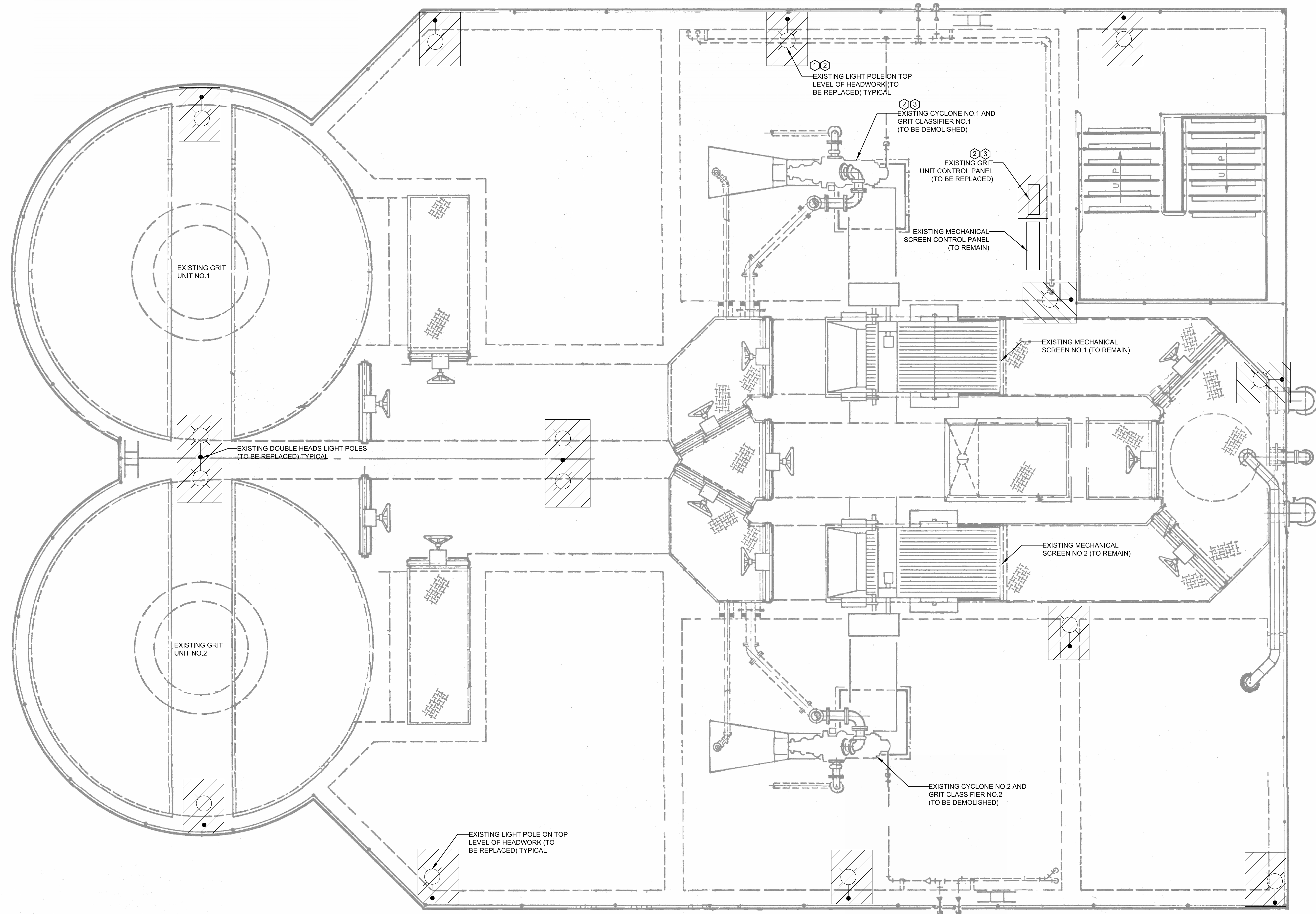
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No. 65722



MANATEE COUNTY
SWWRF HEADWORKS REHABILITATION
ELECTRICAL
EXISTING MCC-HW1 ONE LINE - DEMOLITION

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-4
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	



**KEY NOTES**

- ① CONTRACTOR SHALL DEMOLISH THE EXISTING LIGHT POLES INCLUDING LIGHT FIXTURE AND ASSOCIATED CONDUITS/CABLES. FIELD IDENTIFY EXISTING CIRCUIT AND REUSE THE SAME CIRCUIT FOR NEW LIGHTS POLES. TURN OVER TO OWNER FOR ANY ITEMS REMOVED IF REQUESTED BY THE OWNER.
- ② FOR ALL DEMOLISHED ITEMS, REMOVE ALL EXPOSED CONDUITS BACK TO SOURCE. CUT ALL BURIED CONDUITS FLUSH WITH FLOOR OR WALL AND CAP. REMOVE ALL EXISTING WIRES BACK TO SOURCE.
- ③ COORDINATE AND ASSIST TO OTHER DISCIPLINES FOR DEMOLITION OF THE EXISTING GRIT CLASSIFIER AND CONVEYOR SYSTEM AND DISCONNECT POWER BEFORE DEMOLITION BEGINS.

**HEADWORKS TOP LEVEL - ELECTRICAL DEMOLITION PLAN**

SCALE: 3/8"=1'-0"

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	MARCH 2013
REV	DATE BY DESCRIPTION
PROJECT NO: 7880K10	FILENAME: 7880K10-E-05.dwg

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CHECKED	PFH
DATE	MARCH 2013

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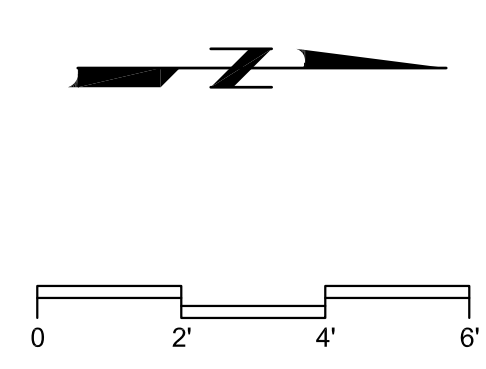
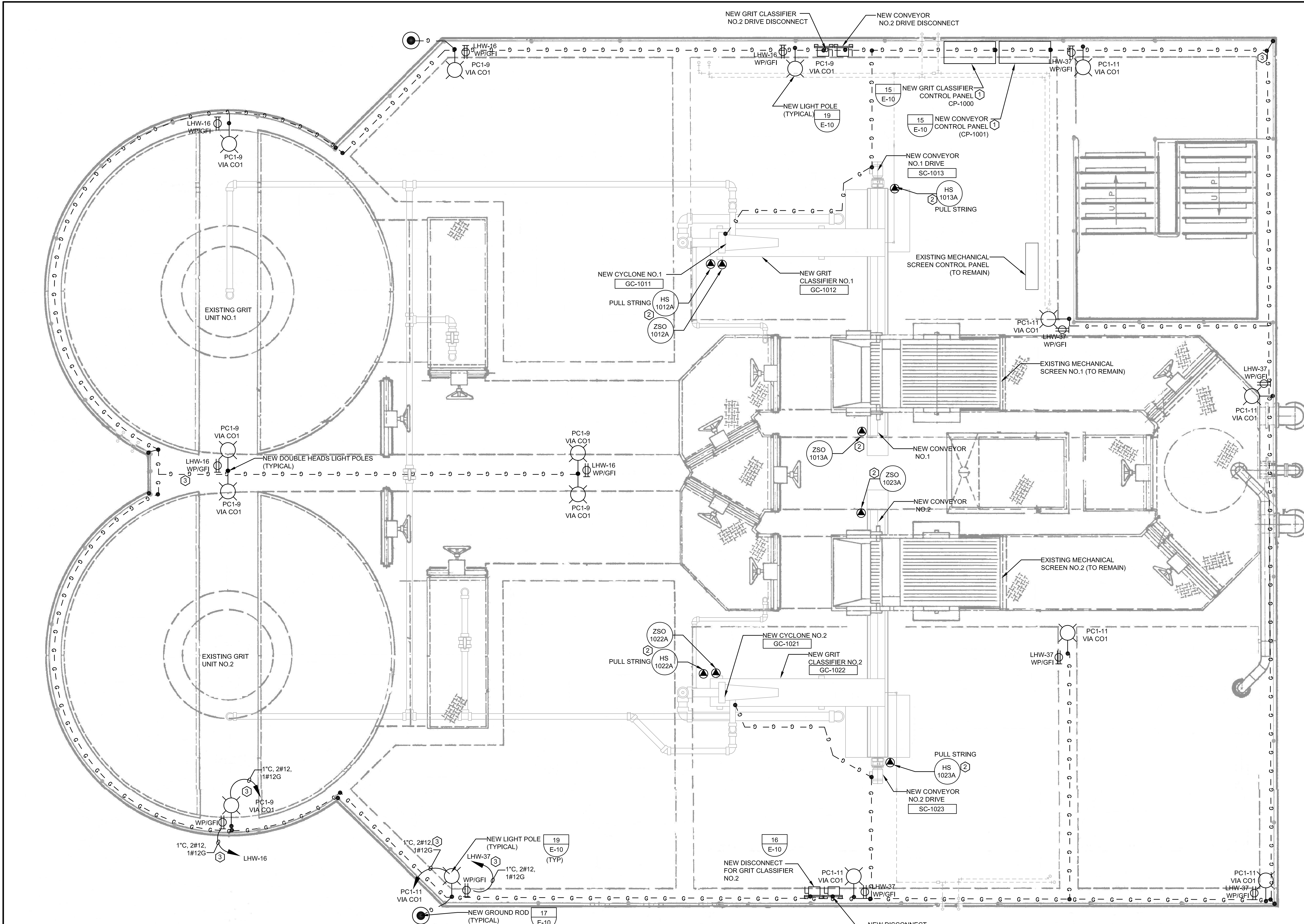
THEIN WIN, P.E.  
 No. 65722



MANATEE COUNTY  
 SWWRF HEADWORKS REHABILITATION  
 ELECTRICAL  
 HEADWORKS TOP LEVEL -  
 ELECTRICAL DEMOLITION PLAN

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-5
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

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- KEY NOTES**
- FIELD LOCATE NEW GRIT CLASSIFIER CONTROL PANEL (CP-1000) AND CONVEYOR CONTROL PANEL (CP-1001) OUTSIDE THE CLASSIFIED AREA. MOUNT NEW PANELS NEAR HANDRAIL USING 316 STAINLESS STEEL UNISTRUT SUPPORTS. ADJUST LOCATION OF PANEL WITH EXISTING CONDITION TO AVOID CONFLICTS. PROVIDE 4 FEET CLEARANCE IN FRONT OF NEW GRIT CLASSIFIER CONTROL PANEL AND CONVEYOR CONTROL PANEL.
  - CONTRACTOR SHALL COORDINATE WITH GRIT CLASSIFIER AND CONVEYOR SUPPLIER FOR THE ACTUAL LOCATION OF THE EMERGENCY PULL STRING AND ZERO SPEED SWITCH LOCATION AND ADJUST ACCORDINGLY.
  - CONDUITS AND CABLES FOR HOME RUN CIRCUITS OF LIGHT POLE AND RECEPTACLE ARE ONLY SHOWN AT THE FIRST LIGHT POLE. CONTRACTOR SHALL PROVIDE CONDUIT AND CABLE TO ALL OTHER REMAINING LIGHT POLES AND RECEPTACLES.

- NOTES:**
- NFPA 820 CLASSIFIES THE 10 FEET ENVELOPE AROUND THE EQUIPMENT AND OPEN CHANNEL OF HEADWORKS WITH 18 INCHES ABOVE AS CLASS 1, DIVISION 2, GROUP D. ALL ELECTRICAL EQUIPMENT INSTALLATION PASSING THRU THIS ENVELOPE SHALL MEET NEC ARTICLE 501 REQUIREMENTS. ALL CONDUITS ENTERING OR LEAVING THIS AREA SHALL HAVE SEAL-OFF AS PER DETAIL ON DRAWING E-10.
  - BEFORE INSTALLATION, COORDINATE LOCATION OF EXPOSED CONDUIT ROUTING WITH ALL OTHER DISCIPLINES TO AVOID CONFLICTS.
  - CONTRACTOR SHALL PROVIDE AND INSTALL #4/0 AWG BARE TINNED COPPER GROUND WIRE ALL THE WAY AROUND TOP STRUCTURE OF THE HEADWORKS ALONG THE HANDRAILS. CLAMP GROUNDING CONDUCTOR AT EACH HANDRAIL. BOND GROUNDING CONDUCTORS TO ALL PANELS, LIGHT POLES, MOTORS, DISCONNECTS, STAIRWAYS, ETC. FOR A COMPLETE GROUNDING SYSTEM. PROVIDE AND INSTALL TWO GROUNDING DOWN WIRE (#4/0 AWG BARE TINNED COPPER) TO THE EXISTING GROUND GRID AT THE GROUND LEVEL OR INSTALL NEW GROUND RODS AT THE GROUND LEVEL. FIELD LOCATE EXISTING GROUND GRID.
  - EXPOSED CONDUIT AND EXPOSED GROUND WIRE INSTALLED ON TOP OF HEADWORK SHALL HAVE ALUMINUM RAMP COVER FOR WALKING AREAS TO AVOID TRIPPING HAZARD. SECURELY ATTACH THE ALUMINUM RAMP TO THE CONCRETE SLAB USING 316 STAINLESS STEEL NUTS AND BOLTS.
  - PROVIDE UNISTRUT OR BACK AND STRAP FOR RIGID ALUMINUM CONDUIT TO BE INSTALLED ON CONCRETE WALL OR SURFACE. RIGID ALUMINUM CONDUIT SHALL NOT BE INSTALLED DIRECT CONTACT WITH CONCRETE.
  - ROUTE EXPOSED CONDUITS ALONG HANDRAIL WHEREVER POSSIBLE.

**HEADWORKS TOP LEVEL - ELECTRICAL PLAN**  
SCALE: 3/8"=1'-0"

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012
REV	DATE BY DESCRIPTION

THEIN WIN, P.E.  
No. 65722

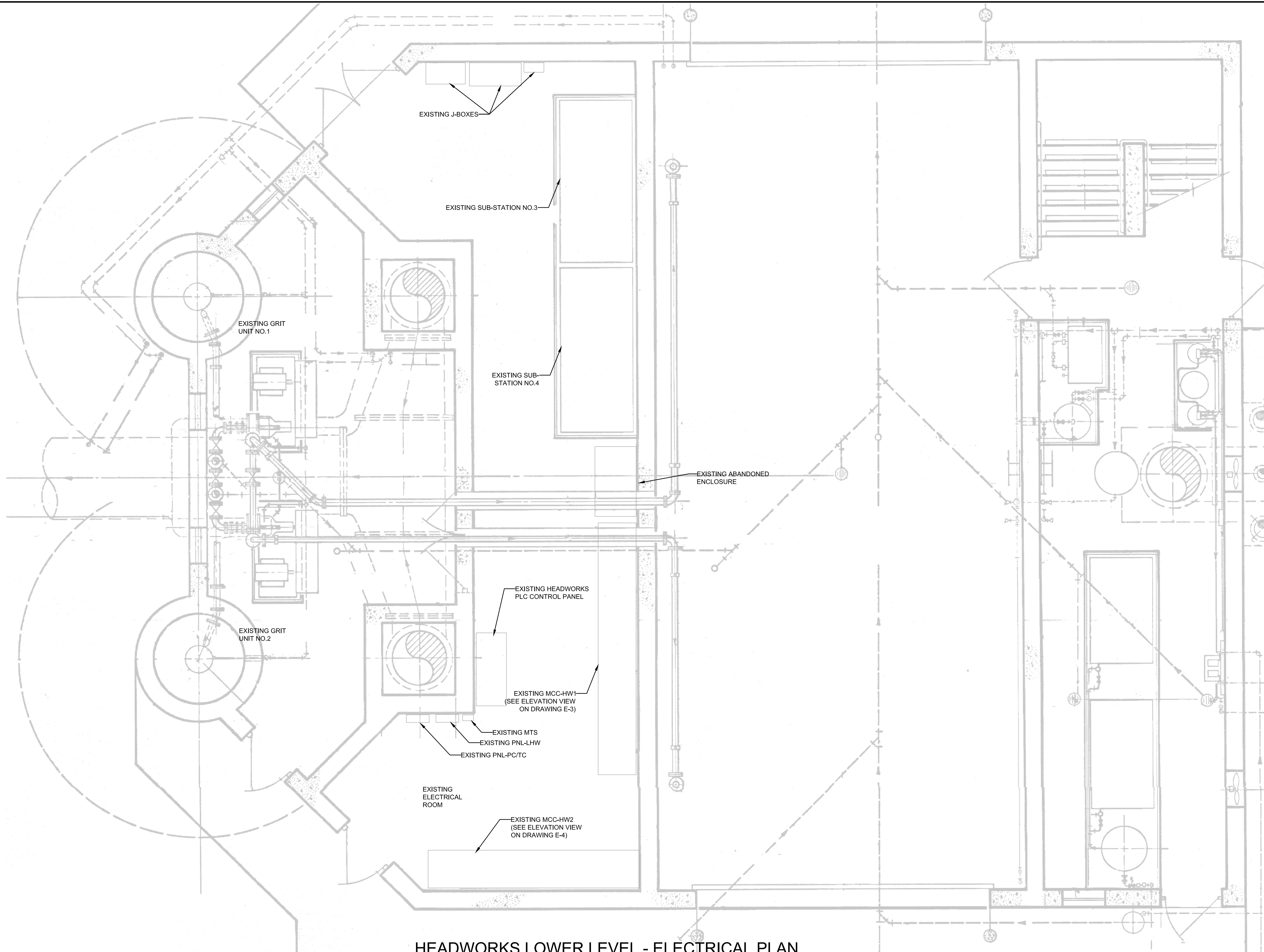
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MANATEE COUNTY  
SWWRF HEADWORKS REHABILITATION  
ELECTRICAL  
HEADWORKS TOP LEVEL - ELECTRICAL PLAN

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-6
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

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**NOTE:**  
 1. PROVIDE AND INSTALL EXPOSED CONDUITS FROM EXISTING MCC-HW1, MCC-HW2, AND PLC CONTROL PANEL TO TOP LEVEL OF HEADWORKS AS SHOWN ON OTHER DRAWINGS, SUCH AS ONE LINE DIAGRAM, PLAN VIEW, RISER DIAGRAM, ETC. SUPPORT EXPOSED CONDUITS AS PER SPECIFICATION 16110 AND FIELD ADJUST CONDUIT ROUTING AND PENETRATIONS WITH EXISTING CONDITION TO AVOID CONFLICTS.

**HEADWORKS LOWER LEVEL - ELECTRICAL PLAN**

SCALE: 3/8"=1'-0"

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012
REV	DATE BY DESCRIPTION

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MANATEE COUNTY  
 SWWRF HEADWORKS REHABILITATION  
 ELECTRICAL  
 HEADWORKS LOWER LEVEL - ELECTRICAL PLAN

VERIFY SCALES  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 7880K10  
 DRAWING NO. E-7

LAST SAVED BY: WTW

EXISTING PNL. PC/TC SCHEDULE

BUS AMPS			LOAD	POLES	AMPS	BUS			LOAD	POLES	AMPS	BUS AMPS		
A	B	C				A	B	C				A	B	C
			TC	3	100	1	2	3	1	60	1			
			CONTROL	1	20	7	8	20	1	EME. SHOWER & RECP. POLES AER. TANK				
			RECP. FINAL CLARIFIER #3, #4	1	20	9	10	20	1	STR. POLES & CENTER POLES AER. TANK				
			RECP. PRIMARY CLARIFIER WEST	1	20	11	12	20	1	RECEP. POLES WEST AERATION TANK				
			10' POLES HEADWORKS SAMPLER RECP.	1	20	13	14	20	1	RECEP. PRIMARY CLARIFIER EAST				
			SPARE	1	20	15	16	20	1	RECEP. LIGHT POLES				
			STAIRWELL LIGHTS HEADWORKS	1	20	17	18	20	1	RECEP. LIGHT POLES				
			SPACE	-	-	19	20	-	-	SPACE				
			SPACE	-	-	21	22	-	-	SPACE				
			SPACE	-	-	23	24	-	-	SPACE				
			STREET POLES PRIMARY CLARIFIER WEST	1	20	1	2	20	1	STREET POLES PRIMARY CLARIFIER EAST				
			10' POLES CENTER AERATION TANK	1	20	3	4	20	1	20' POLES AERATION TANK				
			10' POLES FINAL CLARIFIER #3, #4	1	20	5	6	20	1	10' POLES FINAL CLARIFIER SOUTH				
			10' PO. AER. TANK EAST, 10' PO. PRIM. CLAR. WEST	1	20	7	8	20	1	10' POLES PRIMARY CLARIFIER WEST				
			10' PO. & OUTSIDE LIGHTS ON HEADWORKS EAST	1	20	9	10	20	1	10' POLES PRIMARY CLARIFIER NORTH				
			10' PO. & OUTSIDE LIGHTS ON HEADWORKS WEST	1	20	11	12	20	1	10' POLES AERATION WEST AERATION WEST				
			SPACE	-	-	13	14	-	-	SPACE				
			SPACE	-	-	15	16	-	-	SPACE				
			SPACE	-	-	17	18	-	-	SPACE				
			USED	1	20	1	2	20	1	USED				
			USED	1	20	3	4	20	1	USED				
			USED	1	20	5	6	20	1	USED				
			USED	1	20	7	8	20	1	USED				
			USED	1	20	9	10	20	1	USED				
			USED	1	20	11	12	20	1	USED				

THE LIGHT POLES ARE ONE TO ONE REPLACEMENT AND NO ADDITIONAL LOAD IS ADDED TO THIS PANEL.

NOTES:

- EXISTING PANEL SHCHEDULE IS OBTAINED FORM AS-BUILT DRAWINGS. NEITHER OWNER NOR ENGINEER HAS VERIFY THE INFORMATION FOR CORRECTNESS. CONTRACTOR SHALL FIELD VERIFY THE ACCURACY OF THE INFORMATION AND ADJUST AS NEEDED WITHOUT ADDITIONAL COST TO THE OWNER.
- AFTER REMOVAL OF EXISTING LIGHT POLES, RE-WIRE THE EXISTING HEADWORKS WALL MOUNTED LIGHT AS NEEDED FOR A COMPLETE AND FUNCTIONAL LIGHTING SYSTEM. PROVIDE AND INSTALL NEW CONDUITS AND CABLES AS NEEDED.

EXISTING PNL. LHW SCHEDULE

BUS AMPS			LOAD	POLES	AMPS	BUS			LOAD	POLES	AMPS	BUS AMPS		
A	B	C				A	B	C				A	B	C
2.1			LIGHTING IN COMP ROOM	1	20	1	2	20	1	LIGHTS ELECTRICAL ROOM	6.0			
	1.0		DUCKING SKIMMER #3, #4	1	20	3	4	20	1	FIT426,FIT460,FIN. CLAR.#3&#4 RAS&WAS MET.		2.0		
		0.5	LIGHT AT PRIMARY SLUDGE PUMP FIT 250	1	20	5	6	20	1	T.V.			2.0	
1.0			PH BLK PROBE, FIT #100	1	20	7	8	20	1	EME. SHOWER & RECP. POLES AER. TANK	1.5			
		0.5	DIGESTER DRAIN	1	20	9	10	20	1	LIGHTS RAS PUMP #4 & #6		6.5		
		0.5	PLANT DRAIN	1	20	11	12	20	1	LIGHTING PRIMARY SCUM EJECTER			3.0	
1.0			FIT 470	1	20	13	14	20	1	SAMPLER, RECEP.TS, SOUTH WALL INFL. ROOM	6.0			
		0.5	1,2,3,4 CLARIFIER BLANKET DETECTOR CONTROL	1	20	15	16	20	1	RECEP. ON LIGHT POLES (HEADWO)		9.0		
		1.0	RAS METER	1	20	17	18	20	1	SPARE				
5.2			LIGHTS DRIVE THROUGH	1	20	19	20	20	1	RECEP. ELECTRICAL ROOM	9.0			
		1.0	EMERGENCY LIGHT ELECTRICAL ROOM	1	20	21	22	20	1	LIGHTS PUMP ROOM		10.5		
		3.0	RECEP."XX" CONTROL PANEL	1	20	23	24	100	3	FEED FOR PC/TC PANEL OUTSIDE STR. LIGHT		25.3		
6.5			LIGHTS RAS PUMPS #1, #2	1	20	25	26	20	1		20.5			
		1.0	FIT 450	1	20	27	28	20	1			18.8		
X		1.0	DUCKING SKIMMER #1, #2	1	20	29	30	20	2	MAIN GATE, MAIN CAMERA		3.0	3.0	
		0.5	SPACE	1	20	31	32	20	1		3.0			
		0.5	EMER. HW BYPASS VALVE	1	20	33	34	20	2	AC COMP		10.2		
		2.0	SCADA PANEL 4	1	20	35	36	20	1				10.2	
7.5			RECEP. ON LIGHT POLES (HEADWORKS)	1	20	37	38	20	1	USED	1.0			
		10.2	AC COMP 1	2	20	39	40	20	1	USED		0.5		
		10.2		1	20	41	42	20	1	USED			3.0	

TOTAL AMPS: BUS A 70.3 BUS B 72.2 BUS C 64.7 CONNECTED Kva 24.8

RATED VOLTAGE:  120/208  277/480 3 PHASE, 4 WIRE BRANCH POLES  12  20  24  42

RATED AMPS:  100  225  400  CABINET:  SURFACE  FLUSH

NEUTRAL BUS  100%  150%  200%  GROUND BUS  HINGED DOOR  KEYED DOOR LATCH LOCATION:

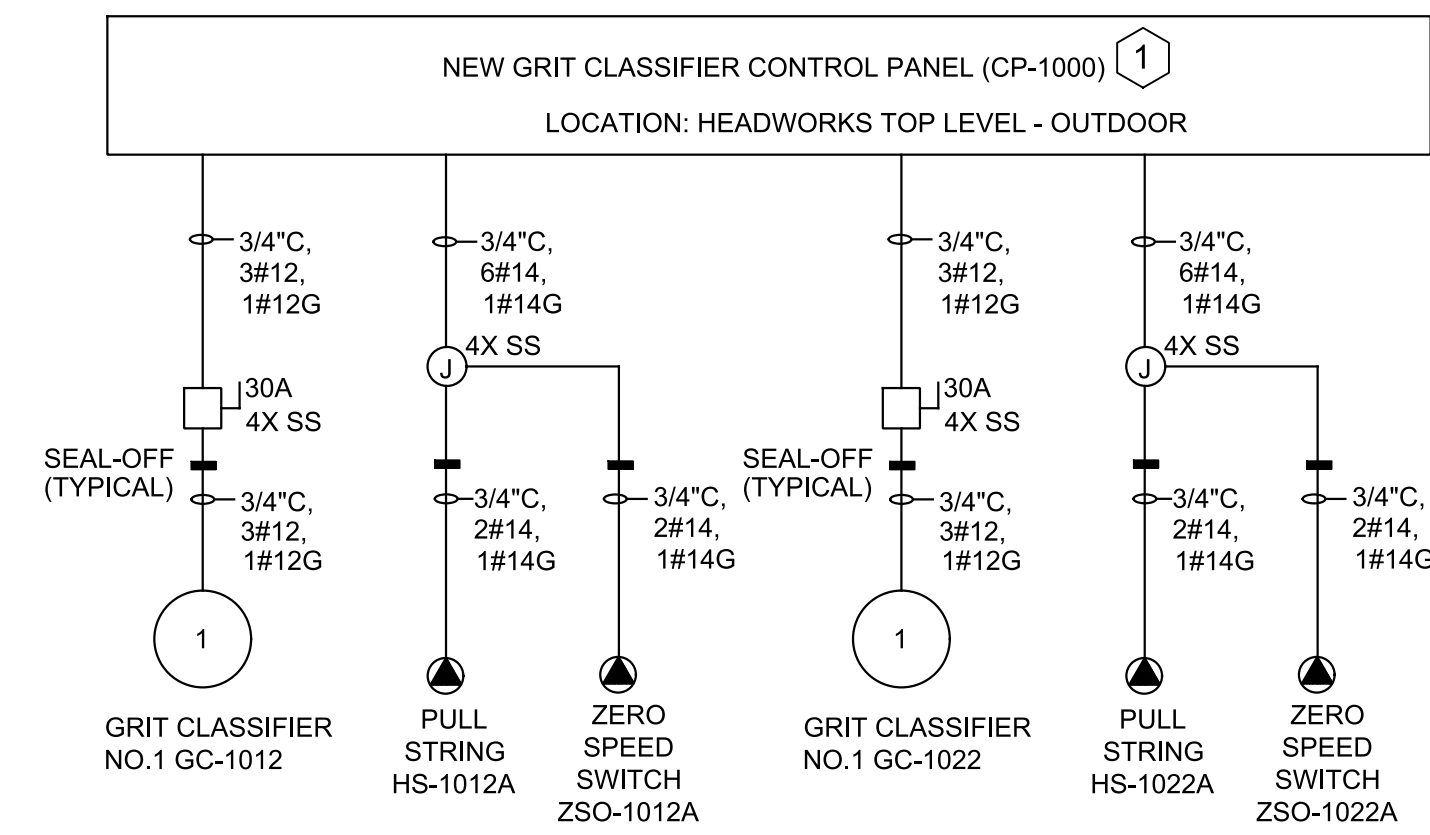
CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES  TVSS ENCLOSURE TYPE  NEMA 1  NEMA 3R  NEMA 4X

MAIN LUGS ONLY  MAIN 100 AMP BREAKER  TO BE GFI BREAKERS

PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL.

MFRS. SQUARE D COPPER BUSES MAIN LUGS \_\_\_\_\_ SETS SIZE: \_\_\_\_\_

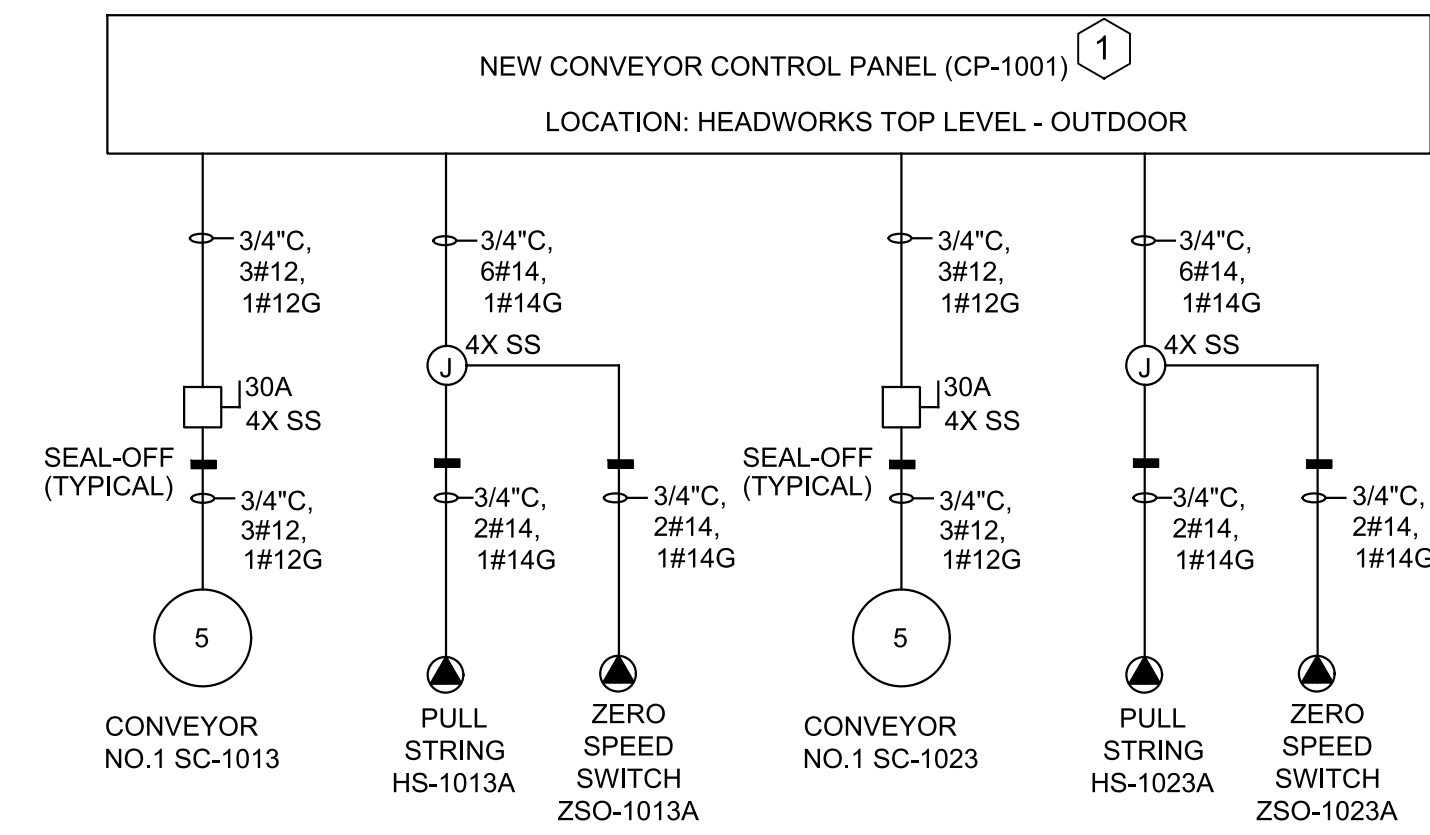
PROVIDE AND INSTALL 20A-1P BREAKER . MATCH STYLE AND AIC RATING WITH EXISTING.



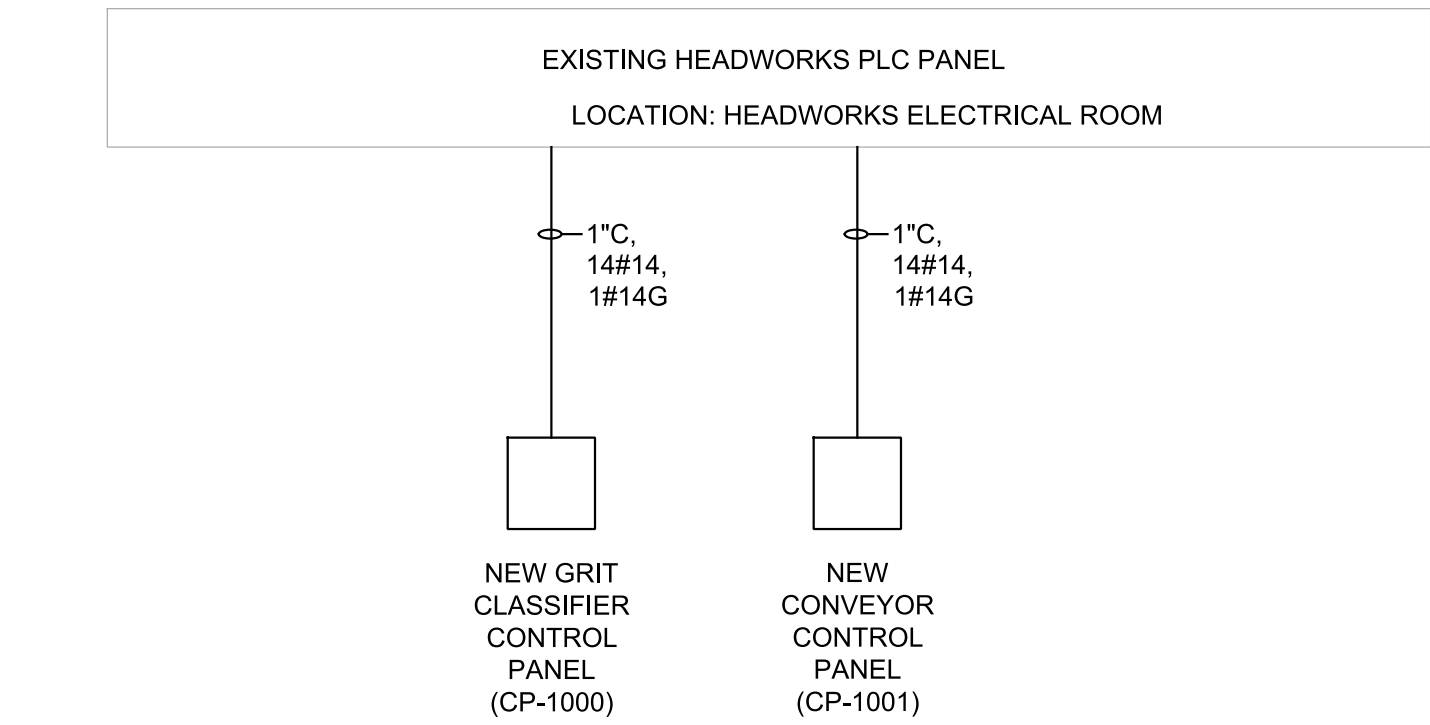
GRIT CLASSIFIER CONTROL PANEL CP-1000 RISER DIAGRAM NOT TO SCALE

KEYED NOTE:

1 BEFORE BIDDING, COORDINATE ALL POWER, CONDUIT, AND CABLE REQUIREMENTS WITH PACKAGED SYSTEM SUPPLIER AND ADJUST ACCORDINGLY.



CONVEYOR CONTROL PANEL CP-1001 RISER DIAGRAM NOT TO SCALE



EXISTING HEADWORKS PLC PANEL RISER DIAGRAM NOT TO SCALE

INPUT/OUTPUT (I/O) SCHEDULE

USE THE FOLLOWING I/O POINTS AT EXISTING HEADWORKS PLC FOR NEW SIGNALS.

CONVEYOR NO.1 RUNNING (QI-1013A) = RACK 1, SLOT 5, INPUT 0  
 CONVEYOR NO.1 FAIL (QA-1013B) = RACK 1, SLOT 5, INPUT 1  
 CONVEYOR NO.2 RUNNING (QI-1023A) = RACK 1, SLOT 5, INPUT 2  
 CONVEYOR NO.2 FAIL (QA-1023B) = RACK 1, SLOT 5, INPUT 3  
 GRIT CLASSIFIER NO.1 IN REMOTE (QI-1012B) = RACK 1, SLOT 5, INPUT 4  
 GRIT CLASSIFIER NO.1 RUNNING (QI-1012A) = RACK 1, SLOT 5, INPUT 5  
 GRIT CLASSIFIER NO.1 FAIL (QA-1012B) = RACK 1, SLOT 5, INPUT 6  
 GRIT CLASSIFIER NO.2 IN REMOTE (QI-1022B) = RACK 1, SLOT 5, INPUT 7  
 GRIT CLASSIFIER NO.2 RUNNING (QI-1022A) = RACK 1, SLOT 5, INPUT 8  
 GRIT CLASSIFIER NO.2 FAIL (QA-1022B) = RACK 1, SLOT 5, INPUT 9  
 GRIT CLASSIFIER NO.1 START/STOP (HK-1012A) = RACK 1, SLOT 10, OUTPUT 11  
 GRIT CLASSIFIER NO.1 START/STOP (HK-1012A) = RACK 1, SLOT 10, OUTPUT 12

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DRAWN DEU	
CHECKED PFH	
DATE SEPTEMBER 2012	

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 23257 STATE ROAD 7, SUITE 100  
 BOCA RATON, FLORIDA 33428  
 (561) 451-9185  
 (561) 451-4886 FAX  
 LICENSE NO: EB 0006877

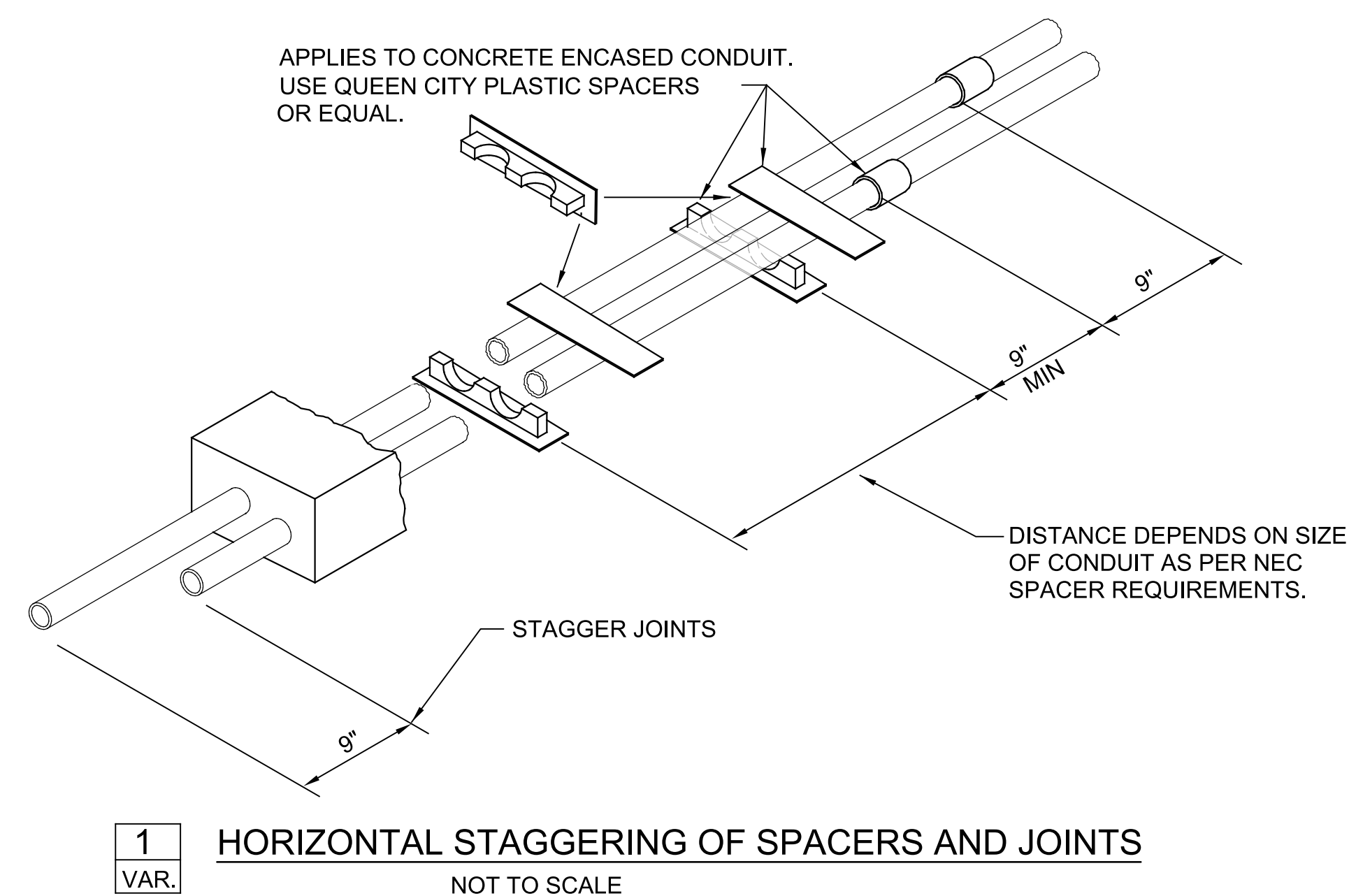
THEIN WIN, P.E.  
 No. 65722



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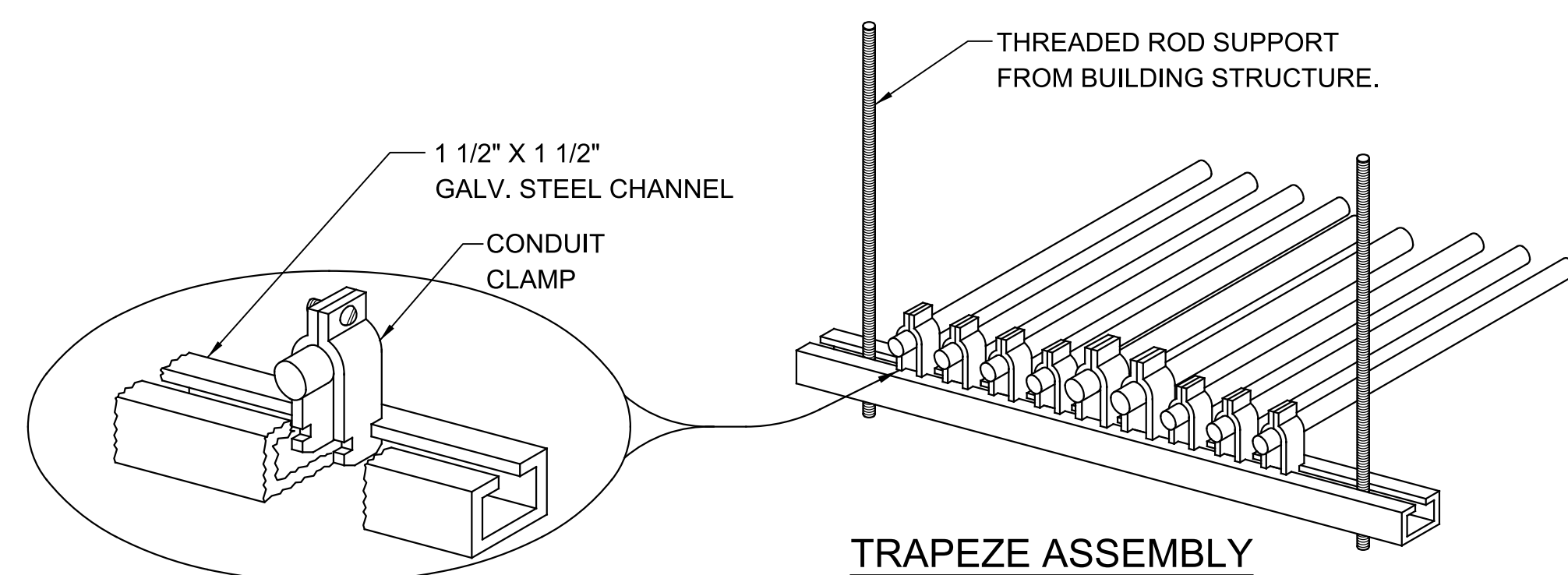
MANATEE COUNTY  
 SWWRWF HEADWORKS REHABILITATION  
 ELECTRICAL SCHEDULES

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	JOB NO. 7880K10 DRAWING NO. E-8
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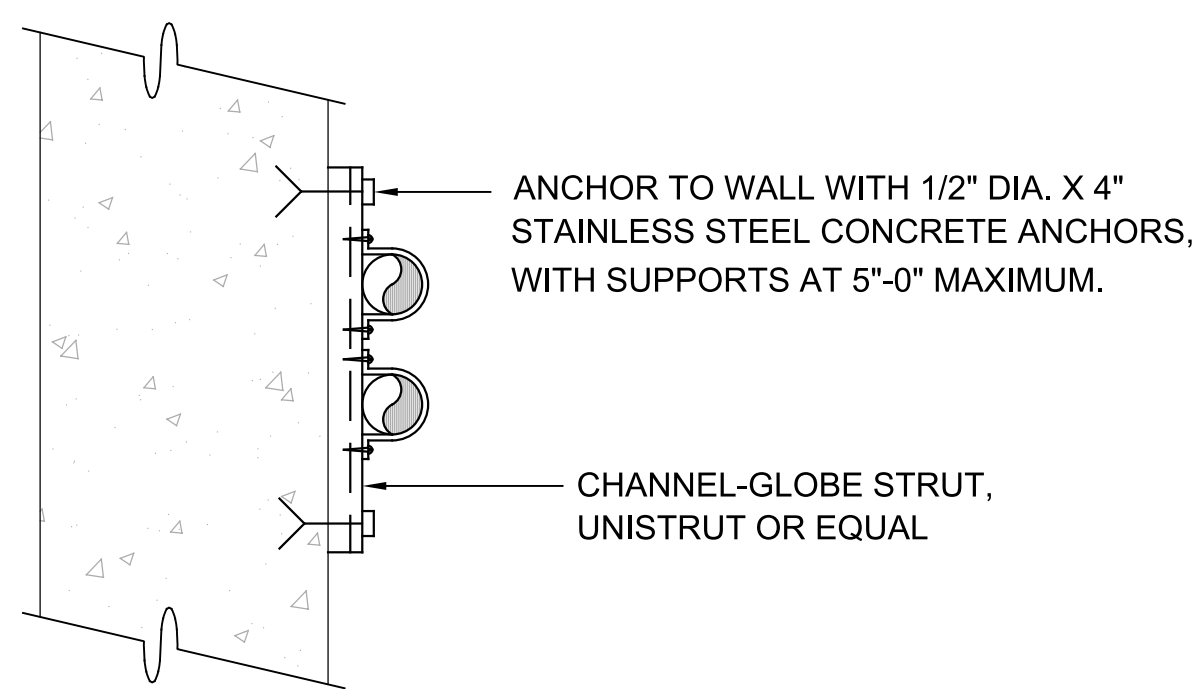
**1** HORIZONTAL STAGGERING OF SPACERS AND JOINTS  
VAR. NOT TO SCALE

- NOTES:
1. THIS DETAIL TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING
  2. CHANNEL AND ALL SUPPORT DEVICES TO BE HOT DIP GALVANIZED STEEL. FIELD COAT ALL CUTS, ETC. TO MATCH.
  3. CHANNELS TO BE SPACED 5' MAXIMUM.

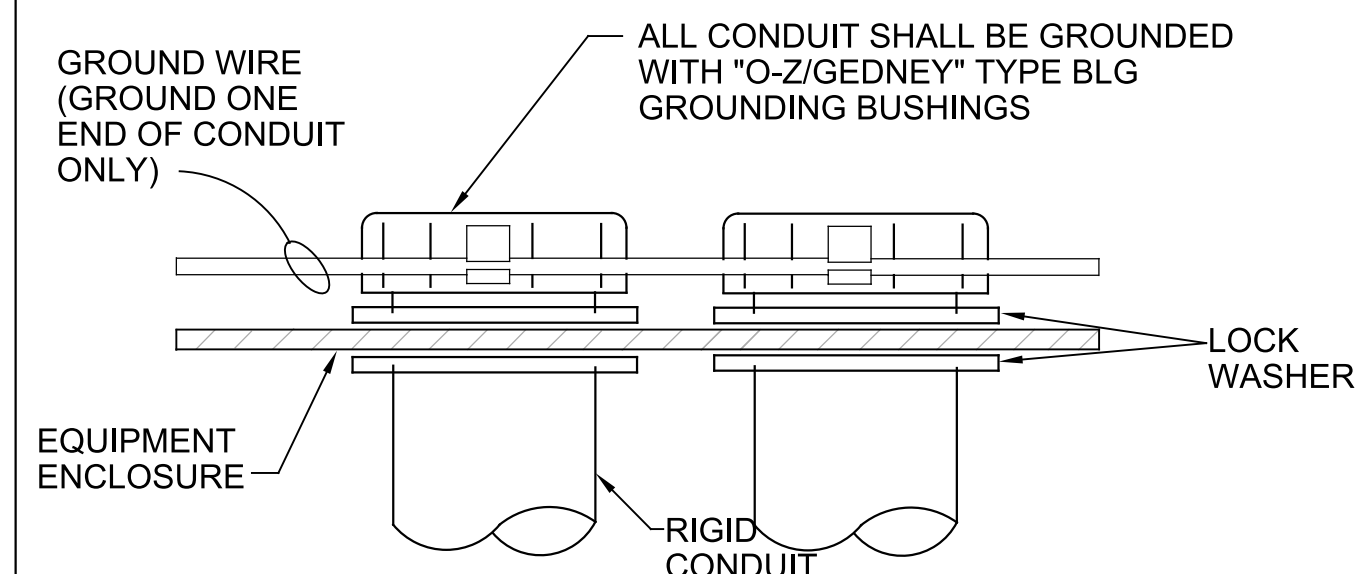


CONDUIT PIPE STRAP  
MOUNTING DETAILS

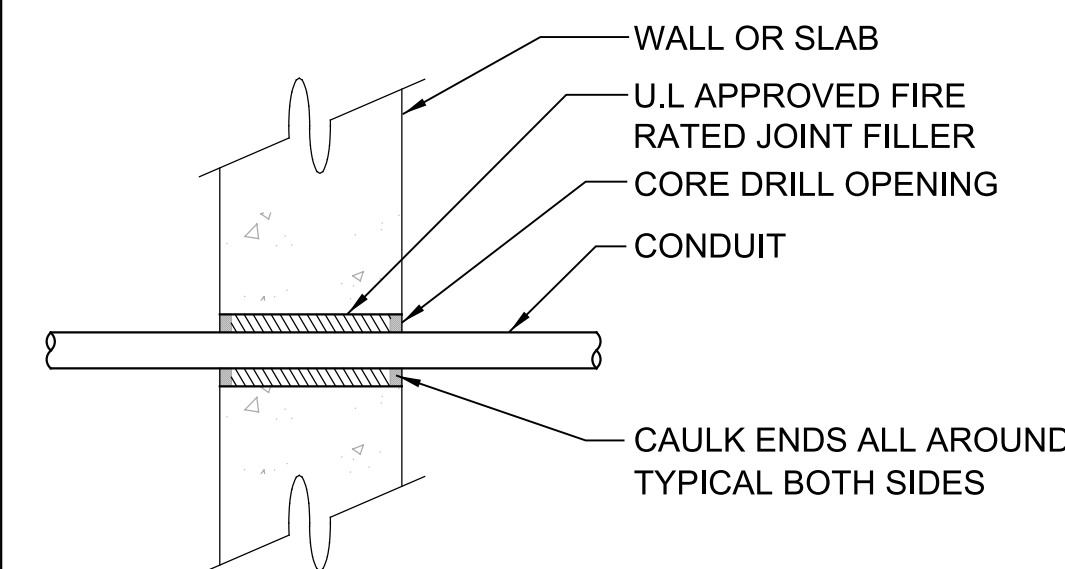
**5** CONDUIT SUPPORT  
VAR. NOT TO SCALE



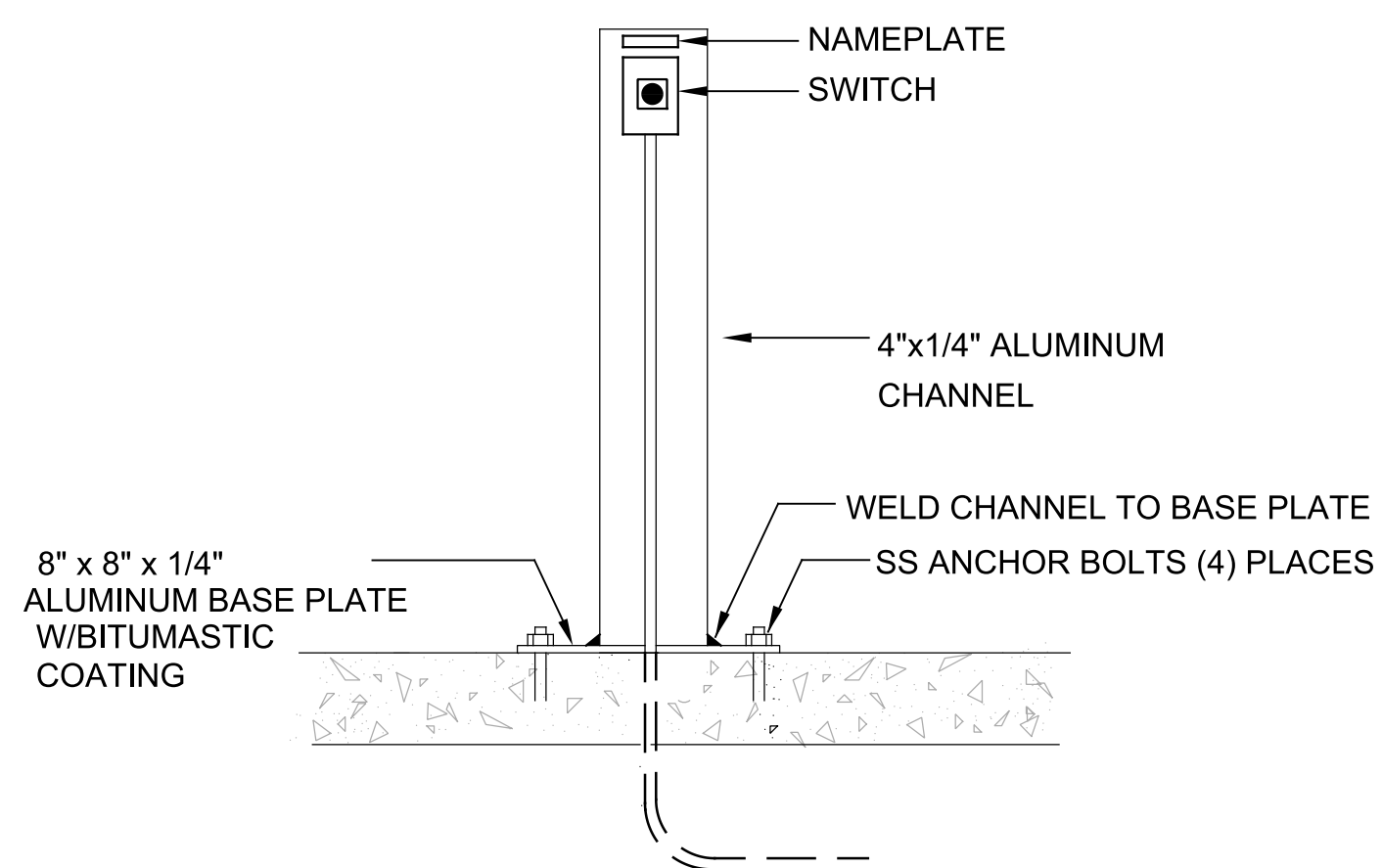
**2** CONDUIT SUPPORT  
VAR. NOT TO SCALE



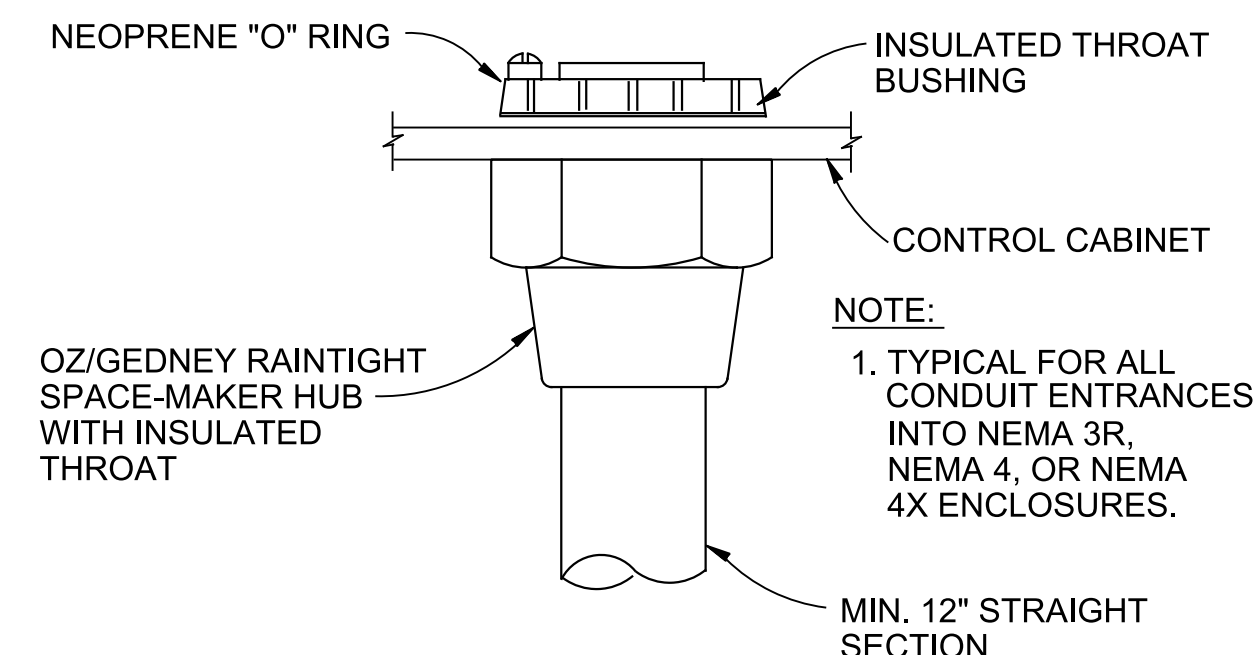
**3** CONDUIT GROUNDING  
VAR. NOT TO SCALE



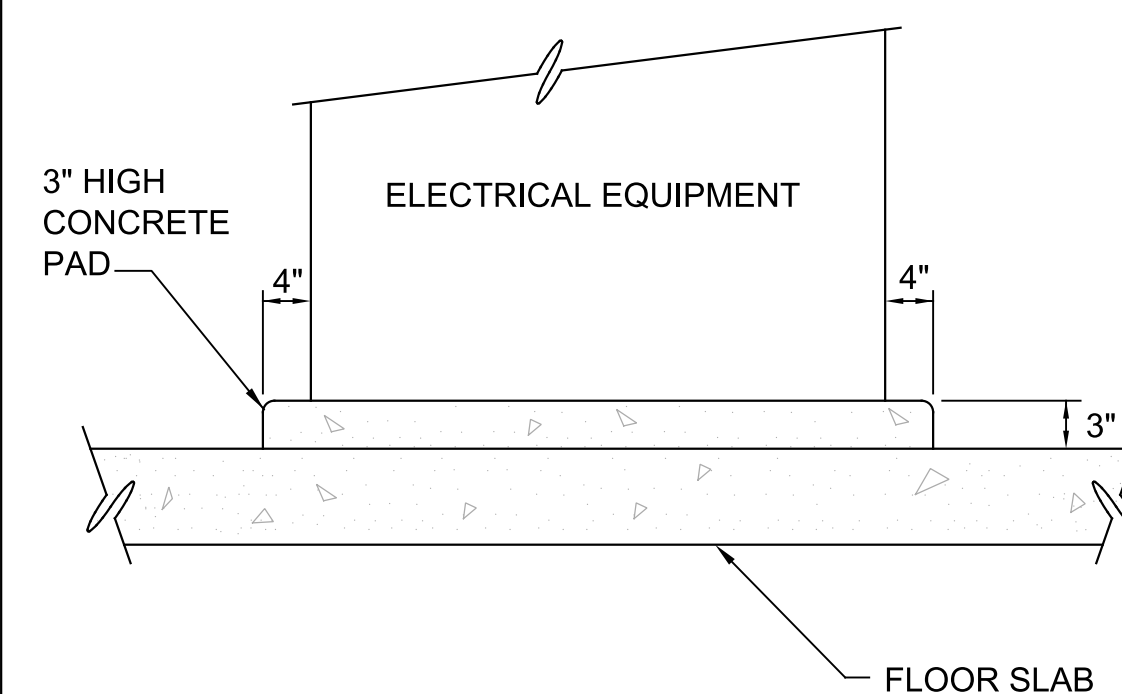
**4** CONDUIT PENETRATION AT  
VAR. WALL OR SLAB  
NOT TO SCALE



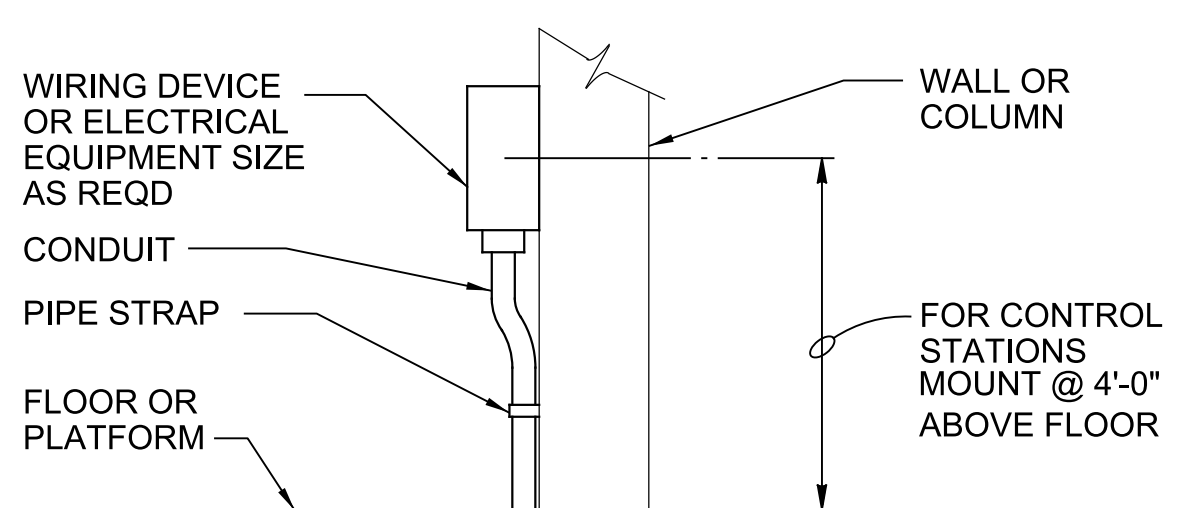
**6** SWITCH PEDESTAL  
VAR. NOT TO SCALE



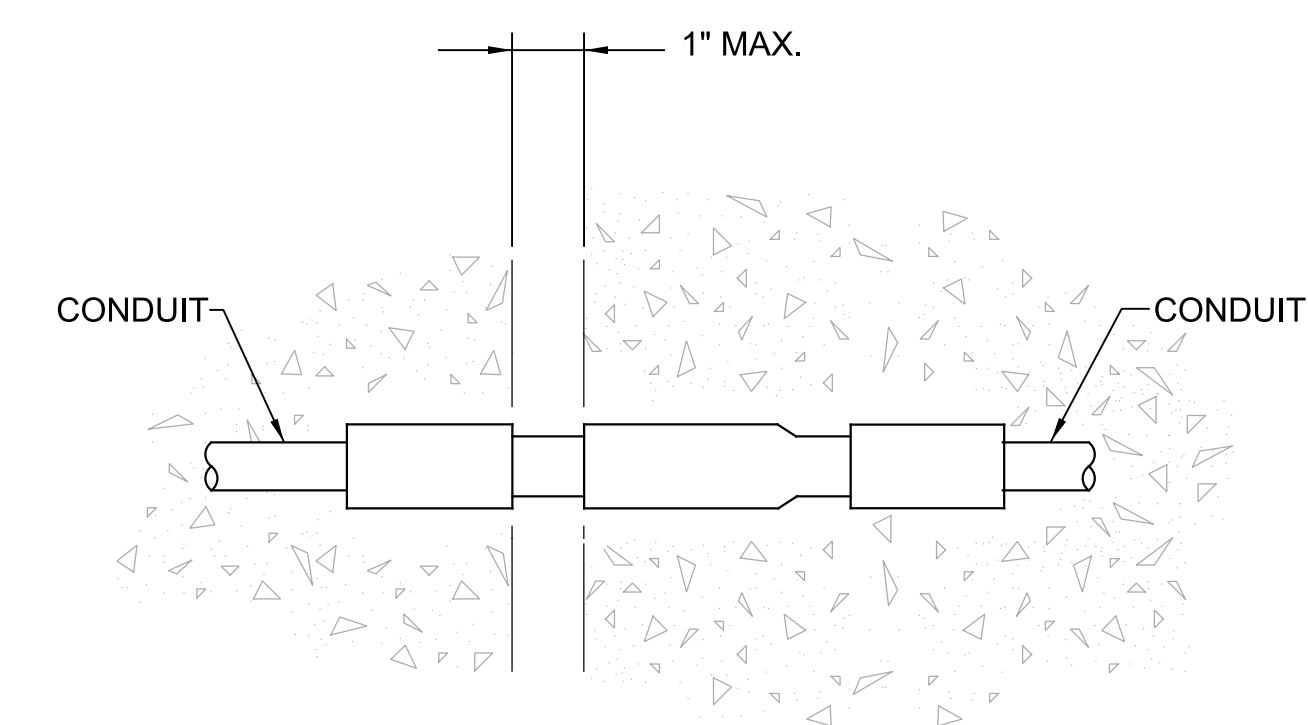
**7** CONDUIT HUB  
VAR. NOT TO SCALE



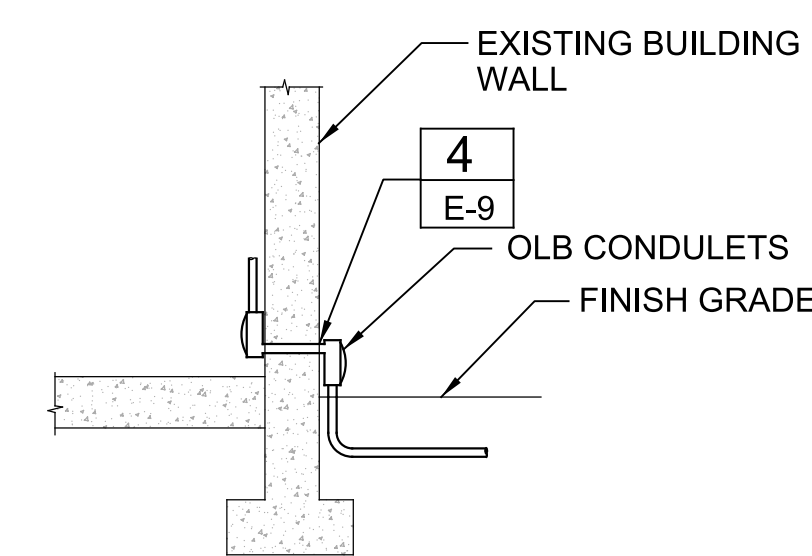
**8** EQUIPMENT HOUSE KEEPING PAD  
VAR. NOT TO SCALE



**9** WALL OR COLUMN MOUNTED DEVICE  
VAR. NOT TO SCALE



**10** EXPANSION COUPLING  
VAR. NOT TO SCALE



**11** CONDUIT ENTRANCE  
VAR. NOT TO SCALE

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DATE	SEPTEMBER 2012

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THEIN WIN, P.E.  
No. 65722

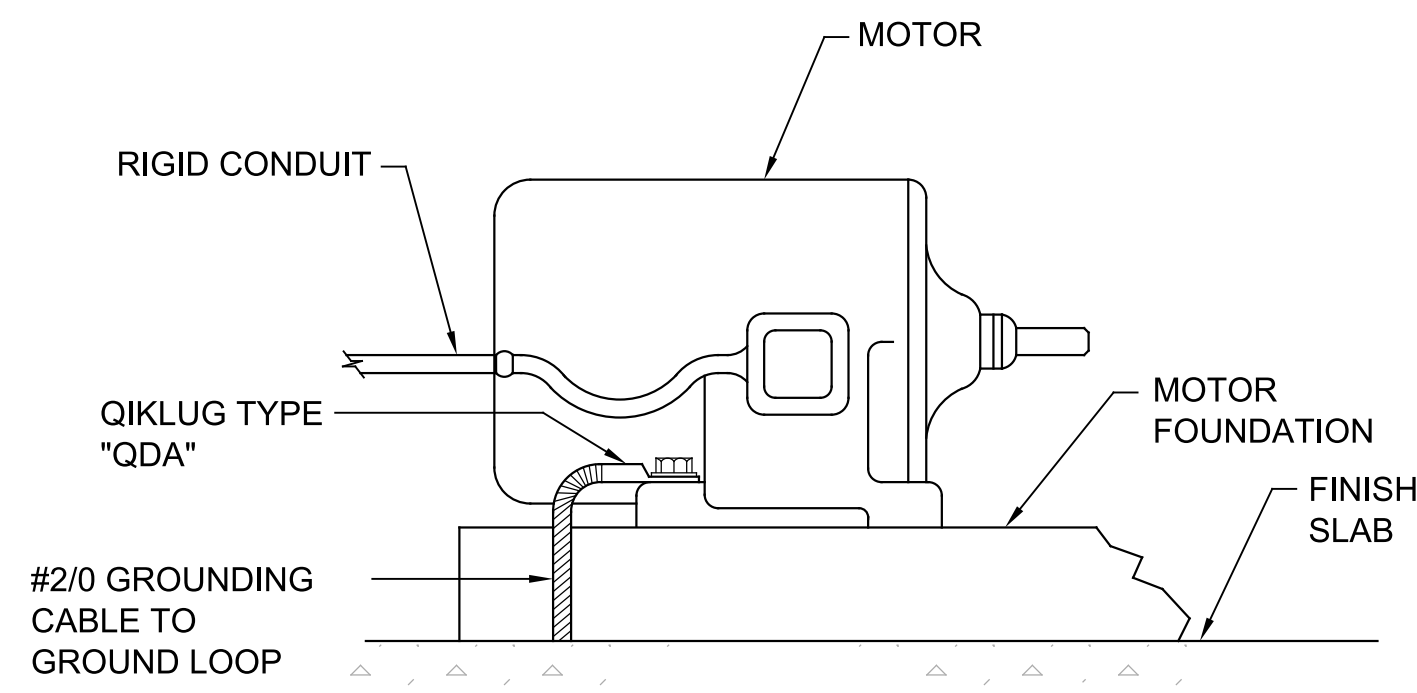


MANATEE COUNTY  
SWWRF HEADWORKS REHABILITATION  
ELECTRICAL  
ELECTRICAL DETAILS - SHEET 1

VERIFY SCALES  
BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

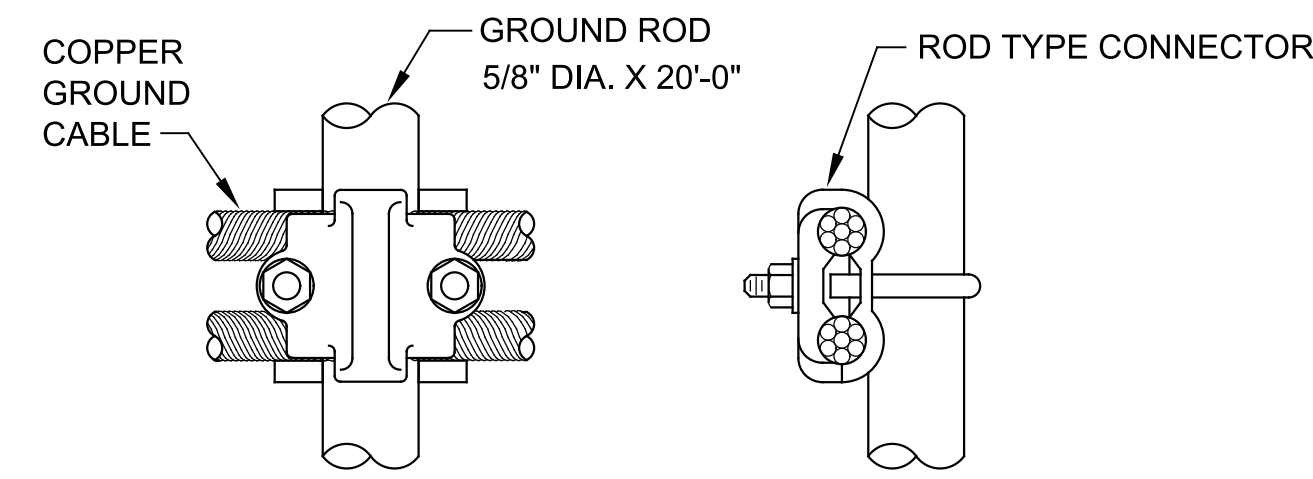
JOB NO.  
7880K10  
DRAWING NO.  
E-9



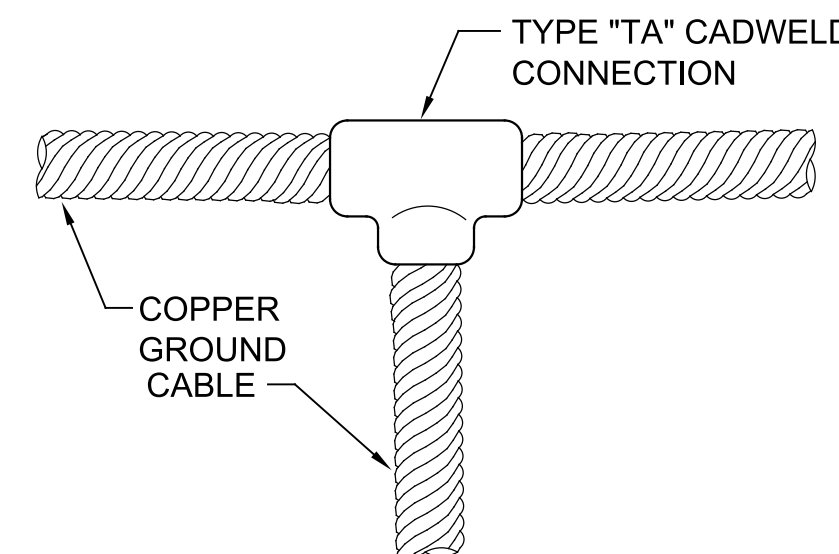


NOTE:  
THIS GROUND IS IN ADDITION TO THE GROUND FROM THE MAIN ELECTRICAL SERVICE.

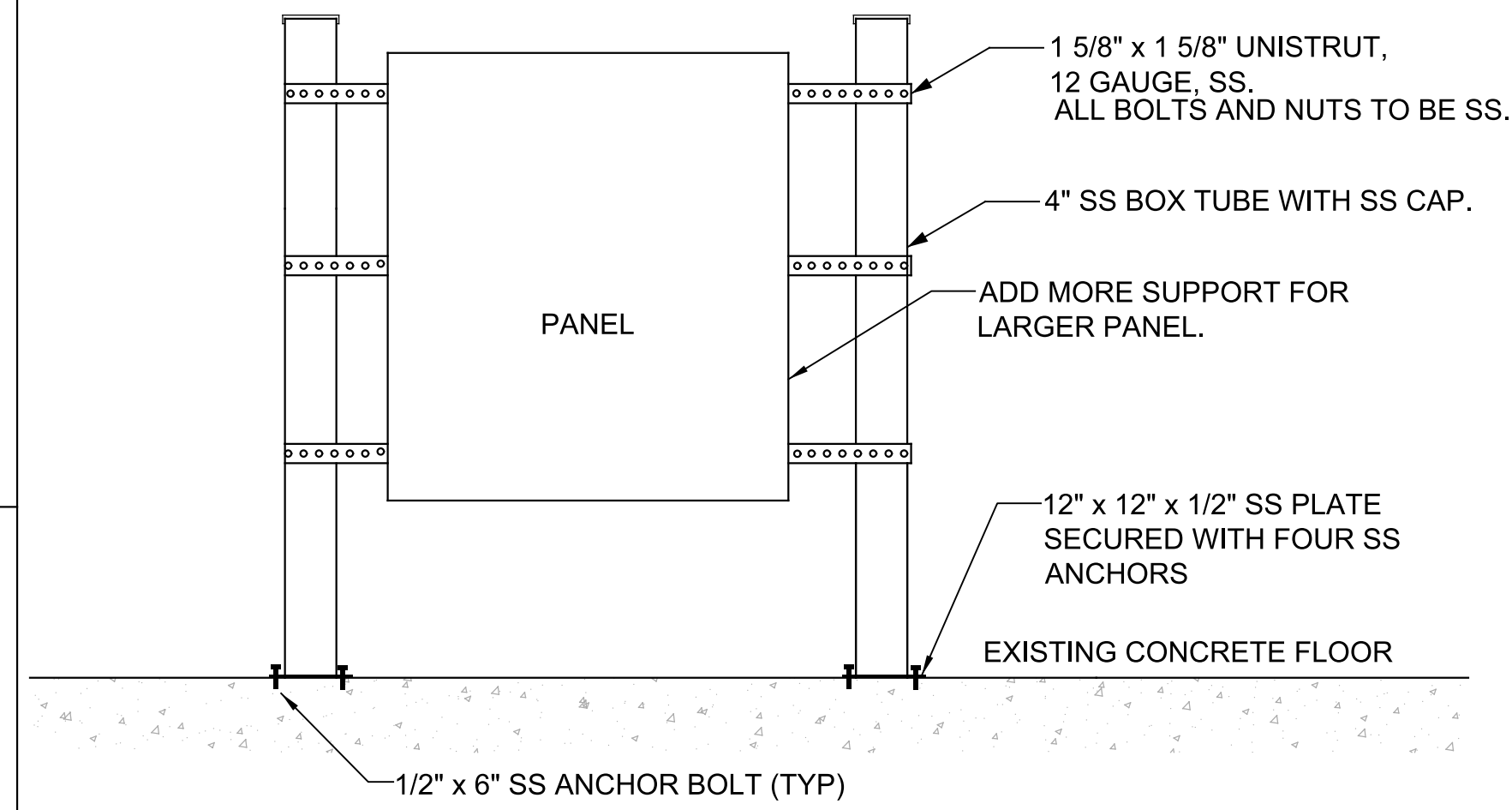
12 VAR. EQUIPMENT GROUNDING DETAIL (TYPICAL) NOT TO SCALE



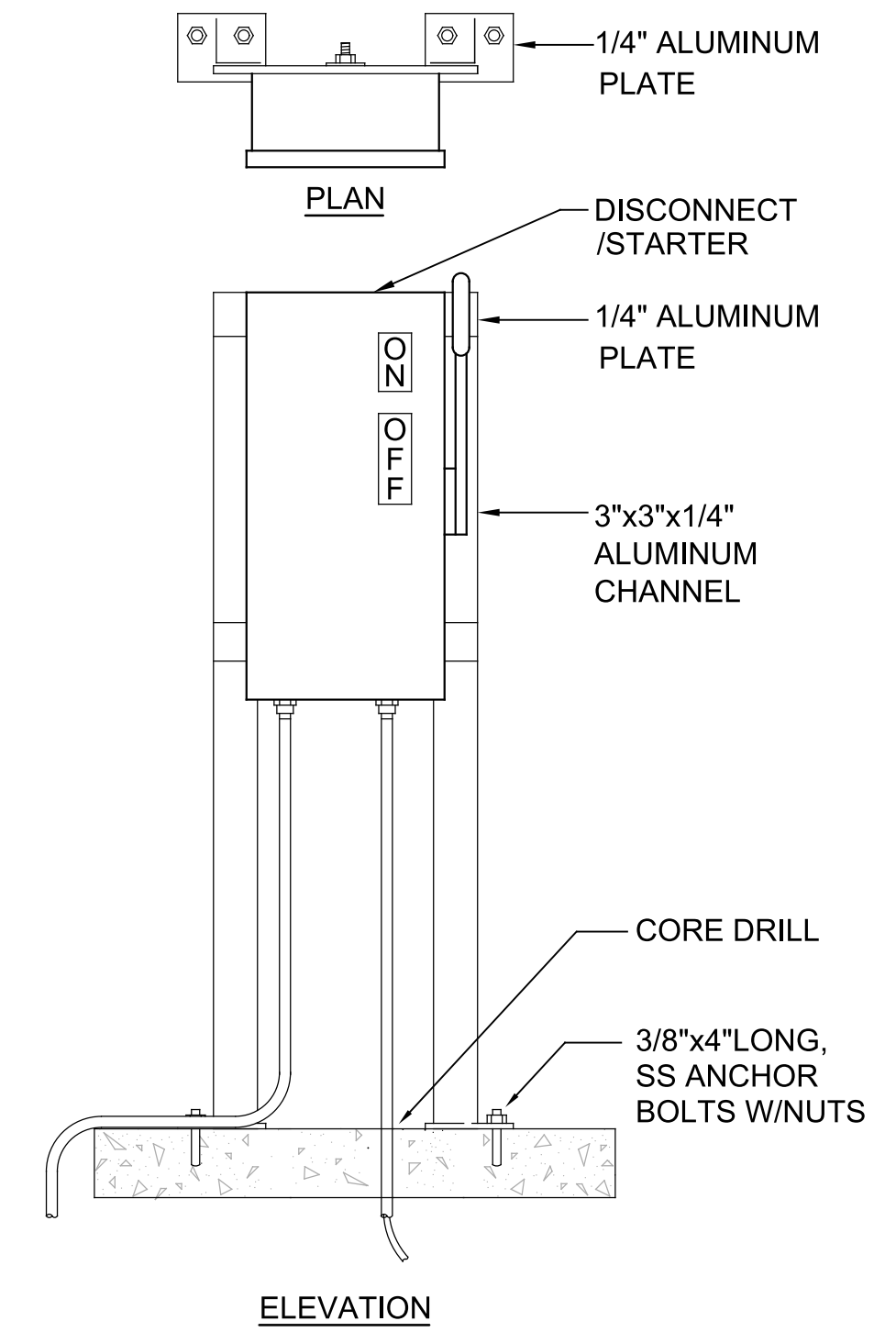
13 VAR. CABLE TO ROD CONNECTION NOT TO SCALE



14 VAR. GROUND CABLE CONNECTION NOT TO SCALE

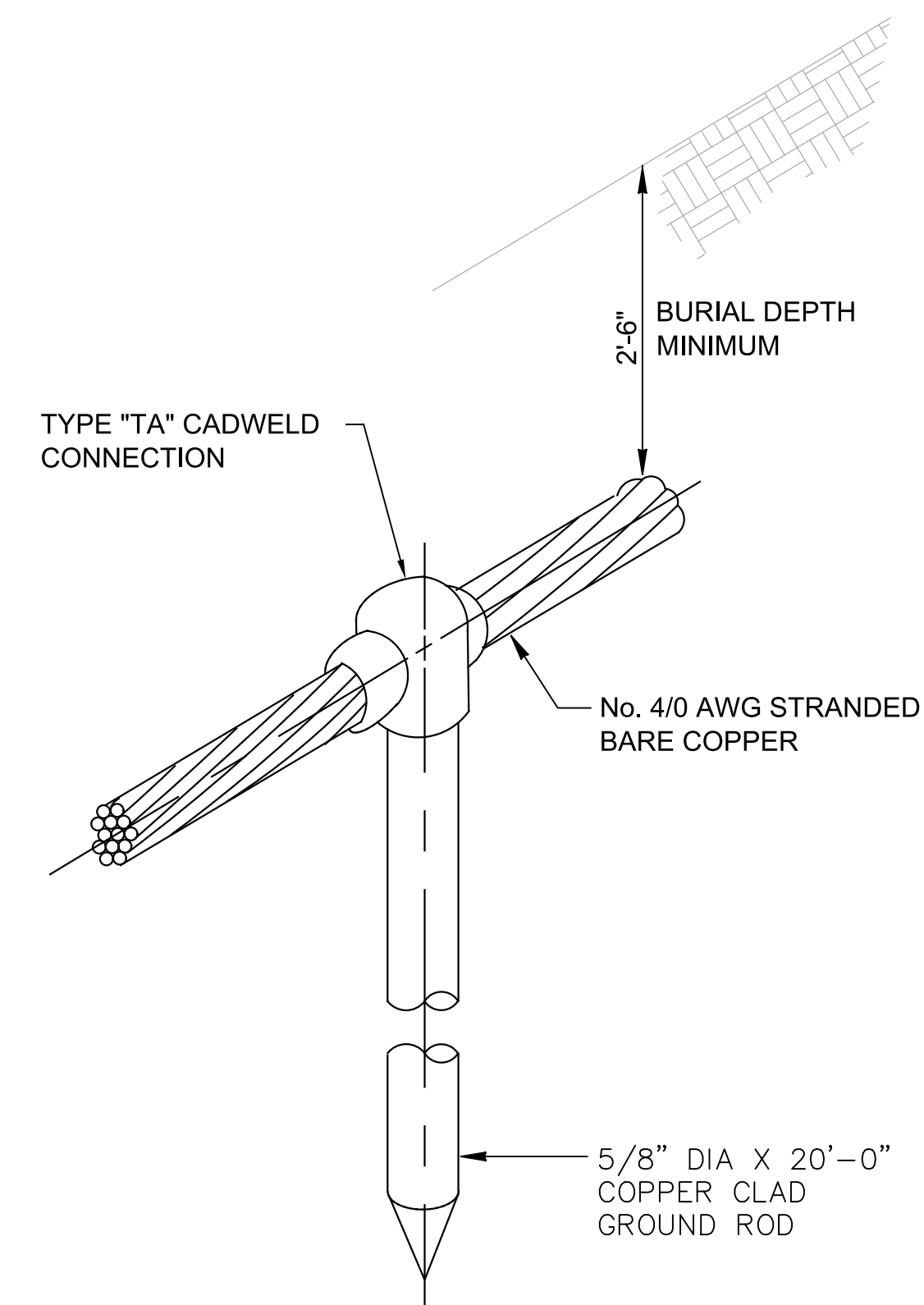


15 VAR. PANEL MOUNTING DETAIL NOT TO SCALE

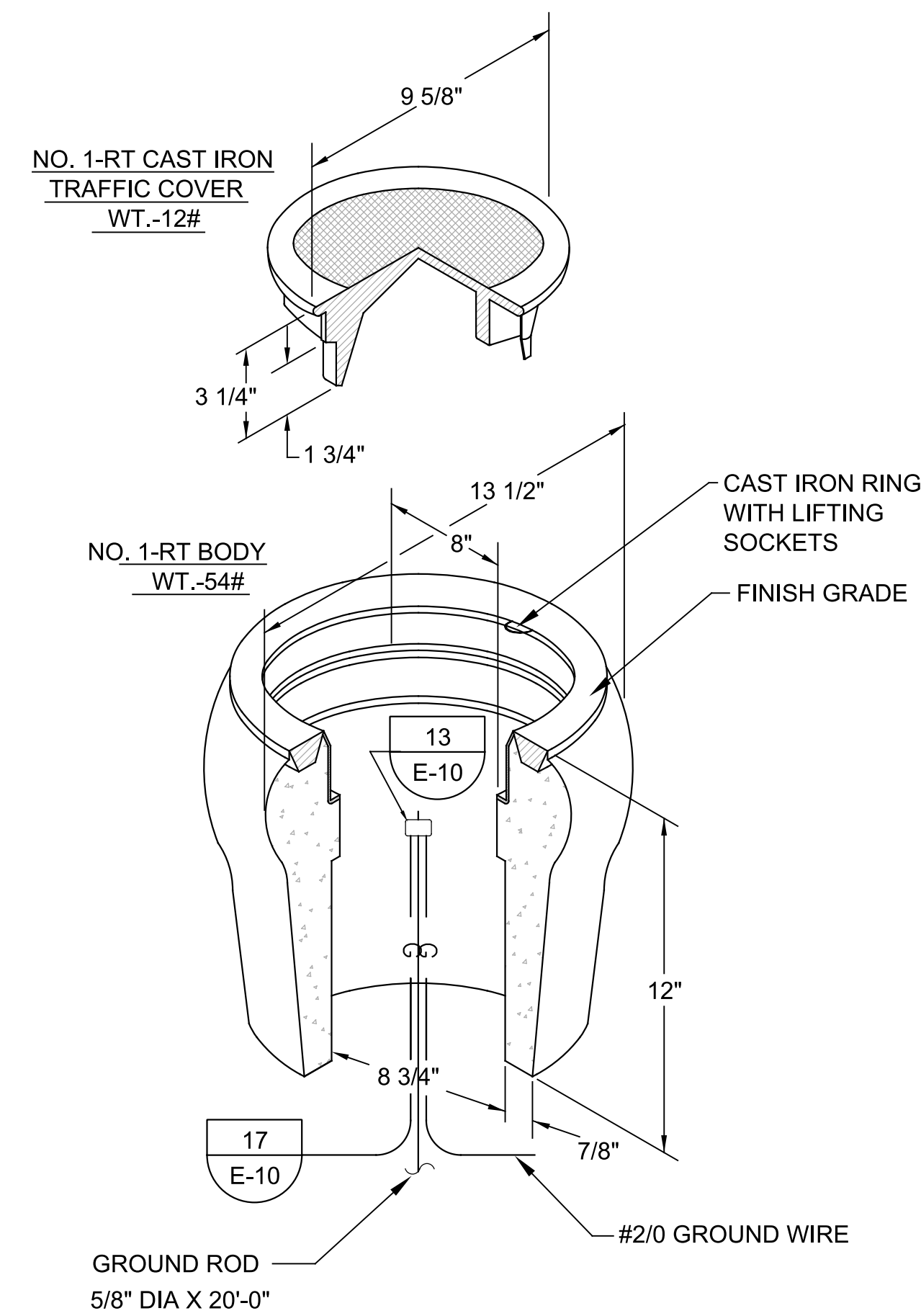


16 VAR. DISCONNECT, COMBINATION STARTER, OR SMALL PANEL PEDESTAL NOT TO SCALE

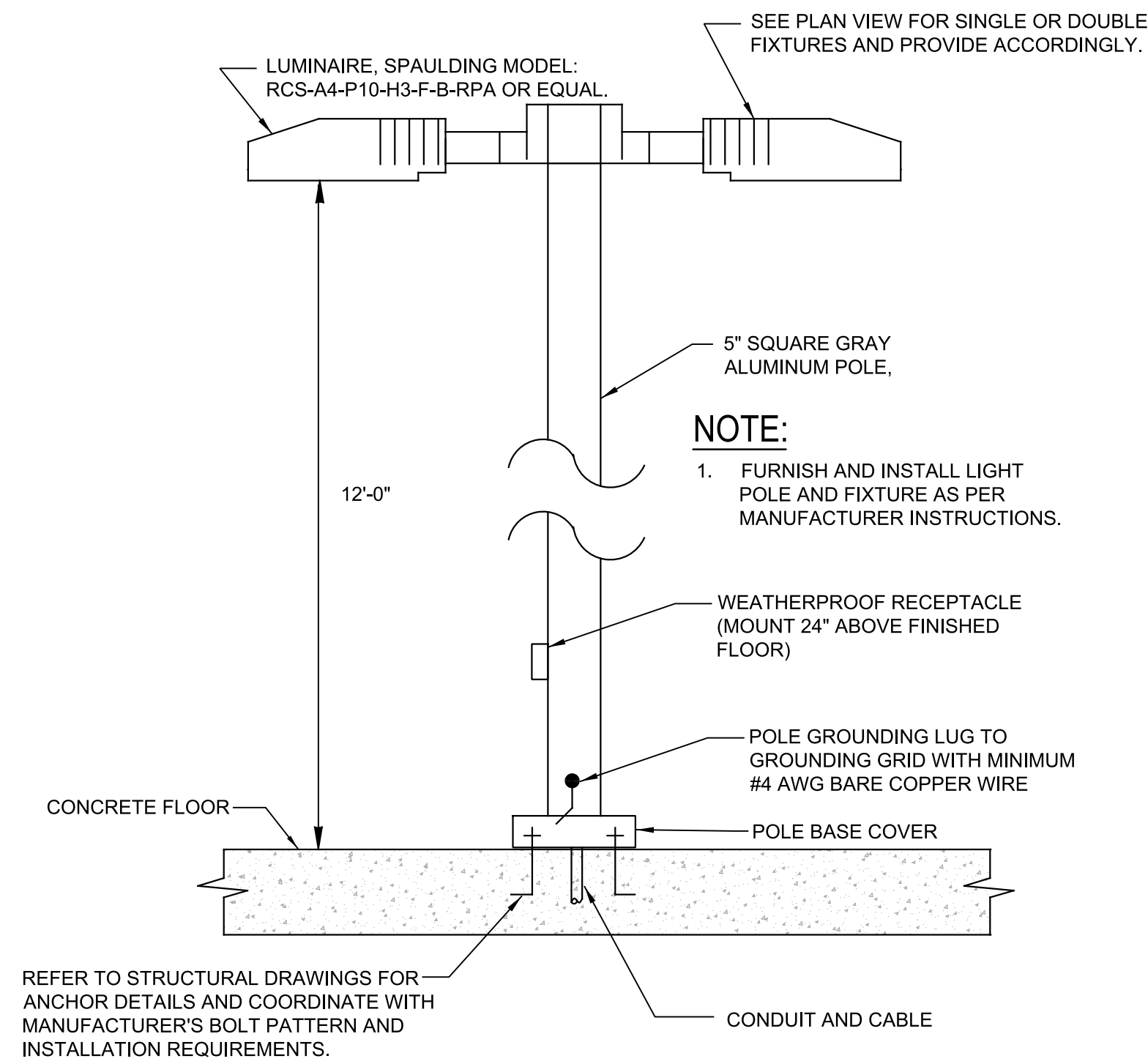
NOTE: FOR SMALL CONTROL PANEL, MINI POWER ZONE, ETC. USE THIS DETAIL FOR MOUNTING. ADJUST THE ALUMINUM CHANNEL SIZE AS REQUIRED.



17 VAR. GROUND ROD DETAIL NOT TO SCALE



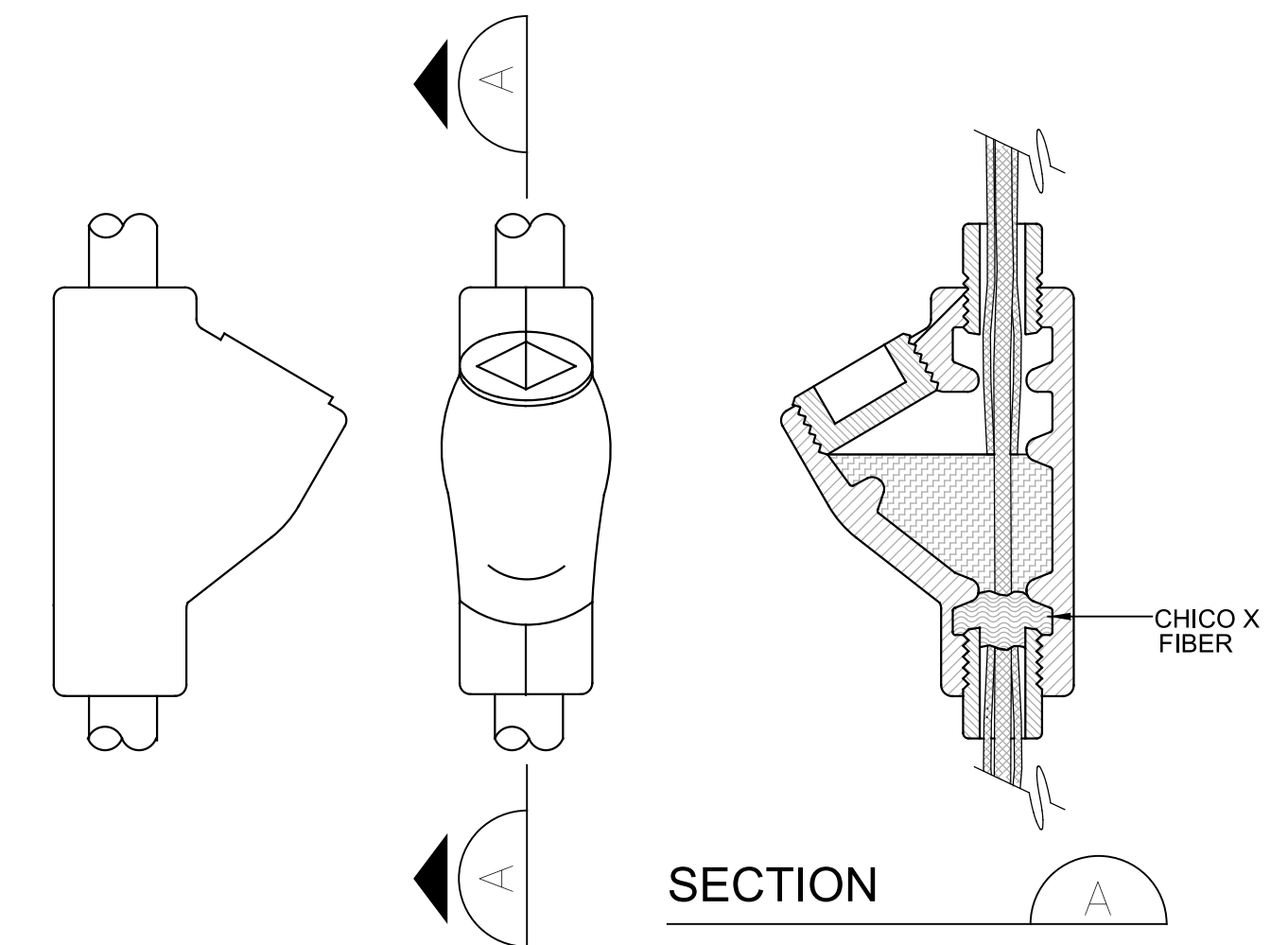
18 VAR. GROUND TEST WELL DETAIL NOT TO SCALE



19 VAR. LIGHT POLE ON CONCRETE FLOOR DETAIL NOT TO SCALE

**WINDLOADING NOTE:**

1. ALL POLE INSTALLATIONS MUST MEET FLORIDA BUILDING CODE WIND LOADING REQUIREMENT WITH APPROPRIATE WIND GUST FACTOR FOR THE LOCATION OF INSTALLATION. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL, A POLE WIND LOADING CALCULATION SIGNED & SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED POLE AND INSTALLATIONS WILL MEET THE GIVEN WIND LOADING REQUIREMENT.



20 VAR. CONDUIT SEAL NOT TO SCALE

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No. 65722



MANATEE COUNTY	
SWWRF HEADWORKS REHABILITATION	
ELECTRICAL	
ELECTRICAL DETAILS - SHEET 2	

VERIFY SCALES	JOB NO. 7880K10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. E-10
0 1"	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

INSTRUMENT SOCIETY OF AMERICA TABLE

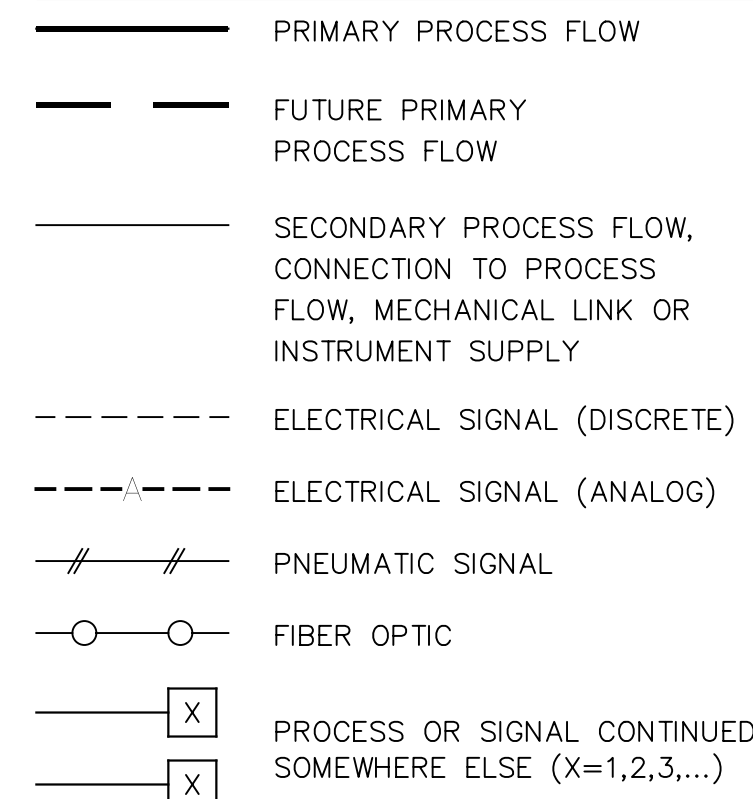
LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)		ALARM		USERS CHOICE (*)
B	BURNER FLAME		USERS CHOICE (*)	USERS CHOICE (*)	
C	CONDUCTIVITY			CONTROL	CLOSE
D	DENSITY (S.G.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION				MIDDLE
N	STROKE		USERS CHOICE (*)	USERS CHOICE (*)	NORMAL
O	LOOP VEH. DETECTOR		OFFICE		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT		INTEGRATE		
R	RATIO		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (*)		MULTIFUNCTION (*)		
V	VIBRATION			VALVE	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (*)		UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	PHOTO CELL		LIGHT SOURCE	RELAY OR COMPUTE (*)	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(\*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL

NOTES:

- COMPONENTS AND PANELS SHOWN WITH A DIAMOND (◆) ARE TO BE PROVIDED UNDER SECTION "INSTRUMENTATION & CONTROLS".
- COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (\*\*) ARE TO BE PROVIDED AS PART OF A PACKAGED OR MECHANICAL SYSTEM.
- COMPONENTS AND PANELS SHOWN WITH A TRIANGLE (▲) ARE EXISTING. COMPONENTS AND PANELS WHICH HAVE NO SYMBOL ATTACHED TO IT ARE EXISTING.
- COMPONENTS AND PANELS SHOWN WITH A HEXAGON (⬡) ARE EXISTING TO BE MODIFIED AND/OR RELOCATED.
- COMPONENTS AND PANELS SHOWN WITH A SQUARE (■) ARE FUTURE. DURING SHOP DRAWING PREPARATION, THE CONTRACTOR SHALL FIELD VERIFY ALL THE EXISTING ANALOG AND DISCRETE POINTS FOR DETAILED INTERFACE AND INCLUDE IT AS PART OF SUBMITTAL.
- THE SINGLE INSTRUMENT & CONTROL SUPPLIER SHALL HAVE A U.L. APPROVED SHOP.
- ALL PROCESS TUBING AND ISOLATION VALVES SHALL BE 1/4" - 316 S.S., UNLESS OTHERWISE NOTED.
- ALL CONTROL PANELS SHALL BE FURNISHED AND INSTALLED WITH A 1P-15A CIRCUIT BREAKER, UNLESS OTHERWISE NOTED.
- SEE MECHANICAL PLANS AND SPECIFICATIONS FOR EQUIPMENT NUMBERS.

INSTRUMENT LINE SYMBOLS

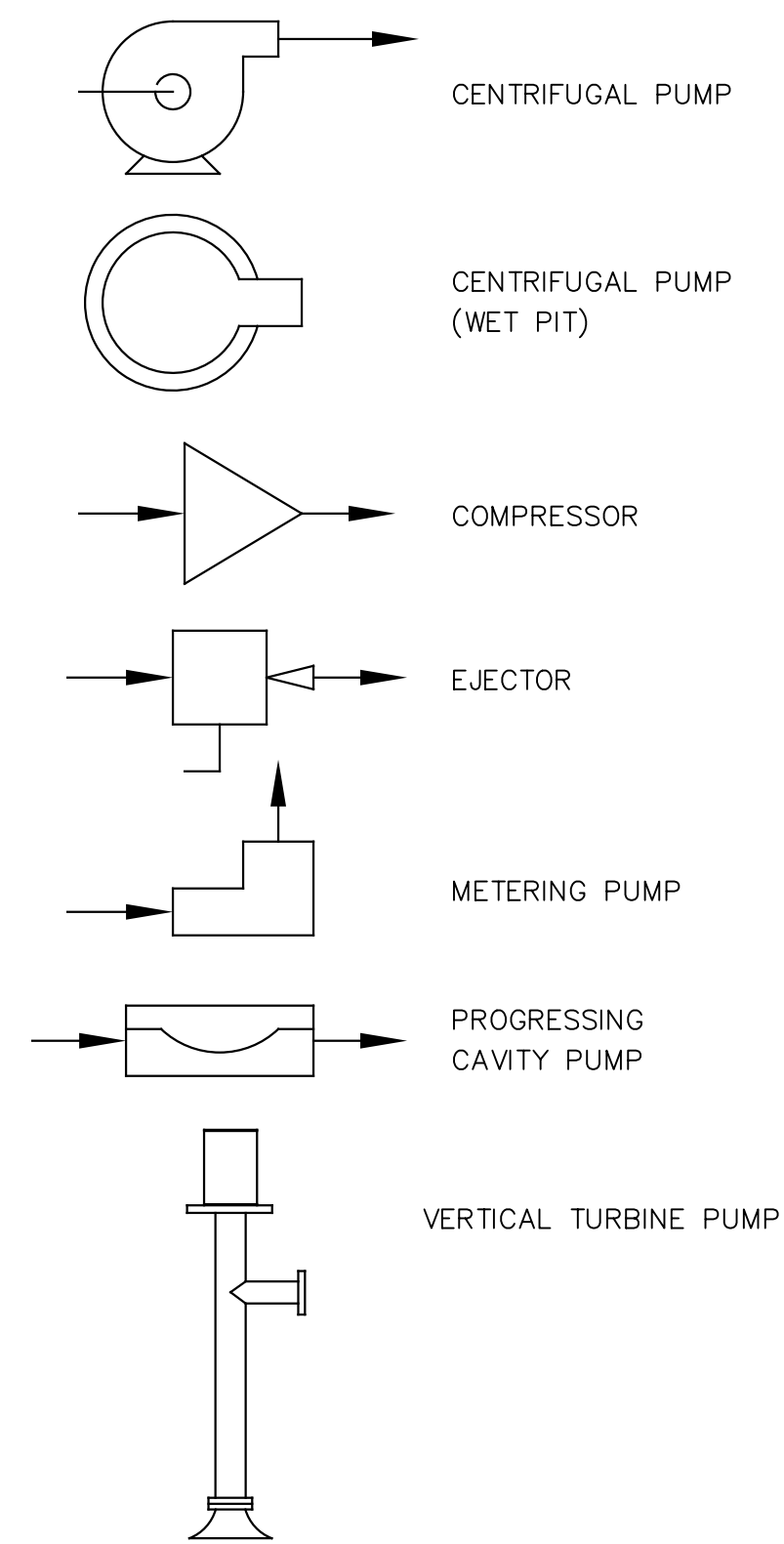


INSTRUMENT ABBREVIATION

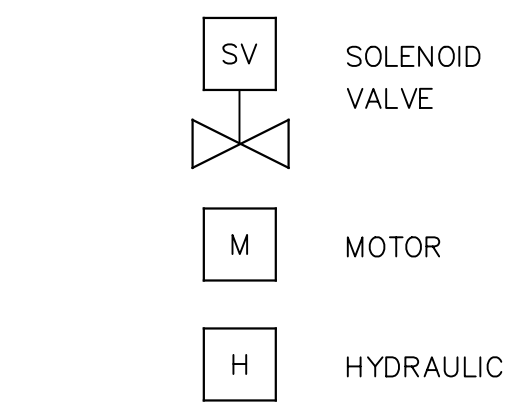
ACC	ACCELERATOR
BFP	BELT FILTER PRESS
CL2	CHLORINE
CLW	CLEARWELL
COM	COMMON
COND	CONDUCTIVITY
CP	CONTROL PANEL
DI, AI	DISCRETE INPUT, ANALOG INPUT
DO, AO	DISCRETE OUTPUT, ANALOG OUTPUT
D.O.	DISSOLVED OXYGEN
DR	DISTANCE RELAY
EFFL	EFFLUENT
EP	ELECTRICAL PANEL
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FD	CHEMICAL FEEDER
FIL	FILTER
GEN	GENERATOR
HLO	HIGH-LOW-OFF
HLOR	HIGH-LOW-OFF-REMOTE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HOTC	HAND-OFF-TIMER-COMPUTER
H/L	HIGH/LOW
HSP	HIGH SERVICE PUMP
INFL	INFLUENT
JP	JOCKEY PUMP
LOS	LOCK-OUT-STOP
LPU	LINE PROTECTION UNIT
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
ME	MISCELLANEOUS EQUIPMENT
M.G.	MILLION GALLON
MOV	MOTOR OPERATED VALVE
OCA	OPEN-CLOSE-AUTO
OC	OPEN-CLOSE
OO	ON-OFF
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
OSCR	OPEN-STOP-CLOSE-REMOTE
PH	HYDROGEN ION CONCENTRATION
PRES	PRESSURE
RES	RESTORE
RF	RF (ADMITTANCE) LEVEL MONITOR
RIP, RIO	REMOTE I/O PANEL
R/L	REMOTE/LOCAL
RSP	REMOTE SETPOINT
SA	SURGE ARRESTER
SEC	SECONDARY
SL	SLAKER
SF	SONIC FLOWMETER
SP	SETPOINT
SS	START/STOP
ST	STEP
STOR	STORAGE
SUS	SUSPENDED SOLIDS
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TD	THERMAL DISPERSION
TP	TRANSFER PUMP
TURB	TURBIDITY
VFD	VARIABLE FREQUENCY DRIVE

INSTRUMENTATION LEGEND

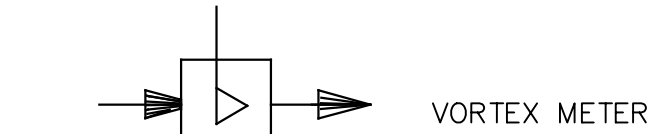
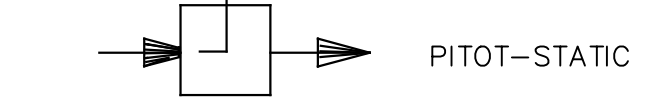
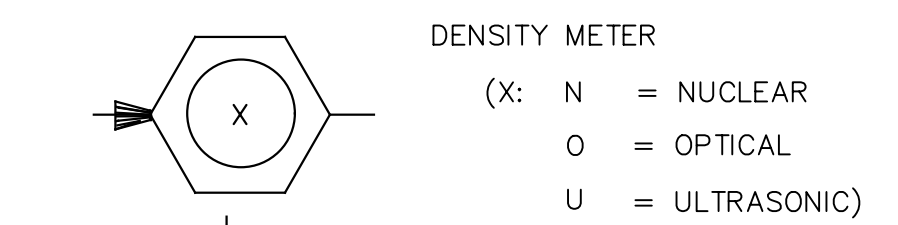
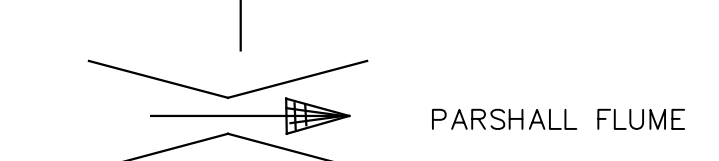
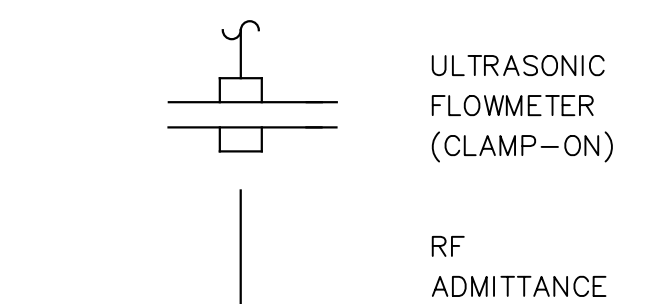
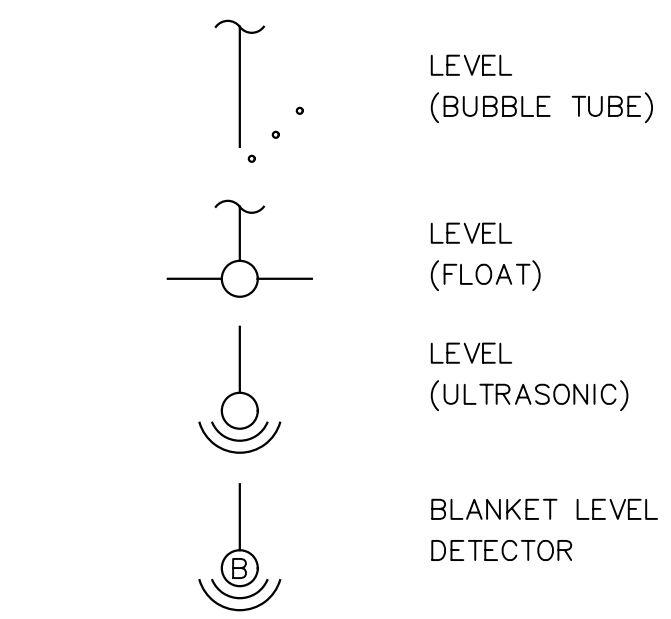
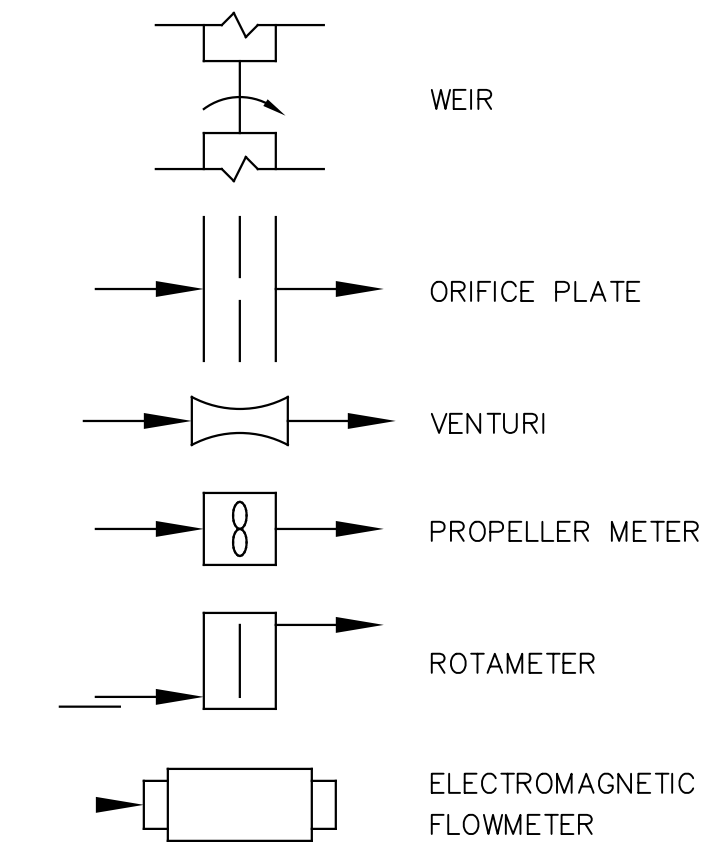
PUMPS & COMPRESSORS



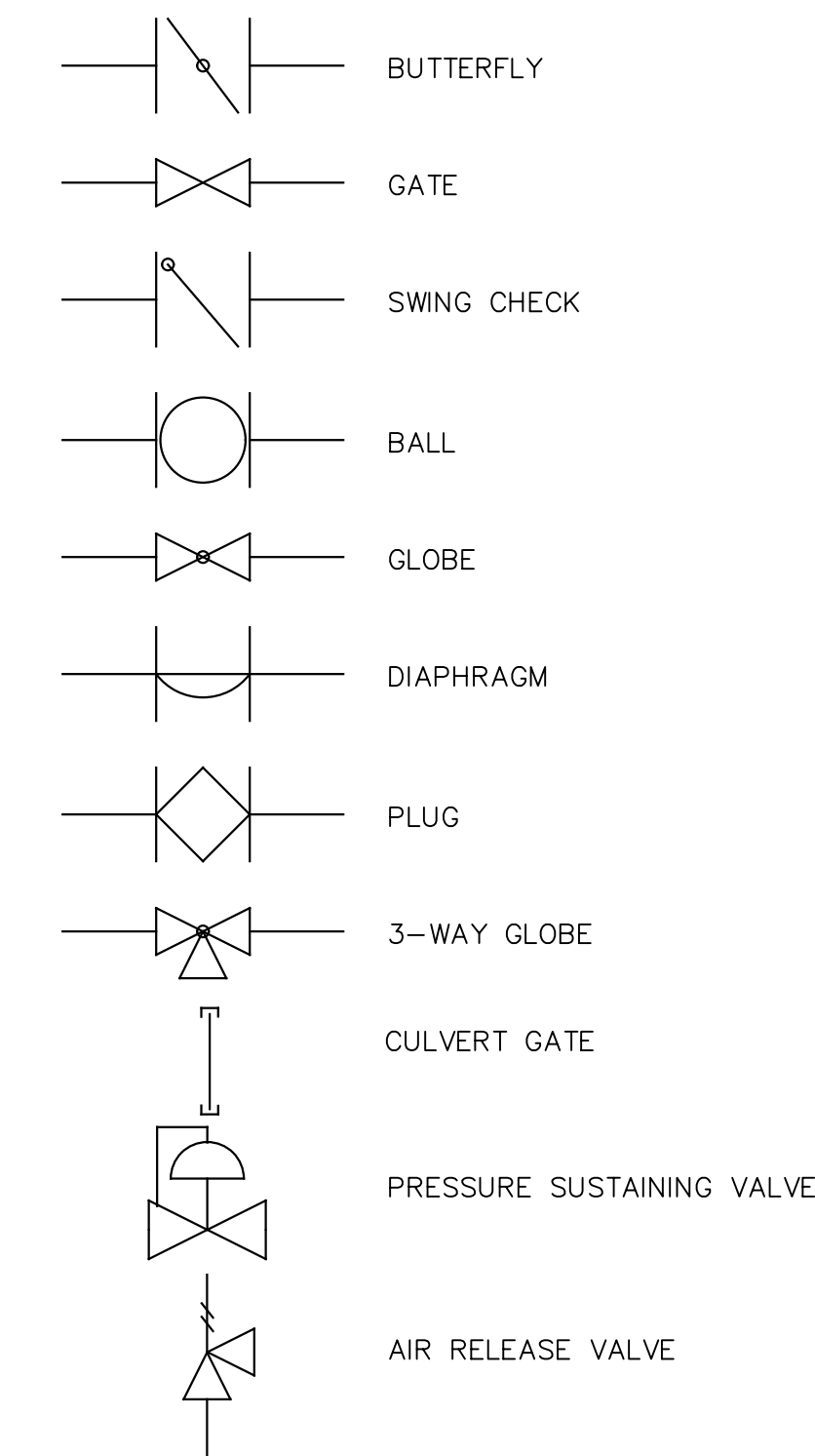
ACTUATOR OR OPERATORS



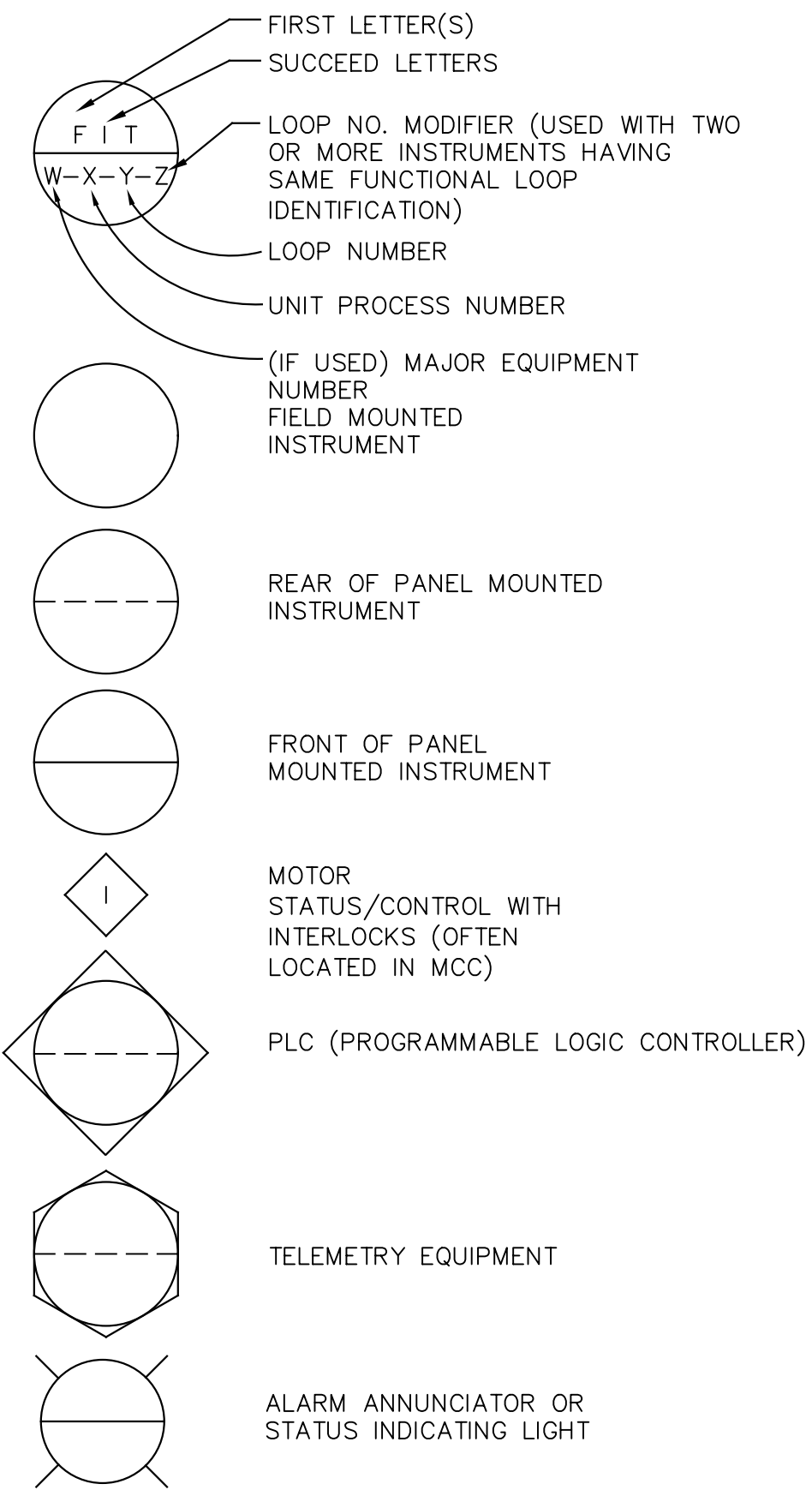
PRIMARY ELEMENTS



VALVES & GATES



INSTRUMENT IDENTIFICATION



LAST SAVED BY: WTW

REV	DATE	BY	DESCRIPTION

DESIGNED	TW
DRAWN	DEU
CHECKED	PFH
DATE	SEPTEMBER 2012

**HILLERS ELECTRICAL ENGINEERING, INC.**  
 23257 STATE ROAD 7, SUITE 100  
 BOCA RATON, FLORIDA 33428  
(561) 451-9185  
 (561) 451-4886 FAX  
 LICENSE NO: EB 0006877

THEIN WIN, P.E.  
 No. 66722




MANATEE COUNTY  
**SWWRF HEADWORKS REHABILITATION**  
 ELECTRICAL  
**INSTRUMENTATION LEGEND AND SYMBOLS**

VERIFY SCALES  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

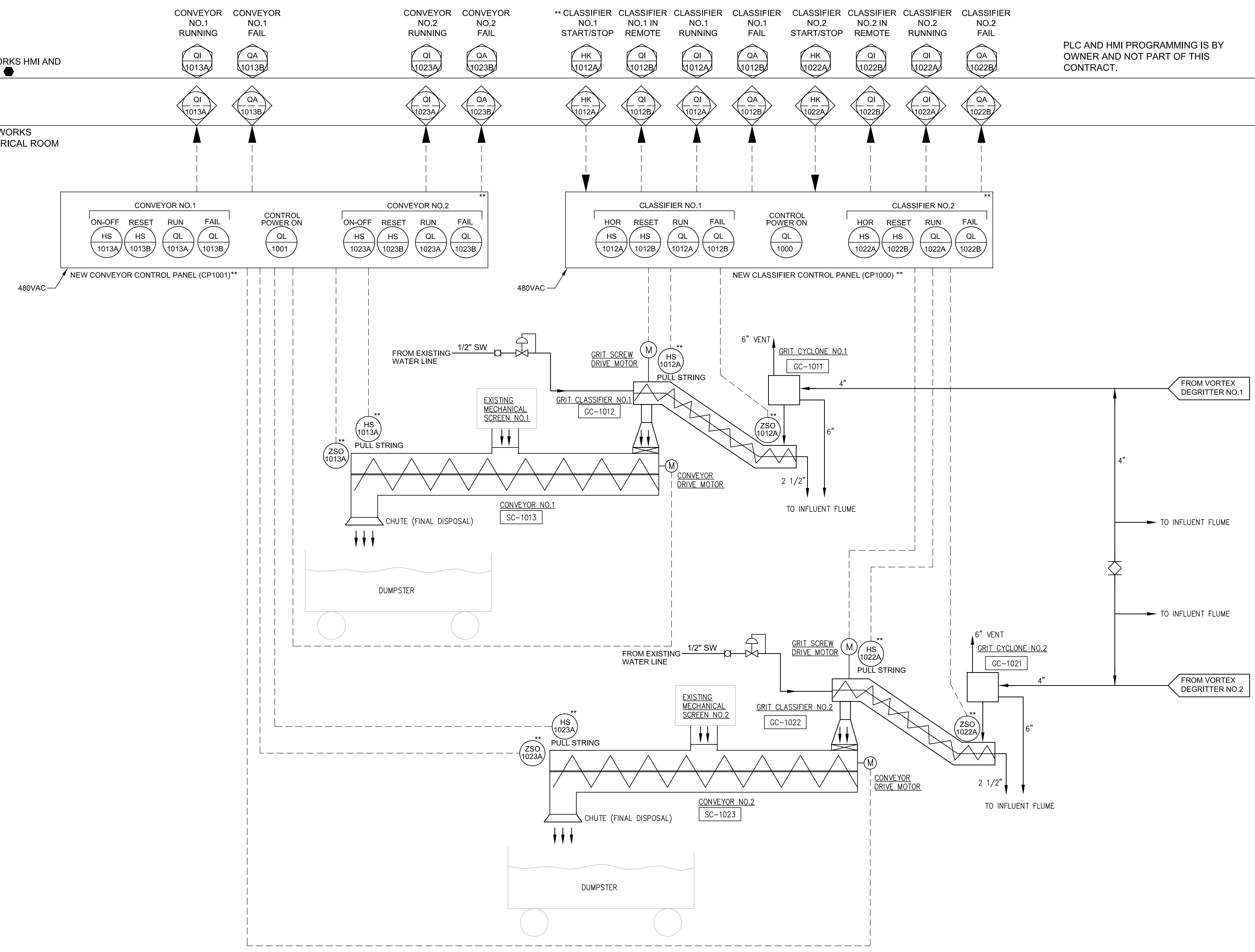
JOB NO. 7880K10  
 DRAWING NO. N-1

EXISTING HEADWORKS HMI AND PLANT HMI/SCADA ●

EXISTING PLANT PLC ●

LOCATION: HEADWORKS BUILDING - ELECTRICAL ROOM

PLC AND HMI PROGRAMMING IS BY OWNER AND NOT PART OF THIS CONTRACT.



LAST SAVED BY: nwn

REV	DATE	BY	DESCRIPTION

DESIGNED TW
DRAWN DEU
CHECKED PFH
DATE SEPTEMBER 2012

**HILLERS ELECTRICAL ENGINEERING, INC.**  
 23257 STATE ROAD 7, SUITE 100  
 BOCA RATON, FLORIDA 33428  
 (561) 451-9165  
 (561) 451-4886 FAX  
 LICENSE NO: EB 0006877

THEIN WIN, P.E.  
 No. 65722



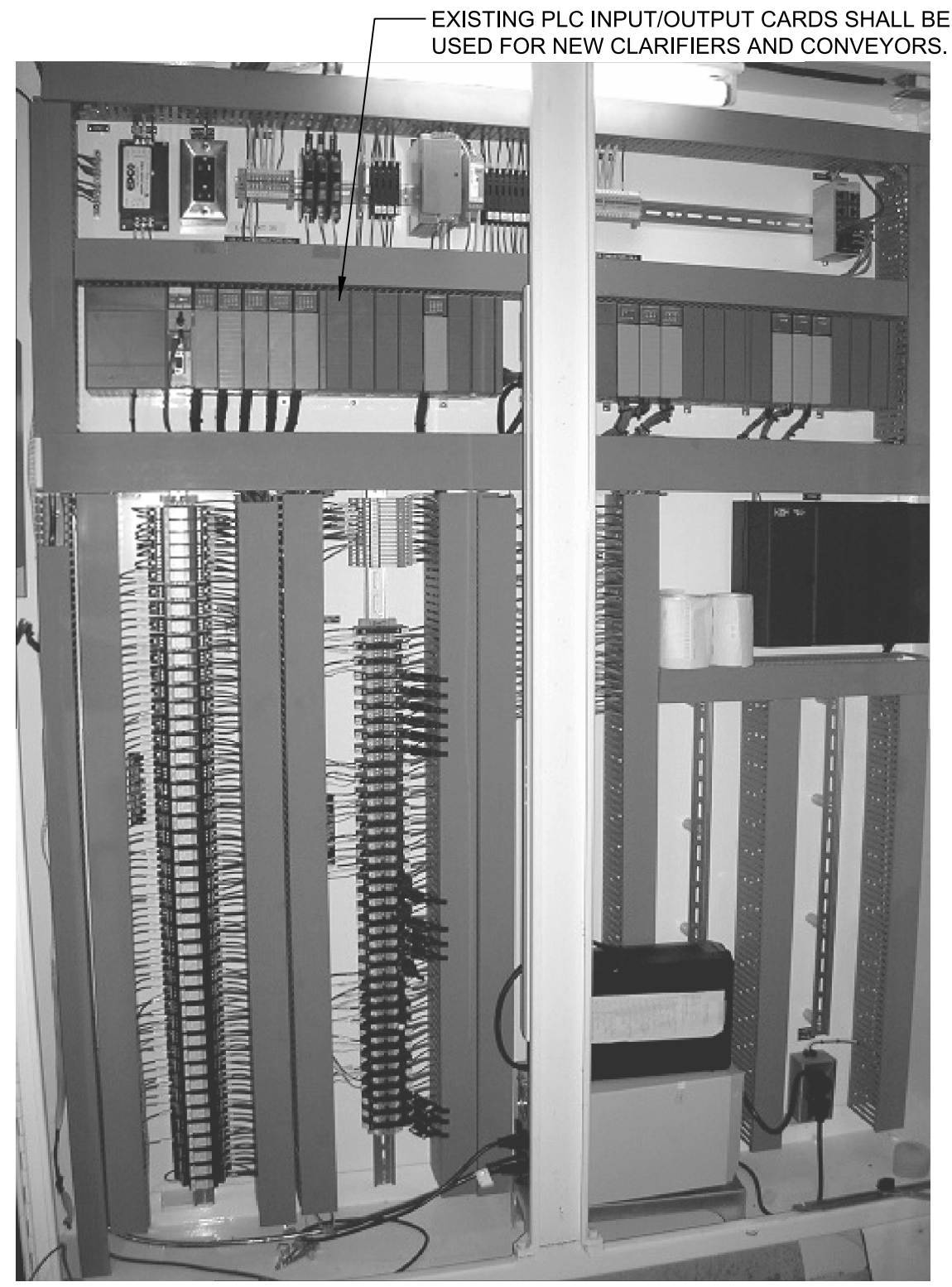
MANATEE COUNTY  
 SWWRF HEADWORKS REHABILITATION  
 ELECTRICAL  
 P&ID - GRIT CLASSIFIERS AND CONVEYORS

VERIFY SCALES  
 BAR IS ONE INCH ON ORIGINAL DRAWING  
 0 1"  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.  
7880K10  
 DRAWING NO.  
N-2



EXISTING HEADWORKS PLC PANEL  
NOT TO SCALE



EXISTING HEADWORKS PLC PANEL - INTERIOR  
NOT TO SCALE

EXISTING HEADWORKS PLC PANEL AS-BUILT I/O DRAWINGS ARE AVAILABLE IN THE PANEL. CONTRACTOR SHALL IDENTIFY AND VERIFY THE SPARE I/O POINTS AS STATED IN DRAWING E-8 FOR NEW SIGNALS. TERMINATE NEW SIGNALS USING EXISTING SPARE TERMINAL POINTS AS SHOWN ON AS-BUILT DRAWINGS. IF ANY SPARE POINTS ARE USED, COORDINATE WITH ENGINEER TO CONNECT TO OTHER SPARE POINTS. PROVIDE UPDATE LOOP DIAGRAMS AFTER INSTALLATION.

LAST SAVED BY: WTW

				DESIGNED TW	<b>HILLERS ELECTRICAL ENGINEERING, INC.</b> 23257 STATE ROAD 7, SUITE 100 BOCA RATON, FLORIDA 33428 <small>(561) 451-9185 (561) 451-4886 FAX LICENSE NO: EB 0006877</small>		MANATEE COUNTY		VERIFY SCALES	JOB NO. 7880K10
				DRAWN DEU			SWWRF HEADWORKS REHABILITATION		BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO.
				CHECKED PFH			ELECTRICAL		0  1"	N-3
				DATE SEPTEMBER 2012			EXISTING PLC PANEL PHOTOS AND INSTRUMENTATION DETAIL		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	
REV	DATE	BY	DESCRIPTION	THEIN WIN, P.E. No. 65722						
PROJECT NO: 7880K10				FILENAME: 7880K10-N-03.dwg						