



FILE NAME:  
FILE DATE:

7/04

CONDUIT/CONDUCTOR SCHEDULE  
THHN, THWN, THWN-2

AMP RATING	DRAWING ID TAG.	CONDUCTOR QTY.*	CONDUCTOR SIZE	MIN. CONDUIT SIZE	EXCEPTIONS
				SIZE	
20**	212	2	#12	3/4"	
20+	312	3		3/4"	
	412	4		3/4"	
30**	20	2	#10	3/4"	
30+	30	3		3/4"	
	40	4		3/4"	
40**	28	2	#8	3/4"	
50+	38	3		3/4"	
	48	4		3/4"	
55**	26	2	#6	3/4"	
65+	36	3		3/4"	
	46	4		3/4"	1"(C9)
70**	24	2	#4	3/4"	1"(C2,C9)
85+	34	3		1"	3/4"(C4),1-1/4"(C9)
	44	4		1"	1-1/4"(C9)
95**	22	2	#2	1"	
115+	32	3		1"	1-1/4"(C9)
	42	4		1-1/4"	
110**	21	2	#1	1-1/4"	1"(C3,C4)
130+	31	3		1-1/4"	1"(C3)
	41	4		1-1/4"	1-1/2"(C2,C9,C10)
150	210	2	1/0	1-1/4"	
	310	3		1-1/4"	1-1/2"(C3,C9)
	410	4		1-1/2"	2"(C9)
175	220	2	2/0	1-1/4"	1-1/2"(C3,C4,C9)
	320	3		1-1/2"	
	420	4		2"	
200	230	2	3/0	1-1/2"	1-1/4(C4)
	330	3		1-1/2"	2"(C3,C9)
	430	4		2"	
230	240	2	4/0	1-1/2"	2"(C3)
	340	3		2"	
	440	4		2"	2-1/2"(C9)
255	225	2	250 KCMIL	2"	1-1/2"(C4)
	325	3		2"	2-1/2"(C1,C8)
	425	4		2-1/2"	2"(C4)
310	235	2	350 KCMIL	2"	2-1/2"(C9)
	335	3		2-1/2"	2"(C4)
	435	4		3"	2-1/2"(C1,C4)
380	250	2	500 KCMIL	2-1/2"	2"(C4)
	350	3		3"	2-1/2"(C1,C4)
	450	4		3"	3-1/2"(C9)
475	275	2	750 KCMIL	3"	
	375	3		3-1/2"	3"(C1,C7,C8)
	475	4		4"	3-1/2"(C1,C4,C8)

\* CONDUCTOR QUANTITY DOES NOT INCLUDE GROUNDING CONDUCTORS. SEE EQUIPMENT GROUNDING CONDUCTORS FOR WIRE SIZES.

WHERE: C1 = ELECTRICAL METALLIC TUBING      "\*\*\*" = 60°C RATING  
C2 = ELECTRICAL NON-METALLIC TUBING    "+" = 75°C RATING  
C3 = FLEXIBLE STEEL CONDUIT  
C4 = INTERMEDIATE METALLIC CONDUIT  
C7 = LIQUIDTIGHT FLEXIBLE METAL CONDUIT  
C8 = RIGID METALLIC CONDUIT  
C9 = PVC SCHEDULE 80 CONDUIT  
C10 = PVC SCHEDULE 40 CONDUIT

"\*\*\*" = RATED AMPACITY AT 60°C  
"+ " = RATED AMPACITY AT 75°C  
USE 60°C CONDUCTOR RATING WHEN TERMINATION RATINGS ARE NOT PUBLISHED

GROUNDING ELECTRODE  
CONDUCTOR SERVICE ENTRANCE  
OR SEPARATELY DERIVED  
SYSTEM

COPPER CONDUCTOR	WIRE SIZE
#2 OR SMALLER	#8
1 OR 1/0	#6
2/0 OR 3/0	#4
>3/0 THRU 350 KCMIL	#2
>350 KCMIL THRU 600 KCMIL	1/0

PROJECT TAG LIST  
HVAC EQUIPMENT

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
36	CU-1	CONDENSING UNIT	OUTSIDE	CONTRACTOR	CONTRACTOR
39	FC-1	FAN COIL UNIT	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
40	FC-2	FAN COIL UNIT	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
41	FC-3	FAN COIL UNIT	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
42	RTU-1	ROOF TOP UNIT	OUTSIDE	CONTRACTOR	CONTRACTOR
43	UH-1	UNIT HEATER	PUMP RM.	CONTRACTOR	CONTRACTOR
44	UH-2	UNIT HEATER	PUMP RM.	CONTRACTOR	CONTRACTOR
45	UH-3	UNIT HEATER	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR

PUMP AND EQUIPMENT

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
1	XFMR	UTILITY TRANSFORMER	OUTSIDE	UTILITY CO.	UTILITY CO.
2	CTS	CURRENT TRANSFORMER SWITCHBOARD	OUTSIDE	CONTRACTOR	CONTRACTOR
3	MSD	MAIN SERVICE DISCONNECT	OUTSIDE	CONTRACTOR	CONTRACTOR
4	MS-1	METER SOCKET	OUTSIDE	CONTRACTOR	CONTRACTOR
5	ATS	AUTOMATIC TRANSFER SWITCH	OUTSIDE	CONTRACTOR	CONTRACTOR
6	GEN	BACKUP POWER GENERATOR	OUTSIDE	CONTRACTOR	CONTRACTOR
7	MDP	PANELBOARD MDP	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
8	PNL H	PANELBOARD H	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
9	XFMR L	TRANSFORMER L	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
10	PNL L	PANELBOARD L	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
11	P-1	PUMP NO. 1	PUMP RM.	CONTRACTOR	CONTRACTOR
12	P-2	PUMP NO. 2	PUMP RM.	CONTRACTOR	CONTRACTOR
13	P-3	PUMP NO. 3	PUMP RM.	CONTRACTOR	CONTRACTOR
14	P-4	PUMP NO. 4	PUMP RM.	FUTURE	FUTURE
15	P-5	PUMP NO. 5	PUMP RM.	FUTURE	FUTURE
16	VFD-1	VFD NO. 1	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
17	VFD-2	VFD NO. 2	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
18	VFD-3	VFD NO. 3	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
19	RVSS-4	REDUCED VOLTAGE SOFT STARTER P#4	ELECTRICAL RM.	FUTURE	FUTURE
20	RVSS-5	REDUCED VOLTAGE SOFT STARTER P#5	ELECTRICAL RM.	FUTURE	FUTURE
21	CP-1	MAIN CONTROL PANEL/RTU	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
22	CP-2	RELAY CONTROL PANEL	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
23	GCS-1	GATE CONTROL STATION	OUTSIDE	CONTRACTOR	CONTRACTOR
24	SC-1	SPRINKLER TIME CONTROLLER	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
25	CP-6	GEN. PARALLELING CONTROLLER	BLD. INTERIOR	CONTRACTOR	CONTRACTOR
26	GA-1	GATE OPERATOR	OUTSIDE	CONTRACTOR	CONTRACTOR
27	JWH-1	GEN. JACKET WATER HEATER	OUTSIDE	CONTRACTOR	CONTRACTOR
28	BC-1	GEN. BATTERY CHARGER	OUTSIDE	CONTRACTOR	CONTRACTOR
29	CP-4	SECURITY EQUIP. ENCLOSURE	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
30	CP-5	DE-ICING CONTROL PANEL	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
31	DDBB-1	DE-ICE JUNCTION BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
32	DDBB-2	DE-ICE JUNCTION BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
33	DDBB-3	DE-ICE JUNCTION BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
34	DDBB-4	DE-ICE JUNCTION BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
58	F1	LIGHT FIXTURE	BLD. INTERIOR	CONTRACTOR	CONTRACTOR
59	F2	LIGHT FIXTURE	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
60	F3A	LIGHT FIXTURE	OUTSIDE	CONTRACTOR	CONTRACTOR
61	F3B	LIGHT POLE	OUTSIDE	CONTRACTOR	CONTRACTOR

EQUIPMENT GROUNDING  
CONDUCTORS

FUSE OR CB SIZE	SIZE (COPPER)
15	14
20	12
30	10
40	10
60	10
100	8
200	6
300	4
400	3
500	2
600	1
800	1/0
1000	2/0
1200	3/0
1600	4/0
2000	250
2500	350

SWITCHES

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
66	LSH-1	FLOOR HIGH WATER SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
67	PSH-1	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
68	PSH-2	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
69	PSH-3	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
70	PSH-4	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
71	PSH-5	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.	FUTURE	FUTURE
72	PSL-1	LOW INTAKE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
73	PSL-2	LOW INTAKE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
74	PSL-3	LOW INTAKE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
75	PSL-4	LOW INTAKE PRESSURE SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
76	PSL-5	LOW INTAKE PRESSURE SWITCH	PUMP RM.	FUTURE	FUTURE

INSTRUMENTS

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
100	PT-3	PRESSURE TRANSMITTER, ZONE 2	PUMP RM.	CONTRACTOR	CONTRACTOR
101	FE-1	FLOW ELEMENT (ZONE 2 SO.)	PUMP RM.	CONTRACTOR	CONTRACTOR
102	FE-2	PRESSURE TRANSMITTER	PUMP RM.	CONTRACTOR	CONTRACTOR
103	FIT-1	FLOW INDICATOR/TRANSMITTER (ZONE 2 SO.)	PUMP RM.	CONTRACTOR	CONTRACTOR
104	FIT-2	FLOW INDICATOR/TRANSMITTER (ZONE 2 NO.)	PUMP RM.	CONTRACTOR	CONTRACTOR
105	PT-1	SYSTEM DISCHARGE PRESSURE (ZONE 2 SO.)	PUMP RM.	CONTRACTOR	CONTRACTOR
106	PT-2	SYSTEM DISCHARGE PRESSURE (ZONE 2 NO.)	PUMP RM.	CONTRACTOR	CONTRACTOR
107	TT-1	TEMPERATURE TRANSMITTER	PUMP RM.	CONTRACTOR	CONTRACTOR
108	TT-2	TEMPERATURE TRANSMITTER	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
109	DPT-1	DIFFERENTIAL PRESSURE TRANSMITTER	PUMP RM.	CONTRACTOR	CONTRACTOR
110	DPT-2	DIFFERENTIAL PRESSURE TRANSMITTER	PUMP RM.	CONTRACTOR	CONTRACTOR
111	AE/AIT-1	RESIDUAL CHLORINE ANALYZER	PUMP RM.	CONTRACTOR	CONTRACTOR

VALVES

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
52	VA-4	MOTORIZED VALVE ACTUATOR	PUMP RM.	FUTURE	FUTURE
53	VA-3	MOTORIZED VALVE ACTUATOR	PUMP RM.	CONTRACTOR	CONTRACTOR
54	VA-2	MOTORIZED VALVE ACTUATOR	PUMP RM.	CONTRACTOR	CONTRACTOR
55	VA-1	MOTORIZED VALVE ACTUATOR	PUMP RM.	CONTRACTOR	CONTRACTOR
56	VA-15	MOTORIZED VALVE ACTUATOR	PUMP RM.	CONTRACTOR	CONTRACTOR
57	VA-5	MOTORIZED VALVE ACTUATOR	PUMP RM.	FUTURE	FUTURE

SECURITY EQUIPMENT

DWG. ITEM NO.	TAG	DESCRIPTION	LOCATION	SUPPLIED BY	INSTALLED BY
48	CCTV-1	SECURITY SYSTEM I-BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
49	CCTV-2	SECURITY SYSTEM I-BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
50	CCTV-3	SECURITY SYSTEM I-BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
51	CCTV-4	SECURITY SYSTEM I-BOX	BLD. EXTERIOR	CONTRACTOR	CONTRACTOR
77	ZS-1	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
78	ZS-10	ROLL UP DOOR POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
79	ZS-11	DOOR POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
80	ZS-12A	DOOR POSITION SWITCH	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
81	ZS-12B	DOOR POSITION SWITCH	ELECTRICAL RM.	CONTRACTOR	CONTRACTOR
82	ZS-2	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
83	ZS-3	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
84	ZS-4	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
85	ZS-5	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
86	ZS-6	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
87	ZS-7	ROOF HATCH POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
88	ZS-8	DOOR POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
89	ZS-9A	DOOR POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR
90	ZS-9B	DOOR POSITION SWITCH	PUMP RM.	CONTRACTOR	CONTRACTOR

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT:22.048 ©2023  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

GENERAL NOTES:

1. NOT USED.

SHEET KEYNOTES:

1. NOT USED.



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

SCALE

NONE



ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
LEGEND & TAG LIST

SHEET

E-1.2

360.39.100

MAIN DISTRIBUTION PANELBOARD (MDP-INTITAL)

LOCATION: PUMP ROOM			MFGR: SQUARE D COMPANY				1600 AMPS			VOLTS: 480Y/277		
DIMENSIONS:			TYPE: QED-2				X M.L.O			PHASE: 3		
MOUNTING: FLOOR			NEMA: 1				64,000 A.I.C.			WIRES: 4		
FEED: BOTTOM							X SURGE PROTECTION			FED FROM: UTILITY		
			PHASE LOADS									
BRKR			WIRE	CONT.	N-CONT.		A		B		C	
A	P	DESCRIPTION	SIZE	WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	CONT.	N-CONT.
20	3	CP-1 SURGE DEVICE				1	0	0	0	0	0	0
100	3	PANELBOARD H	42	6,070	70,314	2	3,631	26,195	2,440	24,475	0	19,645
250	3	PUMP NO. 1 VFD (100 HP)	**		129,542	3	0	43,181	0	43,181	0	43,181
250	3	PUMP NO. 2 VFD (100 HP)	**		129,542	4	0	43,181	0	43,181	0	43,181
250	3	PUMP NO. 3 VFD (100 HP)	**		129,542	5	0	43,181	0	43,181	0	43,181
600	2	PUMP NO. 4 RVSS (250 HP)	**	233,342		6	77,781	0	77,781	0	77,781	0
600	3	PUMP NO. 5 RVSS (250 HP)	**		233,342	7	0	77,781	0	77,781	0	77,781
						8						
TOTAL WATTS:				239,413	692,283		81,411	233,518	80,220	231,798	77,781	226,968
CONTINUOUS LOAD:				239,413								
CONTINUOUS LOAD * 125%:				299,266		** REFER TO ONE-LINE DIAGRAM FOR WIRE/CONDUIT INFORMATION						
NON-CONTINUOUS LOAD:				692,283								
DESIGN WATTS:				991,549								
MIN. RATING (AMPS):				1,194								

MAIN DISTRIBUTION PANELBOARD (MDP-FINAL)

LOCATION: PUMP ROOM			MFGR: SQUARE D COMPANY			1600 AMPS			VOLTS: 480Y/277			
DIMENSIONS:			TYPE: QED-2			X M.L.O			PHASE: 3			
MOUNTING: FLOOR			NEMA: 1			64,000 A.I.C.			WIRES: 4			
FEED: BOTTOM						X SURGE PROTECTION			FED FROM: UTILITY			
									PHASE LOADS			
BRKR			WIRE	CONT.	N-CONT.	A		B		C		
A	P	DESCRIPTION	SIZE	WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	CONT.	N-CONT.
20	3	CP-1 SURGE DEVICE	312			1	0	0	0	0	0	0
100	3	PANELBOARD H	42	6,070	70,314	2	3,631	26,195	2,440	24,475	0	19,645
600	3	PUMP NO. 1 VFD (250 HP)	**	233,342		3	77,781	0	77,781	0	77,781	0
600	3	PUMP NO. 2 VFD (250 HP)	**		233,342	4	0	77,781	0	77,781	0	77,781
600	3	PUMP NO. 3 VFD (250HP)	**		233,342	5	0	77,781	0	77,781	0	77,781
600	2	PUMP NO. 4 RVSS (250 HP)	**		233,342	6	0	77,781	0	77,781	0	77,781
600	3	PUMP NO. 5 RVSS (250 HP)	**		233,342	7	0	77,781	0	77,781	0	77,781
						8						
TOTAL WATTS:				239,413	1,003,683		81,411	337,318	80,220	335,598	77,781	330,768
CONTINUOUS LOAD:				239,413								
CONTINUOUS LOAD * 125%:				299,266		**	REFER TO ONE-LINE DIAGRAM FOR WIRE/CONDUIT INFORMATION					
NON-CONTINUOUS LOAD:				1,003,683								
DESIGN WATTS:				1,302,949								
MIN. RATING (AMPS):				1,569								

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED  
708 EAST 50 SOUTH  
AMERICAN FORK, UT 84003  
HPE PROJECT:22.048  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

(801) 642-2051  
FAX (801) 642-2154  
©2022

GENERAL NOTES:

1. LIGHT FIXTURE SCHEDULE ON E-4.4. HVAC EQUIPMENT SCHEDULE ON E-4.5.

SHEET KEYNOTES:

1. NOT USED.

PANELBOARD H

LOCATION: PUMP ROOM				MFGR: SQUARE D				125 AMPS				VOLTS: 480Y/277				
DIMENSIONS: 20"W x 5.75"D x 32"H				TYPE: NF				X M.L.O.				PHASE: 3				
MOUNTING: SURFACE				NEMA: 1				22,000 A.I.C.				WIRES: 4				
FEED: TOP								X SPD				FED FROM: MDP				
PHASE LOADS																
BRKR			WIRE	CONT.	N-CONT.		A	B	C		N-CONT.	CONT.	WIRE		BRKR	
A	P	DESCRIPTION	ID	WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	CONT.	WATTS	WATTS	ID	A P	
20	3	UNIT HEATER UH-1 (7.5 KW)	312		2,500	1	3,631	9,050				2	6,550	3,631	26 TRANSFORMER L	60 2
-	-	-	-		2,500	3			2,440	7,330		4	4,830	2,440	-	-
-	-	-	-		2,500	5					0	2,500	6		-	1
20	3	UNIT HEATER UH-2 (7.5 KW)	312		2,500	7	0	2,788				8	288	312	VALVE ACTUATOR VA-115	20 3
-	-	-	-		2,500	9			0	2,788		10	288	-	-	-
-	-	-	-		2,500	11					0	2,788	12	288	-	-
20	3	UNIT HEATER UH-3 (5 KW)	312		1,667	13	0	11,189				14	9,522	38	ROOF TOP UNIT RTU-1	40 3
-	-	-	-		1,667	15			0	11,189		16	9,522	-	-	-
-	-	-	-		1,667	17			0		11,189	18	9,522	-	-	-
20	3	VALVE ACTUATOR VA-1	312		288	19	0	2,592				20	2,304	312	OUTDOOR UNIT CU-1	20 3
-	-	-	-		288	21			0	2,592		22	2,304	-	-	-
-	-	-	-		288	23					0	2,592	24	2,304	-	-
20	3	VALVE ACTUATOR VA-2	312		288	25	0	576				26	288	312	FUT. VALVE ACTUATOR VA-4	20 3
-	-	-	-		288	27			0	576		28	288	-	-	-
-	-	-	-		288	29					0	576	30	288	-	-
20	3	VALVE ACTUATOR VA-3	312		288	31	0	576				32	288	312	FUT. VALVE ACTUATOR VA-5	20 3
-	-	-	-		288	33			0	576		34	288	-	-	-
-	-	-	-		288	35					0	576	36	288	-	-
1		AVAILABLE SPACE			37	0	0					38			AVAILABLE SPACE	- 1
1		AVAILABLE SPACE			39				0	0		40			AVAILABLE SPACE	- 1
1		AVAILABLE SPACE			41						0	0	42		AVAILABLE SPACE	- 1
TOTAL WATTS:				0	21,728		3,631	26,195	2,440	24,475	0	19,645	48,586	6,070		
CONTINUOUS LOAD:				6,070												
CONTINUOUS LOAD * 125%:				7,588												
NON-CONTINUOUS LOAD:				70,314												
DESIGN WATTS:				77,902												
MIN. RATING (AMPS):				94												

DE-ICE CONTROL PANEL (CP-5)

LOCATION: ELECTRICAL ROOM		MFGR: CUSTOM		VOLTS: 120/240	
DIMENSIONS:		TYPE:		PHASE: 1	
MOUNTING: SURFACE		NEMA: 1		WIRES: 3	
FEED: BOTTOM				FED FROM:	
		PHASE LOADS			
BRKR		WIRE	CONT.	N-CONT.	
A	P	DESCRIPTION	SIZE	WATTS	NO
20	2	N E GUTTER/DOWNSPOUT	212	900	1
20	2	N W GUTTER/DOWNSPOUT	212	900	2
20	2	S E GUTTER/DOWNSPOUT	212	900	3
20	2	S W GUTTER/DOWNSPOUT	212	900	4

PANELBOARD L

LOCATION: PUMP ROOM				MFGR: SQUARE D COMPANY				225 AMP RATING				VOLT RATING 240/120																			
DIMENSIONS: 20"W x 5.75"D x 50"H				TYPE: NQ				110 M.C.B.				PHASE: 1																			
MOUNTING: SURFACE				NEMA: 1				X SURGE PROTECTION				WIRES: 3																			
FEED: BOTTOM				SYSTEM VOLTAGE: 240/120				10,000 A.I.C.				FED FROM: XFMR L																			
PHASE LOADS																															
BRKR				WIRE		CONT.		N-CONT.		A		B		C		N-CONT.		CONT.		WIRE				BRKR							
A	P	DESCRIPTION		SIZE		WATTS		WATTS		NO		CONT.		N-CONT.		CONT.		N-CONT.		WATTS		WATTS		SIZE		DESCRIPTION		A		P	
20	1	RECPT, INTERIOR		212				720		1		500		720				2				500		212		CONTROL PANEL CP-1/RTU		20		2	
20	1	RECPT, INTERIOR		212				540		3						300		4				300		212		RELAY PANEL CP-2		20		1	
20	1	RECPT, EXTERIOR		212				540		5		50		540				6				50		212		FLOW INDICATOR/TRANSMITTER (Z1)		20		1	
20	1	RECPT, IRRIGATION TIMER		212		100		7								150		8				50		212		FLOW INDICATOR/TRANSMITTER (Z2)		20		1	
20	1	LTS, INTERIOR		212		1,053		9		1,053		750						10		750		*				GEN. NO. 1 J. WATER HEATER		20		3	
20	1	LTS, EXTERIOR		212		90		11						90		750		12		750		-		-		-		-		-	
20	1	LTS, SITE POLES		**		228		13		228		1,000						14		1,000		*				GEN. NO. 1 BATTERY CHARGER		20		1	
20	1	FAN COIL UNIT FC-1, FC-2, FC-3		212		250		15						250		1,040		16		1,040		*				SITE GATE OPERATOR		20		2	
-	-			-		250		17		250		1,040						18		1,040		-		-		-		-		-	
20	1	DE-ICE CONTROL POWER		212		50		19						300		0		20				250		212		SECURITY ENCLOSURE CP-4		20		1	
20	2	DE-ICE POWER		212		1,350		21		1,450		0						22				100		212		RESIDUAL CHLORINE ANALYZER		20		1	
-	-			-		1,350		23						1,350		0		24				-		-		AVAILABLE SPACE		-		1	
20	1	GEN. PARALLELING ENCL. CP-6		212		100		25		100		750						26		750		1"C				FUT. GEN. NO. 2 J. WATER HEATER		20		2	
20	1	SPARE						27						0		750		28		750		-		-		-		-		-	
20	1	SPARE						29		0		1,000						30		1,000		1"C				FUT. GEN. NO. 2 BATTERY CHARGER		20		1	
		AVAILABLE SPACE						31						0		750		32		750		1"C				FUT. GEN. NO. 3 J. WATER HEATER		20		2	
		AVAILABLE SPACE						33		0		750						34		750		-		-		-		-		-	
		AVAILABLE SPACE						35						0		1,000		36		1,000		1"C				FUT. GEN. NO. 3 BATTERY CHARGER		20		1	
		AVAILABLE SPACE						37		0		0						38								SPARE		20		1	
		AVAILABLE SPACE						39						0		0		40								SPARE		20		1	
		AVAILABLE SPACE						41		0		0						42								AVAILABLE SPACE					
TOTAL WATTS:				4,820		1,800		3,631		6,550		2,440		4,830				9,580		1,250											
CONTINUOUS LOAD:				6,070																											
CONTINUOUS LOAD * 125%:				7,588																											
NON-CONTINUOUS LOAD:				11,380																											
DESIGN WATTS:				18,968																											
MIN. RATING (AMPS):				79																											

TRANSFORMER L

LOCATION: PUMP ROOM		39.5 PRIMARY AMPS		PRIMARY VOLTS: 480	
DIMENSION: 37"H x 20"W x 20"D		79.0 SECONDARY AMPS		SECONDARY VOLTS: 240/120	
MOUNTING: FLOOR				KVA: 25	
FEED: SIDE				FED FROM: PNL H	
		PHASE LOADS			
		CONT.	N-CONT.	A	B
		WATTS	WATTS	CONT.	N-CONT.
PANELBOARD L		6,070	11,380	3,631	6,550
				2,440	4,830
TOTAL WATTS:		6,070	11,380	3,631	6,550
CONTINUOUS LOAD:		6,070			
CONTINUOUS LOAD * 125%:		7,588			
NON-CONTINUOUS LOAD:		11,380			
DESIGN WATTS:		18,968			



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

SCALE

NONE



SARATOGA SPRINGS

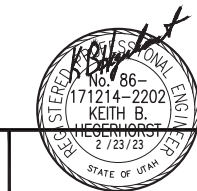
ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
SCHEDULES

SHEET

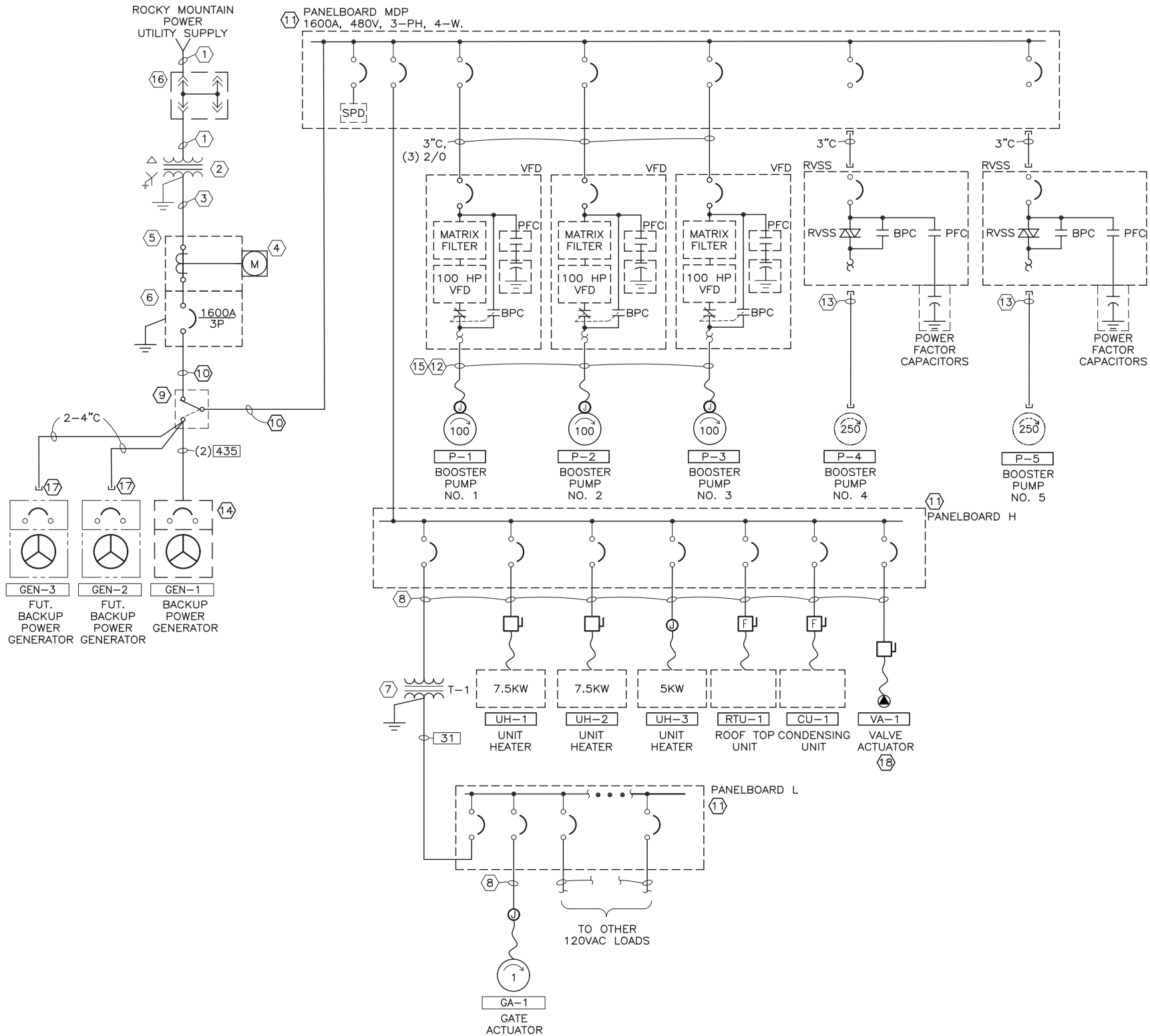
E-2.1

360.39.100





ELECTRICAL UTILITY INSTALLATION		
UTILITY INFORMATION		
UTILITY COMPANY:	ROCKY MOUNTAIN POWER	
UTILITY COMPANY CONTACT:	MARK STEELE	
CONTACT INFORMATION:	PHONE: (801) 756-1220	
WORK ORDER NUMBER:		
SERVICE PRIMARY	SUPPLIED BY:	INSTALLED BY:
PRIMARY TRENCHING/BACKFILL	-	CONTRACTOR
PRIMARY CONDUIT	CONTRACTOR	CONTRACTOR
PRIMARY CONDUCTOR	UTILITY COMPANY	UTILITY COMPANY
SERVICE TRANSFORMER	SUPPLIED BY:	INSTALLED BY:
TRANSFORMER PAD/VAULT	CONTRACTOR	CONTRACTOR
TRANSFORMER	UTILITY COMPANY	UTILITY COMPANY
SERVICE SECONDARY	SUPPLIED BY:	INSTALLED BY:
SECONDARY TRENCHING/BACKFILL	-	CONTRACTOR
SECONDARY CONDUIT	CONTRACTOR	CONTRACTOR
SECONDARY CONDUCTOR	UTILITY COMPANY	UTILITY COMPANY
METERING EQUIPMENT	SUPPLIED BY:	INSTALLED BY:
METER	UTILITY COMPANY	UTILITY COMPANY
METER SOCKET	CONTRACTOR	CONTRACTOR
COMBO METER/MAIN	-	-
CURRENT TRANSFORMER ENCL.	CONTRACTOR	CONTRACTOR
MAIN SERVICE DISCONNECT	CONTRACTOR	CONTRACTOR
CT ENCL. TO METER SOCKET WIRING	UTILITY COMPANY	UTILITY COMPANY
CT ENCL. TO METER SOCKET CONDUIT	-	-
MAIN SERVICE DISCONNECT	SUPPLIED BY:	INSTALLED BY:
CIRCUIT BREAKER	CONTRACTOR	CONTRACTOR
FUSED DISCONNECT SWITCH	-	-



### GENERAL NOTES:

- REFER TO CONDUIT/CONDUCTOR TABLE FOR WIRE AND CONDUIT REQUIREMENTS.
- REFER TO ELECTRICAL PLANS FOR ELECTRICAL EQUIPMENTS LOCATIONS.
- REFER TO THE ELECTRICAL UTILITY INSTALLATION TABLE FOR CONTACTOR AND UTILITY RESPONSIBILITIES.

### SHEET KEYNOTES:

- CONDUIT 2 EA 6"C. COORDINATE WITH UTILITY COMPANY AS AS REQUIRED.
- UTILITY TRANSFORMER: PROVIDED AND INSTALLED BY UTILITY COMPANY. PAD BY CONTRACTOR.
- (6) 4"C, CONDUCTORS BY UTILITY COMPANY.
- METER SOCKET. INSTALL ON EXTERIOR OF THE SERVICE EQUIPMENT ENCLOSURE.
- CT METERING SECTION: 1600A, 480 VAC, 3-PH. NEMA 3R.
- MAIN SERVICE DISCONNECT: 480VAC, 1600A, 3-POLE CIRCUIT BREAKER IN NEMA 3R ENCLOSURE. LABEL AS "MAIN SERVICE DISCONNECT" AND AS REQUIRED BY NEC 110.24. CB SHALL INCLUDE GROUND FAULT PROTECTION.
- TRANSFORMER T-1: 25 KVA, 480VAC PRIMARY, 240/120V SECONDARY.
- REFER TO PANELBOARD SCHEDULE FOR WIRE IDENTIFICATION.
- AUTOMATIC TRANSFER SWITCH: 1600A, 480 VAC, 3-PHASE, 4-WIRE, 4-POLE, NEMA 3R ENCLOSURE.
- 6 EA (2-1/2"C, W/4-300KCMIL CONDUCTORS).
- REFER TO ELECTRICAL SCHEDULES FOR ADDITIONAL EQUIPMENT INFORMATION.
- 3-1/2"C, 1-3C, #2/0 SHIELDED VFD CABLE (BELDEN 29530) OR APPROVED EQUAL. CONDUIT SIZED FOR FUTURE UPGRADE TO 250 HP MOTOR.
- 3-1/2"C WITH PULL STRING (FOR FUTURE 1-3C, 500KCMIL SHIELDED VFD CABLE (BELDEN 29535 OR APPROVED EQUAL)).
- BACKUP POWER GENERATOR: 400 KW, 480 VAC, 3-PH, DIESEL FUELED UNIT. REFER TO GENERATOR PARALLELING DIAGRAMS FOR GENERATOR REMOTE START/STOP WIRING.
- CONDUIT SIZED FOR A FUTURE 250 HP PUMP AND MOTOR.
- SECTIONALIZING CABINET: PROVIDED AND INSTALLED BY UTILITY COMPANY. TRENCHING AND CONDUIT BY CONTRACTOR.
- INSTALL CONDUIT TO NEAR FUTURE GENERATOR LOCATION AND CAP. LOCATE ON AS-BUILD DRAWINGS.
- SHOWN FOR VALVE ACTUATOR VA-1, DUPLICATE FOR VA-2, VA-3 AND VA-15. INSTALL CONDUIT FOR FUT VA-4 AND FUT VA-5.



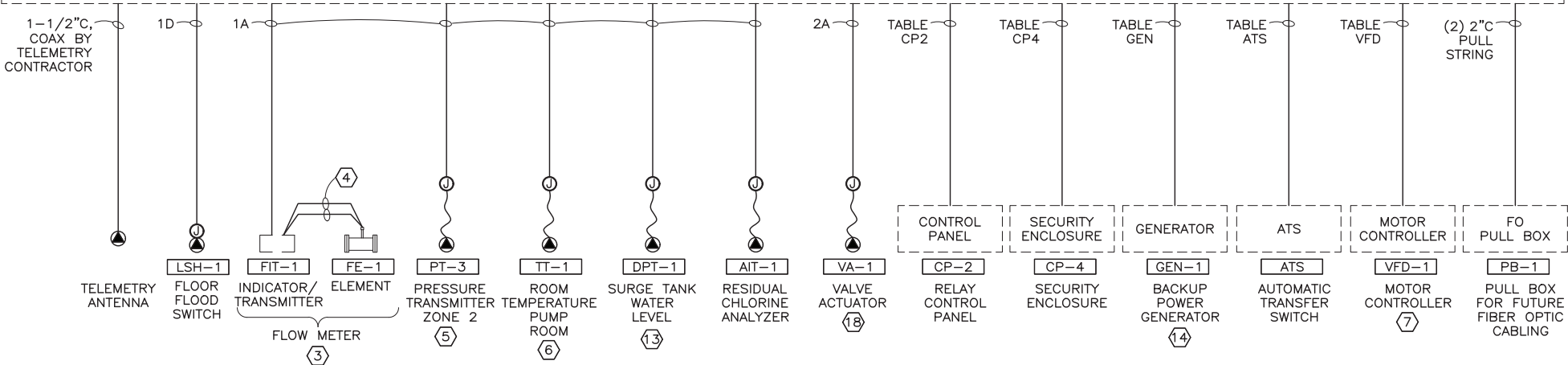
GENERAL NOTES:

1. FOR DEVICE AND EQUIPMENT LOCATIONS, REFER TO THE INSTRUMENTATION AND CONTROL PLAN, SHEET E-4.3.

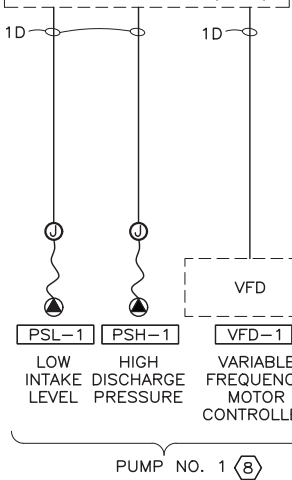
SHEET KEYNOTES:

1. SHOWN FOR HATCH POSITION SWITCH ZS-1. DUPLICATE FOR ZS-2, ZS-3, ZS-4, ZS-5, ZS-6, AND ZS-7.
2. DOUBLE DOOR POSITION SWITCHES. SHOWN FOR ZS-9A/9B. DUPLICATE FOR ZS-12A/12B.
3. ZONE 2 SO. STATION DISCHARGE FLOW METER. DUPLICATE FOR ZONE 2 NO. STATION DISCHARGE FLOW MITER FE/FIT-2.
4. SIGNAL AND DATA CABLE SUPPLIED BY FLOW METER SUPPLIER. PROVIDE 1-IN CONDUIT FOR EACH CABLE. DO NOT COMBINE SIGNAL AND DATA CABLES IN SAME CONDUIT.
5. SHOWN FOR ZONE 2 PRESSURE PT-3. DUPLICATE FOR ZONE 2 NO. DISCHARGE PRESSURE PT-1 AND ZONE 2 SO. DISCHARGE PRESSURE PT-2.
6. SHOWN FOR PUMP ROOM TEMPERATURE TRANSMITTER. DUPLICATE FOR ELECTRICAL ROOM TEMPERATURE TRANSMITTER TT-2.
7. SHOWN FOR VFD-1. DUPLICATE FOR VFD-2, VFD-3. INSTALL CONDUIT AND PULL STRING FOR FUT RVSS-4 AND FUT RVSS-5.
8. SHOWN FOR P-1. DUPLICATE FOR P-2, P-3. INSTALL CONDUIT WITH PULL STRING FOR FUT P-4 AND FUT P-5.
9. SHOWN FOR CCTV-1 J-BOX. DUPLICATE FOR CCTV-2, CCTV-3 AND CCTV-4.
10. LOCATE J-BOX NEAR GATE ACTUATOR ON SECURE SIDE OF FENCE. COORDINATE LOCATION WITH OWNER DURING CONSTRUCTION.
11. 3/4"C, #24 TSP (MODBUS).
12. GENERATOR PARALLELING CONTROLS SHOWN FOR GENERAC EQUIPMENT. IF OTHER MANUFACTURER IS SUPPLIED, CONTRACTOR SHALL MODIFY CONDUIT AND CONDUCTORS AS REQUIRED FOR THE PROVIDED GENERATORS AT NO COST TO THE OWNER. PROVIDE ALL CONDUITS FOR FUTURE GENERATORS WITH PULL STRINGS.
13. SHOWN FOR DIFFERENTIAL PRESSURE TRANSMITTER DPT-1. DUPLICATE FOR DPT-2.
14. SHOWN FOR BACKUP POWER GENERATOR GEN-1. DUPLICATE FOR FUT GEN-2 AND FUT GEN-3.
15. SHOWN FOR POLE-1. DUPLICATE FOR POLE-2, POLE-3 AND POLE-4.
16. STUB CONDUITS INTO THE ELECTRICAL ROOM NEAR SECURITY ENCLOSURE. LABEL EACH CONDUIT FOR THE DESTINATION LIGHT POLE.
17. CONDUIT FOR FUTURE MOTOR RTD TEMPERATURE CONDUCTORS. SHOWN FOR PUMP P-1, DUPLICATE FOR P-2, P-3, P-4 AND P-5.
18. SHOWN FOR VALVE ACTUATOR VA-1. DUPLICATE FOR VA-2, VA-3, AND VA-15. INSTALL CONDUIT FOR FUT VA-4 AND FUT VA-5.

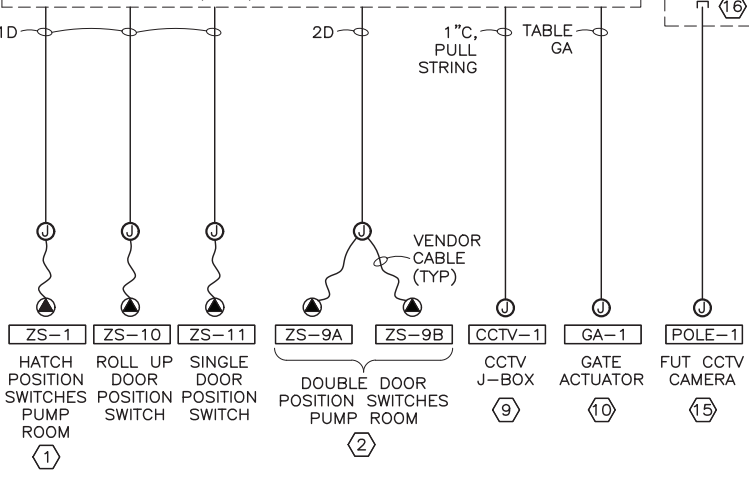
MAIN CONTROL PANEL/RTU (CP-1)



RELAY CONTROL PANEL (CP-2)

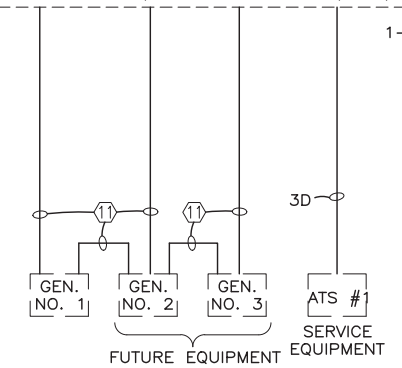


SECURITY ENCLOSURE (CP-4)

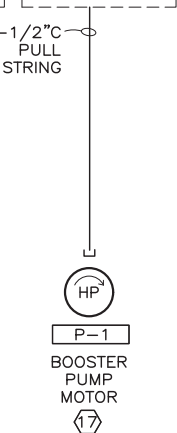


ELECTRICAL ROOM

POWER MANAGER/SYSTEM CONTROLLER (CP-6)



VFD-1



I&C WIRE/CONDUIT TABLE

IDENT.	CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1A	3/4"	1	#18TSP	1 ANALOG SIGNAL
2A	3/4"	2	#18TSP	2 ANALOG SIGNALS
3A	3/4"	3	#18TSP	3 ANALOG SIGNALS
IDENT.	CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1D	3/4"	2	#14	1 SIGNAL
2D	3/4"	3	#14	1 COMMON, 2 DISCRETE SIG.
3D	3/4"	4	#14	VARIES
4D	3/4"	5	#14	VARIES

TABLE CP2 (CP-1 TO CP-2)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1"	1	#18	COMMON INPUT
	2	#18	CP-1 ALARM RESET
	1	#18	P-1 HIGH DISCH. PRESS. (PSH-1)
	1	#18	P-1 LOW INTAKE PRESS. (PSL-1)
	1	#18	P-2 HIGH DISCH. PRESS. (PSH-2)
	1	#18	P-2 LOW INTAKE PRESS. (PSL-2)
	1	#18	P-3 HIGH DISCH. PRESS. (PSH-3)
	1	#18	P-3 LOW INTAKE PRESS. (PSL-3)
	1	#18	P-4 HIGH DISCH. PRESS. (PSH-4)
	1	#18	P-4 LOW INTAKE PRESS. (PSL-4)
	1	#18	P-5 HIGH DISCH. PRESS. (PSH-5)
	1	#18	P-5 LOW INTAKE PRESS. (PSL-5)
	1	#18TSP	VFD SPEED STATUS
	1	#18TSP	VFD SPEED CONTROL
	1	CAT 5	VFD PARAMETERS

TABLE VFD (CP-1 TO VFD/RVSS-#)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
3/4"	1	#18	COMMON OUTPUT
	1	#18	COMMON INPUT
	1	#18	FILTER HIGH TEMPERATURE
	1	#18	GENERATOR RUNNING
	1	#18	PUMP RUN COMMAND
	1	#18	PUMP HOR IN REMOTE
	1	#18	PUMP HOR IN HAND
	1	#18	REMOTE RESET
	1	#18	PUMP RUNNING ON BYPASS
	1	#18	PUMP RUNNING ON VFD
	2	#18	VFD FAULT
	4	#18	SPARE
	1	#18TSP	VFD SPEED STATUS
	1	#18TSP	VFD SPEED CONTROL
	1	CAT 5	VFD PARAMETERS

TABLE CP4 (CP-1 TO CP-4)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1"	1	#18	COMMON INPUT
	1	#18	DOOR A OPEN (ZS-12A)
	1	#18	DOOR A OPEN (ZS-9A)
	1	#18	DOOR B OPEN (ZS-12B)
	1	#18	DOOR B OPEN (ZS-9B)
	1	#18	DOOR OPEN (ZS-11)
	1	#18	ROLL UP DOOR OPEN (ZS-10)
	1	#18	ROOF HATCH OPEN (ZS-1)
	1	#18	ROOF HATCH OPEN (ZS-2)
	1	#18	ROOF HATCH OPEN (ZS-3)
	1	#18	ROOF HATCH OPEN (ZS-4)
	1	#18	ROOF HATCH OPEN (ZS-5)
	1	#18	ROOF HATCH OPEN (ZS-6)
	1	#18	ROOF HATCH OPEN (ZS-7)
	1	P.S.	FUT. ETHERNET CABLE

TABLE ATS (CP-1 TO ATS)

CONDUIT T SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
3/4"	1	#14	COMMON INPUT
	1	#14	AC POWER ON GENERATOR
	1	#14	AC POWER ON SYSTEM
1"	1		PULL TAPE SPARE CONDUIT

TABLE GEN (CP-1 TO GEN-1)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	GENERATOR SIGNAL DESCRIPTION
3/4"	1	#14	COMMON INPUT
	1	#14	GENERATOR RUNNING
	1	#14	GENERATOR ALARM
1"	1		PULL TAPE SPARE CONDUIT

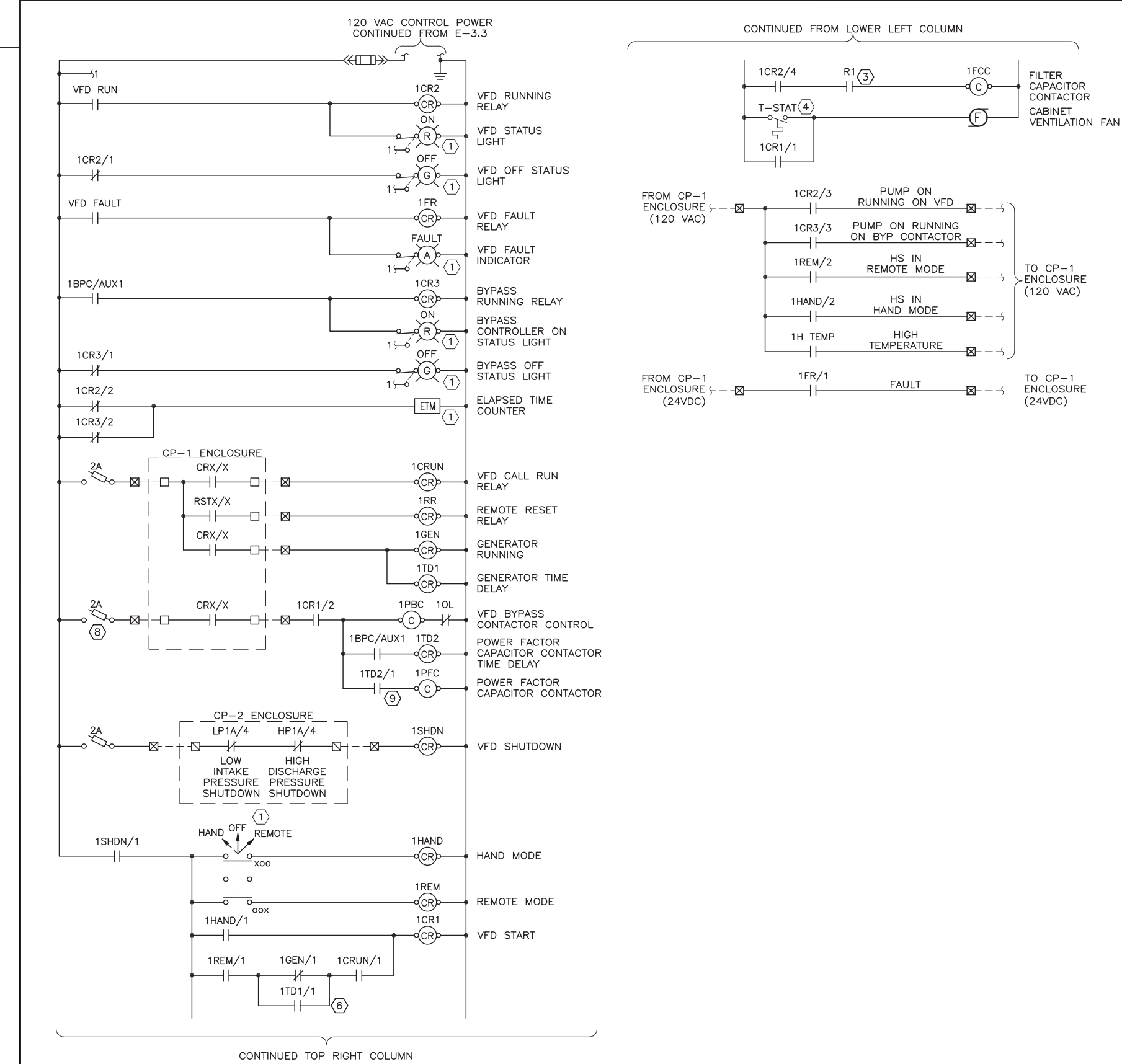
TABLE GA (CP-1 TO GATE ACTUATOR)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1"	1	#14	COMMON INPUT
	1	#14	COMMON OUTPUT
	1	#14	GATE OPEN
	1	#14	GATE CLOSED
	1	#14	GATE CLOSE COMMAND
1"	1	#14	GATE OPEN COMMAND
	4	#14	SPARE



GENERAL NOTES:

1. REFER TO E-3.3 FOR GENERAL AND KEYNOTES.



FILE NAME:  
FILE DATE:



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

SCALE  
NONE



ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
TYP VFD CONTROL DIAGRAM, SHT. 2

SHEET  
E-3.4  
360.39.100



GENERAL NOTES:

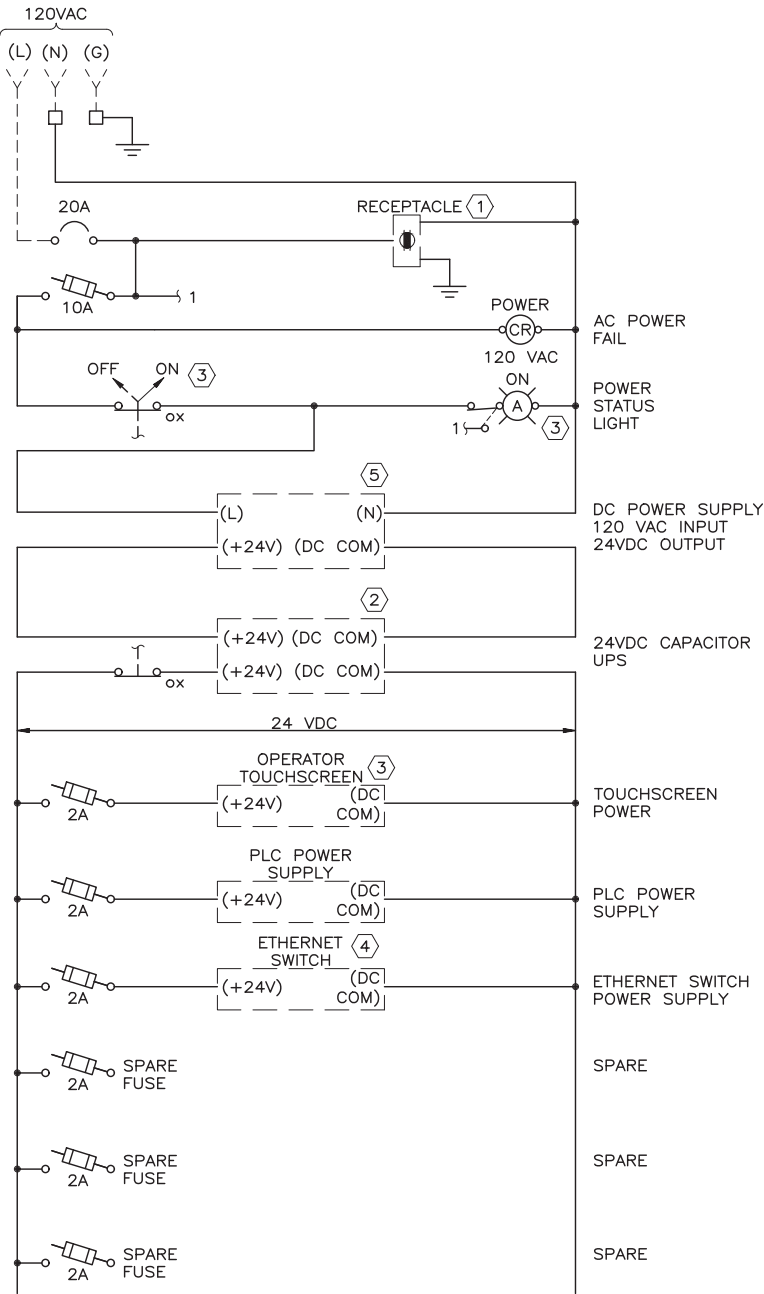
1. THIS DIAGRAM IS TYPICAL AND INDICATES THE BASIC CONTROL PANEL CONTROL DIAGRAM. THE CONTRACTOR SHALL MODIFY AS REQUIRED FOR THE DEVICES AND PLC MODULES USED. FOUR OR EIGHT CHANNEL MODULES HAVE BEEN SHOWN, PROVIDED MULTI-CHANNEL I/O MODULES AS REQUIRED.
2. CONTRACTOR SHALL PREPARE A CONTROL DIAGRAM BASED ON THE DEVICES SUPPLIED, INCLUDING WIRE, FUSE AND TERMINAL NUMBERS AS REQUIRED. THE PLC I/O SHOWN IS GENERIC.
3. FOR THE PROJECT INPUT AND OUTPUT REQUIREMENTS REFER TO THE I/O LIST SHOWN ON E5.1.

SHEET KEYNOTES:

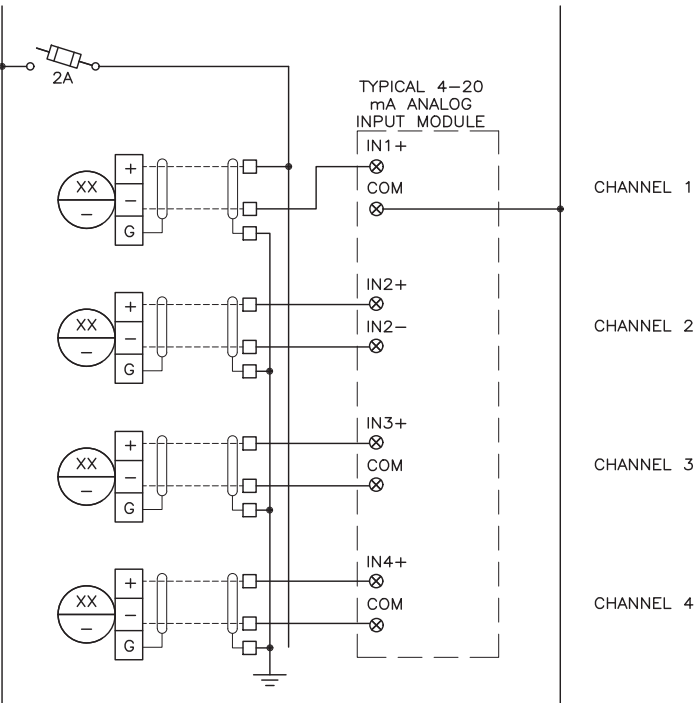
1. PROVIDE A DUPLEX GFCI RECEPTACLE IN THE ENCLOSURE.
2. PROVIDE AN ALTECH C-TEC2410-10 24VDC CAPACITOR UPS,
3. DEVICE SHALL BE INSTALLED IN THE ENCLOSURE DOOR AND AVAILABLE TO THE OPERATOR.
4. PROVIDE A MULTI-PORT ETHERNET SWITCH AS REQUIRED. PROVIDE A MINIMUM OF 2 SPARE PORTS.
5. DC POWER SUPPLY WITH 150% RATING FOR THE CONTROL PANEL LOAD.

TERMINAL LEGEND:

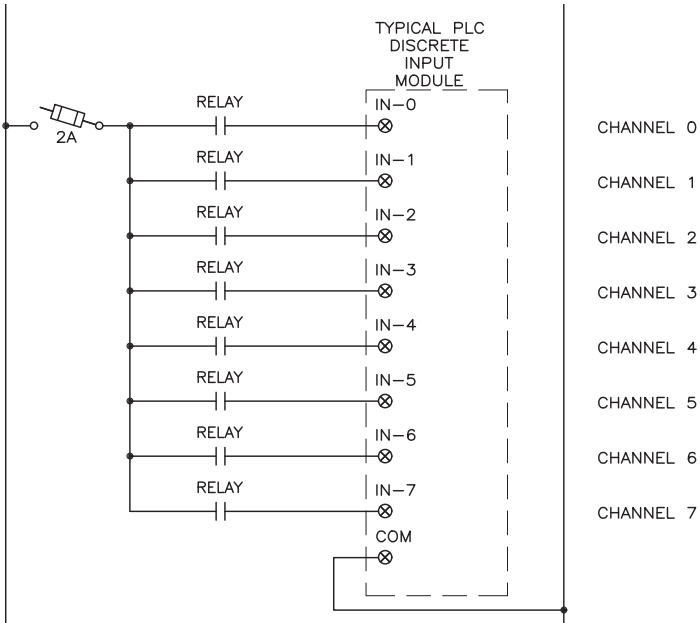
- CP-1 MAIN CONTROL PANEL  
▣ CP-2 RELAY CONTROL PANEL  
▤ CP-5 DE-ICE CABLE CONTROL PANEL  
⊗ RVSS ENCLOSURE  
⊙ VFD ENCLOSURE  
○ FIELD TERMINAL



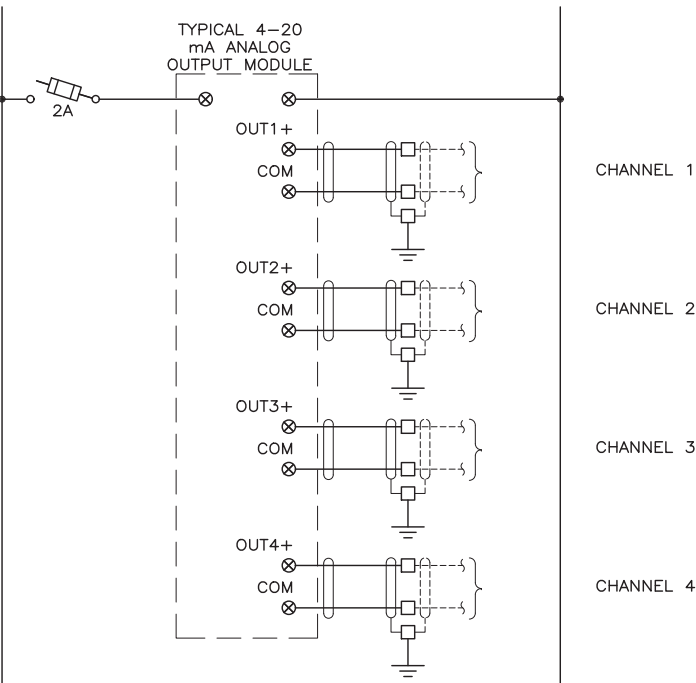
TYPICAL POWER LOGIC WIRING



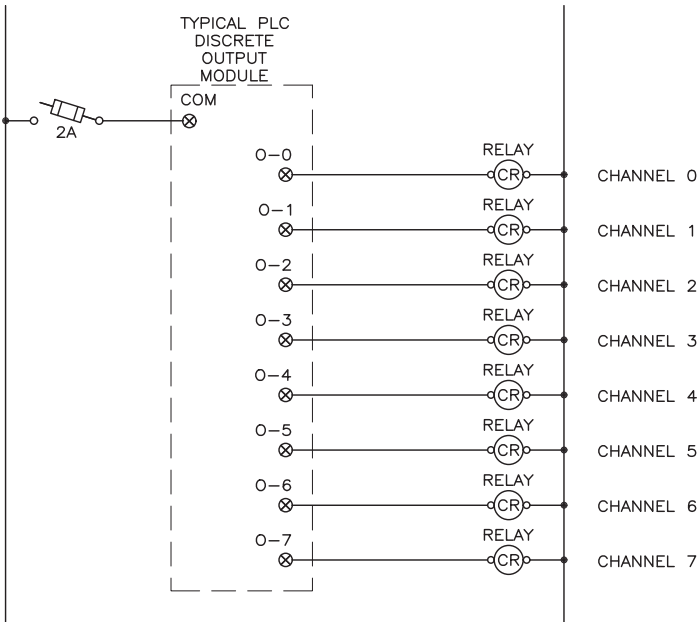
TYPICAL ANALOG INPUT MODULE WIRING



TYPICAL DISCRETE INPUT MODULE WIRING



TYPICAL ANALOG OUTPUT MODULE WIRING



TYPICAL DISCRETE OUTPUT MODULE WIRING

GENERAL NOTES:

1. REFER TO E3.6 FOR GENERAL NOTES.

SHEET KEYNOTES:

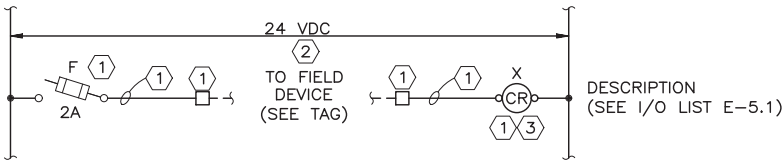
1. KEYNOTES ARE SHOWN IN EACH DIAGRAM.

TERMINAL LEGEND:

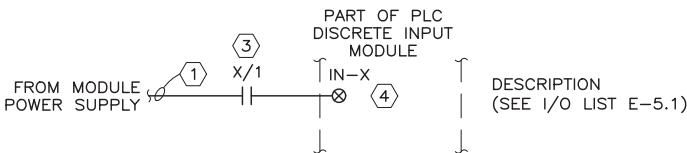
- CP-1 MAIN CONTROL PANEL  
▣ CP-2 RELAY CONTROL PANEL  
▤ CP-5 DE-ICE CABLE CONTROL PANEL  
⊗ RVSS ENCLOSURE  
⊙ VFD ENCLOSURE  
○ FIELD TERMINAL

NOTES:

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.  
2. CONTRACTOR MAY COMBINE CONDUCTORS IN COMMON CONDUIT TO DEVICES IN SAME PROXIMITY.  
3. PROVIDE AN INTERPOSING RELAY AND WIRE RELAY CONTACT TO PLC INPUT AS INDICATED.  
4. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.



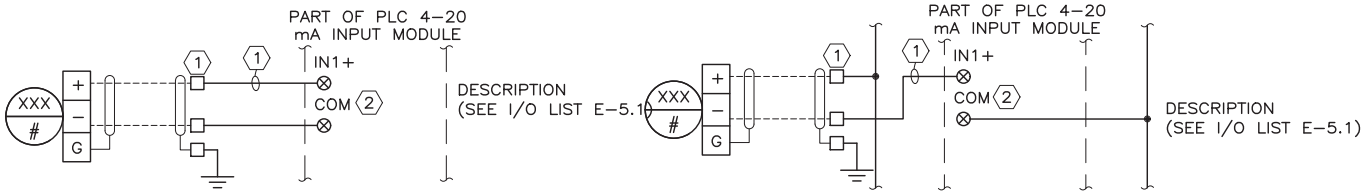
INTERPOSE RELAY LOGIC



PLC DISCRETE INPUT LOGIC

NOTES:

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.  
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.

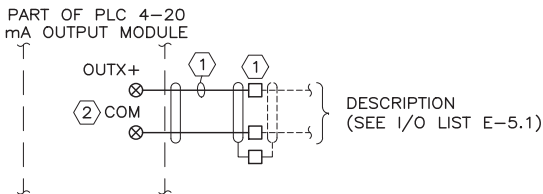


PLC ANALOG INPUT TYPE 1

PLC ANALOG INPUT TYPE 2

NOTES:

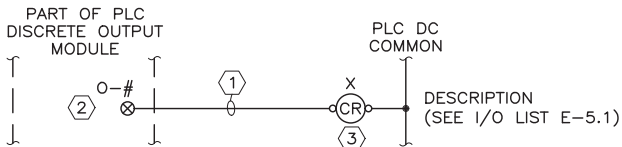
1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.  
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.



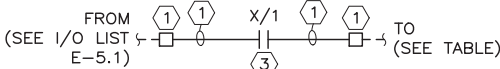
PLC ANALOG OUTPUT

NOTES:

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.  
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.  
3. PROVIDE AN INTERPOSING RELAY AND WIRE RELAY CONTACT TO PLC INPUT AS INDICATED.



PLC DISCRETE OUTPUT LOGIC



INTERPOSE RELAY LOGIC

TYPICAL INPUT AND OUTPUT WIRING

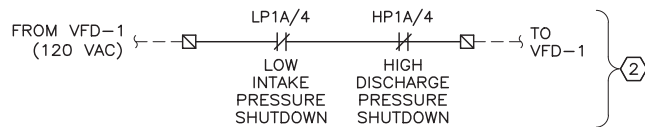
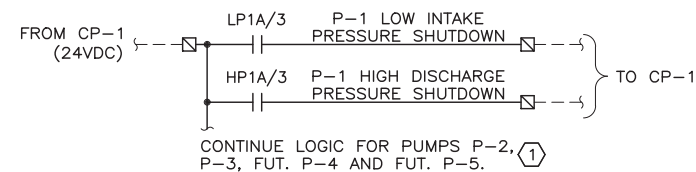




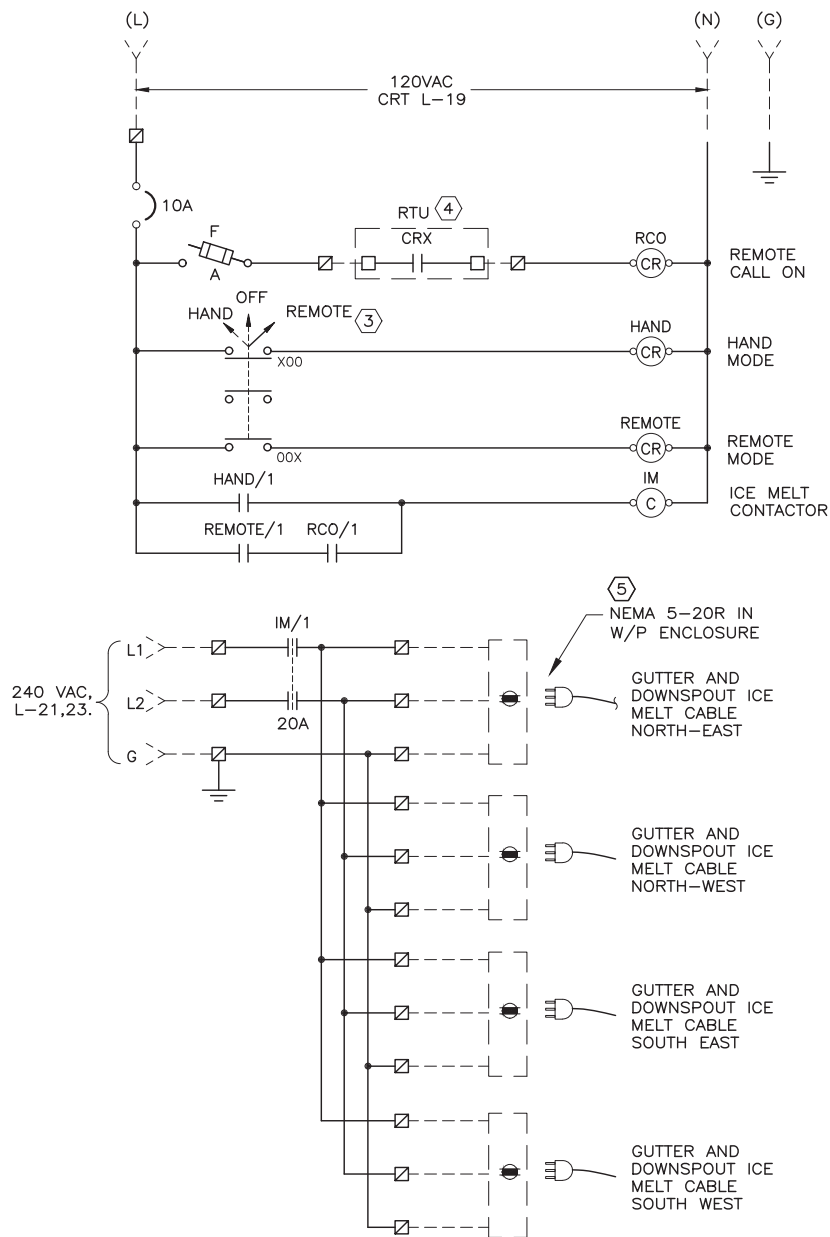
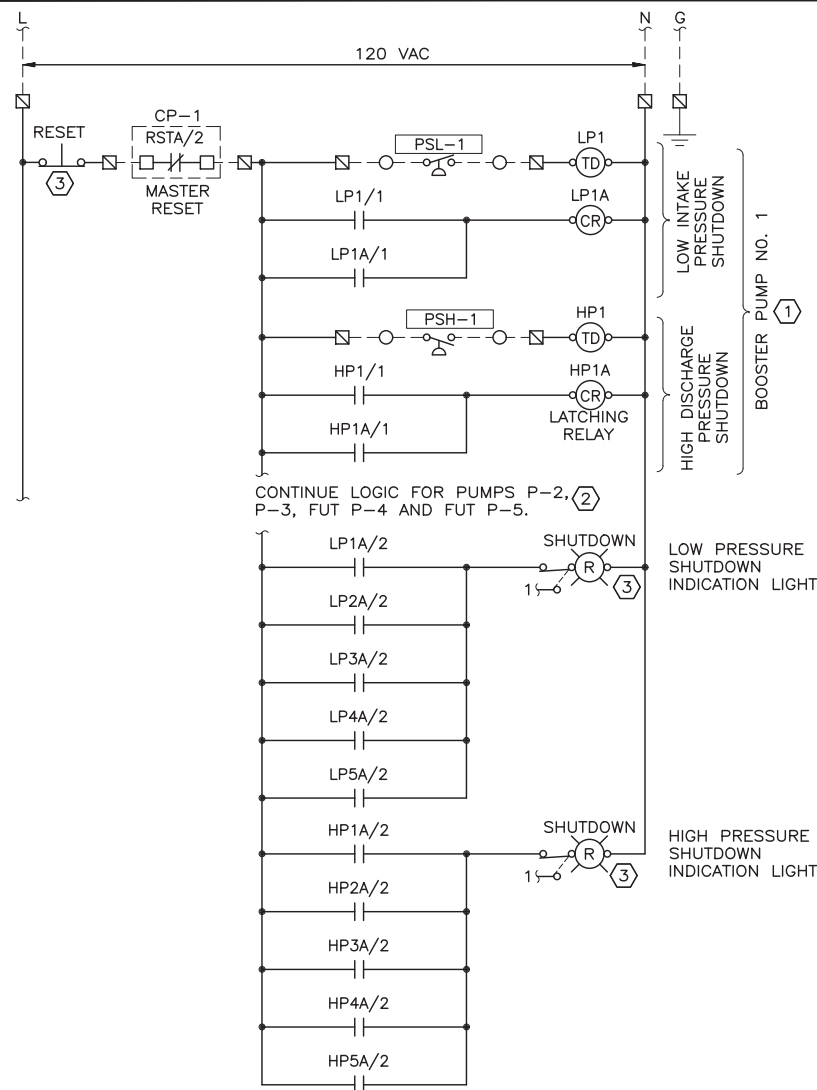


CP-2 RELAY DESIGNATION MATRIX

PUMP NO.	LOW INTAKE PRESSURE SWITCH	HIGH DISCHARGE PRESSURE SWITCH	TIMING DELAY RELAY	SHUTDOWN LATCHING RELAY
1	PSL-1	PSH-1	LP1	LP1A
2	PSL-2	PSH-2	LP2	LP2A
3	PSL-3	PSH-3	LP3	LP3A
4	PSL-4	PSH-4	LP4	LP4A
5	PSL-5	PSH-5	LP5	LP5A



CP-2 TYPICAL CONTROL DIAGRAM



CP-5 TYPICAL CONTROL DIAGRAM

TERMINAL LEGEND:

- CP-1 MAIN CONTROL PANEL
- ▣ CP-2 RELAY CONTROL PANEL
- ▤ CP-5 DE-ICE CABLE CONTROL PANEL
- RVSS ENCLOSURE
- VFD ENCLOSURE
- FIELD TERMINAL

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT:22.048  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST ©2023

GENERAL NOTES:

- CP-2 ARRANGEMENT DRAWING SHOWN ON E-5.2.
- DIAGRAM IS TYPICAL AND SHALL BE MODIFIED BY THE CONTRACTOR FOR THE SPECIFIC DEVICES PROVIDED.
- CONTRACTOR SHALL PROVIDE FUSE, TERMINAL AND WIRE NUMBERS AS REQUIRED.
- CONTROL PANEL EXTERIOR ARRANGEMENTS ON E-5.2.
- PROVIDE A COMPLETE PANEL INCLUDING RELAYS/WIRING FOR THE FUTURE PUMPS.

SHEET KEYNOTES:

- DIAGRAM IS SHOWN FOR PUMP-1. CONTRACTOR SHALL DUPLICATE LOGIC FOR PUMP P-2, P-3, P-4 AND THE P-5. REFER TO THE RELAY DESIGNATION MATRIX FOR THE RELAY DESIGNATIONS.
- VFD SHUTDOWN LOGIC SHOWN FOR VFD-1. DUPLICATE FOR VFD-2, VFD-3, FUT. RVSS-4 AND FUT. RVSS-5.
- DEVICE INSTALLED ON ENCLOSURE DOOR AND AVAILABLE TO THE OPERATOR.
- RELAY CONTACT IN MCP TO BE DETERMINED DURING CONSTRUCTION.
- INSTALL RECEPTACLE NEAR DOWNSPOUT.

7/04  
FILE NAME:  
FILE DATE:



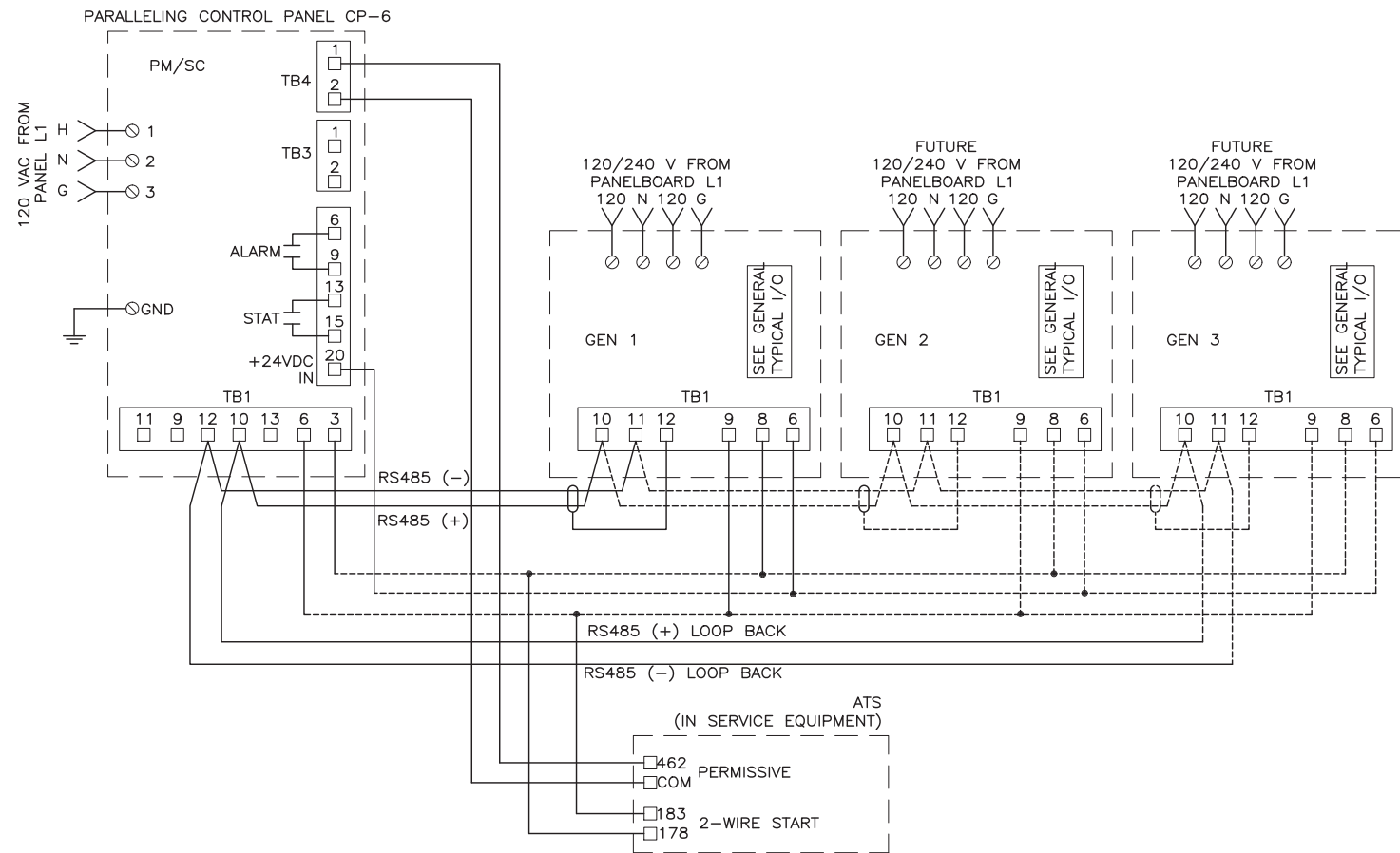
DESIGNED	KBH
DRAFTED	KBH
CHECKED	KBH
DATE	JANUARY 2023


SCALE  
NONE

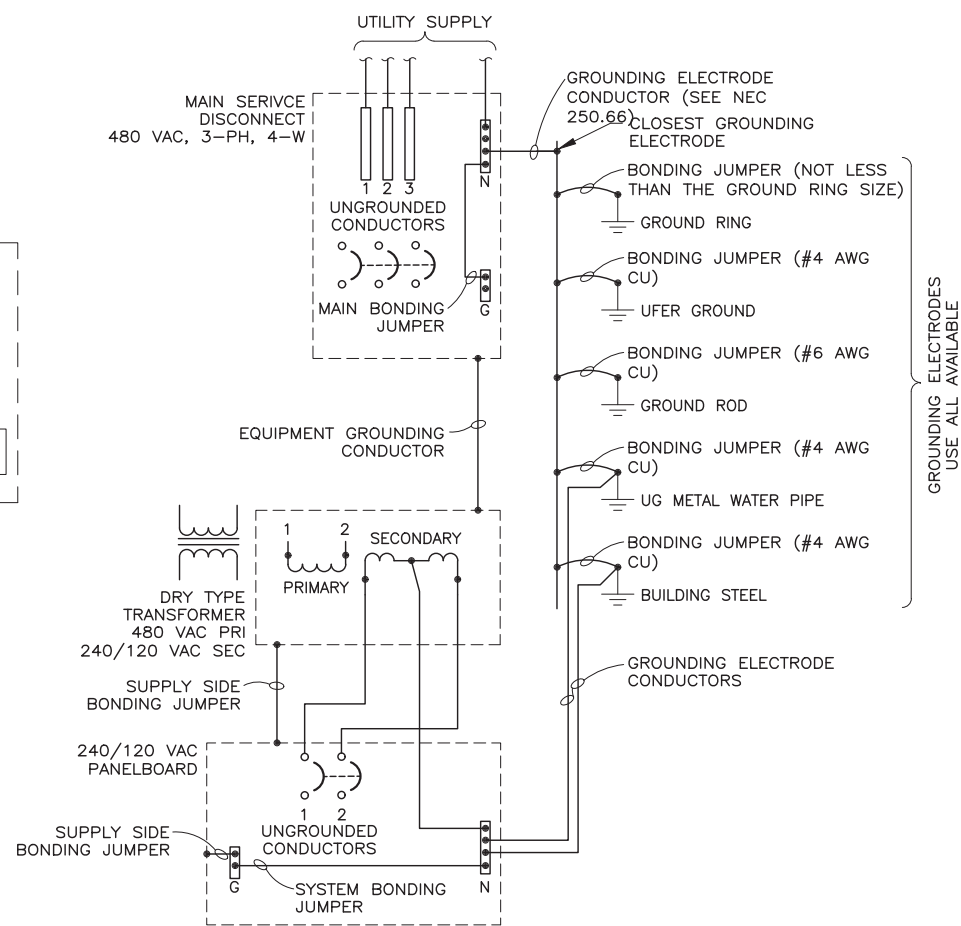


ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
MISCELLANEOUS DIAGRAMS

SHEET  
E-3.9  
360.39.100



GENERATOR PARALLELING DIAGRAM ①



TYPICAL GROUNDING DIAGRAM

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH FAX (801) 642-2154  
AMERICAN FORK, UT 84003  
HPE PROJECT: 22.048  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST ©2023

GENERAL NOTES:

1. NOT USED.

SHEET KEYNOTES:

1. THIS GENERATOR PARALLELING DIAGRAM IS FOR GENERAC GENERATORS. IF ANOTHER MANUFACTURER IS PROVIDED, THE CONTRACTOR SHALL MODIFY THE INSTALLED CONDUIT (AND WIRING) AS REQUIRED FOR THE PROVIDED GENERATOR PARALLELING CONTROL AT NO ADDITIONAL COST TO THE OWNER. ALL FUTURE GENERATORS SHALL BE BY THE SAME MANUFACTURER.

ELECTRICAL PLAN ITEMS (E-4.1)

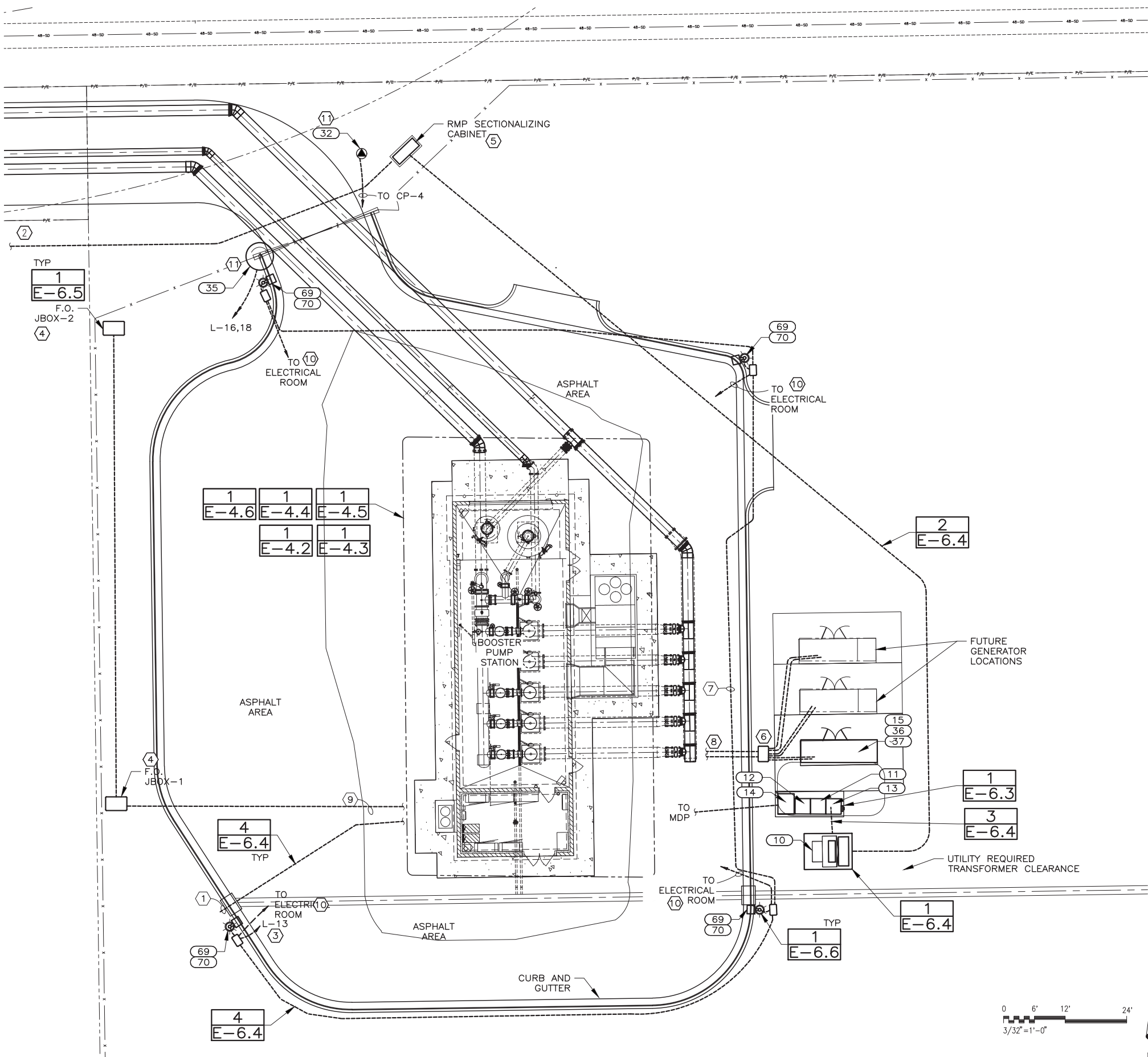
DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
10	XFMR	UTILITY TRANSFORMER	UTILITY	OUTSIDE
11	CTS	CURRENT TRANSFORMER SWITCHBOARD	N/A	OUTSIDE
12	MSD	MAIN SERVICE DISCONNECT	U. XFMR	OUTSIDE
13	MS-1	METER SOCKET	N/A	OUTSIDE
14	ATS	AUTOMATIC TRANSFER SWITCH	MSD/GEN	OUTSIDE
15	GEN	BACKUP POWER GENERATOR	N/A	OUTSIDE
32	GCS-1	GATE CONTROL STATION	-	OUTSIDE
35	GA-1	GATE OPERATOR	L-16,18	OUTSIDE
36	JWH-1	GEN. JACKET WATER HEATER	L-10,12	OUTSIDE
37	BC-1	GEN. BATTERY CHARGER	L-14	OUTSIDE
69	F3A	LIGHT FIXTURE	L-13	OUTSIDE
70	F3B	LIGHT POLE	N/A	OUTSIDE

GENERAL NOTES:

- REFER TO THE POWER ONE-LINE DIAGRAM FOR THE WIRE AND CONDUIT REQUIREMENTS.
- CONTRACTOR SHALL INSTALL CONDUIT FOR THE RMP SERVICE. NOT ALL CONDUIT IS SHOWN ON THIS PLAN.
- CONDUIT LOCATIONS SHOWN ARE APPROXIMATE. VERIFY LOCATIONS PRIOR TO CONDUIT ROUGH-IN.
- FOR GENERATOR CONCRETE PAD REQUIREMENTS REFER TO CIVIL DRAWINGS.

SHEET KEYNOTES:

- INSTALL A 2" CONDUIT WITH A PULL STRING FROM NEAR THE IRRIGATION CONTROLLER IN THE ELECTRICAL ROOM TO NORTH OF THE POLE LIGHT FOR FUTURE LANDSCAPE IRRIGATION VALVE WIRING. ACCURATELY IDENTIFY LOCATION ON AS-BUILD DRAWINGS.
- ADDITIONAL UTILITY CONDUIT INSTALLATION REQUIRED. REFER TO SHEET G-6 FOR THE LOCATION AND POWER SOURCE FOR THIS PUMP STATION.
- INSTALL 1-1/4" C WITH #6 CONDUCTORS FOR ALL POLE LIGHT POWER CIRCUITS AND HOME RUN TO PANEL L IN THE ELECTRICAL ROOM. REFER TO E-6.6 FOR ADDITIONAL SITE LIGHTING REQUIREMENTS.
- INSTALL TYPE III-PC BOX FOR FUTURE FIBER OPTIC CABLING. INSTALL PULL STRINGS IN ALL CONDUIT.
- SECTIONALIZING CABINET PROVIDED AND INSTALLED BY ROCKY MOUNTAIN POWER. LOCATION SHOWN IS APPROXIMATE. COORDINATE DURING CONSTRUCTION FOR FINAL LOCATION.
- INSTALL A TRAFFIC RATED CONCRETE POLYMER PULL BOX FOR THE GENERATOR JACKET WATER HEATER AND BATTERY CHARGER POWER CIRCUITS, SCADA MONITORING FOR ATS AND THE GENERATOR PARALLELING CIRCUITS. INSTALL ALL CONDUITS FOR THE FUTURE GENERATORS TO 12-IN FROM BACK OF CURB. CONTRACTOR SHALL SIZE PULL BOX AS REQUIRED. NOT ALL CONDUITS SHOWN ON THIS PLAN. REFER TO ONE-LINE DIAGRAMS FOR THE REQUIRED CONDUITS.
- INSTALL POLE LIGHT CIRCUIT CONDUIT IN ASPHALT AND NOT BELOW THE GENERATOR OR FUTURE GENERATORS.
- CONDUITS TO PANELBOARD L, CP-1 (MCP) AND CP-6 (GENERATOR PARALLEL CONTROL PANEL). REFER TO E-4.2 FOR LOCATIONS.
- F.O. CONDUITS TO CP-1.
- CONDUIT FOR FUTURE CCTV CAMERA CABLING.
- AUTOMATIC GATE OPERATOR, CARD READER PEDESTAL AND CONTROLS PROVIDED BY SUPPLIER. NOT SHOWN ON THESE PLANS ARE THE GATE PRESSURE SWITCH AND SENSING LOOPS. CONTRACTOR SHALL INSTALL ALL COMPONENTS SUPPLIED WITH GATE ACTUATOR AS REQUIRED BY SUPPLIER. COORDINATE WITH SUPPLIER FOR INSTALLATION LITERATURE DURING CONSTRUCTION AS REQUIRED.





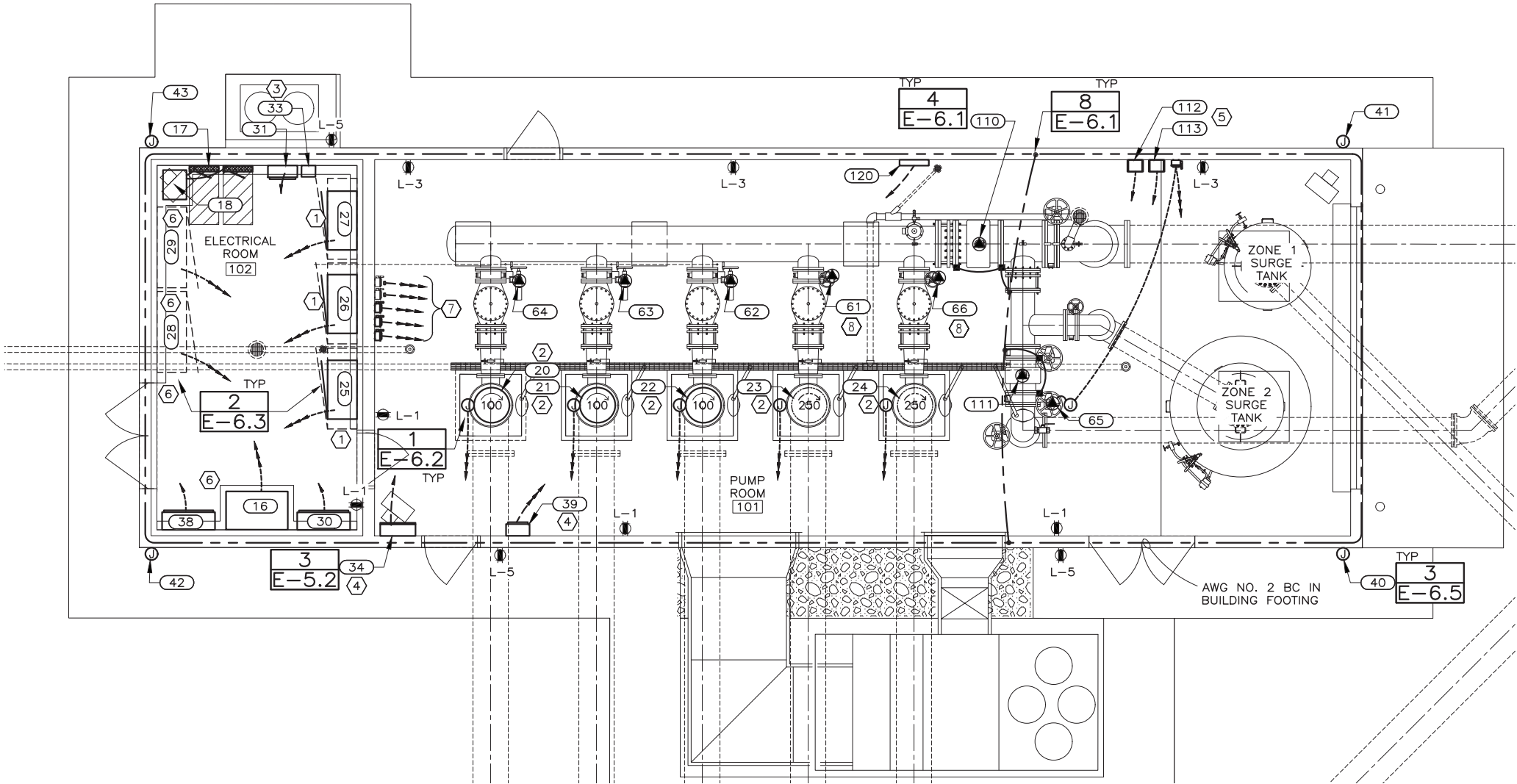
POWER PLAN ITEMS (E-4.2)				
DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
16	MDP	PANELBOARD MDP	ATS	ELECTRICAL RM.
17	PNL H	PANELBOARD H	MDP-2	ELECTRICAL RM.
18	XFMR L	TRANSFORMER L	H-2,4	ELECTRICAL RM.
19	PNL L	PANELBOARD L	XFMR-L	ELECTRICAL RM.
20	P-1	PUMP NO. 1	VFD-1	PUMP RM.
21	P-2	PUMP NO. 2	VFD-2	PUMP RM.
22	P-3	PUMP NO. 3	VFD-3	PUMP RM.
23	P-4	PUMP NO. 4	VFD-4	PUMP RM.
24	P-5	PUMP NO. 5	VFD-5	PUMP RM.
25	VFD-1	VFD NO. 1	MDP-1	ELECTRICAL RM.
26	VFD-2	VFD NO. 2	MDP-4	ELECTRICAL RM.
27	VFD-3	VFD NO. 3	MDP-5	ELECTRICAL RM.
28	RVSS-4	REDUCED VOLTAGE SOFT STARTER P#4	MDP-6	ELECTRICAL RM.
29	RVSS-5	REDUCED VOLTAGE SOFT STARTER P#5	MDP-7	ELECTRICAL RM.
30	CP-1	MAIN CONTROL PANEL/RTU	L-2	ELECTRICAL RM.
31	CP-2	RELAY CONTROL PANEL	L-4	ELECTRICAL RM.
33	SC-1	SPRINKLER TIME CONTROLLER	L-7	ELECTRICAL RM.
34	CP-6	GEN. PARALLELING CONTROLLER	L-25	BLD. INTERIOR
38	CP-4	SECURITY EQUIP. ENCLOSURE	L-20	ELECTRICAL RM.
39	CP-5	DE-ICING CONTROL PANEL	L-19,21,23	ELECTRICAL RM.
40	DDB-1	DE-ICE JUNCTION BOX	CP-5	BLD. EXTERIOR
41	DDB-2	DE-ICE JUNCTION BOX	CP-5	BLD. EXTERIOR
42	DDB-3	DE-ICE JUNCTION BOX	CP-5	BLD. EXTERIOR
43	DDB-4	DE-ICE JUNCTION BOX	CP-5	BLD. EXTERIOR
61	VA-4	MOTORIZED VALVE ACTUATOR	H-26,28,30	PUMP RM.
62	VA-3	MOTORIZED VALVE ACTUATOR	H-31,33,35	PUMP RM.
63	VA-2	MOTORIZED VALVE ACTUATOR	H-25,27,29	PUMP RM.
64	VA-1	MOTORIZED VALVE ACTUATOR	H-19,21,23	PUMP RM.
65	VA-15	MOTORIZED VALVE ACTUATOR	H-8,10,12	PUMP RM.
66	VA-5	MOTORIZED VALVE ACTUATOR	H-32,34,36	PUMP RM.
112	FIT-1	FLOW INDICATOR/TRANSMITTER (ZONE 2 SO.)	L-6	PUMP RM.
113	FIT-2	FLOW INDICATOR/TRANSMITTER (ZONE 2 NO.)	L-8	PUMP RM.
120	AE/AT-1	RESIDUAL CHLORINE ANALYZER	L-22	PUMP RM.

GENERAL NOTES:

- "HOME RUN" POWER SOURCE LISTED IN THE POWER PLAN ITEM TABLE ABOVE.
- FOR WIRE AND CONDUIT REQUIREMENTS, REFER TO THE POWER ONE-LINE AND/OR PANEL SCHEDULE FOR THE CIRCUIT ID, THEN THE WIRE AND CONDUIT INFORMATION IS IN THE CONDUIT/CONDUCTOR TABLE ON E-1.2.
- INSTALL ALL INTERIOR RECEPTACLES AT +36-IN ABOVE THE FLOOR. INSTALL EXTERIOR RECEPTACLES +18-IN ABOVE THE FINISHED SURFACE AND PROVIDE IN-SERVICE W/P COVER.

SHEET KEYNOTES:

- 100 HP VFD SHOWN IN SOLID LINE, FUTURE 250 HP VFD SHOWN IN DASHED LINE. INSTALL THE 100 HP VFD ENCLOSURE WITH ADEQUATE CLEARANCE TO BE ABLE TO UPGRADE TO A 250 HP VFD ENCLOSURE IN THE FUTURE.
- FUTURE 250 HP PUMP MOTOR.
- INSTALL A NEMA 5-20R BELOW TIMER, AND WIRE TO PANEL L AS SHOWN.
- INSTALL TOP OF ENCLOSURE AT 72-IN ABOVE FLOOR.
- INSTALL FLOW METER INDICATOR/TRANSMITTER AT +60" ABOVE FINISHED FLOOR.
- FLOOR MOUNTED EQUIPMENT: EXTEND HOUSEKEEPING PAD 4-IN IN FRONT AND SIDES. WALL MOUNTED EQUIPMENT: PAD SHALL EXTEND 6-IN (MAX.) FROM WALL.
- DISCONNECT SWITCHES FOR VA-1, VA-2, VA-3. STUB CONDUIT BELOW FUTURE DISCONNECT SWITCHES VA-3B AND VA-3C.
- STUB CONDUITS FOR VA-3B AND VA-3C FOR THE FUTURE VALVE ACTUATORS. EXTEND ABOVE CONCRETE FLOOR MIN. OF 6-IN.



POWER PLAN 1  
1/4"=1'-0" Z

EQUIPMENT SCHEDULE

ITEM	DESCRIPTION	LOCATION	EQUIPMENT RATING							DISCONNECT					STARTER		
			VOLTS	PH	HP	WATTS	FLA	MCA	AMPS	VOLTS	POLES	NEMA	FUSE	CONNECTION	TYPE	NEMA SIZE	
P-1	BOOSTER PUMP	PUMP ROOM	460	3	100	98,793	124	-	-	-	-	-	-	HARD-WIRED	VFD	100 HP	1)
P-2	BOOSTER PUMP	PUMP ROOM	460	3	100	98,793	124	-	-	-	-	-	-	HARD-WIRED	VFD	100 HP	1)
P-3	BOOSTER PUMP	PUMP ROOM	460	3	100	98,793	124	-	-	-	-	-	-	HARD-WIRED	VFD	100 HP	1)
P-4	FUT. BOOSTER PUMP	PUMP ROOM	460	3	250	223,878	281	-	-	-	-	-	-	HARD-WIRED	VFD	250 HP	2)
P-5	FUT. BOOSTER PUMP	PUMP ROOM	460	3	250	223,878	281	-	-	-	-	-	-	HARD-WIRED	VFD	250 HP	2)
VA-15	VALVE ACTUATOR	PUMP ROOM	460	3	F	864	1		30	600	3	1	NF	HARD-WIRED	INCL.	-	-
VA-1	VALVE ACTUATOR	PUMP ROOM	460	3	F	864	1		30	600	3	1	NF	HARD-WIRED	INCL.	-	-
VA-2	VALVE ACTUATOR	PUMP ROOM	460	3	F	864	1		30	600	3	1	NF	HARD-WIRED	INCL.	-	-
VA-3	VALVE ACTUATOR	PUMP ROOM	460	3	F	864	1		30	600	3	1	NF	HARD-WIRED	INCL.	-	-
VA-4	FUTURE VALVE ACTUATOR	PUMP ROOM															2)
VA-5	FUTURE VALVE ACTUATOR	PUMP ROOM															2)

NOTES: 1) REFER TO TYPICAL VFD CONTROL DIAGRAM ON E-3.3.  
2) PROVIDE CONDUIT WITH PULL STRING ONLY.



INSTR. & CONTROL PLAN ITEMS (E-4.3)

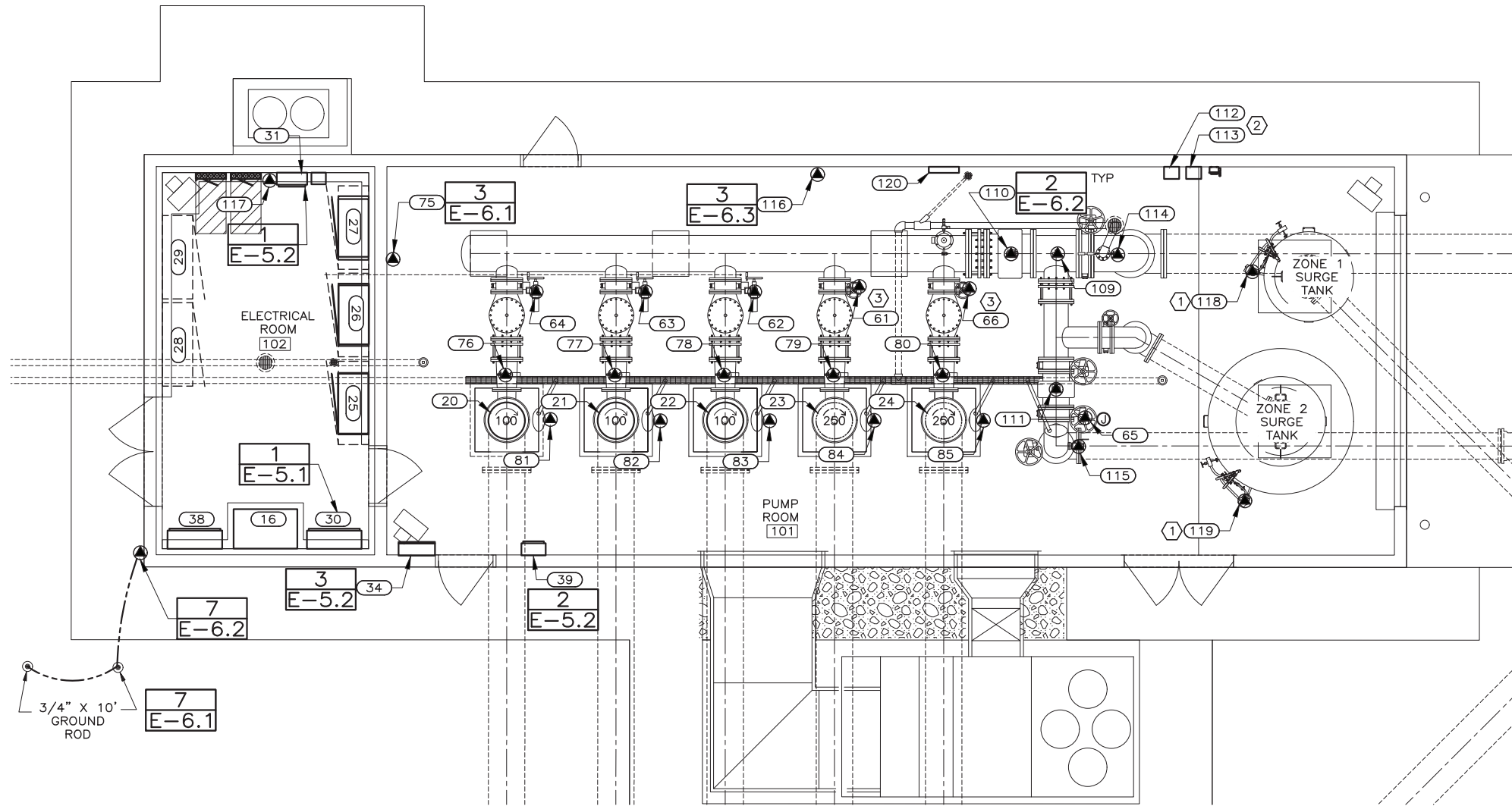
DRAWING ID	TAG	DESCRIPTION	LOCATION
16	MDP	PANELBOARD MDP	ELECTRICAL RM.
20	P-1	PUMP NO. 1	PUMP RM.
21	P-2	PUMP NO. 2	PUMP RM.
22	P-3	PUMP NO. 3	PUMP RM.
23	P-4	PUMP NO. 4	PUMP RM.
24	P-5	PUMP NO. 5	PUMP RM.
25	VFD-1	VFD NO. 1	ELECTRICAL RM.
26	VFD-2	VFD NO. 2	ELECTRICAL RM.
27	VFD-3	VFD NO. 3	ELECTRICAL RM.
28	RVSS-4	REDUCED VOLTAGE SOFT STARTER P#4	ELECTRICAL RM.
29	RVSS-5	REDUCED VOLTAGE SOFT STARTER P#5	ELECTRICAL RM.
30	CP-1	MAIN CONTROL PANEL/RTU	ELECTRICAL RM.
31	CP-2	RELAY CONTROL PANEL	ELECTRICAL RM.
34	CP-6	GEN. PARALLELING CONTROLLER	BLD. INTERIOR
38	CP-4	SECURITY EQUIP. ENCLOSURE	ELECTRICAL RM.
39	CP-5	DE-ICING CONTROL PANEL	ELECTRICAL RM.
61	VA-4	MOTORIZED VALVE ACTUATOR	PUMP RM.
62	VA-3	MOTORIZED VALVE ACTUATOR	PUMP RM.
63	VA-2	MOTORIZED VALVE ACTUATOR	PUMP RM.
64	VA-1	MOTORIZED VALVE ACTUATOR	PUMP RM.
65	VA-15	MOTORIZED VALVE ACTUATOR	PUMP RM.
66	VA-5	MOTORIZED VALVE ACTUATOR	PUMP RM.
75	LSH-1	FLOOR HIGH WATER SWITCH	PUMP RM.
76	PSH-1	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.
77	PSH-2	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.
78	PSH-3	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.
79	PSH-4	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.
80	PSH-5	HIGH DISCHARGE PRESSURE SWITCH	PUMP RM.
81	PSL-1	LOW INTAKE PRESSURE SWITCH	PUMP RM.
82	PSL-2	LOW INTAKE PRESSURE SWITCH	PUMP RM.
83	PSL-3	LOW INTAKE PRESSURE SWITCH	PUMP RM.
84	PSL-4	LOW INTAKE PRESSURE SWITCH	PUMP RM.
85	PSL-5	LOW INTAKE PRESSURE SWITCH	PUMP RM.
109	PT-3	PRESSURE TRANSMITTER, ZONE 2	PUMP RM.
110	FE-1	FLOW ELEMENT (ZONE 2 SO.)	PUMP RM.
111	FE-2	FLOW ELEMENT (ZONE 2 NO.)	PUMP RM.
112	FIT-1	FLOW INDICATOR/TRANSMITTER (ZONE 2 SO.)	PUMP RM.
113	FIT-2	FLOW INDICATOR/TRANSMITTER (ZONE 2 NO.)	PUMP RM.
114	PT-1	SYSTEM DISCHARGE PRESSURE (ZONE 2 SO.)	PUMP RM.
115	PT-2	SYSTEM DISCHARGE PRESSURE (ZONE 2 NO.)	PUMP RM.
116	TT-1	TEMPERATURE TRANSMITTER	PUMP RM.
117	TT-2	TEMPERATURE TRANSMITTER	ELECTRICAL RM.
118	DPT-1	DIFFERENTIAL PRESSURE TRANSMITTER	PUMP RM.
119	DPT-2	DIFFERENTIAL PRESSURE TRANSMITTER	PUMP RM.
120	AE/AIT-1	RESIDUAL CHLORINE ANALYZER	PUMP RM.

GENERAL NOTES:

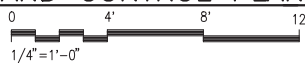
- FOR WIRE AND CONDUIT INFORMATION REFER TO THE INSTRUMENTATION AND CONTROL ONE-LINE DIAGRAM ON E-3.2

SHEET KEYNOTES:

- VERIFY LOCATION OF SURGE TANK PRESSURE TRANSMITTERS PRIOR TO CONDUIT ROUGH-IN. TRANSMITTERS SUPPLIED BY SURGE TANK SUPPLIER, INSTALLED BY CONTRACTOR.
- REFER TO E-4.2 KEYNOTE 5 FOR MOUNTING HEIGHT.
- STUB CONDUIT FOR FUTURE VALVE ACTUATORS 6-IN ABOVE FLOOR.



INSTRUMENTATION AND CONTROL PLAN



1  
E-4.1



ELECTRICAL LIGHTING PLAN ITEMS (E-4.4)

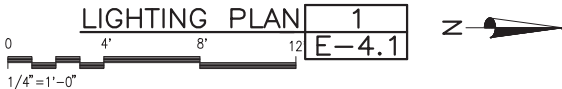
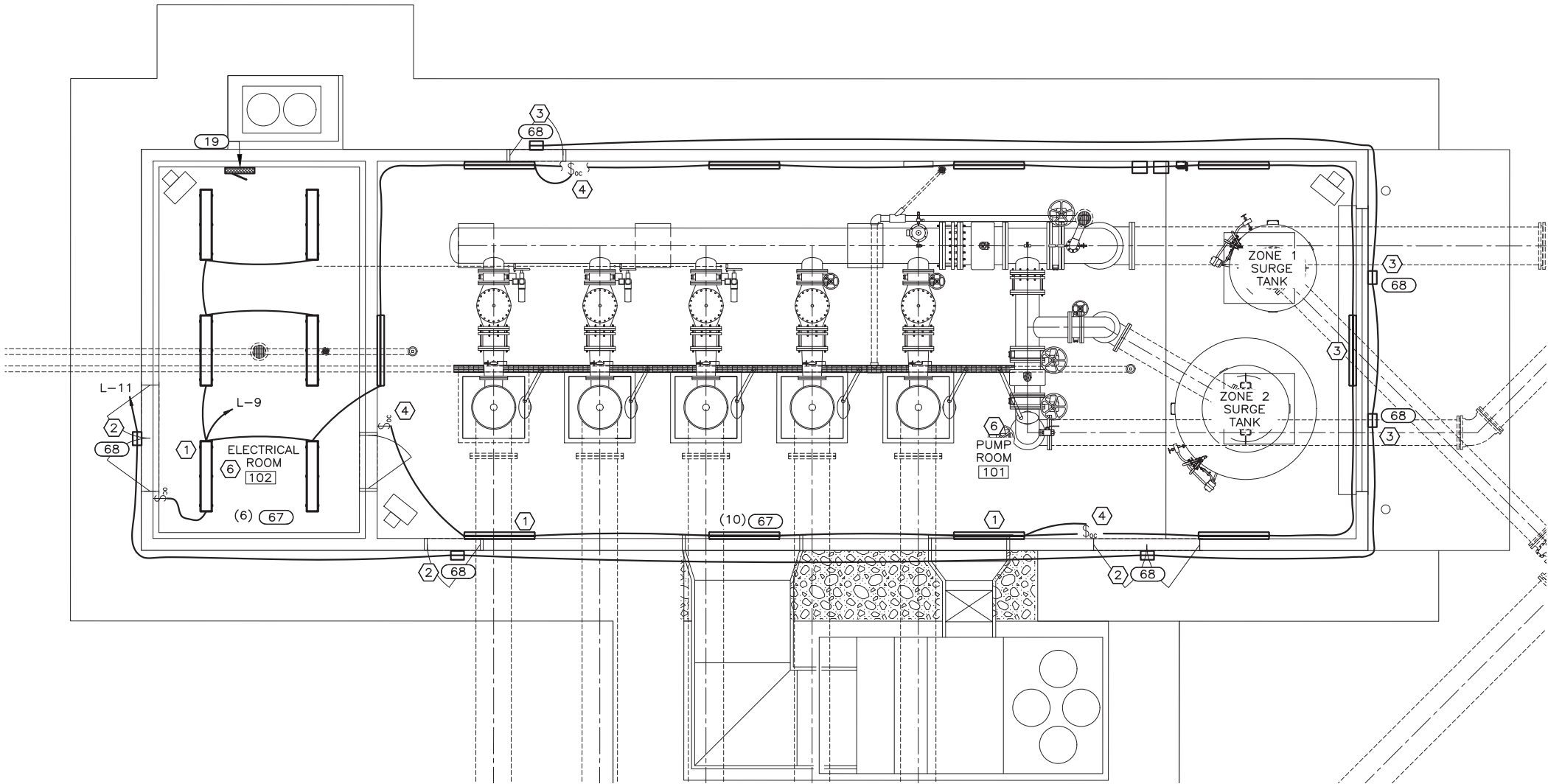
DRAWING ID	TAG	DESCRIPTION	LOCATION
19	PNL L	PANELBOARD L	ELECTRICAL RM.
67	F1	LIGHT FIXTURE	BLD. INTERIOR
68	F2	LIGHT FIXTURE	BLD. EXTERIOR

GENERAL NOTES:

- FOR WIRE AND CONDUIT REQUIREMENTS, REFER TO THE PANELBOARD SCHEDULE FOR THE CIRCUIT ID, THEN REFER TO THE CONDUIT/CONDUCTOR TABLE ON E-1.2.
- OUTSIDE POLE LIGHTING SHOWN ON E-4.1.
- INSTALL PUMP ROOM LIGHTS AT +9-FT ABOVE THE FLOOR.
- INSTALL SWITCHES +48-IN ABOVE THE FLOOR.

SHEET KEYNOTES:

- PROVIDE A 90-MINUTE BATTERY BACKUP POWER SOURCE IN THIS FIXTURE.
- INSTALL FIXTURE 8-INCHES ABOVE CENTER TOP OF DOOR.
- INSTALL FIXTURE 8-IN ABOVE DOOR.
- WIRE ALL THREE OCCUPANCY SWITCHES TO CONTROL THE ROOM LIGHTS. LIGHTING SHALL AUTOMATICALLY TURN OFF AFTER 30 MINUTES OF ROOM INACTIVITY. ROOM SWITCH SHALL INCLUDE OFF-AUTO-ON SELECTOR.



FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER		FDX VA	LAMP	LUMENS	TEMPERATURE (KELVIN)	MOUNTING	NOTES:
		NAME	CATALOG NO.						
F1	VAPORTITE LED 4' INDUSTRIAL	METALUX	4VT2-LD5-8-DR-W-UNV-L840-C-D1-WL-U	58	LED	8000	4000	CEILING	
F2	LED WALL MOUNTED FULL CUTOFF MINI AREA WALL PACK FOR WET LOCATIONS	LUMARK	XTOR21-PC1	18	LED	2135	4000	WALL	
F3A	CITY STANDARD TYPE LP-3A, SINGLE-FIXTURE				LED		4000	POLE	1)
F3B	CITY STANDARD TYPE LP-3A, POLE								1)

NOTES: FOR POLE AND FIXTURE INFORMATION CONTACT TED MAESTAS AT MOUNTAIN STATES LIGHTING (801) 268-4879

FILE NAME:  
FILE DATE:

7/04



HANSEN  
ALLER  
& LUCE  
ENGINEERS

PROJECT ENGINEER

DESIGNED KBH

DRAFTED KBH

CHECKED KBH

DATE JANUARY 2023

SCALE

AS SHOWN



CITY OF  
SARATOGA SPRINGS

ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
LIGHTING PLAN

SHEET

E-4.4

360.39.100

HVAC PLAN ITEMS (E-4.5)

DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
17	PNL H	PANELBOARD H	MDP-2	ELECTRICAL RM.
19	PNL L	PANELBOARD L	XFMR-L	ELECTRICAL RM.
45	CU-1	CONDENSING UNIT	H-20,22,24	OUTSIDE
48	FC-1	FAN COIL UNIT	L-15,17	ELECTRICAL RM.
49	FC-2	FAN COIL UNIT	L-15,17	ELECTRICAL RM.
50	FC-3	FAN COIL UNIT	L-15,17	ELECTRICAL RM.
51	RTU-1	ROOF TOP UNIT	H-14,16,18	OUTSIDE
52	UH-1	UNIT HEATER	H-1,3,5	PUMP RM.
53	UH-2	UNIT HEATER	H-7,9,11	PUMP RM.
54	UH-3	UNIT HEATER	H-13,15,17	ELECTRICAL RM.

GENERAL NOTES:

- "HOME RUN" POWER SOURCE LISTED IN THE POWER PLAN ITEM TABLE ABOVE.
- FOR WIRE AND CONDUIT REQUIREMENTS, REFER TO THE POWER ONE-LINE AND/OR PANEL SCHEDULE FOR THE CIRCUIT ID, THEN THE WIRE AND CONDUIT INFORMATION IS IN THE CONDUIT/CONDUCTOR TABLE ON E-1.2.
- COORDINATE WITH HVAC CONTRACTOR FOR HVAC EQUIPMENT CONTROLS.

SHEET KEYNOTES:

- INSTALL DISCONNECT SWITCH ON CONDENSING UNIT. VERIFY LOCATION WITH VENDOR DRAWINGS PRIOR TO CONDUIT ROUGH-IN.

HVAC MECHANICAL EQUIPMENT SCHEDULE

			EQUIPMENT RATING							DISCONNECT					STARTER		
ITEM	DESCRIPTION	LOCATION	VOLTS	PH	HP	WATTS	FLA	MCA	AMPS	VOLTS	POLES	NEMA	FUSE	CONNECTION	TYPE	NEMA SIZE	NOTES
CU-1	CONDENSER UNIT	OUTSIDE	480	1	-	6,912	14.4	18	30	600	3	3R	18	HARD-WIRED	INCL.	-	2)
FC-1	FAN COIL UNIT	ELECTRICAL ROOM	208	1	-	166	0.8	1	-	-	-	-	-	-	-	-	1)
FC-2	FAN COIL UNIT	ELECTRICAL ROOM	208	1	-	166	0.8	1	-	-	-	-	-	-	-	-	1)
FC-3	FAN COIL UNIT	ELECTRICAL ROOM	208	1	-	166	0.8	1	-	-	-	-	-	-	-	-	1)
RTU-1	ROOF TOP UNIT	OUTSIDE	480	3	-	28,566	34.4	43	60	600	3	3R	50	HARD-WIRED	INCL.	-	
UH-1	UNIT HEATER	PUMP ROOM	480	3	-	7,500	9.02	-	30	600	3	1	NF	HARD-WIRED	INCL.	-	
UH-2	UNIT HEATER	PUMP ROOM	480	3	-	7,500	9.02	-	30	600	3	1	NF	HARD-WIRED	INCL.	-	
UH-3	UNIT HEATER	ELECTRICAL ROOM	480	3	-	5,000	6.01	-	-	-	-	-	-	HARD-WIRED	INCL.	-	1)

NOTES: 1) DISCONNECT NOT REQUIRED.  
2) FUSE AS REQUIRED BY MANUFACTURER.

HVAC POWER PLAN 1  
E-4.1  
1/4"=1'-0"





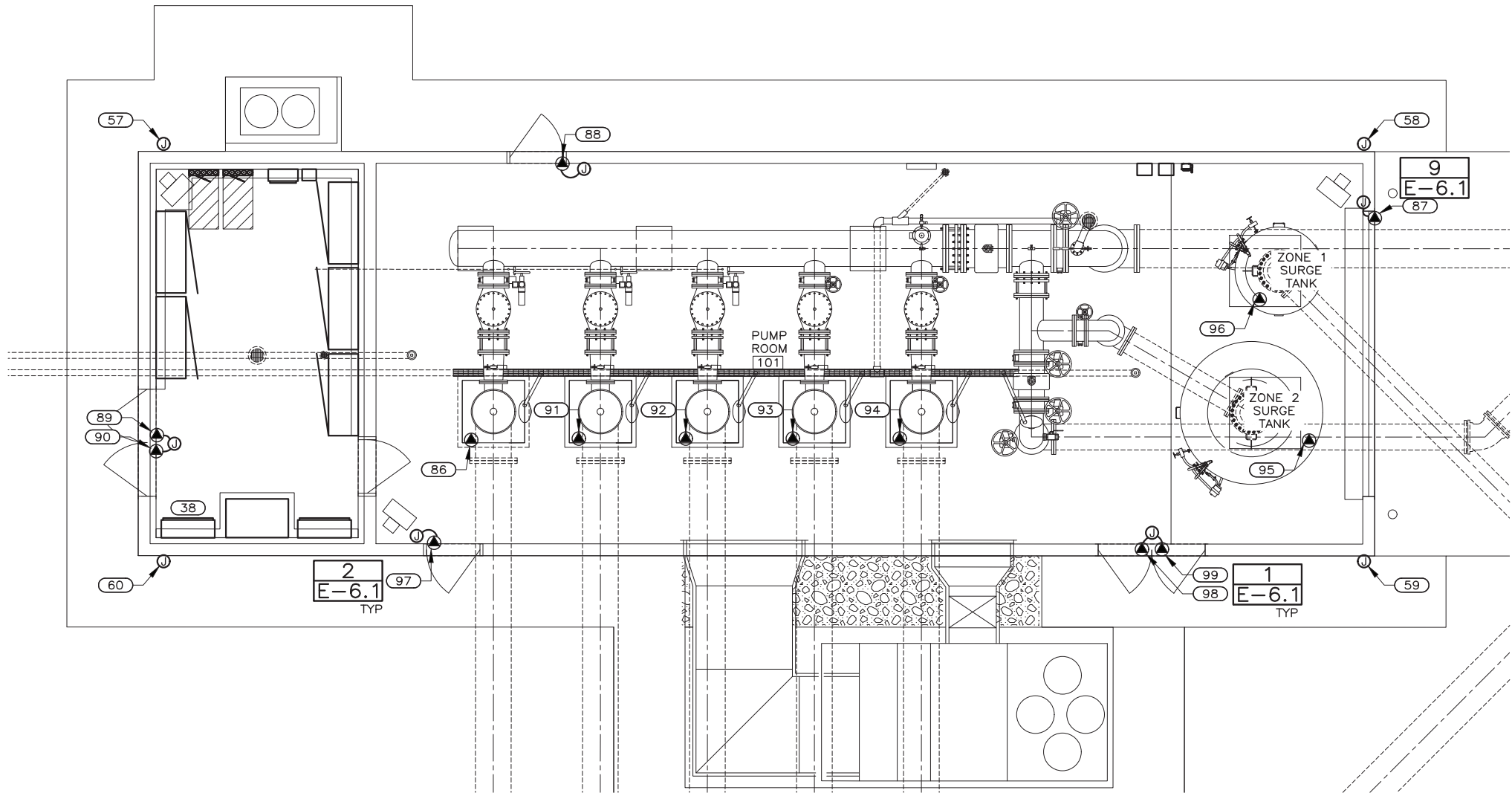
SECURITY PLAN ITEMS (E-4.6)				
DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
38	CP-4	SECURITY EQUIP. ENCLOSURE	L-20	ELECTRICAL RM.
57	CCTV-1	SECURITY SYSTEM J-BOX	-	BLD. EXTERIOR
58	CCTV-2	SECURITY SYSTEM J-BOX	-	BLD. EXTERIOR
59	CCTV-3	SECURITY SYSTEM J-BOX	-	BLD. EXTERIOR
60	CCTV-4	SECURITY SYSTEM J-BOX	-	BLD. EXTERIOR
86	ZS-1	ROOF HATCH POSITION SWITCH	-	PUMP RM.
87	ZS-10	ROLL UP DOOR POSITION SWITCH	-	PUMP RM.
88	ZS-11	DOOR POSITION SWITCH	-	PUMP RM.
89	ZS-12A	DOOR POSITION SWITCH	-	ELECTRICAL RM.
90	ZS-12B	DOOR POSITION SWITCH	-	ELECTRICAL RM.
91	ZS-2	ROOF HATCH POSITION SWITCH	-	PUMP RM.
92	ZS-3	ROOF HATCH POSITION SWITCH	-	PUMP RM.
93	ZS-4	ROOF HATCH POSITION SWITCH	-	PUMP RM.
94	ZS-5	ROOF HATCH POSITION SWITCH	-	PUMP RM.
95	ZS-6	ROOF HATCH POSITION SWITCH	-	PUMP RM.
96	ZS-7	ROOF HATCH POSITION SWITCH	-	PUMP RM.
97	ZS-8	DOOR POSITION SWITCH	-	PUMP RM.
98	ZS-9A	DOOR POSITION SWITCH	-	PUMP RM.
99	ZS-9B	DOOR POSITION SWITCH	-	PUMP RM.

GENERAL NOTES:

- FOR WIRE AND CONDUIT REQUIREMENTS, REFER TO THE INSTRUMENTATION AND CONTROL ONE-LINE DIAGRAM ON E-2.2

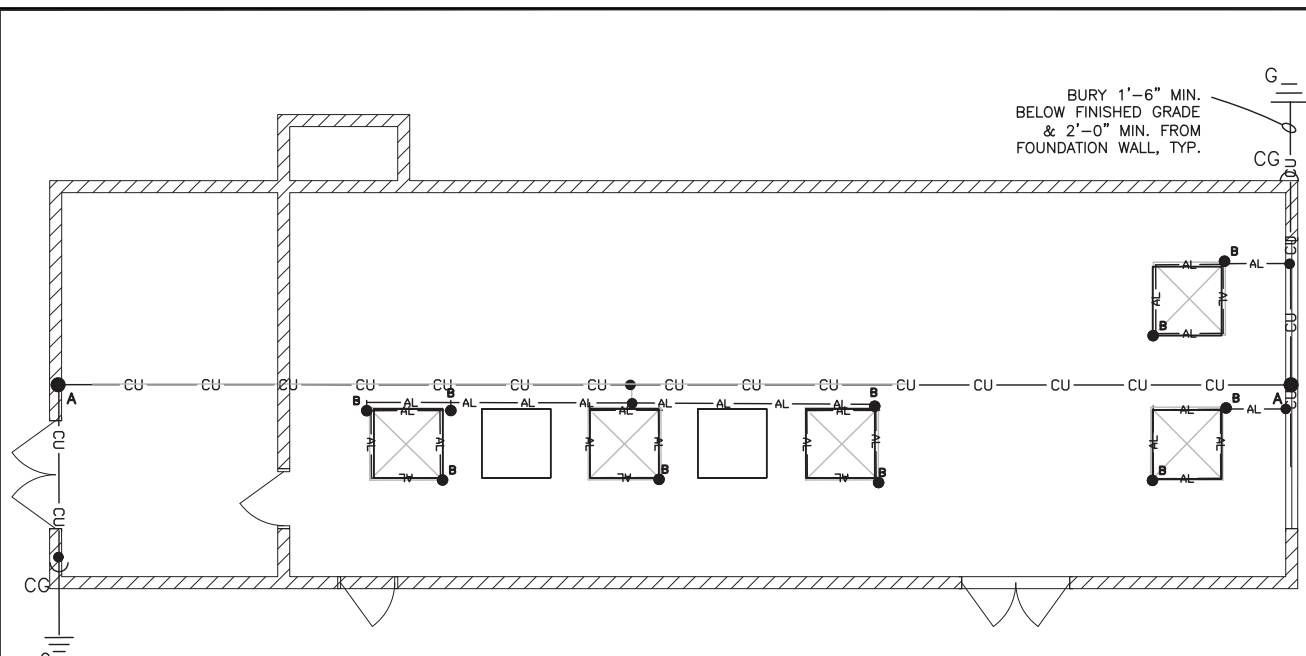
SHEET KEYNOTES:

- NOT USED.



SECURITY PLAN 1  
E-4.1  
0 4' 8' 12'  
1/4" = 1'-0"

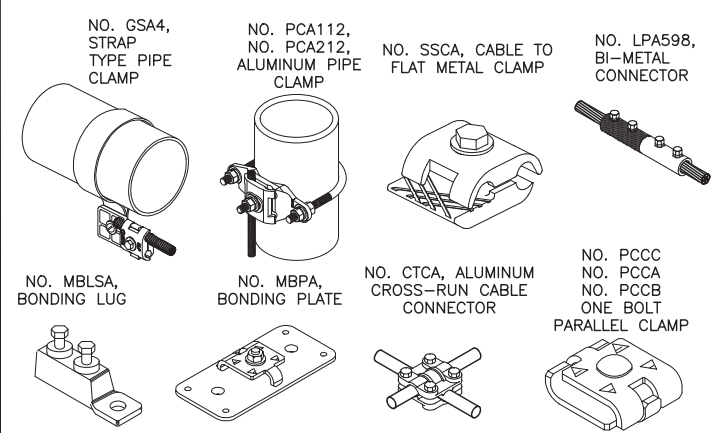




**1 LIGHTNING PROTECTION PLAN**  
3/16" = 1'-0"

- LEGEND**
- AIR TERMINAL
  - MECHANICAL CONNECTION
  - ▲ MISC. BONDING
  - TR THRU-ROOF CONNECTOR
  - CG PVC CABLE GUARD

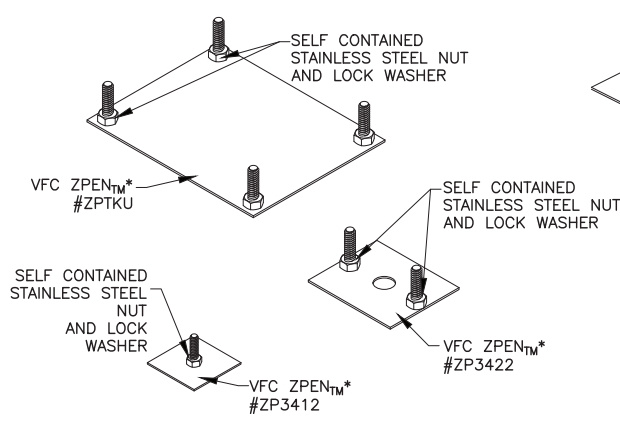
- AL CLASS I ALUMINUM MAIN CONDUCTOR
- CU CLASS I COPPER MAIN CONDUCTOR
- G COPPER CLAD GROUND ROD WITH EXOTHERMIC WELD CONNECTION



**E MISCELLANEOUS**  
NTS

USE TO SPLICE MAIN SIZE CONDUCTOR TO MAIN SIZE CONDUCTOR

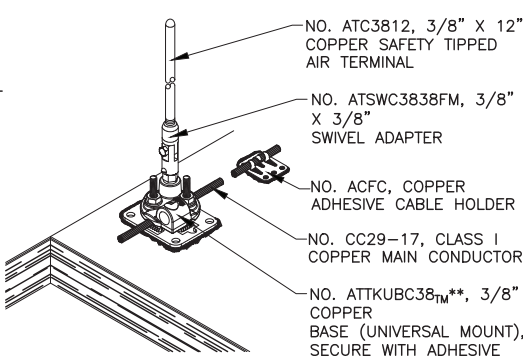
- GENERAL CONSTRUCTION NOTES**
- THIS DRAWING IS INTENDED FOR USE AS A CONSTRUCTION DOCUMENT. FIELD VERIFY ACTUAL CONDITIONS PRIOR TO CONSTRUCTION. CONTACT VFC, TO CLARIFY ANY DISCREPANCIES.



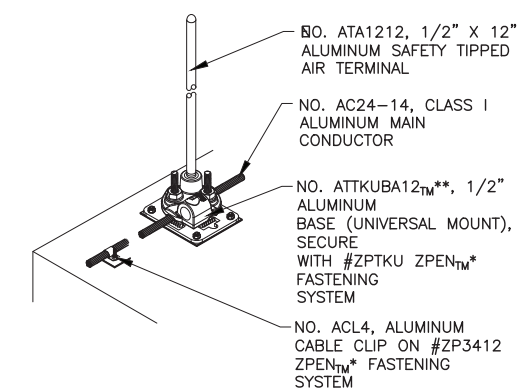
ALL FASTENERS TO BE VFC ZPENTM\* #ZP3412 WITH APPROPRIATE LOOP SUPPORTS. NO SUPPORT PENETRATIONS SHALL BE MADE IN ANY SHEET METAL FLASHING OR ROOF TOP EQUIPMENT. SHEET METAL SCREWS SHALL NOT BE USED. APPROPRIATE ADHESIVE SUPPORTS AND CONSTRUCTION MASTIC MAY BE USED ON MEMBRANE ROOF SURFACES ONLY. ADHESIVE SUPPORTS AND CONSTRUCTION MASTIC SHALL NOT BE USED ON ANY SHEET METAL SURFACES.

THE CONTRACTOR SHALL FURNISH 10 YEAR ADHESION WARRANTY ON THE VFC ZPENTM\* FASTENER SYSTEM.

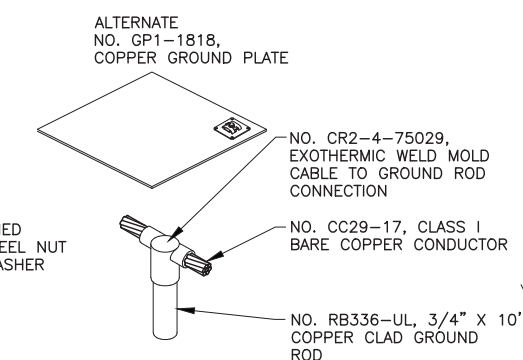
\* US PATENT 8,950,055



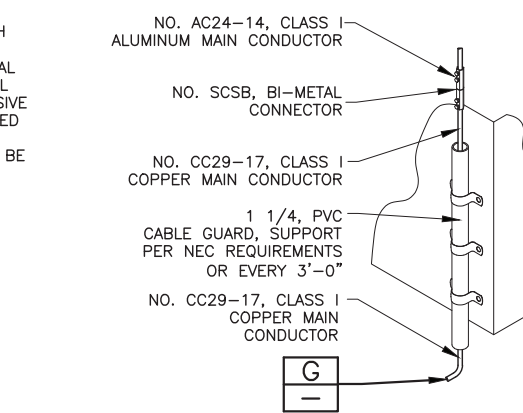
**A AIR TERMINAL**  
NTS \*\*US PATENT 9,263,864



**B AIR TERMINAL**  
NTS \*\*US PATENT 9,263,864



**EZWeld EXOTHERMIC WELD MOLD - CR2**  
NTS



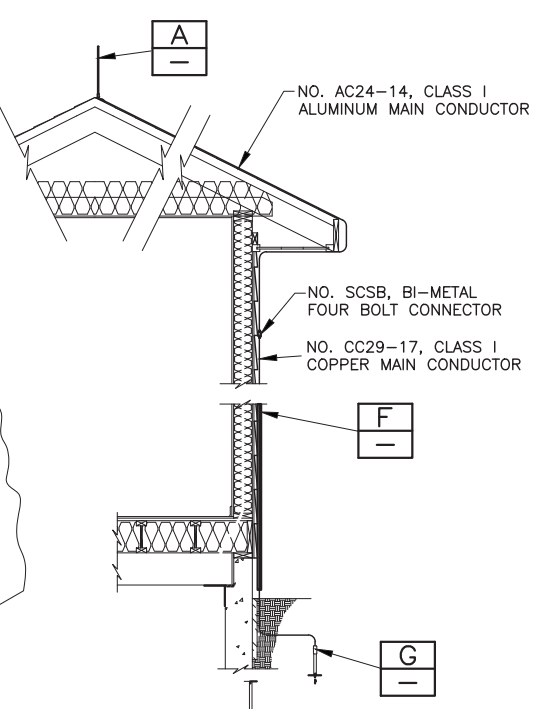
**F PVC CABLE GUARD**  
NTS

**GENERAL BONDING NOTES**

- TYPICAL BODIES OF CONDUCTANCE AS NOTED BELOW. USE FULL SIZE CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.
- (PLUMBING STACK) REQUIRES BONDING WITH MAIN SIZE CABLE ONLY IF WITHIN 6'-0" (1,828mm) OF LIGHTNING PROTECTION SYSTEM.
- TYPICAL BODIES OF INDUCTANCE AS NOTED BELOW. USE SECONDARY SIZE (SMALLER) CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.
- BONDING CONNECTIONS AND FITTINGS SHOWN ARE TYPICAL. EXAMPLES. MAKE ALL CONNECTIONS REQUIRED TO MEET CODES AS NOTED BELOW. ADJUST FITTING TYPE AS REQUIRED TO SUIT FIELD CONDITIONS.

NOTE:  
NO BEND OF A CONDUCTOR SHALL FORM AN INCLUDED ANGLE OF LESS THAN 90 DEGREES, NOR SHALL IT HAVE A RADIUS OF BEND LESS THAN 203mm (8").

**C BEND RADIUS DETAIL**  
NTS



**G TYPICAL DOWNLOAD DETAIL**  
NTS

**H.P.E. INC. ELECTRICAL ENGINEERS**  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT:22.048 ©2023  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

- LOCATE AIR TERMINALS AS SHOWN. TAKE CARE TO INSURE THAT ALL POINTS ARE WITHIN 2'-0" (609mm) OF OUTSIDE BUILDING EDGE, OUTSIDE CORNERS, RIDGE ENDS, AND THAT MAX SPACING DOES NOT EXCEED 20'-0" (6,096mm), AND THAT MIN PROJECTION ABOVE OBJECT PROTECTED IS 10" (254mm); POINTS PROJECTING 24" (609mm) MAY BE SPACED @ 25'-0" (7,520mm) MAX.
- MAINTAIN HORIZONTAL OR DOWNWARD COURSING OF MAIN CONDUCTOR. INSURE THAT ALL BENDS HAVE AT LEAST AN 8" (203mm) RADIUS AND DO NOT EXCEED 90 DEGREES.
- ATTACH ALL EXPOSED ROOF, DOWN LEAD AND BONDING CABLES AT 3'-0" (914mm) ON CENTER MAX. VERIFY COMPATIBILITY OF ADHESIVE ON MEMBRANE ROOF APPLICATION PRIOR TO INSTALLATION.
- GROUND ELECTRODES SHALL BE INSTALLED AS SHOWN, BUT IN NO INSTANCE SHALL THEY BE LESS THAN 1'-0" (304mm) BELOW GRADE AND 2'-0" (609mm) FROM FOUNDATION WALL. DRIVEN RODS SHALL PENETRATE THE EARTH AT LEAST 10'-0" (3,048mm).
- BOND TO WATER SERVICE AND OTHER PIPING SYSTEMS AS SHOWN AND AS REQUIRED BY CODE.
- MAIN SIZE LIGHTNING CONDUCTOR BONDED TO MAIN GROUND BUS. FIELD VERIFY LOCATION 1 1/4" CONDUIT FOR ACCESS, INSTALLED BY OTHERS. INTERCONNECT LIGHTNING PROTECTION GROUND TO TELEPHONE AND OTHER BUILDING GROUND SYSTEMS LOCATION FIELD DETERMINED OR AS REQUIRED BY CODE.
- LB'S AND SIMILAR CONDUIT BODIES MAY NOT BE USED IN THE INSTALLATION OF DOWNLEAD CONDUITS, AS THEY DO NOT ADHERE TO THE REQUIRED 8" (203mm) MINIMUM BEND RADIUS.
- SYSTEM SHALL BE INSTALLED AS SHOWN TO INSURE PROPER CODE COMPLIANCE AND SYSTEM CERTIFICATION. ANY MAJOR VARIANCE SHALL BE RESUBMITTED FOR APPROVAL.
- ALL MATERIALS TO BE UNDERWRITER'S LABORATORIES APPROVED WITH "A" LABELS ON CONDUCTORS @ 10'-0" (3,048mm) INTERVALS AND "B" LABELS ON ALL AIR TERMINALS.
- FINAL SYSTEM INSPECTION AND QUALITY CONTROL
  - THE CONTRACTOR SHALL FURNISH AN LPI-IP CERTIFICATE OR A UL CERTIFICATE UPON COMPLETION OF THE INSTALLATION.
  - LPI CERTIFICATION IF REQUIRED, REQUIRES SIGNATURE BY A REPRESENTATIVE OF THE OWNER AT MULTIPLE STAGES OF INSTALLATION & BY THEIR THIRD PARTY FIELD STAFF. UL CERTIFICATION IF REQUIRED, REQUIRES INSPECTION BY THEIR THIRD-PARTY FIELD STAFF AFTER COMPLETION OF THE INSTALLATION.
  - AS-BUILT DRAWINGS SHALL BE COMPLETED AND STAMPED BY AN LPI CERTIFIED MASTER DESIGNER - INSTALLER OF LIGHTNING PROTECTION SYSTEMS.
  - FINAL INSPECTION REPORT - A FINAL INSPECTION AND INSPECTION REPORT SHALL BE COMPLETED BASED ON ANSI/TIA/EIA 607, NEC, NFPA 780, AND UL96A INDUSTRY STANDARDS AS APPLICABLE. THE SCOPE OF THE INSPECTION AND REPORT SHALL INCLUDE:
    - TEST AND EVALUATION THE GROUNDING SYSTEM. RECORD FINAL SYSTEMS TO GROUND RESISTANCE LEVEL.
    - EVALUATION AND TESTING OF THE INTERNAL BONDING AND GROUNDING SYSTEMS.
    - EVALUATION AND TESTING OF EQUIPMENT GROUNDING.
    - EVALUATION OF AC SURGE SUPPRESSION INSTALLATION.
    - EVALUATION OF TELCO SURGE SUPPRESSION INSTALLATION.
    - COPY OF THE LPI-IP OR UL LIGHTNING PROTECTION CERTIFICATION.
    - FINAL AS-BUILT REVIEW AND SUBMISSION.
  - REPORT SHALL INCLUDE DETAILED REPORTING AND TEST RESULTS WITH CORRESPONDING PHOTOS OF EACH EVALUATION CATEGORY.
- SYSTEM TO BE DESIGNED AND INSTALLED BY:  
VFC LIGHTNING PROTECTION  
90 NORTH CUTLER DRIVE \* NORTH SALT LAKE, UT 84054  
PHONE: (801) 292-2956 \* FAX: (801) 292-4164  
EMAIL: cad@vfcinc.com \* INTERNET: www.vfcinc.com
- SYSTEM DESIGNED UTILIZING UL LISTED T&B/FURSE MATERIALS.

FILE NAME: 7/04



DESIGNED	KBH
DRAFTED	KBH
CHECKED	KBH
DATE	JANUARY 2023

SCALE	NONE
CITY OF	SARATOGA SPRINGS

ZONE 2 SOUTH DW BOOSTER #8	SHEET
ELECTRICAL	E-4.7
LIGHTNING PROTECTION PLAN	360.39.100



20"

24"

CP-2  
RELAY PANEL

TYP

5

E-6.3

LOW PRESSURE  
SHUTDOWN

SHUTDOWN

R

HIGH PRESSURE  
SHUTDOWN

SHUTDOWN

R

RESET

1

16"

16"

CP-5  
GUTTER/DOWNSPOUT  
CONTROL PANEL

DE-ICE

HAND OFF REMOTE

CP-5 ARRANGEMENT

2

E-4.2

2

E-4.3

6" = 1'-0"

24"

30"

GENERAC

POWER MANAGER SYSTEM CONTROLLER

CP-6 ARRANGEMENT

3

E-4.2

3

E-4.3

3" = 1'-0"

FILE NAME:  
FILE DATE:

REGISTERED PROFESSIONAL ENGINEER  
No. 86-171214-2202  
KEITH B. HEGERHORST  
STATE OF UTAH  
2/23/23

DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

HANSEN  
ALLAN  
& LUCE  
ENGINEERS

SCALE  
NONE

CITY OF  
SARATOGA SPRINGS

ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
CONTROL PANEL ARRANGEMENTS

SHEET  
E-5.2

360.39.100

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT 22.048 ©2023  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

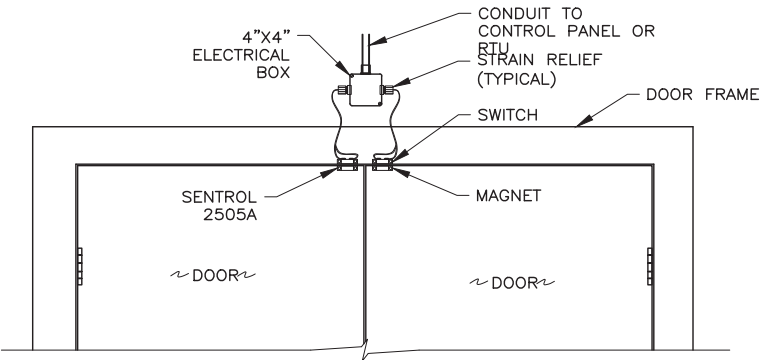
GENERAL NOTES:

1. ENCLOSURE DIMENSIONS DETERMINED BY CONTRACTOR FOR INCLUDED DEVICES.  
2. CP-2 AND CP-5 TYPICAL CONTROL DIAGRAM SHOWN ON E-3.7.

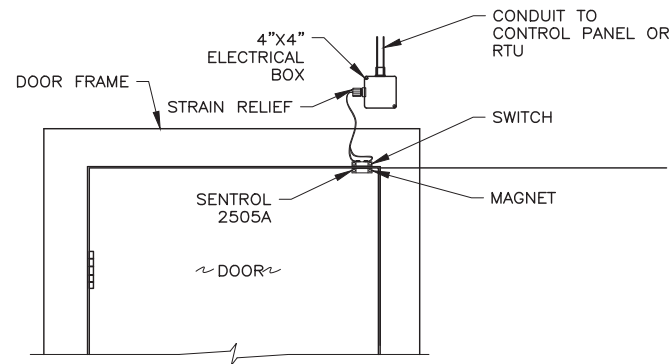
SHEET KEYNOTES:

1. PROVIDE A LABEL "HIGH OR LOW PRESSURE RESET ONLY".

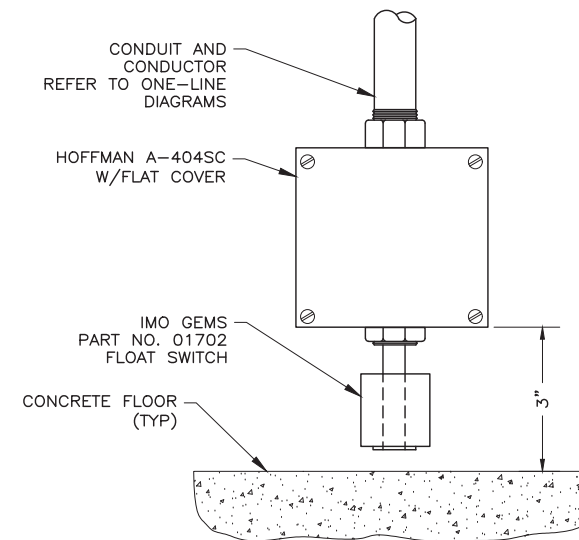




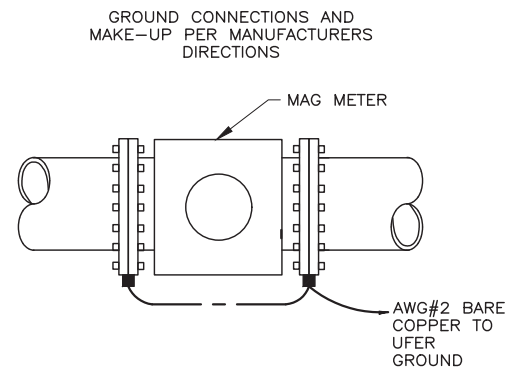
DOUBLE DOOR POSITION SWITCH 1  
1" = 1'-0" E-4.3



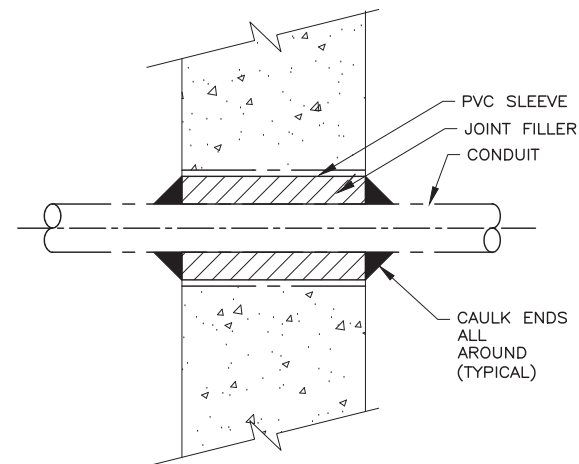
SINGLE DOOR POSITION SWITCH 2  
1" = 1'-0" E-4.3



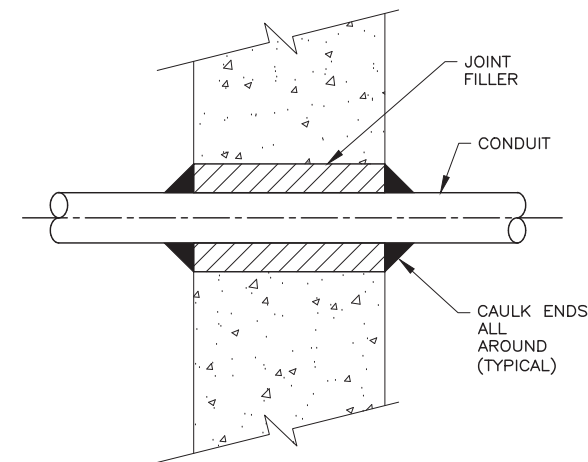
FLOOR FLOOD SWITCH DETAIL 3  
6" = 1'-0" E-4.3



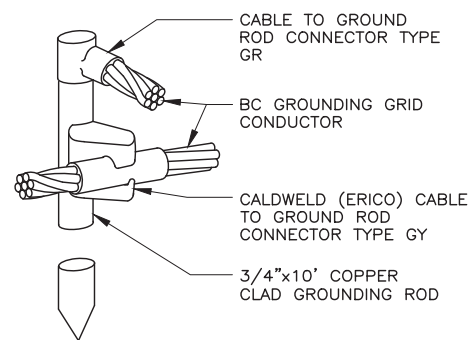
MAG METER GROUNDING 4  
1 1/2" = 1'-0" E-4.2



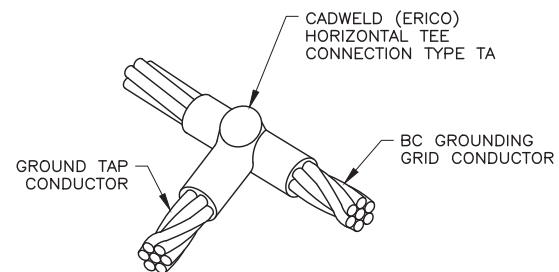
CONDUIT PENETRATION THRU NEW CONCRETE OR WALL



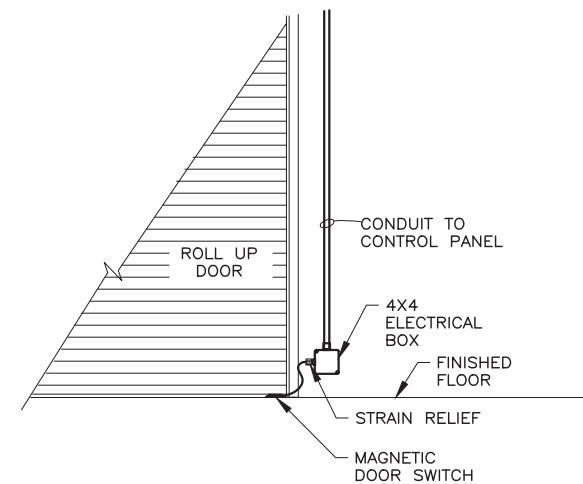
CONDUIT PENETRATION THRU EXISTING CONCRETE OR WALL



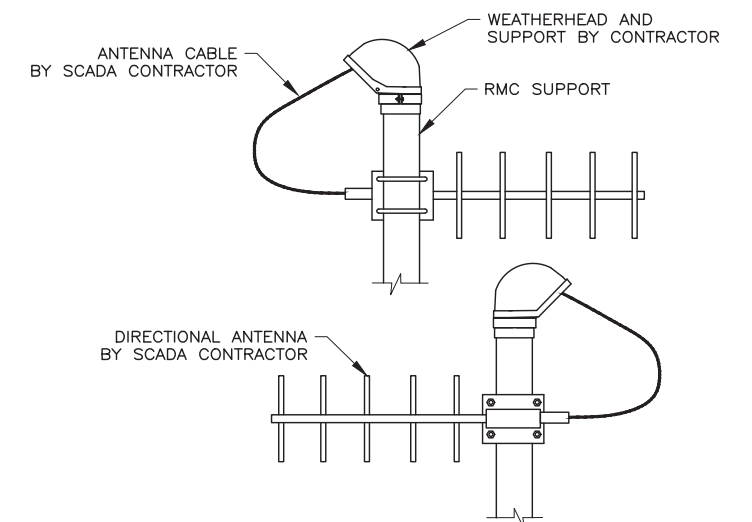
GROUND ROD CONNECTION 7  
6" = 1'-0" E-4.3



WELDED GROUND CONNECTION 8  
1' = 1'-0" E-4.2



ROLL UP DOOR POSITION SWITCH 9  
3/4" = 1'-0" E-4.3



ANTENNA WEATHERHEAD 10  
3" = 1'-0" E-6.2

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH FAX (801) 642-2154  
AMERICAN FORK, UT 84003 ©2023  
HPE PROJECT:22.048  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

GENERAL NOTES:

1. NOT USED.

SHEET KEYNOTES:

1. NOT USED.

FILE NAME:  
FILE DATE:

HANSEN  
& LUCE  
ENGINEERS



PROJECT ENGINEER

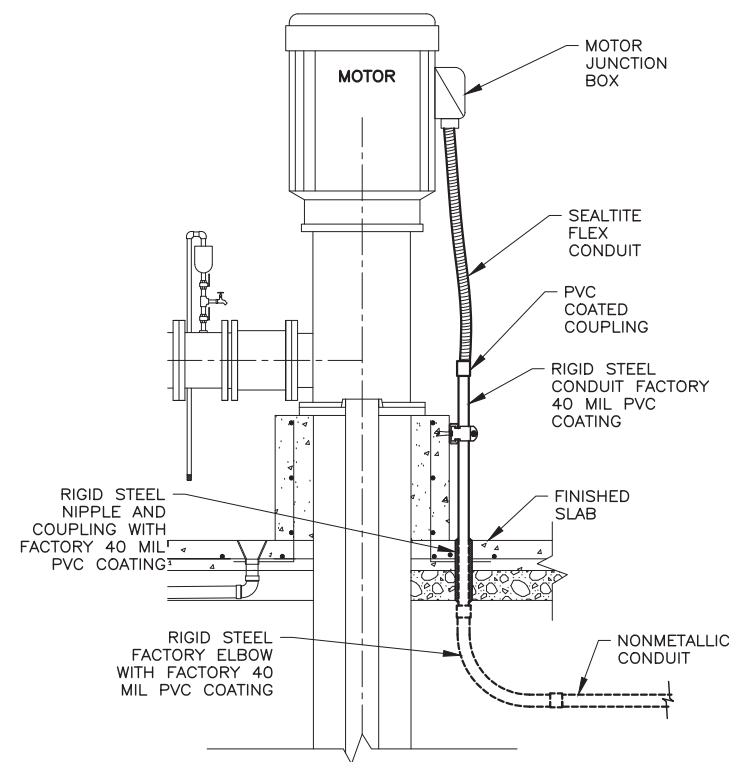
DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

SCALE  
NONE

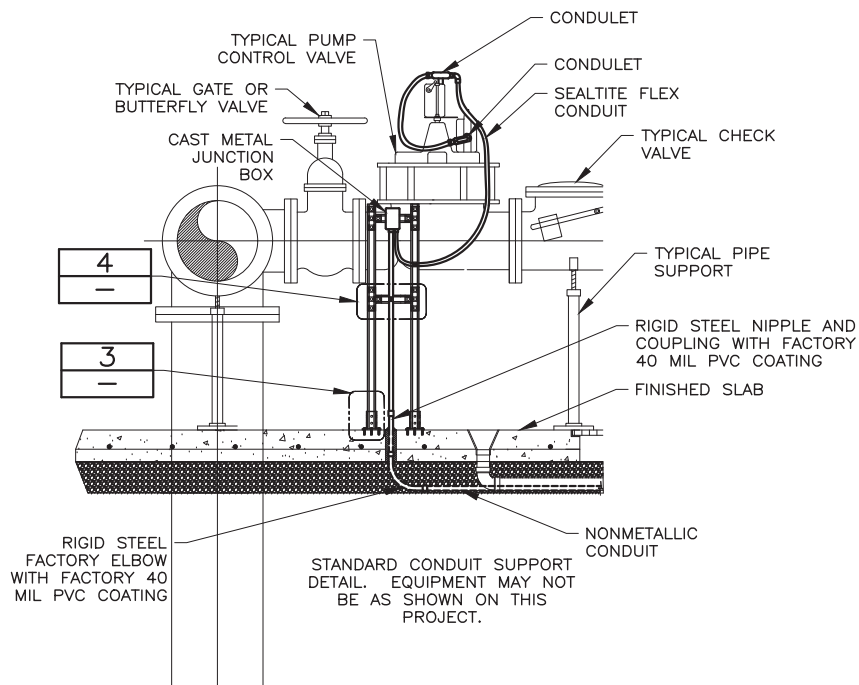
CITY OF  
SARATOGA SPRINGS

ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
DETAILS, SHT. 1

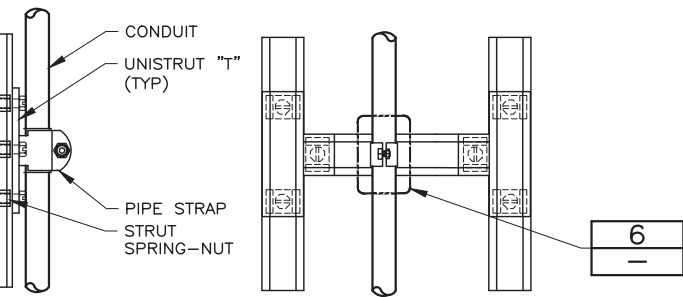
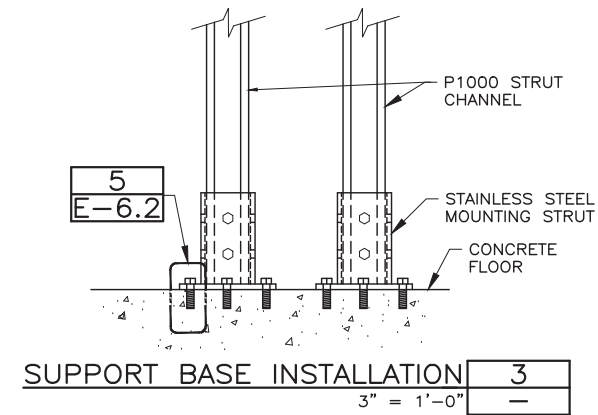
SHEET  
E-6.1  
360.39.100



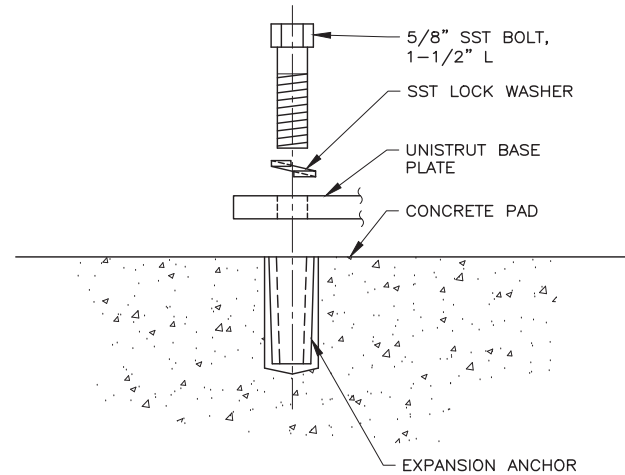
VERTICAL MOTOR CONDUIT INSTALLATION 1  
3/8" = 1'-0" E-4.2



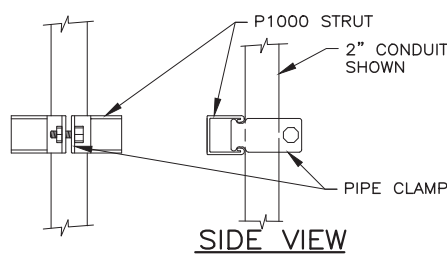
CONDUIT SUPPORT INSTALLATION 2  
3/4" = 1'-0" E-4.3



CONDUIT SUPPORT BRACE 4  
3" = 1'-0"



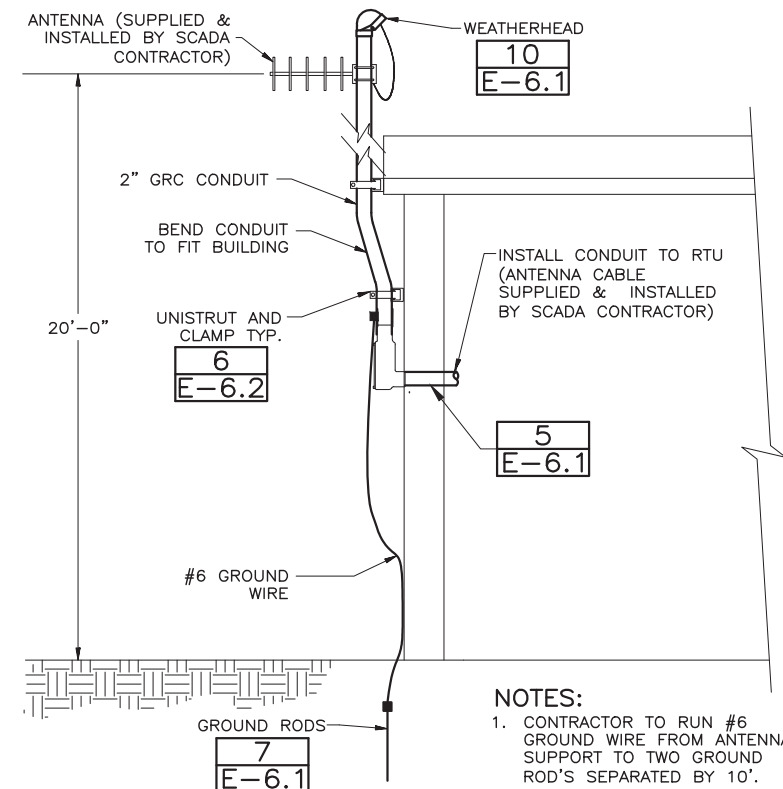
SUPPORT ATTACHMENT 5  
6" = 1'-0"



CONDUIT PIPE CLAMPS*				
SIZE	EMT	RGS	EMT/RGS	
1/2"	P1426	P1111	-	
3/4"	P1427	P1112	P1212	
1"	P1428	P1113	P1213	
1-1/4"	P1429	P1114	P1214	
1-1/2"	P1430	P1115	P1215	
2"	P1431	P1117	P1217	
2-1/2"	P1118	P1118	-	
3"	P1119	P1119	-	
3-1/2"	P1120	P1120	-	
4"	P1121	P1121	-	

\* = SUPPLIED WITH SLOTTED HEAD SCREW AND NUT

TYPICAL CONDUIT CLAMP



SCADA ANTENNA SUPPORT 7  
1' = 1'-0" E-4.3

NOTES:  
1. CONTRACTOR TO RUN #6 GROUND WIRE FROM ANTENNA SUPPORT TO TWO GROUND ROD'S SEPARATED BY 10'.

7/04  
FILE NAME:  
FILE DATE:



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023


SCALE  
AS SHOWN



ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
DETAILS, SHT. 2

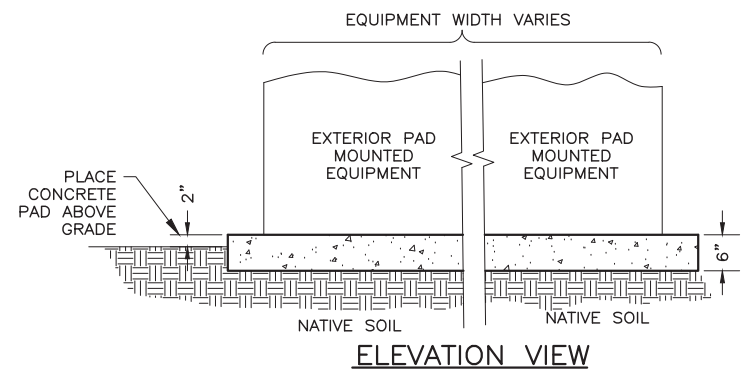
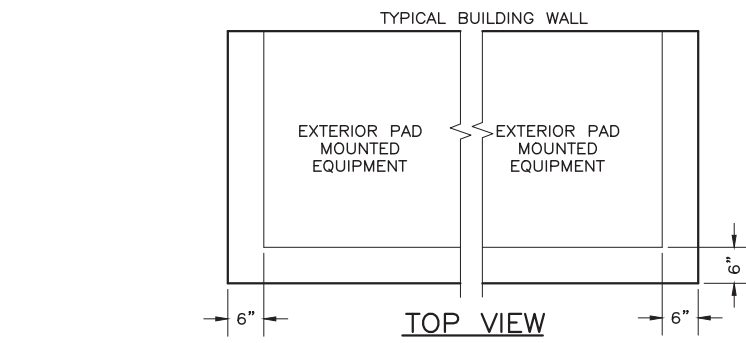
SHEET  
E-6.2  
360.39.100

GENERAL NOTES:

1. NOT USED.

SHEET KEYNOTES:

1. NOT USED.

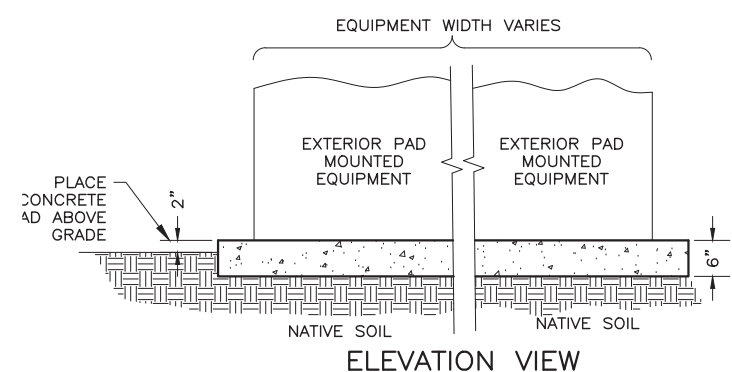
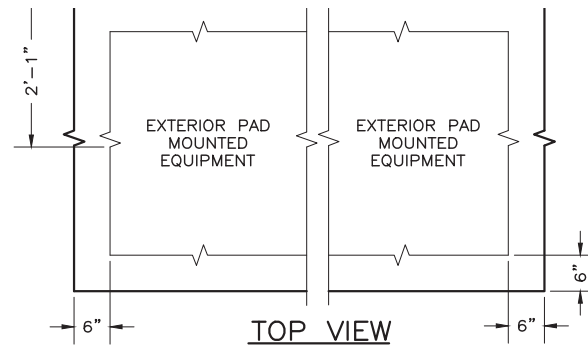


SWITCHGEAR PAD INSTALLATION 

1
---

  
3/4" = 1'-0" 

E-4.1
-------

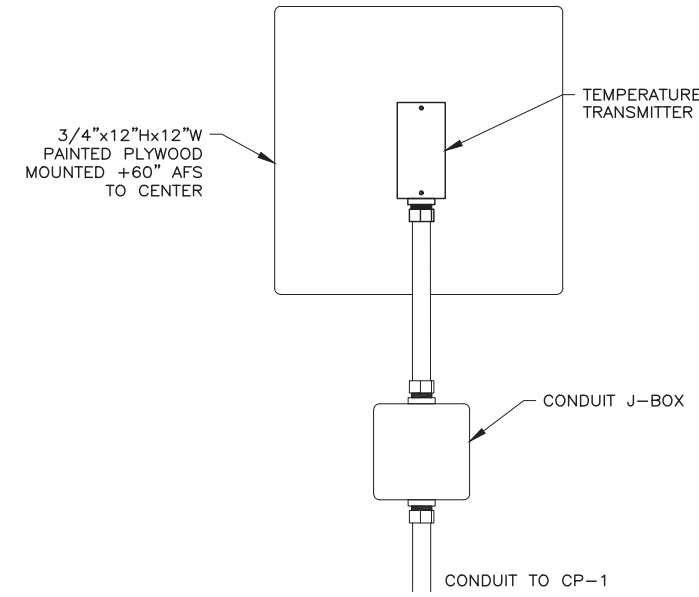


FLOOR MOUNTED EQUIPMENT PAD 

2
---

  
3/4" = 1'-0" 

E-4.3
-------

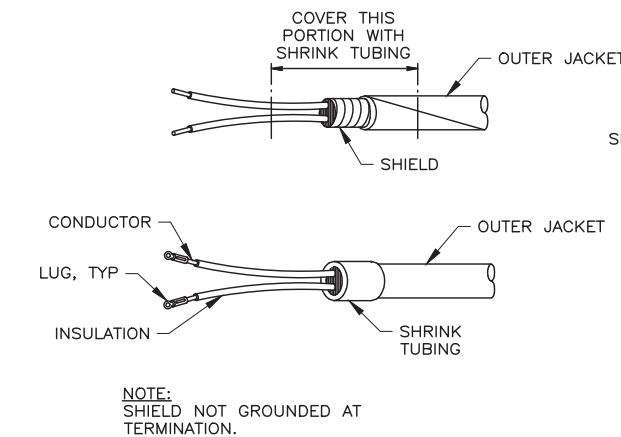


TEMPERATURE TRANSMITTER 

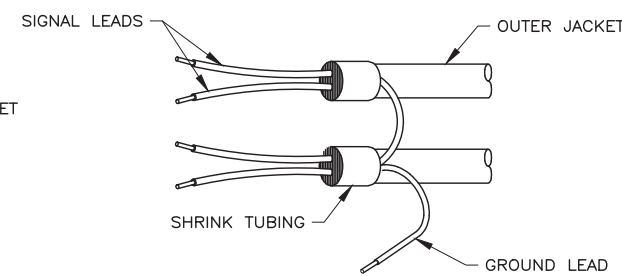
3
---

  
1' = 1'-0" 

E-4.3
-------

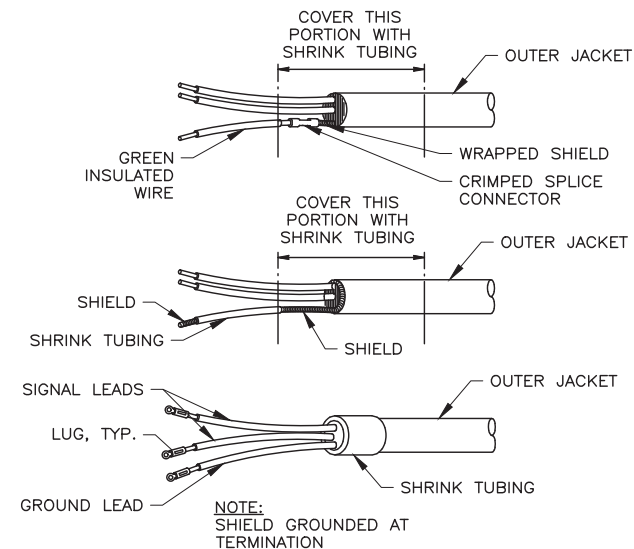


TERMINATION OF SHIELDED CONTROL CABLE NTS

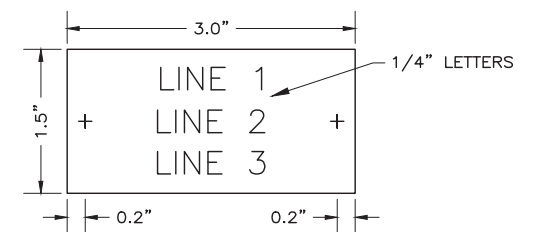
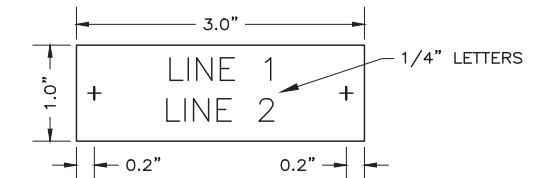
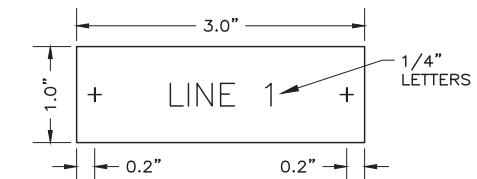


UNACCEPTABLE METHOD OF GROUNDING CONTROL CABLE SHIELD NTS

SIGNAL WIRE TERMINATIONS



TERMINATION OF SHIELDED CONTROL CABLE NTS



NAMEPLATES 

5
---

5
---

  
1' = 1'-0" 

E-5.1
-------

E-5.2
-------

PCORP #7992600 - SI #1790023  
3,600 LBS.

TOP

3/8" DIA.  
INSERTS W/HOLD  
DOWN CLEATS 2  
EA. REQ'D.  
(SEE DETAIL 1)

3.51" DIA.  
TERM-A-DUCT  
1 EA. REQ'D.

2"-0" LONG GALV. "C"  
CHANNEL  
4 EA. REQ'D.  
(1 EA. WALL)

GALV. PULL IRON  
4 EA. REQ'D.  
(1 EA. CORNER)

4.5" DIA.  
TERM-A-DUCTS  
14 EA. REQ'D.  
(7 EA. NEAR WALL  
7 EA. FAR WALL)

BASE  
8,081 LBS.

84"

54"

12" DIA.  
HDPE  
SUMP

84"

5'-8" LONG GALV. "C"  
CHANNEL  
2 EA. REQ'D.  
(1 EA. NEAR & FAR  
WALLS)

NO. 25P GALV.  
DIAMOND  
PLATE DOORS W/  
LOCKING BOLTS

1/2"DIA. GROUND INSERTS  
4 EA. REQ'D.  
(2 EA. OUTSIDE WALLS  
2 EA. INSIDE WALLS)

2.38" IDA. TERM-A-DUCTS  
2 EA. REQ'D.  
(1 EA. NEAR WALL  
1 EA. FOR WALL)

5.57" DIA. TERM-A-DUCTS  
8 EA. REQ'D.  
(4 EA. NEAR WALL  
4 EA. FAR WALL)

84"

8"

60"

52"

84" OR 96"

24"

24"

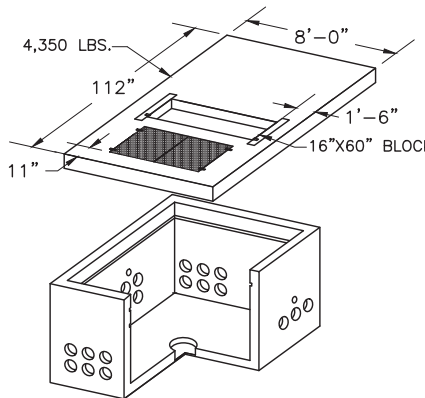
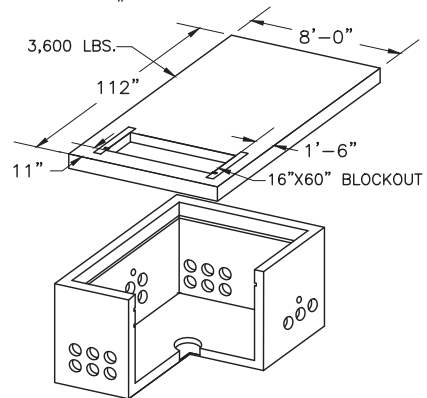
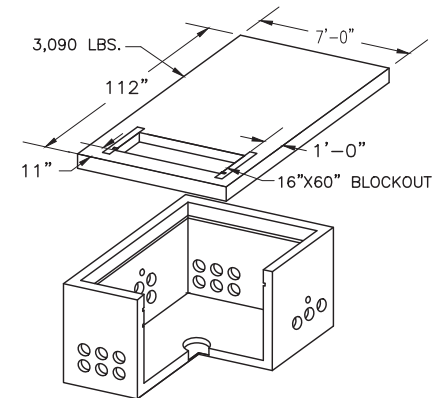
112"

#### OPTIONAL TOPS

2.4 - 25kV, 3-PHASE TRANSFORMER PADVAULT  
WITHOUT ACCESS  
PCORP #7992601 - SI #1790024  
2.4 - 25kV, 3-PHASE TRANSFORMER PAD ONLY (NO  
BASE)  
PCORP #1790021

35kV, 3-PHASE TRANSFORMER PADVAULT WITHOUT  
ACCESS  
PCORP #7992603-SI#1008975  
35kV, 3-PHASE TRANSFORMER PAD ONLY (NO BASE)  
PCORP #1008958

35kV, 3-PHASE TRANSFORMER PADVAULT  
WITH ACCESS  
PCORP #7992602-SI#1008977



RMP TRANSFORMER PAD-VAULT 1  
N/A E-4.1

#### NOTES:

1 CONTRACTOR SHALL COORDINATE  
WITH ROCKY MOUNTAIN POWER  
PLANNER WHICH VAULT WILL BE  
REQUIRED.

2.4 - 25 kV, 3-PHASE TRANSFORMER PADVAULT  
WITH ACCESS STOCK ITEM 7992600-STOCK ITEM  
1790023.

2.4 - 25 kV, 3-PHASE TRANSFORMER PAD VAULT  
WITHOUT ACCESS, STOCK ITEM 7992601-STOCK ITEM  
1790024.

2.4- 25 kV, 3-PHASE TRANSFORMER PAD, STOCK  
ITEM 1790021 35 kV, 3-PHASE TRANSFORMER  
PADVAULT WITH ACCESS, STOCK ITEM  
7992603-STOCK ITEM 1008977.

35 kV, 3-PHASE TRANSFORMER PADVAULT WITHOUT  
ACCESS STOCK ITEM 7992602-STOCK ITEM  
1008975.

35 kV, 3-PHASE TRANSFORMER PAD, STOCK ITEM  
1008958.

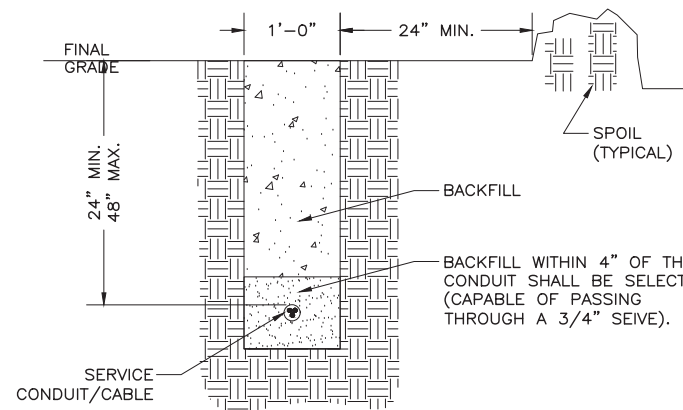


#### HOLD DOWN CLEAT DETAIL 1

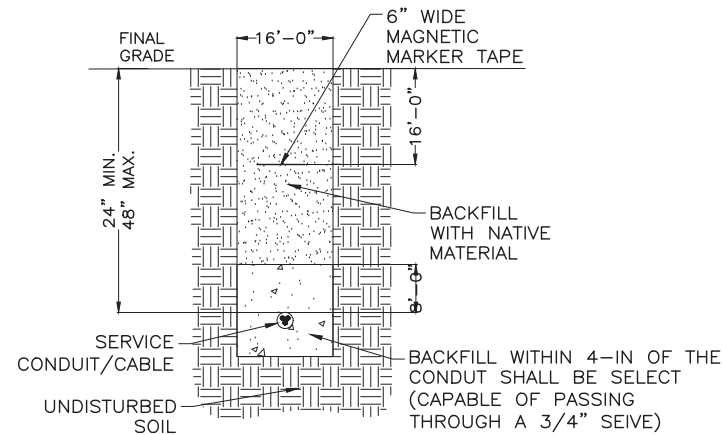
1-1/4" x 2-1/2" STAINLESS STEEL HOLD DOWN  
CLEAT - 2 REQ'D.  
3/8" x 1-1/4" STAINLESS STEEL BOLT - 2 REQ'D.  
3/8" STAINLESS STEEL BELLVILLE WASHER - 2  
REQ'D.

TRANSFORMER DIMENSIONS OF BASE MEASURED IN FEET & INCHES			
KVA SIZE	DEPTH/LENGTH FT & INCHES	WIDTH FT & INCHES	
75	3'6"	5'8"	
150	3'7"	5'8"	
225	3'9"	6'	
300	3'11"	6'	
500	4'	6'	
750	4'8"	6'	
1000	4'10"	6'	
1500	5'3"	6'	
2000	5'7"	6'8"	
2500	6'9"	5'9"	

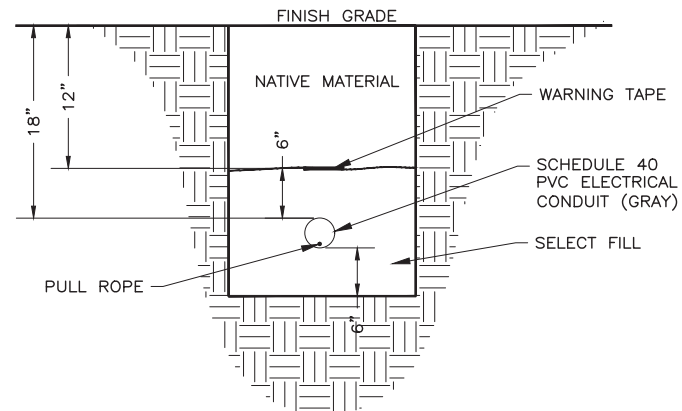
PADVAULTS SI#1790023 WITH DOORS MEASURED IN FEET & INCHES		
25kV	9'4"	7'



PRIMARY CONDUIT TRENCH 2  
1" = 1'-0" E-4.1



SECONDARY CONDUIT TRENCH 3  
1" = 1'-0" E-4.1



TYPICAL CONDUIT TRENCH 4  
1" = 1'-0" E-4.1

H.P.E. INC. ELECTRICAL ENGINEERS  
POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT:22.048 ©2023  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

#### GENERAL NOTES:

1. NOT USED.

#### SHEET KEYNOTES:

1. NOT USED.

7/04  
FILE NAME:  
FILE DATE:

HANSEN  
ALLEN  
& LUCE  
ENGINEERS



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

SCALE  
AS SHOWN



ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
DETAILS, SHT. 4

SHEET  
E-6.4  
360.39.100

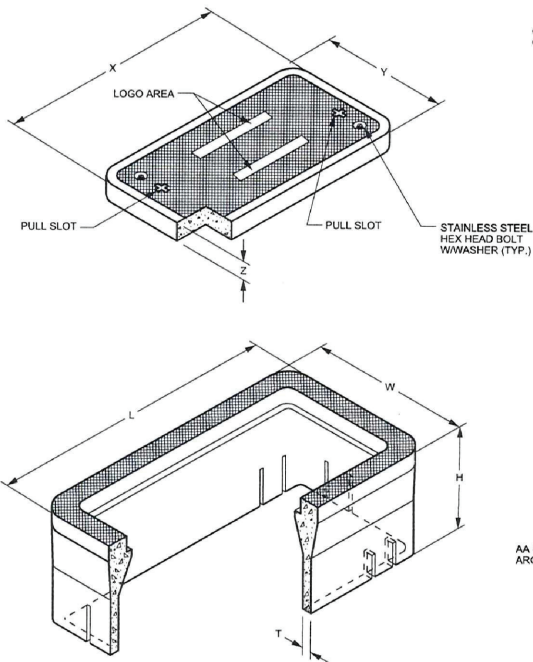


GENERAL NOTES:

1. NOT USED.

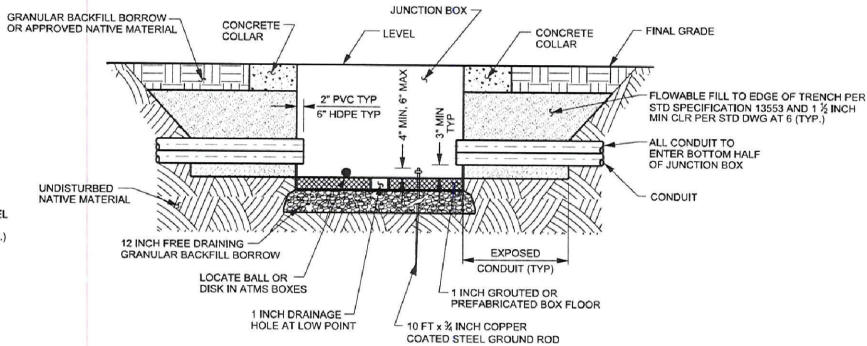
SHEET KEYNOTES:

1. NOT USED.

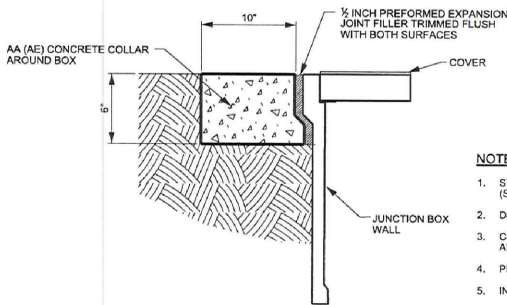


BOX AND LID DIMENSIONS

BOX TYPE	1" Inch	1 1/2" Inch	2" Inch	2 1/2" Inch	3" Inch	3 1/2" Inch	4" Inch
I-PC	24	25	1 1/2	16	23 1/2	13 1/2	2
II-PC	24	37 1/2	1 1/2	26	35 1/2	24	3
III-PC	24	49 1/2	2	32 1/2	47 1/2	30 1/2	3



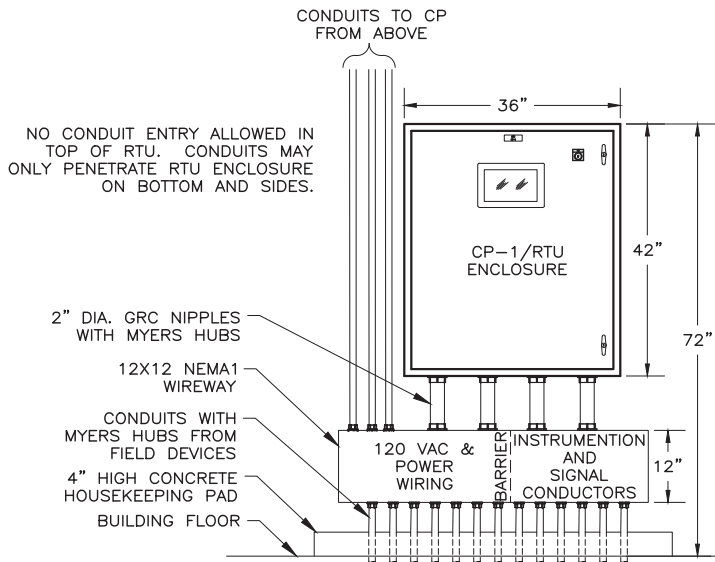
JUNCTION BOX CONDUIT PENETRATION DETAIL



NOTES:

1. STAMP BOX LOGO INTO THE LID FROM THE FACTORY. (SEE STANDARD SPECIFICATION 13554).
2. DO NOT PLACE JUNCTION BOXES IN THE TRAVELED WAY OR ON FREEWAY SHOULDERS.
3. CONCRETE COLLAR WIDTH VARIES WHEN ADJACENT TO ATMS CABINETS. REFER TO AT AND SL SERIES STD DWGS.
4. PROVIDE CONCRETE COLLARS EXCEPT WITHIN CONCRETE PAVED AREAS.
5. INSTALL CONDUIT PLUG PER STANDARD SPECIFICATION 13554.
6. ALIGN ATMS CONDUIT BY COLOR ON EACH SIDE OF THE JUNCTION BOX.
7. PROVIDE TYPE III-PC JUNCTION BOXES WITH A SPLIT LID.
8. CONFORM TO ANSI/ISCTE-77 2007 "SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY" TIER 22 LOADING FOR ALL JUNCTION BOXES.
9. EXTEND GROUND ROD A MINIMUM OF 4 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF JUNCTION BOX.
10. USE A SPLIT BOLT TO ATTACH GROUND WIRES TO GROUND ROD. ATTACH NOT MORE THAN TWO WIRES PER BOLT.
11. DO NOT CUT GROUND RODS.

N/A E-4.1

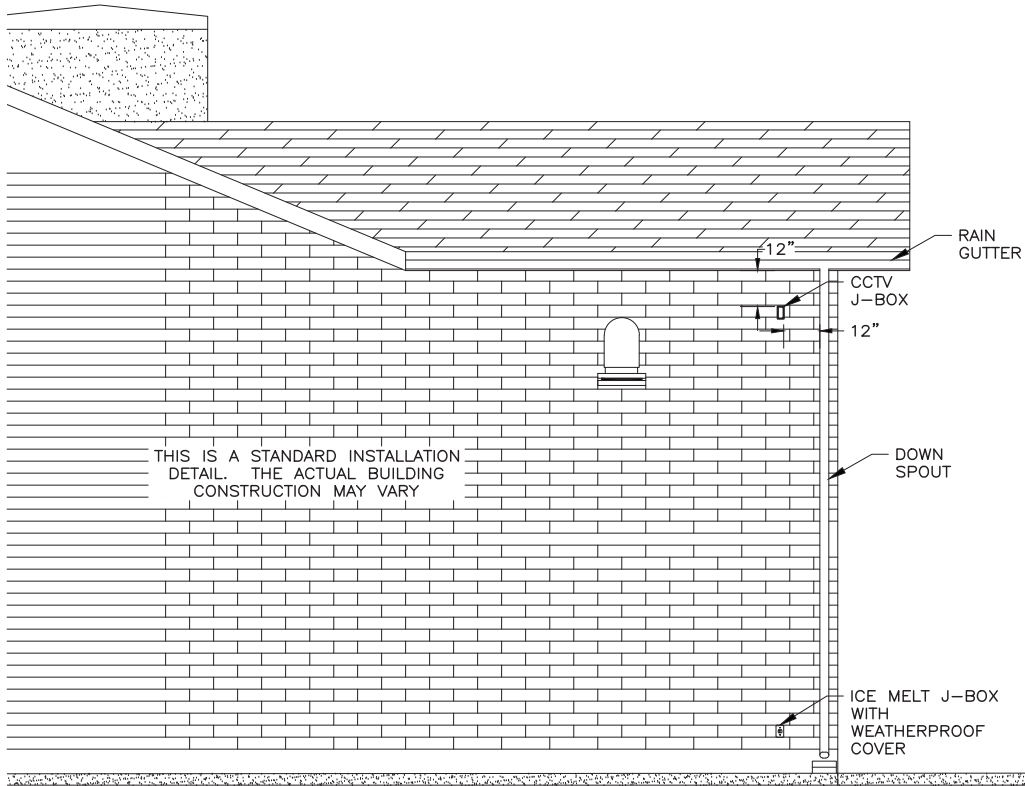


CP-1 INSTALLATION

2

3/4" = 1'-0"

E-4.3



TYPICAL CCTV AND ICE MELT JBOX LOCATIONS

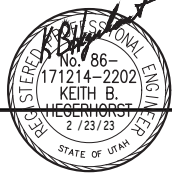
3

3/8" = 1'-0"

E-4.2

FILE NAME:  
FILE DATE:

HANSEN  
ALLER  
& LUCE  
ENGINEERS



DESIGNED KBH  
DRAFTED KBH  
CHECKED KBH  
DATE JANUARY 2023

PROJECT ENGINEER

SCALE  
AS SHOWN



ZONE 2 SOUTH DW BOOSTER #8  
ELECTRICAL  
DETAILS, SHT. 5

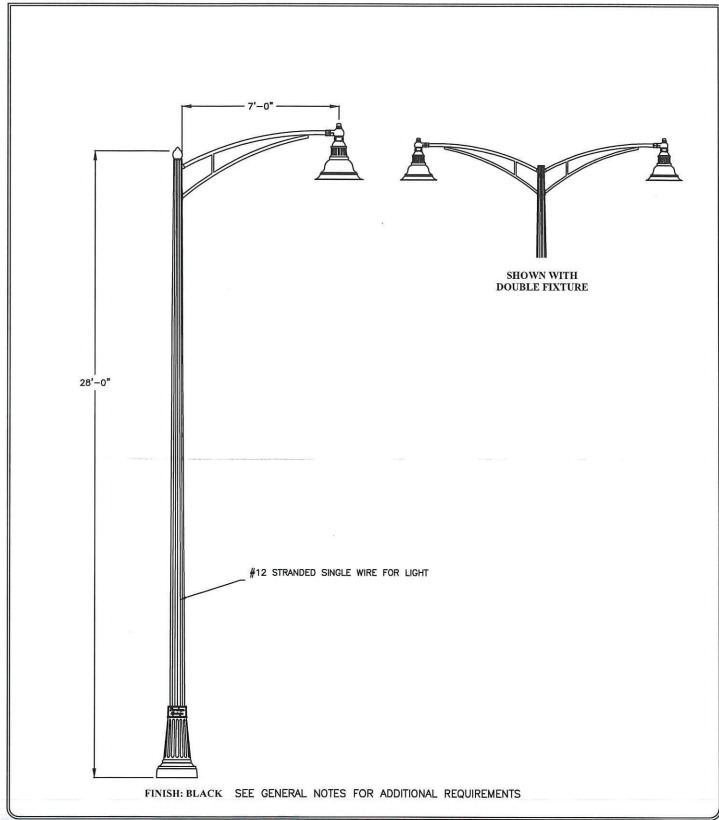
SHEET

E-6.5

360.39.100

GENERAL NOTES:

1. FOR THIS PROJECT PROVIDE A PULL BOX AT EACH POLE AS SHOWN ON E-4.1.
2. FOR EACH POLE BASE CONSTRUCT THE RAISED POLE BASE (SEE NOTE 24).
3. INSTALL CONDUIT FOR EACH POLE VIA THE PULL BOX AND FUSE (SEE NOTE 18).
4. INSTALL A 1" CONDUIT FROM THE PULL BOX THROUGH THE POLE BASE FOR THE FUTURE CCTV ETHERNET CONDUCTOR.
5. SARATOGA SPRINGS STANDARD STREET LIGHTING REQUIREMENTS ARE ON THEIR WEB SITE. REFER TO THE WEB SITE FOR ADDITIONAL INFORMATION.

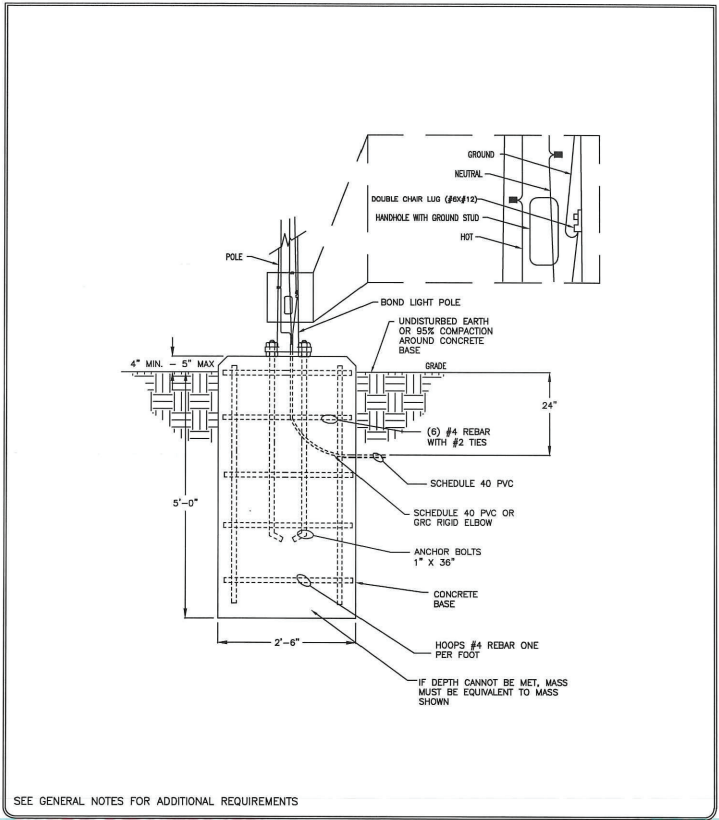


28' ARTERIAL STREET LIGHT

DATE: AUGUST 2017  
DRAWING NAME: LP-3A  
DRAWN BY: ETL  
CHECKED: ETL/REV

REVISION: DATE BY COMMENTS  
1 08/21/17 JRP REVISION NOTES  
SARATOGA SPRINGS CITY  
100% CONFORMANCE  
UTAH DIVISION OF PUBLIC UTILITIES  
FILE NO. 188495  
FILE NO. 188495

STANDARD DETAILS  
STREET LIGHTS  
LP-3A

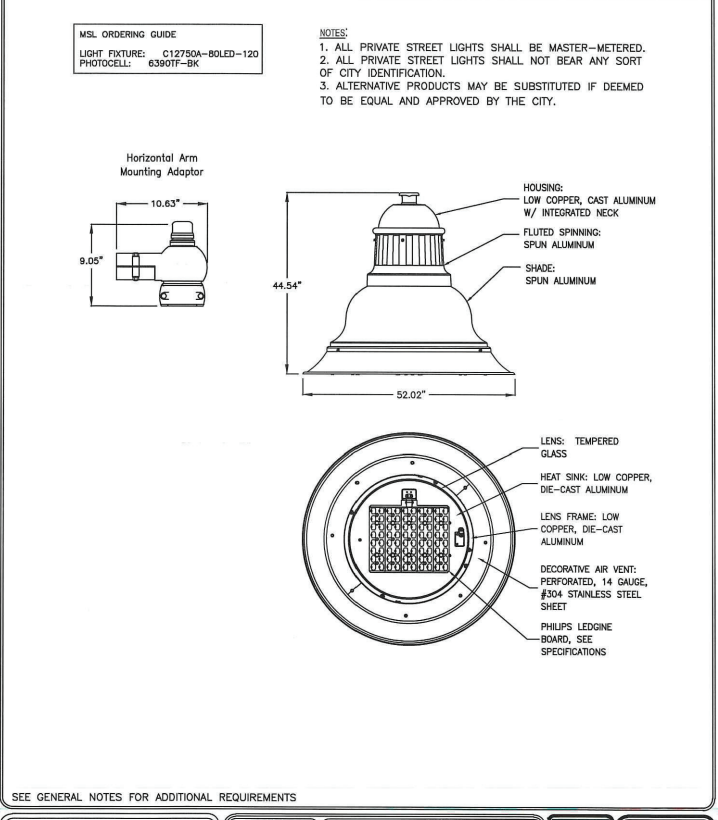


CONCRETE BASE FOR ARTERIAL STREET LIGHT

DATE: AUGUST 2017  
DRAWING NAME: LP-3C  
DRAWN BY: ETL  
CHECKED: ETL/REV

REVISION: DATE BY COMMENTS  
1 08/21/17 JRP REVISION NOTES  
SARATOGA SPRINGS CITY  
100% CONFORMANCE  
UTAH DIVISION OF PUBLIC UTILITIES  
FILE NO. 188495  
FILE NO. 188495

STANDARD DETAILS  
STREET LIGHTS  
LP-3C

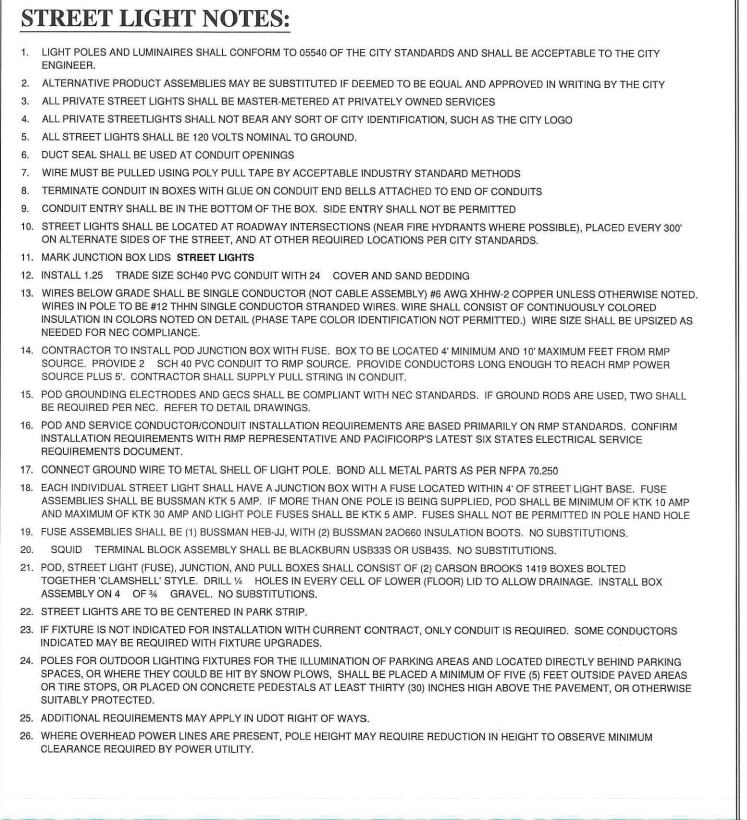


ARTERIAL STREET LIGHT LUMINAIRE

DATE: AUGUST 2017  
DRAWING NAME: LP-3D  
DRAWN BY: ETL  
CHECKED: ETL/REV

REVISION: DATE BY COMMENTS  
1 08/21/17 JRP REVISION NOTES  
SARATOGA SPRINGS CITY  
100% CONFORMANCE  
UTAH DIVISION OF PUBLIC UTILITIES  
FILE NO. 188495  
FILE NO. 188495

STANDARD DETAILS  
STREET LIGHTS  
LP-3D



STREET LIGHT DETAILS

DATE: MARCH 2020  
DRAWING NAME: LP-1  
DRAWN BY: JRP  
CHECKED: JRP/REV

REVISION: DATE BY COMMENTS  
1 03/01/20 JRP REVISION NOTES  
SARATOGA SPRINGS CITY  
100% CONFORMANCE  
UTAH DIVISION OF PUBLIC UTILITIES  
FILE NO. 188495  
FILE NO. 188495

STANDARD DETAILS  
STREET LIGHTS  
LP-1

STREET LIGHT STANDARD 1  
N/A E-4.1

