Appendix D2
Drawings

- 00 General
- 01 Freshwater Arizona
- 02 Freshwater California
- 03 TCS Recirculation Loop
- 04 NTH IRZ
- 05 Inner Recirculation Loop
- 06 MW-20 Bench

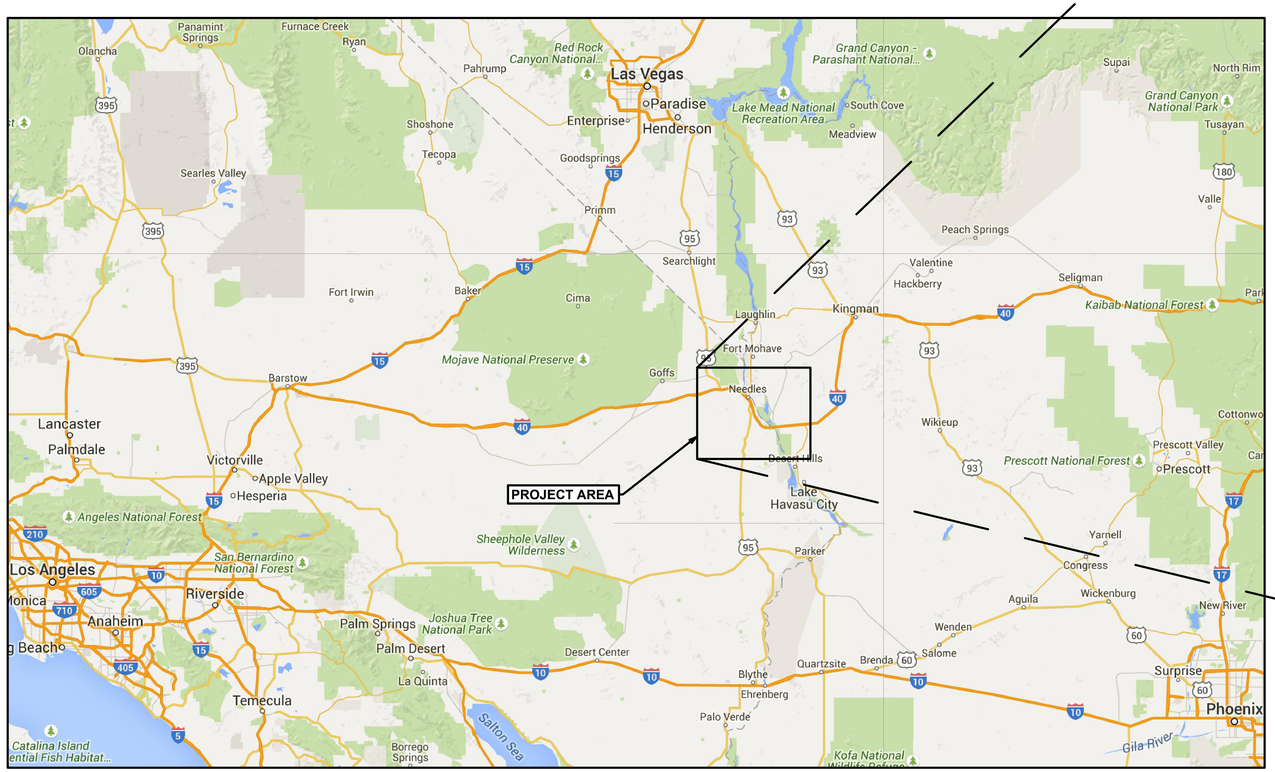
TOPOCK GROUNDWATER REMEDIATION PROJECT

PG&E TOPOCK COMPRESSOR STATION

NEEDLES, CALIFORNIA

FINAL DESIGN PLANS

NOVEMBER 2015



NO SCALE



NO SCALE

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
0	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN					

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

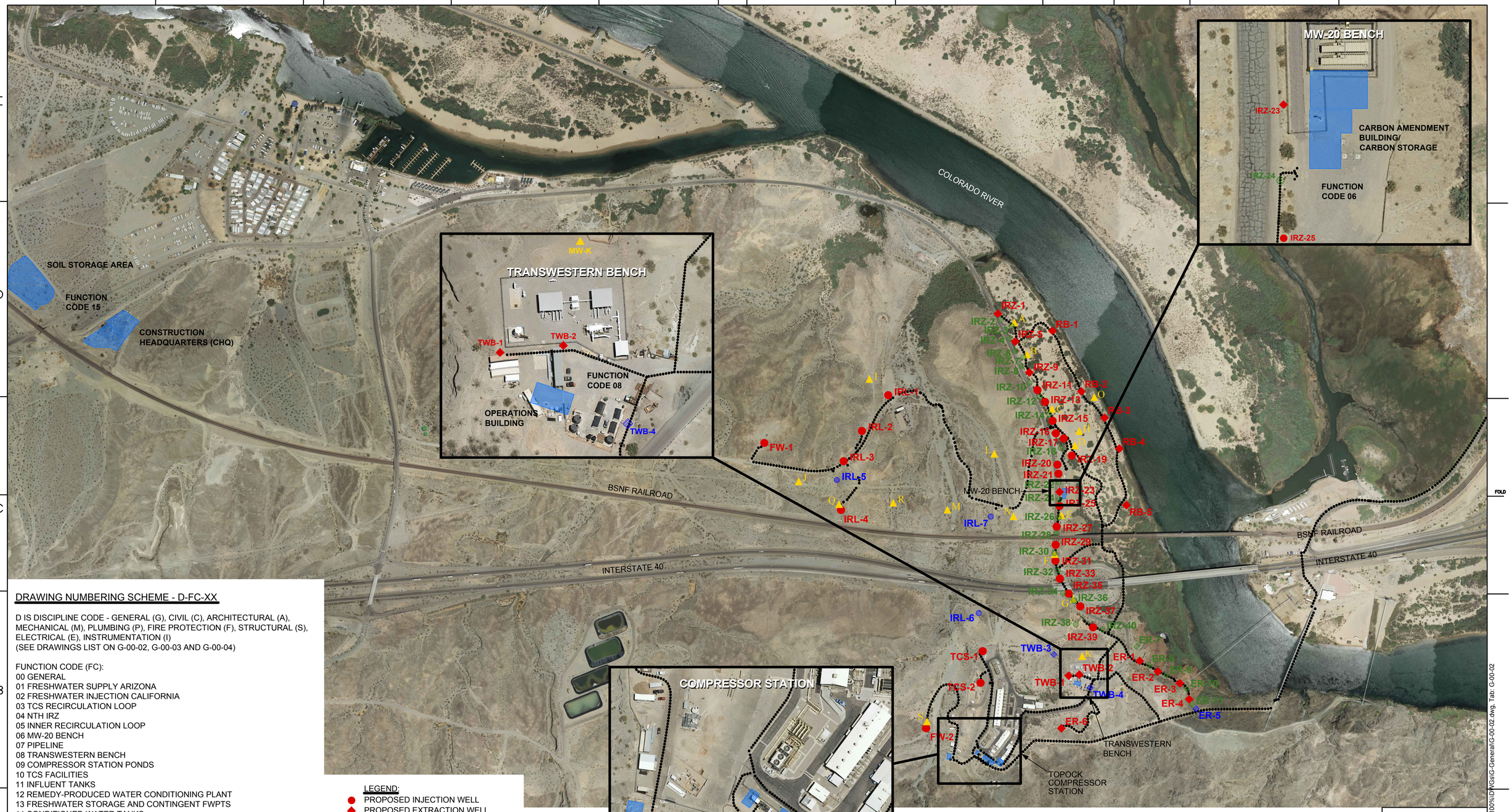
TITLE SHEET, VICINITY MAP, AND LOCATION MAP

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-00-01	REV 1

N180B

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DRAWING NUMBERING SCHEME - D-FC-XX

D IS DISCIPLINE CODE - GENERAL (G), CIVIL (C), ARCHITECTURAL (A), MECHANICAL (M), PLUMBING (P), FIRE PROTECTION (F), STRUCTURAL (S), ELECTRICAL (E), INSTRUMENTATION (I)
(SEE DRAWINGS LIST ON G-00-02, G-00-03 AND G-00-04)

FUNCTION CODE (FC):
00 GENERAL
01 FRESHWATER SUPPLY ARIZONA
02 FRESHWATER INJECTION CALIFORNIA
03 TCS RECIRCULATION LOOP
04 NTH IRZ
05 INNER RECIRCULATION LOOP
06 MW-20 BENCH
07 PIPELINE
08 TRANSWESTERN BENCH
09 COMPRESSOR STATION PONDS
10 TCS FACILITIES
11 INFLUENT TANKS
12 REMEDY-PRODUCED WATER CONDITIONING PLANT
13 FRESHWATER STORAGE AND CONTINGENT FWPTS
14 CONDITIONED WATER TANKS
15 PARK MOABI FACILITIES
16 MONITORING WELLS

XX - SEQUENTIAL DRAWING NUMBER STARTS AT 0 FOR EACH DISCIPLINE AND FUNCTION CODE.

FOR PIPELINE DRAWINGS (FUNCTION CODE 07) SEE THE PIPELINE DRAWINGS KEY MAP C-07-01 AND PIPELINE SEGMENT MAP C-07-02.

LEGEND:
- PROPOSED INJECTION WELL
- PROPOSED EXTRACTION WELL
- APPROXIMATE LOCATION OF FUTURE PROVISIONAL INJECTION WELL
- APPROXIMATE LOCATION OF FUTURE PROVISIONAL EXTRACTION WELL
- APPROXIMATE LOCATION OF FUTURE PROVISIONAL WELL LOCATIONS RELOCATED OR ADDED AS A RESULT OF 60% RTC's
- PROPOSED NEW MONITORING WELL

0 400 800 1,200
SCALE: 1"=400'

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING
ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
4	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
3	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		JM	JP	JP	CH
2	9/8/14	PRE-FINAL (90%) DESIGN		JM	JP	JP	CH
1	4/5/13	INTERMEDIATE (60%) DESIGN		JM	JP	JP	CH
0	11/18/11	PRELIMINARY (30%) DESIGN		JM	JP	JP	CH

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

DRAWINGS KEY MAP

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-00-02	REV 4

11/04/2015, 11:54, G:\Graphics\ARTOPOCK-01\Submittal_100%\DWGs\G-General\G-00-02.dwg, Tab: G-00-02

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00 - GENERAL SHEETS	
DRAWING NUMBER	**DRAWING TITLE**
G-00-01	TITLE SHEET, VICINITY MAP & LOCATION MAP
G-00-02	DRAWINGS KEY MAP
G-00-03	DRAWING INDEX 1
G-00-04	DRAWING INDEX 2
G-00-05	DRAWING INDEX 3
G-00-06	ABBREVIATIONS
G-00-07	GENERAL LEGENDS AND SYMBOLS
G-00-08	PROCESS SCHEMATIC FOR FRESH WATER INJECTION AND REMEDY-PRODUCED WATER
C-00-01	GENERAL CIVIL NOTES
C-00-02	WELL LOCATION MAP
C-00-03	WELL SCHEDULE
C-00-04	OVERALL CIVIL SITE PLAN
C-00-05	CIVIL DETAILS
C-00-06	CHAIN LINK FENCE AND GATE
C-00-07	CHAIN LINK FENCE AND GATE DETAILS
C-00-08	TYPICAL DETAILS
C-00-09	TYPICAL DETAILS
C-00-10	TYPICAL DETAILS
C-00-12	PIPE ID AND ABREVIATION SCHEDULE
S-00-01	GENERAL STRUCTURAL NOTES
S-00-02	GENERAL STRUCTURAL DETAILS
S-00-03	GENERAL STRUCTURAL DETAILS
S-00-04	GENERAL STRUCTURAL DETAILS
S-00-05	WELL VAULT SCHEDULE
S-00-06	WELL VAULT TOP SLAB DETAILS
M-00-01	MECHANICAL STANDARD DETAILS
M-00-02	MECHANICAL STANDARD DETAILS
M-00-03	MECHANICAL STANDARD DETAILS
M-00-04	MECHANICAL STANDARD DETAILS
M-00-05	MECHANICAL STANDARD DETAILS
M-00-06	WELL CONSTRUCTION SCHEDULE
M-00-07	WATER CONDITIONING PLANT (BUILDING 12) MECHANICAL LEGEND & ABBREVIATIONS
F-00-01	FIRE PROTECTION GENERAL NOTES AND STANDARD DETAILS
F-00-02	FIRE PROTECTION STANDARD DETAILS
E-00-01	ELECTRICAL SYMBOLS AND ABBREVIATIONS
E-00-02	GROUNDWATER REMEDY OVERALL ELECTRICAL SITE PLAN
E-00-03	TCS ELECTRICAL AREA PLAN
E-00-04	TRANSWESTERN BENCH AREA PLAN
E-00-05	MW-20 BENCH AREA PLAN
E-00-06	NORTH RIVERBANK AREA PLAN
E-00-07	NORTHERN BAT CAVE WASH AREA PLAN
E-00-08	UPLANDS AREA PLAN
E-00-09	TYPICAL NODE SITE PLAN
E-00-10	GROUNDWATER REMEDY ONE-LINE DIAGRAM AND ELEVATION
E-00-11	NODE 1 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
E-00-12	NODE 1 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
E-00-13	NODE 2 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
E-00-14	NODE 2 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
E-00-15	NODE 3 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
E-00-16	NODE 3 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
E-00-17	NODE 3 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
E-00-18	NODE 4 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
E-00-19	NODE 4 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
E-00-20	NODE 5 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
E-00-21	REMEDY SCADA SYSTEM BLOCK DIAGRAM
E-00-22	TRANSWESTERN BENCH COMMUNICATION PANEL 1 ELEVATION & LAYOUT
E-00-23	TRANSWESTERN BENCH COMMUNICATION PANEL 1 SCHEMATIC 1
E-00-24	TRANSWESTERN BENCH COMMUNICATION PANEL 1 SCHEMATIC 2
E-00-25	REMOTE WELL COMMUNICATION PANEL 2 ELEVATION & LAYOUT
E-00-26	REMOTE WELL COMMUNICATION PANEL 2 SCHEMATIC
E-00-27	REMOTE WELL COMMUNICATION PANEL 3 ELEVATION & LAYOUT
E-00-28	REMOTE WELL COMMUNICATION PANEL 3 SCHEMATIC
E-00-29	REMOTE WELL COMMUNICATION PANEL 4 ELEVATION & LAYOUT
E-00-30	REMOTE WELL COMMUNICATION PANEL 4 SCHEMATIC
E-00-31	REMOTE WELL COMMUNICATION PANEL 5 ELEVATION & LAYOUT
E-00-32	REMOTE WELL COMMUNICATION PANEL 5 SCHEMATIC
E-00-33	ENERGY USE CALCULATIONS
E-00-34	LOAD CALCULATIONS
E-00-35	LOAD CALCULATIONS
E-00-36	LOAD CALCULATIONS
E-00-37	ELECTRICAL PANEL FABRICATION NOTES
E-00-38	MOTOR ELECTRICAL PANEL EP1
E-00-39	MOTOR ELECTRICAL PANEL EP2
E-00-40	MOTOR ELECTRICAL PANEL EP3
E-00-41	VAULT ELECTRICAL PANEL FABRICATION NOTES
E-00-42	VAULT ELECTICAL PANEL W1
E-00-43	VAULT ELECTICAL PANEL W2
E-00-44	VAULT ELECTICAL PANEL W2A
E-00-45	VAULT ELECTICAL PANEL W2B
E-00-46	VAULT ELECTICAL PANEL W10
E-00-47	VAULT ELECTICAL PANEL W20
E-00-48	VAULT ELECTICAL PANEL W30
E-00-61	ELECTRICAL DETAILS 1
E-00-62	ELECTRICAL DETAILS 2
E-00-63	ELECTRICAL DETAILS 3

00 - GENERAL SHEETS (Continued)	
DRAWING NUMBER	**DRAWING TITLE**
E-00-64	ELECTRICAL DETAILS 4
E-00-65	ELECTRICAL DETAILS 5
E-00-66	ELECTRICAL DETAILS 6
E-00-67	ELECTRICAL DETAILS 7
E-00-68	ELECTRICAL DETAILS 8
E-00-69	CONDUIT AND CABLE SCHEDULE
E-00-70	CONDUIT & CABLE SCHEDULES
E-00-71	CONDUIT & CABLE SCHEDULES
E-00-72	CONDUIT & CABLE SCHEDULES
E-00-73	CONDUIT & CABLE SCHEDULES
I-00-01	P&ID INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 1
I-00-02	P&ID INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 2
I-00-03	REMEDY WELL ID SCHEDULE
01 - FRESHWATER SUPPLY ARIZONA	
C-01-01	HNWR FRESH WATER SUPPLY WELL SITE PLAN
C-01-02	FRESH WATER SUPPLY WELL SITE B - SITE PLAN
S-01-01	HNWR-1A FRESHWATER SUPPLY WELL - FOUNDATION PLAN AND SECTION
S-01-02	HNWR-1A FRESHWATER SUPPLY WELL - ELECTRICAL PAD FLOOR & ROOF PLAN AND SECTIONS
S-01-03	HNWR-1A FRESHWATER SUPPLY WELL - ELECTRICAL PAD SECTIONS AND DETAILS
S-01-04	FRESHWATER WELL SITE B - FOUNDATION PLAN AND SECTION
S-01-05	FRESHWATER WELL SITE B - ELECTRICAL PAD FLOOR & ROOF PLAN AND SECTION
S-01-06	FRESHWATER WELL SITE B - ELECTRICAL PAD SECTIONS AND DETAILS
S-01-07	FRESHWATER WELL - SAND COLLECTION SYSTEM PLAN, SECTIONS AND DETAILS
S-01-08	FRESHWATER WELL - SAND COLLECTION SYSTEM SECTIONS AND DETAILS
M-01-01	HNWR-1 WELL HEAD PIPING AND ELECTRICAL PAD PLAN AND SECTION
M-01-02	SITE B WELL HEAD PIPING PLAN AND SECTIONS
E-01-01	FRESHWATER WELL (HNWR-1A) ELECTRICAL SITE PLAN
E-01-02	FRESHWATER WELL (HNWR-1A) PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
E-01-03	FRESHWATER WELL (HNWR-1A) CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
E-01-04	FRESHWATER WELL (HNWR-1A) PUMP ELEMENTARY DIAGRAM
E-01-05	FRESHWATER WELL (SITE B) ELECTRICAL SITE PLAN
E-01-06	FRESHWATER WELL (SITE B) PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
E-01-07	FRESHWATER WELL (SITE B) CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
E-01-08	FRESHWATER WELL (SITE B) PUMP ELEMENTARY DIAGRAM
I-01-01	P&ID FRESHWATER SUPPLY WELLS
02 - FRESHWATER INJECTION CALIFORNIA	
C-02-01	FRESHWATER INJECTION WELL FW-1 - SITE PLAN
C-02-02	FRESHWATER INJECTION WELL FW-2 - SITE PLAN
S-02-01	FW INJECTION WELL VAULTS - TYPE 1 - TOP PLAN
S-02-01A	FW INJECTION WELL VAULTS - TYPE 2 - TOP PLAN
S-02-02	FW INJECTION WELL VAULTS TYPES 1 AND 2 - FOUNDATION PLAN
S-02-02A	FW INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-02-02B	FW INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2
S-02-03	REMEDY FRESH WATER STORAGE TANK PLANS
S-02-04	REMEDY FRESH WATER STORAGE TANK - SECTIONS AND DETAILS
M-02-01	FRESHWATER INJECTION WELL CONSTRUCTION DETAILS
M-02-02	FRESHWATER INJECTION WELL VAULTS MECHANICAL DETAILS
M-02-03	FRESHWATER INJECTION WELL VAULTS MECHANICAL SECTIONS
M-02-04	REMEDY FRESHWATER STORAGE TANK MECHANICAL PLAN AND DETAILS
M-02-05	REMEDY FRESHWATER STORAGE TANK MECHANICAL PLAN AND DETAILS
E-02-01	TYPICAL INJECTION WELL AND METER VAULTS ELECTRICAL PLAN (TYPICAL)
E-02-02	FRESHWATER INJECTION WELL FW-1 PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
E-02-03	FRESHWATER INJECTION WELL FW-1 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
E-02-04	FRESHWATER INJECTION WELL FW-1 PUMP ELEMENTARY DIAGRAM
E-02-05	FRESHWATER INJECTION WELL FW-2 PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
E-02-06	FRESHWATER INJECTION WELL FW-2 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
E-02-07	FRESHWATER INJECTION WELL FW-2 SSS PUMP ELEMENTARY DIAGRAM
E-02-08	FRESHWATER INJECTION WELL FW-2 FVNR PUMP ELEMENTARY DIAGRAM
E-02-09	FRESHWATER INJECTION WELL FW-1 - SITE PLAN
E-02-10	FRESHWATER INJECTION WELL FW-2 - SITE PLAN
I-02-01	P&ID FRESHWATER TANK
I-02-02	P&ID INJECTION WELL
03 - TCS RECIRCULATION LOOP	
G-03-01	TCS LOOP PROCESS FLOW DIAGRAM
S-03-01	TCS LOOP EXTRACTION WELL VAULTS - TYPE 2 - TOP PLAN
S-03-01A	TCS LOOP EXTRACTION WELL VAULTS - TYPE 1 - TOP PLAN
S-03-02	TCS LOOP EXTRACTION WELL VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN
S-03-03	TCS LOOP EXTRACTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-03-03A	TCS LOOP EXTRACTION WELL VAULTS - SECTIONS SHEET 2 OF 2
S-03-04	TCS LOOP INJECTION WELL VAULTS - TYPE 1 - TOP PLAN
S-03-05	TCS LOOP INJECTION WELL VAULTS - TYPE 2 - TOP PLAN
S-03-06	TCS LOOP INJECTION WELL VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN
S-03-07	TCS LOOP INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-03-08	TCS LOOP INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2
M-03-01	TCS LOOP EXTRACTION WELL CONSTRUCTION DETAILS
M-03-02	TCS LOOP INJECTION WELL CONSTRUCTION DETAILS
M-03-03	TCS LOOP EXTRACTION WELL VAULTS MECHANICAL DETAILS
M-03-04	TCS LOOP INJECTION WELL VAULTS MECHANICAL DETAILS
M-03-05	TCS LOOP INJECTION VAULTS MECHANICAL DETAILS

03 - TCS RECIRCULATION LOOP (Continued)	
DRAWING NUMBER	**DRAWING TITLE**
E-03-01	TCS LOOP EAST RAVINE EXTRACTION WELL ELECTRICAL PLAN
E-03-02	TCS LOOP TRANSWESTERN BENCH EXTRACTION WELL ELECTRICAL PLAN
E-03-03	TCS LOOP INJECTION WELL ELECTRICAL PLAN
I-03-01	TCS LOOP EAST RAVINE EXTRACTION WELLS P&ID
I-03-02	TCS LOOP TRANSWESTERN BENCH EXTRACTION WELLS P&ID
I-03-03	TCS LOOP INJECTION WELLS P&ID
04 - NTH IRZ	
G-04-01	IRZ EXTRACTION WELL PROCESS FLOW DIAGRAM
G-04-02	IRZ INJECTION WELL PROCESS FLOW DIAGRAM
C-04-01	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 13+50
C-04-02	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 13+50 TO STA 19+00
C-04-03	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 19+00 TO STA 24+50
C-04-04	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 24+50 TO STA 30+00
C-04-05	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 30+00 TO STA 35+50
C-04-06	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 35+50 TO STA 39+50
C-04-07	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 12+02
C-04-08	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 14+50
C-04-09	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 14+50 TO STA 17+50
C-04-10	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 14+58
C-04-11	ACCESS ROAD - TYPICAL ROAD SECTION
S-04-01	IRZ EXTRACTION WELL VAULTS - TYPE 1 - TOP PLAN
S-04-02	IRZ EXTRACTION WELL VAULTS - TYPE 2 - TOP PLAN
S-04-03	IRZ EXTRACTION WELL VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN
S-04-04	IRZ EXTRACTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-04-05	IRZ EXTRACTION WELL VAULTS - SECTIONS SHEET 2 OF 2
S-04-06	IRZ INJECTION WELL VAULTS - TYPE 1 - TOP PLAN
S-04-07	IRZ INJECTION WELL VAULTS - TYPE 2 - TOP PLAN
S-04-08	IRZ INJECTION WELL VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN
S-04-09	IRZ INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-04-10	IRZ INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2
M-04-01	IRZ EXTRACTION WELL CONSTRUCTION DETAILS
M-04-02	IRZ INJECTION WELL CONSTRUCTION DETAILS
M-04-03	IRZ SINGLE SCREEN EXTRACTION WELL VAULTS MECHANICAL DETAILS
M-04-04	IRZ DUAL SCREEN EXTRACTION WELL VAULTS MECHANICAL DETAILS
M-04-05	IRZ SINGLE SCREEN INJECTION WELL VAULTS MECHANICAL DETAILS
M-04-06	IRZ DUAL SCREEN INJECTION WELL VAULTS MECHANICAL DETAILS
M-04-07	IRZ DUAL SCREEN INJECTION WELL VAULTS MECHANICAL SECTIONS
M-04-08	IRZ DUAL SCREEN CLUSTER INJECTION WELL VAULTS MECHANICAL DETAILS
M-04-09	IRZ DUAL SCREEN CLUSTER INJECTION WELL VAULTS MECHANICAL DETAILS
E-04-01	IRZ SINGLE SCREEN EXTRACTION WELL ELECTRICAL PLAN
E-04-02	IRZ DUAL SCREEN EXTRACTION WELL ELECTRICAL PLAN
E-04-03	NTH IRZ SINGLE SCREEN INJECTION WELL ELECTRICAL PLAN
E-04-04	IRZ DUAL SCREEN INJECTION WELL ELECTRICAL PLAN
E-04-05	IRZ DUAL SCREEN CLUSTER INJECTION WELL ELECTRICAL PLAN
I-04-01	IRZ SINGLE SCREEN EXTRACTION WELLS P&ID
I-04-02	IRZ DUAL SCREEN EXTRACTION WELLS P&ID
I-04-03	IRZ SINGLE SCREEN INJECTION WELLS P&ID
I-04-04	IRZ DUAL SCREEN EXTRACTION WELLS P&ID
I-04-05	IRZ DUAL SCREEN CLUSTER INJECTION WELLS P&ID SHEET 1 OF 2
I-04-06	IRZ DUAL SCREEN CLUSTER INJECTION WELLS P&ID SHEET 2 OF 2
I-04-07	NODE 03 FIBER OPTIC NETWORK
I-04-08	NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 1 OF 4
I-04-09	NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 4
I-04-10	NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 3 OF 4
I-04-11	NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 4 OF 4
I-04-12	NODE 04 FIBER OPTIC NETWORK
I-04-13	NODE 04 PLC PANELS INSTRUMENTATION CONNECTION SHEET 1 OF 3
I-04-14	NODE 04 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 3
I-04-15	NODE 04 PLC PANELS INSTRUMENTATION CONNECTION SHEET 3 OF 3
05 - INNER RECIRCULATION LOOP	
G-05-01	INNER RECIRCULATION LOOP PROCESS FLOW DIAGRAM
C-05-01	IRL-4 ACCESS ROAD SITE PLAN
C-05-02	IRL-4 ACCESS ROAD - SECTIONS
C-05-03	IRL-2 ACCESS ROAD PLAN AND SECTION
C-05-04	INNER RECIRCULATION LOOP INJECTION WELL - IRL-1 SITE PLAN
C-05-05	INNER RECIRCULATION LOOP INJECTION WELL - IRL-2 SITE PLAN
C-05-06	INNER RECIRCULATION LOOP INJECTION WELL - IRL-3 AND NODE 5 SITE PLAN
C-05-07	INNER RECIRCULATION LOOP INJECTION WELL - IRL-4 SITE PLAN
C-05-08	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "G" STA 10+00 TO STA 13+50
C-05-09	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "G" STA 13+50 TO STA 19+00
C-05-10	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "G" STA 19+00 TO STA 24+50
C-05-11	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "G" STA 24+50 TO STA 29+50
C-05-12	ACCESS ROAD - PLAN AND PROFILE - PIPELINE "G" STA 29+50 TO STA 33+17
C-05-13	ACCESS ROAD - TYPICAL ROAD SECTION
S-05-01	INNER RECIRCULATION LOOP EXTRACTION WELL VAULTS TYPE 1 - TOP PLAN
S-05-02	INNER RECIRCULATION LOOP EXTRACTION WELL VAULTS - TYPE 1 - FOUNDATION PLAN
S-05-03	INNER RECIRCULATION LOOP EXTRACTION WELL VAULTS - SECTIONS
S-05-04	INNER RECIRCULATION LOOP INJECTION WELL VAULTS - TYPE 1 - TOP PLAN
S-05-05	INNER RECIRCULATION LOOP INJECTION WELL VAULTS - TYPE 2 - TOP PLAN
S-05-06	INNER RECIRCULATION LOOP INJECTION WELL VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN
S-05-07	INNER RECIRCULATION LOOP INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2
S-05-08	INNER RECIRCULATION LOOP INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2
M-05-01	INNER RECIRCULATION LOOP EXTRACTION WELL CONSTRUCTION DETAILS
M-05-02	INNER RECIRCULATION LOOP TYPE 1 INJECTION WELL CONSTRUCTION DETAILS

05 - INNER RECIRCULATION LOOP (Continued)	
DRAWING NUMBER	**DRAWING TITLE**
M-05-03	INNER RECIRCULATION LOOP TYPE 2 INJECTION WELL CONSTRUCTION DETAILS
M-05-04	RIVERBANK EXTRACTION WELL VAULTS MECHANICAL DETAILS
M-05-05	INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 1 MECHANICAL DETAILS
M-05-06	INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 1 MECHANICAL SECTIONS
M-05-07	INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 2 MECHANICAL DETAILS
M-05-08	INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 2 MECHANICAL SECTIONS
E-05-01	INNER RECIRCULATION LOOP INJECTION WELL IRL-1 SITE PLAN
E-05-02	INNER RECIRCULATION LOOP INJECTION WELL IRL-2 SITE PLAN
E-05-03	INNER RECIRCULATION LOOP INJECTION WELL IRL-3 SITE PLAN
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- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
4	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
3	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		JU	JP	CH	CH
2	9/8/14	PRE-FINAL (90%) DESIGN		JU	JP	CH	CH
1	4/5/13	INTERMEDIATE (60%) DESIGN		JU	JP	CH	CH
0	11/8/11	PRELIMINARY (30%) DESIGN		JU	JP	CH	CH

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

GENERAL DRAWING INDEX 1

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-00-03	REV 4

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07 - PIPELINE	
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C-07-21	PLAN AND PROFILE - PIPELINE "A" - STA 20+50 TO STA 28+75
C-07-22	PLAN AND PROFILE - PIPELINE "A" - STA 28+75 TO STA 36+50
C-07-23	PLAN AND PROFILE - PIPELINE "A" - STA 36+50 TO STA 45+00
C-07-24	PLAN AND PROFILE - PIPELINE "A" - STA 45+50 TO STA 54+93.36
C-07-25	PLAN AND PROFILE - PIPELINE "H" - STA 10+00 TO STA 15+33
C-07-26	PLAN AND PROFILE - PIPELINE "B" - STA 3+05 TO STA 13+50
C-07-27	PLAN AND PROFILE - PIPELINE "B" - STA 13+50 TO STA 21+00
C-07-28	PLAN AND PROFILE - PIPELINE "B" - STA 21+00 TO STA 30+50
C-07-29	PLAN AND PROFILE - PIPELINE "B" - STA 30+50 TO STA 40+18.83
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C-07-32	PLAN AND PROFILE - PIPELINE "B" - STA 59+15 TO STA 69+00
C-07-33	PLAN AND PROFILE - PIPELINE "B" - STA 69+00 TO STA 78+00
C-07-34	PLAN AND PROFILE - PIPELINE "B" - STA 78+00 TO STA 86+50
C-07-35	PLAN AND PROFILE - PIPELINE "B" - STA 86+50 TO STA 96+50
C-07-36	PLAN AND PROFILE - PIPELINE "B" - STA 96+50 TO STA 106+50
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C-07-39	PIPELINE - PLAN AND PROFILE - PIPELINE "C1", "C2", & "C3" STA 10+00 TO STA 13+50
C-07-40	PIPELINE - PLAN AND PROFILE - PIPELINE "C2" STA 13+50 TO STA 19+60
C-07-41	PIPELINE - PLAN AND PROFILE - PIPELINE "C3", "C4", & "C6" STA 19+60 TO STA 25+79
C-07-42	PIPELINE - PLAN AND PROFILE - PIPELINE "C13" STA 10+00 TO STA 12+38
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E-09-03	COMPRESSOR STATION PONDS UPGRADES COMMUNICATION BLOCK DIAGRAM
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A-12-08	WATER CONDITIONING PLANT (BUILDING 12) LEVEL 2 OVERALL FLOOR PLAN
A-12-09	WATER CONDITIONING PLANT (BUILDING 12) ROOF PLAN
A-12-10	WATER CONDITIONING PLANT (BUILDING 12) LEVEL 2 ENLARGED AREA FLOOR PLAN AND INTERIOR ELEVATIONS
A-12-11	WATER CONDITIONING PLANT (BUILDING 12) LEVEL 1 OVERALL RCP
A-12-12	WATER CONDITIONING PLANT (BUILDING 12) LEVEL 2 OVERALL RCP
A-12-13	WATER CONDITIONING PLANT (BUILDING 12) STAIR FLOOR PLANS AND DETAILS
A-12-15	WATER CONDITIONING PLANT (BUILDING 12) OVERALL EXTERIOR ELEVATIONS
A-12-16	WATER CONDITIONING PLANT (BUILDING 12) OVERALL EXTERIOR ELEVATIONS
A-12-17	WATER CONDITIONING PLANT (BUILDING 12) INTERIOR ELEVATIONS
A-12-18	WATER CONDITIONING PLANT (BUILDING 12) OVERALL BUILDING SECTIONS
A-12-19	WATER CONDITIONING PLANT (BUILDING 12) WALL SECTIONS
A-12-20	WATER CONDITIONING PLANT (BUILDING 12) WALL/PARTITION TYPES
A-12-23	WATER CONDITIONING PLANT (BUILDING 12) DOOR & WINDOW SCHEDULES, DETAILS

12 - REMEDY-PRODUCED WATER CONDITIONING PLANT (Continued)	
DRAWING NUMBER	**DRAWING TITLE**
S-12-01	REMEDY - PRODUCED WATER CONDITIONING PLANT - FOUNDATION PLAN
S-12-02	REMEDY - PRODUCED WATER CONDITIONING PLANT - FIRST FLOOR PLAN
S-12-03	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECOND FLOOR PLAN
S-12-04	REMEDY - PRODUCED WATER CONDITIONING PLANT - ROOF FRAMING PLAN
S-12-05	REMEDY - PRODUCED WATER CONDITIONING PLANT - WALL FRAMING ELEVATIONS
S-12-06	REMEDY - PRODUCED WATER CONDITIONING PLANT - WALL FRAMING ELEVATIONS
S-12-07	REMEDY - PRODUCED WATER CONDITIONING PLANT - BUILDING SECTION
S-12-08	REMEDY - PRODUCED WATER CONDITIONING PLANT - BUILDING SECTION
S-12-09	REMEDY - PRODUCED WATER CONDITIONING PLANT - BUILDING SECTION
S-12-10	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECTIONS AND DETAILS
S-12-11	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECTIONS AND DETAILS
S-12-12	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECTIONS AND DETAILS
S-12-13	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECTIONS AND DETAILS
S-12-14	REMEDY - PRODUCED WATER CONDITIONING PLANT - SECTIONS AND DETAILS
S-12-15	REMEDY - PRODUCED WATER CONDITIONING PLANT - BEAM AND PILASTER SCHEDULES
S-12-16	REMEDY - PRODUCED WATER CONDITIONING PLANT - PILASTER DETAILS
S-12-17	REMEDY - PRODUCED WATER CONDITIONING PLANT - PLAN, SECTIONS AND DETAILS
S-12-18	REMEDY - PRODUCED WATER CONDITIONING PLANT BUILDING - FOUNDATION REINFORCING PLAN
S-12-19	REMEDY - PRODUCED WATER CONDITIONING PLANT - BUILDING SECTIONS AND DETAILS
S-12-20	REMEDY - PRODUCED WATER CONDITIONING PLANT - BUILDING SECTIONS AND DETAILS
S-12-21	REMEDY - PRODUCED WATER CONDITIONING PLANT - EQUIP. PAD - PLANS, SECTIONS AND DETAILS
S-12-22	SWITCH GEAR CANOPY - PLANS AND DETAILS
S-12-23	SWITCH GEAR CANOPY - FRAMING ELEVATIONS, SECTIONS AND DETAILS
S-12-24	SWITCH GEAR CANOPY - SECTIONS AND DETAILS
S-12-25	SWITCH GEAR CANOPY - SECTIONS AND DETAILS
M-12-01	REMEDY - PRODUCED WATER CONDITIONING PLANT FIRST FLOOR PLAN
M-12-02	REMEDY - PRODUCED WATER CONDITIONING PLANT SECOND FLOOR PLAN
M-12-03	REMEDY - PRODUCED WATER CONDITIONING PLANT SECTIONS
M-12-04	REMEDY - PRODUCED WATER CONDITIONING PLANT HVAC & PLUMBING DETAILS
M-12-05	WATER CONDITIONING PLANT (BUILDING 12) MECHANICAL 2ND FLOOR PLAN
M-12-05	REMEDY - PRODUCED WATER CONDITIONING PLANT HVAC & PLUMBING 1ST FLOOR PLAN
M-12-06	WATER CONDITIONING PLANT (BUILDING 12) MECH SCHEDULES
M-12-07	REMEDY - PRODUCED WATER CONDITIONING PLANT POTABLE WATER
P-12-00	WATER CONDITIONING PLANT (BUILDING 12) PLBG LEGEND & ABBREVIATIONS
P-12-01	WATER CONDITIONING PLANT (BUILDING 12) PLUMBING FIRST FLOOR PLAN
P-12-02	WATER CONDITIONING PLANT (BUILDING 12) PLUMBING SECOND FLOOR PLAN
P-12-03	WATER CONDITIONING PLANT (BUILDING 12) PLUMBING SCHEDULES
P-12-04	REMEDY PRODUCED WATER CONDITIONING PLANT PLUMBING DETAILS
P-12-05	REMEDY PRODUCED WATER CONDITIONING PLANT PLUMBING POTABLE WATER
E-12-01	REMEDY PRODUCED WATER CONDITIONING PLANT MCC ONE-LINE & ELEVATION
E-12-02	REMEDY PRODUCED WATER CONDITIONING PLANT FVNR ELEMENTARY DIAGRAM
E-12-03	REMEDY PRODUCED WATER CONDITIONING PLANT VFD ELEMENTARY DIAGRAM
E-12-04	REMEDY PRODUCED WATER CONDITIONING PLANT CONTROL PANEL ELEVATION
E-12-05	REMEDY PRODUCED WATER CONDITIONING PLANT CONTROL PANEL BACKPAN LAYOUT
E-12-06	REMEDY PRODUCED WATER CONDITIONING PLANT POWER DISTRIBUTION DIAGRAM
E-12-07	REMEDY PRODUCED WATER CONDITIONING PLANT EXAMPLE PLC I/O WIRING DIAGRAMS
E-12-08	REMEDY PRODUCED WATER COMMUNICATION PANEL ELEVATION & LAYOUT
E-12-09	REMEDY PRODUCED WATER COMMUNICATION PANEL SCHEMATIC
E-12-10	REMEDY PRODUCED WATER RADIO COMMUNICATION PANEL ELEVATION AND LAYOUT
E-12-11	REMEDY PRODUCED WATER CONDITIONING PLANT PANELBOARD SCHEDULES
E-12-20	REMEDY PRODUCED WATER CONDITIONING PLANT 1st FLOOR POWER & CONTROL PLAN
E-12-21	REMEDY PRODUCED WATER CONDITIONING PLANT 1st FLOOR LIGHTING AND RECEPTACLE PLAN
E-12-22	REMEDY PRODUCED WATER CONDITIONING PLANT 2nd FLOOR POWER & CONTROL PLAN
E-12-23	REMEDY PRODUCED WATER CONDITIONING PLANT 2nd FLOOR LIGHTING AND RECEPTACLE PLAN
E-12-24	TCS EXISTING WATER STORAGE TANK AREA PLAN
I-12-01	P&ID FILTER SYSTEM A SIDE
I-12-02	P&ID FILTER SYSTEM B SIDE
I-12-03	P&ID CAUSTIC AND COAGULANT SYSTEM
I-12-04	P&ID ACID AND DEWATERING AID SYSTEMS
I-12-05	P&ID LIQUID PHASE SEPARATOR & AIR COMPRESSOR

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
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NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
4	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
3	2/2/15	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		JU	JP	CH	CH
2	9/8/14	PRE-FINAL (90%) DESIGN		JU	JP	CH	CH
1	4/5/13	INTERMEDIATE (60%) DESIGN		JU	JP	CH	CH
0	11/18/11	PRELIMINARY (30%) DESIGN		JU	JP	CH	CH

REVISIONS

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RAO	SO
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	DSGN
	DWN
	CHKD
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	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

GENERAL DRAWING INDEX 2

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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13 - FRESHWATER STORAGE AND CONTINGENT FWPTS	
DRAWING NUMBER	**DRAWING TITLE**
G-13-01	PROCESS SCHEMATIC FOR FRESH WATER PRE-INJECTION TREATMENT SYSTEM
G-13-02	MASS BALANCE FRESH WATER PRE-INJECTION TREATMENT SYSTEM
S-13-01	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - FOUNDATION PLAN
S-13-02	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - FIRST FLOOR PLAN
S-13-03	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING -SECOND FLOOR FRAMING PLAN @ EL. 639.50
S-13-04	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING -SECOND FLOOR PLAN
S-13-05	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - ROOF PLAN
S-13-06	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - SECTION
S-13-07	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - SECTIONS AND DETAILS
S-13-08	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - SECTIONS
S-13-09	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - SECTIONS AND DETAILS
S-13-10	FRESHWATER PRE-INJECTION TREATMENT SYSTEM BUILDING - SECTIONS AND DETAILS
S-13-11	CHEMICAL STORAGE AREA - FOUNDATION , FLOOR AND ROOF PLAN
S-13-12	CHEMICAL STORAGE AREA - SECTION
S-13-13	CHEMICAL STORAGE AREA - SECTIONS AND DETAILS
S-13-14	BACKWASH AND TREATED WATER STORAGE TANKS - PLAN
S-13-15	BACKWASH AND TREATED WATER STORAGE TANKS - SECTIONS AND DETAILS
M-13-00	FRESHWATER PRE-INJECTION TREATMENT SYSTEM EQUIPMENT GENERAL ARRANGEMENT
M-13-01	FRESHWATER PRE-INJECTION TREATMENT MEDIA VESSEL SYSTEM LOWER PLAN
M-13-02	FRESHWATER PRE-INJECTION TREATMENT MEDIA VESSEL SYSTEM UPPER PLAN
M-13-03	FRESHWATER PRE-INJECTION TREATMENT MEDIA VESSEL SYSTEM SECTIONS
M-13-04	FRESHWATER PRE-INJECTION TREATMENT MEDIA SYSTEM ISOMETRIC
M-13-06	FRESHWATER PRE-INJECTION TREATMENT CHEMICAL SYSTEMS PLAN
M-13-07	FRESHWATER PRE-INJECTION TREATMENT CHEMICAL SYSTEMS SECTIONS
M-13-08	FRESHWATER PRE-INJECTION TREATMENT PROCESS TANKS PLAN
M-13-09	FRESHWATER PRE-INJECTION TREATMENT PROCESS TANKS ELEVATIONS & SECTIONS
E-13-01	FRESHWATER PRE-INJECTION TREATMENT SYSTEM MCC ONE-LINE & ELEVATION
E-13-02	FRESHWATER PRE-INJECTION TREATMENT SYSTEM FVNR ELEMENTRY DIAGRAM
E-13-03	FRESHWATER PRE-INJECTION TREATMENT SYSTEM VFD ELEMENTARY DIAGRAM
E-13-04	FRESHWATER PRE-INJECTION TREATMENT SYSTEM CONTROL PANEL ELEVATION
E-13-05	FRESHWATER PRE-INJECTION TREATMENT SYSTEM CONTROL PANEL BACKPAN LAYOUT
I-13-01	P&ID FWPI TREATMENT SYSTEM PRE-FILTERS
I-13-02	P&ID FWPI TREATMENT SYSTEM MEDIA VESSELS
I-13-03	P&ID FWPI TREATMENT SYSTEM CHEMICAL STORAGE 1
I-13-04	P&ID FWPI TREATMENT SYSTEM CHEMICAL STORAGE 2
I-13-05	P&ID FWPI TREATMENT SYSTEM BACKWASH SYSTEM
I-13-06	P&ID FWPI TREATMENT SYSTEM TREATED WATER
14 - CONDITIONED WATER TANKS	
S-14-01	CONDITIONED WATER STORAGE TANK - FOUNDATION PLAN AND DETAILS
S-14-03	CONDITIONED WATER STORAGE TANK SECTIONS AND DETAILS
S-14-04	CONDITIONED WATER STORAGE TANK - DETAILS
S-14-08	CONDITIONED WATER STORAGE TANK - RETAINING WALL PLAN AND SECTIONS
S-14-09	CONDITIONED WATER STORAGE TANK - RETAINING WALL ELEVATION
S-14-10	CONDITIONED WATER STORAGE TANK FARM - FOUNDATION AND FLOOR PLANS
S-14-11	CONDITIONED WATER STORAGE TANK FARM - CANOPY PLAN AND SECTIONS
S-14-12	CONDITIONED WATER STORAGE TANK FARM - SECTIONS AND DETAILS
S-14-13	CONDITIONED WATER STORAGE TANK FARM - SECTIONS AND DETAILS
M-14-01	CONDITIONED WATER STORAGE TANK FARM PLAN
M-14-02	CONDITIONED WATER STORAGE TANK FARM SECTIONS
M-14-03	CONDITIONED WATER STORAGE TANK FARM SECTIONS AND DETAILS
M-14-04	CONDITIONED WATER STORAGE TANK MECHANICAL PLAN
M-14-05	CONDITIONED WATER STORAGE TANK MECHANICAL DETAILS
M-14-06	CONDITIONED WATER STORAGE TANK MECHANICAL DETAILS
M-14-07	WW TANK CONNECTION MECHANICAL DETAILS
M-14-08	CONDITIONED WATER STORAGE TANK MECHANICAL SCHEDULE
E-14-01	CONDITIONED WATER TANK FARM ELECTRICAL PLAN
E-14-02	CONDITIONED WATER STORAGE TANK ELECTRICAL PLAN
I-14-01	P&ID CONDITIONED WATER STORAGE TANK FARM A SIDE
I-14-02	P&ID CONDITIONED WATER B SIDE

15 - PARK MOABI REGIONAL PARK FACILITIES	
DRAWING NUMBER	**DRAWING TITLE**
G-15-01	CONSTRUCTION HEADQUARTERS PROCESS FLOW DIAGRAM
C-15-01	CONSTRUCTION HEADQUARTERS YARD PLAN
C-15-02	CONSTRUCTION HEADQUARTERS UTILITY CONNECTIONS
C-15-03	CONSTRUCTION HEADQUARTERS PIPING PLAN
C-15-04	CONSTRUCTION HEADQUARTERS SECURITY PLAN
C-15-05	PARK MOABI SOIL STAGING AND STORAGE PLAN
C-15-06	CONSTRUCTION HEADQUARTERS CIVIL DETAILS
C-15-07	CONSTRUCTION HEADQUARTERS TRENCH SECTIONS
C-15-08	CONSTRUCTION HEADQUARTERS GRADING PLAN
C-15-09	CHQ ENTRANCE ROAD - PLAN AND PROFILE STA 0+00 TO STA 2+34
C-15-11	CHQ ENTRANCE ROAD - RIP RAP LAYOUT
S-15-02	WORKSHOP BUILDING AXONOMETRIC VIEWS
S-15-03	WORKSHOP BUILDING ELEVATIONS (1 OF 2)
S-15-04	WORKSHOP BUILDING ELEVATIONS (2 OF 2)
S-15-05	WORKSHOP BUILDING FOUNDATION PLAN
S-15-06	WORKSHOP BUILDING FINISH FLOOR PLAN
S-15-07	WORKSHOP BUILDING ROOF PLAN
S-15-08	WORKSHOP BUILDING SECTION - TYPICAL FRAME
S-15-09	WORKSHOP BUILDING SECTION
S-15-10	WORKSHOP BUILDING SECTIONS AND DETAILS (1 OF 2)
S-15-11	WORKSHOP BUILDING SECTIONS AND DETAILS (2 OF 2)
S-15-12	WORKSHOP BUILDING TYPICAL DETAILS
S-15-13	PARKING SUN SHADE FOUNDATION PLAN
S-15-14	PARKING SUN SHADE ROOF FRAMING PLAN
S-15-15	PARKING SUN SHADE ROOF PLAN
S-15-16	PARKING SUN SHADE SECTIONS
S-15-17	PARKING SUN SHADE DETAILS
S-15-18	UTILITY PAD PLAN
S-15-19	UTILITY PAD DETAILS
S-15-20	DECONTAMINATION PAD PLANS AND DETAILS
S-15-21	CHQ ENTRANCE ROAD - PLAN AND SECTIONS
M-15-01	WORKSHOP BUILDING - HVAC PLAN
P-15-01	WORKSHOP BUILDING PLUMBING FLOOR PLAN - DWV
P-15-02	WORKSHOP BUILDING PLUMBING SCHEMATIC - DWV
P-15-03	WORKSHOP BUILDING PLUMBING FLOOR PLAN - DOMESTIC HOT AND COLD WATER
P-15-04	WORKSHOP BUILDING PLUMBING SCHEMATIC - DOMESTIC HOT AND COLD WATER
F-15-01	CONSTRUCTION HEADQUARTERS FIRE SUPPRESSION YARD PLAN
F-15-02	WORKSHOP FIRE PROTECTION PLAN (1 OF 2)
F-15-03	WORKSHOP FIRE PROTECTION PLAN (2 OF 2)
E-15-01	CONSTRUCTION HEADQUARTERS SINGLE LINE DIAGRAM
E-15-02	CONSTRUCTION HEADQUARTERS SOLAR SINGLE LINE DIAGRAM
E-15-03	CONSTRUCTION HEADQUARTERS ELECTRICAL PLAN
E-15-04	UTILITY PAD ELECTRICAL PLAN
E-15-05	WORKSHOP BUILDING ELECTRICAL PLAN
E-15-06	WORKSHOP BUILDING LIGHTING PLAN (1 OF 2)
E-15-07	WORKSHOP BUILDING LIGHTING PLAN (2 OF 2)
E-15-08	WORKSHOP BUILDING ELECTRICAL SCHEDULES
16 - MONITORING WELLS	
C-16-01	MONITORING WELL HEAD DESIGNS
E-16-01	MONITORING WELLS DATA COLLECTION STATIONS SITE PLAN
E-16-02	DATA COLLECTION PANEL MONITORING WELL ELEVATION (TYPICAL)
E-16-03	DATA COLLECTION PANEL RADIO MONITORING WELL ELEVATION (TYPICAL)
E-16-04	MONITORING WELL DATA COLLECTION SYSTEM SHEET 1
E-16-05	MONITORING WELL DATA COLLECTION SYSTEM SHEET 2
E-16-06	MONITORING WELL DATA COLLECTION SYSTEM SHEET 3
E-16-07	MONITORING WELL DATA COLLECTION SYSTEM SHEET 4
E-16-08	MONITORING WELL DATA COLLECTION SYSTEM SHEET 5
E-16-09	MONITORING WELL DATA COLLECTION SYSTEM SHEET 6
E-16-10	MONITORING WELL DATA COLLECTION SYSTEM SHEET 7
E-16-11	MONITORING WELL DATA COLLECTION SYSTEM SHEET 8
E-16-12	MONITORING WELL DATA COLLECTION SYSTEM SHEET 9
E-16-13	MONITORING WELL DATA COLLECTION SYSTEM SHEET 10
E-16-14	MONITORING WELL DATA COLLECTION SYSTEM SHEET 11
E-16-15	MONITORING WELL DATA COLLECTION SYSTEM SHEET 12
E-16-16	MONITORING WELL DATA COLLECTION SYSTEM SHEET 13
E-16-17	MONITORING WELL DATA COLLECTION SYSTEM SHEET 14
E-16-18	MONITORING WELL DATA COLLECTION SYSTEM SHEET 15
E-16-19	MONITORING WELL DATA COLLECTION SYSTEM SHEET 16
E-16-20	MONITORING WELL DATA COLLECTION SYSTEM SHEET 17
E-16-21	MONITORING WELL DATA COLLECTION SYSTEM SHEET 18
E-16-22	MONITORING WELL DATA COLLECTION SYSTEM SHEET 19
E-16-23	MONITORING WELL DATA COLLECTION SYSTEM SHEET 20
E-16-24	MONITORING WELL DATA COLLECTION SYSTEM SHEET 21
E-16-25	MONITORING WELL DATA COLLECTION SYSTEM SHEET 22

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TOPOCK GROUNDWATER REMEDIATION PROJECT

GENERAL DRAWING INDEX 3

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
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STANDARD ABBREVIATIONS

<	ANGLE
@	AT
AB	ANCHOR BOLT
ABDN	ABANDONED
ABS	ACRYLONITRILE-BUTADIENE-STYRENE
AC	ASBESTOS CEMENT, ASPHALTIC CONCRETE
ACBD	ACOUSTICAL BOARD
ACI	AMERICAN CONCRETE INSTITUTE
ACST	ACOUSTICAL TILE
ACT	ACOUSTICAL
ACU	AIR CONDITIONING UNIT
AD	AREA DRAIN
ADDL	ADDITIONAL
ADJ	ADJACENT, ADJUSTABLE
ADPTR	ADAPTER
AG	ABOVE GROUND
AGGR	AGGREGATE
AHR	ANCHOR
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ALUMINUM
ALTN	ALTERNATE
ANDZ	ANODIZE
AP	ANGLE POINT
APPROX	APPROXIMATE
APVD	APPROVED
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ARCH	ARCHITECTURAL
ARV	AIR RELEASE VALVE
ASSY	ASSEMBLY
ASU	AIR SUPPLY UNIT
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
BA	BRIDGE ATTACHMENT
BC	BEGIN CURVE
BCW	BAT CAVE WASH
BETW	BETWEEN
BF	BOTTOM FACE, BLIND FLANGE
BJ	BORE AND JACK
BLDG	BUILDING
BM	BENCH MARK, BEAM
BNSF	BURLINGTON NORTHERN SANTA FE
BOP	BOTTOM OF PIPE
BOL	BOTTOM OF LINE
BOT	BOTTOM
BR	BROMINE
BRG	BEARING
BSMT	BASEMENT
BVC	BEGINNING OF VERTICAL CURVE
BW	BACKWASH
C	CHANNEL BEAM
C TO C	CENTER TO CENTER
	CENTER ANGLE
°C	DEGREE CELSIUS
CA	CARBON AMENDED, CARBON AMENDMENT
CARV	COMBINATION AIR RELEASE VALVE
CAV	COMBINATION AIR RELEASE VALVE
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CEM PLAS	CEMENT PLASTER
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
C.G.	CENTER GRADE
C & G	CURB & GUTTER
CHAN	CHANNEL
CHEM	CHEMICAL
CHKD	CHECKERED
CI	CAST IRON
CIMJ	CAST IRON MECHANICAL JOINT
CIP	CLEAN IN PLACE
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL	CENTERLINE
CLDI	CEMENT LINED DUCTILE IRON
CLG	CEILING
CLO	CLOSET
CLP	CLAY PIPE
CLR	CLEAR, CLEARANCE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMC	CEMENT MORTAR COATING
CML	CEMENT MORTAR LINING
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
COL	COLUMN
COMP	COMPRESSOR STATION
CONC	CONCRETE
CONN	CONNECTION, CONNECT
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUE
CONTR	CONTRACTOR
COORD	COORDINATE
COP	COPPER
COR	CORNER
CORR	CORRUGATED
CP	CONCRETE PIPE, CONTROL PANEL, CONTROL POINT
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CRS	COLD ROLLED STEEL
CTR	CENTER
CTRD	CENTERED
CTSK	COUNTERSUNK
CU	CUBIC
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CU YD	CUBIC YARD
CULV	CULVERT
CYL	CYLINDER
d	PENNY (NAIL SIZE)
DB	DISTRIBUTION BOX
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DECHLOR	DECHLORINATION
DET	DETAIL
DF	DOUGLAS FIR
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL
DIL	DILUTE
DIM	DIMENSION
DIMJ	DUCTILE IRON MECHANICAL JOINT
DIMJGL	DUCTILE IRON MECHANICAL JOINT, GLASS LINED
DIP	DUCTILE IRON PIPE
DIPFGL	DUCTILE IRON PIPE, FLANGED, GLASS LINED
DIR	DIRECTION
DISCH	DISCHARGE
DISCH	DISCHARGE
DMU	DRAINAGE MANAGEMENT UNIT
DML	DRAINWATER MAINLINE
DR	DRAIN
DRWR	DRAWER
DS	DOWNSPOUT
DW	DRAIN WATER
DWG	DRAWING
DWL	DOWEL
E	EAST, ELECTRICAL
EA	EACH
EC	END CURVE
ECC	ECCENTRIC
EF	EACH FACE, EXHAUST FAN
EFL	EFFLUENT
EIR	ENVIRONMENTAL IMPACT REPORT
EL	ELEVATION
ELB	ELBOW
ELC	ELECTRICAL LOAD CENTER
ELEC	ELECTRIC, ELECTRICAL
EMBED	ELECTRIC, ELECTRICAL
ENGR	ENGINEER
EOH	ELECTRICAL OVERHEAD
EQL	EQUAL
EQL SP	EQUALLY SPACED
EQPT	EQUIPMENT
EQUIV	EQUIVALENT
ETOH	ETHANOL
EVC	END OF VERTICAL CURVE
EW	EACH WAY, EXTRACTION WELL
EX	EXTRACTION
EXH	EXHAUST
EXP	EXPOSED, EXPANSION
EXP JT	EXPANSION JOINT
EXST	EXISTING
EXT	EXTERIOR, EXTERNAL
F FL EL	FINISHED FLOOR ELEVATION
°F	DEGREE FAHRENHEIT
FAB	FABRICATION, FABRICATE
FACIL	FACILITY
FBDR	FILTER BACKWASH DRAIN
FC	FLEXIBLE COUPLING
FCA	FLANGED COUPLING ADAPTER
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDA	FLOOR DRAIN W/INTEGRAL TRAP
FDN	FOUNDATION
FEXT	FIRE EXTINGUISHER
FF	FINISH FLOOR
FG	FINISH GRADE
FHT	FEMALE HOSE THREAD
FHY	FIRE HYDRANT
FIG	FIGURE
FIN	FINISH
FIPT	FEMALE IRON PIPE THREAD
FLEX	FLEXIBLE
FLG	FLANGE
FLH	FLAT HEAD
FLL	FLOW LINE ELEVATION
FLR	FLOOR
FLTR	FILTER
FNPT	FEMALE NATIONAL PIPE THREAD
FNSH	FINISH
FOC	FIBER OPTIC CONDUIT
FP	FIXED POINT, FLAT PANEL
FPW	FIRE PROTECTION WATER
FRP	FIBERGLASS REINFORCED FLOODPLAIN PLASTIC
FS	FINISH SLAB, FERTIGATION SOLUTION
FT	FOOT OR FEET
FTG	FOOTING
FW	FRESH WATER
FWD	FORWARD
G	GAS
GA	GAGE, GAUGE
GAL	GALLON
GALV	GALVANIZED
GALVI	GALVANIZED IRON
GALVS	GALVANIZED (HOT DIP) STEEL
GB	GRAB BAR, GRADE BREAK
GC	GROOVED COUPLING
GCF	GROOVED COUPLING FITTING
GL	GLASS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GSP	GALVANIZED STEEL PIPE
GVL	GRAVEL
GWD	GYPSUM WALLBOARD
GYP	GYPSUM
GYP PLAS	GYPSUM PLASTER
H.A.S.	HEADED ANCHOR STUD
HB	HOSE BIB
HD	HUB DRAIN
HDNR	HARDENER
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HDW	HARDWARE
HGT	HEIGHT
HK	HOOK
HLA	HIGH LEVEL ALARM
HM	HOLLOW METAL
HNWR	HAVASU NATIONAL WILDLIFE REFUGE
HORIZ	HORIZONTAL
HP	HORSEPOWER
HR	HOSE RACK, HOUR
HT	HEAT TRACE
HV	HOSE VALVE
HWL	HIGH WATER LEVEL
HWS	HIGH WATER SURFACE
HWY	HIGHWAY
I & C	INSTRUMENTATION AND CONTROL
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH
INFL	INFLUENT
INJ	INJECTION
INSTL	INSTALL
INSTM	INSTRUMENTATION
INSUL	INSULATION
INVT	INVERT
IPS	IRON PIPE SIZE
IRZ	IN-SITU REACTIVE ZONE
ITG	INSULATED TEMPERED GLASS
IW	IRRIGATION WATER
JAN	JANITOR
JT	JOINT
KIP	THOUSAND POUNDS
KW	KILOWATT
L	LENGTH OF CURVE
LAB	LABORATORY
LAT	LATERAL DRAIN LINE
LAV	LAVATORY
LB	POUNDS
LB/CU FT	POUNDS PER CUBIC FOOT
LB/D	POUNDS PER DAY
LF	LINEAR FEET
LG	LONG
LLDPE	LINEAR LOW DENSITY POLYETHYLENE
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LOC	LIMIT OF CONSTRUCTION
LONG	LONGITUDINAL
LP	LOCAL PANEL
LR	LONG RADIUS
LT	LIGHT, LEFT
LWL	LOW WATER LEVEL
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MG/L	MILLIGRAMS PER LITER
MH	MAINTENANCE HOLE
MHT	MALE HOSE THREAD
MIN	MINIMUM
MIPT	MALE IRON PIPE THREAD
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
MLVSS	
MNPT	MALE NATIONAL PIPE THREAD
MO	MASONRY OPENING
MON	MONUMENT
MTD	MOUNTED
MTG	MOUNTING
MTL	METAL
MTRG	METERING
MTS	MILL TYPE STEEL
MW	MONITORING WELL
MWS	MAXIMUM WATER SURFACE
N	NORTH
N/A	NOT APPLICABLE
NE	NORTHEAST
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NORM	NORMAL
NTH	NATIONAL TRAILS HIGHWAY
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
O TO O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OF	OUTSIDE FACE, OVERFLOW
O/H	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OSD	OPEN SITE DRAIN
OVFL	OVERFLOW
OZ	OUNCE
P	PILASTER
PBD	PARTICLE BOARD
P & ID	PROCESS AND INSTRUMENTATION DIAGRAM
PC	POINT OF CURVE
PCC	PORTLAND CEMENT CONCRETE
PE	PLAIN END, POLYETHYLENE
PEN	PENETRATE
PERF	PERFORATED
PERP	PERPENDICULAR
PF	PARTIAL FLUME
PI	POINT OF INTERSECTION
PIP	PLASTIC IRRIGATION PIPE
PJF	PREMOLDED JOINT FILLER
PKG	PACKAGE
PL	PLATE (STEEL)
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PMP	PLANT MONITORING PANEL, PUMP
PNL	PANEL
POC	POINT ON CURVE
POT	POINT ON TANGENT
PP	POLYPROPYLENE
PPL	POLYPROPYLENE LINED
PR	PAIR
PRCST	PRECAST
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PREP	PREPARE
PRESS	PRESSURE
PRI	PRIMARY
PROP	PROPERTY
PS	PUMP STATION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH, ABSOLUTE
PSIG	POUNDS PER SQUARE INCH, GAUGE
PSV	PRESSURE SUSTAINING VALVE
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
PWR	POWER
QUAD	QUADRANT
R	RISER
R	R-VALUE (INSULATION)
RA	RETURN AIR
RAD	RADIUS
RAV	RAVINE
RB	RIVERBANK
RC	RELATIVE COMPACTION
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RDCR	REDUCER
RDW	REDWOOD
REF	REFER OR REFERENCE
REFR	REFRIGERATOR
REHAB	REHABILITATION
REINF	REINFORCED, REINFORCING, REINFORCE
RELOC	RELOCATE
REQD	REQUIRED
REV	REVISE
RESIL	RESILIENT
RGS	RIGID GALVANIZED STEEL CONDUIT
RH	RODHOLE
RL	RAIN LEADER
RLS	RUBBER LINED STEEL
RM	ROOM
RO	ROUGH OPENING
RST	REINFORCING STEEL
RT	RIGHT
RTN	RETURN
RV	ROOF VENT
RW	REMEDY WATER
R/W	RIGHT-OF-WAY
S	SOUTH, SLOPE
SAT	SUSPENDED ACOUSTICAL TILE
SC	SOLID CORE
SCFM	STANDARD CUBIC FEET PER MINUTE
SCHED	SCHEDULE
SD	STORM DRAIN, SOAP DISPENSER
SDR	STANDARD DIMENSION RATIO
SDWK	SIDEWALK
SEC	SECONDARY
SECT	SECTION
SEW	SEWAGE
SF	SHALLOW FLOOD
SG	SAFETY GLASS
SH	SHEET, SODIUM HYPOCHLORITE
SHLD	SHOULDER
SHS	SOLIDS HANDLING SYSTEM
SHTG	SHEETING
SIM	SIMILAR
SIP	STATE IMPLEMENTATION PLAN
SLP	SLOPE
SLV	SHORT LEG VERTICAL
S.O.	SHUTOFF
SOC	SOCKET
SOLN	SOLUTION
SP	SPACE OR SPACES
SPEC	SPECIFICATIONS
SPECD	SPECIFIED
SPG	SPACING
SPIG	SPIGOT
SPLY	SUPPLY
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SS	STAINLESS STEEL, SANITARY SEWER
SST	STAINLESS STEEL
STA	STATION
STD	STANDARD
STIF	STIFFENER
STL	STEEL
STOR	STORAGE
STR	STRAIGHT
STRL	STRUCTURAL
STRUCT	STRUCTURE
SUSP	SUSPEND
SUPP	SUPPLEMENTAL
SYMM	SYMMETRICAL
SW	SETTLED WATER
T	TANGENT LENGTH, TREAD, TELEPHONE, TURNOUT, THICKNESS
TAN	TANGENT
T & B	TOP AND BOTTOM
TBG	TUBING
TC	TOP OF CONCRETE, CURB
TCS	TOPOCK COMPRESSOR STATION
TDH	TOTAL DYNAMIC HEAD
TECH	TECHNICAL
TEMP	TEMPERATURE, TEMPORARY
TF	TOP FACE
TG	TEMPERED GLASS
THD	THREAD
THK	THICKNESS, THICK
THRD	THREADED
THRU	THROUGH
T.O.	TOP OF, TURNOUT
TOH	TELEPHONE OVERHEAD
TP	TURNING POINT
TPD	TONS PER DAY
TPI	TURNOUT POINT OF INTERSECTION
TRANSV	TRANSVERSE
TRL	THRUST RESTRAINED LENGTH
TRW	TREATED WATER
TSS	TOTAL SUSPENDED SOLIDS
TST	TOP OF STEEL
TT	THRUST TIE, TEFLON TUBING
TW	TOP OF WALL, TAILWATER, CONDITIONED WATER, TRANSWESTERN
TWPS	TAILWATER PUMP STATION
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY
ULT	ULTIMATE
UC	UNDERCOAT
UPGRAD	UPGRADIENT
UT	UNDERGROUND TRENCH
UV	ULTRAVIOLET
V	VENT, VOLT
VAC	VACUUM
VAT	VINYL ASBESTOS TILE
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WIDE FLANGE (BEAM), WATTS, WEST
W SH ST	WEATHERING SHEET STEEL
WD	WOOD
W/F	WATTS PER FOOT
WG	WIRE GLASS
WH	WATER HEATER
WK	WEEK
WR	WASTE RECEPTACLE
WR GWB	WATER RESISTANT GYPSUM WALLBOARD
WS	WATER STOP OR WATER SURFACE
WSTL	WELDED STEEL
WSP	WELDED STEEL PIPE
WT	WEIGHT
WTR	WATER
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
W/	WITH
W/O	WITHOUT
"WG	INCHES WATER GAGE
XFMR	TRANSFORMER
YD	YARD
YR	YEAR

NOTES:

1. STANDARD ABBREVIATIONS ARE SHOWN. THEREFORE, SOME ABBREVIATIONS MAY NOT BE USED ON THE DRAWINGS. FOR ABBREVIATIONS NOT LISTED, SEE "ABBREVIATIONS FOR USE ON DRAWINGS AND TEXT", PUBLISHED BY THE AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI).

2. ADDITIONAL ABBREVIATIONS FOR SPECIALIZED WORK DIVISIONS (ELECTRICAL, ETC.) ARE SHOWN ON OTHER LEGEND SHEETS.

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REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN	AJW	JPB	BW	RAO	
2	9/8/14	PRE-FINAL (90%) DESIGN	GM/SPEC	JU	JP	CH	
1	4/5/13	INTERMEDIATE (60%) DESIGN	GM/SPEC	JU	JP	CH	
0	11/18/11	PRELIMINARY (30%) DESIGN	GM/SPEC	JU	JP	CH	

REVISIONS

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RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ABBREVIATIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-00-06	REV 3

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GENERAL SYMBOLS

(NOTE: SEE ABBREVIATIONS FOR PIPE LABELS)

- DIRT ROAD
- AGGREGATE BASE
- CONCRETE ROAD
- ASPHALTIC CONCRETE PAVING
- GRAVEL
- NEW CONCRETE
- MASONRY OR CONCRETE BLOCK
- GRATING
- CHECKERED PLATE
- STEEL
- ALUMINUM
- OPENING OR DEPRESSION IN SLAB OR WALL
- SURVEYED POINT (1095 / 5.46 / EG)
- FINISH GRADE SPOT ELEVATION (5.46 FG)
- EXISTING CONTOUR (5)
- GROUND LINE
- BUSHES OR TREE LINE
- TREE WITH TRUNK DIA. (26")
- TREE TO BE REMOVED (12")
- CAR
- VAN
- PROPERTY LINE
- EXISTING CYCLONE FENCE
- EXISTING FENCE
- NEW FENCE
- FENCE TO BE REMOVED
- TO BE DEMOLISHED
- TO BE ABANDONED
- BLOWOFF STATION
- COMBINATION AIR RELEASE VALVE
- WELL LOCATION (FW-INJ-XX)

- CENTER LINE
- DIAMETER
- ANGLE
- AT
- TRAFFIC SIGNAL
- NUMBER
- EXISTING CATCH BASIN OR INLET (C.B.)
- NEW CATCH BASIN OR INLET (C.B.)
- TEST BORINGS (SB OR B), DRILL HOLE (DH) (SB–1)
- PAVEMENT BENCH MARK OR SURVEY MONUMENT (B.M.)
- WATER METER (W.M.)
- GAS METER (G.M.)
- SERVICE WYE
- SERVICE WYE AND LATERAL
- CLEAN OUT (C.O.)
- VALVES (EXIST. UTILITIES)
- TELEPHONE, POWER OR LIGHT POLE (J.P.)
- GUY WIRE (GUY)
- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- 3-WAY VALVE
- 4-WAY VALVE
- ANGLE VALVE
- PRESSURE REDUCING VALVE W/ EXTERNAL PRESSURE TAP
- PRESSURE REDUCING VALVE, SELF CONTAINED
- PRESSURE SAFETY VALVE

- SLIDE OR STOP GATE
- ORIFICE VALVE
- S = SOLENOID OPERATED VALVE (S OR M) / M = MOTOR OPERATED VALVE
- PISTON OPERATED VALVE
- DIAPHRAGM OPERATED VALVE
- TELESCOPING VALVE
- STRAINER
- COMBINATION AIR VALVE
- EXISTING UNDERGROUND LINE
- NEW UNDERGROUND LINE
- EXISTING ABOVE GROUND LINE
- NEW ABOVE GROUND LINE
- EXISTING BORE AND JACK
- NEW BORE AND JACK
- EXISTING BRIDGE ATTACHMENT
- NEW BRIDGE ATTACHMENT

CIVIL LEGEND

- 10+00 TRENCH ALIGNMENT AND STATIONING
- NEW INJECTION WELL
- FUTURE INJECTION WELL
- NEW EXTRACTION WELL
- EXISTING EXTRACTION WELL
- FUTURE EXTRACTION WELL
- IN-SITU REDUCTION ZONE WELL
- FUTURE IN-SITU REDUCTION ZONE WELL
- MONITORING WELL
- OFFSET PIPE AND TRENCH TO IRZ WELL
- CAPPED OFFSET PIPE (FUTURE CONNECTION)
- CONCRETE VAULT BOX (SEE NOTE 1)
- XFMR 004 TRANSFORMER (APPROX. LOCATION)
- BURY TRENCH AND ELECTRIC HAND HOLE
- P1-1 ELECTRICAL NODE AND SECTION (SEE NOTE 2)

UTILITY KEY:

- FOUND LAND MONUMENT
- E — ELECTRIC
- G — GAS
- T(OH) — TELECOMM
- T — TELECOMM (UNDERGROUND)
- W — WATER

SECTION / DETAIL DESIGNATIONS

- NORTH ARROW
- SECTION (LETTER) OR DETAIL (NUMBER) DESIGNATION
- DRAWING NUMBER (REPLACED WITH A LINE IF TAKEN AND SHOWN ON SAME SHEET)
- ON DRAWING WHERE SECTION OR DETAILS IS TAKEN: DRAWING NUMBER WHERE SHOWN

A — SECTION — SCALE — C-1

ON DRAWING WHERE SECTION OR DETAILS IS TAKEN: DRAWING NUMBER(S) WHERE SHOWN

1 — DETAIL — SCALE — C-1

ON DRAWING WHERE SECTION OR DETAILS IS TAKEN: DRAWING NUMBER(S) WHERE SHOWN

DRAWING TITLE — SCALE

ON DRAWING WHERE ONLY A TITLE IS REQUIRED WITH NO REFERENCE (e.g. ELEVATIONS)

A / -

SECTION CALLOUT WHERE SECTION IS GREATER THAN 3"

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ETIC ENGINEERING

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3	11/18/15	FINAL DESIGN	AJW	JPB	BW	RAO		
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0	11/18/11	PRELIMINARY (30%) DESIGN	GM/SPEC	JU	JP	CH		

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TOPOCK GROUNDWATER REMEDIATION PROJECT

GENERAL LEGENDS AND SYMBOLS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

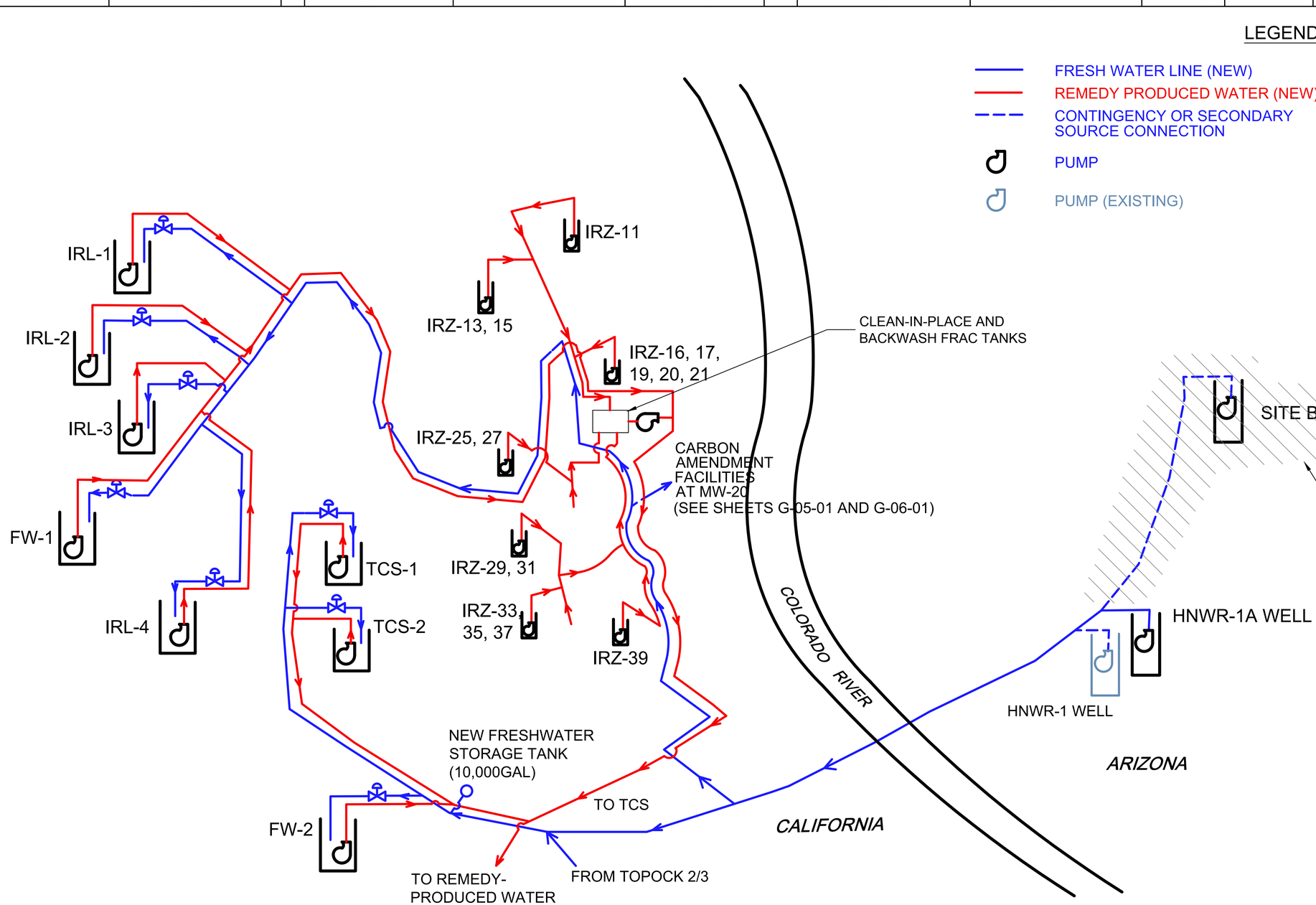
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SHEET NO. G-00-07 of SHEETS

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ETIC ENGINEERING

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3	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
2	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
1	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PC	PT	VMB
0	11/18/11	PRELIMINARY (30%) DESIGN		PC	PC	PT	VMB

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TOPOCK GROUNDWATER REMEDIATION PROJECT

PROCESS SCHEMATIC FOR FRESH WATER INJECTION AND REMEDY-PRODUCED WATER

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. G-00-08 of SHEETS | REV 3

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GEN ERAL NOTES

1. THE PROJECT AREA IS ELIGIBLE FOR LISTING ON THE NATIONAL REGISTER AS A TRADITIONAL CULTURAL PROPERTY AND/OR CONSIDERED A SACRED PLACE BY AREA AMERICAN INDIAN TRIBES; ALL WORKERS ARE SUBJECT TO SENSITIVITY TRAINING BEFORE WORKING IN THE FIELD.

2. LOCATION OF UTILITIES HAS BEEN DETERMINED FROM BEST AVAILABLE INFORMATION. HOWEVER, ACCURACY OR COMPLETENESS OF THE UTILITIES SHOWN IS NOT GUARANTEED. FIELD VERIFY THE LOCATION OF UTILITIES PRIOR TO CONSTRUCTION (BY POTHOLING WITH SOFT DIG METHODS). UTILITIES SHOWN ON THE DRAWINGS ARE UNDERGROUND UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL CONTACT THE FOLLOWING RESPECTIVE PARTIES FOR LOCATION OF UNDERGROUND UTILITIES AT LEAST 48 HOURS IN ADVANCE OF INTRUSIVE FIELD WORK :
   a. UNDERGROUND SERVICE ALERT (USA) (800) 643-2444
   b. PACIFIC GAS AND ELECTRIC (PG&E) (800) 743-5000
   c. ARIZONA BLUE STAKE (800) 782-5348

3. ANY DAMAGE TO EXISTING PIPELINES AND OTHER IMPROVEMENTS NOT SCHEDULED FOR REPLACEMENT AS PART OF THIS WORK, DUE TO CONSTRUCTION ACTIVITIES, SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER

4. MANAGEMENT OF DISPLACED SOILS SHALL BE IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN AND PROTOCOL FOR HANDLING AND DISPOSITION OF DISPLACED SITE MATERIALS (INCLUDED AS APPENDIX TO THE CONSTRUCTION/REMEDIAL WORK PLAN).

5. PERFORM POT-HOLING UNDER THE PRESENCE AND SUPERVISION OF THE OWNER'S REPRESENTATIVE AND RESPECTIVE UTILITY REPRESENTATIVES. HAND DIGGING MAY BE REQUIRED IN AREAS WHERE BURIED FACILITIES ARE LOCATED. COMPRESSOR STATION PROTOCOL REQUIRES ALL INTRUSIVE WORK INSIDE THE STATION FENCE LINE BE PERFORMED BY HYDRO VACUUM OR HAND EXCAVATION METHODS.

6. WHERE TEMPORARY OR PERMANENT RELOCATION OF EXISTING UNDERGROUND OR OVERHEAD UTILITIES IS REQUIRED, TAKE NECESSARY STEPS TO ENSURE THAT CONTINUOUS SERVICE IS MAINTAINED IN A MANNER APPROVED BY THE AFFECTED UTILITY AND IN ACCORDANCE WITH APPLICABLE COUNTY AND STATE PUBLIC HEALTH REGULATIONS. BEAR ALL COSTS ASSOCIATED WITH RELOCATION AND MAINTENANCE OF SERVICE, EXCEPT AS OTHERWISE NOTED ON THE DRAWINGS OR SPECIFICATIONS.

7. THE OWNER HAS ACQUIRED ACCESS FOR CONSTRUCTION SEE THE SPECIFICATIONS, FOR ANY REQUIREMENTS PERTAINING TO ACCESS. IFADDITIONAL ACCESS FOR STORAGE OR CONSTRUCTION OPERATIONS ARE REQUIRED OR DESIRED, CONTACT PG&E REPRESENTATIVE.

8. PLACE EROSION AND SILTATION CONTROL MEASURES PRIOR TO OR AS FIRST STEP IN GRADING.

9. DURING CONSTRUCTION, PROTECT EXISTING STORM SEWER AND DRAIN INLETS AND NEWLY CONSTRUCTED MANHOLES AND UNDERGROUND VAULTS BY SILT TRAPS. MAINTAIN AND MODIFY PROTECTIVE MEASURES AS CONSTRUCTION PROGRESSES.

10. RESTORE EXISTING NATURAL DRAINAGE DITCHES AND STREAM BANKS DISTURBED DURING CONSTRUCTION TO ORIGINAL ALIGNMENT, GRADE AND INVERT, EXCEPT WHERE OTHERWISE INDICATED. EMPLOY EROSION CONTROL MEASURES AS SPECIFIED.

11. PROVIDE 3 FEET MINIMUM COVER OVER TOP OF PIPE UNLESS OTHERWISE SPECIFICALLY SHOWN ON THE PIPELINE DRAWINGS

12. RESTRAINED (WELDED OR MECHANICALLY JOINED) PIPE JOINTS ARE USED FOR RESISTANCE TO THRUST AT PIPE BENDS AND FOR PROTECTION OF PARALLEL WATER MAINS. MINIMUM LIMITS OF RESTRAINED JOINTS ARE SHOWN ON THE DRAWINGS. SHOULD A CHANGE IN ALIGNMENT OCCUR THAT RESULTS IN CHANGED OR ADDED PIPE BENDS OR RW/TW PIPELINE TO BE CLOSER THAN 5 FEET TO A PARALLEL WATER MAIN, PROVIDE ADDITIONAL WELDED PIPE JOINTS AS REQUIRED AND DIRECTED BY OWNER.

13. WHERE PIPELINE CROSSES WATER MAINS, AVOID IF POSSIBLE INSTALLING PIPE JOINT WITHIN 10 FOOT DISTANCE OF EACH SIDE OF CROSSING WATER MAIN. IF A JOINT IN THIS ZONE IS UNAVOIDABLE, INSTALL WELDED JOINT ONLY. REPLACE ALL SEVERED OR DAMAGED MAINS CROSSING CONSTRUCTION TRENCHES UNDER INSPECTION OF THE ENTITY HAVING JURISDICTION. PERFORM EXCAVATION, PIPE INSTALLATION, BACKFILL COMPACTION AND RESTORATION WORK NECESSARY FOR REPLACEMENT AT NO ADDITIONAL EXPENSE TO THE OWNER.

14. VERTICAL CONTROL: PIPE CENTERLINE IS INDICATED ON THE DRAWINGS. IT IS THE INTENT OF THESE DRAWINGS THAT PIPE CENTERLINE ELEVATIONS SHOWN AT VERTICAL ANGLE POINTS EXCEPT WHERE A FITTING IS SPECIFICALLY INDICATED, ARE FOR THE PURPOSE OF ESTABLISHING A P.I. FOR VERTICAL CURVES USING JOINT DEFLECTION. WHERE THE VERTICAL P.I. SHOWN WOULD CREATE A CONFLICT WITH THE STATED MINIMUM COVER, THE MINIMUM COVER HAS PRECEDENCE. PIPE SLOPES SHOWN ARE FOR INFORMATION ONLY, INVERT ELEVATIONS NOTE CONTROL.

15. UNLESS OTHERWISE NOTED, ELEVATIONS SHOWN ON THE SE DRAWINGS ARE BASED ON NAVD88, DATA SHEETS EU1248 AND EU0763 IN US SURVEY FEET

16. HORIZONTAL CONTROL. THE BEARINGS AND DISTANCES SHOWN ARE BASED UPON 1983 STATE PLANE GROUND COORDINATES, ZONE 5 (NAD1983, STATE PLANE, CALIFORNIA V, FIPS, 0405) STANDARD TRAN SVERSE MERCATOR PROJECTION. GRID ADJUSTMENT FACTOR OF 1.000123 FOR X=0.0000 AND Y= 0.0000

17. HORIZONTAL CONTROL POINTS ARE INDICATED ON THE DRAWINGS FOR THE PURPOSE OF DEFINING A SPECIFIC, REQUIRED ALIGNMENT. WHERE PERMITTED ON A CASE -BY -CASE BASIS, THE HORIZONTAL CONTROL POINTS MAY BE USED AS A P.I. FOR HORIZONTAL CURVES PROVIDED THE RESULTING PIPELINE ALIGNMENT DOES NOT COME CLOSER THAN 5 FEET FROM ANY PARALLEL WATER MAIN EXCEPT AS OTHERWISE NOTED. CONSTRUCT HORIZONTAL CURVES BY DEFLECTING PIPE JOINTS PRIOR TO WELDING. DO NOT EXCEED MAXIMUM ALLOWABLE JOINT DEFLECTION SHOWN IN SPECIFICATIONS.

18. REPLACE ALL ROAD SURFACE, BERMS AND FENCING DAMAGED DURING CONSTRUCTION, AS PER SPECIFICATIONS AND DRAWINGS.

19. LOCATE COMBINATION AIR RELEASE AND VACUUM VALVE ASSEMBLIES AND AIR RELEASE ASSEMBLIES AT HIGH POINTS IN PIPING AS SHOWN ON THE DRAWINGS. INSTALL PIPE TO SLOPE CONTINUOUSLY AWAY (DOWN) FROM THE STATION MARK FOR THE VALVE INSTALLATION FROM BOTH SIDES. LOCATE BLOW OFF -ASSEMBLIES, WHERE SHOWN ON THE DRAWINGS, AT LOW POINTS IN THE PIPING. INSTALL PIPE TO SLOPE CONTINUOUSLY TOWARD THE VALVE INSTALLATION FROM BOTH SIDES. OBTAIN OWNER VERIFICATION IN FIELD LOCATING OF ALL VALVE ASSEMBLIES BEFORE INSTALLING.

20. STORAGE OF PIPE OR OTHER MATERIALS ON PUBLIC RIGHTS-OF-WAY OR PR IVATE PROPERTY DURING NON WORKING HOURS WILL NOT BE PERMITTED EXCEPT WHERE AND WHEN SPECIFICALLY APPROVED BY THE OWNER.

21. EXISTING CONCRETE THRUST BLOCKS AND ANCHORS AT VALVES AND FITTINGS ON EXISTING UTILITIES ARE NOT SHOWN. REMOVE OR WORK AROUND, AS DETER MINED BY THE OWNER OR RESPECTIVE UTILITY, THRUST BLOCKS AND ANCHORS WHICH INTERFERE WITH THE WORK. INCLUDE ALL COSTS FOR SUCH WORK IN PROPOSAL.

22. REFER TO SPECIFICATIONS AND DRAWINGS FOR SPECIFIC PAVING REQUIREMENTS. IN CONJUNCTION WITH THE FINAL PAVING OPERATIONS:
   i. RESTORE SURVEY MONUMENTS DAMAGED AS A CONSEQUENCE OF CONSTRUCTION OPERATIONS.
   ii. RAISE TO FINISHED GRADE ALL METAL WORK (MANHOLE FRAME AND COVERS, VALVE BOXES, ETC.) EXISTING AND NEW, LOCATED IN AREAS PAVED AS PART OF THIS CONTRACT.
   iii. COMPLY WITH ALL THE GENERAL REQUIREMENTS AND REQUIREMENTS OF THE SPECIFICATION, REGARDING PROTECTION OF EXISTING IMPROVEMENTS.

23. MAINTAIN REQUIRED TRAFFIC CONTROL, INCLUDING SIGNAGE AND FLAGMEN, AT POINTS OF EGRESS FROM CONSTRUCTION SITE TO PUBLIC ROADS. COMPLY WITH SPECIFIED HAUL ROUTES.

24. WORK AND DISTURB GROUND ONLY WITHIN LIMITS SHOWN, SPECIFIED AND APPROVED BY OWNER. PRESERVE, PROTECT AND DO NOT ENTER AREAS OUTSIDE THOSE LIMITS. DO NOT DISTURB MORE GROUND OR VEGETATION THAN IS REQUIRED TO COMPLETE WORK.

25. VEHICLE BEDS, BOWLS OR BUCKETS MUST BE COVERED WHEN TRANSPORTING EARTHEN MATERIALS ON PAVED PUBLIC ROADS.

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ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
4	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
3	8/5/15	90% RTC RESOLUTION		AJW	PT	PT	VMB
2	9/8/14	PRE-FINAL (90%) DESIGN		MD	PT	PT	VMB
1	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	PT	VMB
0	11/18/11	PRELIMINARY (30%) DESIGN		EE	PT	PT	VMB

REVISIONS

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RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

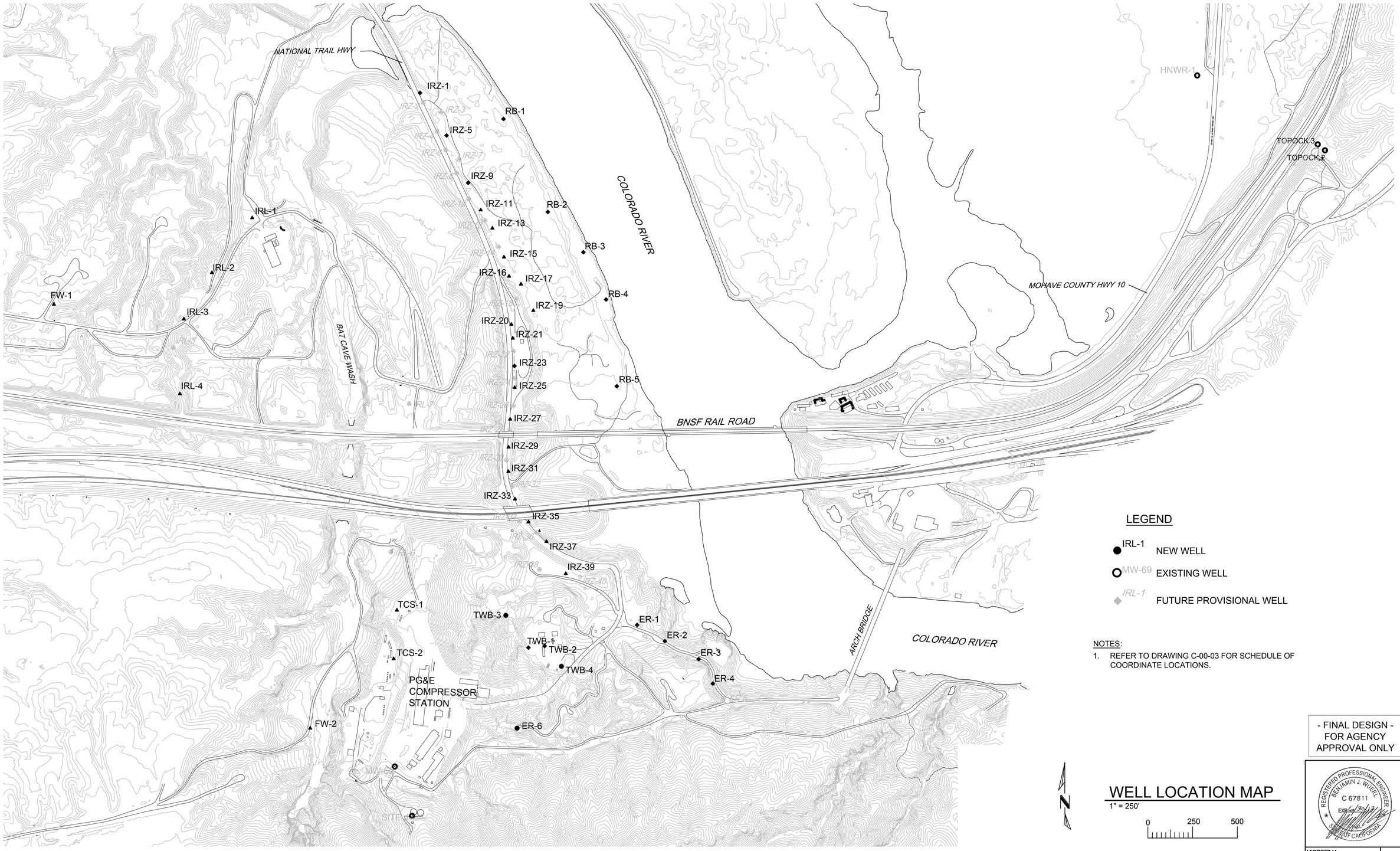
GENERAL CIVIL NOTES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
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LEGEND

- IRL-1 — NEW WELL
- MW-69 — EXISTING WELL
- IRL-1 — FUTURE PROVISIONAL WELL

NOTES:

1. REFER TO DRAWING C-00-03 FOR SCHEDULE OF COORDINATE LOCATIONS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

WELL LOCATION MAP

1" = 250'

0 250 500

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
4	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
3	8/5/15	90% RTC RESOLUTION		AJW	PT	PT	VMB	
2	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB	
1	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB	
0	11/18/11	PRELIMINARY (30%) DESIGN		EE	PT	PT	VMB	

REVISIONS

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TOPOCK GROUNDWATER REMEDIATION PROJECT

WELL LOCATION MAP

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
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SUPSDS	
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Inner Recirculation Loop							
Well Location ID	Figure Coordinates		Preliminary Injection/Extraction Rates (gpm)			Preliminary New Well Count	Preliminary Future Provisional Well Count
	X	Y	Nominal	Minimum	Maximum		
River Bank Extraction Wells							
RB-1	7615764	2103918	25	25	170	1	0
RB-2	7616012	2103398	0	25	170	1	0
RB-3	7616211	2103173	50	25	170	1	0
RB-4	7616338	2102909	50	25	170	1	0
RB-5	7616398	2102424	25	25	170	1	0
Inner Recirculation Loop							
IRL-1	7614392	2103403	75	35	200	1	0
IRL-2	7614133	2103058	75	35	200	1	0
IRL-3	7613976	2102799	100	35	200	1	0
IRL-4	7613954	2102381	200	35	200	1	0
IRL-5	*TBD*	*TBD*	*0*	*35*	*200*	*0*	*1*
IRL-6	*TBD*	*TBD*	*0*	*35*	*200*	*0*	*1*
IRL-7	*TBD*	*TBD*	*0*	*35*	*200*	*0*	*1*
					Total New Well Count	**9**	**3**

Freshwater Supply/Injection Wells							
Well Location ID	Figure Coordinates		Preliminary Injection/Extraction Rates (gpm)			Preliminary New Well Count	Preliminary Future Provisional Well Count
	X	Y	Nominal	Minimum	Maximum		
Freshwater Injection Wells							
FW-1	7613297	2102955	100	50	200	1	0
FW-2	7614683	2100512	50	25	100	1	0
Freshwater Supply Wells							
HNWR-1 (existing well)	7619656	2104263		700		0	0
HNWR-1A	7619656	2104263		700		1	0
Site B	7619599	2107503		700		0	1
					Total New Well Count	**3**	**1**

TCS Recirculation Loop							
Well Location ID	Figure Coordinates		Preliminary Injection/Extraction Rates (gpm)			Preliminary New Well Count	Preliminary Future Provisional Well Count
	X	Y	Nominal	Minimum	Maximum		
Transwestern Bench Extraction Wells							
TWB-1	7615903	2100962	13	1	15	1	0
TWB-2	7615994	2100972	9	1	15	1	0
TWB-3	*7615777*	*2101143*	*0*	*1*	*15*	*0*	*1*
TWB-4	*7616088*	*2100859*	*0*	*1*	*15*	*0*	*1*
East Ravine Extraction Wells							
ER-1	7616511	2101089	0.5			1	0
ER-2	7616666	2100999	0.5	2 total	4 total	1	0
ER-3	7616855	2100898	0.5			1	0
ER-4	7616935	2100761	0.5			1	0
ER-5	*7616995*	*2100678*	*0*	*1*	*1*	*0*	*1*
ER-6	7615840	2100512	*3*	*1*	*5*	*1*	*0*
TCS Injection Wells							
TCS-1	7615168	2101171	13.5	4	40	1	0
TCS-2	7615149	2100900	13.5	4	40	1	0
					Total New Well Count	**9**	**3**

Future provisional wells are shown in italics

National Trails Highway In-Situ Reactive Zone							
Well Location ID	Figure Coordinates		Intermediate Injection/Extraction Rates (gpm)			Intermediate New Well Count	Intermediate Future Provisional Well Count
	X	Y	Nominal	Minimum	Maximum		
NTH IRZ Wells							
IRZ-1 (Extraction)	7615297	2104064	40	40	160	1	0
IRZ-2	*7615315*	*2104010*	*0*	*0*	*24*	*0*	*2*
IRZ-3	*7615416*	*2103957*	*0*	*0*	*24*	*0*	*2*
IRZ-4	*7615392*	*2103849*	*0*	*0*	*24*	*0*	*2*
IRZ-5 (Extraction)	7615445	2103826	80	40	160	1	0
IRZ-6	*7615441*	*2103745*	*0*	*0*	*24*	*0*	*2*
IRZ-7	*7615515*	*2103692*	*0*	*0*	*24*	*0*	*2*
IRZ-8	*7615502*	*2103615*	*0*	*0*	*24*	*0*	*2*
IRZ-9 (Extraction)	7615566	2103561	80	40	160	1	0
IRZ-10	*7615569*	*2103470*	*0*	*0*	*24*	*0*	*2*
IRZ-11	7615636	2103409	40	0	80	2	0
IRZ-12	*7615660*	*2103351*	*0*	*0*	*24*	*0*	*2*
IRZ-13	7615702	2103307	36	0	80	2	0
IRZ-14	*7615737*	*2103203*	*0*	*0*	*24*	*0*	*2*
IRZ-15	7615766	2103146	28	0	60	2	0
IRZ-16	7615794	2103038	24	0	60	2	0
IRZ-17	7615861	2102994	28	0	60	2	0
IRZ-18	*7615834*	*2102912*	*0*	*0*	*24*	*0*	*2*
IRZ-19	7615930	2102847	28	0	52	2	0
IRZ-20	7615808	2102769	16	0	52	2	0
IRZ-21	7615816	2102692	20	0	40	2	0
IRZ-22	*7615820*	*2102619*	*0*	*0*	*24*	*0*	*2*
IRZ-23 (Extraction)	7615825	2102535	100	40	160	1	0
IRZ-24	*7615822*	*2102468*	*0*	*0*	*26*	*0*	*1*
IRZ-25	7615826	2102416	16	0	36	1	0
IRZ-26	*7615819*	*2102314*	*0*	*0*	*26*	*0*	*1*
IRZ-27	7615801	2102239	16	0	36	1	0
IRZ-28	*7615798*	*2102180*	*0*	*0*	*26*	*0*	*1*
IRZ-29	7615792	2102083	14	0	30	1	0
IRZ-30	*7615781*	*2102011*	*0*	*0*	*26*	*0*	*1*
IRZ-31	7615791	2101947	12	0	26	1	0
IRZ-32	*7615813*	*2101863*	*0*	*0*	*26*	*0*	*1*
IRZ-33	7615828	2101793	8	0	26	1	0
IRZ-34	*7615854*	*2101667*	*0*	*0*	*26*	*0*	*1*
IRZ-35	7615904	2101665	6	0	15	1	0
IRZ-36	*7615949*	*2101606*	*0*	*0*	*25*	*0*	*1*
IRZ-37	7616004	2101555	4	0	10	1	0
IRZ-38	*7615965*	*2101400*	*0*	*0*	*25*	*0*	*1*
IRZ-39	7616112	2101376	4	0	5	1	0
IRZ-40 (Extraction)	*7616192*	*2101358*	*0*	*0*	*25*	*0*	*1*
Extraction Total						**4**	**1**
Injection Total						**24**	**30**
					Total New Well Count	**28**	**31**

Total Intermediate New Well Count for the Groundwater Remedy (excludes new monitoring well)	**49**
Total Intermediate Future Provisional Well Count (excludes monitoring wells)	**38**

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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ETIC ENGINEERING

ARCADIS

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3	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
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1	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB	
0	11/18/11	PRELIMINARY (30%) DESIGN		EE	PT	PT	VMB	

REVISIONS

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	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

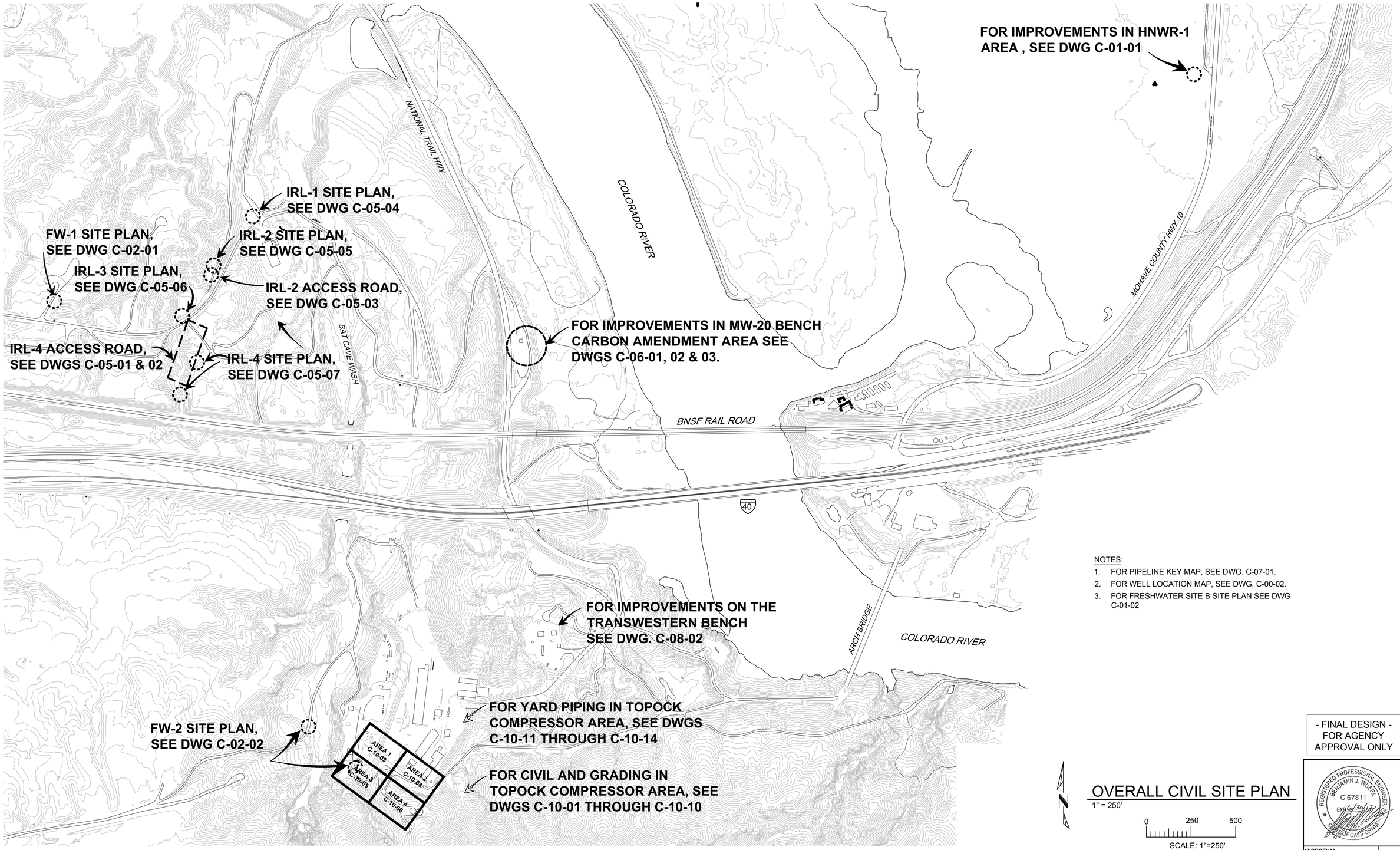
WELL SCHEDULE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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NOTES:

1. FOR PIPELINE KEY MAP, SEE DWG. C-07-01.
2. FOR WELL LOCATION MAP, SEE DWG. C-00-02.
3. FOR FRESHWATER SITE B SITE PLAN SEE DWG C-01-02

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

OVERALL CIVIL SITE PLAN

1" = 250'

0 250 500

SCALE: 1"=250'

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
2	9/8/14	PRE-FINAL (90%) DESIGN	PH	PT	PT	VMB	
1	4/5/13	INTERMEDIATE (60%) DESIGN	PC/EE	PT	PT	VMB	
0	11/18/11	PRELIMINARY (30%) DESIGN	EE	PT	PT	VMB	

REVISIONS

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	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

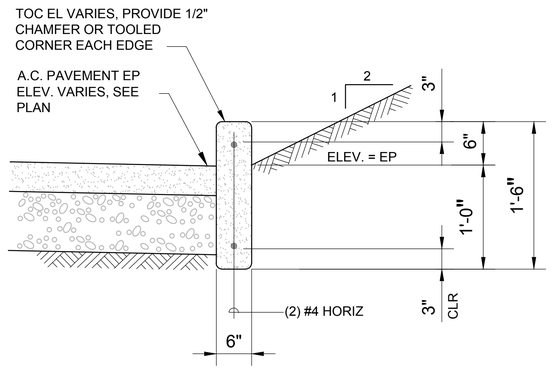
OVERALL CIVIL SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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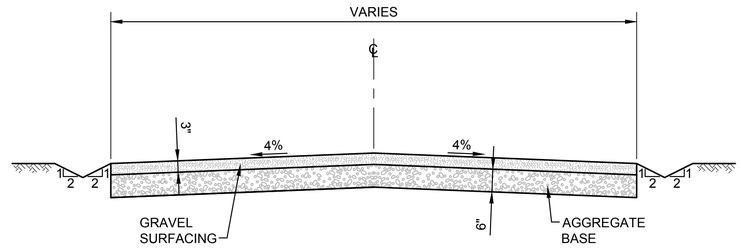
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1 CONCRETE CURB

NTS

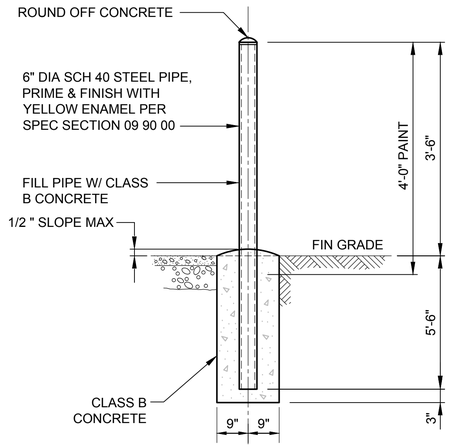
S-12-03



2 GRAVEL ENTRANCE ROAD SECTION

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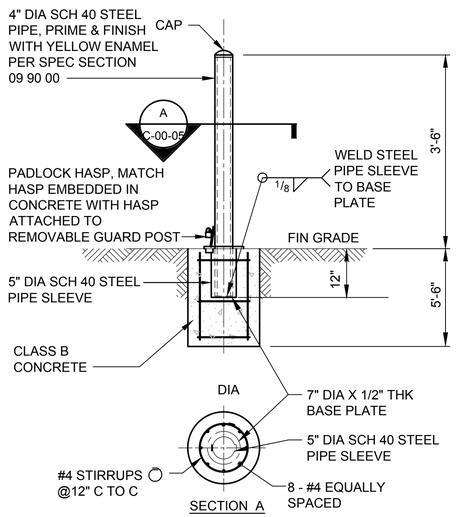
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3 FIXED GUARD POST DETAIL

NTS

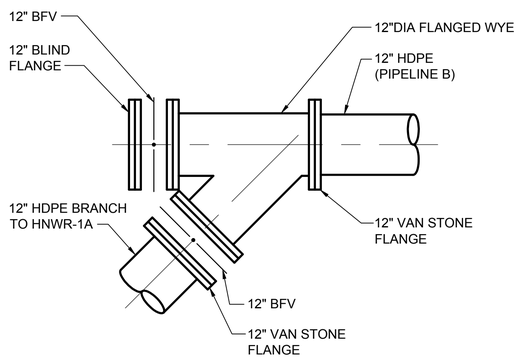
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4 REMOVABLE GUARD POST DETAIL

NTS

S-12-03

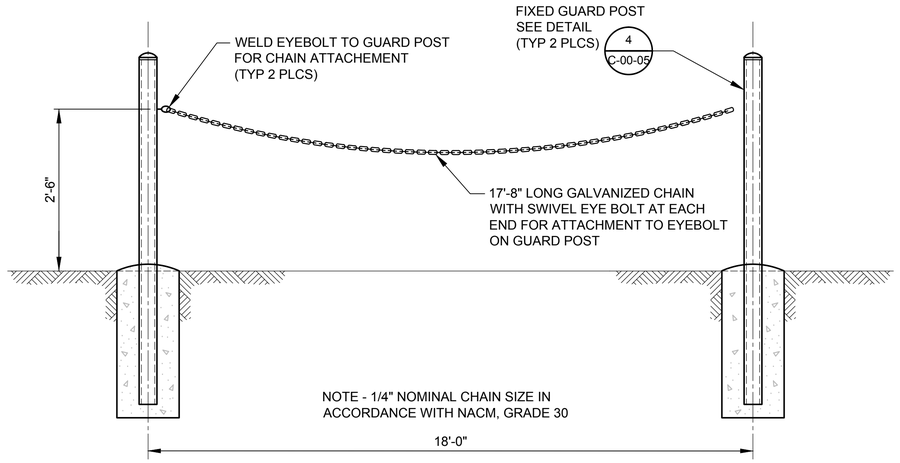


NOTE:
THIS DETAIL APPLIES IF PIPELINE B IS NOT EXTENDED TO SITE B.

5 TERMINATION DETAIL FOR PIPELINE B

NTS

C-01-01



6 CABLE AND POST ACCESS GATE

NTS

S-12-03

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REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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2	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
1	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN	MD	PT	VMB	VMB	
0	9/8/14	PRE-FINAL (90%) DESIGN	PH	PT	PT	VMB	

REVISIONS

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	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

CIVIL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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SHEET NO.	of SHEETS
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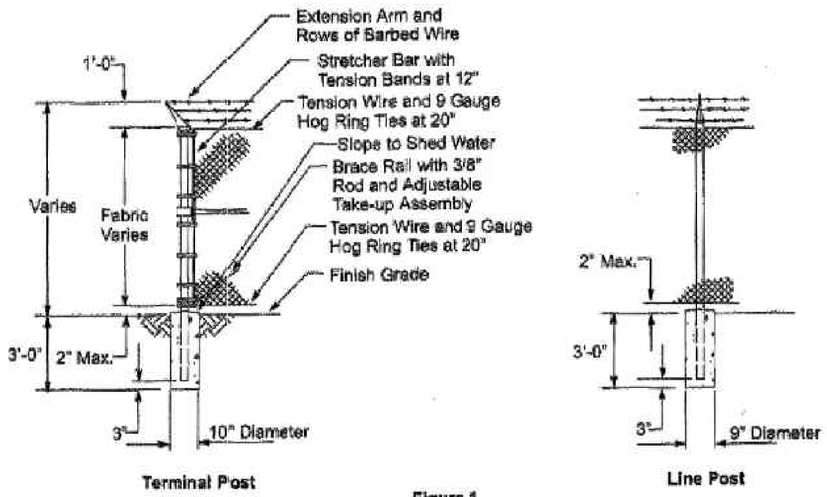


Figure 1
Chain-link Fabric Fence

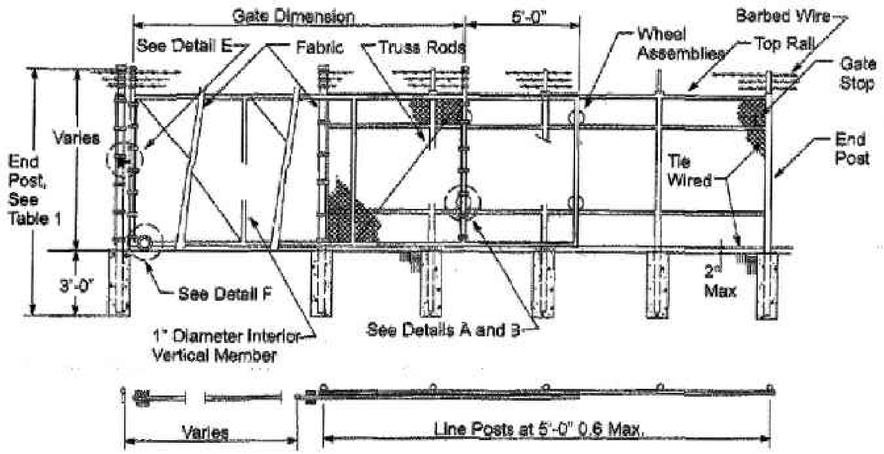


Figure 2
Sliding Gate (Plan) and Elevation

NOTE: THE FENCE AND GATES SHALL COMPLY WITH PG&E STANDARD L-50

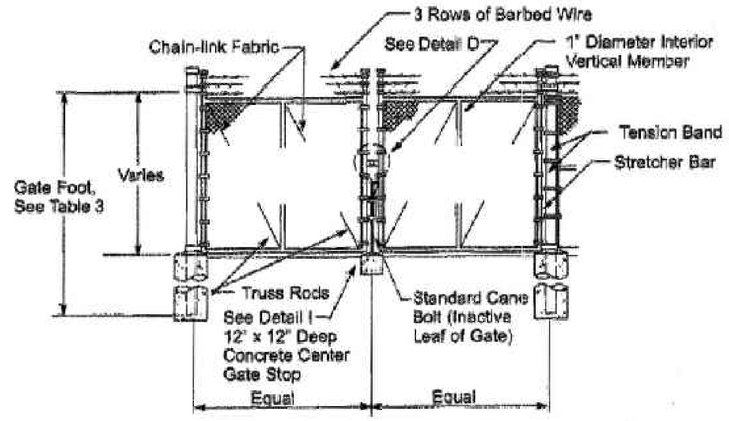


Figure 3
Standard Swing Gate (Elevation)

Table 1 Fence Posts and Braces

Galvanized Chain-link Fabric; Aluminum-coated Chain-link Fabric; and Plastic-coated, Galvanized Chain-link Fabric				
Fabric Height	Fence Framing	Posts		Braces
		Line	Terminal	
6' - 0" 7' - 0" and 8' - 0"	Standard Weight Pipe	2-3/8" O.D. 3.65 Lbs./Ft.	2-7/8" O.D. 5.79Lbs-/Ft.	1-5/8" O.D. 2.27 Lbs./Ft.
	Roll Form Section	1-7/8" x 1-5/8" 2.28 Lbs./Ft.	3-1/2" Square 4.85 Lbs./Ft.	1-5/8" x 1-1/4" 1.35 Lbs./Ft.
	Aluminum Shapes	2-1/2" O.D. Schedule 40	2-1/2" Square 2.98 Lbs./Ft.	2" O.D. Schedule 40

Table 2 Fence Posts and Rails

Galvanized Chain-link Fabric; Aluminum-coated Chain-link Fabric; and Plastic-coated, Galvanized Chain-link Fabric				
Fabric Height	Fence Framing	Posts		Rails and Braces
		Line	Terminal	
6' - 0" 7' - 0" and 8' - 0" 6' - 0" 7' - 0" and 8' - 0"	Standard Weight Pipe	2-7/8" O.D. 5.79 Lbs./Ft.	2-7/8" O.D. 5.79 Lbs./Ft.	1-5/8" O.D. 2.27 Lbs./Ft.
	Roll Form Section	2-1/4" x 1-5/8" 2.64 Lbs./Ft.	3-1/2" x 3-1/2" 4.85 Lbs./Ft.	1-5/8" x 1-1/4" 1.35 Lbs./Ft.
	Aluminum Shapes	2-1/2" Square 2.9 Lbs./Ft.	2-1/2" Square 2.9 Lbs./Ft.	2" O.D. Schedule 40

Table 3 8'-0" High Gate-Minimum Gate Posts and Gate Footings

Table of Gate Face Material	Gate Leaf	Post Size (Outside Diameter)	Footing	
			Diameter of Footings	Depth of Footings
Chain-link Fabric	Up To and Including 6'-0" Wide	3"	12"	48"
	Over 6'-0" and Up To and Including 13'-0" Wide	4"	14"	48"
Chain-link Fabric with Redwood Pickets	Up To and Including 6'-0" Wide	4"	12"	48"
	Over 6'-0" and Up To and Including 13'-0" Wide	6-5/8"	18"	48"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEST C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
REVISIONS							
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB
REVISIONS							

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

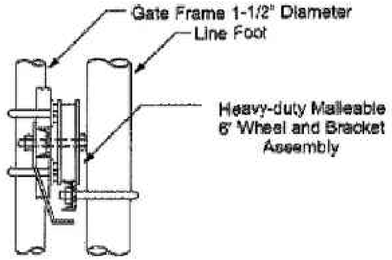
CHAIN LINK FENCE AND GATE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

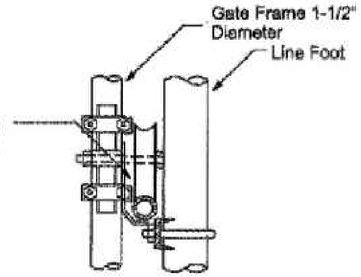
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-00-06	REV 2

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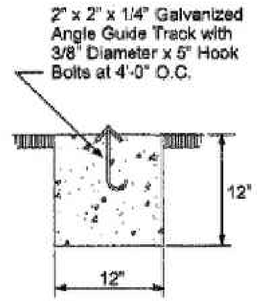
N1808



Detail A
Rear Wheels for Channel Track,
Scale: 3" = 1'-0"

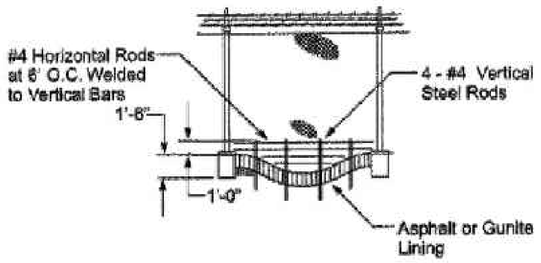


Detail B
Rear Wheels for Pipe Track,
Scale: 3" = 1'-0"

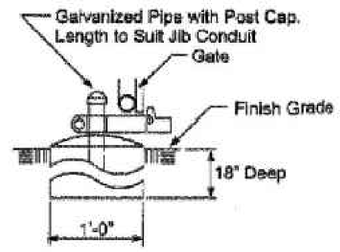


Note: Angle Track to be 1'-0" Longer than Gate Opening.

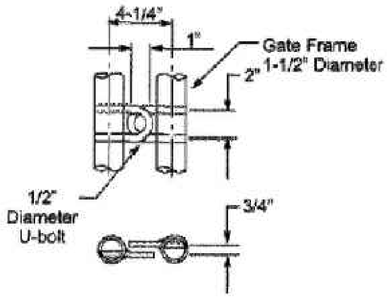
Detail G
Rolling Gate Guide Track



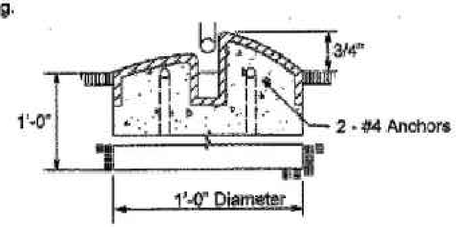
Detail H
Drainage Trench Detail



Detail C
Gate Keeper,
Scale: 1-1/2" = 1'-0"



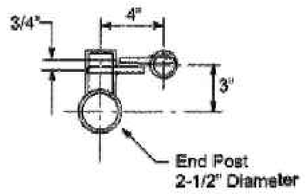
Detail D
Padlock for Standard Swinging Gate



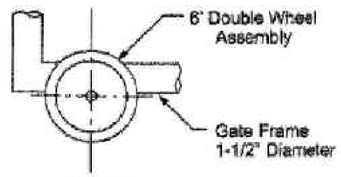
Note: Stop to be Supplied by PG&E and Installed by Contractor.

Detail I
Center Gate Stop Detail For Ornamental Swing Gate or Rustic Gate, For Chain Fabric Gate, Use Masters No. 15911 Stock.

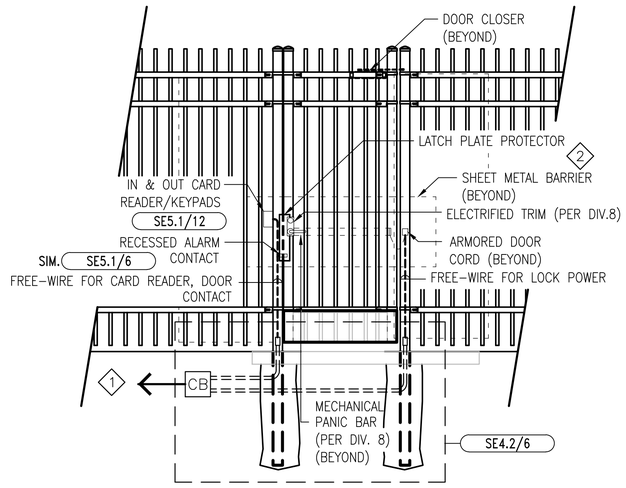
NOTE: THE FENCE AND GATES SHALL COMPLY WITH PG&E STANDARD L-50.



Detail E
Padlock for Rolling Gate,
Scale: 3" = 1'-0"



Detail F
Front Wheels for Rolling Gate,
Scale: 3" = 1'-0"



1 DETAIL
NTS

KEY NOTE:

1. SEE PLAN DRAWINGS FOR CONDUIT SIZE AND ROUTING.
2. INSTALL SHEET METAL BARRIER APPROX. 10–12" ABOVE AND BELOW CENTERLINE OF PANIC HARDWARE TO PREVENT ACTIVATION OF THE PANIC BAR FROM THE EXTERIOR SIDE OF THE GATE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/14 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB	
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

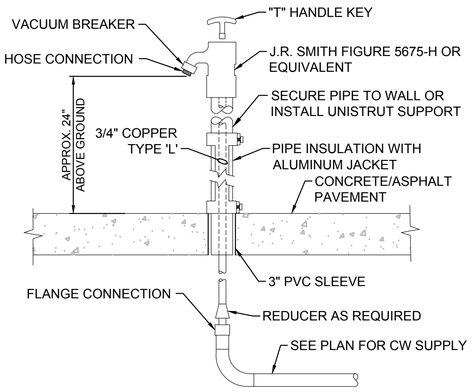
CHAIN LINK FENCE AND GATE DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

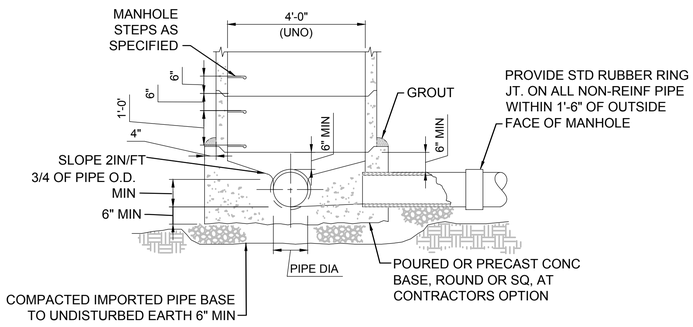
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-00-07	REV 2

N1808

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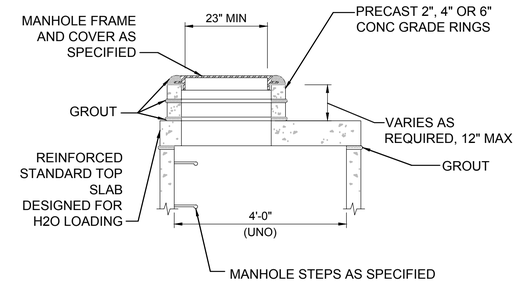


1 HOSE BIB
NTS



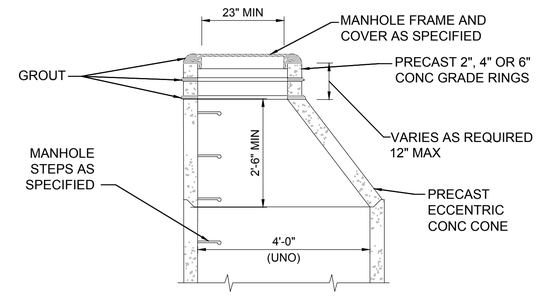
2 MANHOLE BASE SECTION - 6" TO 21" PIPE
NTS

NOTE: MANHOLE FRAME AND COVER SHALL BE ALIGNED ABOVE STEPS.

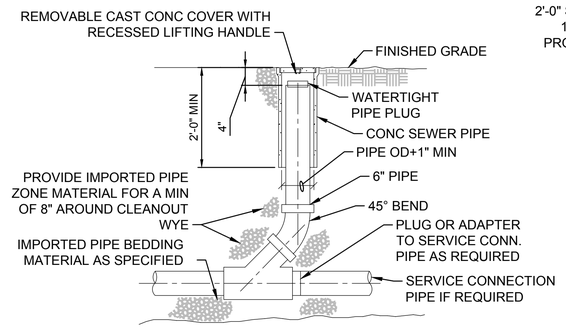


3 FLAT TOP MANHOLE WITH RING EXTENSIONS
NTS

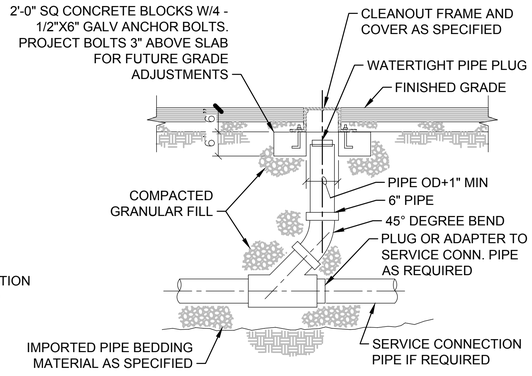
NOTE: MANHOLE FRAME AND COVER SHALL BE ALIGNED ABOVE STEPS.



4 MANHOLE ECCENTRIC TOP SECTION WITH RING EXTENSIONS
NTS



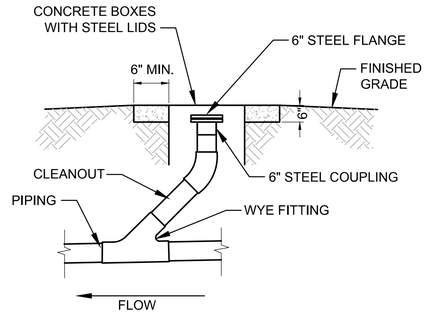
UNPAVED AREA



PAVED AREA

5 CLEANOUT
NTS

NOTE:
1. SEE LEGEND, NOTES, AND ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.



6 REMEDY PIPELINE CLEANOUT SECTION
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TYPICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

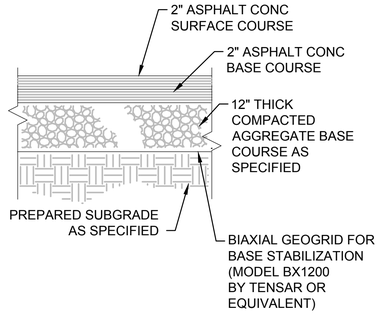
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C-00-08 | REV 2

ETIC ENGINEERING | ARCADIS

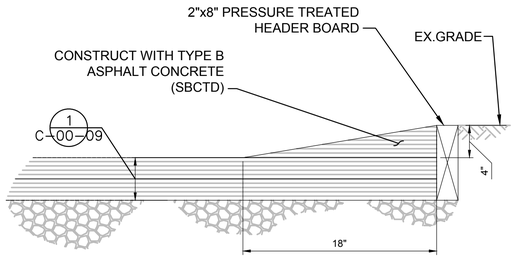
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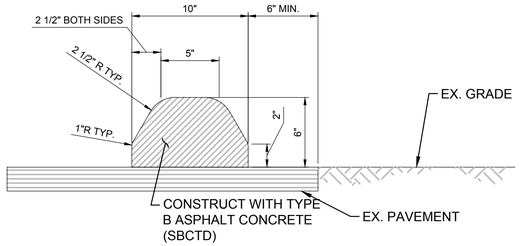


1 ASPHALT PAVEMENT
NTS

NOTE: SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.

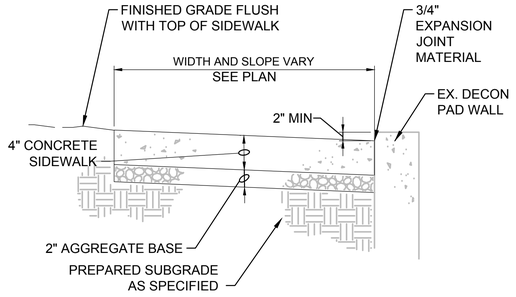


2 ASPHALT THICKENED EDGE
NTS

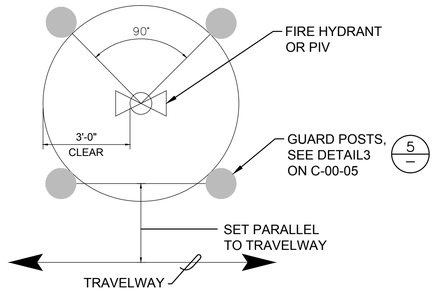


3 EXTRUDED ASPHALT CURB
NTS

NOTE: EXTRUDED AC CURB SHALL BE BONDED TO THE PAVEMENT WITH TACK COAT OR SLURRY MIXTURE ADHESIVE.

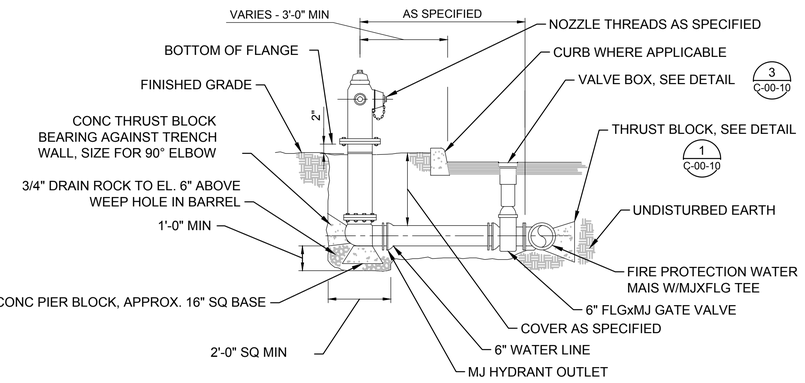


4 CONCRETE SIDEWALK
NTS



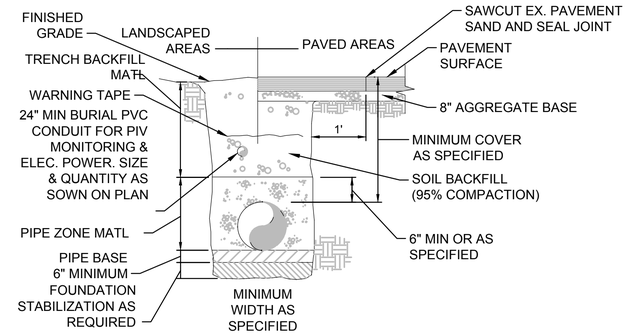
BOLLARD SPACING AROUND FIRE HYDRANT/POST INDICATOR VALVE 5
NTS

NOTES:
1. ADJUST ALL EXISTING HYDRANTS TO FINISHED GRADE WHEN FINAL GRADING IS COMPLETE.
2. SEE DETAIL 5. C-00-09 FOR BOLLARD SPACING AROUND HYDRANT (UNO)



6 FIRE HYDRANT
NTS

NOTE:
1. SEE LEGEND, NOTES, AND ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.



7 TYPICAL TRENCH
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

REVISIONS																	
NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY	NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
									2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
									1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF	
									0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF	

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TYPICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-00-09	REV 2

ETIC ENGINEERING
ARCADIS

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NOTES:
1. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES.
2. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. REQUIRED VOLUMES OR BEARING AREAS AT FITTINGS SHALL BE AS SPECIFIED, AND ADJUSTED AS NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING PRESSURE(S).
4. THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 200 PSIG AND THE WEIGHT OF CONCRETE = 4050 LBS/CU YD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES, USE THE FOLLOWING EQUATION :VOLUME = (TEST PRESS./200) x (TABLE VALUE)
5. BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS ARE BASED ON TEST PRESSURE OF 200 PSIG AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 LBS/SQ FT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING PRESSURE, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESS./200) x (2000/SOIL BEARING PRESSURE) x (TABLE VALUE).
6. THRUST BLOCKS FOR VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS SHALL BE THE SAME AS FOR HORIZONTAL BENDS.
7. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER THIS STANDARD.
8. BEARING AREA OF THRUST BLOCK SHALL NOT BE LESS THAN 1.0 SQ FT.
9. VERTICAL BENDS THAT REQUIRE A THRUST BLOCK VOLUME EXCEEDING 5 CUBIC YARDS REQUIRE SPECIAL BLOCKING. SEE PLANS.

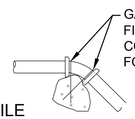
BEARING AREA OF THRUST BLOCKS IN SQUARE FEET (HORIZONTAL BENDS)

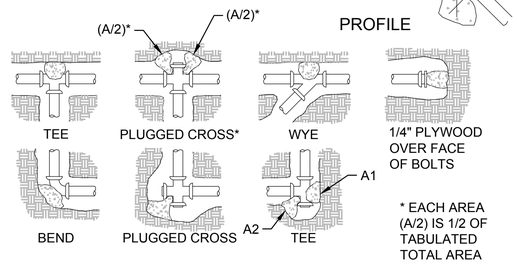
FITTING SIZE	TEE, WYE, PLUG OR CAP	90° BEND, PLUGGED CROSS	TEE PLUGGED ON RUN		BEND ANGLE		
			A_1	A_2	45°	22 1/2°	11 1/4°
4	1.4	1.9	2.5	1.9	1.4	-	-
6	2.8	4.0	5.7	4.0	2.1	1.4	-
8	5.1	7.1	10.1	7.2	3.9	2.0	1.4
10	7.9	11.2	15.7	11.2	6.1	3.2	1.6
12	11.3	16.0	22.7	16.0	8.8	4.5	2.3
14	15.3	21.7	30.7	21.2	11.9	6.1	3.1
16	20.0	28.4	40.0	28.4	15.5	8.0	4.0
18	25.3	36.0	50.7	36.0	19.5	10.1	5.1
20	31.3	44.4	62.7	44.4	24.1	12.5	6.3
24	45.3	64.0	90.1	64.0	34.9	18.1	9.1

VOLUME OF THRUST BLOCK IN CUBIC YARDS (VERTICAL BENDS)

FITTING SIZE	BEND ANGLE		
	45°	22 1/2°	11 1/4°
4	1.5	0.6	0.3
6	3.6	1.4	0.6
8	5.3	2.0	0.8
10	8.0	3.1	1.2
12	11.3	4.3	7.7
14	15.3	5.7	2.4
16	19.7	7.5	3.1

FITTING SIZE	ROD SIZE	EMBEDMENT
12" AND LESS	#6	30"
14" - 16"	#8	36"

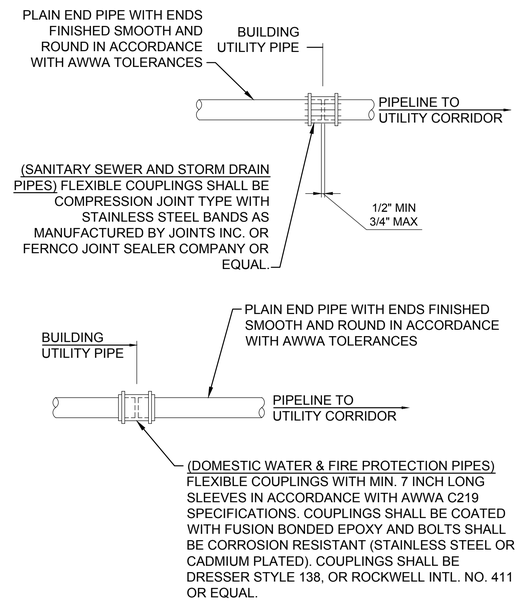




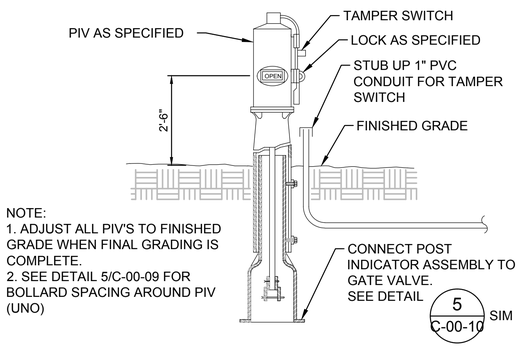
1 THRUST BLOCK DETAILS AND NOTES
NTS

SAN BERNARDINO COUNTY FIRE DEPARTMENT - NFPA 24 NOTES [SIC]
1. VEHICULAR ACCESS MUST BE PROVIDED AND MAINTAINED SEVICEABLE THROUGHOUT CONSTRUCTION.
2. THE INSPECTION, HYDROSTATIC TEST AND FLUSH OF THE FIRE HYDRANTS OR SPRINKLER SYSTEM SHALL BE WITNESSED BY A FIRE DEPARTMENT REPRESENTATIVE.
3. NO UNDERGROUND PIPING SHALL BE COVERED WITH EARTH OR HIDDEN FROM VIEW UNTIL THE FIRE DEPARTMENT REPRESENTATIVE HAS BEEN NOTIFIED AND GIVEN NO LESS THAN 48 HOURS NOTICE IN WHICH TO INSPECT SUCH INSTALLATION.
4. PIPING SHALL BE LISTED FOR FIRE PROTECTION SERVICES AND COMPLY WITH AWWA STANDARDS, WHERE APPLICABLE (NFPA 24 SECTION 7-1.1).
5. PIPE USED IN PRIVATE FIRE SERVICE SHALL BE DESIGNED TO WITHSTAND A WORKING PRESSURE OF NOT LESS NA 150 PSI (NFPA 24 SECTION 7-1.3).
6. PIPE. VALVES, HYDRANTS, AND FITTINGS SHALL BE INSPECTED FOR DAMAGE WHEN RECEIVED AND SHALL BE INSPECTED PRIOR TO INSTALL.ATION.
7. BOLTED JOINTS SHALL BE CHECKED FOR PROPER TORQUING OF BOLTS. PIPE, VALVES, HYDRANTS, AND FITTINGS SHALL BE CLEAN INSIDE. WHEN WORK IS STOPPED, OPEN ENDS SHALL BE PLUGGED TO PREVENT STONES AND FOREIGN MATERIALS FROM ENTERING THE PIPE. (NFPA 24 SECTION 8-4.1)
8. BACKFILL SHALL BE WELL TAMPED IN LAYERS UNDER AND AROUND PIPE TO PREVENT SETTLEMENT AND LATERAL MOVEMENT, AND SHALL CONTAIN NO ASHES, CINDERS, REFUSE, ORGANIC MATTER, OR OTHER CORROSIVE MATERIAL (NFPA 24 SECTION 8-7.1).
9. UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS SHALL BE FLUSHED THOROUGHLY AND WHITNESSED BY THE FIRE DEPARTMENT BEFORE CONNECTION IS MADE TO THE SPRINKLER TO REMOVE FOREIGN MATERIALS WHICH MAY HAVE ENTERED THE PIPE DURING THE COURSE OF INSTALLATION (NFPA 24 SECTION 9-1.1).
10. THE MINIMUM RATE OF FLOW FOR #9 ABOVE SHALL BE NOT LESS THAT THE WATER DEMAND RATE OF THE SYSTEM, WHICH IS DETERMINED BY THE SYSTEM DESIGN, OR NOT LESS THAN THAT NECESSARY TO PROVIDE A VELOCITY OF 10 FEET PER SECOND, WHICHEVER IS GREATER. FOR ALL SYSTEMS, THE FLUSHING OPERATIONS SHALL BE CONTINUED FOR A SUFFICIENT TIME TO INSURE THOROUGH CLEANING. WHEN THE FLOW RATE AS USED IN TABLE 9-1.1 CANNOT BE VERIFIED OR MET, SUPPLY PIPE SHALL BE FLUSHED AT THE MAXIMUM FLOW RATE AVAILABLE TO THE SYSTEM UNDER FIRE CONDITIONS (NFPA 24 SECTION 9-1.1).
11. THE TRENCH SHALL BE BACKFILLED BETWEEN JOINTS BEFORE TESTING TO PREVENT MOVEMENT OF PIPE (NFPA 24 SECTION 9-2.2).
12. ALL NEW PRIVATE FIRE SERVICE MAINS SHALL BE HYDROSTATICALLY TESTED AT NOT LESS THAN 200 FOR TWO HOURS OR AT 50 PSI IN EXCESS OF THE MAXIMUM STATIC PRESSURE WHEN THE MAXIMUM STATIC PRESSURE IS IN EXCESS OF 150 PSI (NFPA 24 SECTION 9-2.3.1).
13. TEST SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION. THE CERTIFICATE IN FIGURE A-9-2.1 IS TO BE COMPLETED (NFPA 24 SECTION 9-2.3.4).
14. THRUST BLOCKS OR ANOTHER SUITABLE MEANS OF THRUST RESTRAINTS SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF A PIPE AND AT ALL TEES. PLUGS, CAPS, AND BENDS (NFPA 24 SECTION 8-6.2).
15. THRUST BLOCK LOCATIONS SHALL BE INSPECTED PRIOR TO AND AFTER POURING OF THE THRUST BLOCKS (NFPA 24 SECTION 8-2.2.1).
16. PROVIDE THRUST BLOCK DETAIL ON PLANS FOR FIELD VERIFICATION (NFPA 24 SECTION 8-2.2.1)
17. PROVIDE FIRE HYDRANT AND SHUT-OFF VALVE DETAIL ON PLANS.

2 SAN BERNARDINO COUNTY FIRE DEPARTMENT - NFPA 24 NOTES
NTS

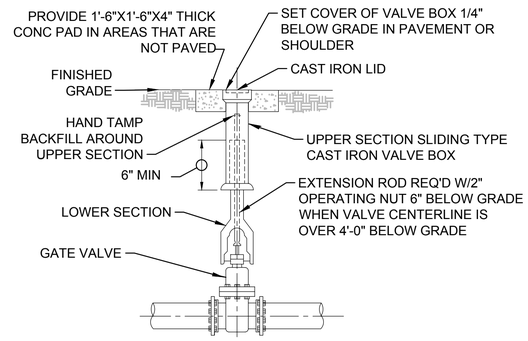


3 BLDG UTILITY PIPE CONNECTION
NTS

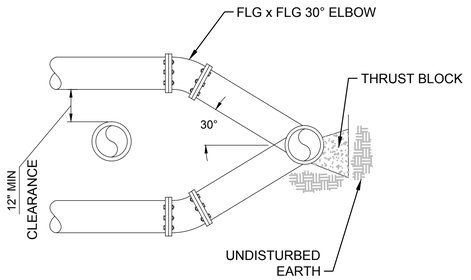


4 POST INDICATOR VALVE
NTS

NOTE:
1. SEE LEGEND, NOTES, AND ABBREVIATIONS C-08-00 FOR COMPLETE GENERAL NOTES.



5 VALVE BOX DETAIL
NTS



6 WATER CROSSING
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TYPICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-00-10	REV 2

N1808

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PIPE ID AND ABBREVIATION SCHEDULE

PIPE ID	SERVICE	SERVICE ABBREVIATION
1	FRESH WATER INJECTION LOOP	FW INJ
2	UPGRADIENT INJECTION	UPGRAD INJ
3	UPGRADIENT BACKWASH	UPGRAD BW
4	NORTH IRZ INJECTION (1-22)	N IRZ INJ
5	SOUTH IRZ INJECTION (24-40)	S IRZ INJ
6	NORTHERN IRZ EXTRACTION	N IRZ EX
7	IRZ-23 EXTRACTION	IRZ-23 EX
8	RIVERBANK EXTRACTION	RB EX
9	BACKWASH NORTH	BW N
10	BACKWASH SOUTH	BW S
11	EAST RAVINE EXTRACTION WELL NETWORK HEADER	E RAV EX
12	NOT USED/ NORTHEAST OF TCS EXTRACTION WELL NETWORK HEADER	
13	TCS INJECTION	TCS INJ
14	TCS BACKWASH	TCS BW
15	REMEDY WASTEWATER	RW
16	TREATED WATER	TW
17	FIRE PROTECTION WATER	FPW
18	SOUTH IRZ EXTRACTION SPARE	S IRZ EX SP
19	EAST RAVINE ER-6 EXTRACTION	E RAV ER-6 EX
20	480V POWER CONDUIT (2",U.N.O)	E
21	COMMUNICATIONS CONDUIT (2")	FO
22	12 kV POWER (3")	12 KV
23	#2/0 BARE COPPER GROUND	GND
24	NOT USED/ TWB SUPPLEMENTAL FLOW	TWB SUPP
25	TWB EXTRACTION WELL NETWORK HEADER	TWB
26	WELL MAINTENANCE ROOM SUPPLY-- TO BACKWASH FRAC TANK	WMR
27	CONDITIONED WATER -- TO CONDITIONED WATER FRAC TANK	CWFT
28	BACKWASH WATER -- TO CARBON AMENDMENT BUILDING	BWCA
29	C.I.P. WATER -- TO CARBON AMENDMENT BUILDING	CW
30	C.I.P. RETURN -- TO C.I.P. TANK FROM CARBON AMENDMENT BUILDING	CRTRN
31	FRESHWATER -- TO C.I.P. TANK FROM CARBON AMENDMENT BUILDING	CF
32	C.I.P. REAGENT -- TO C.I.P. TANK FROM OFFLOADING AREA	CRGNT
33	WELL MAINTENANCE LINE	WM
34	CARBON TANK FILL LINE	CTF
35	VAPOR RECOVERY LINE	VR
36	CARBON LINE -- FROM CARBON TANK TO CARBON AMENDMENT BUILDING	CL
37	PURGE WATER	PW
38	WASTE STREAM	WS
39	TREATED FRESHWATER WASTE	TFW
40	BACKWASH WASTE	BWW
41	BACKWASH SUPPLY	BWS
42	LAB WASTE	LW
43	ACID (19% HCL)	ACD
44	COAGULANT	COG
45	CAUSTIC (25%)	CAU
46	TEMPERED WATER SUPPLY	TWS
47	TEMPERED WATER RETURN	TWR
48	INSTRUMENT AIR	IA
49	UTILITY AIR	UA
50	SLURRY	SL
51	DRAIN	DR
52	DECHLORINATION	DCL
53	CALCIUM HYPOCHLORITE	HC
54	OVERFLOW	OF
55	UTILITY WATER	UW
56	SANITARY SEWER	SS
57	INSTRUMENTATION CONDUIT	I1
58	SECURITY CONDUIT	S1
CA	CARBON AMENDED WATER	CA
PO	POTABLE WATER	POT WTR
SP	SPARE PIPE	SP
SP(e)	SPARE ELECTRICAL CONDUIT	SP(e)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

PIPE ID AND ABBREVIATION SCHEDULE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. C-00-12 of SHEETS | REV 0

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GENERAL STRUCTURAL NOTES

GENERAL

GOVERNING CODES

CALIFORNIA BUILDING CODE (CBC), 2013 AS AMENDED BY SAN BERNARDINO COUNTY ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURE, AND AWWA STANDARD D-100 (2011)

INTENT OF GENERAL STRUCTURAL NOTES

THE INTENT OF THESE GENERAL STRUCTURAL NOTES IS TO DEFINE DESIGN PARAMETERS (LOADS AND ALLOWABLE STRESSES) FOR ALL STRUCTURES AND MATERIALS USED. PROJECT MATERIALS AND INSTALLATION REQUIREMENT ARE A PART OF THIS JOB AND ARE CONTAINED IN PROJECT SPECIFICATION MANUAL.

DESIGN

THE STRUCTURES ARE DESIGNED TO BE STABLE AND SELF- SUPPORTING WHEN ERECTED AND FULLY COMPLETED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE ERECTION PROCEDURE, INCLUDING SEQUENCE OF CONSTRUCTION, AND TO INSURE THE SAFETY OF THE STRUCTURES DURING THE CONSTRUCTION PHASE, INCLUDING THE DESIGN AND SAFETY OF ANY TEMPORARY BRACING OR OTHER MEASURES WHICH MAY BE NECESSARY TO FACILITATE AND COMPLETE CONSTRUCTION.

LIVE LOADS

DESIGN LIVE LOADS FOR THE STRUCTURES ARE AS FOLLOWS (UNLESS OTHERWISE INDICATED ON DRAWINGS FOR EACH INDIVIDUAL BUILDING):

STAIRS	= 100 PSF
CONCRETE FLOOR ON GRADE	= 500 PSF OR H20 TRUCK
ELEVATED CONCRETE FLOOR	= 200 PSF OR 4 KIPS FORKLIFT
ROOF	= 20 PSF
CAT WALK @ AERIAL CROSSING	= 25 PSF

WIND LOADS

DESIGN HORIZONTAL WIND LOADS ON VERTICAL SURFACES:

20 PSF (MINIMUM)
BASIC WIND SPEED: (3 SECOND GUST) BUILDING SPECIFIC, SEE TABLE ON DRAWINGS FOR EACH INDIVIDUAL BUILDING.

SEISMIC LOADS

CBC, 2013 SITE CLASS: D
SEISMIC DESIGN CATEGORY: BUILDING SPECIFIC, SEE TABLE ON DRAWINGS FOR EACH INDIVIDUAL BUILDING.

S_S = 0.230
S_1 = 0.120
S_{DS} = BUILDING SPECIFIC, SEE TABLE ON DRAWINGS FOR EACH INDIVIDUAL BUILDING.
S_{D1} = BUILDING SPECIFIC, SEE TABLE ON DRAWINGS FOR EACH INDIVIDUAL BUILDING.

IMPORTANCE FACTOR: BUILDING SPECIFIC, SEE TABLE ON DRAWINGS FOR EACH INDIVIDUAL BUILDING.

FOUNDATION

DESIGN SHALL BE BASED ON: GEOTECHNICAL INVESTIGATION REPORT, TOPOCK COMPRESSOR STATION BY CH2M HILL, 2004

FINAL WORKPLAN FOR TIME CRITICAL REMOVAL ACTION AT AOC4 DEBRIS RAVINE, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CA BY CH2M HILL DEC,18, 2009

A) MAT FOUNDATION AND SPREAD FOUNDATIONS:
ALLOW. SOIL BEARING PRESSURE = 4000 PSF-(TOPOK COMPRESSOR STATION)
= 2000 PSF-(EVERYWHERE ELSE UNLESS OTHERWISE NOTED)

GROUND WATER ELEVATION

STRUCTURES ARE DESIGNED FOR A HIGH GROUND WATER LEVEL AT EL. 465.30.

COORDINATION OF WORK

MECHANICAL FRAMING, OPENINGS AND SUPPORTS FOR EQUIPMENT OR OTHER PROCESS ITEMS ARE SHOWN FOR BIDDING PURPOSES ONLY. THE EXACT SIZE AND LOCATION OF SUCH ITEMS SHALL BE VERIFIED FROM MANUFACTURER'S APPROVED SHOP DRAWINGS AND BY COORDINATION OF SUCH WORK WITH THE PERTINENT TRADE.

MISCELLANEOUS

FOR LOCATIONS AND DETAIL OF PIPES, CONDUITS, DUCTS, AND OTHER OPENINGS IN SLABS AND WALLS, SEE SITEWORK, MECHANICAL, PLUMBING, HVAC, AND ELECTRICAL DRAWINGS.

CONCRETE

(SPEC. SECT. DIV 3)

CONCRETE DESIGN DATA

CODE	- ACI 318-11 AND 350/350R-06 BUILDING CODES FOR REINFORCED CONCRETE.
STRENGTH	- F_C' = 5,000 PSI UNLESS OTHERWISE INDICATED IN SPEC SECTION 03 30 00.
REINFORCING	- ASTM A615, GRADE 60
WELDED STEEL WIRE FABRIC	- ASTM A185 OR ASTM 497
DESIGN	- STRENGTH DESIGN METHOD OR ALTERNATE DESIGN METHOD
DETAILING	- ACI SP-66(04) ACI DETAILING MANUAL

STANDARD HOOKS

UNLESS OTHERWISE SHOWN OR NOTED, ALL 90-, 135- AND 180-DEGREE HOOKS FOR REINFORCING SHALL BE IN ACCORDANCE WITH THE STANDARD HOOK DETAILS SHOWN IN ACI SP-66(04).

REINFORCING BAR DEVELOPMENT

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, REINFORCING BARS SHALL BE DEVELOPED AND/OR SPLICED IN ACCORDANCE WITH THE FOLLOWING TABLE:

BAR SIZE	Ld DEVELOPMENT LENGTH	TENSION LAP LAP SLICES * TOP BARS	OTHER BARS
4	2'-1"	2'-5"	2'-1"
5	2'-7"	3'-4"	2'-7"
6	3'-1"	4'-0"	3'-1"
7	4'-6"	5'-10"	4'-6"
8	5'-2"	6'-8"	5'-2"
9	5'-10"	7'-7"	5'-10"

*HORIZONTAL BARS SO PLACED THAT MORE THAN 12 IN. OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

CONCRETE PROTECTION FOR REINFORCEMENT

UNLESS NOTED OTHERWISE, THE CONCRETE COVER FOR REINFORCING BARS PLACED IN SURFACES EXPOSED TO WATER SHALL BE 2 INCHES AND CONCRETE CAST AGAINST EARTH SHALL BE 3 INCHES. ALL OTHER MINIMUM COVER REQUIREMENTS SHALL BE AS PER ACI 318-11.

REINFORCEMENT PLACEMENT:

PLACE, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT. DO NOT DEVIATE FOR REQUIRED POSITION.

CONCRETE ACCESSORIES

ELASTOMERIC SEALANT FOR JOINTS SHALL BE SIKAFLEX-2C SL OR EQUAL

PREFORMED PLASTIC ADHESIVE WATERSTOP (PPAWS FR)

SINGLE COMPONENT SELF-SEALING PLASTIC ADHESIVE TYPE EXTRUDED ROPE FORM BETWEEN TWO PROTECTIVE SILICONE TREATED PAPERS, ½"x1-1/8" SQUARE CROSS SECTION. 1 INCH LAP SPLICE FURNISH WITH PRIMER HENRY COMPANY PRODUCTS SF312-SYNKO-FLEX WATERSTOP FR OR AS APPROVED.

TPV WATERSTOP

WATERSTOP SHALL BE 4" THERMOPLASTIC VULCANIZATE (TPV) SERRATED WITH CENTER BULB UNLESS NOTED OTHERWISE ON DRAWINGS. WATERSTOP TO BE WELDED IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS. MANUFACTURED BY JP SPECIALTIES, INC. TYPE JP436 OR AS APPROVED.

CONCRETE COATING SYSTEM

CONCRETE COATING SYSTEM IS NOT SHOWN ON DRAWINGS. FOR COATING SYSTEM REQUIREMENTS SEE SPECIFICATION SECTIONS 09 90 00, 09 90 05, 09 96 35 AND 09 97 26.

UTILITY VAULTS

UTILITY VAULTS WILL BE PRECAST CONCRETE SECTIONS CONFORMING TO PG&E STANDARD K-35.

EARTHWORK

SUBGRADE COMPACTION (PER SPEC 31 23 13)

UNDER EARTHFILL

COMPACT UPPER 6 INCHES TO MINIMUM OF 90 PERCENT RELATIVE COMPACTION AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.

UNDER PAVEMENT STRUCTURE

COMPACT UPPER 6 INCHES TO MINIMUM OF 95 PERCENT RELATIVE COMPACTION AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.

UNDER FLOOR SLAB ON GRADE, FOOTINGS, OR GRANULAR FILL UNDER STRUCTURE

COMPACT UPPER 12 INCHES TO MINIMUM OF 95 PERCENT RELATIVE COMPACTION AS DETERMINED IN ACCORDANCE WITH ASTM D 1557.

ENGINEERED FILLS

WHEN ENGINEERED FILL IS REQUIRED BY GEOTECHNICAL ENGINEER, IT SHALL BE TESTED AND INPECTED BY GEOTECHNICAL ENGINEER.

EXPANSIVE SOILS

IF THE BUILDING OFFICAL OR GEOTECHNICAL ENGINEER DETERMINES THAT THE EXPANSIVE SOILS OR OTHER GEOLOGIC ISSUES OF CONCREN MAY BE PRESENT, THEN HE/SHE MAY REQUIRE THAT SPECIAL PROVISIONS MADE TO THE FOUNDATION DESIGN TO SAFEGUARD AGAINST DAMAGE DUE TO THE EXPANSIVENESS OR OTHER GEOLOGIC ISSUES. IF THIS BECOMES THE SITUATION THAN ALL FOUNDATION CONSTRUCTION MUST BE HALTED AND THE GEOTECHNICAL ENGINEER SHALL PROVIDE A GEOTECHNICAL REPORT WITH RECOMMENDATIONS IN CONSIDERATION OF THE CONDITIONS.

STRUCTURAL STEEL

(SPEC. SECT. 05 12 00)

DESIGN DATA

SPECIFICATIONS	- AISC MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 14th EDITION
DESIGN	- AISC TYPE "2 SIMPLE

FRAMING CONSTRUCTION

WIDE FLANGE SHAPES	- ASTM A992 (fy = 50KSI)
CHANNELS, PLATES & ANGLES	- ASTM A36 (fy=36 KSI)
STRUCTURAL PIPES	- ASTM A53, GRADE B
STRUCTURAL TUBES	- ASTM A500, GRADE B (46 KSI)
WELDING	- AWS E70 ELECTRODES
HIGH STRENGTH BOLTS	- ASTM A325-SC CLASS A, 3/4 INCH DIAMETER UNLESS OTHERWISE NOTED. SUFFIX SC FOLLOWING ASTM DESIGNATION DENOTES A SLIP-CRITICAL CONNECTION
COMMON BOLTS	- ASTM A307, UNLESS OTHERWISE INDICATED
ANCHOR BOLTS	- ASTM F 1554 GRADE 36 THREADED RODS WITH HEAVY HEX NUTS AND WASHERS UNLESS OTHERWISE INDICATED
ADHESIVE ANCHORS	- SPEC 05 50 00
EXPANSION ANCHORS	- SPEC 05 50 00

STAINLESS STEEL

DESIGN DATA

SPECIFICATION	- ALLOY TYPES CONFORM TO ASTM A-167 & ASTM A-276
PLATES & SHAPES	- TYPE 316 UNLESS OTHERWISE NOTED
BOLTS, NUTS, & WASHERS	- TYPE 316

COMPOSITE FLOOR

(UNLESS OTHERWISE INDICATED ON DRAWINGS FOR EACH INDIVIDUAL BUILDING

TOTAL THICKNESS MINMUM 6 INCHES UNLESS OTHERWISE NOTED.

STEEL DECK: MINMUM 18 GAGE, 1 1/2 INCH DEEP x 36 INCH WIDE PANELS. RIBS SPACING @ 6" C/C (UNLESS OTHERWISE NOTED)

I + = 0.27 IN ⅛T S+ = 0.312 IN ⅜T
I - = 0.28 IN ⅛T S- = 0.316 IN ⅜T

CONCRETE: NORMAL WEIGHT CONCRETE WITH MINMUM f'c = 5,000 PSI UNLESS NOTED OTHERWISE

ALUMINUM

SPECIFICATION	- ASTM - 6061-T6 ALLOY, UNLESS OTHERWISE NOTED.

MASONRY

MINIMUM COMPRESSIVE STRENGTH OF MASONRY: F'm - 1,500 PSI

CONCRETE MASONRY BLOCK UNITS-ASTM C90 COMPRESSIVE STRENGTH AT 28 DAYS = 1,900 PSI

MORTAR - ASTM C270, CONFORM WITH CBC-2013, TYPE M, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS = 2,500 PSI

GROUT - ASTM 476, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS = 3,000 PSI

REINFORCING - ASTM 615, GRADE 60

COLD-DRAWN STEEL WIRE - ASTM 482

1. DETAILS, WORKMANSHIP, AND GENERAL PROCEDURE SHALL CONFORM TO ACI 530 AND ACI 530.1 UNLESS OTHERWISE NOTED.
2. LAP SPLICES - 24 INCHES FOR #4 BARS, 32 INCHES FOR #5 BARS, AND 44 INCHES FOR #6 BAR UNLESS NOTED OTHERWISE.
3. PROVIDE ALL MASONRY BOND BEAMS WITH (2) CONTINUOUS #5 BARS. BOND BEAM REINFORCING SHALL BE CONTINUOUS AT WALL CORNERS AND INTERSECTIONS.
4. PROVIDE #4 @ 48 TYPICAL VERTICAL REINFORCING IN GROUTED CORES FOR ALL WALLS UNLESS NOTED OTHERWISE.
5. MASONRY CORES CONTAINING REINFORCING STEEL OR BOLTS, INCLUDING BOND BEAMS AND LINTELS, SHALL BE GROUTED SOLID.
6. LAP ALL VERTICAL REINFORCING WITH DOWELS INTO CONCRETE FOUNDATIION WALL.
7. PROVIDE (1) #4 BAR VERTICALLY IN EACH OF THE FIRST TWO CORES ON BOTH SIDES OF ALL MASONRY WALL OPENINGS, CONTROL JOINTS AND AT ALL CORNERS UNLESS NOTED OTHERWISE.
8. ALL VERTICAL MASONRY REINFORCING SHALL BE CONTINUOUS FROM TOP OF FOUNDATION TO TOP OF WALL.
9. WHERE VERTICAL MASONRY REINFORCING IS REQUIRED TO PASS THRU MASONRY OR STEEL LINTELS, THE LINTELS SHALL BE FABRICATED WITH OVERSIZE HOLES TO ALLOW THE PASSAGE OF REINFORCING. HOLES SHALL BE GROUTED SOLID AFTER PLACING THE REINFORCING.
10. HORIZONTAL JOINT REINFORCEMENT SHALL CONSIST OF 2-9 GAGE WIRES (W1.7) SPACED 16" O.C. TYPICAL, AT THE TOP AND BOTTOM OF ALL WALL OPENINGS AND EXTEND A MINIMUM OF 24" PAST THE OPENINGS UNLESS NOTED OTHERWISE.

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
VINOD M. BADANI
C-041281
EXP. DATE 3/31/17
CIVIL
STATE OF CALIFORNIA

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB
0	04/05/13	INTERMEDIATE (60%) DESGIN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES: N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

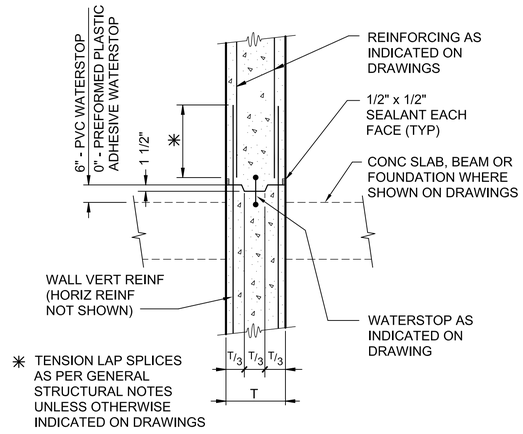
GENERAL STRUCTURAL NOTES

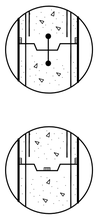
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
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SHEET NO. of SHEETS
S-00-01
REV 1

FINAL (90%) DESIGN

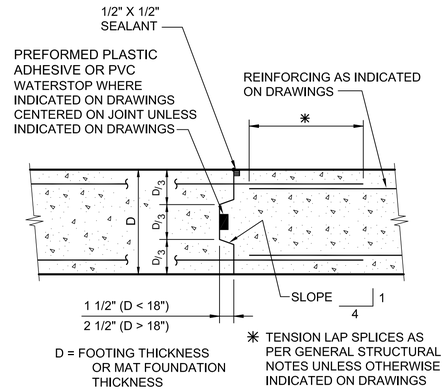
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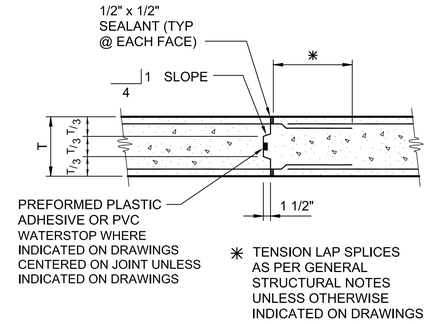


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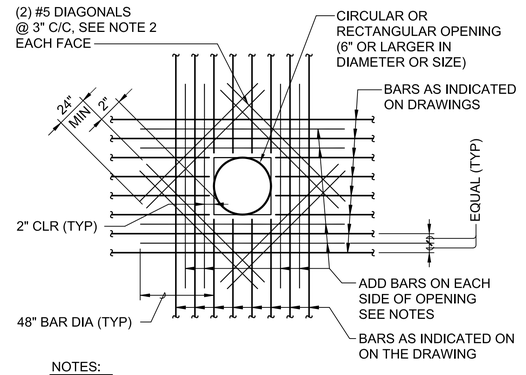
1 WALL HORIZONTAL CONSTRUCTION JOINT
TYP — NTS



2 FOUNDATION OR BASE SLAB CONSTRUCTION JOINT
TYP — NTS



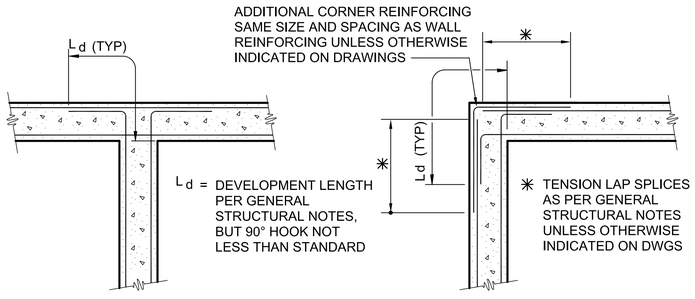
3 WALL VERTICAL CONSTRUCTION JOINT ELEVATED SLAB CONSTRUCTION DETAIL
TYP — NTS



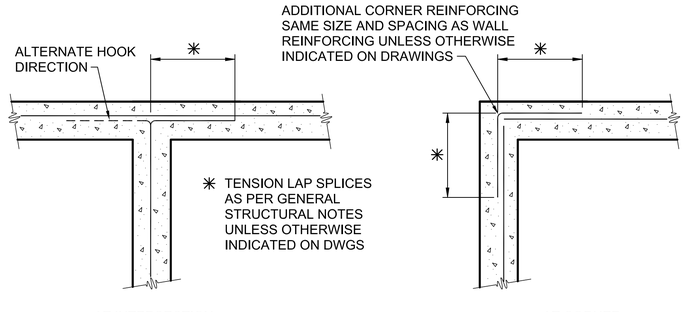
NOTES:

1. AREA OF ADDED BARS AT EACH EDGE OF OPENING IN EACH DIRECTION SHALL BE AT LEAST 1/2 THE CROSS SECTIONAL AREA OF THE INTERRUPTED BARS.
2. PROVIDE STANDARD ACI HOOKS ON BARS IF STRAIGHT EXTENSION PAST THE OPENING CANNOT BE OBTAINED.
3. PLACE ADD BARS IN SAME PLANES AS INDICATED REINFORCING.

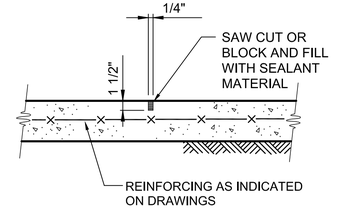
4 OPENING REINFORCEMENT DETAIL
TYP — NTS

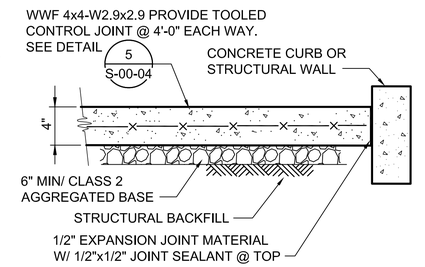


AT INTERSECTION — AT CORNER

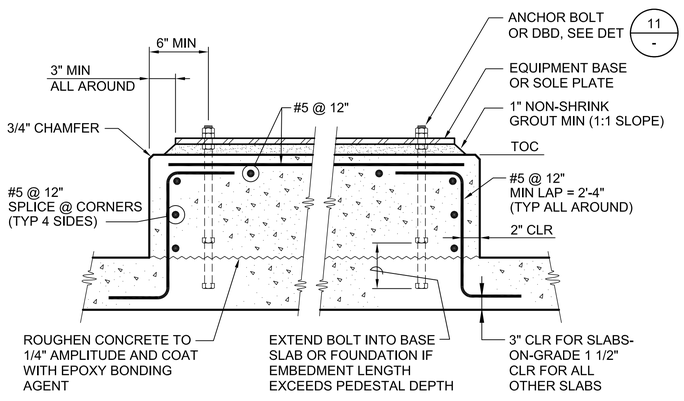


AT INTERSECTION — AT CORNER

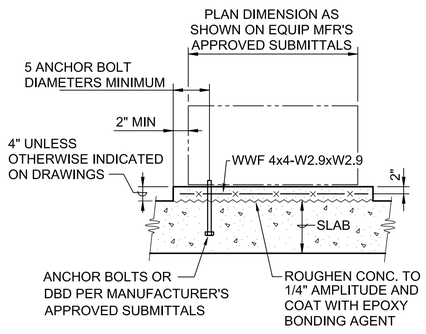




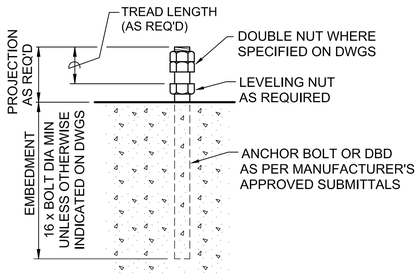
5 DOUBLE REINFORCING WALL DETAIL
TYP — NTS



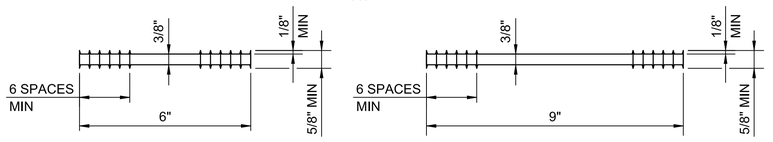
6 SINGLE REINFORCING WALL DETAIL
TYP — NTS

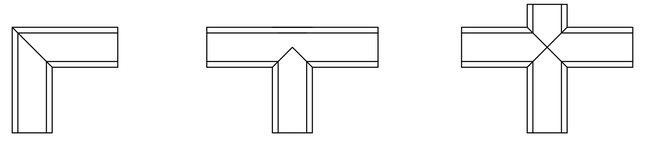


7 CONTROL JOINT DETAIL
NTS — TYP



8 CONCRETE WALKWAY DETAIL
TYP — NTS





9 EQUIPMENT FOUNDATION DETAIL
TYP — NTS

10 EQUIPMENT PAD DETAIL
TYP — NTS

11 ANCHOR BOLT DETAIL
TYP — NTS

12 PREFABRICATED PVC WATERSTOP JOINT DETAIL
TYP — NTS

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — VINOD M. BADANI — C-041281 — EXP. DATE 3/31/17 — CIVIL — STATE OF CALIFORNIA

2 11/18

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
1	09/08/13	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB
0	04/13/14	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT

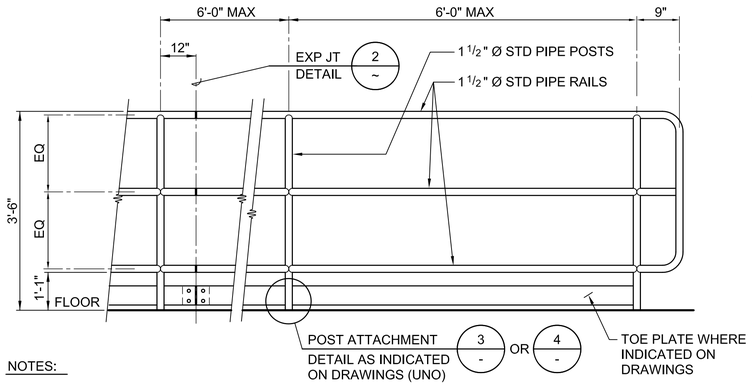
GENERAL STRUCTURAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-00-02	REV 1

E2-S-XXX-0002.dwg

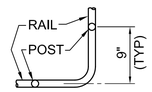
N1808



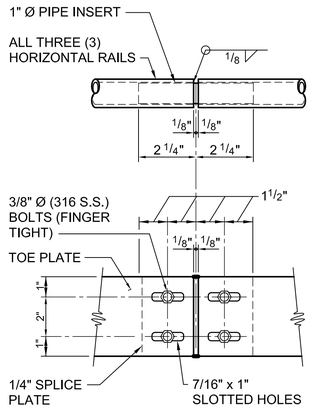
NOTES:

1. ALL MATERIAL TO BE ALUMINUM 6061-T6.

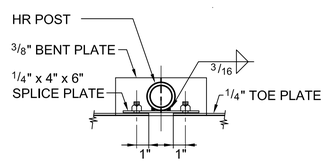
1 HANDRAIL DETAIL
NTS
TYP



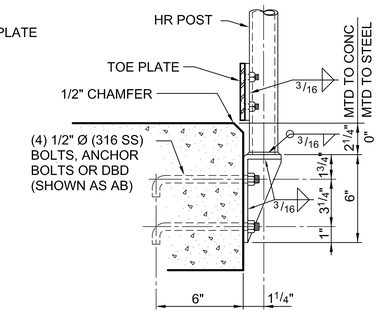
CORNER PLAN



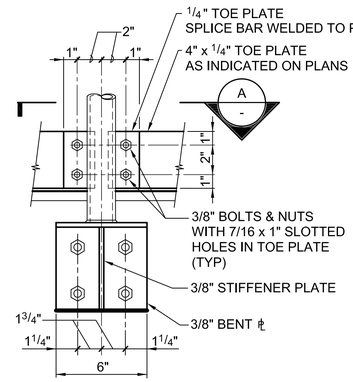
2 HANDRAIL EXPANSION JT. DETAIL
NTS



A SECTION
NTS



SIDE ELEVATION

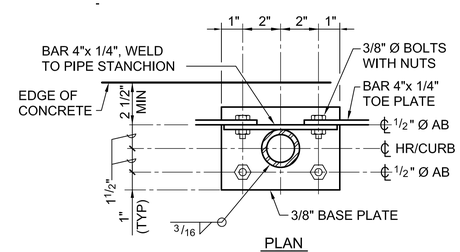


FRONT ELEVATION

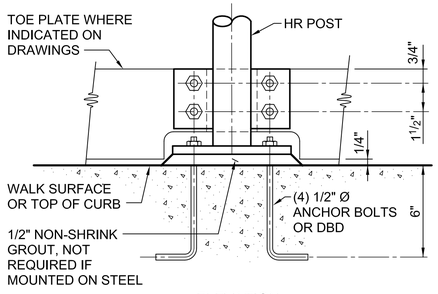
NOTES:

1. ALL CONNECTION ANGLES, PLATES, STIFFENER PLATES AND TOE PLATES SHALL BE OF ALUMINUM 6061-T6 AND ALL FASTENERS SHALL BE TYPE 316 SS.
2. COAT ALUMINUM SURFACES IN CONTACT WITH CONCRETE PER SPECIFICATIONS.
3. OPTIONAL TO USE APPROVED MFR's SUPPORT ASSEMBLY.
4. FOR ATTACHMENT TO STEEL MEMBERS USE TYPE 316 SS BOLTS IN LIEU OF DBD AND PROVIDE NEOPRENE GASKET BETWEEN STEEL AND ALUMINUM SURFACES.

3 SIDE MOUNTED POST ATTACHMENT DETAIL
NTS



PLAN

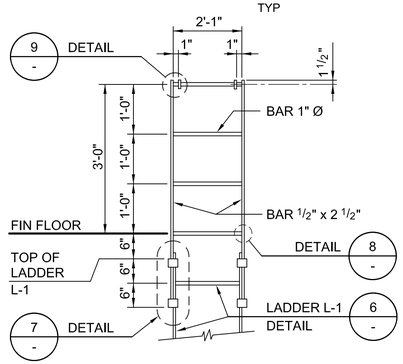


ELEVATION

NOTES:

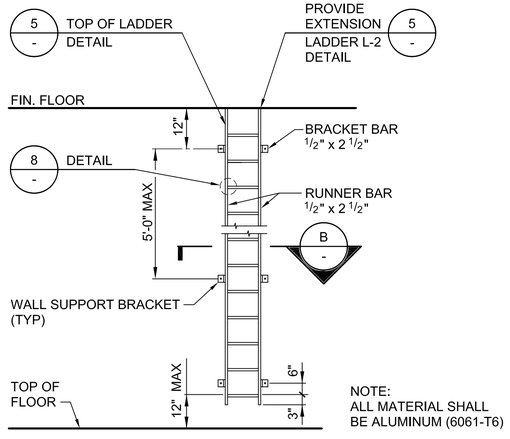
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2. COAT ALUMINUM SURFACES IN CONTACT WITH CONCRETE PER SPECIFICATIONS.
3. OPTIONAL TO USE APPROVED MFR's SUPPORT ASSEMBLY.
4. FOR ATTACHMENT TO STEEL MEMBERS USE TYPE 316 SS BOLTS IN LIEU OF DBD AND PROVIDE NEOPRENE GASKET BETWEEN STEEL AND ALUMINUM SURFACES.

4 TOP MOUNTED POST ATTACHMENT DETAIL
NTS



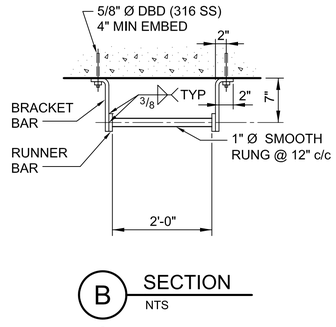
NOTE: ALL MATERIAL SHALL BE ALUMINUM (6061-T6)

5 EXTENSION LADDER L-2 DETAIL
NTS
TYP

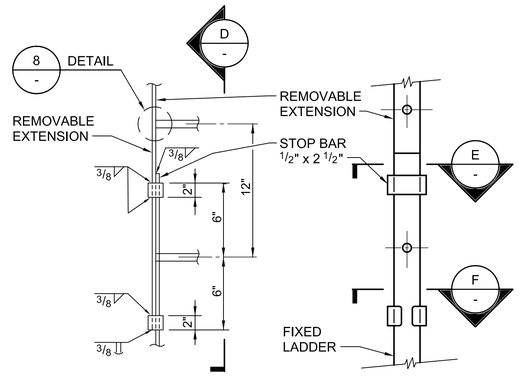


NOTE:
ALL MATERIAL SHALL BE ALUMINUM (6061-T6)

6 LADDER L-1 DETAIL
NTS
TYP

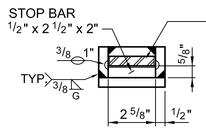


B SECTION
NTS

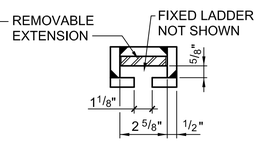


7 DETAIL
NTS

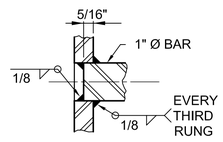
D SECTION
NTS



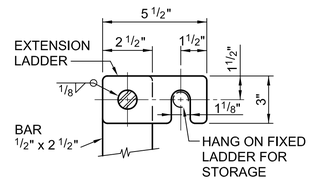
E SECTION
NTS



F SECTION
NTS



8 DETAIL
NTS



9 DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
VINOD M. BADANI
C-041281
EXP. DATE 3/31/17
CIVIL
STATE OF CALIFORNIA

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ARCADIS

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0	04/05/13	INTERMEDIATE (60%) DESIGN	MD	KJ	VMB	VMB	

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES
	AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT

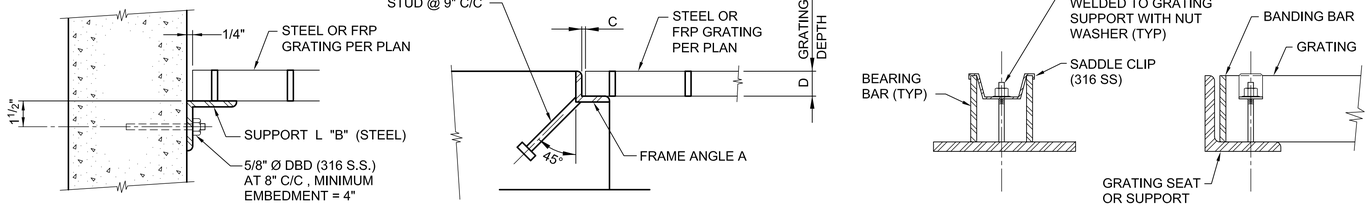
GENERAL STRUCTURAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-00-03	REV 1

E2-S-XXX-0003.dwg

N1808

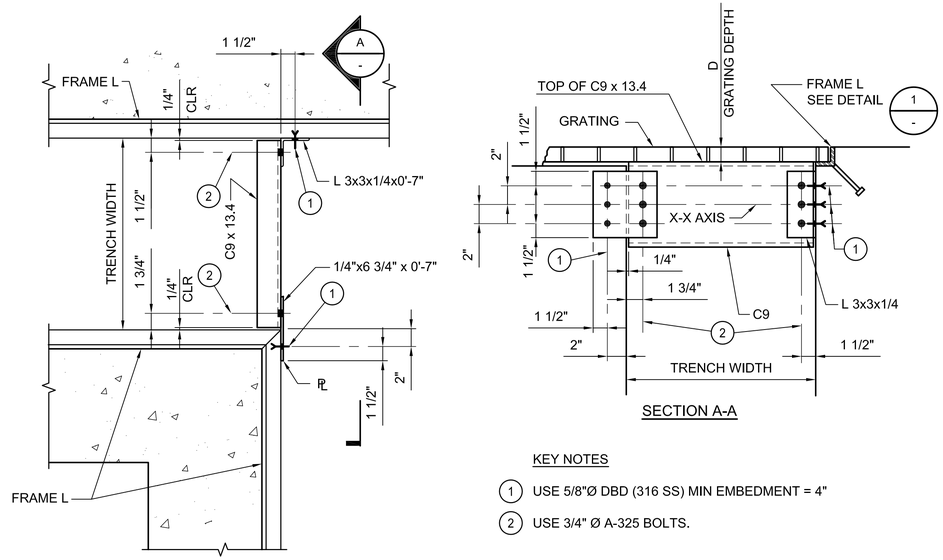


GRATING DEPTH = D IN	FRAME L 'A'	SUPPORT L 'B'	DIM 'C'
3"	L 3 1/2 x 3 1/2" x 1/2"	L 3 x 3 x 1/2"	3/8"
2"	L 2 1/2 x 2 1/2" x 1/2"	L 3 x 3 x 1/2"	3/16"
1 1/2"	L 1 3/4 x 1 3/4 x 1/4"	L 3 x 3 x 1/2"	1/4"

NOTES:

1. PROVIDE 4 CLIPS PER GRATING PANEL APPROXIMATELY 4 INCHES FROM PANEL CORNERS. MAXIMUN CLIP SPACING = 36 INCHES OC.

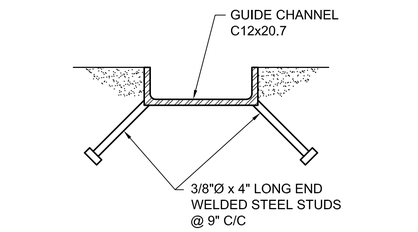
1 GRATING SUPPORT DETAIL
TYP — NTS



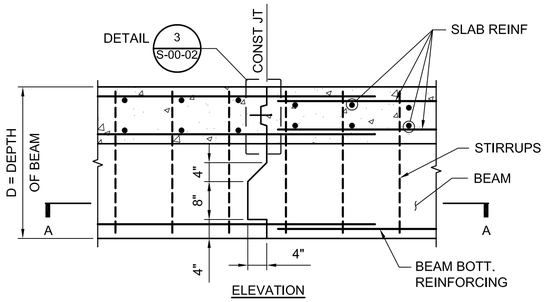
KEY NOTES

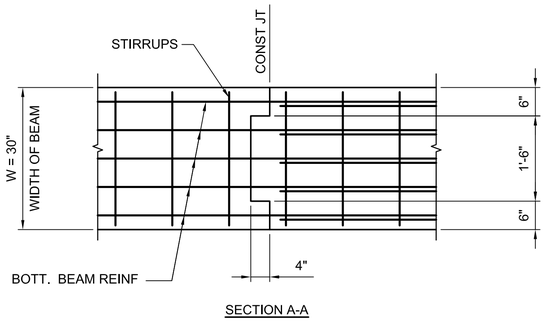
1. USE 5/8"Ø DBD (316 SS) MIN EMBEDMENT = 4"
2. USE 3/4" Ø A-325 BOLTS.

2 GRATING SUPPORT CHANNEL DETAIL
1 1/2" = 1'-0"

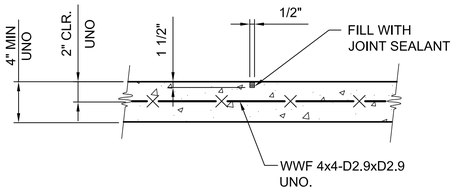


3 GUIDE CHANNEL DETAIL
TYP — 3" = 1'-0"

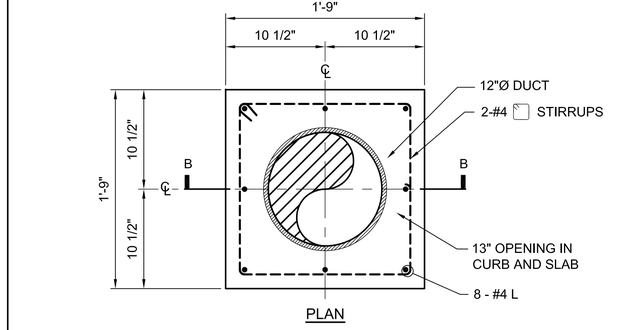


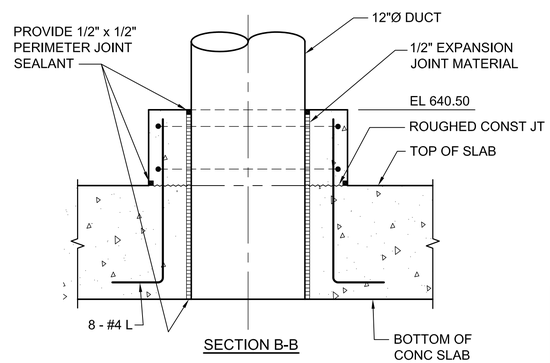


4 DETAIL
3/4" = 1'-0" — S-12-03



5 WALKWAY CONTROL JOINT DETAIL
3/4" = 1'-0" — S-12-03





6 DETAIL
1 1/2" = 1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — VINOD M. BADANI — C-041281 — EXP. DATE 3/31/17 — CIVIL — STATE OF CALIFORNIA

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0	04/08/13	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT

GENERAL STRUCTURAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-00-04	REV 1

E2-S-XXX-0004.dwg

N1808

Vault Schedule, Topock Compressor Station San Bernardino County, California

Location	Well Number/ Physical Well ID	Interior Dimension Size (L X W)[1]	Depth	Quantity	Vault Type	Vault Access Door/Hatch Load Rating[2, 3, 4]	Vault Access Door[3, 4]	Reference Sheet(s)
NTH IRZ Wells								
IRZ Extraction Well Meter Vault	IRZ-23	6'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-04-02, S-04-03 and S-04-05
IRZ Extraction Well Meter Vault	IRZ-5 IRZ-9	8'-0" X 4'-0"	4'-0"	2	1	Parkway rated	Yes	S-04-01, S-04-03 and S-04-04
IRZ Extraction Well Meter Vault	IRZ-1	8'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-04-02, S-04-03 and S-04-05
IRZ Injection Well Meter Vault	IRZ-20 IRZ-21 IRZ-35 IRZ-37	8'-0" X 4'-0"	4'-0"	4	2	Highway rated (HS20-44)	No	S-04-07, S-04-08 and S-04-10
IRZ Injection Well Meter Vault	IRZ-25 IRZ-27 IRZ-29 IRZ-31 IRZ-33	6'-0" X 4'-0"	4'-0"	5	2	Highway rated (HS20-44)	No	S-04-07, S-04-08 and S-04-10
IRZ Injection Well Meter Vault	IRZ-39	8'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-04-06, S-04-08 and S-04-09
IRZ Injection Well Meter Vault	IRZ-11 IRZ-13 IRZ-15 IRZ-16 IRZ-17 IRZ-19	8'-0" X 4'-0"	4'-0"	6	1	Parkway rated	Yes	S-04-06, S-04-08 and S-04-09
IRZ Injection Well Vault	IRZ20-A IRZ20-B IRZ21-A IRZ21-B IRZ25-A IRZ27-A IRZ29-A IRZ31-A IRZ33-A	5'-0" X 4'-0"	4'-0"	9	2	Highway rated (HS20-44)	No	S-04-07, S-04-08 and S-04-10
IRZ Injection Well Vault	IRZ25-A	5'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-04-06, S-04-08 and S-04-09
IRZ Injection Well Vault	IRZ11-A IRZ11-B IRZ13-A IRZ13-B IRZ15-A IRZ15-B IRZ16-A IRZ16-B IRZ17-A IRZ17-B IRZ19-A IRZ19-B	5'-0" X 4'-0"	4'-0"	12	1	Parkway rated	Yes	S-04-06, S-04-08 and S-04-09

Location	Well Number/ Physical Well ID	Interior Dimension Size (L X W)[1]	Depth	Quantity	Vault Type	Vault Access Door/Hatch Load Rating[2, 4, 5]	Vault Access Door with Integral Safety Grating[3, 4, 5] (Yes/ No)	Reference Sheet(s)
INNER RECIRCULATION LOOP								
Extraction Well Meter Vault	RB-1 RB-2 RB-3 RB-4 RB-5	8'-0" X 4'-0"	4'-0"	5	1	Parkway rated	Yes	S-05-01, S-05-02 and S-05-03
Injection Well Meter Vault	IRL-1 IRL-2 IRL-4	8'-0" X 4'-0"	4'-0"	3	1	Off-street traffic rated (HS20)	Yes	S-05-04, S-05-06 and S-05-07
Injection Well Meter Vault	IRL-3	8'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-05-05, S-05-06 and S-05-08
Injection Well Vault	IRL01-A IRL02-A IRL04-A	5'-0" X 4'-0"	4'-0"	3	1	Off-street traffic rated (HS20)	Yes	S-05-04, S-05-06 and S-05-07
Injection Well Vault	IRL03-A	5'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-05-05, S-05-06 and S-05-08
TCS LOOP								
Extraction Well Meter Vault	ER-1 ER-2 ER-3 ER-4	6'-0" X 4'-0"	4'-0"	4	2	Highway rated (HS20-44)	No	S-03-01, S-03-02 and S-03-03
Extraction Well Meter Vault	ER-6	6'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-03-01A, S-03-02 and S-03-03A
Extraction Well Vault	ER01-A ER02-A ER03-A ER04-A ER06-A	5'-0" X 4'-0"	4'-0"	5	2	Highway rated (HS20-44)	No	S-03-01, S-03-02 and S-03-03
Extraction Well Meter Vault	TWB-1 TWB-2	6'-0" X 4'-0"	4'-0"	2	2	Highway rated (HS20-44)	No	S-03-01, S-03-02 and S-03-03
Injection Well Meter Vault	TCS-1	6'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-03-05, S-03-06 and S-03-08
Injection Well Meter Vault	TCS-2	6'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-03-04, S-03-06 and S-03-07
Injection Well Vault	TCS01-A	5'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-03-05, S-03-06 and S-03-08
Injection Well Vault	TCS02-A	5'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-03-06, S-03-04 and S-03-07
FW								
Injection Well Meter Vault	FW-1	9'-0" X 5'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-02-01, S-02-02 and S-02-02A
Injection Well Meter Vault	FW-2	9'-0" X 5'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-02-01A, S-02-02 and S-02-02B
Injection Well Vault	FW1-A	5'-0" X 4'-0"	4'-0"	1	1	Off-street traffic rated (HS20)	Yes	S-02-01, S-02-02 and S-02-02A
Injection Well Vault	FW2-A	5'-0" X 4'-0"	4'-0"	1	2	Highway rated (HS20-44)	No	S-02-01A, S-02-02 and S-02-02B

Notes:

1. Vault sizes are based on Jensen Precast standard sizes.
2. Types of covers: Highway rated (HS20-44) - intended for highway traffic; Off-street traffic (HS-20) - intended for occasional traffic; Parkway - intended for pedestrian traffic.
3. Safety grating is under the floor door at the top of the vault. Intermediate grating will not be used.
4. Well meter vault covers that are highway rated shall be typ. 2' diameter manholes with no safety grating.
5. Well vaults that are highway rated shall be typ 3'(min) square traffic lids with no safety grating.

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
C 61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

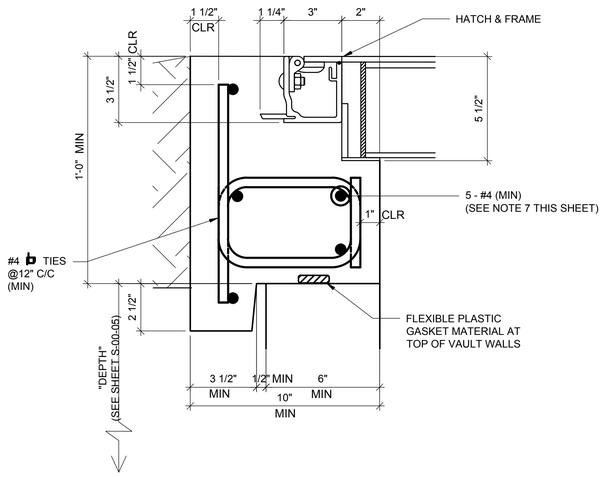
WELL VAULT SCHEDULE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-00-05	REV 2

N1608

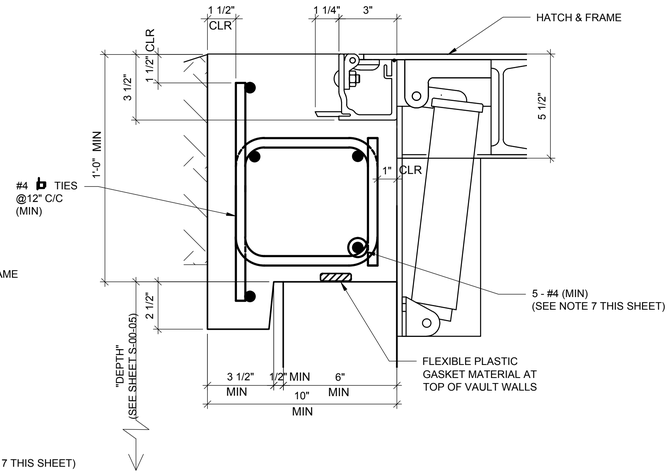
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TYPE 1 VAULT COVER - SECTION B&C ENLARGED DETAIL

1 — 3" = 1'-0"

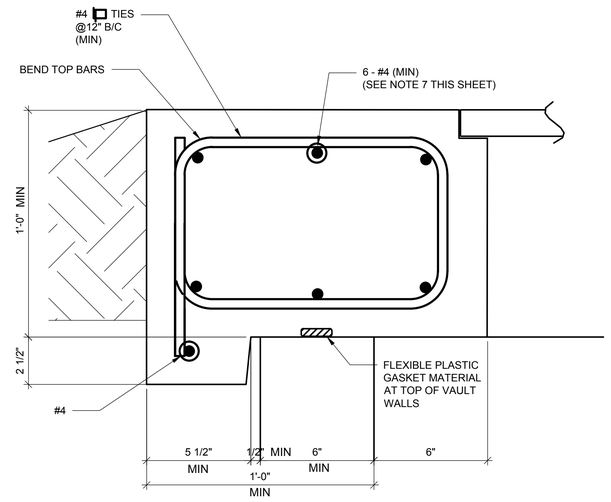
S-02-02A
S-03-07
S-04-04
S-04-09
S-05-03
S-05-07



TYPE 1 VAULT COVER - SECTION A ENLARGED DETAIL

2 — 3" = 1'-0"

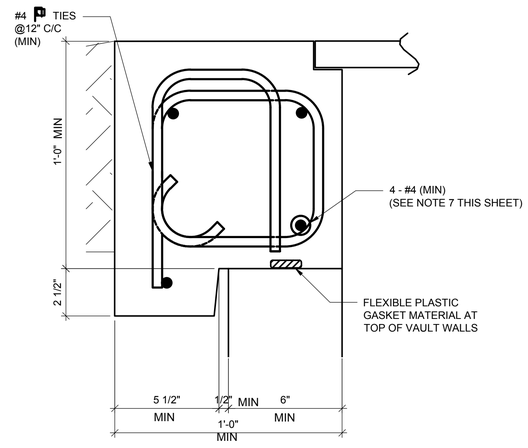
S-02-02A
S-03-07
S-04-04
S-04-09
S-05-03
S-05-07



TYPE 2 VAULT COVER - SECTION A ENLARGED DETAIL

3 — 3" = 1'-0"

S-02-02B
S-03-03
S-03-08
S-04-05
S-04-10
S-05-08



TYPE 2 VAULT COVER - SECTION C ENLARGED DETAIL

4 — 3" = 1'-0"

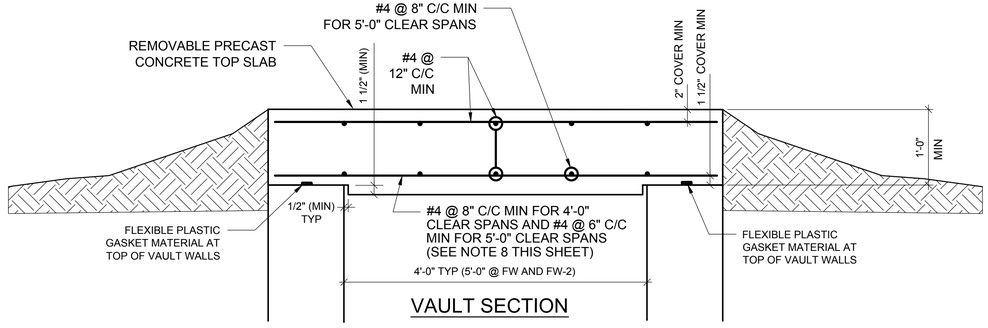
S-02-02B
S-03-03
S-03-08
S-04-05
S-04-10
S-05-08

0 1'

SCALE: 3"=1'-0"

0 1' 2' 3'

SCALE: 1"=1'-0"

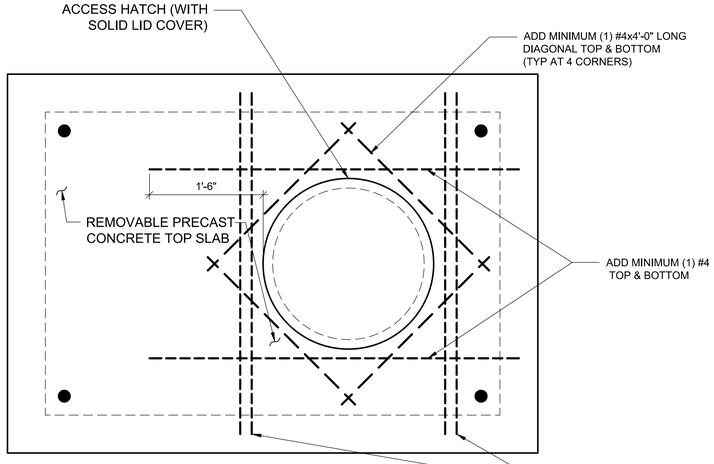


VAULT SECTION

WELL METER & WELL VAULT TYPE 2 - TYPICAL SECTION

5 — 1" = 1'-0"

S-02-02B
S-03-03
S-03-08
S-04-05
S-04-10
S-05-08



ADDITIONAL REINFORCING AT OPENING TOP SLAB PLAN

PLAN NOTE:
1. TYPE 2 WELL METER VAULT TOP SLAB WITH 2'-0" DIAMETER ACCESS HATCH (WITH SOLID COVER) IS SHOWN IN PLAN.

NOTES:
1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. AT CORNERS OF TOP SLAB, LAP SPLICE ONE SIDE OF TOP AND BOTTOM LONGITUDINAL BARS (VIA 90° HOOKED END WITH THE LONGITUDINAL BARS COMING IN FROM OTHER SIDE OF CORNER).
8. PROVIDE 90° HOOKS AT ENDS OF TOP AND BOTTOM RESTEEL IN TOP SLABS WHERE RESTEEL IS WITHIN 1'-6" OF LIFTING INSERTS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOVE
No. C61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

WELL VAULT TOP SLAB DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

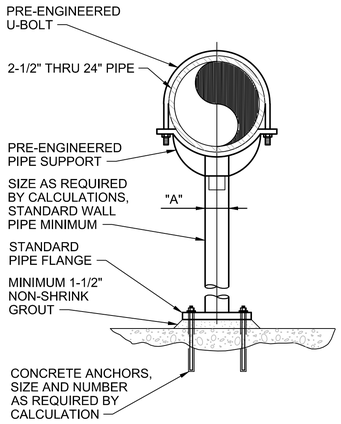
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

S-00-06

REV 2

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N1808

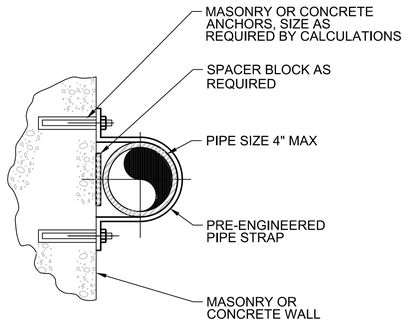


DIMENSION TABLE	
PIPE SIZE	"A" MINIMUM NOMINAL PIPE SIZE
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	3"
16"	3"
20"	4"
24"	4"

NOTE:
1. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

1 PIPE SUPPORT - SADDLE SUPPORT PEDESTAL TYPE - NON-ADJUSTABLE

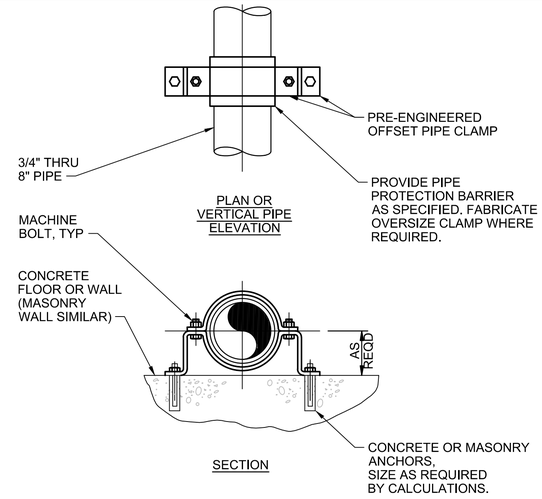
NTS



NOTES:
1. ONLY FOR VERTICAL PIPES.
2. NOT FOR USE ON CEILINGS OR BOTTOMS OF BEAMS.
3. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED. FABRICATE OVERSIZE STRAP WHERE REQUIRED.
4. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

2 PIPE SUPPORT - WALL MOUNT

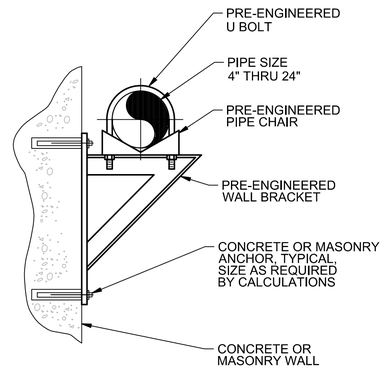
NTS



NOTES:
1. ONLY FOR VERTICAL OR FLOOR MOUNTED PIPES.
2. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

3 PIPE SUPPORT - WALL MOUNTED

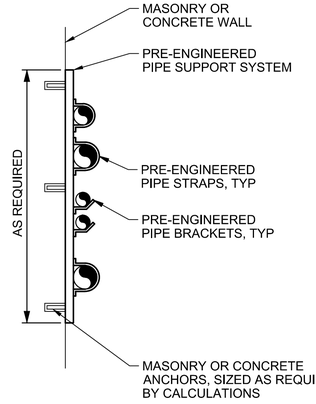
NTS



NOTES:
1. WALL BRACKET SHALL BE MEDIUM HEAVY DUTY AS REQUIRED BY CALCULATIONS.
2. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

4 PIPE SUPPORT - WALL MOUNTED MEDIUM

NTS

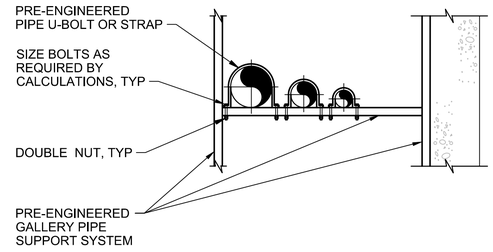


NOTES:
1. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.
2. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.

5 STACKED PIPE WALL SYSTEM

NTS

M-11-04
M-14-03

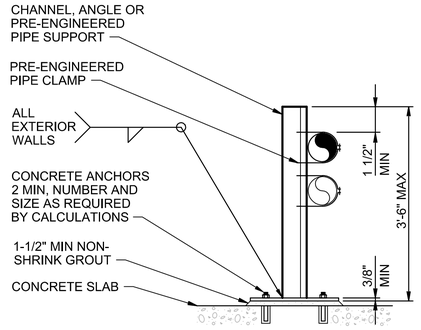


NOTES:
1. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.
2. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.

6 GALLERY PIPE SUPPORT ATTACHMENT

NTS

M-11-04
M-14-03

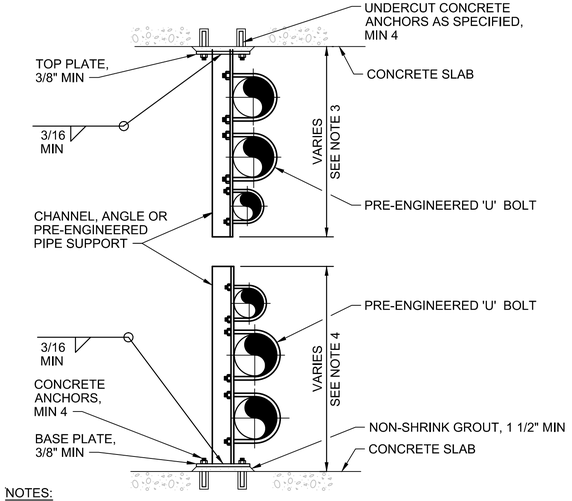


NOTES:
1. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.
2. MAXIMUM PIPE SIZE: 2" DIAMETER.
3. MATERIAL TYPE SHALL BE AS SHOWN ON DRAWINGS OR AS SPECIFIED.
4. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.

7 FLOOR PIPE SUPPORT

NTS

M-14-05



NOTES:
1. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.
2. MAXIMUM PIPE SIZE: 4" DIAMETER WITHOUT LATERAL BRACING.
3. BRACE BOTTOM OF SUPPORT FOR LENGTHS EXCEEDING 2'-0".
4. BRACE TOP OF SUPPORT FOR LENGTHS EXCEEDING 4'-0".
5. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.

8 OVERHEAD AND FLOOR PIPE SUPPORT

NTS

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
0	9/8/14	PRE-FINAL (90%) DESIGN	DS	-	-	JP	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

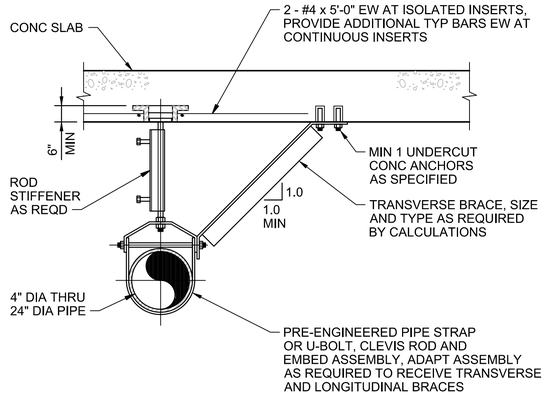
TOPOCK GROUNDWATER REMEDIATION PROJECT

MECHANICAL
STANDARD DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

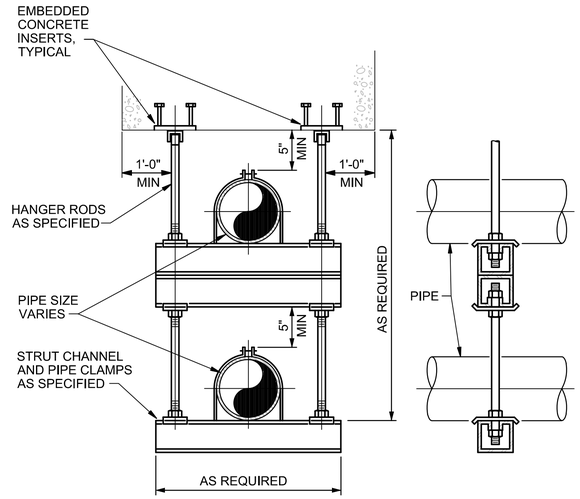
MICROFILM	
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DWG LIST	
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SHEET NO.	of SHEETS
M-00-01	REV 1

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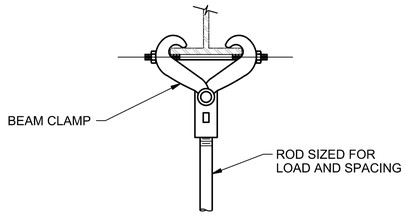


NOTES:
1. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORS AS SPECIFIED.
2. LONGITUDINAL BRACE BEYOND (NOT SHOWN) AS REQUIRED BY CALCULATIONS.

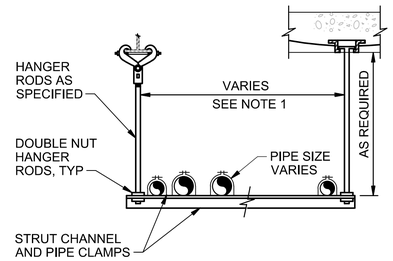
1 OVERHEAD PIPE HANGER
NTS



2 STACKED TRAPEZE PIPE HANGER
NTS

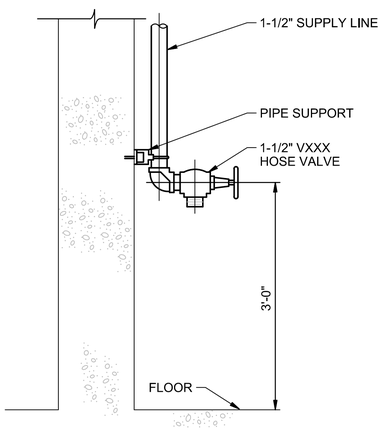


3 BEAM CLAMP
NTS



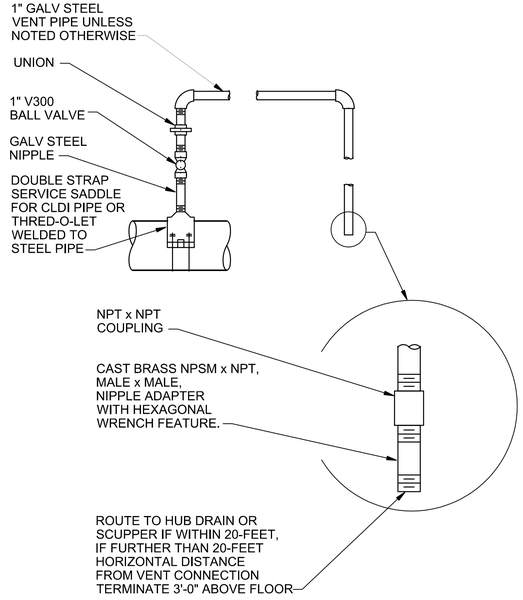
NOTES:
1. LENGTH VARIES WITH NUMBER OF PIPES TO BE SUPPORTED, AND SPACING BETWEEN PIPES.

4 TRAPEZE PIPE HANGER
NTS

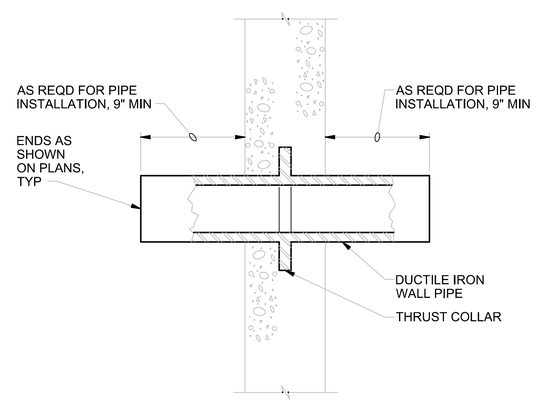


NOTES:
1. ROTATE HOSE VALVE 30° OFF WALL.

5 INTERIOR HOSE VALVE
NTS

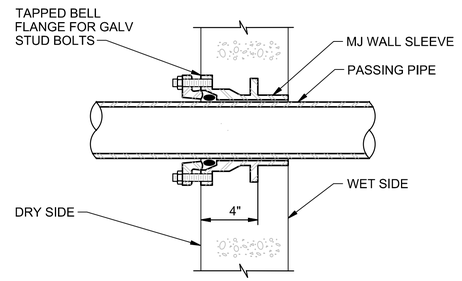


6 PIPE HIGH POINT VENT
NTS



NOTES:
1. COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

7 DUCTILE IRON WALL PIPE
NTS



NOTES:
1. COAT PIPE SLEEVE WITHSPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

8 TYPE A PIPE SLEEVE
NTS

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

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1	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
0	9/8/14	PRE-FINAL (90%) DESIGN	DS			JP	DS

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

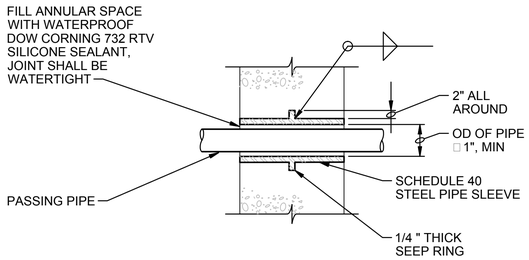
MECHANICAL STANDARD DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

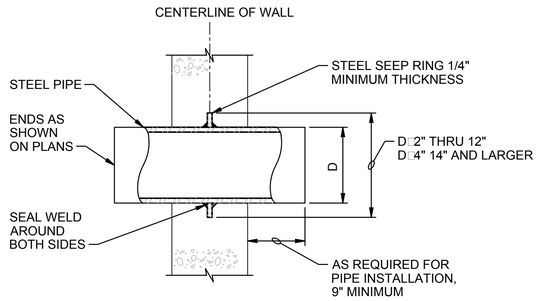
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-00-02	REV 1

N1808

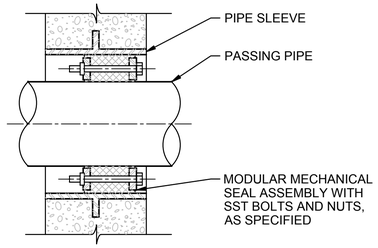


NOTE:
1. DO NOT USE WHERE SUBJECT TO HYDROSTATIC PRESSURE. PAINT ENTIRE SLEEVE AND SEEP RING AS SPECIFIED.

1 TYPE B PIPE SLEEVE
NTS

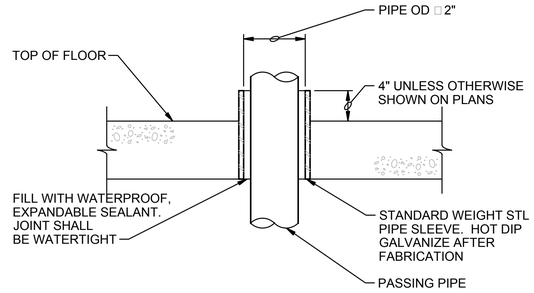


2 STEEL WALL PIPE
NTS



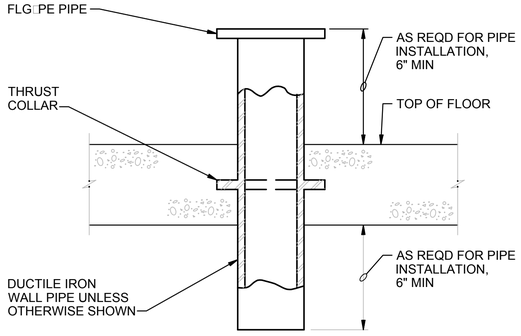
3 WALL PIPE PENETRATION SEAL
NTS

M-12-01



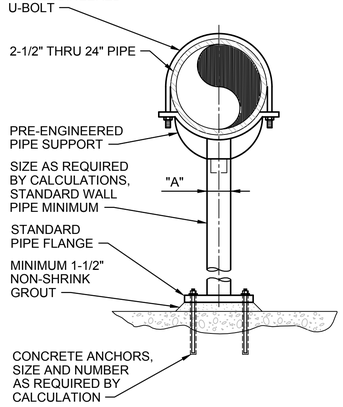
NOTE:
1. COAT FLOOR SLEEVE WITH SPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

4 FLOOR SLEEVE
NTS



NOTE:
1. COAT FLOOR SLEEVE WITH SPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

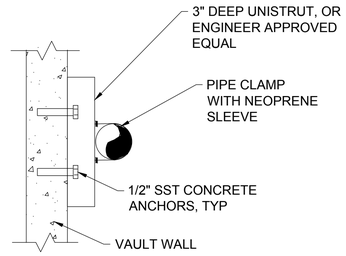
5 FLOOR PIPE
NTS



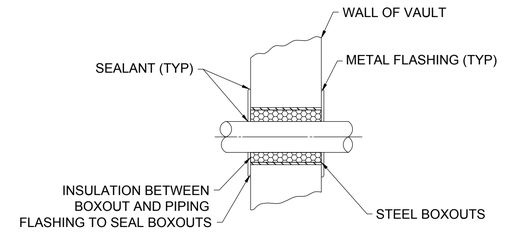
DIMENSION TABLE	
PIPE SIZE	"A" MINIMUM NOMINAL PIPE SIZE
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	3"
16"	3"
20"	4"
24"	4"

NOTE:
1. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

6 PIPE SUPPORT SADDLE SUPPORT PEDESTAL TYPE - NON-ADJUSTABLE
NTS



7 WELL VAULT PIPE SUPPORT
NTS



8 CONCRETE WALL PENETRATION DETAIL
NTS

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		DS	-	-	JP

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

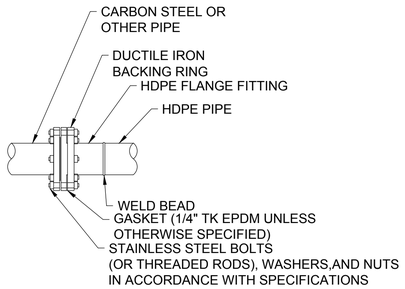
TOPOCK GROUNDWATER REMEDIATION PROJECT

MECHANICAL STANDARD DETAILS

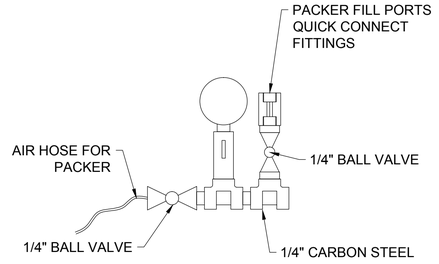
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-00-03	REV 1

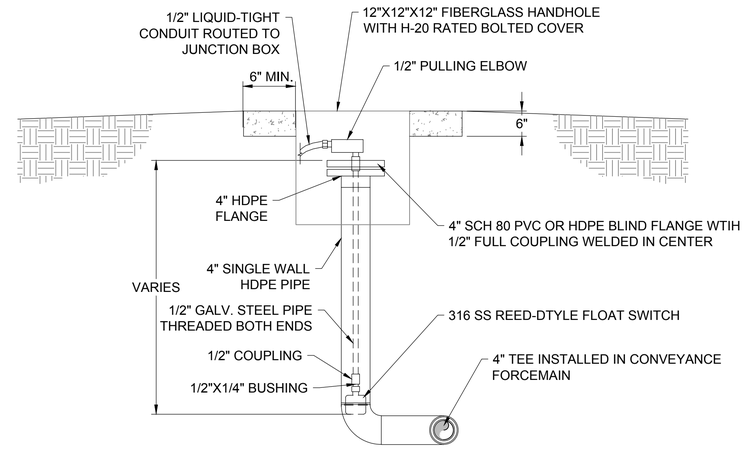
N1808



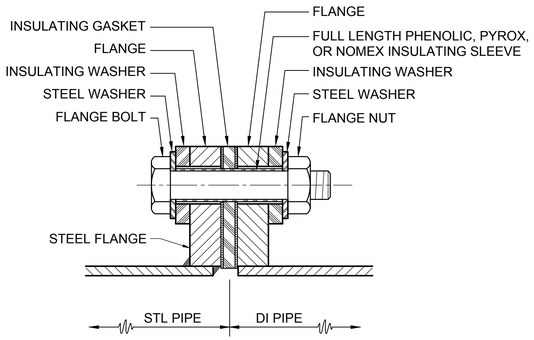
1 MATERIAL TRANSITION DETAIL (TYP)
NTS



2 WELL PACKER FILL ASSEMBLY DETAIL
NTS

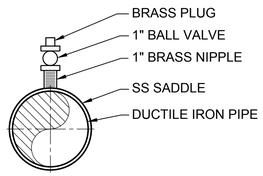


3 DOUBLE CONTAINED LEAK DETECTION DETAIL (TYP)
NTS



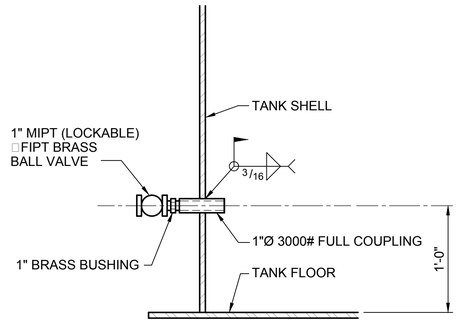
4 FLANGED INSULATING JOINT DETAIL
NTS

M-02-05
M-14-05



5 AIR RELEASE VALVE DETAIL
NTS

M-14-05

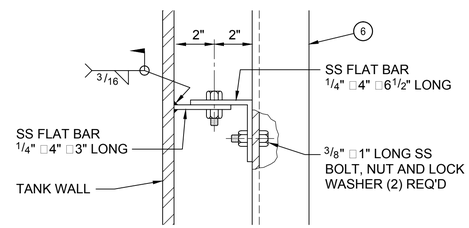


6 LEVEL TRANSDUCER DETAIL
NTS

S-14-01
S-02-03
M-02-04
M-14-04

7 DETAIL - ANCHOR
NTS

M-00-05



8 DETAIL - BRACKET
NTS

M-00-05

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUEST
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	AJW	BEH	JPB	JEF	
0	9/8/14	INTERMEDIATE (60%) DESIGN	AJW	BEH	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

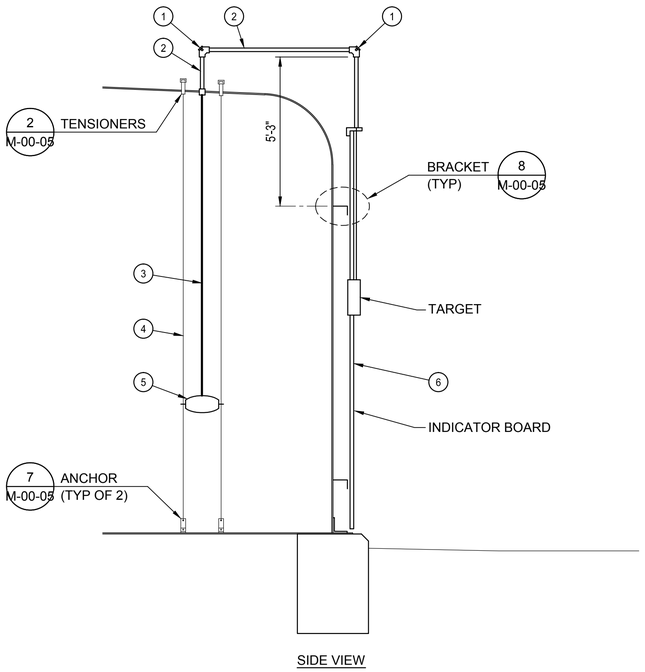
TOPOCK GROUNDWATER REMEDIATION PROJECT

MECHANICAL
STANDARD DETAILS

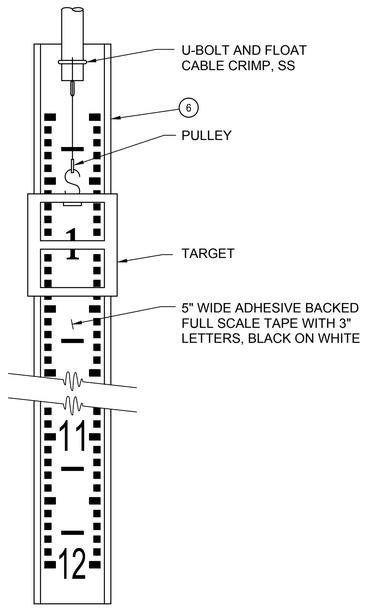
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
M-00-04	REV 2

N1808



SIDE VIEW



FRONT VIEW

1 LIQUID LEVEL INDICATOR (HALF SCALE LEVEL GAUGE) DETAIL

NTS

S-14-01
S-02-03
M-02-04
M-14-04

LEGEND

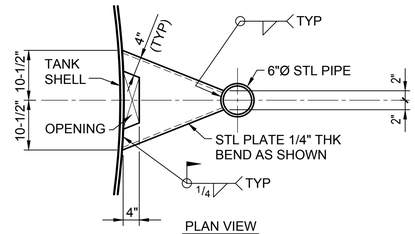
(1) REFERENCE ITEM NUMBER IN SCHEDULE

SCHEDULE

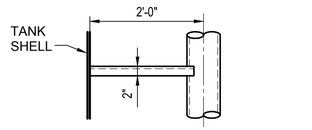
ITEM	DESCRIPTION
1	1 1/2" TANK PRODUCTS SS 90° SHEAVE ELBOW
2	1 1/2" SS SCH 40 PIPE NIPPLE
3	3/64" STRANDED FLOAT CABLE SS, LENGTH AS REQ'D
4	3/16" STRANDED FLOAT GUIDE WIRES, LENGTH AS REQUIRED
5	SS FLOAT, 12 GA □15" DIA □6 1/2"
6	C6□2.83 AMERICAN STANDARD CHANNEL ALUM

NOTES:

1. DIMENSIONS AND DETAILS NOT SHOWN SHALL BE AS PER TANK MANUFACTURER'S APPROVED SUBMITTALS.
2. ALL STAINLESS STEEL SHALL BE SS 316.



PLAN VIEW

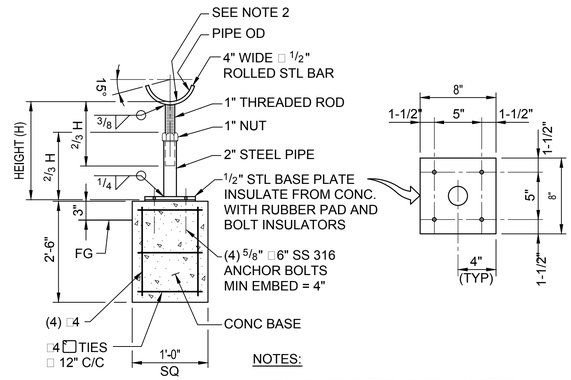


PIPE SUPPORT SIDE VIEW

3 DETAIL

3/4" = 1'-0"

M-02-05
M-14-06



NOTES:

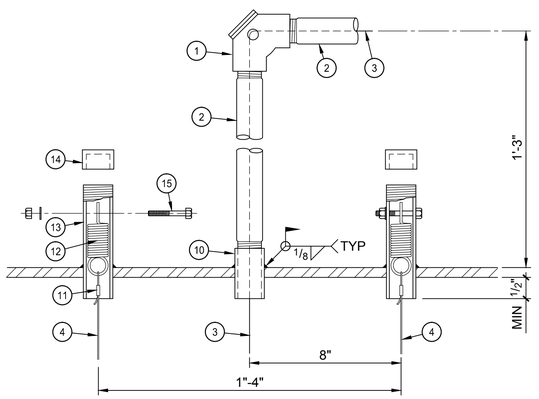
1. GALVANIZE ENTIRE ASSEMBLY AFTER FABRICATION.
2. PROVIDE 1/8" THK. NEOPRENE PAD BETWEEN DI PIPE AND SUPPORT.

PIPE SUPPORT - PS-1

4 DETAIL

3/4" = 1'-0"

M-14-05



2 DETAIL - TENSIONERS

NTS

LEGEND

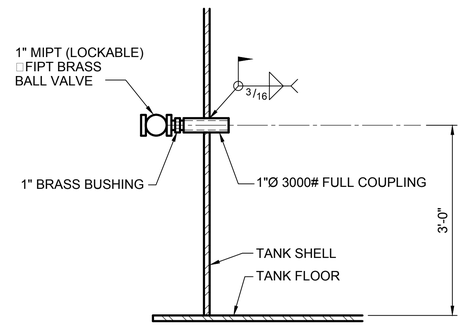
(1) REFERENCE ITEM NUMBER IN SCHEDULE

SCHEDULE

ITEM	DESCRIPTION
7	SS FLAT BAR, 1/4" □1 1/2" □3 1/2" LONG
8	A36 FLAT BAR, 1/4" □1 1/2" □2" LONG
9	ISOLATION KIT WITH 1/2" □1 1/2" BOLT AND NUT, SS/NYLON
10	1 1/2" □150□SS HALF COUPLING
11	SS CABLE CRIMP, (2) REQUIRED
12	1" OD □3 1/2" □.105 SS EXTENSION SPRING (2) REQUIRED
13	1 1/4" SS SCH 40 PIPE □6" LONG (2) REQUIRED)
14	1 1/4" □150□SS THREADED PIPE CAP (2) REQUIRED
15	SS BOLT AND NUT 1/4" □2" LONG WITH LOCK WASHER, (2) REQUIRED

NOTE:

1. ALL STAINLESS STEEL SHALL BE SS 316.



SAMPLE TAP

5 DETAIL

1-1/2" = 1'-0"

M-02-04
M-14-04

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO

REVISIONS

APPROVED BY
RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MECHANICAL STANDARD DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
M-00-05
REV 0

N1808

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INJECTION WELLS

WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H
FW-01	12"	354	1	250	7613297	2102955	658	0	202	91	94	99	349	352	354
FW-02	12"	151	1	60	7614683	2100512	665	0	209	78	81	86	146	149	151

IRZ																					
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
IRZ-11s	10"	153	1	40	7615636	2103409	483	0	30	33	26	38	78	83	86	80	100	103	108	148	151	153
			2	40																		
IRZ-11d	10"	271	3	40	7615636	2103409	483	0	153	156	28	161	196	201	204	198	218	221	226	266	269	271
			4	40																		
IRZ-13s	10"	130	1	40	7615702	2103307	482	0	12	15	29	20	55	60	63	57	77	80	85	125	128	130
			2	40																		
IRZ-13d	10"	242	3	40	7615702	2103307	482	0	124	127	30	132	167	172	175	169	189	192	197	237	240	242
			4	40																		
IRZ-15s	10"	121	1	40	7615766	2103146	482	0	3	6	31	11	46	51	54	48	68	71	76	116	119	121
			2	40																		
IRZ-15d	10"	212	3	40	7615766	2103146	482	0	104	107	32	112	147	152	155	149	169	172	177	207	210	212
			4	30																		
IRZ-16s	10"	126	1	40	7615794	2103038	480	0	8	11	33	16	51	56	59	53	73	76	81	121	124	126
			2	40																		
IRZ-16d	10"	204	3	30	7615794	2103038	480	0	116	119	34	124	149	154	157	151	171	174	179	199	202	204
			4	20																		
IRZ-17s	10"	122	1	40	7615861	2102994	480	0	4	7	35	12	47	52	55	49	69	72	77	117	120	122
			2	40																		
IRZ-17d	10"	194	3	30	7615861	2102994	480	0	106	109	36	114	139	144	147	141	161	164	169	189	192	194
			4	20																		
IRZ-19s	10"	106	1	35	7615930	2102847	478	0	3	6	37	11	41	46	49	43	63	66	71	101	104	106
			2	30																		
IRZ-19d	10"	157	3	20	7615930	2102847	478	0	84	87	38	92	107	112	115	109	129	132	137	152	155	157
			4	15																		
IRZ-20s	10"	129	1	35	7615808	2102769	496	0	26	29	39	34	64	69	72	66	86	89	94	124	127	129
			2	30																		
IRZ-20d	10"	172	3	15	7615808	2102769	496	0	109	112	40	117	127	132	135	129	149	152	157	167	170	172
			4	10																		
IRZ-21s	10"	119	1	40	7615816	2102692	497	0	21	24	41	29	64	69	72	66	86	89	94	114	117	119
			2	20																		
IRZ-21d	10"	162	3	10	7615816	2102692	497	0	99	102	42	107	112	117	120	114	134	137	142	157	160	162
			4	15																		
IRZ-25	10"	147	1	40	7615826	2102416	501	0	29	32	43	37	72	77	80	74	94	97	102	142	145	147
			3	40																		
IRZ-27	10"	145	1	40	7615801	2102239	502	0	27	30	44	35	70	75	78	72	92	95	100	140	143	145
			3	40																		
IRZ-29	10"	150	1	40	7615792	2102083	502	0	37	40	45	45	80	85	88	82	102	105	110	145	148	150
			3	35																		
IRZ-31	10"	126	1	35	7615791	2101947	502	0	28	31	46	36	66	71	74	68	88	91	96	121	124	126
			3	25																		
IRZ-33	10"	113	1	25	7615828	2101793	502	0	30	33	47	38	58	63	66	60	80	83	88	108	111	113
			3	20																		
IRZ-35	8"	104	1	30	7615904	2101665	504	0	-	-	68	-	-	-	-	-	61	64	69	99	102	104
IRZ-37	8"	69	1	20	7616004	2101555	505	0	-	-	69	-	-	-	-	-	36	39	44	64	67	69
IRZ-39	8"	61	1	10	7616112	2101376	482	0	-	-	70	-	-	-	-	-	38	41	46	56	59	61

TCS AREA																					
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
TCS-1	10"	262	1	50	7615168	2101171	623	0	129	132	47	137	187	192	195	189	209	212	217	257	260	262
			3	40																		
TCS-2	10"	240	1	40	7615149	2100900	585	0	117	120	48	125	165	170	173	167	187	190	195	235	238	240
			3	40																		

INNER RECIRCULATION LOOP																					
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
IRL-1	12"	322	1	80	7614392	2103403	668	0	29	32	212	34	37	117	122	125	139	142	320	147	317	322
			2	170																		
IRL-2	12"	333	1	74	7614133	2103058	664	0	56	59	208	61	64	138	143	146	160	163	331	168	328	333
			2	160																		
IRL-3	12"	328	1	140	7613976	2102799	660	0	74	77	204	79	82	222	227	230	244	247	326	252	323	328
			2	71																		
IRL-4	12"	302	1	115	7613954	2102381	658	0	88	91	202	93	96	211	216	219	233	236	300	241	297	302
			2	56																		

EXTRACTION WELLS

IRZ																					
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
IRZ-1	12	380	1	120	7615297	2104064	482	0	27	34	37	42	45	165	170	173	187	190	192	195	375	380
			2	180																		
IRZ-5	12	358	1	150	7615445	2103826	474	0	19	22	25	30	33	183	188	191	205	208	210	213	353	358
			2	140																		
IRZ-9	12	310	1	130	7615566	2103561	479	0	24	14	17	22	25	155	160	163	177	180	182	185	305	310
			2	120																		
IRZ-23	12	153	1	70	7615825	2102535	500	0	45	70	73	75	78	148	153	-	-	-	-	-	-	-

RIVERBANK																				
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N
RB-1	8"	367	1	160	7615764	2103918	474	0	19	24	27	32	192	197	200	214	217	209	212	362	367
			2	150																	
RB-2	8"	253	1	70	7616012	2103398	480	0	25	25	28	33	103	108	111	125	128	120	123	248	253
			2	125																	
RB-3	8"	216	1	70	7616211	2103173	468	0	13	13	16	21	91	96	99	113	116	108	111	211	216
			2	100																	
RB-4	8"	193	1	60	7616338	2102909	466	0	11	20	23	28	88	93	96	110	113	105	108	188	193
			2	80																	
RB-5	8"	87	1	15	7616398	2102424	465	0	10	14	17	22	37	42	45	59	62	54	57	82	87
			2	25																	

TRANSWESTERN BENCH														
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H
TWB-1	6"	146	1	20	7615903	2100962	536	0	80	113	116	118	121	141	146
TWB-2	6"	122	1	15	7615994	2100972	537	0	81	94	97	99	102	117	122

EAST RAVINE														
WELL NUMBER	WELL DIAMETER	WELL DEPTH	WELL SCREEN INTERVAL	WELL SCREEN LENGTH	X COORDINATE	Y COORDINATE	GROUND SURFACE ELEVATION	A	B	C	D	E	F	G	H
ER-1	6"	136	1	90	7616511	2101089	504	0	48	33	36	38	41	131	136
ER-2	6"	138	1	90	7616666	2100999	508	0	52	35	38	40	43	133	138
ER-3	6"	155	1	90	7616855	2100898	518	0	62	52	55	57	60	150	155
ER-4	6"	159	1	90	7616935	2100761	520	0	63	56	59	61	64	154	159
ER-6	6"	159	1	90	7615840	2100513	537	0	79	56	59	61	64	154	159

NOTES:
1. ALL COORDINATES BASED ON NAD 83, CA ZONE 5.
2. COORDINATES AND ELEVATIONS ARE APPROXIMATE AND WILL BE VERIFIED DURING CONSTRUCTION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		BEH	JPB	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		BEH	JPB	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

WELL CONSTRUCTION SCHEDULE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. of SHEETS

M-00-06 | REV 2

N1808

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MECHANICAL ABBREVIATIONS

AAT	AMBIENT AIR TEMPERATURE
AAV	AUTOMATIC AIR VENT
ABAND	ABANDONED
A/C	AIR CONDITIONING
ACCEPT.	ACCEPTANCE
ACU	AIR CONDITIONING UNIT
A/D	ACCESS DOOR
ADJ	ADJUSTABLE
A/E	ARCHITECT / ENGINEER
AF	AIRFOIL
AFF	ABOVE FINISHED FLOOR
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
A/L	ACOUSTICALLY LINED
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL / ARCHITECT
AS	AIR SEPARATOR
ATM	ATMOSPHERE
BAS	BUILDING AUTOMATION SYSTEM
B/D	BACKDRAFT DAMPER
BF	BLIND FLANGE
BHP	BRAKE HORSEPOWER
BI	BACKWARD INCLINED
BLDG.	BUILDING
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNITS PER HOUR
CA	COMPRESSED AIR
CAB	CABINET
CAP	PIPE/DUCT CAP
CAP.	CAPACITY
CENTRIF	CENTRIFUGAL
CO_2	CARBON DIOXIDE
CC	COOLING COIL
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHBT	CHILLED WATER BUFFER TANK
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CHS&R	CHILLED WATER SUPPLY & RETURN
CHW	CHILLED WATER
CHWST	CHILLED WATER STORAGE TANK
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
C.O.	CLEANOUT
COEFF	COEFFICIENT
COMM	COMMUNICATION
CONN	CONNECTION
CONT.	CONTINUATION
CP	CONDENSATE PUMP
CR	CONDENSER WATER RETURN
CRAH	COMPUTER ROOM AIR HANDLING UNIT
CS	CONDENSER WATER SUPPLY
CV	CONTROL VALVE
CW	CITY WATER
DB	DRY BULB
DCW	DOMESTIC COLD WATER
DEG	DEGREES
DEMO	DEMOLITION
DESIG	DESIGNATION
DET	DETAIL
DIA, □	DIAMETER
DIFF	DIFFUSER
DN	DOWN
DR	DRAIN
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR, EACH
EAT	ENTERING AIR TEMPERATURE
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
E.G.	FOR EXAMPLE
EL	ELEVATION
ELEC	ELECTRIC / ELECTRICAL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
(E)	EXISTING
EXP	EXPANSION
F	FIRE PROTECTION WATER SUPPLY
FC	FORWARD CURVED
FCU	FAN COIL UNIT
F/D	FIRE DAMPER
FDC	FIRE DEPARTMENT CONNECTION
FDR	FLOOR DRAIN
FF	FINISHED FLOOR
FFP	FUEL OIL FILL PORT
FFS	FUEL OIL FILTRATION SYSTEM
FMF	FLOW METER FITTING
FLEX	FLEXIBLE
FO	FUEL OIL
FOP	FUEL OIL PUMP
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VENT
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTU	FAN POWERED TERMINAL UNIT
FST	FUEL OIL STORAGE TANK
FT	FEET
FTR	FINNED TUBE RADIATION
FT WG	FEET (WATER GAUGE)
FW	FRESH WATER
G	GENERATOR
GLV	GALVANIZED
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRILLE
H	HUMIDIFIER
HC	HEATING COIL
HDP	HIGH DENSITY PUMPING UNIT
HED	HOSE-END DRAIN
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPR	HIGH PRESSURE CONDENSATE RETURN
HPS	HIGH PRESSURE STEAM
HR	HOUR
HGT	HEIGHT
HTR	HEATER
HW	HEATING WATER
HWP	HEATING WATER PUMP
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
HWS&R	HEATING WATER SUPPLY & RETURN
HX	HEAT EXCHANGER
HZ	HERTZ
IN.	INCHES
IND	INDEPENDENT
IN. WG	INCHES (WATER GAUGE)
IPLV	INTEGRATED PART LOAD VALUE
IPS	IRON PIPE SIZE
IU	INDOOR UNIT (VRV HEAT PUMP SYSTEM)
KW	KILOWATTS
L	LONG / LENGTH
LAT	LEAVING AIR TEMPERATURE
LD	LINER DIFFUSER
LF	LINEAR FEET
LPR	LOW PRESSURE CONDENSATE RETURN
LPS	LOW PRESSURE CONDENSATE SUPPLY
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSANDS OF BTUs PER HOUR
MECH	MECHANICAL
MEZZ	MEZZANINE
MFG	MANUFACTURER
MIN	MINIMUM
M/D	MOTOR OPERATED DAMPER
MPR	MEDIUM PRESSURE CONDENSATE RETURN
MPS	MEDIUM PRESSURE CONDENSATE SUPPLY
N/A	NOT APPLICABLE
NC	NOISE CRITERIA
N.O.	NORMALLY CLOSED
NIC	NOT IN CONTRACT
N.F.C.	NOT FOR CONSTRUCTION
N.O.	NORMALLY OPEN
NPLV	NON-STANDARD PART LOAD VALUE
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER
OED	OPEN END DUCT
OEP	OPEN END PIPE
OU	OUTDOOR UNIT (VRV HEAT PUMP SYSTEM)
P	PUMP
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PC	PUMPED CONDENSATE RETURN
PCHW	PRIMARY CHILLED WATER
PCWR	PRIMARY CHILLED WATER RETURN
PCWS	PRIMARY CHILLED WATER SUPPLY
PCWS&R	PRIMARY CHILLED WATER SUPPLY & RETURN
PD	PRESSURE DROP
PIV	POST INDICATOR VALVE
PW	POTABLE WATER
PRESS	PRESSURE
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
P/T	PRESSURE/TEMPERATURE PORT
PTRV	PRESSURE/TEMPERATURE RELIEF VALVE
QTY	QUANTITY
R-12	REFRIGERANT TYPE (123, 134A, ETC.)
RA	RETURN AIR
RAD	RADIUS
RAF	RAISED ACCESS FLOOR
REFRIG	REFRIGERANT
REG	REGISTER
RET	RETURN
REV	REVOLUTIONS
RF	RETURN FAN
RH	ROOF HOOD, RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RPP	REDUCED PRESSURE PRINCIPLE
RS	REFRIGERANT SUCTION
RV	RELIEF VALVE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAN	SANITARY WASTE (PIPE)
SCH	SCHEDULE
SCHW	SECONDARY CHILLED WATER
SCWR	SECONDARY CHILLED WATER RETURN
SCWS	SECONDARY CHILLED WATER SUPPLY
S/D	SMOKE DAMPER
SE	SMOKE EXHAUST
SENS	SENSIBLE
SF	SHOT FEEDER
S/F	COMBINATION SMOKE/FIRE DAMPER
SH	SENSIBLE HEAT
SQ	SQUARE
SP	STATIC PRESSURE
SUP	SUPPLY
TDH	TOTAL DYNAMIC HEAD
TDV	TRIPLE DUTY VALVE
TEMP	TEMPERATURE
THK	THICK
TONS	TONS OF REFRIGERATION
TSP	TOTAL STATIC PRESSURE
TU	TERMINAL UNIT
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
V	VOLTS
VA	VOLT-AMPERE
VAC	VACUUM AIR
VAV	VARIABLE AIR VOLUME
V/D	VOLUME DAMPER (MANUAL)
VEL	VELOCITY
VERT	VERTICAL
VT	VENT
VTR	VENT THRU ROOF
W	WIDE / WIDTH, WATTS
WB	WET BULB
WTR	WATER
W/	WITH
dBA	DECIBELS (A-WEIGHTED)
@	AT
°C	DEGREES CELSIUS
°F	DEGREES FAHRENHEIT
ϕ	ELECTRICAL PHASE
%	PERCENT
ΔP	PRESSURE DROP
#	NUMBER / QUANTITY

NOTE:
NOT ALL ABBREVIATIONS & SYMBOLS MAY BE USED

SINGLE-LINE PIPING ELEMENTS

- FLOW ARROW
- PIPE CAP
- FLANGE PAIR
- BLIND FLANGED PIPE
- ELBOW TURNED UP
- ELBOW TURNED DN
- BOTTOM BRANCH CONNECTION
- TOP BRANCH CONNECTION
- SIDE BRANCH CONNECTION
- PIPE RISE/DROP AT 45°
- REDUCER (CONCENTRIC)
- REDUCER (ECCENTRIC)
- UNION
- BUTTERFLY VALVE
- PLUG VALVE
- BALANCING VALVE
- BALL VALVE
- BALL VALVE (LOCKABLE)
- GLOBE VALVE
- GATE VALVE
- PRESSURE REDUCING/REGULATING VALVE
- CONTROL VALVE (3-WAY)
- CONTROL VALVE (2-WAY)
- PRESSURE INDEPENDENT CONTROL VALVE
- MANUAL VALVE IN VERTICAL
- CONTROL VALVE IN VERTICAL
- STRAINER
- STRAINER W/ BLOWDOWN VALVE
- CHECK VALVE
- BACKFLOW PREVENTER
- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- VACUUM BREAKER
- PRESSURE/TEMPERATURE TEST PORT
- CORROSION COUPON
- PRESSURE GAGE W/ BALL VALVE
- PRESS GAGE W/ BALL VALVE & SIPHON
- TEMPERATURE GAGE
- TOTALIZING FLOWMETER
- FLOWMETER
- HOSE BIBB
- SUCTION DIFFUSER
- FLEXIBLE CONNECTION
- RELIEF VALVE
- STEAM TRAP ASSEMBLY
- EXPANSION JOINT
- PIPE ANCHOR
- PIPE GUIDE
- EXPANSION LOOP
- DIFFERENTIAL PRESSURE TRANSMITTER
- FIRE DEPARTMENT CONNECTION
- DUPLEX BASKET STRAINER
- TRIPLE DUTY VALVE
- FLOW METER FITTING
- MOTORIZED BUTTERFLY VALVE

DOUBLE-LINE PIPING ELEMENTS

- PIPE CONTINUATION
- TEE FITTING
- ELBOW
- REDUCER (CONCENTRIC)
- FLANGE (WELD NECK)
- BUTTERFLY VALVE
- CHECK VALVE (SILENT GLOBE TYPE)

DUCTWORK ELEMENTS

- SECTION THROUGH OUTSIDE AIR DUCT
- SECTION THROUGH RETURN OR EXHAUST AIR DUCTWORK
- SECTION THROUGH SUPPLY AIR DUCT
- DUCTWORK
- AIR MONITOR STATION
- ACOUSTICALLY LINED DUCT
- DAMPER, FIRE
- DAMPER, MANUAL VOLUME
- DAMPER, MOTOR OPERATED
- DAMPER, SMOKE/FIRE, MOTOR OPERATED
- DAMPER, SMOKE, AUTOMATICALLY OPERATED
- INCLINED DROP IN DIRECTION OF ARROW
- INCLINED RISE IN DIRECTION OF ARROW
- STATIC PRESSURE CONTROLLER
- SOUND ATTENUATOR
- TRANSITION, RECTANGULAR TO ROUND
- FLEXIBLE CONNECTION
- FLEXIBLE CONNECTOR
- FAN POWERED TERMINAL UNIT
- TRANSITION, RECTANGULAR
- SPIN-IN COLLAR
- SPIN-IN COLLAR WITH DAMPER
- AIR HANDLING BOOT (FLOURESCENT LIGHT)
- AIR HANDLING SLOT DIFFUSER
- CEILING SUPPLY AIR DIFFUSER
- LINEAR DIFFUSER (DASHES INDICATE INACTIVE BLANKED-OFF PORTIONS) AS INDICATED ON DRAWINGS
- SIDEWALL SUPPLY AIR REGISTER
- ELBOW TURNED DOWN
- ELBOW TURNED UP
- ELBOW, RADIUS TYPE
- ELBOW, WITH AIRFOIL TURNING VANES
- RETURN OR EXHAUST AIR DUCT
- CEILING RETURN OR EXHAUST AIR REGISTER
- SIDEWALL RETURN AIR REGISTER
- OPEN END DUCT

MISCELLANEOUS

- NEW WORK (HEAVY LINE - SOLID)
- DEMOLITION WORK (HEAVY LINE - DASHED)
- EXISTING WORK (LIGHT LINE)
- PIPE OR DUCT CONTINUATION
- REMOVE FROM EXISTING
- CONNECT TO EXISTING
- FLOOR DRAIN
- W"xH" RECTANGULAR DUCT DIMENSIONS
- W"/H" FLAT OVAL DUCT DIMENSIONS

CONTROL SYMBOLS

- ALM GENERAL ALARM
- AMS AIRFLOW MONITORING STATION
- AVA AUDIBLE / VISUAL ALARM
- BBS BIDIRECTIONAL BLEED SENSOR
- CDS CARBON DIOXIDE SENSOR
- CS CURRENT SWITCH
- DA DAMPER ACTUATOR
- DPS DIFFERENTIAL PRESSURE SWITCH
- DPT DIFFERENTIAL PRESSURE TRANSMITTER
- ES END SWITCH
- FM FLOWMETER
- FS FLOW SWITCH
- FZ FREEZESTAT
- HHL HIGH HIGH LEVEL
- HHS HIGH HUMIDITY SWITCH
- HL HIGH LEVEL
- HSP HIGH SPEED
- HT HUMIDITY TRANSMITTER
- LD LEAK DETECTION
- LI LEVEL INDICATION
- LL LOW LEVEL
- LLL LOW LOW LEVEL
- LSP LOW SPEED
- POT POSITION TRANSMITTER
- PT PRESSURE TRANSMITTER
- RES TEMPERATURE RESET
- RUN RUN STATUS
- SD SMOKE DETECTOR
- SPT STATIC PRESSURE TRANSMITTER
- SS START/STOP
- TT TEMPERATURE TRANSMITTER
- TUC TERMINAL UNIT CONTROLLER
- VA VALVE ACTUATOR
- VFD VARIABLE FREQUENCY DRIVE
- WD WATER DETECTION
- (AI) ANALOG INPUT
- (AO) ANALOG OUTPUT
- (DI) DIGITAL INPUT
- (DO) DIGITAL OUTPUT

HVAC ELEMENTS

- (H) HUMIDISTAT
- (T) THERMOSTAT
- (S) SMOKE DETECTOR
- [H] HUMIDITY SENSOR
- (C) CARBON DIOXIDE SENSOR
- [R] REFRIGERANT SENSOR
- ◇ HYDROGEN SENSOR
- [SP] STATIC PRESSURE SENSOR
- [T] TEMPERATURE SENSOR
- [LCP] LOCAL CONTROL PANEL
- [PUR] CLEAN AGENT PURGE SWITCH
- [EAS] EMERGENCY AIR DISTRIBUTION SHUT-OFF SWITCH

GENERAL MECHANICAL NOTES

1. PLANNING AND CHECKING HAS BEEN DONE BY THE ENGINEER TO MINIMIZE INTERFERENCES. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND SIZES OF ALL ELEMENTS RELATED TO THE WORK. ROUTING OF PIPING AND DUCTWORK SHOWN ON DRAWINGS IS DIAGRAMMATIC. CONTRACTOR SHALL ASCERTAIN THAT INTERFERENCES WILL NOT BE ENCOUNTERED, PREVENTING THE DISASSEMBLY OF PARTIALLY OR COMPLETELY ERECTED SYSTEMS FOR RE-ROUTING TO CLEAR OBSTRUCTIONS WHICH MAY EXIST.
2. CONTRACTOR SHALL COORDINATE DUCTWORK, CONDUIT AND PIPING INSTALLATIONS WITH LIGHT FIXTURES AND PROVIDE ADDITIONAL RISERS, DROPS AND OFFSETS AS REQUIRED. IF INSTALLED PROPOSED WORK WHICH ARE IN CONFLICT WITH ARCHITECTURAL OR MEP ELEMENTS WHICH ARE SHOWN ON THE DRAWINGS, THEY SHALL BE RELOCATED WITHOUT ADDITIONAL COST.
3. ALL CONSTRUCTION DEBRIS SHALL BE REMOVED AND THE AREA OF WORK SHALL BE LEFT IN CLEAN CONDITION. CONTRACTOR SHALL THOROUGHLY CLEAN WITH SOAP AND WATER ALL AIR DEVICES AFTER CONSTRUCTION.
4. WORK INDICATED THAT PENETRATES FLOOR OR ROOF SLABS OR WALLS SHALL BE COORDINATED WITH STRUCTURAL OR ARCHITECTURAL OPENINGS PROVIDED.
5. ALL PIPE SIZES SHOWN ARE NOMINAL SIZES.
6. NOMINAL SIZE 2" AND SMALLER PIPING SHALL BE FIELD ROUTED IN ACCORDANCE WITH APPROPRIATE ENGINEERING PRACTICES, INDUSTRY STANDARDS, AND GOVERNING CODES/REGULATIONS. ROUTE OF PIPE, INCLUDING CLEARANCE, IS THE RESPONSIBILITY OF THE CONTRACTOR. UNIONS, BUSHINGS, AND REDUCING INSERTS, NOT SHOWN ON THE DRAWINGS, BUT REQUIRED FOR INSTALLATION, SHALL BE PROVIDED BY THE CONTRACTOR.
7. CONTRACTOR SHALL PROVIDE LOW POINT HOSE END PIPE DRAINS AS REQUIRED TO COMPLETELY DRAIN ALL NEW WORK SYSTEMS. CONTRACTOR SHALL PROVIDE MANUAL AIR VENTS AT HIGH POINTS IN ALL NEW WORK SYSTEMS (PROVIDE AUTOMATIC AIR VENTS WHERE NOTED IN DRAWINGS).
8. ALL DUCTWORK DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS.
9. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH.
10. ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL ALL LINE VOLTAGE WIRING AND CONDUIT. TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE AND INSTALL ALL LOW VOLTAGE (24V) WIRING AND ALL ASSOCIATED STEP-DOWN TRANSFORMERS WHEN REQUIRED.
11. CONDENSATE DRAIN PIPING SHALL BE SLOPED AT A MINIMUM OF $\frac{1}{8}$" PER FOOT.
12. DASHED LINES AROUND MECHANICAL EQUIPMENT REPRESENT SERVICE/MAINTENANCE CLEARANCE AREAS. DUCTWORK, PIPING, ETC, SHALL NOT BE INSTALLED WITHIN THIS AREA. COORDINATE FINAL DIMENSIONS OF CLEARANCE AREA WITH MANUFACTURER'S RECOMMENDATIONS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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CALLISONRTKL A DESIGN CONSULTANCY OF ARCADIS

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
		REVISIONS					
1	11/18/2015	FINAL DESIGN	JMH	HS	HS	RAO	

APPROVED BY	SO
RAO	SUPV HS
	DSGN JMH
	DWN JMH
	CHKD HS
	OK
	DATE 11/18/2015
	SCALES 12" = 1'-0"

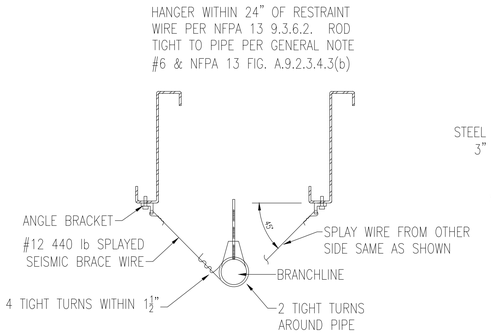
TOPOCK GROUNDWATER REMEDIATION PROJECT
WATER CONDITIONING PLANT (BUILDING 12)
MECH LEGEND & ABBREVIATIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-00-07	REV 0

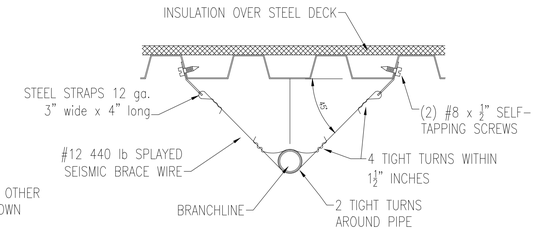
Project Number

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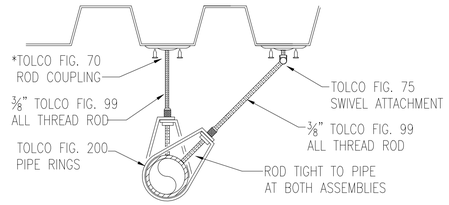


BRANCH LINE RESTRAINT
(FOR PIPE HUNG w/ ROD LONGER THAN 6")



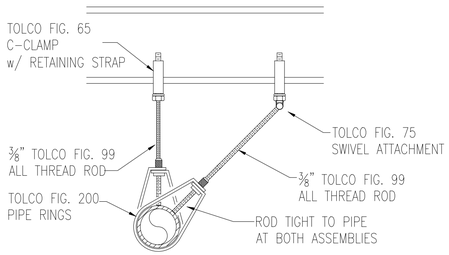
BRANCH LINE RESTRAINT
(FOR PIPE HUNG w/ ROD LONGER THAN 6")

RESTRAINT TO BE INSTALLED WITHIN 24" OF HANGER PER NFPA 13. ROD TO BE RUN DOWN TIGHT TO PIPE PER NFPA 13.



TYPICAL BRANCH LINE RESTRAINT
(FOR PIPE HUNG w/ ROD LONGER THAN 6")

HANGER WITHIN 6" OF RESTRAINT WIRE PER NFPA 13 9.3.6.2. ROD TIGHT TO PIPE PER GENERAL NOTE #6 & NFPA 13 FIG. A.9.2.3.4.3(b)



TYPICAL BRANCH LINE RESTRAINT
(FOR PIPE HUNG w/ ROD LONGER THAN 6")

HANGER WITHIN 6" OF RESTRAINT WIRE PER NFPA 13 9.3.6.2. ROD TIGHT TO PIPE PER GENERAL NOTE #6 & NFPA 13 FIG. A.9.2.3.4.3(b)

BRANCH LINE RESTRAINT NOTES
(FOR PIPE HUNG W/ ROD LONGER THAN 6")

1. BRANCH LINE RESTRAINT SHALL BE PROVIDED BY THE USE OF ONE OF THE FOLLOWING (PER NFPA 13, 2013 ED., SECTION 9.3.6):
   - 1.1. LISTED SWAY BRACE ASSEMBLY (SEE SEISMIC BRACING DETAILS).
   - 1.2. WRAPAROUND U-HOOK SATISFYING THE REQUIREMENTS OF 9.3.5.5.11
   - 1.3. NO. 12, 440 LB WIRE INSTALLED AT LEAST 45° FROM THE VERTICAL PLANE AND ANCHORED ON BOTH SIDES OF THE PIPE. (WIRE RESTRAINT SHALL BE LOCATED WITHIN 24" OF A HANGER WHICH IS OF A TYPE THAT WILL PREVENT UPWARD MOVEMENT PER 9.3.6.2.
   - 1.4. CPVC HANGERS UTILIZING TWO POINTS OF ATTACHMENT.
   - 1.5. HANGER NOT LESS THAN 45° FROM VERTICAL INSTALLED WITHIN 6" OF THE VERTICAL HANGER ARRANGED FOR RESTRAINT AGAINST UPWARD MOVEMENT, PROVIDED IT IS UTILIZED SUCH THAT L/R DOES NOT EXCEED 400, WHERE THE ROD SHALL EXTEND TO THE PIPE OR HAVE A SURGE CLIP INSTALLED. MAX LENGTH OF ⅜" ROD @ L/R OF 400 = 30"
2. THE END SPRINKLER ON A LINE SHALL BE RESTRAINED. PER 9.3.6.3.
3. BRANCH LINES SHALL BE LATERALLY RESTRAINED AT INTERVALS NOT EXCEEDING THOSE SPECIFIED IN TABLE 9.3.6.4(A) BASED ON BRANCH LINE DIAMETER AND THE VALUE OF CP. (PER 9.3.5.9.3, CP = .35)
4. WHERE BRANCH LINES ARE SUPPORTED BY RODS LESS THAN 6" LONG MEASURED BETWEEN THE TOP OF THE PIPE AND THE POINT OF ATTACHMENT TO THE BUILDING STRUCTURE, THE REQUIREMENTS OF 9.3.6.1 THROUGH 9.3.6.4 SHALL NOT APPLY AND ADDITIONAL RESTRAINT SHALL NOT BE REQUIRED. (PER 9.3.6.5.)
5. SPRIGS 4 FT OR LONGER SHALL BE RESTRAINED AGAINST LATERAL MOVEMENT. (9.3.6.6)
6. DROPS AND ARMOVERS SHALL NOT REQUIRE RESTRAINT. (9.3.6.7)

Cp value per NFPA 13 - 2013 table 9.3.5.9.3

Ss		Cp
0.23	=	0.35

SEISMIC COEFFICIENT
ASCE 7 Standard

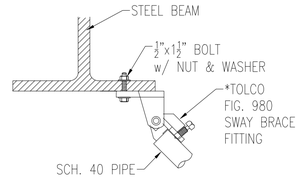
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Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0
Data are based on a 0.01 deg grid spacing

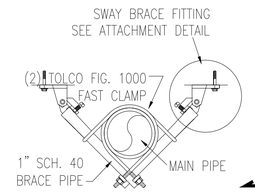
Period (sec)	Sa (g)	
0.2	0.226	(Ss, Site Class B)
1.0	0.135	(S1, Site Class B)

MAX SPACING OF STEEL BRANCHLINE RESTRAINTS PER NFPA Table 9.3.6.4(a)

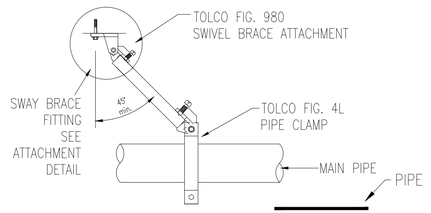
	SEISMIC COEFFICIENT (Cp)		
PIPE (IN.)	Cp≤0.50	0.5<Cp≤0.71	Cp>0.71
1"	43	36	26
1¼"	46	39	27
1½"	49	41	29
2"	53	45	31



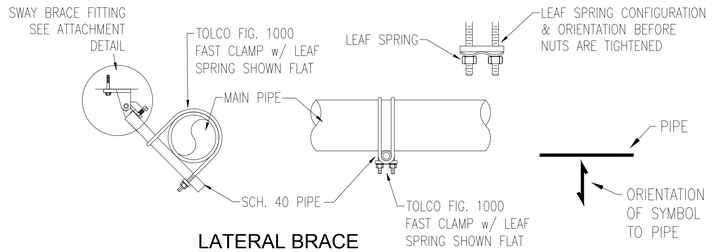
DETAIL S1
*PARALLEL OR PERPENDICULAR TO BEAM



FOUR-WAY BRACE @ TOP OF RISER



LONGITUDINAL BRACE



LATERAL BRACE

SEISMIC BRACING
NO SCALE

EARTHQUAKE BRACING NOTES

1. EARTHQUAKE BRACING SHALL BE PROVIDED PER NFPA 13, 2013 ed., SECTION 9.3.5.
2. LOADS ARE DETERMINED BY ANALYSIS PER 9.3.5.5.3 (SEE ANNEX E & CALCULATIONS).
3. LONGITUDINAL BRACES SHALL BE ALLOWED TO ACT AS LATERAL BRACES WHERE THEY ARE INSTALLED WITHIN 24" OF PIPING WHICH IS BRACED LATERALLY AND VICE VERSA PER 9.3.5.6.27 & 9.3.5.5.8.
4. EACH RUN OF PIPE BETWEEN A CHANGE IN DIRECTION SHALL BE PROVIDED WITH BOTH LATERAL AND LONGITUDINAL BRACING. EXCEPTION: PIPE RUNS LESS THAN 12 ft. PER 9.3.5.7.2.
5. WHERE THERE IS A CHANGE IN DIRECTION, THE CUMULATIVE DISTANCE BETWEEN LATERAL SWAY BRACES SHALL NOT EXCEED THE MAXIMUM PERMITTED DISTANCE IN ACCORDANCE WITH 9.3.5.5.2.2 (40 FT).

GENERAL NOTES

1. THE AUTOMATIC SPRINKLER SYSTEM SHALL CONFORM TO THE REQUIREMENTS OF THE 2013 EDITION OF NFPA 13.
2. PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. (SEE DETAIL)
3. ALL ELECTRICAL WIRING TO BE PERFORMED BY OTHERS.
4. ARMOVERS LONGER THAN 24" SHALL BE PROVIDED WITH A HANGER.
5. THE NEW SYSTEM IS HYDRAULICALLY CALCULATED. (SEE PIPING PLAN)
6. NEW PIPING SHALL BE SUPPLIED FROM NEW UNDERGROUND.
7. UPON COMPLETION, THE OVERHEAD SYSTEM SHALL BE TESTED AT 200 PSI FOR TWO (2) HOURS. (BEFORE TIE-IN)
8. BUILDING CONSTRUCTION IS OF NON-COMBUSTIBLE CONSTRUCTION.
9. OWNER:
10. FOR INSPECTION CALL:
11. EXCLUSIONS (WORK BY OTHERS):
    1. Installation of Systems.
    2. Wiring of Fire Alarm Systems.
    3. All Underground Fire Line and Hydrant Design (By Civil).
    4. Structural Calculations.
    5. Plan Review, Permit and Water Dept. Flow Fees

LEGEND

2-WAY EARTHQUAKE BRACE		SYSTEM RISER	GOE – GROOVE ONE END
4-WAY EARTHQUAKE BRACE		PIPE ELEVATION	GxG – GROOVE x GROOVE
FLEX – FLEXIBLE GROOVED COUPLING		+10'0" – CEILING HEIGHT	TxG – THREAD x GROOVE
RIGID "O-FLEX" GRV'D COUPLING		℄ – CENTER LINE	FxG – FLANGE x GROOVE
GROOVED CAP		AFF – ABOVE FINISH FLOOR	TOR – TOP OF RISER
#4 – HANGER No.		UNO – UNLESS NOTED OTHERWISE	BOR – BOTTOM OF RISER
APPROX. HANGER LOCATION		BOB – BOTTOM OF BEAM	MC – MALLEABLE COUPLING
XX – HYDRAULIC REFERENCE NODE		BOD – BOTTOM OF DECK	UG – UNDERGROUND
		BOF – BOTTOM OF FRAMING	OH – OVERHEAD
		COJ – CUT ON JOB	RN – RISER NIPPLE
		TOE – THREAD ONE END	SU – SPRIG UP
			DR – DROP TO SPRINKLER
			(E) – EXISTING
			(N) – NEW
			(R) – RELOCATE

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

MARQUEE FIRE PROTECTION
710 W. Stadium Lane
Sacramento, CA. 95834-1130
TEL. 641-7997 / 707. 642-7905
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CA. LIC. 570970 C-16

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		TPH	TPH	JJA	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		AJW	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		AJW	MWM	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FIRE PROTECTION GENERAL NOTES AND STANDARD DETAILS

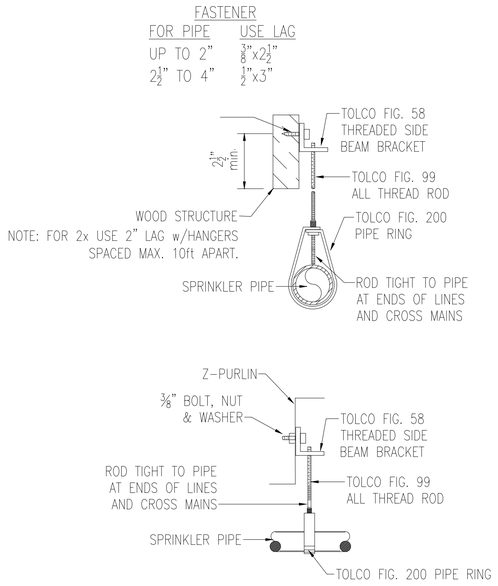
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. F-00-01 of SHEETS | REV 2

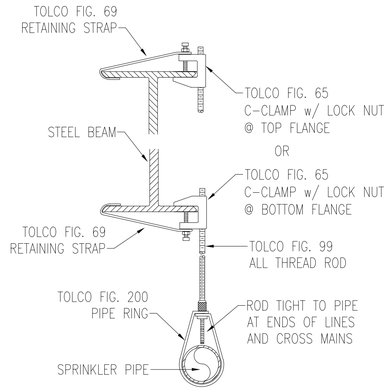
N1808

11/02/2015, 09:47, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWG\F-Fire Protection\F-00-01_00-02_F-08-01_F_F-08-01.dwg, Tab: F-00-01



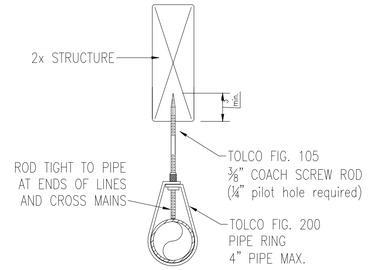
SIDE BEAM BRACKET #4

NO SCALE



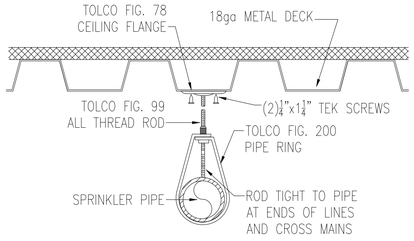
C-CLAMP HANGER #7

NO SCALE



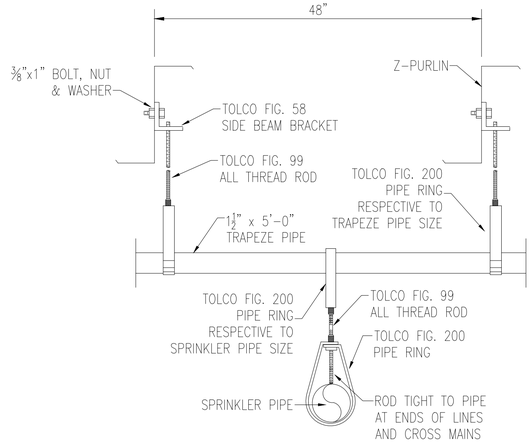
COACH SCREW ROD HANGER #13

NO SCALE



CEILING FLANGE HANGER #14

NO SCALE



PIPE TRAPEZE HANGER #32

NO SCALE

HANGER NOTES

1. ALL HANGER ASSEMBLIES ARE PER NFPA 13 & MANUFACTURER DETAILS.
2. PER CBC AND NFPA 13 THE BUILDING STRUCTURE MUST BE CAPABLE OF SUPPORTING THE ADD LOAD OF THE WATER FILLED PIPE PLUS A MINIMUM OF 250 LBS.
3. HANGER SPACING SHALL BE PER NFPA 13 TABLE 9.2.2.1(A).

9.2.4 LOCATION OF HANGERS ON MAINS

9.2.4.1 UNLESS THE REQUIREMENTS OF 9.2.4.2, 9.2.4.3, 9.2.4.4, 9.2.4.5 OR 9.2.4.6 ARE MET, HANGERS FOR MAINS SHALL BE IN ACCORDANCE WITH 9.2.2, BETWEEN EACH BRANCH LINE OR ON EACH SECTION OF PIPE, WHICHEVER IS THE LESSER DIMENSION.

9.2.4.2: FOR WELDED OR MECHANICAL OUTLETS ON A CONTINUOUS SECTION OF PIPE, HANGER SPACING SHALL BE ACCORDING TO TABLE 9.2.2.1(A).

9.2.4.3: FOR CROSS MAINS IN STEEL PIPE SYSTEMS IN BAYS HAVING TWO BRANCH LINES, THE INTERMEDIATE HANGER SHALL BE PERMITTED TO BE OMITTED PROVIDED THAT A HANGER ATTACHED TO A PURLIN IS INSTALLED ON EACH BRANCH LINE LOCATED AS NEAR TO THE CROSS MAIN AS THE LOCATION OF THE PURLIN PERMITS. REMAINING BRANCH LINE HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH 9.2.3.

9.2.4.7: A SINGLE SECTION OF PIPE SHALL NOT REQUIRE A HANGER WHEN THE CUMULATIVE DISTANCE BETWEEN HANGERS ON THE MAIN DOES NOT EXCEED THE SPACING REQUIRED BY TABLE 9.2.2.1(A).

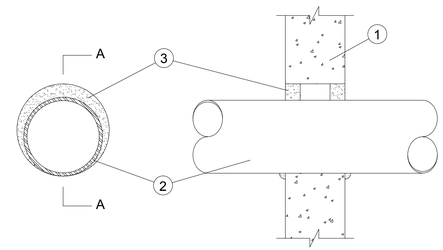
HANGER SPACING TABLE PER NFPA Table 9.2.2.1(a)

Nominal Pipe Size (in.)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"
Steel Pipe	12'-0"	12'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"

U.L. SYSTEM NO. WJ1067

METAL PIPE THROUGH A SLEEVE IN CONCRETE FLOOR,WALL,OR BLOCK WALL

F RATING = 1 & 2-HR.
T RATING = 0-HR.
L RATING AT AMBIENT = 0 LESS THAN 1 CFM/SQ. FT.
L RATING AT 400° = 4 CFM/SQ. FT.



SECTION A-A

1. WALL ASSEMBLY :
   A. MINIMUM 5" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL.
   B. U.L. CLASSIFIED CONCRETE BLOCK WALL (MINIMUM 8" BLOCK).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   A. MAXIMUM 30" DIAMETER SCHEDULE 10 OR HEAVIER STEEL PIPE.
   B. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   D. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT FIRESTOP SEALANT: MIN. 5/8" THICKNESS APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PIPE AND WALL, A MIN 1/2" DIA BEAD OF FILL MATERIAL SHALL BE APPLIED AT PIPE-WALL INTERFACE ON BOTH SURFACES.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32-1/4".
2. *ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
3. PIPE TO BE CENTERED WITHIN THE FIRESTOP SYSTEM.

SEE HILTI FIRESTOP INSTALLATION MANUAL FOR ADDITIONAL INSTRUCTIONS
HILTI, INC. TULSA, OK 1-800-879-8000

* PIPES 4" AND LARGER SHALL BE PROVIDED WITH A FLEXIBLE COUPLING WITHIN 12" OF EACH SIDE OF PENETRATION.(NFPA 13)

PENETRATION DETAIL

(NOT TO SCALE)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

LICENSED FIRE PROTECTION CONTRACTOR — CLASSIFICATION C-16 — LICENSE No. 570970 — STATE OF CALIFORNIA

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710 W. Stadium Lane
Sacramento, CA. 95834-1130
TEL. 916. 641-7997 / 707. 642-7905
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REVISIONS

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TOPOCK GROUNDWATER REMEDIATION PROJECT

FIRE PROTECTION STANDARD DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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SHEET NO. F-00-02 of SHEETS REV 2

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COMPONENTS

SYMBOL	DESCRIPTION
RES	RESISTOR
SV	SOLENOID COIL
HTR	HEATER
	CAPACITOR
	DIODE
	DIODE, ZENER
MOV	METAL OXIDE VARISTOR
	AUDIBLE ALARM
?	3 PHASE MOTOR ? = MOTOR HP
M	3 PHASE MOTOR
M	SINGLE PHASE MOTOR
	TRANSFORMER SIZE AND VOLTAGE AS SHOWN
M	UTILITY POWER METER
	UFER GROUND
	GROUND ROD
	CURRENT TRANSFORMER RATIO AS NOTED

SWITCHES - PROCESS

SYMBOL	DESCRIPTION
FS	FLOW SWITCH - CLOSES UPON INCREASING FLOW
FS	FLOW SWITCH - OPENS UPON INCREASING FLOW
LS	LEVEL SWITCH - CLOSES UPON INCREASING LEVEL
LS	LEVEL SWITCH - OPENS UPON INCREASING LEVEL
PS	PRESSURE SWITCH - CLOSES UPON INCREASING PRESSURE (DECREASING VACUUM)
PS	PRESSURE SWITCH - OPENS UPON INCREASING PRESSURE (DECREASING VACUUM)
TS	TEMPERATURE SWITCH - CLOSES UPON INCREASING TEMPERATURE
TS	TEMPERATURE SWITCH - OPENS UPON INCREASING TEMPERATURE
ZS	LIMIT SWITCH - CLOSES AT SET LIMIT
ZS	LIMIT SWITCH - OPENS AT SET LIMIT
WS	TORQUE SWITCH - CLOSES UPON INCREASING TORQUE
WS	TORQUE SWITCH - OPENS UPON INCREASING TORQUE

DEVICES - RELAY

SYMBOL	DESCRIPTION
M 1	CONTACTOR OR STARTER M1
CR 1	CONTROL RELAY CR1
TR 2	TIME DELAY RELAY TR2 - ADJUSTABLE TIME DELAY RANGE & SETTING AS SHOWN
TDOE TDOD	TIME DELAY ON ENERGIZATION TIME DELAY ON DE-ENERGIZATION
107, 121	REFERENCED RELAY WITH N.O. CONTACT ON LINE 107 N.C. CONTACT ON LINE 121
CR1 (105)	NORMALLY OPEN, RELAY CONTACT - ACTUATED BY RELAY CR1 COIL LOCATED ON LINE 105
CR1	NORMALLY CLOSED, RELAY CONTACT - ACTUATED BY RELAY CR1
TR2	NORMALLY OPEN, TIME DELAY RELAY CONTACT - CONTACT CLOSES AFTER TR2 IS ENERGIZED
TR2	NORMALLY CLOSED, TIME DELAY RELAY CONTACT - CONTACT OPENS AFTER TR2 IS ENERGIZED
TR2	NORMALLY OPEN, TIME DELAY RELAY CONTACT - CONTACT OPENS AFTER TR2 IS DE-ENERGIZED
TR2	NORMALLY CLOSED, TIME DELAY RELAY CONTACT - CONTACT CLOSES AFTER TR2 IS DE-ENERGIZED
TR2	CONTACT OPENS AND CLOSES IN A TIMED REPEAT CYCLE

WIRING - CONNECTIONS

SYMBOL	DESCRIPTION
	PANEL OR EQUIPMENT WIRING
	FIELD WIRING
	CONDUCTORS - NOT CONNECTED
	CONDUCTORS - CONNECTED
	GROUND CONNECTION
	PLUG AND RECEPTACLE
	INCOMING LINE
123 123 123	TERMINAL BLOCKS WITH TERMINAL NUMBER AS SHOWN
	TERMINAL BLOCKS WITH TERMINAL NUMBER DETERMINED BY SUBMITTAL
SHIELD CONDUCTOR	SHIELDED CABLE

PLAN - SYMBOLS

SYMBOL	DESCRIPTION
	CONDUIT, EXPOSED
	CONDUIT, IN SLAB OR BELOW GRADE
	CONDUIT, CONCEALED IN WALL OR CEILING
	CONDUIT STUBBED OUT & CAPPED
	CONDUIT BENDS TOWARD OBSERVER
	CONDUIT BENDS AWAY FROM OBSERVER
	CONDUIT ENDS
J	FLEXIBLE CONDUIT CONNECTION FROM J-BOX TO EQUIPMENT
	CONDUIT CHANGE IN ELEVATION
G	BARE COPPER GROUND WIRE
G	GROUND CONNECTION BOLTED TYPE
G	GROUND CONNECTION EXOTHERMIC WELD TYPE
	DISCONNECT SWITCH
	FIELD MOUNTED DEVICE
	SPECIAL RECEPTACLE
	TELEPHONE/DATA RECEPTACLE 2 PORT TA568A, 2 CAT 6 CABLES
#	CONDUIT REFERENCE TO SCHEDULE
T	THERMOSTAT
E	EYS SEAL
J	JUNCTION BOX
	PULL BOX OF SIZE SHOWN (CHRISTY BOX SIZE MINIMUM)
A a #	LIGHTING FIXTURE # - CIRCUIT BREAKER NUMBER A - FIXTURE SCHEDULE REF. a - CONTROL SWITCH REFERENCE
WP #7 WP	DUPLEX RECEPTACLE # - CIRCUIT BREAKER NUMBER WP - WEATHERPROOF (IF SHOWN) GFI - GROUND FAULT TYPE
a M	TOGGLE SWITCH a - FIXTURES CONTROLLED 3 - 3 WAY M = MOTION DETECTOR T = TIMER SWITCH

SWITCHES - OPERATOR

SYMBOL	DESCRIPTION
SW	TOGGLE OR DISCONNECT SWITCH
PB	PUSHBUTTON - NORMALLY OPEN, MOMENTARY ACTION
PB	PUSHBUTTON - NORMALLY CLOSED, MOMENTARY UNLESS LOS (LOCK OUT STOP) WHERE MECHANICALLY HELD
PB	PUSHBUTTON, MECHANICALLY CONNECTED, DOUBLE CIRCUIT - NORMALLY CLOSED AND NORMALLY OPEN
HAND OFF AUTO	SELECTOR SWITCH, 3 POSITION - CONTACT STATUS SHOWN EXISTS I.E. AT POSITION OF HAND, OFF, OR AUTO
	SELECTOR SWITCH, 2 POSITION - MIDDLE POSITION IS DELETED
	POTENTIOMETER

DEVICES - FRONT PANEL

SYMBOL	DESCRIPTION
X	INDICATING LIGHT, LETTER "X" INDICATES COLOR: R=RED G=GREEN, A=AMBER, W=WHITE Y=YELLOW, B=BLUE
PTT X	INDICATING LIGHT, PUSH TO TEST
ETM	ELAPSED TIME METER

DEVICES - PROTECTIVE

SYMBOL	DESCRIPTION
Y xA xP xT	LOW VOLTAGE MOLDED CASE, INSULATED CASE OR POWER CIRCUIT BREAKER. RATINGS AS SHOWN IN DRAWINGS AND AS DEFINED BELOW: xA: CIRCUIT BREAKER AMERAGE xAT: AMPERAGE TRIP xAF: AMPERAGE FRAME xP: NUMBER OF POLES xT: TRIP PROTECTION MCP: MOTOR CIRCUIT PROTECTION TM: THERMAL MAGNETIC L: LONG TIME DELAY S: SHORT TIME DELAY I: INSTANTANEOUS TRIP G: GROUND FAULT A: ARC FLASH PROTECTION 100% DUTY RATED
100%	y: BREAKER FEATURES / OPTIONS
S	- SHUNT TRIP
K	- KIRK-KEY INTERLOCK
M	- MOTORIZED OPERATION
E	- ELECTRICALLY CHARGED PUSHBUTTON OPERATION
OL	THERMAL OVERLOAD CONTACT
	THERMAL OVERLOAD ELEMENT
	FUSE MEDIUM VOLTAGE CIRCUIT BREAKER
52	TRIP FUNCTIONS PER DRAWINGS AND SPECIFICATIONS
MFR	MULTIFUNCTION RELAY PER SPECIFICATIONS

MISCELLANEOUS ABBREVIATIONS

&	AND	MTR	MOTOR
@	AT	MUX	MULTIPLEXER
A	AMBER, AMPERES	MV	MERCURY VAPOR, MEDIUM VOLTAGE
AC	ALTERNATING CURRENT	N	NEUTRAL
ACK	ACKNOWLEDGE	NC	NORMALLY CLOSED
AFF	ABOVE FINISHED FLOOR	NHC	NORMALLY HELD CLOSED
AH	AMP HOUR	NHO	NORMALLY HELD OPEN
AI	ANALOG INPUT	NIC	NOT IN CONTRACT
AIC	AMP INTERRUPTING CAPACITY SYMMETRICAL	NL	NIGHT LIGHT
AM	AMP METER	NO	NORMALLY OPEN
AO	ANALOG OUTPUT	NTS	NOT TO SCALE
AWG	AMERICAN WIRE GUAGE	(N)	NEW
ATS	AUTOMATIC TRANSFER SWITCH	OC	ON CENTER
BATT	BATTERY	OI	OPERATOR INTERFACE
(B)	PROVIDED BY OWNER - INSTALLED BY CONTRACTOR	OL	OVERLOAD
BFC	BELOW FINISHED CEILING	ORP	OXIDATION REDUCTION POTENTIAL
BOD	BIOCHEMICAL OXYGEN DEMAND	P	POLE
BPF	BAND PASS FILTER	PB	PUSHBUTTON
BYP	BYPASS	PBX	PULL BOX
C	CONDUIT	PF	POWER FACTOR
CAP	CAPACITOR	PFR	POWER FAIL RELAY
CB	CIRCUIT BREAKER	PH	HYDROGEN ION CONCENTRATION
CKT	CIRCUIT	PLC	PROGRAMMABLE LOGIC CONTROLLER
COAX	COAXIAL CABLE	PM	POWER MONITOR
COMM	COMMUNICATION	PNL	PANEL
CR	CONTROL RELAY	POT	POTENTIOMETER
CT	CURRENT TRANSFORMER	PRESS	PRESSURE
CS	CONSTANT SPEED	PR	PAIR, TWISTED AND SHIELDED
CU	COPPER	PRI	PRIMARY
DC	DIRECT CURRENT	PROVIDE	FURNISH, INSTALL, AND CONNECT
DET	DETAIL	PS	PRESSURE SWITCH
DI	DIGITAL INPUT	PT	POTENTIAL TRANSFORMER
DISC	DISCONNECT	PTT	PUSH TO TEST
DO	DIGITAL OUTPUT	PVC	POLYVINYLCHLORIDE
DPDT	DOUBLE POLE DOUBLE THROW	PWR	POWER
DWG	DRAWING	REF	REFERENCE
E-DTL	ELECTRICAL DRAWING DETAIL	RFI	RADIO FREQUENCY INTERFERENCE
ELEV	ELEVATION	RMS	ROOT MEAN SQUARE
ENET	ETHERNET	RTD	RESISTANCE TEMPERATURE DETECTOR
ETM	ELAPSED TIME METER	RST	RESET
ESW	ETHERNET SWITCH	RVAT	REDUCE VOLTAGE AUTO TRANSFORMER
(E)	EXISTING	RTU	REMOTE TERMINAL UNIT
FCS	FIELD CONTROL STATION	(R)	REWIRE, RELOCATE, REVISE, REUSE
FLA	FULL LOAD AMPS	SCH	SCHEDULE
FLEX	FLEXIBLE LIQUID TIGHT CONDUIT	SEC	SECONDARY, SECOND
FRP	FIBERGLASS REINFORCED PLASTIC	SECS	SECONDS
FS	FULL SPEED	SEL	SELECTOR
FVNR	FULL VOLTAGE NON-REVERSING	SFA	SERVICE FACTOR AMPS
FVR	FULL VOLTAGE REVERSING	SPEC	SPECIFICATION
FWD	FORWARD	SS	STAINLESS STEEL
(F)	FUTURE	SSRC	STAINLESS STEEL RIGID CONDUIT
GALV	GALVANIZED	SSS	SOLID STATE STARTER
GFI	GROUND FAULT INTERRUPTER	STT	START
GND	GROUND	STP	STOP
GRS	GALVANIZED RIGID STEEL CONDUIT	SV	SOLENOID VALVE
GRS-PVC	PVC COATED GRS CONDUIT	SW	SWITCH
HI	HIGH	SWBD	SWITCHBOARD
HIM	HUMAN INTERFACE MODULE	SYMM	SYMMETRICAL
HOA	HAND OFF AUTO	TB	TERMINAL BLOCK
HP	HORSE POWER	TC	TIME CLOCK
HPS	HIGH PRESSURE SODIUM	TDOD	TIME DELAY ON DE-ENERGIZATION
HS	HAND SWITCH	TDOE	TIME DELAY ON ENERGIZATION
HTR	HEATER	TELCO	TELEPHONE COMPANY
HZ	HERTZ	TM	THERMAL MAGNETIC
HZD	HAZARD	TEMP	TEMPERATURE
I	INTERLOCK	TR	TIME DELAY RELAY
I-DTL	INSTRUMENTATION DRAWING DETAIL	TRIAD	TWISTED AND SHIELDED 3 CONDUCTOR
I/O	INPUT/OUTPUT	TS	TEMPERATURE SWITCH
INST	INSTANTANEOUS	TSPR	TWISTED AND SHIELDED PAIR
ISR	INTRINSICALLY SAFE RELAY	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
IS	INTRINSICALLY SAFE	TYP	TYPICAL
J	JUNCTION BOX	UG	UNDERGROUND
K	KILO, PREFIX	ULH	ULTRA LOW HARMONIC
LA	LIGHTNING ARRESTOR	UON	UNLESS OTHERWISE NOTED
LC	LIGHTING CONTACTOR	UPS	UNINTERRUPTIBLE POWER SUPPLY
LEL	LOWER EXPLOSION LIMIT	V	VOLTAGE
LO	LOW	VA	VOLT AMPS
LOS	LOCK OUT STOP	VAR	VOLT AMPS REACTIVE
LR	LATCHING RELAY	VFD	VARIABLE FREQUENCY DRIVE
LS	LIMIT SWITCH	VLV	VALVE
M	MOTOR CONTACTOR	VM	VOLTMETER
MAG	MAGNETIC FLOWMETER	VMR	VOLTAGE MONITOR RELAY
MAX	MAXIMUM	VR	VOLTAGE RELAY
MCM	THOUSAND CIRCULAR MILS	W	WATTS
MCP	MOTOR CIRCUIT PROTECTOR	WP	WEATHER PROOF, NEMA 3R
MCS	MOLDED CASE SWITCH	WTP	WATER TREATMENT PLANT
MH	MANHOLE	WWTP	WASTE WATER TREATMENT PLANT
MIN	MINIMUM, MINUTE	XFMR	TRANSFORMER
MODEM	MODEM	Z	IMPEDANCE
MOV	MOTOR OPERATED VALVE	ZS	LIMIT SWITCH

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOO
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

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APPROVED BY: RAO

SO	
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DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

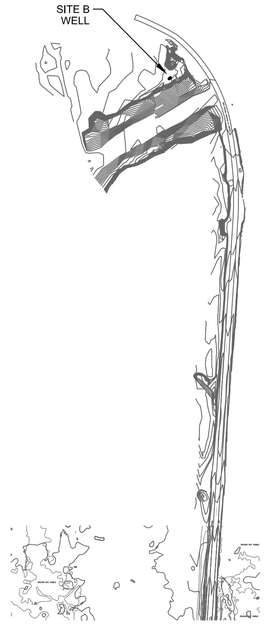
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SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SHEET NO.	of SHEETS
E-00-01	REV

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:15:31pm
FILENAME: E-00-01.dwg

N1808





INSET

CONTINUED FROM LEFT

LEGEND

- △ TRANSFORMER, POWER DISTRIBUTION, AND FIBER OPTIC BREAKOUT LOCATION (APPROX)
- UNDERGROUND 12KV DISTRIBUTION

ELECTRICAL PLAN NOTES:

1. REPAIR SURFACE TO PREVIOUS CONDITION FOR ALL UNDERGROUND CONDUIT ROUTES. GROUT, CAULK, AND PAINT ANY PENETRATIONS INTO STRUCTURES FOR WATERTIGHT SEAL.
2. INSTALL NON-UTILITY CONDUITS PER DRAWING DETAILS E-00-52/DET 4 AND SPECIFICATIONS SECTION XXXXX.
3. SITEPLAN ACCURATE FOR ELECTRICAL WORK ONLY. COORDINATE ALL WORK WITH CIVIL/MECH PLANS.
4. CONDUITS SIZE, TYPE AND FILL DEFINED BY TAG NAME IN CONDUIT SCHEDULE, E-XX-XX.
5. CONDUIT TYPE IN CONDUIT SHEDULE IS TYPICAL FOR UNDERGROUND HORIZONTAL PORTIONS OF RUN. IF ENTIRE RUN OF CONDUIT IS EXPOSED, THEN TYPE SHALL BE PER AREA CLASSIFICATION AS DEFINED IN SPECIFICATIONS SECTION 26 05 33ST.
6. CONDUIT TRANSITIONS SHALL BE PER EXPOSED CONDUIT TRANSITION DETAIL E-00-52/DET 5.
7. EXPOSED CONDUIT TYPE TO BE USED ABOVE TRANSITION SHALL BE PER AREA CLASSIFICATION DEFINED IN CONDUIT SPECIFICATIONS AND EQUIPMENT SPECIFIC DETAIL.
8. FITTINGS, CONDULETS, BOXES AND COVERS SHALL MATCH DUTY OF ADJACENT PIPE, SEE CONDUIT SPECIFICATIONS.
9. USE SS EXPANSION WEDGE ANCHORS OR EPOXY ANCHORS AS NECESSARY FOR EQUIPMENT MOUNTING.
10. RECEPTACLES TO BE GROUND FAULT INTERRUPTER (GFI) TYPE AND WEATHERPROOF (WP) WHERE SHOWN.
11. SEE ELECTRICAL SYMBOLS AND ABBREVIATIONS DRAWING FOR SYMBOL DEFINITIONS.
12. ALL WORK SHALL CONFORM TO LOCAL CODES AND NATIONAL ELECTRIC CODE.
13. ELECTRICAL CONDUIT ROUTE LOCATIONS DIAGRAMMATICAL. SEE ASSOCIATED CIVIL DRAWINGS FOR TRENCH, PULLBOX, AND TRANSFORMER LOCATIONS.

OVERALL ELECTRICAL SITE PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDDOWAY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
GROUNDWATER REMEDY
OVERALL ELECTRICAL SITEPLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-02	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:19:54pm
FILENAME: E-00-02.dwg

N1808

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

1. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH ELECTRICAL DRAWINGS. SEE DRAWINGS E-10-01 THROUGH E-10-04.
2. CONDUIT TAG "T00" REPRESENTS DIRECT BURY 12KV CABLE (TYPICAL). SEE CIVIL DRAWINGS C-07-26, C-07-27, C-07-68, C-07-69, C-07-72 AND C-10-11 FOR ROUTING.
3. CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-07-75, C-07-76 AND C-10-11 THROUGH C-10-13.
4. CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL DRAWINGS. SEE DRAWING C-10-14.
5. PROVIDE SERVICE LOOP FOR ALL CONDUCTORS IN PULLBOX TO ALLOW FOR EXPANSION & CONTRACTION.
6. SURFACE MOUNT CONDUIT FROM PULLBOX TO CONTROL ROOM ON EXISTING CONDUIT RACK. PROVIDE AND INSTALL NEW MOUNTING HARDWARE AS REQUIRED FOR NEW CONDUIT.

FRESHWATER WELL VAULT FW-2 SEE DRAWING E-02-10.
FRESHWATER WELL METER VALVE VAULT FW-2. SEE DRAWING E-02-10.
PBX-P1N
PBX-D1N
F0201 P0201 X0201 X0202
PIPELINE "J"
PBX-P1M
PBX-D1M
CONDITIONED WATER TANK FARM
PBX-D1F
PBX-P1F
PBX-D1H
PBX-P1H
PBX-P1L
PBX-D1L
PIPELINE "J"
PBX-D1G
PBX-P1G
PBX-D1J
PBX-P1J
F0201 X0201 P0201 X0202
PIPELINE "J"
PBX-D1K
PBX-P1K
CONDITIONED WATER STORAGE TANK
PIPELINE "K"
EXISTING WASTE WATER/TANK
PBX-P1C PBX-D1C
PBX-P1D PBX-D1D
PBX-C0A
PBX-P0A
PIPELINE "D"
PIPELINE "K"
PIPELINE "M"
RADIO COMMUNICATIONS CONTROL PANEL
PBX-P1E PBX-D1E
C340A P340A D340A X340A
PBX-D1A PBX-P1A
REMEDY BUILDING
PBX-P1B PBX-D1B
MV MAIN BREAKER
PBX-T1A
XFMR-99
REMEDY 480V SWITCHGEAR
T99C
EXISTING STORAGE TANKS
PBX-P1G
PBX-D1E
PBX-D1F
F99A X020
INFLUENT TANK FARM
P001F C001 P001G P001A P001H P001B X020 P001C P001D P001E
PBX-P1D
PBX-C0B
PBX-P0B
PIPELINE "M"
COMPRESSOR STATION
CONTROL ROOM
F99A X020
T99C
F00C
PIPELINE "B"
PIPELINE "F"
MONITORING WELL
D-DC22B
D-DC22A
MONITORING WELL CONTROL PANEL
MONITORING WELL
TCS-2 WELL SEE DRAWINGS E-03-01 THROUGH E-03-03
PBX-P0E
PBX-C0E
P340B C340C D340C X340C
PIPELINE "N"
PBX-C0C
PBX-P0C
L-DC22 D-DC22
PIPELINE "M"
PBX-C0D
PBX-P0D
P340A L-DC22 P340B D-DC22 C340B X340B D340B
TCS-1 WELL SEE DRAWINGS E-03-01 THROUGH E-03-03
MATCH LINE FOR CONTINUATION SEE SHEET E-00-04

0 50 100 150
SCALE: 1"=50'

COMPRESSOR STATION AREA PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOTA 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

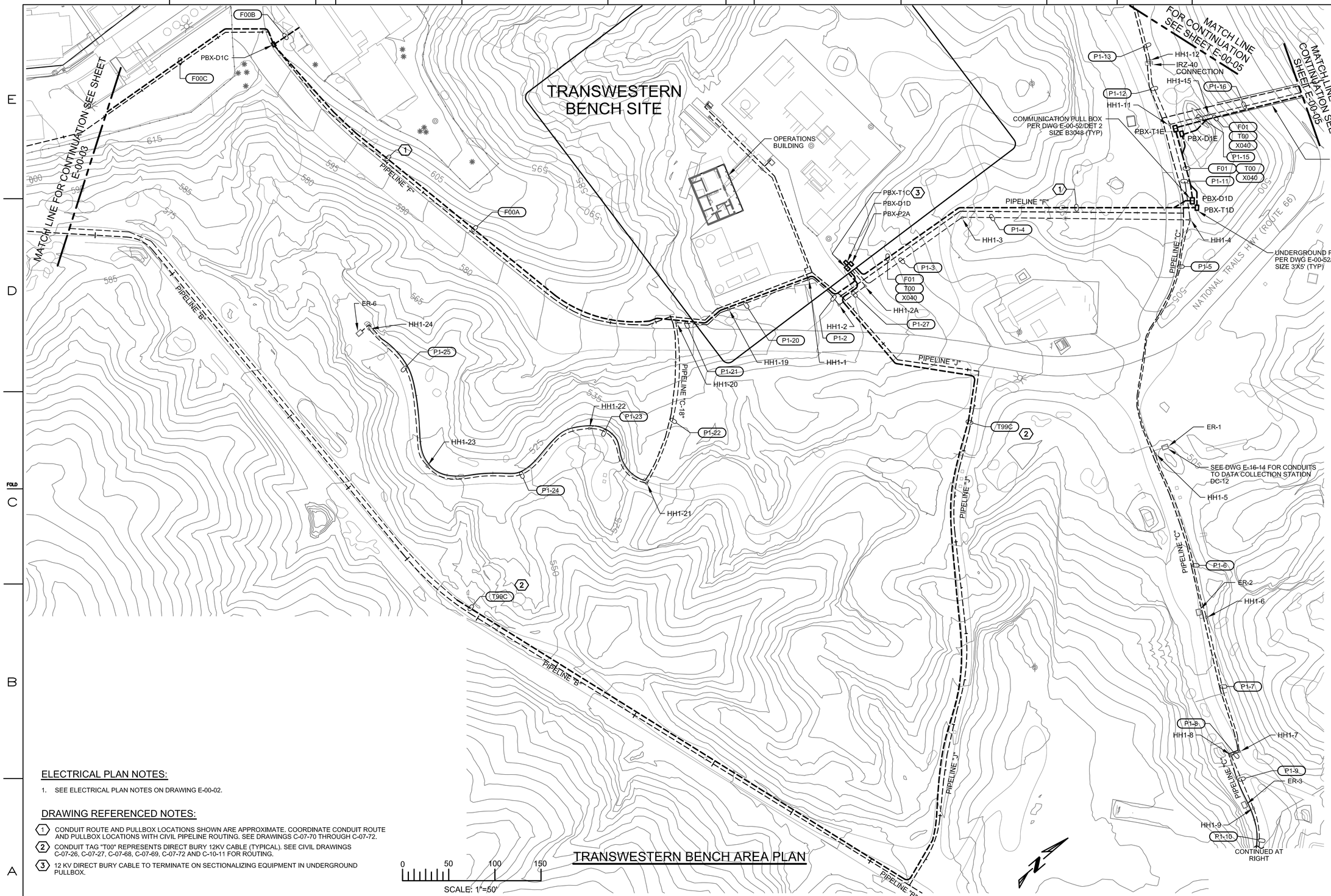
REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
TCS ELECTRICAL AREA PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-03	REV 1

PLOT DATE: Oct 30, 2015 PLOT TIME: 11:13:00am
FILENAME: E-00-02.dwg
N1808



ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

1. CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-07-70 THROUGH C-07-72.
2. CONDUIT TAG "T00" REPRESENTS DIRECT BURY 12KV CABLE (TYPICAL). SEE CIVIL DRAWINGS C-07-26, C-07-27, C-07-68, C-07-69, C-07-72 AND C-10-11 FOR ROUTING.
3. 12 KV DIRECT BURY CABLE TO TERMINATE ON SECTIONALIZING EQUIPMENT IN UNDERGROUND PULLBOX.

TRANSWESTERN BENCH AREA PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.CM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
SO	
RAO	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-04	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:27:12pm

FILENAME: E-00-02.dwg

N1808

SEE DWG E-16-07 FOR CONDUITS TO DATA COLLECTION STATION DC-04

SEE DWG E-16-09, E-16-10 FOR CONDUITS TO DATA COLLECTION STATION DC-06, DC-07, DC-08

MATCH LINE FOR CONTINUATION SEE SHEET E-00-06

MATCH LINE FOR CONTINUATION SEE SHEET E-00-06

MATCH LINE FOR CONTINUATION SEE SHEET E-00-04

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL TRENCH AND PIPELINE ROUTING.

RB-4 WELL
RB-5 WELL
PIPELINE "G"
PIPELINE "C"
COMMUNICATION PULL BOX PER DWG E-00-51/DET 2 SIZE B3048 (TYP)
UNDERGROUND PULL BOX PER DWG E-00-52/DET 2 SIZE 3'X5' (TYP)
SECTIONALIZING PULL BOX PER DWG E-00-51/DET 2 SIZE 3'X5'
POWER AND COMMUNICATIONS NODE 3 LOCATED IN BUILDING, SEE (DWGS C-06-01 THROUGH C-6-03 AND E-06-01 THROUGH E-06-05)
POWER AND COMMUNICATIONS NODE 2, SEE TYPICAL NODE SITE PLAN E-00-09
BORE AND JACK UNDERMINE
GROUND NOT VISIBLE
DENSE TREES
INTERSTATE FWY 40
NATIONAL TRAILS HWY (ROUTE 66)
SEE DWG E-16-11, E-16-12, E-16-13 FOR CONDUITS TO DATA COLLECTION STATION DC-09, DC-10, DC-11

PBX-D2C PBX-T2C
PBX-D2B PBX-T2B
PBX-D1F PBX-T1F
PBX-D4C PBX-T4C
PBX-D2A PBX-P2D PBX-T2A

HH1-17 HH1-16 HH1-18 HH1-14 HH1-13
HH2-16 HH2-17 HH2-15 HH2-14 HH2-13 HH2-12 HH2-11 HH2-10 HH2-9 HH2-8 HH2-7 HH2-6 HH2-5 HH2-4 HH2-3 HH2-2 HH2-1
HH3-16 HH3-15 HH3-14 HH3-13 HH3-12 HH3-11 HH3-10 HH3-9 HH3-8 HH3-7 HH3-3 HH3-2 HH3-1

IRZ-19 IRZ-18 CONNECTION IRZ-20 WELL IRZ-21 WELL IRZ-23 WELL IRZ-24 IRZ-25 IRZ-26 IRZ-27 WELL IRZ-28 IRZ-29 WELL IRZ-30 CONNECTION IRZ-31 WELL IRZ-33 WELL IRZ-34 WELL IRZ-35 WELL IRZ-36 CONNECTION IRZ-37 WELL IRZ-38 CONNECTION IRZ-39 WELL

P1-13 P1-14 P1-16 P1-17 P1-18 P1-19
P2-1 P2-2 P2-3 P2-4 P2-5 P2-6 P2-7 P2-8 P2-9 P2-10 P2-11 P2-12 P2-13 P2-14 P2-15 P2-16 P2-17 P2-18
P3-1 P3-2 P3-3 P3-4 P3-08 P3-09 P3-10 P3-11 P3-12 P3-13 P3-14 P3-15 P3-16 P3-17 P3-18 P3-19
T03 F04 P300
F01 T00 X040
F02 T02 X040
F03 T00 X040

0 50 100 150
SCALE: 1"=50'

(1) MW-20 BENCH AREA PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

PLOT DATE: Oct 29, 2015 PLOT TIME: 4:12:51pm

FILENAME: E-00-02.dwg

FRISCH ENGINEERING, INC.
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13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.CONSULTING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH AREA PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-05	REV 1

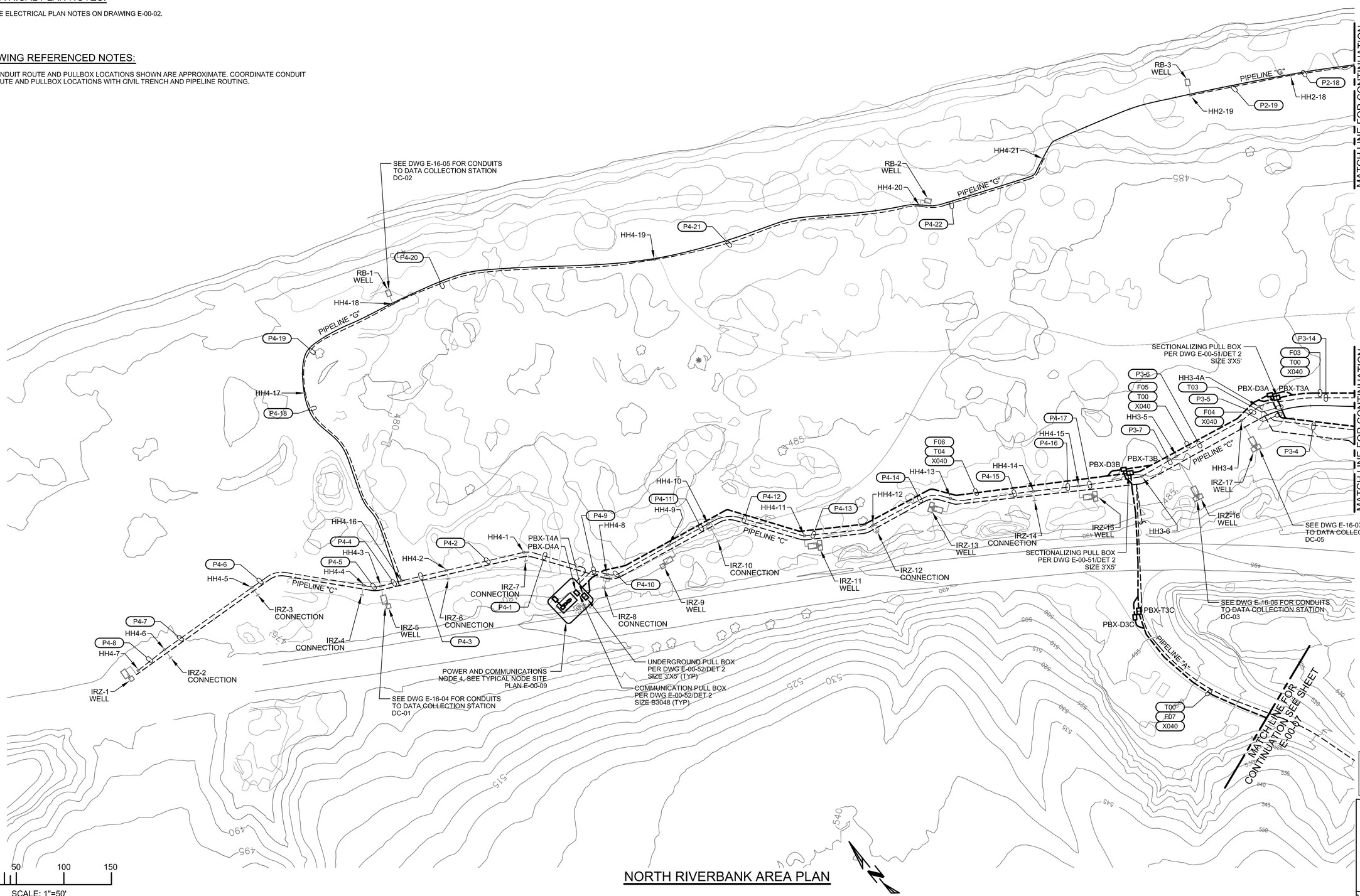
N1808

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL TRENCH AND PIPELINE ROUTING.



NORTH RIVERBANK AREA PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
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13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

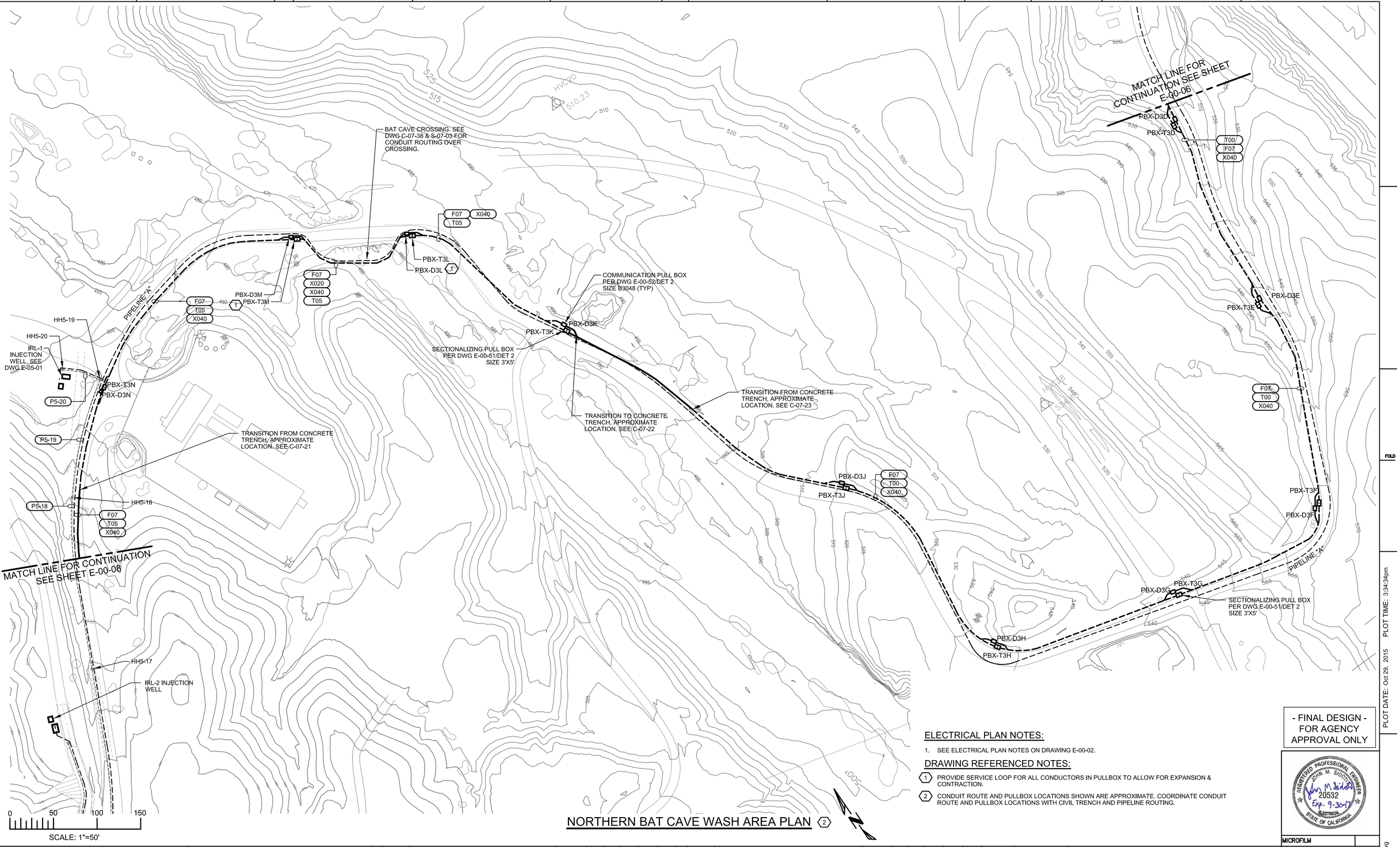
APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NORTH RIVERBANK AREA PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-06	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:32:18pm
FILENAME: E-00-02.dwg
N1808



NORTHERN BAT CAVE WASH AREA PLAN (2)

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) PROVIDE SERVICE LOOP FOR ALL CONDUCTORS IN PULLBOX TO ALLOW FOR EXPANSION & CONTRACTION.

(2) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL TRENCH AND PIPELINE ROUTING.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

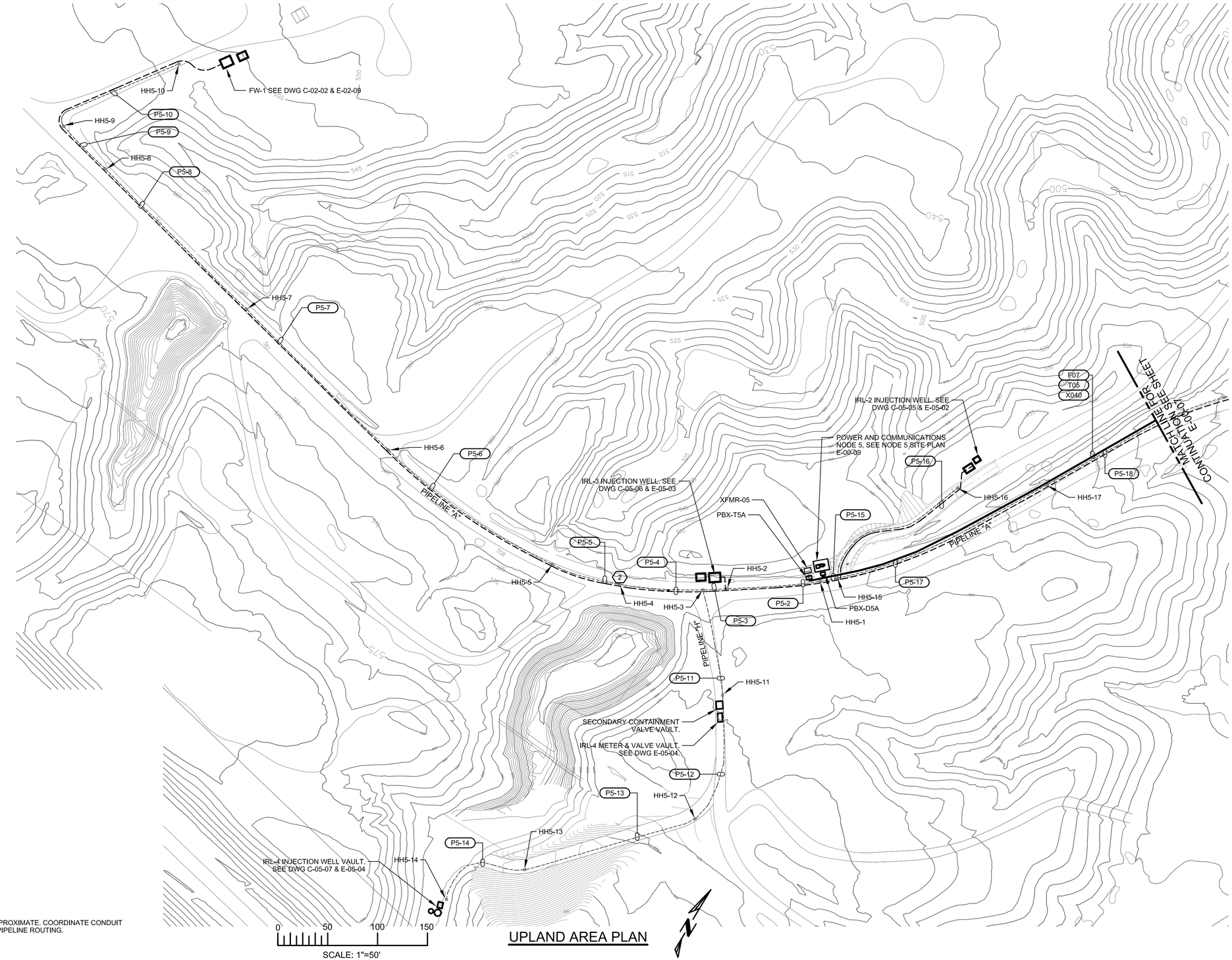
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NORTHERN BAT CAVE WASH AREA PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-07	REV 2

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:34:34pm
FILENAME: E-00-02.dwg

N1808



UPLAND AREA PLAN

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

1. CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL TRENCH AND PIPELINE ROUTING.
2. PROVISIONS FOR FUTURE WELL IRL-5.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

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CONSULTING ELECTRICAL ENGINEERS
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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

UPLANDS AREA PLAN

GAS TRANSMISSION & DISTRIBUTION

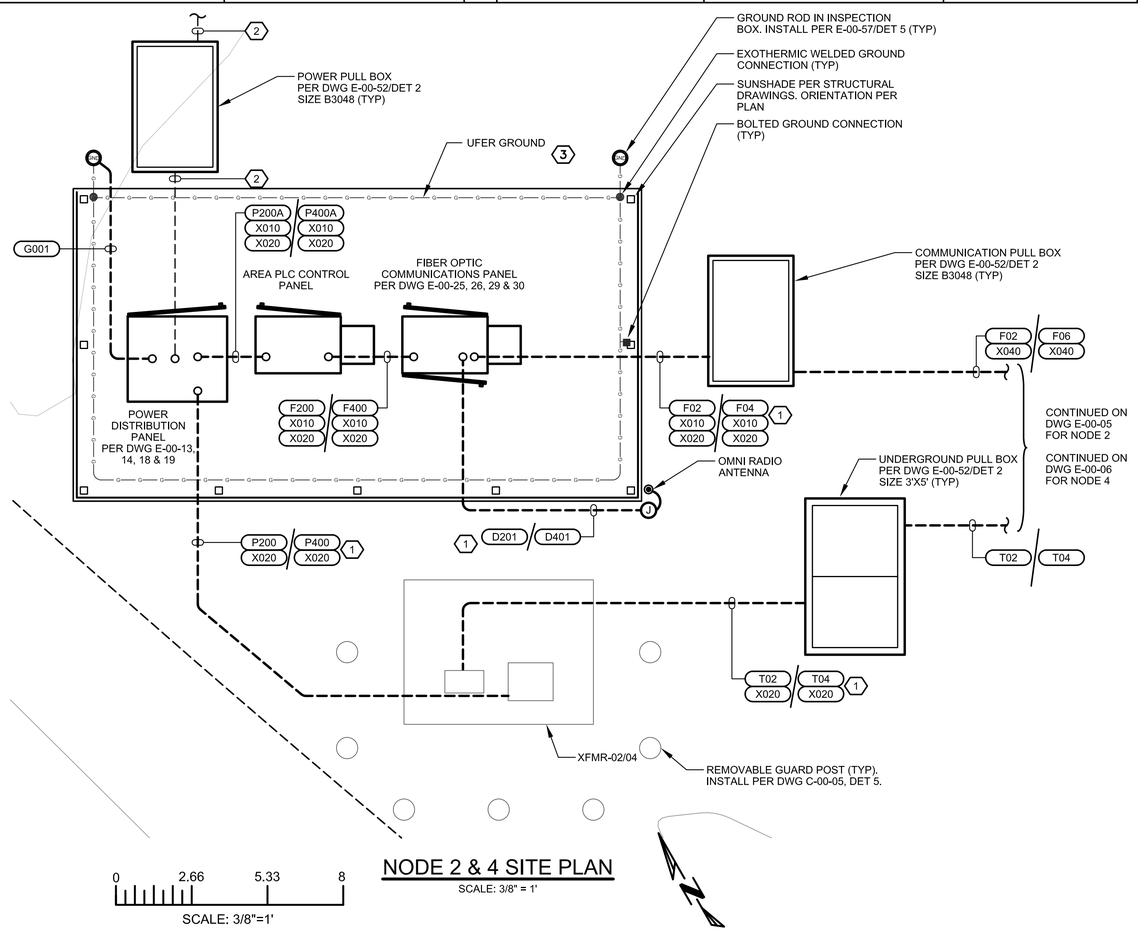
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-08	REV 2

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:36:17pm

FILENAME: E-00-02.dwg

N1808

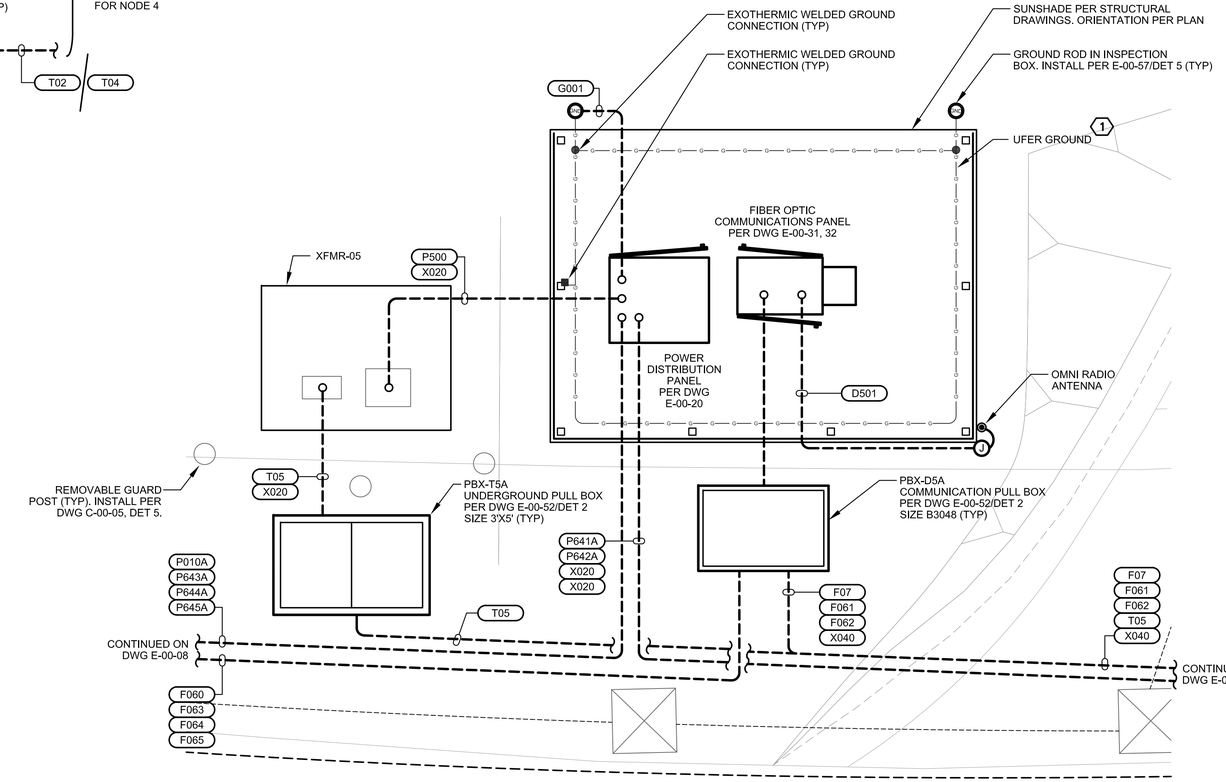


NODE 2 & 4 SITE PLAN

SCALE: 3/8" = 1'

DRAWING REFERENCED NOTES:

1. SIMILAR DIAGRAM FOR NODE NO. 2 AND 4.
   USE 2, 20 & 200 SERIES NUMBERING FOR NODE 2 CONDUITS AND DEVICES
   USE 4, 40 & 400 SERIES NUMBERING FOR NODE 4 CONDUITS AND DEVICES
2. POWER CONDUITS TO AREA WELLS. CONDUIT SIZE AND QUANTITY PER NODE POWER DISTRIBUTION DIAGRAM AND CIVIL DRAWINGS.
3. UFER GROUND SHALL CONSIST OF #2 BARE COPPER CONDUCTOR CENTERED IN CONCRETE PAD (25 FEET MINIMUM). LOOP CONDUCTOR TO FIT WITHIN CONCRETE PAD. MAINTAIN 3" MINIMUM COVER OVER ALL PORTIONS OF CONDUCTOR.



NODE 5 SITE PLAN

SCALE: 3/8" = 1'

DRAWING REFERENCED NOTES:

1. UFER GROUND SHALL CONSIST OF #2 BARE COPPER CONDUCTOR CENTERED IN CONCRETE PAD (25 FEET MINIMUM). LOOP CONDUCTOR TO FIT WITHIN CONCRETE PAD. MAINTAIN 3" MINIMUM COVER OVER ALL PORTIONS OF CONDUCTOR.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDDOWAY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

TYPICAL NODE SITE PLAN

GAS TRANSMISSION & DISTRIBUTION

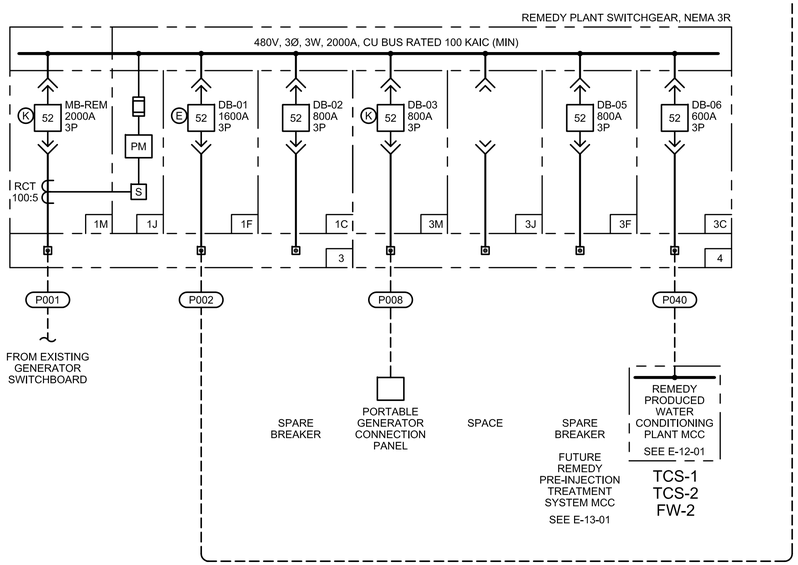
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-09	REV 2

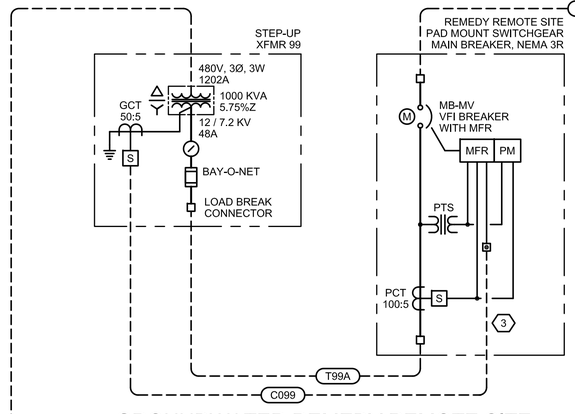
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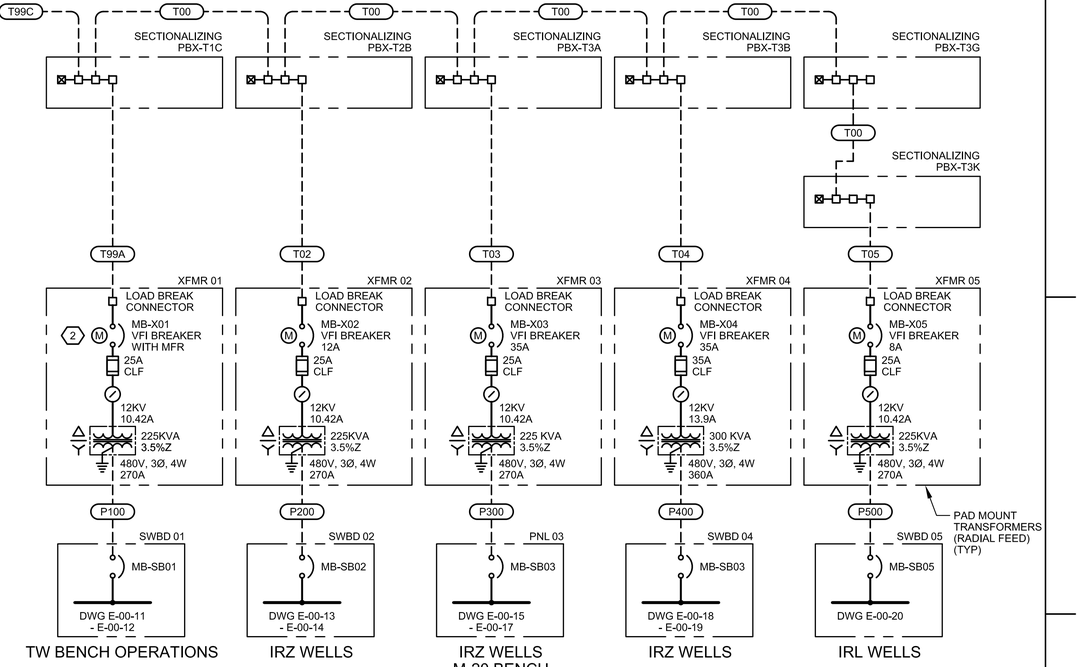
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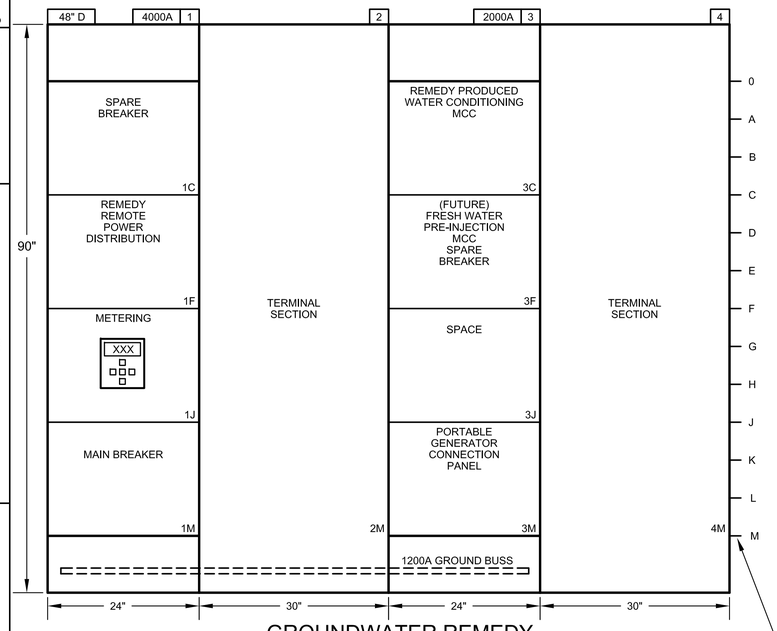
GROUNDWATER REMEDY
480V SWITCHGEAR ONE-LINE DIAGRAM



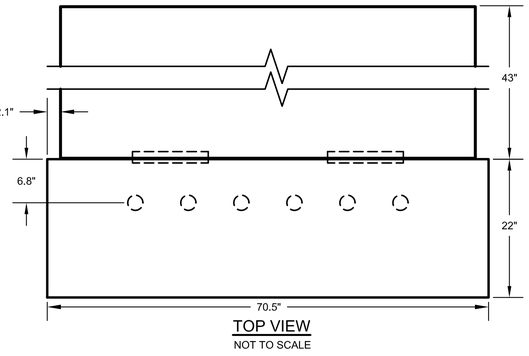
GROUNDWATER REMEDY REMOTE SITE
12KV PAD MOUNT SWITCHGEAR ONE-LINE DIAGRAM



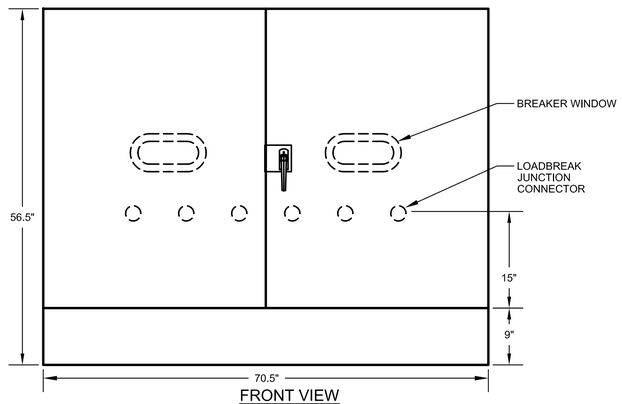
REMOTE SITE POWER DISTRIBUTION ONE-LINE DIAGRAM



GROUNDWATER REMEDY
480V SWITCHGEAR ELEVATION
(NEMA 3R)



TOP VIEW
NOT TO SCALE



FRONT VIEW

REMEDY REMOTE SITE
12KV PAD MOUNT SWITCHGEAR

LEGEND

- MFR — MULTI-FUNCTION PROTECTIVE RELAY
- PM — POWER MONITOR
- S — CT SHORTING TERMINAL BLOCK
- PTS — POTENTIAL TRANSFORMER, 120 / 69 V SECONDARY
- FUSE, CLF = CURRENT LIMITING FUSE
- TAP CHANGER
- (M) MOTORIZED OPERATOR
- (E) ELECTRICALLY OPERATED
- (K) KIRK-KEY INTERLOCK
- TRANSFORMER, 2 WINDING COILS
- FEED-THROUGH SECTIONALIZING RECEPTACLE
- SPARE SECTIONALIZING RECEPTACLE (1)
- DEAD FRONT RECEPTACLE, HOT STICK OPERABLE,
- TERMINATION LUGS, CABLE TO BUSS TRANSITION

DRAWING REFERENCED NOTES:

1. CAP UNUSED (SPARE) SECTIONALIZING RECEPTACLES.
2. MOTORIZED OPERATOR. OPERATOR SHALL OPEN ON LOSS OF VOLTAGE, CLOSE ON VOLTAGE RETURN WITH VARIABLE TIME DELAY. RELAY TO BE LOCATED WITHIN TERMINATION COMPARTMENT.
3. FURNISH SEPARATE 50/51 RELAY FOR GROUND FAULT DETECTION AS NEEDED. RELAY TO REPORT SUPERVISORY TRIP TO MULTI-FUNCTION RELAY. RELAY TO BE BASLER BE1-50/51M-204 OR EQUAL. RELAY TO BE ACCESSIBLE OUTSIDE OF TERMINATION COMPARTMENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIDDOWAY — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
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FOLSOM, CA 95630
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WWW.FRISCHENGINEERING.COM

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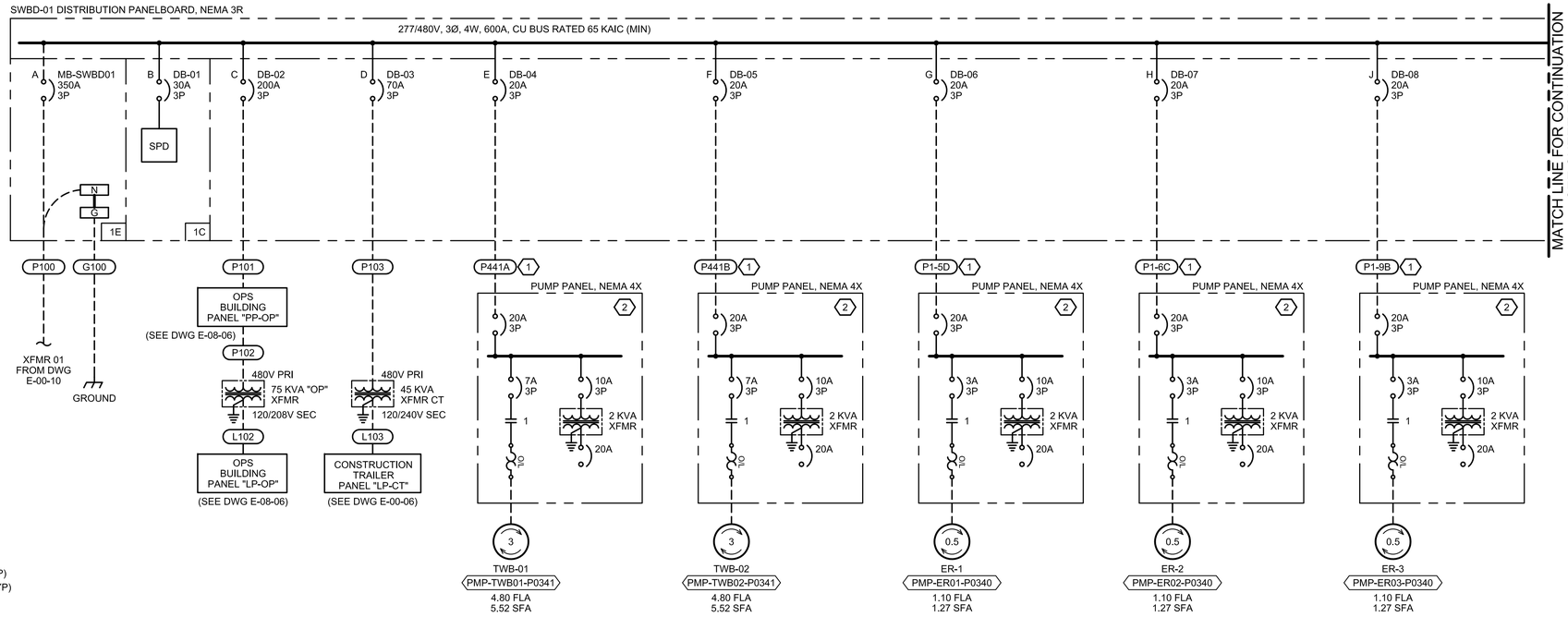
REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

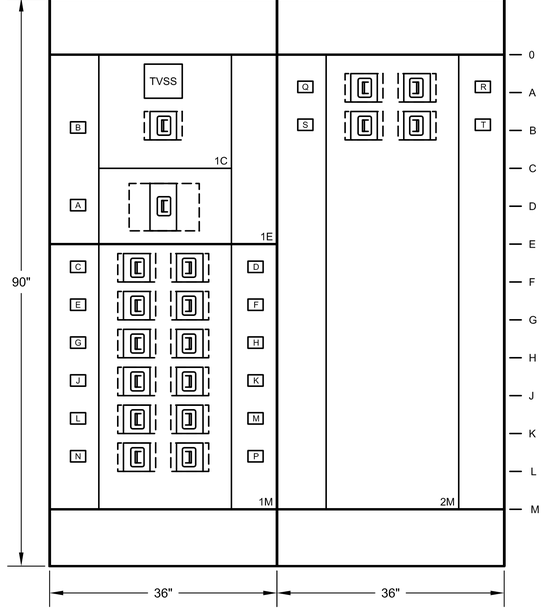
TOPOCK GROUNDWATER REMEDIATION PROJECT
GROUNDWATER REMEDY ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-10	REV 1

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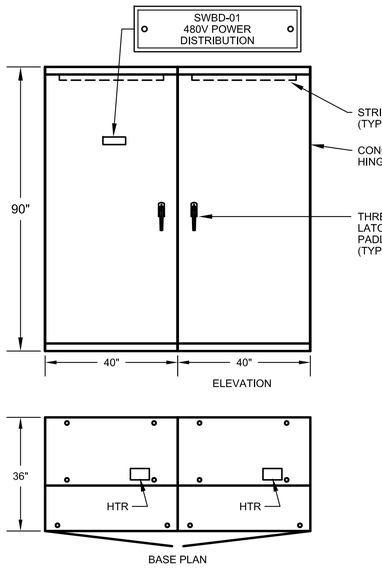


SWITCHBOARD ONE-LINE DIAGRAM (2)



DISTRIBUTION PANELBOARD ELEVATION

NOTES: 1. PROVIDE NEMA 3R ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.



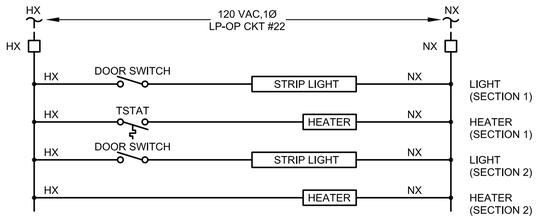
DISTRIBUTION PANELBOARD WEATHERWRAP

DRAWING REFERENCED NOTES:

1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS





PANELBOARD AUX. WIRING DIAGRAM

SWITCHBOARD GENERAL NOTES:

1. REAR ACCESS SHALL NOT BE REQUIRED TO SERVICE OR REPLACE SWITCHBOARD COMPONENTS.
2. EACH BREAKER SHALL HAVE A PADLOCKABLE HASP TO LOCK BREAKER IN THE OFF POSITION.
3. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE PER MANUFACTURER APPROVED IN SUBMITTAL.
4. PANEL SHALL BE SUITABLE FOR OUTDOOR INSTALLATION (NEMA 3R) WITH GASKETED DOORS AND SCREENED VENTS.

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	SURGE PROTECTION DEVICE	DISCONNECT	3/16"
C	OPERATIONS BLDG	DISCONNECT	3/16"
D	CONSTRUCTION TRAILER XFMR	DISCONNECT	3/16"
E	TWB-1 WELL	DISCONNECT	3/16"
F	TWB-2 WELL	DISCONNECT	3/16"
G	ER-1	DISCONNECT	3/16"
H	ER-2	DISCONNECT	3/16"
J	ER-3	DISCONNECT	3/16"
K	ER-4	DISCONNECT	3/16"
L	ER-6	DISCONNECT	3/16"
M	IRZ-39	DISCONNECT	3/16"
N	SPARE	DISCONNECT	3/16"
P	SPARE	DISCONNECT	3/16"
Q	SPARE	DISCONNECT	3/16"
R	SPARE	DISCONNECT	3/16"
S	SPARE	DISCONNECT	3/16"
T	SPARE	DISCONNECT	3/16"

PUMP PANEL ONE-LINE GENERAL NOTES:

1. SEE SHEET E-00-10 FOR TRANSFORMER DESIGN INFROMATION. TRANSFORMER IS SIZED TO ACCOMMODATE FUTURE PROVISIONAL EXPANSION.
2. ALL ELECTRICAL WELL ENCLOSURES DEPLOYED IN SUBGRADE VAULTS SHALL BE NEMA 4X.
3. SEAL OFF FITTINGS SALL BE INSTALLED ON ALL CONDUITS WHICH ENTER AND/OR EXIT CLASSIFIED AREAS. ELECTREAL INSTALLATION IN CLASS I, DIV II, ARE SHALL COMPLY WITH NEC ARTICLE 501.
4. EACH WELL PUMP JUNCTION BOX INSIDE WELL VAULT MUST BE LABELED INDICATING LOCKOUT/TAGOUT LOCATIN INSIDE ITS CORRESPONDING VALVE VAULT.
5. SEE CONDUIT AND WIRE SCHEDULE ON E-00-69 TO E-00-71 FOR CONDUIT AND WIRE SIZE.
6. SEE E-00-37 TO E-00-48 FOR COMBINATION STARTER INFROMATION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTA 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

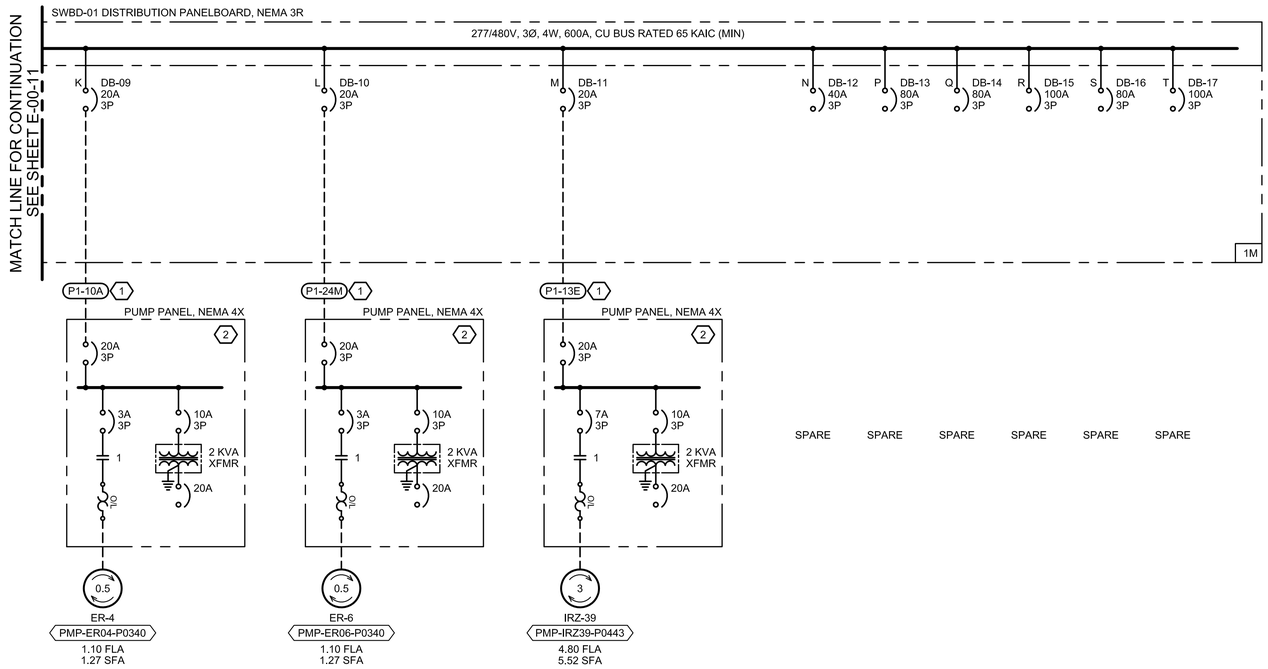
REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 1 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-11	REV 0

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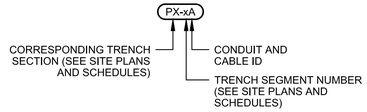


SWITCHBOARD ONE-LINE DIAGRAM 2

DRAWING REFERENCED NOTES:

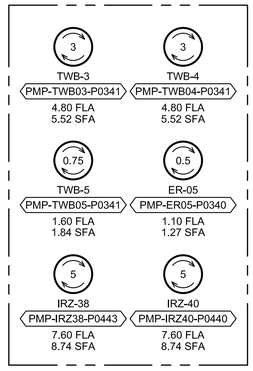
1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS



PUMP PANEL ONE-LINE GENERAL NOTES:

1. SEE SHEET E-00-10 FOR TRANSFORMER DESIGN INFROMATION. TRANSFORMER IS SIZED TO ACCOMMODATE FUTURE PROVISIONAL EXPANSION.
2. ALL ELECTRICAL WELL ENCLOSURES DEPLOYED IN SUBGRADE VAULTS SHALL BE NEMA 4X.
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4. EACH WELL PUMP JUNCTION BOX INSIDE WELL VAULT MUST BE LABELED INDICATING LOCKOUT/TAGOUT LOCATIN INSIDE ITS CORRESPONDING VALVE VAULT.
5. SEE CONDUIT AND WIRE SCHEDULE ON E-00-69 TO E-00-71 FOR CONDUIT AND WIRE SIZE.
6. SEE E-00-37 TO E-00-48 FOR COMBINATION STARTER INFROMATION.



FUTURE PROVISIONAL WELLS
(FUTURE PANELBOARD)

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOCHI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY	
RAO	

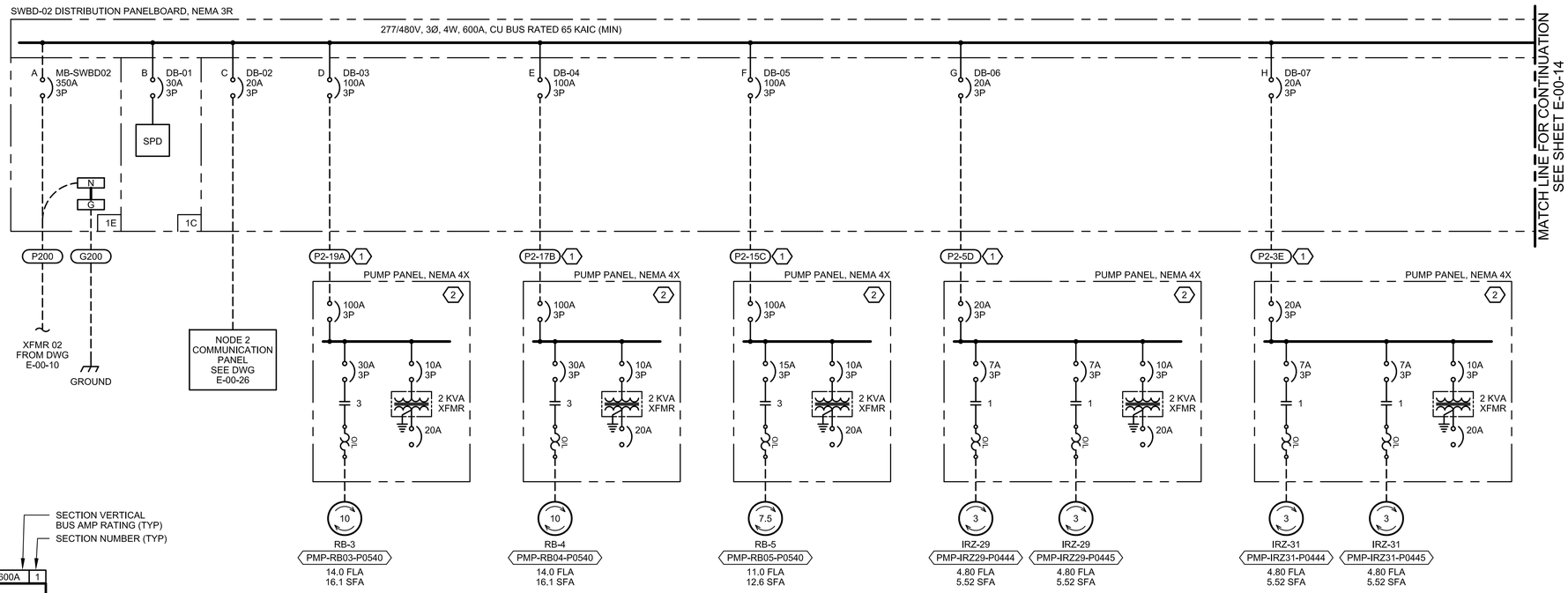
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SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 1 SWITCHBOARD
ONE-LINE DIAGRAM
CONTINUED
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

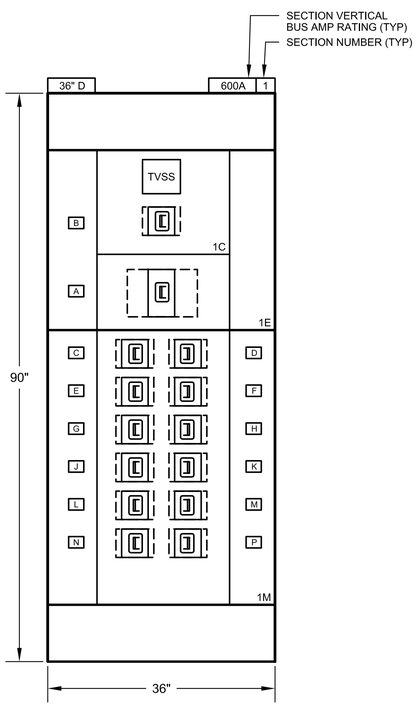
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BILL OF MATL	
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SHEET NO.	of SHEETS
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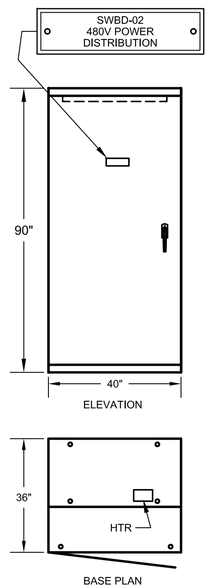


SWITCHBOARD ONE-LINE DIAGRAM (2)



DISTRIBUTION PANELBOARD ELEVATION

NOTES: 1. PROVIDE NEMA 3R ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.

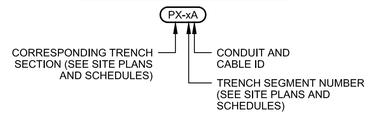


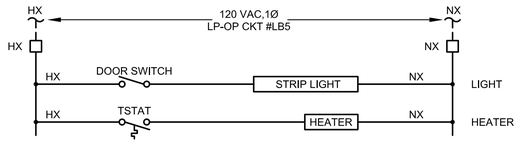
DISTRIBUTION PANELBOARD WEATHERWRAP

DRAWING REFERENCED NOTES:

1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS





PANELBOARD AUX. WIRING DIAGRAM

SWITCHBOARD GENERAL NOTES:

1. REAR ACCESS SHALL NOT BE REQUIRED TO SERVICE OR REPLACE SWITCHBOARD COMPONENTS.
2. EACH BREAKER SHALL HAVE A PADLOCKABLE HASP TO LOCK BREAKER IN THE OFF POSITION.
3. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE PER MANUFACTURER APPROVED IN SUBMITTAL.
4. PANEL SHALL BE SUITABLE FOR OUTDOOR INSTALLATION (NEMA 3R) WITH GASKETED DOORS AND SCREENED VENTS.

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	SURGE PROTECTION DEVICE	DISCONNECT	3/16"
C	NODE 2 COMM PANEL	DISCONNECT	3/16"
D	RB-3	DISCONNECT	3/16"
E	RB-4	DISCONNECT	3/16"
F	RB-5	DISCONNECT	3/16"
G	IRZ-29	DISCONNECT	3/16"
H	IRZ-31	DISCONNECT	3/16"
J	IRZ-33	DISCONNECT	3/16"
K	IRZ-35	DISCONNECT	3/16"
L	IRZ-37	DISCONNECT	3/16"
M	SPARE	DISCONNECT	3/16"
N	SPARE	DISCONNECT	3/16"
P	SPARE	DISCONNECT	3/16"

PUMP PANEL ONE-LINE GENERAL NOTES:

1. SEE SHEET E-00-10 FOR TRANSFORMER DESIGN INFROMATION. TRANSFORMER IS SIZED TO ACCOMMODATE FUTURE PROVISIONAL EXPANSION.
2. ALL ELECTRICAL WELL ENCLOSURES DEPLOYED IN SUBGRADE VAULTS SHALL BE NEMA 4X.
3. SEAL OFF FITTINGS SALL BE INSTALLED ON ALL CONDUITS WHICH ENTER AND/OR EXIT CLASSIFIED AREAS. ELECTREAL INSTALLATION IN CLASS I, DIV II, ARE SHALL COMPLY WITH NEC ARTICLE 501.
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5. SEE CONDUIT AND WIRE SCHEDULE ON E-00-69 TO E-00-71 FOR CONDUIT AND WIRE SIZE.
6. SEE E-00-37 TO E-00-48 FOR COMBINATION STARTER INFROMATION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
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ARCADIS

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REVISIONS

APPROVED BY: RAO

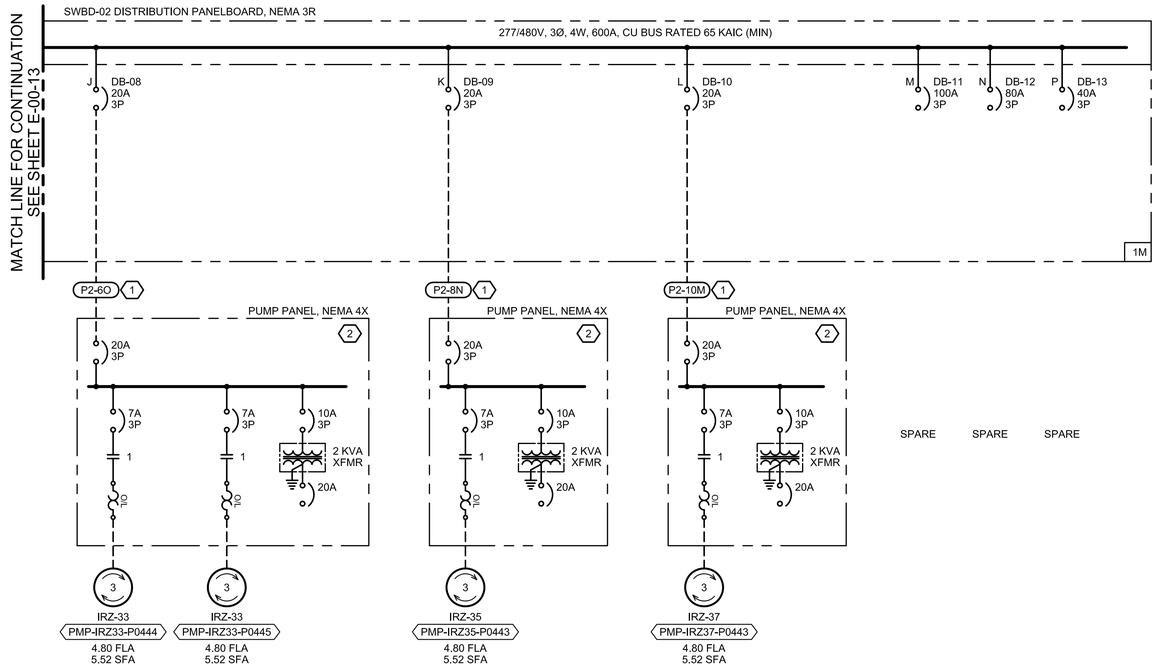
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 2 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. E-00-13 of SHEETS
REV 0

FILENAME: E-00-13.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:43:45pm

N1806

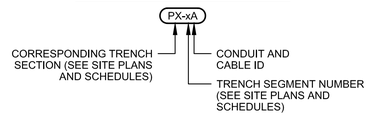


SWITCHBOARD ONE-LINE DIAGRAM (2)

DRAWING REFERENCED NOTES:

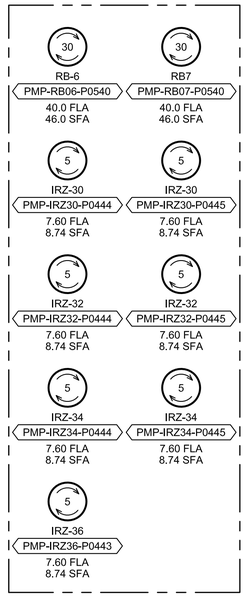
1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS



PUMP PANEL ONE-LINE GENERAL NOTES:

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5. SEE CONDUIT AND WIRE SCHEDULE ON E-00-69 TO E-00-71 FOR CONDUIT AND WIRE SIZE.
6. SEE E-00-37 TO E-00-48 FOR COMBINATION STARTER INFROMATION.



FUTURE PROVISIONAL WELLS (FUTURE PANELBOARD)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

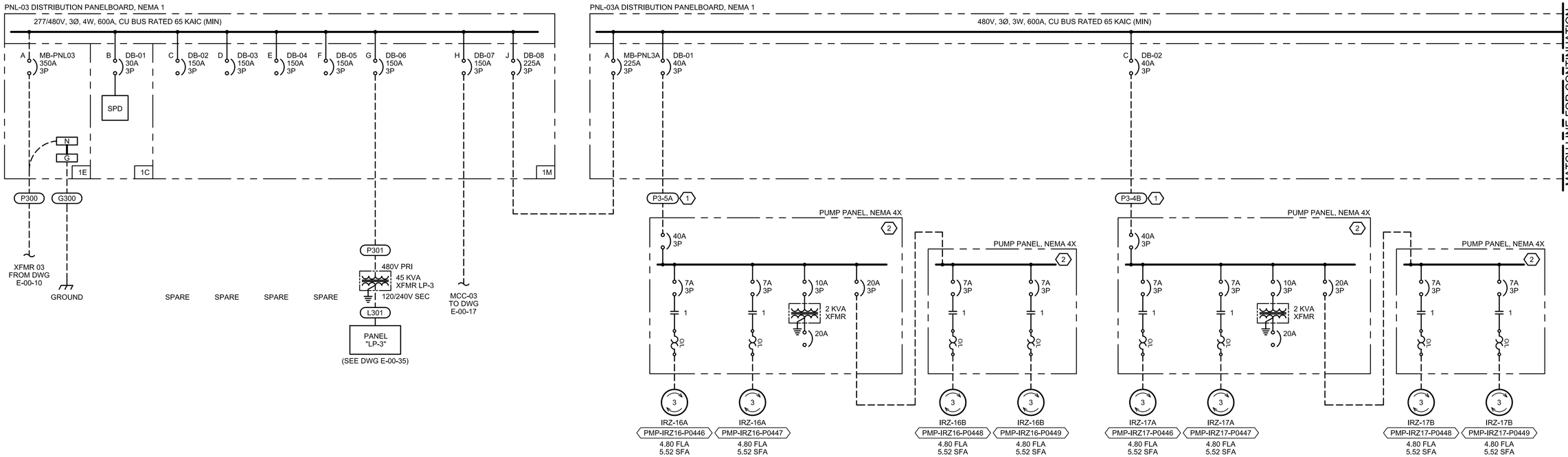
APPROVED BY	
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SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 2 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

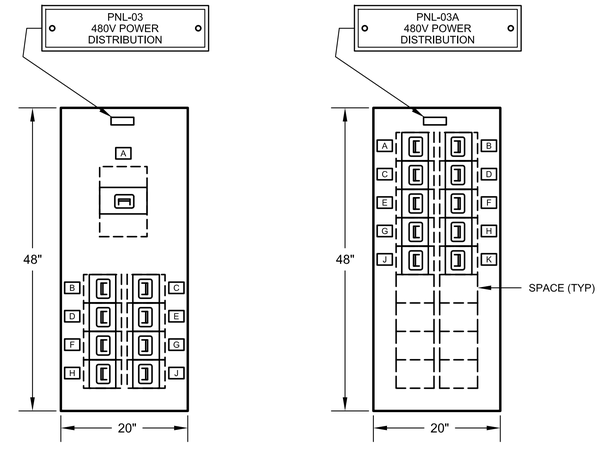
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SWITCHBOARD ONE-LINE DIAGRAM



PANELBOARD 03
PNL-03
ELEVATION

NOTES: 1. PROVIDE NEMA 1 ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.

PANELBOARD 03A
PNL-03A
ELEVATION

NOTES: 1. PROVIDE NEMA 1 ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.

PANELBOARD PNL-3
NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	SURGE PROTECTION DEVICE	DISCONNECT	3/16"
C	SPARE	DISCONNECT	3/16"
D	SPARE	DISCONNECT	3/16"
E	SPARE	DISCONNECT	3/16"
F	SPARE	DISCONNECT	3/16"
G	PANEL LP-3	DISCONNECT	3/16"
H	MCC-03	DISCONNECT	3/16"
J	PANELBOARD PNL-03A	DISCONNECT	3/16"

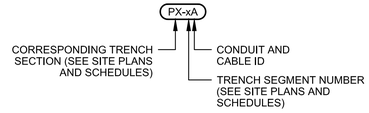
PANELBOARD PNL-3A
NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	IRZ-16	DISCONNECT	3/16"
C	IRZ-17	DISCONNECT	3/16"
D	IRZ-19	DISCONNECT	3/16"
E	IRZ-20	DISCONNECT	3/16"
F	IRZ-21	DISCONNECT	3/16"
G	IRZ-23	DISCONNECT	3/16"
H	IRZ-25	DISCONNECT	3/16"
J	IRZ-27	DISCONNECT	3/16"
K	SPARE	DISCONNECT	3/16"
L	SPARE	DISCONNECT	3/16"
M	SPARE	DISCONNECT	3/16"

DRAWING REFERENCED NOTES:

1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS



PUMP PANEL ONE-LINE GENERAL NOTES:

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CONSULTING ELECTRICAL ENGINEERS
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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

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1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

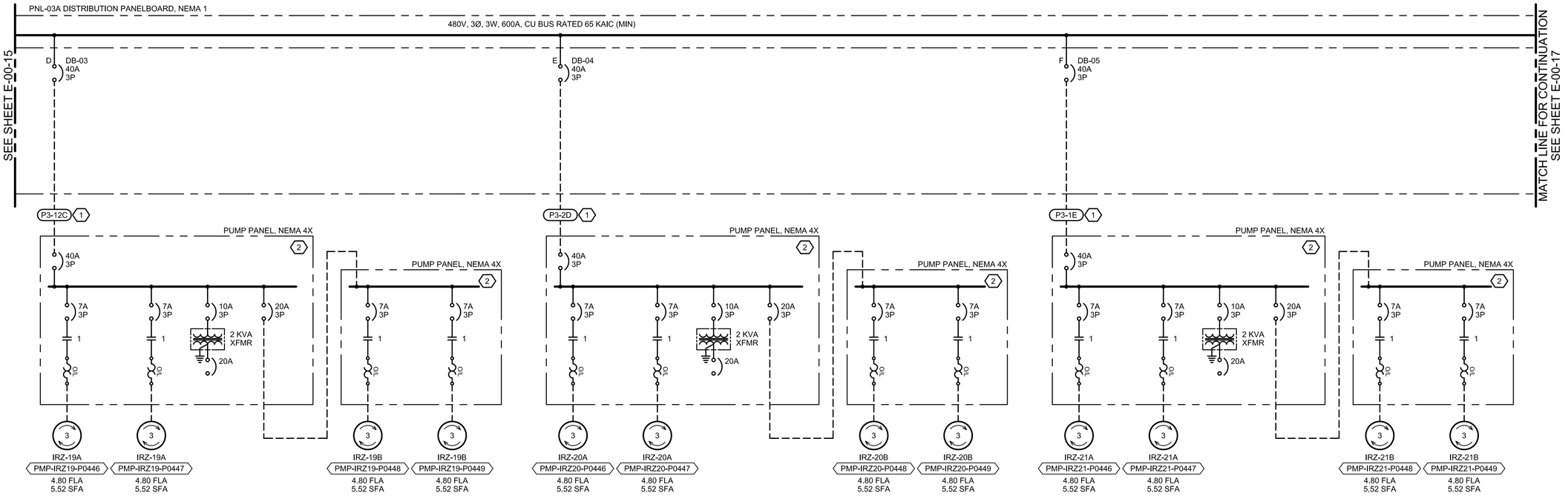
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SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 3 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
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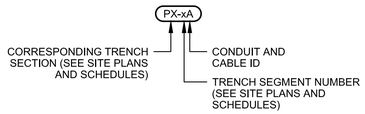


SWITCHBOARD ONE-LINE DIAGRAM

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CONDUIT AND CABLE TAGS



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WWW.FRISCHENGINEERING.COM

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0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

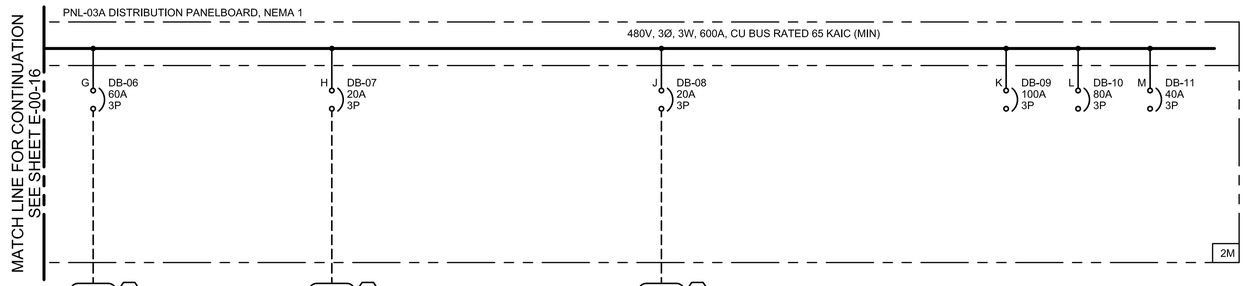
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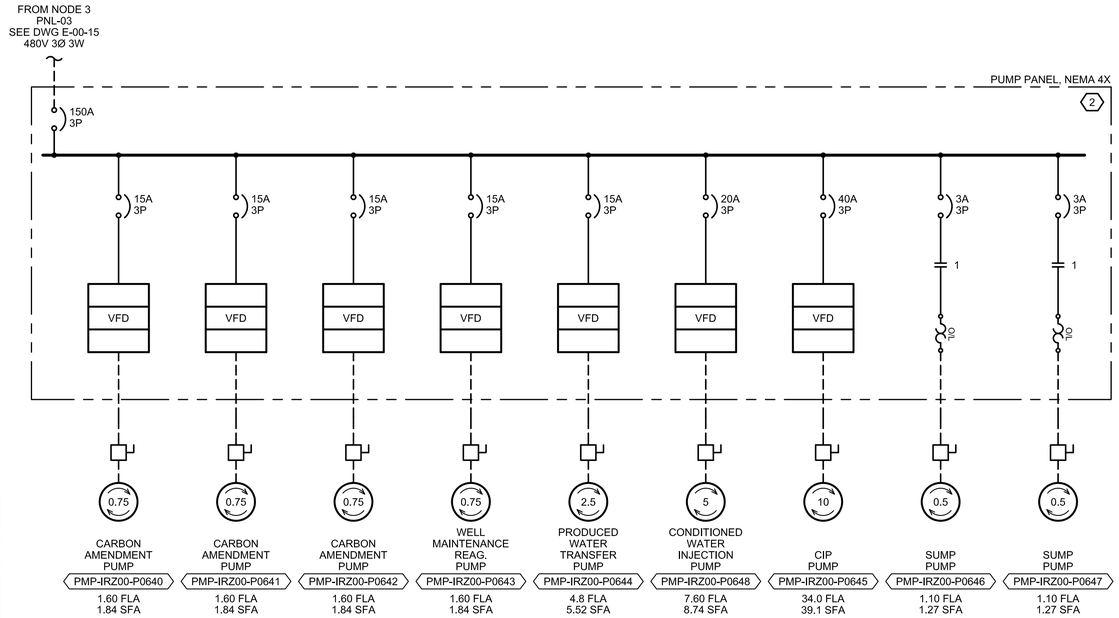
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	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 3 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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BILL OF MATL	
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SUPSDS	
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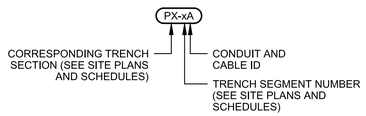


SWITCHBOARD ONE-LINE DIAGRAM

DRAWING REFERENCED NOTES:

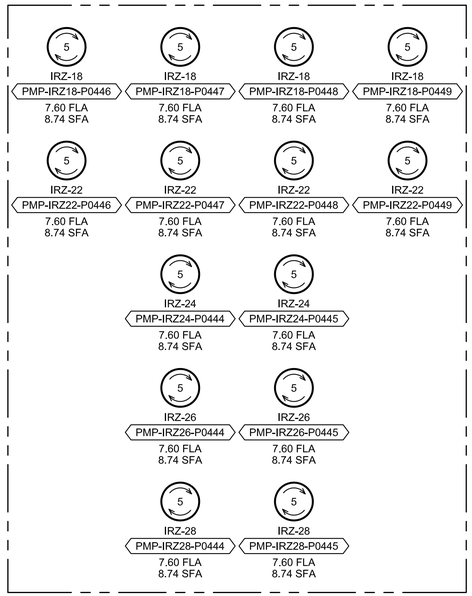
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CONDUIT AND CABLE TAGS



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FUTURE PROVISIONAL WELLS
(FUTURE PANELBOARD)

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIGOTA
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

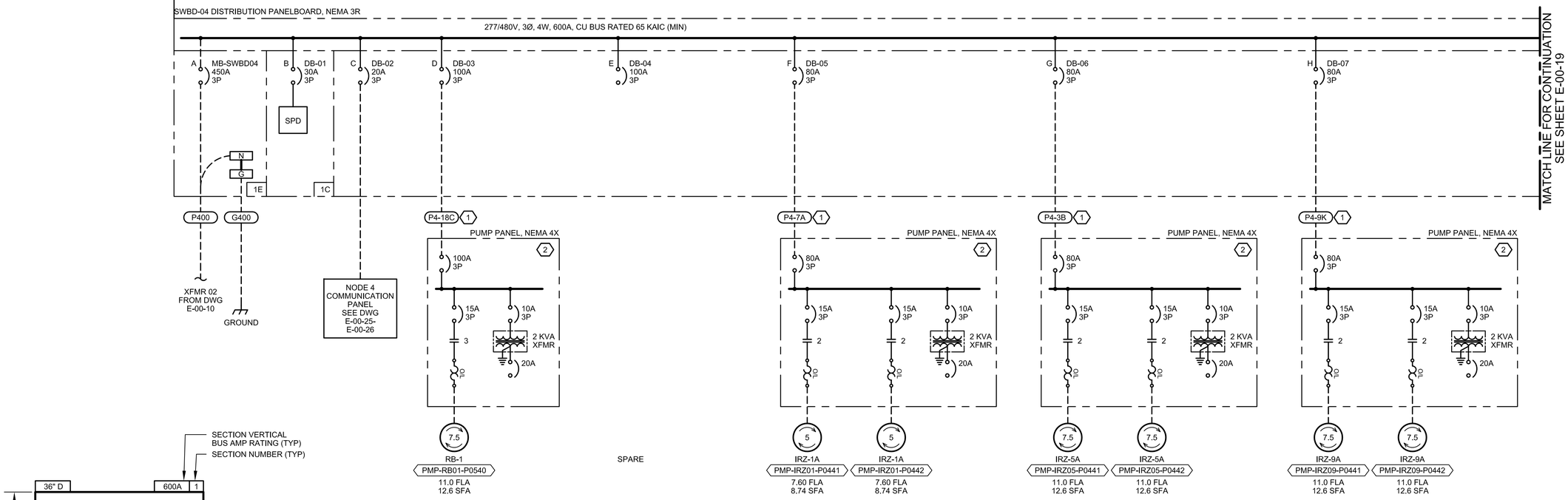
REVISIONS

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SCALES	N/A

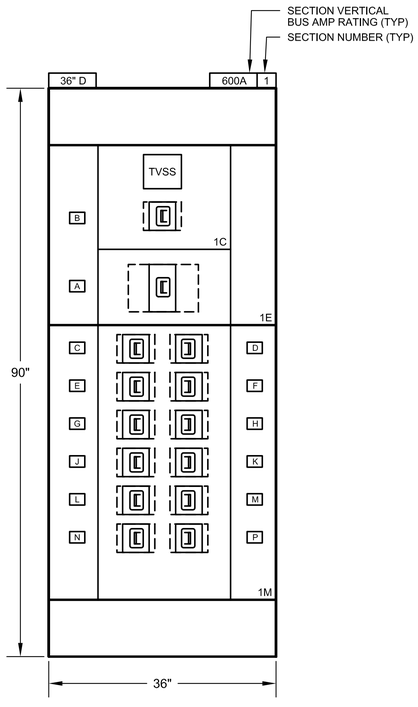
TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 3 SWITCHBOARD
ONE-LINE DIAGRAM
CONTINUED
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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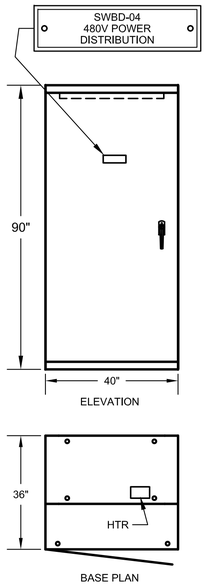


SWITCHBOARD ONE-LINE DIAGRAM (2)



DISTRIBUTION PANELBOARD ELEVATION

NOTES: 1. PROVIDE NEMA 3R ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.

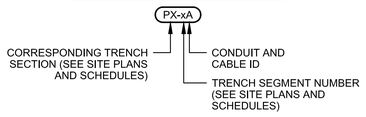


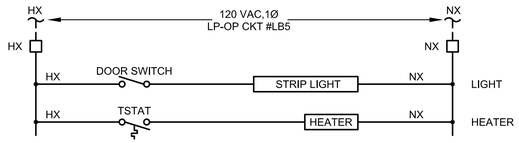
DISTRIBUTION PANELBOARD WEATHERWRAP

DRAWING REFERENCED NOTES:

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CONDUIT AND CABLE TAGS





PANELBOARD AUX. WIRING DIAGRAM

SWITCHBOARD GENERAL NOTES:

1. REAR ACCESS SHALL NOT BE REQUIRED TO SERVICE OR REPLACE SWITCHBOARD COMPONENTS.
2. EACH BREAKER SHALL HAVE A PADLOCKABLE HASP TO LOCK BREAKER IN THE OFF POSITION.
3. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE PER MANUFACTURER APPROVED IN SUBMITTAL.
4. PANEL SHALL BE SUITABLE FOR OUTDOOR INSTALLATION (NEMA 3R) WITH GASKETED DOORS AND SCREENED VENTS.

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	SURGE PROTECTION DEVICE	DISCONNECT	3/16"
C	NODE 4 COMM PANEL	DISCONNECT	3/16"
D	RB-1	DISCONNECT	3/16"
E	SAPRE	DISCONNECT	3/16"
F	IRZ-1A	DISCONNECT	3/16"
G	IRZ-5A	DISCONNECT	3/16"
H	IRZ-9A	DISCONNECT	3/16"
J	IRZ-11	DISCONNECT	3/16"
K	IRZ-13	DISCONNECT	3/16"
L	IRZ-15	DISCONNECT	3/16"
M	SPARE	DISCONNECT	3/16"
N	SPARE	DISCONNECT	3/16"
P	SPARE	DISCONNECT	3/16"

PUMP PANEL ONE-LINE GENERAL NOTES:

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CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

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1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

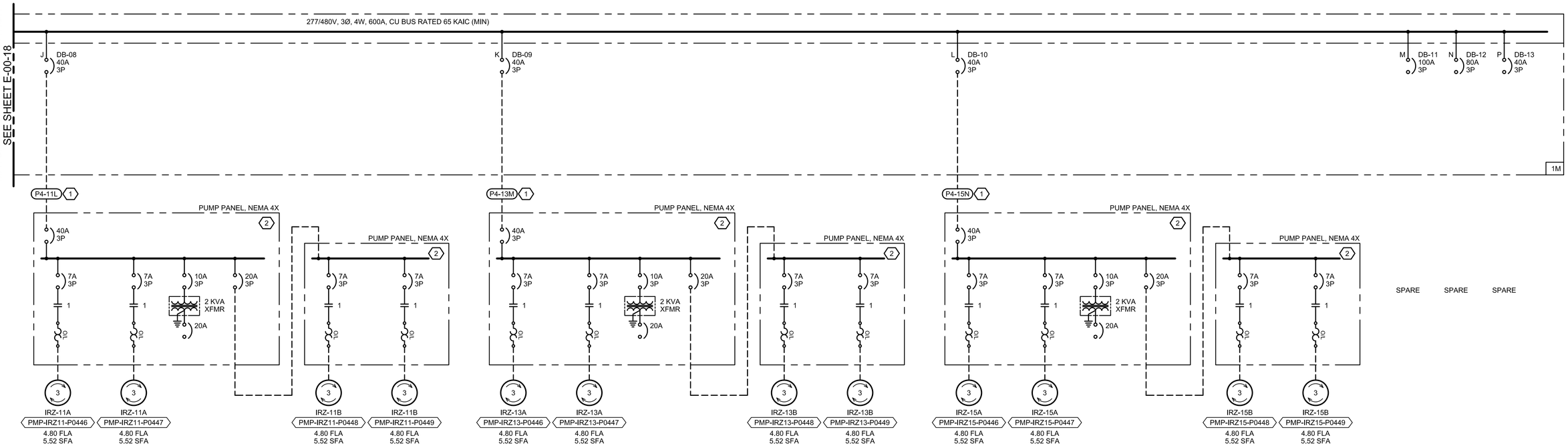
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SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 4 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
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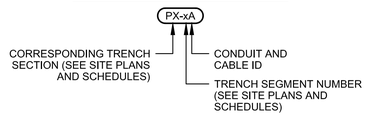
SWITCHBOARD ONE-LINE DIAGRAM (2)

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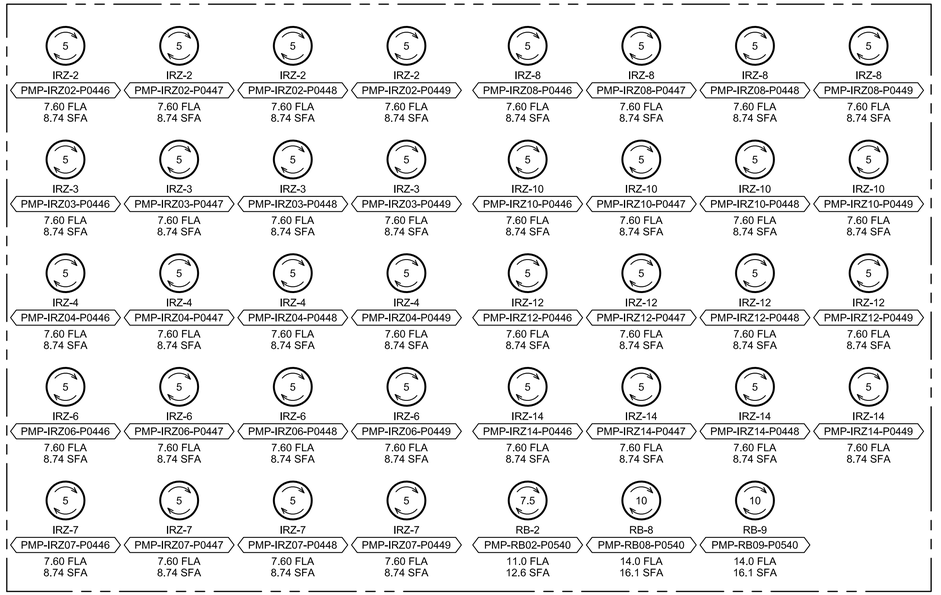
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CONDUIT AND CABLE TAGS



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FUTURE PROVISIONAL WELLS
(FUTURE PANELBOARD)

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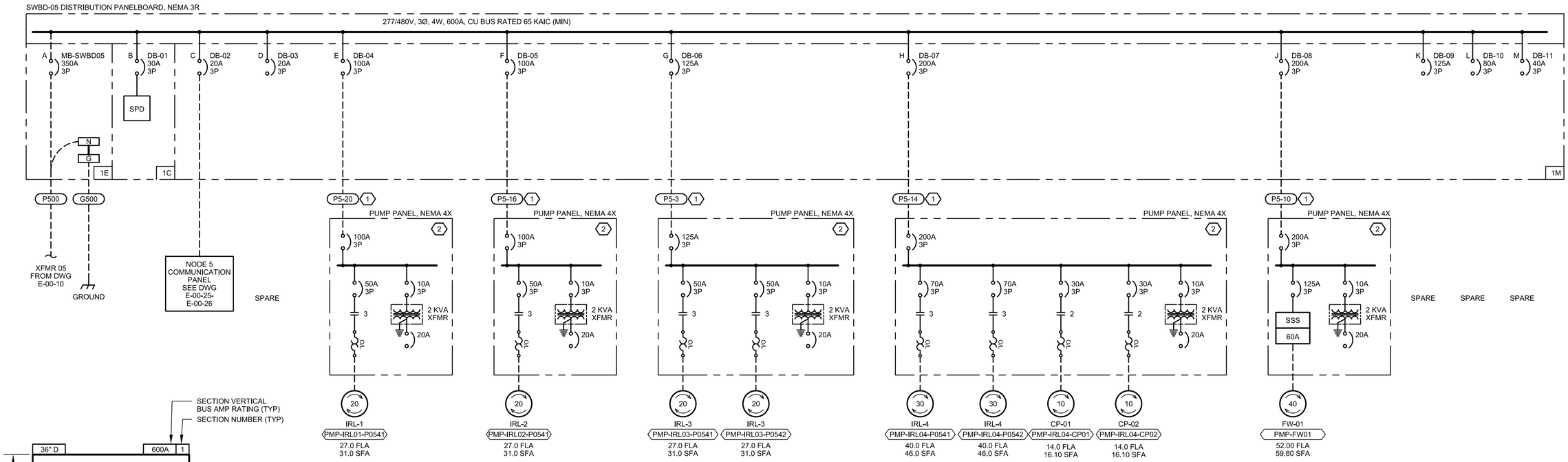
REVISIONS

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	OK JMS
	DATE
	SCALES N/A

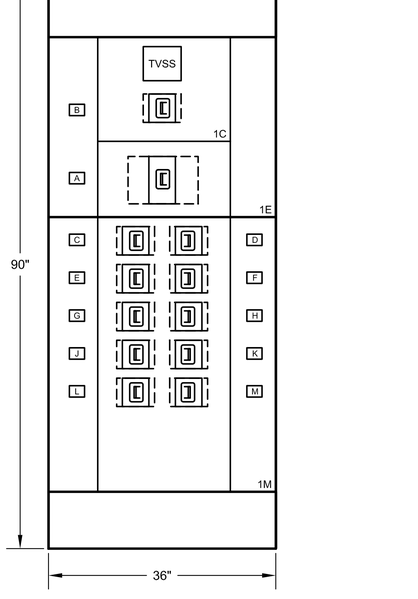
TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 4 SWITCHBOARD ONE-LINE DIAGRAM CONTINUED
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-19	REV 0

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:44:48pm
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N1808

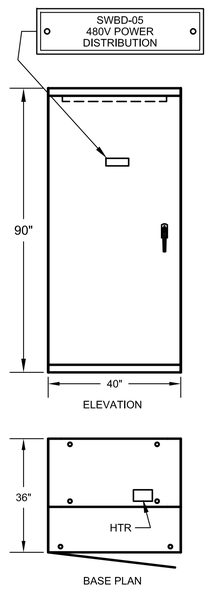


SWITCHBOARD ONE-LINE DIAGRAM 2



DISTRIBUTION PANELBOARD ELEVATION

NOTES: 1. PROVIDE NEMA 3R ENCLOSURE
2. PROVIDE NAMEPLATES PER SCHEDULE THIS PAGE.

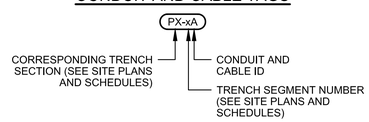


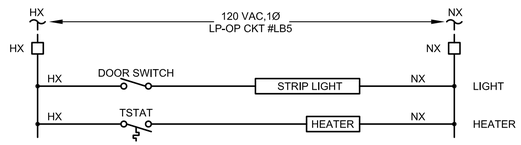
DISTRIBUTION PANELBOARD WEATHERWRAP

DRAWING REFERENCED NOTES:

1. CONDUIT TAG REPRESENTS TERMINATING SEGMENT OF DUCTBANK ONLY. ADDITIONAL SEGMENTS MAY BE REQUIRED AS SHOWN ON SITE PLANS AND SCHEDULES.
2. MOTOR CONTROL EQUIPMENT SIZED FOR MAXIMUM HORSEPOWER. MCP BREAKER SIZED FOR CONNECTED LOAD SHOWN. SEE LOAD CALCULATIONS ON E-00-35 FOR MAXIMUM HORSEPOWER.

CONDUIT AND CABLE TAGS





PANELBOARD AUX. WIRING DIAGRAM

SWITCHBOARD GENERAL NOTES:

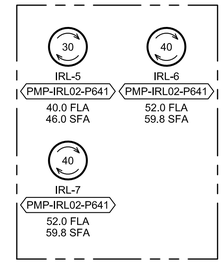
1. REAR ACCESS SHALL NOT BE REQUIRED TO SERVICE OR REPLACE SWITCHBOARD COMPONENTS.
2. EACH BREAKER SHALL HAVE A PADLOCKABLE HASP TO LOCK BREAKER IN THE OFF POSITION.
3. ALL DIMENSIONS ARE APPROXIMATE. ACTUAL DIMENSIONS SHALL BE PER MANUFACTURER APPROVED IN SUBMITTAL.
4. PANEL SHALL BE SUITABLE FOR OUTDOOR INSTALLATION (NEMA 3R) WITH GASKETED DOORS AND SCREENED VENTS.

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	LINE 2	LETTER HEIGHT
A	MAIN	DISCONNECT	3/16"
B	SURGE PROTECTION DEVICE	DISCONNECT	3/16"
C	NODE 5 COMM PANEL	DISCONNECT	3/16"
D	SPARE	DISCONNECT	3/16"
E	IRL01	DISCONNECT	3/16"
F	IRL02	DISCONNECT	3/16"
G	IRL03	DISCONNECT	3/16"
H	IRL04	DISCONNECT	3/16"
J	FW01	DISCONNECT	3/16"
K	SPARE	DISCONNECT	3/16"
L	SPARE	DISCONNECT	3/16"
M	SPARE	DISCONNECT	3/16"

PUMP PANEL ONE-LINE GENERAL NOTES:

1. SEE SHEET E-00-10 FOR TRANSFORMER DESIGN INFROMATION. TRANSFORMER IS SIZED TO ACCOMMODATE FUTURE PROVISIONAL EXPANSION.
2. ALL ELECTRICAL WELL ENCLOSURES DEPLOYED IN SUBGRADE VAULTS SHALL BE NEMA 4X.
3. SEAL OFF FITTINGS SALL BE INSTALLED ON ALL CONDUITS WHICH ENTER AND/OR EXIT CLASSIFIED AREAS. ELECTREAL INSTALLATION IN CLASS I, DIV II, ARE SHALL COMPLY WITH NEC ARTICLE 501.
4. EACH WELL PUMP JUNCTION BOX INSIDE WELL VAULT MUST BE LABELED INDICATING LOCKOUT/TAGOUT LOCATIN INSIDE ITS CORRESPONDING VALVE VAULT.
5. SEE CONDUIT AND WIRE SCHEDULE ON E-00-69 TO E-00-71 FOR CONDUIT AND WIRE SIZE.
6. SEE E-00-37 TO E-00-48 FOR COMBINATION STARTER INFROMATION.



FUTURE PROVISIONAL WELLS (FUTURE PANELBOARD)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY: RAO


SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 5 SWITCHBOARD ONE-LINE DIAGRAM AND ELEVATION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. E-00-20 of SHEETS
REV 0

FILENAME: E-00-20.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:44:56pm

N1808



REMEDY SCADA SYSTEM COMMUNICATIONS BLOCK DIAGRAM (2)

NOTES:

1. MULTIPLE WICS PER LOCATION. REFERENCE COMMUNICATIONS PANEL LAYOUTS ON DRAWINGS E-00-22 THRU E-00-32 FOR QUANTITY REQUIRED IN EACH PANEL.
2. TERMINATE ALL FIBER AND COPPER CABLES. SPARE TERMINATION ARE NOT SHOWN.
3. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

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NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

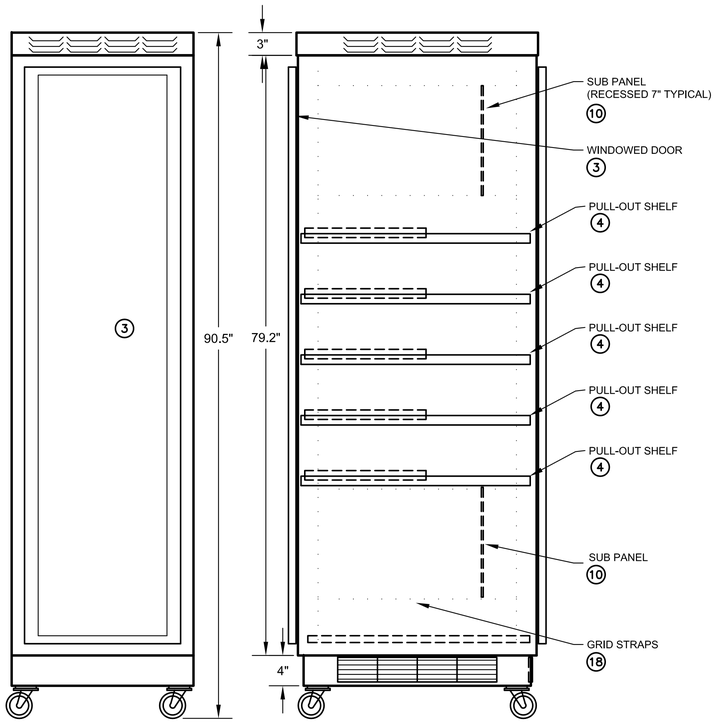
REVISIONS

APPROVED BY: RAO
SO
SUPV JMS
DSGN MBY
DWN MBY
CHKD TPF
OK JMS
DATE
SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMEDY SCADA SYSTEM
BLOCK DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

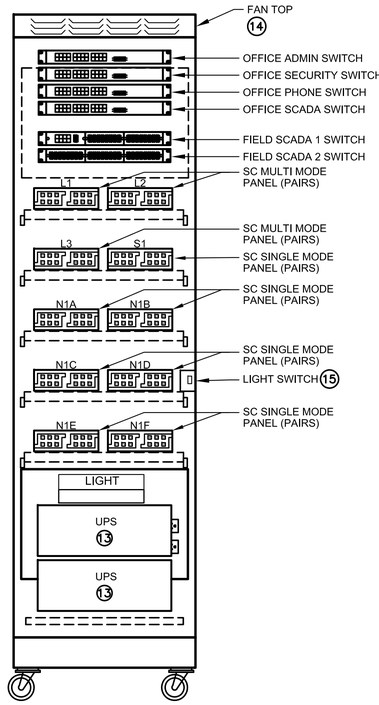
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BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
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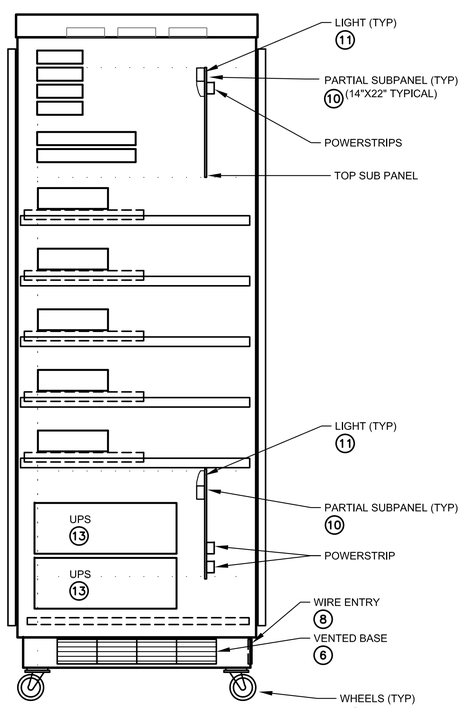


FRONT VIEW

SIDE VIEW



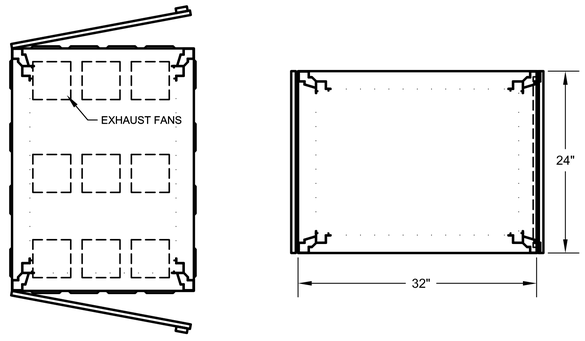
FRONT VIEW



SIDE VIEW
WITH SIDE PANEL REMOVED

COMMUNICATIONS PANEL EQUIPMENT LAYOUT

SCALE: 1" = 10"



TOP VIEW

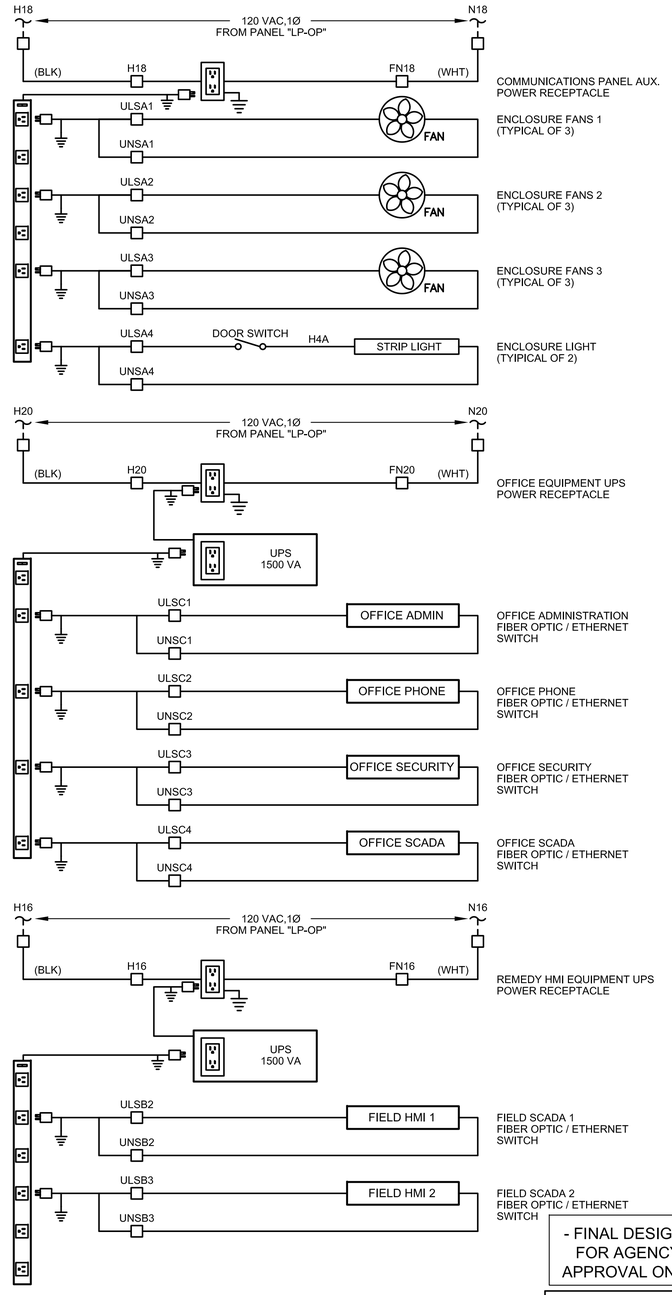
BOTTOM VIEW

COMMUNICATIONS PANEL ELEVATION

SCALE: 1" = 10"

BILL OF MATERIALS

REFERENCE CIRCLED NUMBER	DESCRIPTION	MANUFACTURE	PART NUMBER
1	PROLINE-PC MODULAR ENCLOSURE	HOFFMAN	EER43U6080
2	NOT USED		
3	WINDOW DOOR WITH LARGE WINDOW	HOFFMAN	EERPD43U
4	PROLINE FRAME FULL EXTENTION PULL-OUT SHELF	HOFFMAN	PFSHP66
5	PROLINE VENTED FRAME SHELF	HOFFMAN	PFSH66
6	PROLINE 100MM PLINTH BASE	HOFFMAN	PPB168
6	PROLINE VENTED SECTIONS FOR PLINTH BASE	HOFFMAN	PPBCV1600
7	NOT USED		
8	PROLINE CABLE ENTRY GLAND PLATE	HOFFMAN	PCEGP
9	PROLINE CASTER KIT	HOFFMAN	PC1M12
10	PROLINE PARTIAL SUBPANEL	HOFFMAN	PPP46
11	PROLINE FLUORESCENT LIGHT	HOFFMAN	ALF16M12R
12	15A POWERSTRIP WITH MINIMUM 6 SOCKETS AND 6FT LONG CORD	LEVITON	AS DESCRIBED
13	UNINTERRUPTIBLE POWER SUPPLY	APC	SUA1500XL-NETPKG
14	PROLINE VENTED TOP WITH INTEGRAL FAN TRAY	HOFFMAN	PVT3F861
15	PROLINE MANUAL LIGHT SWITCH KIT	HOFFMAN	PLFSWM
16	FLAT PANEL WALL MOUNT WITH DUAL ARTICULATING ARM WITH UNIVERSAL 4 BOLT MOUNTING.	SATECHI	B000X3D7V8
17	NOT USED		
18	GRID STRAPS	HOFFMAN	P-GH1S8
19	F.O. SWITCH	PER SPEC	PER SPEC
20	NOT USED		
21	NOT USED		
22	NOT USED		
23	NOT USED		
24	NOT USED		



COMMUNICATIONS PANEL WIRING DIAGRAM

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH
COMMUNICATION PANEL 1
ELEVATION & LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

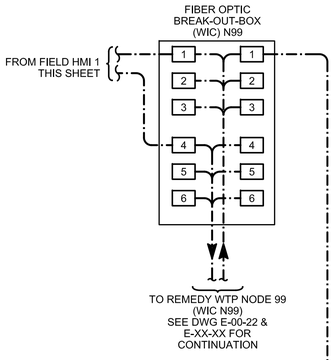
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SHEET NO.	of SHEETS
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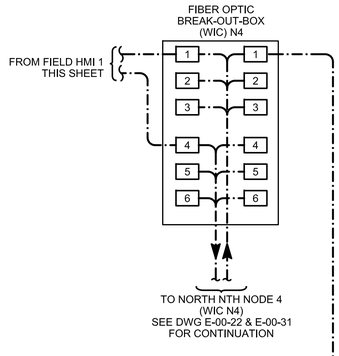
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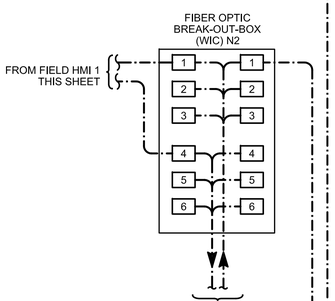
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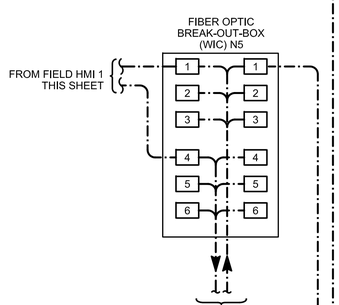
FIBER OPTIC SWITCH CONNECTION DIAGRAM

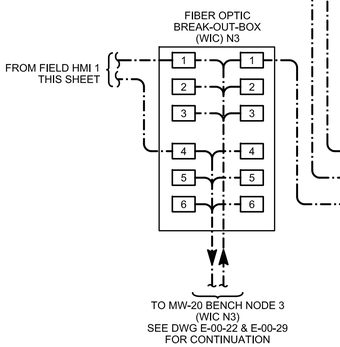
LEGEND	
SYMBOL	DESCRIPTION
——·—·——	SINGLE MODE FIBER OPTIC CABLE
———·———	MULTI-MODE FIBER OPTIC CABLE
- - - - - -	10/100BASE-TX CAT5E CABLE

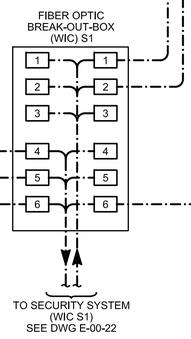


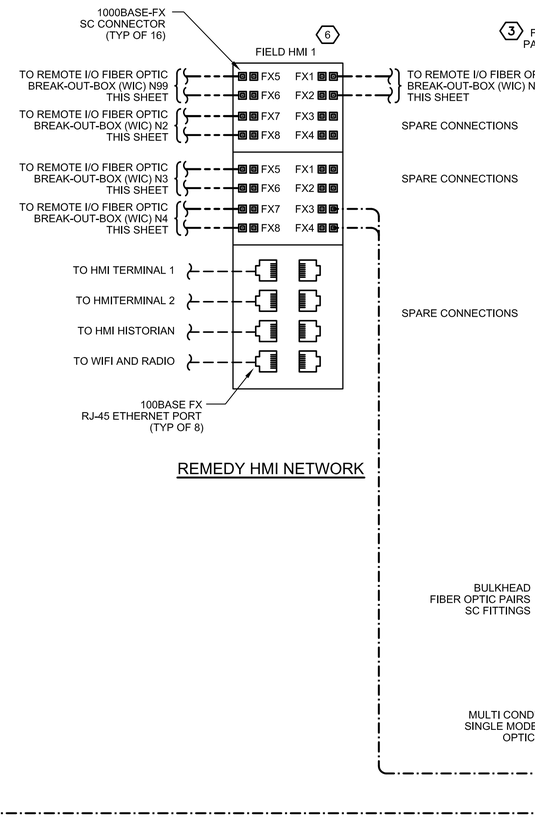


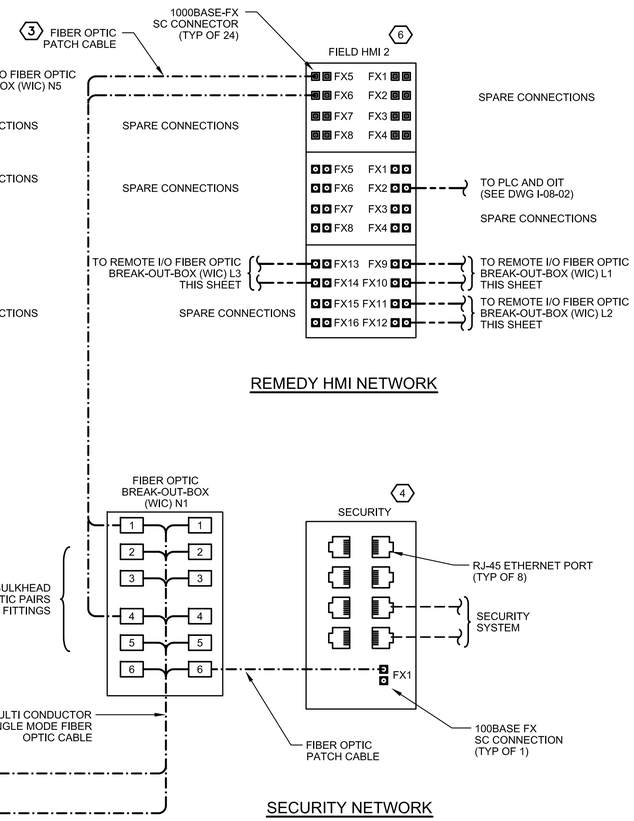


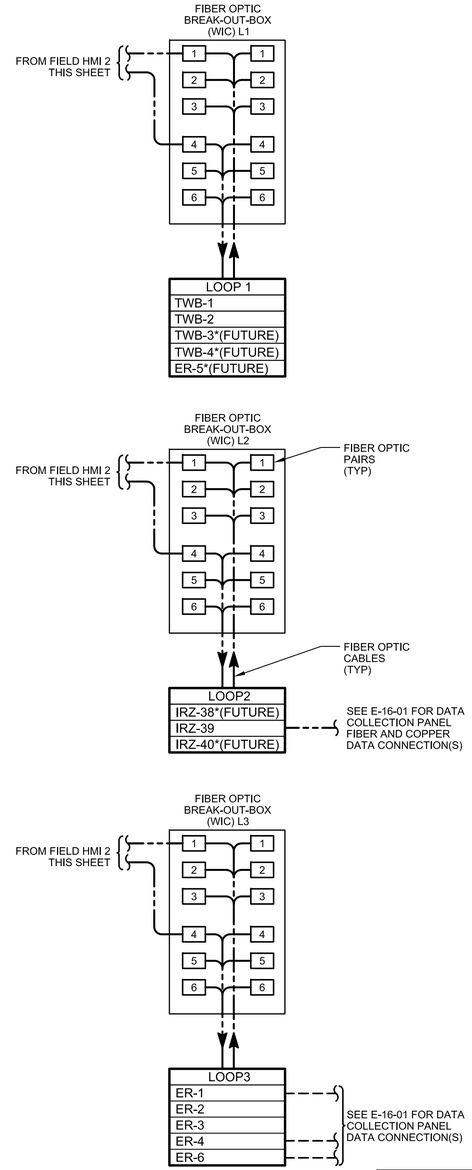












FIBER OPTIC BREAK-OUT-BOX (WIC) DIAGRAMS

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.
2. LC CONNECTOR FOR SINGLEMODE FIBER.
3. PATCH CABLE SHALL BE COORDINATED WITH FIBER CONNECTOR AND ETHERNET SWITCH.
4. SWITCH MODEL NTRON 309FXE-N-SC-15 OR EQUIVALENT.
5. SWITCH MODEL NTRON 309FX-N-SC OR EQUIVALENT.
6. SWITCH MODEL NTRON NT24k-DR24 WITH (2)NT24k-FX8-SC AND (1) NT24K-GXE8-SC-10 OR EQUIVALENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY
RAO

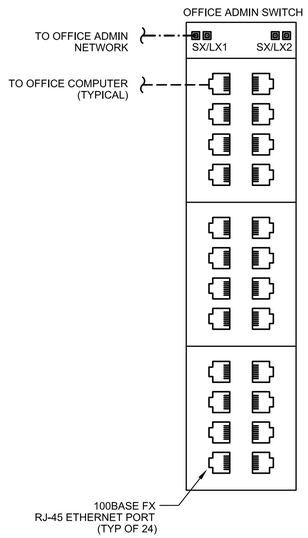
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH COMMUNICATION PANEL 1 SCHEMATIC 1
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

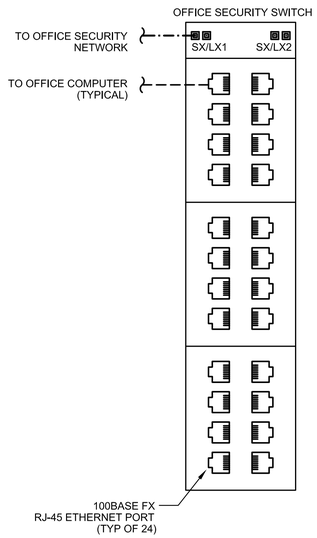
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BILL OF MATL	
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SUPSDS	
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SHEET NO.	of SHEETS
E-00-23	REV 1

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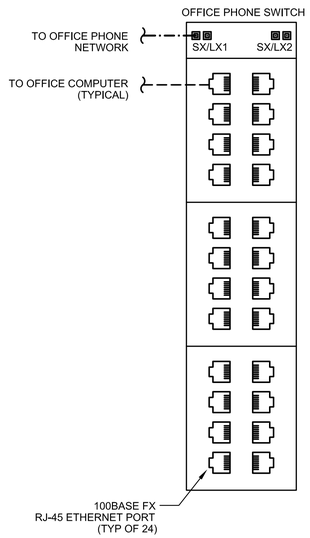
LEGEND	
SYMBOL	DESCRIPTION
——·——·——	SINGLE MODE FIBER OPTIC CABLE
———·———	MULTI-MODE FIBER OPTIC CABLE
- - - - - -	10/100BASE-TX CAT5E CABLE



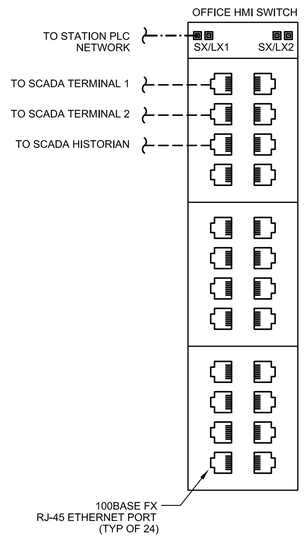
ADMIN NETWORK



SECURITY SYSTEM



PHONE NETWORK



STATION PLC NETWORK

ETHERNET SWITCH CONNECTION DIAGRAM

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDDOWAY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

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REVISIONS

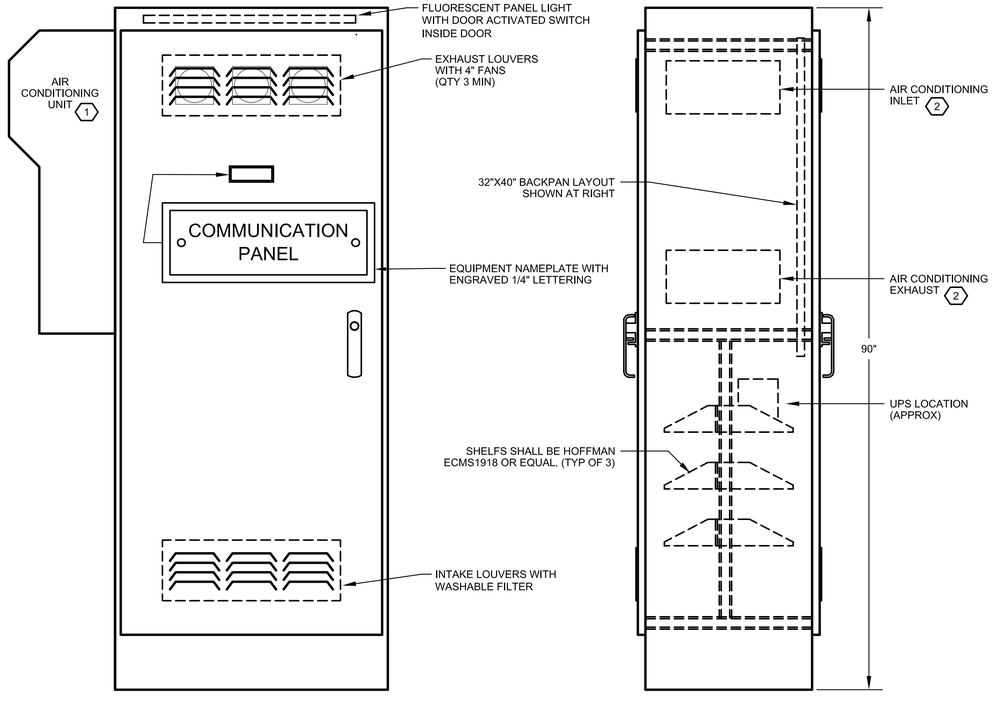
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SO	
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OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
TRANSWESTERN BENCH
COMMUNICATION PANEL 1
SCHEMATIC 2
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SHEET NO.	of SHEETS
E-00-24	REV 0

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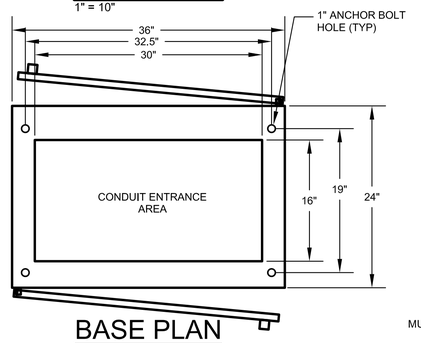


FRONT ELEVATION

SIDE ELEVATION

ELEVATION

1" = 10"



BASE PLAN

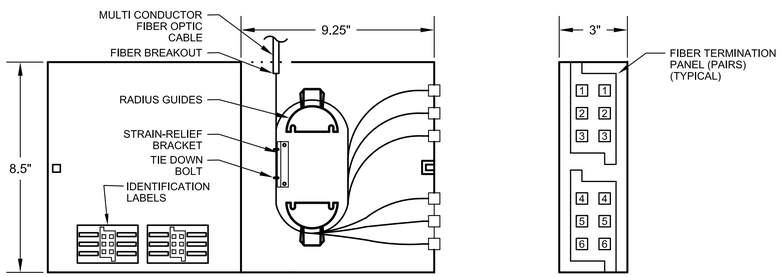
1" = 10"

PANEL FABRICATION METHODS

1. NEMA 3R, DUAL ACCESS.
2. OUTER DOOR SEALED WITH RUBBERIZED FOAM GASKET.
3. PANEL SHALL BE FABRICATED FROM PAINT BOND GALVANEAL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
6. DOOR TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCH.
7. DOOR HINGES AND PINS SHALL BE CONTINUOUS, HEAVY DUTY.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE MACHINE THREAD INTO TAPPED BACKPAN.
10. EXTERIOR PANEL COLOR: ANSI 61 GRAY.
11. MOUNTING PAN AND INTERIOR DOOR COLOR: WHITE.
12. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
13. ALL WIRING SHALL BE PERMANENTLY LABELED WITH WIRE MARKERS ON BOTH ENDS.
14. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
15. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.
16. HOFFMAN A903624FSDA FREE-STANDING, DUAL ACCESS OR EQUAL.

DRAWING REFERENCED NOTES:

1. AIR CONDITIONING SHALL BE RITTAL 3305114 OR EQUAL.
2. AIR CONDITIONING INLET AND EXHAUST OPENING LOCATIONS PER MANUFACTURER.

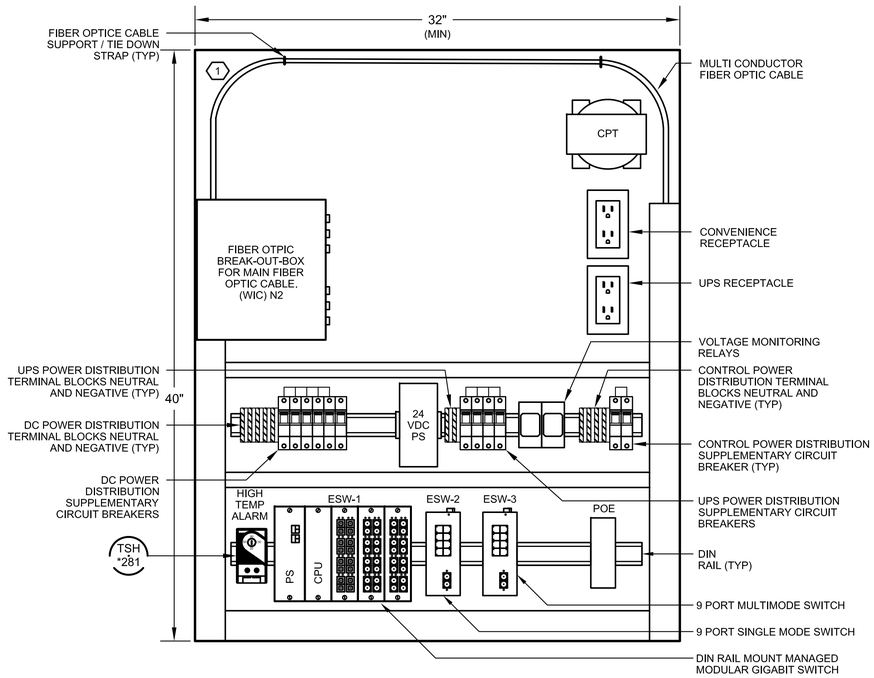


DOOR REAR ELEVATION

FRONT ELEVATION

SIDE ELEVATION

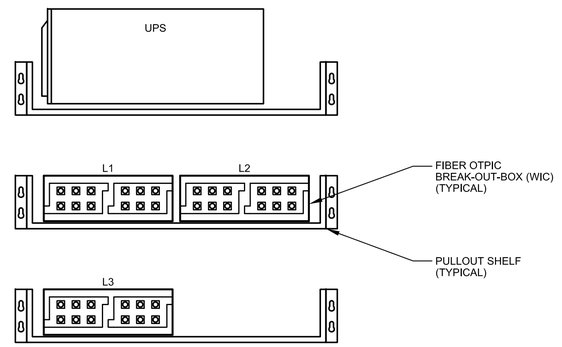
TYPICAL FIBER OPTIC BREAK-OUT-BOX (WIC) ELEVATION



BACKPAN LAYOUT

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.



SHELF LAYOUT

1" = 10"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

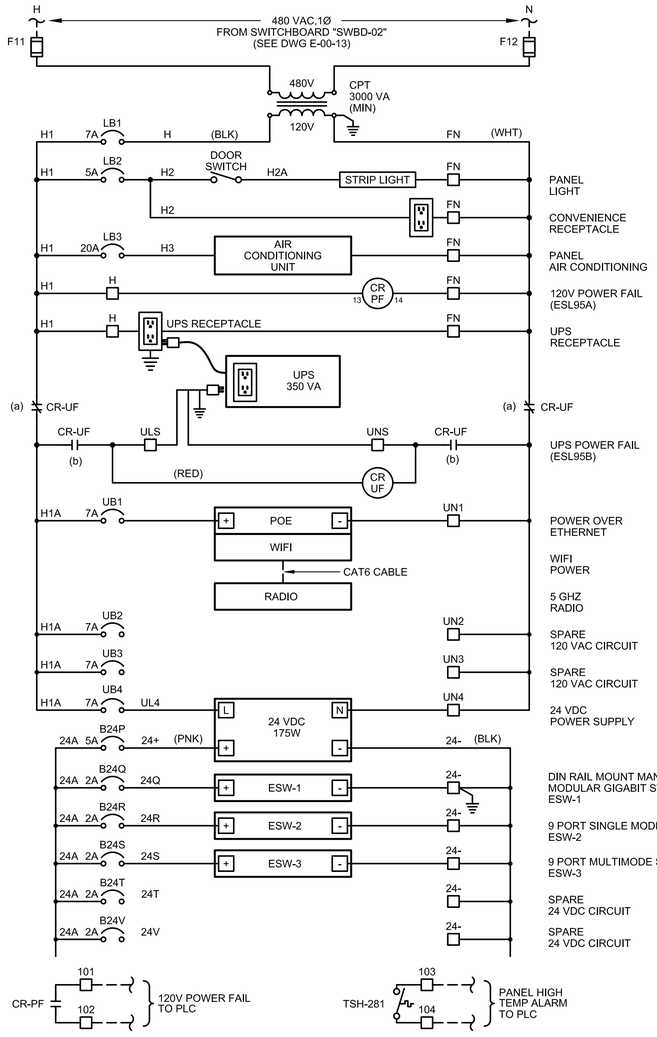
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 2 ELEVATION & LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

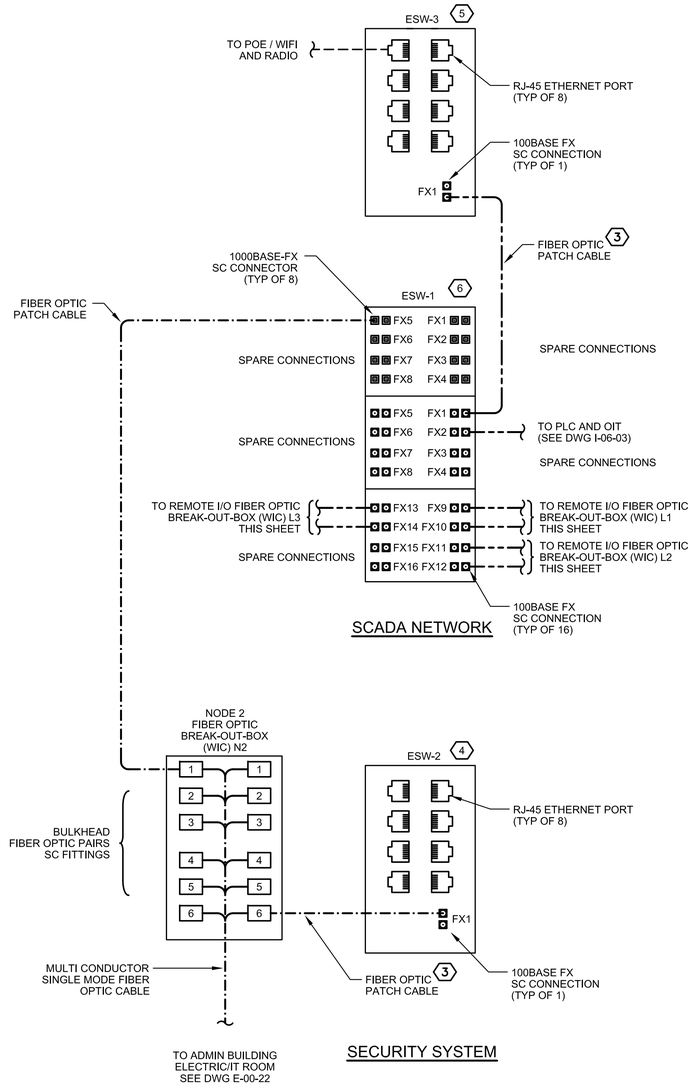
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-00-25	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:46:39pm
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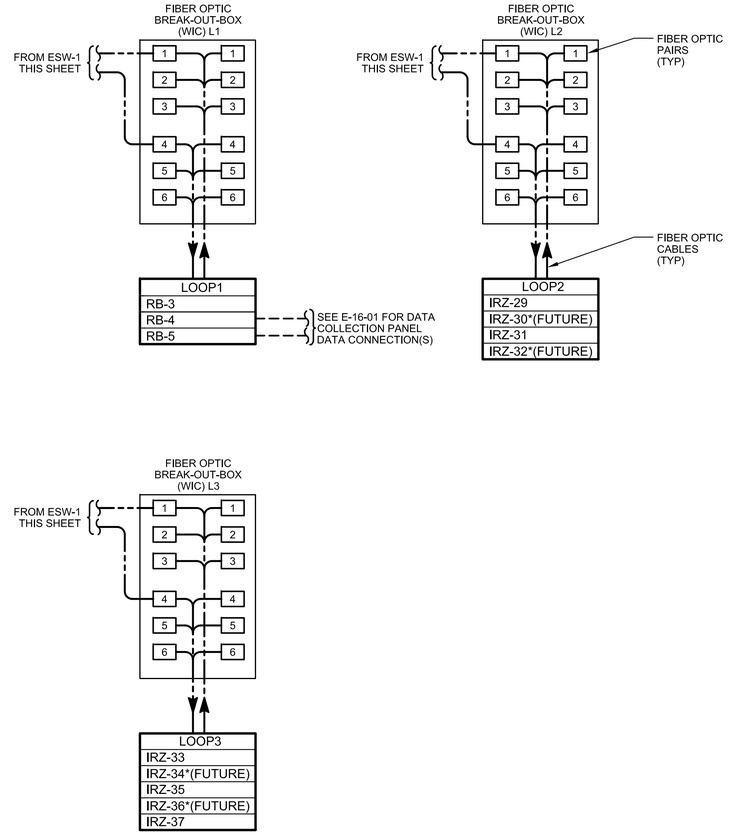
N1808



COMMUNICATIONS PANEL POWER DISTRIBUTION DIAGRAM



FIBER OPTIC SWITCH DIAGRAM



FIBER OPTIC BREAK-OUT-BOX (WIC) DIAGRAMS

LEGEND	
SYMBOL	DESCRIPTION
⋯·⋯	SINGLE MODE FIBER OPTIC CABLE
⋯·⋯	MULTI-MODE FIBER OPTIC CABLE
- - -	10/100BASE-TX CAT5E CABLE

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.
2. LC CONNECTOR FOR SINGLEMODE FIBER.
3. PATCH CABLE SHALL BE COORDINATED WITH FIBER CONNECTOR AND ETHERNET SWITCH.
4. SWITCH MODEL NTRON 309FXE-N-SC-15 OR EQUIVALENT.
5. SWITCH MODEL NTRON 309FX-N-SC OR EQUIVALENT.
6. SWITCH MODEL NTRON NT24k-DR24 WITH (2)NT24k-FX8-SC AND (1) NT24K-GXE8-SC-10 OR EQUIVALENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOCHI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

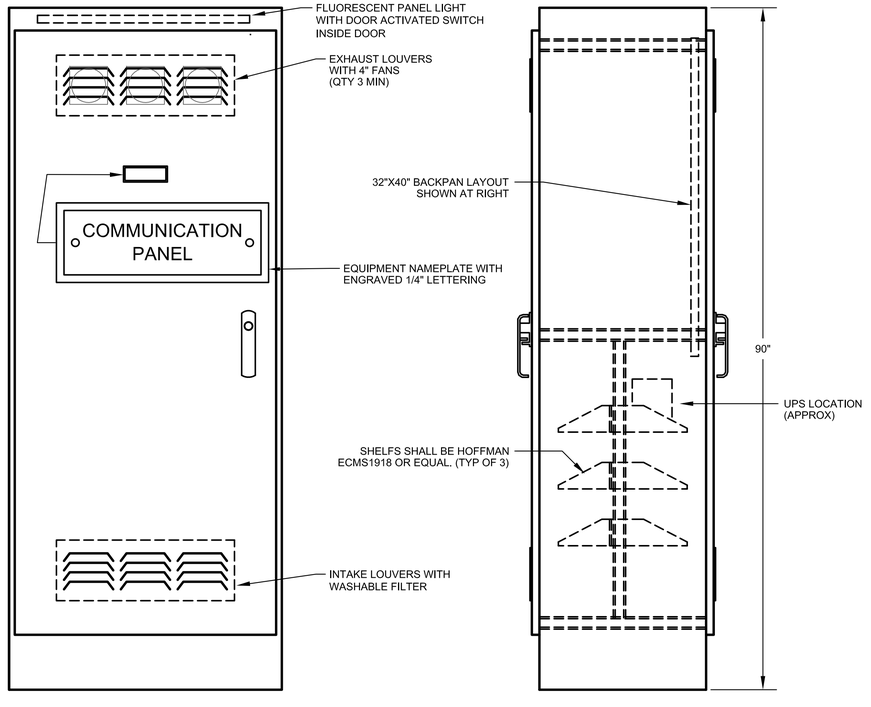
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL
COMMUNICATION PANEL 2
SCHEMATIC
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-26	REV 1

FILENAME: E-00-26.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:46:45pm

N1808

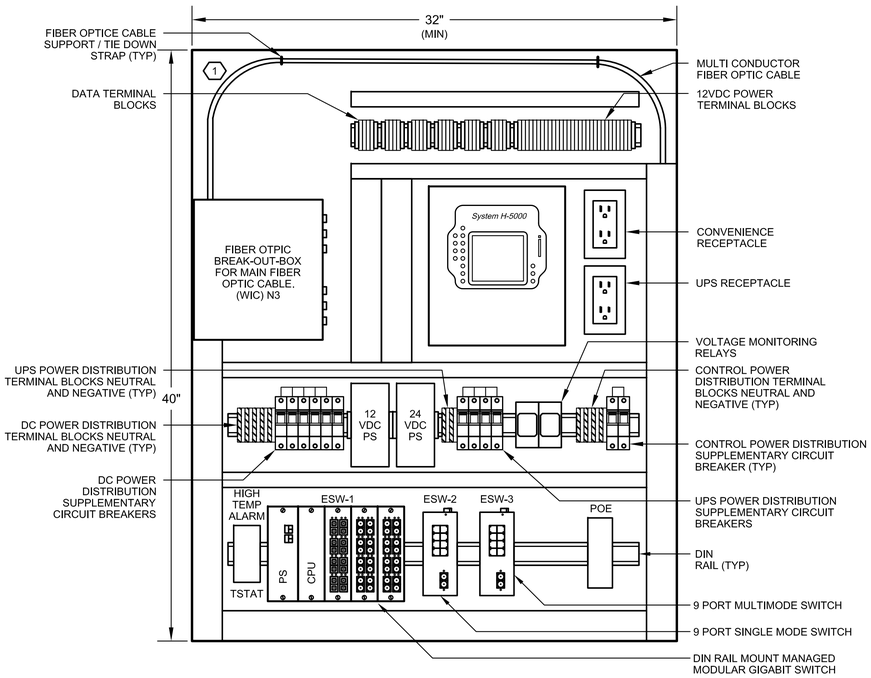


FRONT ELEVATION

SIDE ELEVATION

ELEVATION

1" = 10"



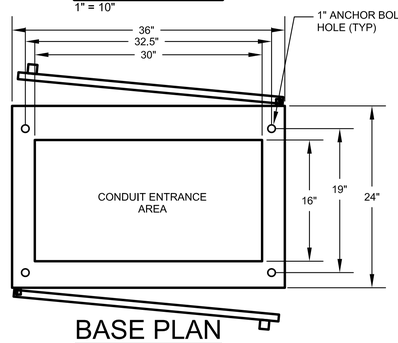
BACKPAN LAYOUT

PANEL FABRICATION METHODS

1. NEMA 3R, DUAL ACCESS.
2. OUTER DOOR SEALED WITH RUBBERIZED FOAM GASKET.
3. PANEL SHALL BE FABRICATED FROM PAINT BOND GALVANEAL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
6. DOOR TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCH.
7. DOOR HINGES AND PINS SHALL BE CONTINUOUS, HEAVY DUTY.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE MACHINE THREAD INTO TAPPED BACKPAN.
10. EXTERIOR PANEL COLOR: ANSI 61 GRAY.
11. MOUNTING PAN AND INTERIOR DOOR COLOR: WHITE.
12. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
13. ALL WIRING SHALL BE PERMANENTLY LABELED WITH WIRE MARKERS ON BOTH ENDS.
14. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
15. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.
16. HOFFMAN A903624FSDA FREE-STANDING, DUAL ACCESS OR EQUAL.

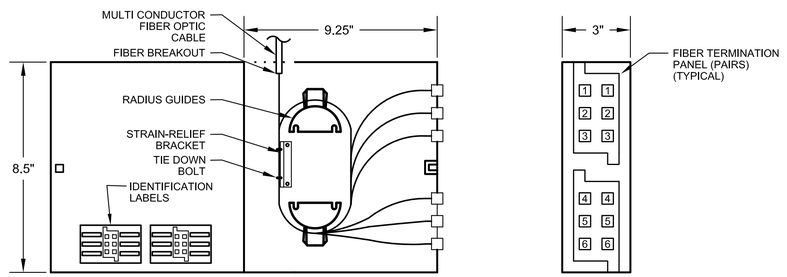
DRAWING REFERENCED NOTES:

(1) OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.



BASE PLAN

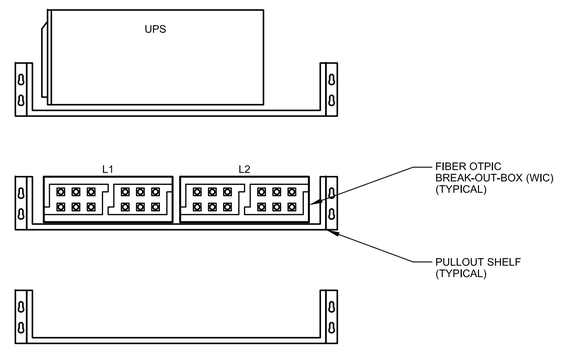
1" = 10"



DOOR REAR ELEVATION

FRONT ELEVATION

SIDE ELEVATION



SHELF LAYOUT

1" = 10"

TYPICAL FIBER OPTIC BREAK-OUT-BOX (WIC) ELEVATION

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

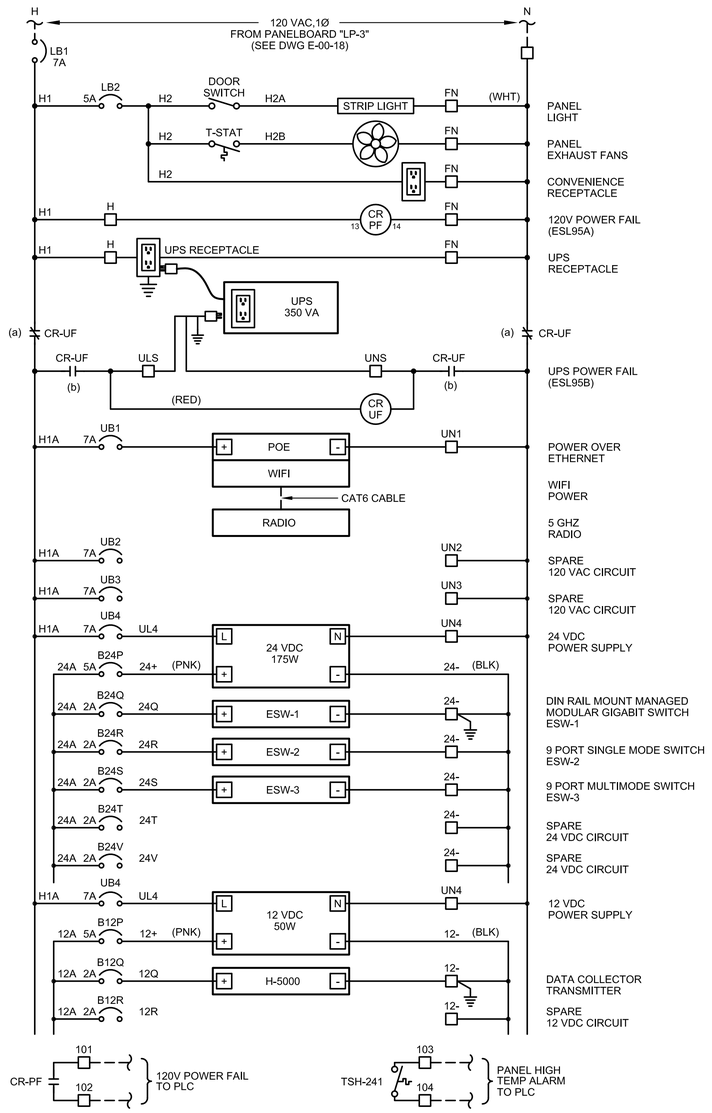
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 3 ELEVATION & LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

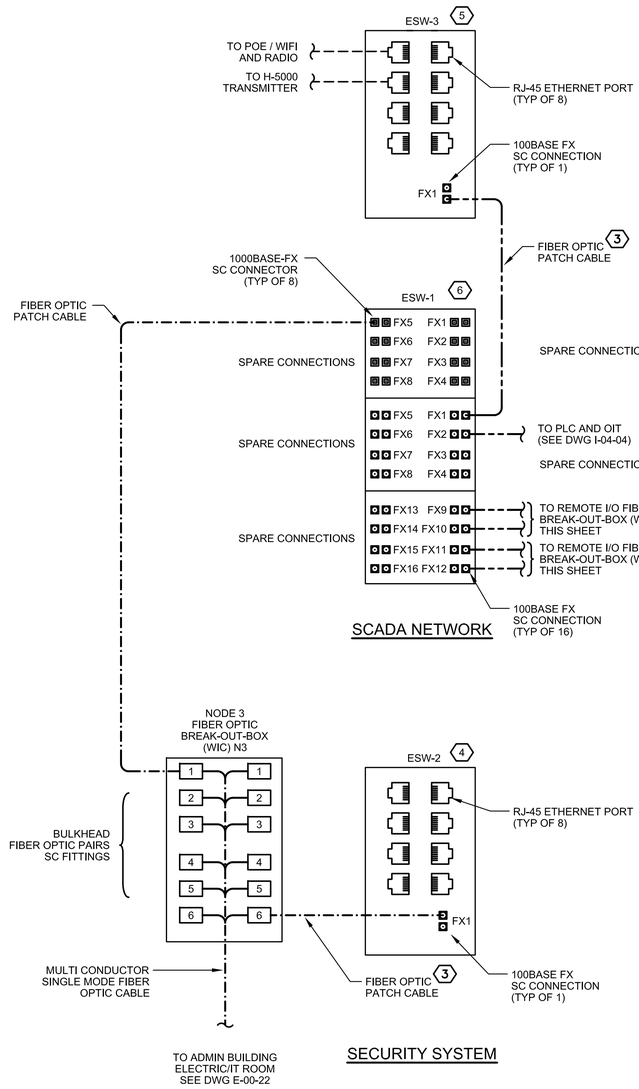
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-00-27	REV 1

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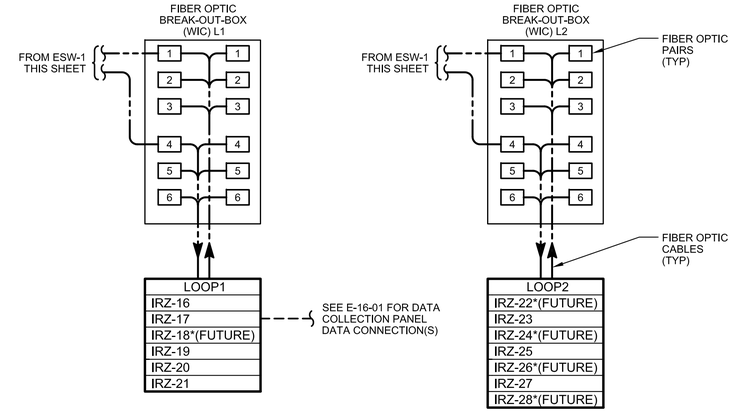
N1808



COMMUNICATIONS PANEL POWER DISTRIBUTION DIAGRAM



FIBER OPTIC SWITCH DIAGRAM



FIBER OPTIC BREAK-OUT-BOX (WIC) DIAGRAMS

LEGEND	
SYMBOL	DESCRIPTION
——·——	SINGLE MODE FIBER OPTIC CABLE
———	MULTI-MODE FIBER OPTIC CABLE
- - - - -	10/100BASE-TX CAT5E CABLE

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.
2. LC CONNECTOR FOR SINGLEMODE FIBER.
3. PATCH CABLE SHALL BE COORDINATED WITH FIBER CONNECTOR AND ETHERNET SWITCH.
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- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDOWAY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

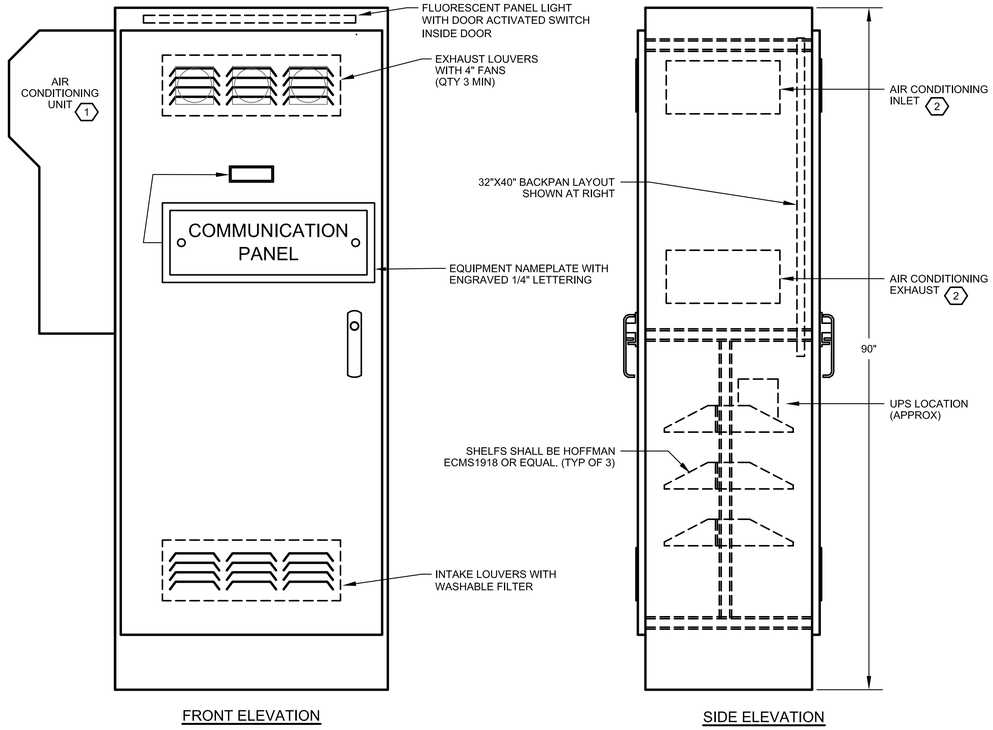
SO	
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DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 3 SCHEMATIC
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-28	REV 1

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N1808

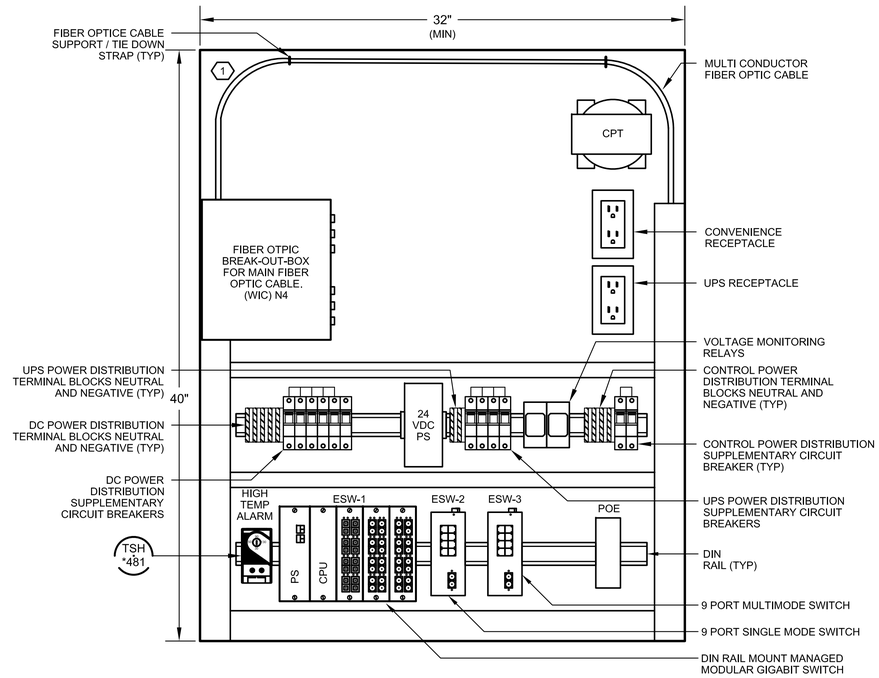


FRONT ELEVATION

SIDE ELEVATION

ELEVATION

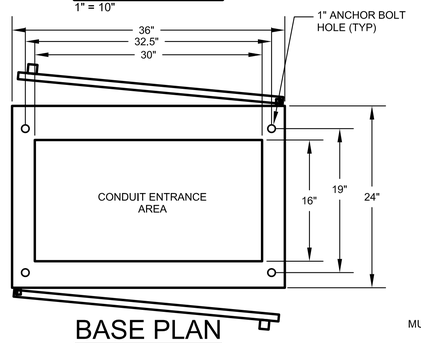
1" = 10"



BACKPAN LAYOUT

PANEL FABRICATION METHODS

1. NEMA 3R, DUAL ACCESS.
2. OUTER DOOR SEALED WITH RUBBERIZED FOAM GASKET.
3. PANEL SHALL BE FABRICATED FROM PAINT BOND GALVANEAL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
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15. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.
16. HOFFMAN A903624FSDA FREE-STANDING, DUAL ACCESS OR EQUAL.

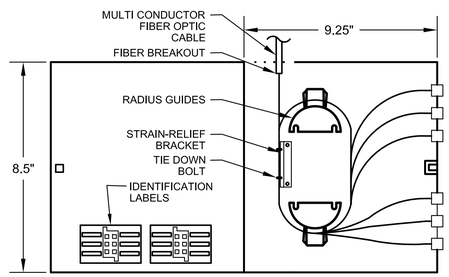


BASE PLAN

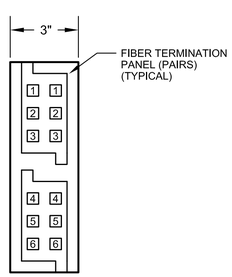
1" = 10"

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.

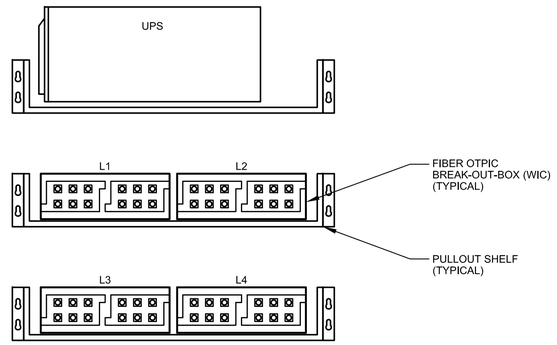


DOOR REAR ELEVATION



FRONT ELEVATION

SIDE ELEVATION



SHELF LAYOUT

1" = 10"

DRAWING REFERENCED NOTES:

1. AIR CONDITIONING SHALL BE RITTAL 3305114 OR EQUAL.
2. AIR CONDITIONING INLET AND EXHAUST OPENING LOCATIONS PER MANUFACTURER.

TYPICAL FIBER OPTIC BREAK-OUT-BOX (WIC) ELEVATION

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

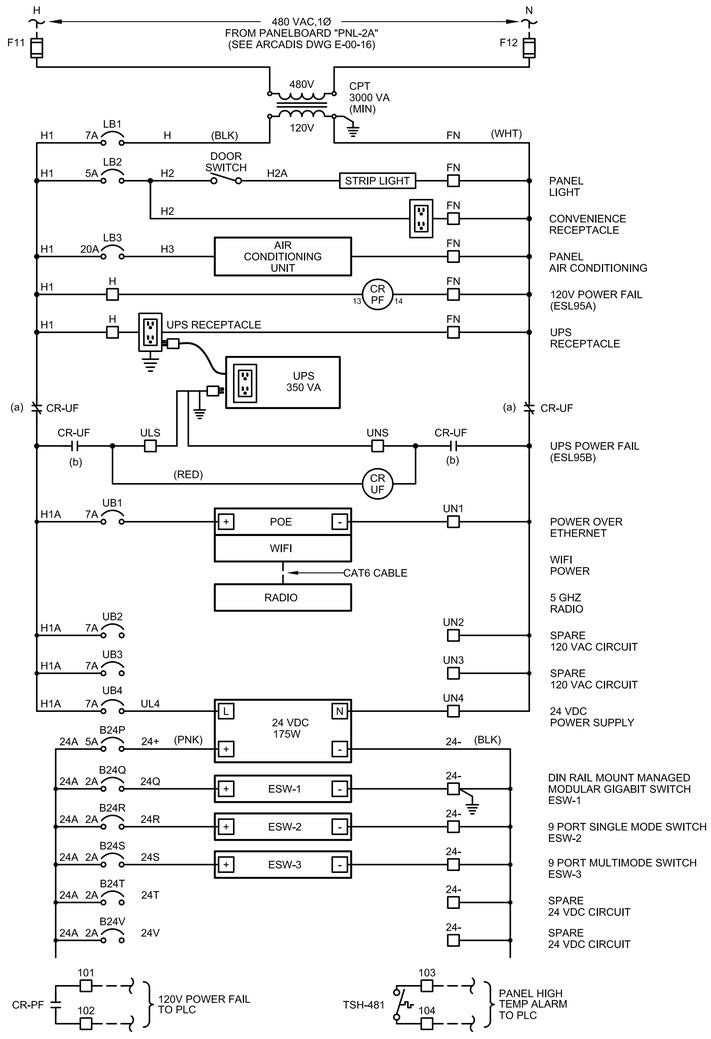
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 4 ELEVATION & LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

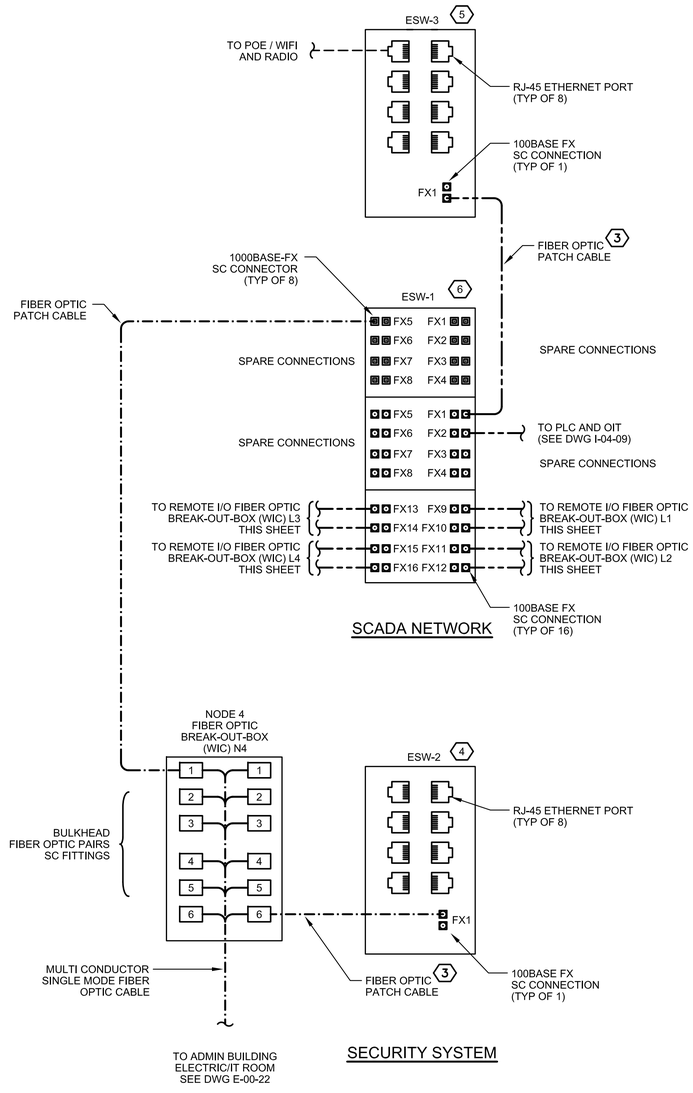
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BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO. of SHEETS	
E-00-29	REV 1

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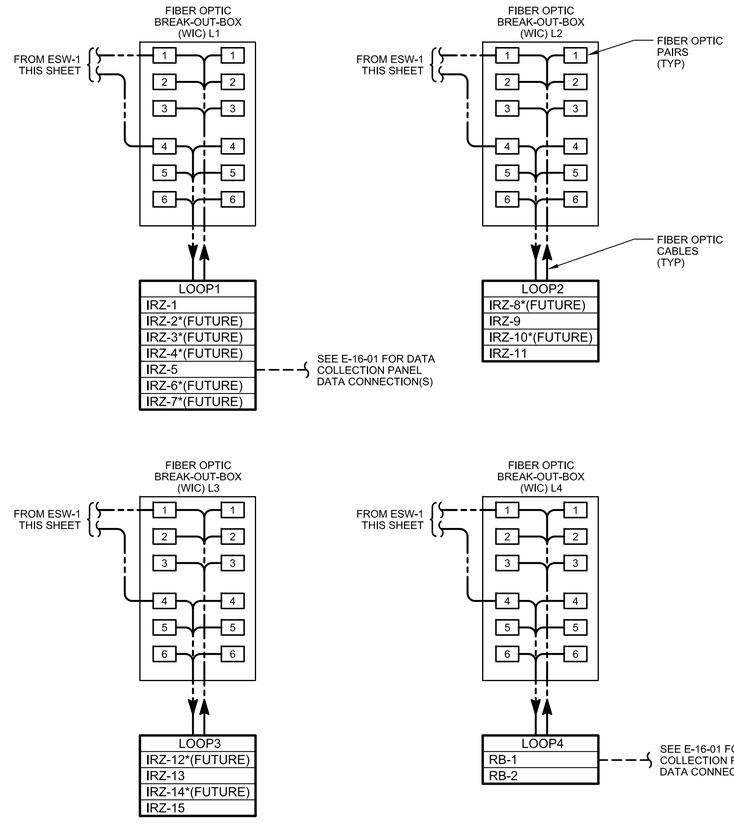
N1808



COMMUNICATIONS PANEL POWER DISTRIBUTION DIAGRAM



FIBER OPTIC SWITCH DIAGRAM



FIBER OPTIC BREAK-OUT-BOX (WIC) DIAGRAMS

LEGEND	
SYMBOL	DESCRIPTION
——·——	SINGLE MODE FIBER OPTIC CABLE
———	MULTI-MODE FIBER OPTIC CABLE
- - - - -	10/100BASE-TX CAT5E CABLE

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.
2. LC CONNECTOR FOR SINGLEMODE FIBER.
3. PATCH CABLE SHALL BE COORDINATED WITH FIBER CONNECTOR AND ETHERNET SWITCH.
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5. SWITCH MODEL NTRON 309FX-N-SC OR EQUIVALENT.
6. SWITCH MODEL NTRON NT24k-DR24 WITH (2)NT24k-FX8-SC AND (1) NT24K-GXE8-SC-10 OR EQUIVALENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDOWAY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

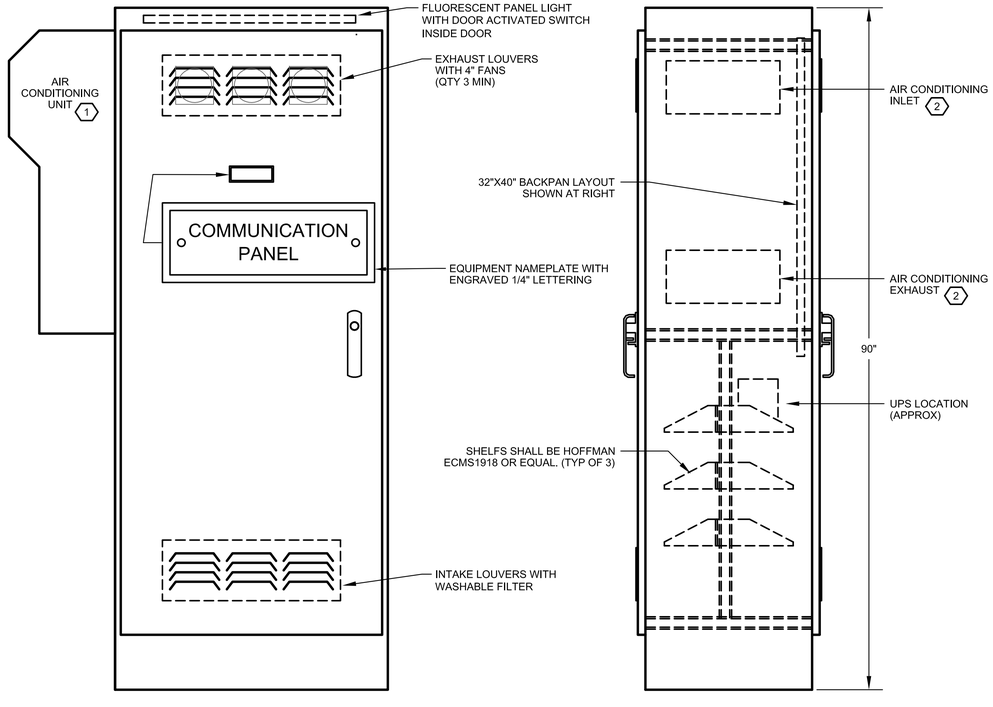
APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 4 SCHEMATIC
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-30	REV 1

FILENAME: E-00-30.dwg
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:47:16pm
N1808



FRONT ELEVATION

SIDE ELEVATION

ELEVATION

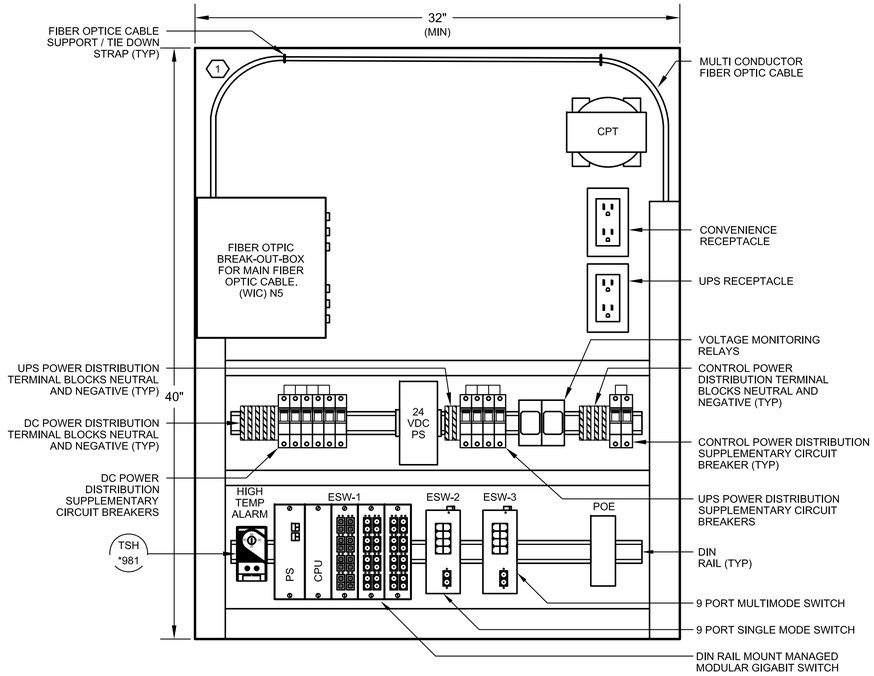
1" = 10"

BASE PLAN

1" = 10"

PANEL FABRICATION METHODS

1. NEMA 3R, DUAL ACCESS.
2. OUTER DOOR SEALED WITH RUBBERIZED FOAM GASKET.
3. PANEL SHALL BE FABRICATED FROM PAINT BOND GALVANEAL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
6. DOOR TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCH.
7. DOOR HINGES AND PINS SHALL BE CONTINUOUS, HEAVY DUTY.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE MACHINE THREAD INTO TAPPED BACKPAN.
10. EXTERIOR PANEL COLOR: ANSI 61 GRAY.
11. MOUNTING PAN AND INTERIOR DOOR COLOR: WHITE.
12. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
13. ALL WIRING SHALL BE PERMANENTLY LABELED WITH WIRE MARKERS ON BOTH ENDS.
14. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
15. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.
16. HOFFMAN A903624FSDA FREE-STANDING, DUAL ACCESS OR EQUAL.



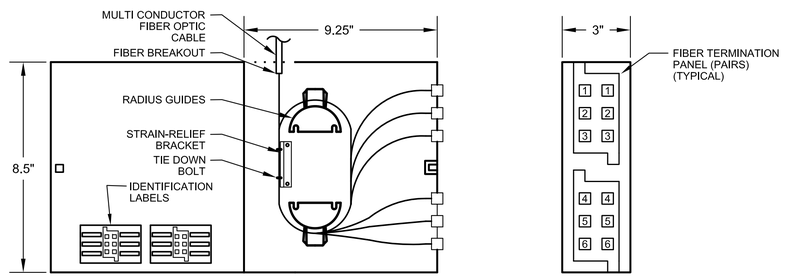
BACKPAN LAYOUT

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.

DRAWING REFERENCED NOTES:

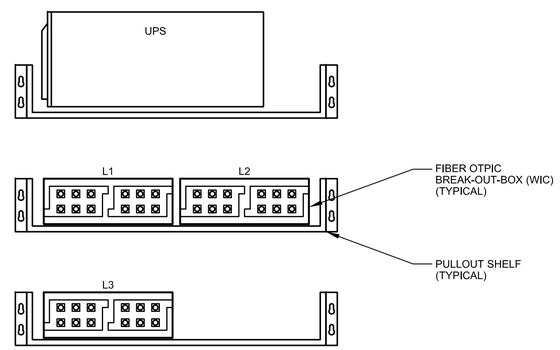
1. AIR CONDITIONING SHALL BE RITTAL 3305114 OR EQUAL.
2. AIR CONDITIONING INLET AND EXHAUST OPENING LOCATIONS PER MANUFACTURER.



DOOR REAR ELEVATION

FRONT ELEVATION

SIDE ELEVATION



SHELF LAYOUT

1" = 10"

TYPICAL FIBER OPTIC BREAK-OUT-BOX (WIC) ELEVATION

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

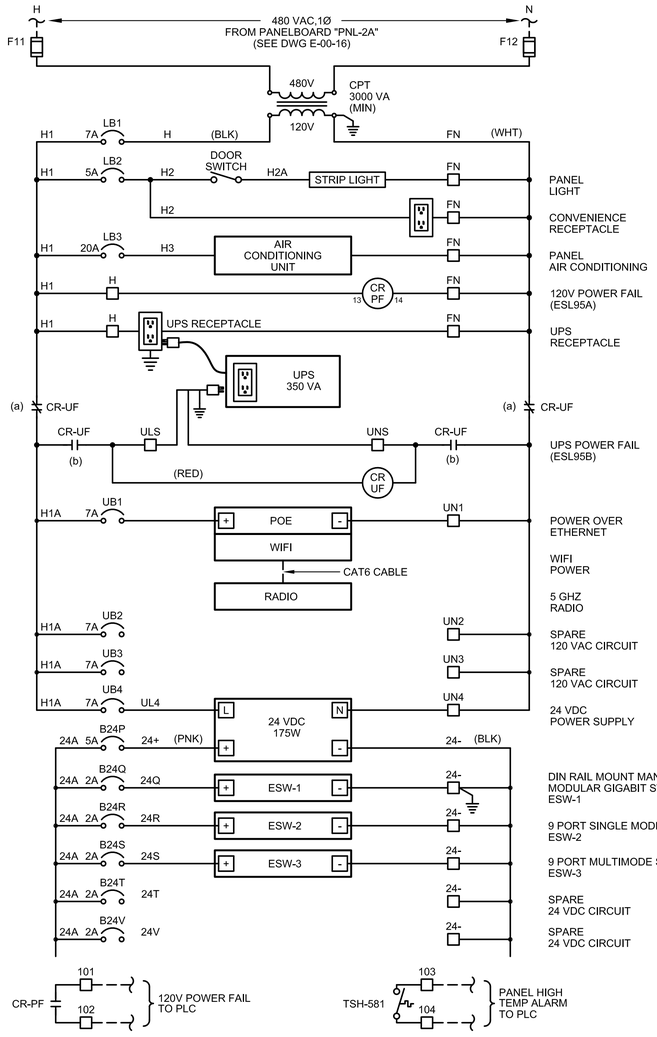
APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

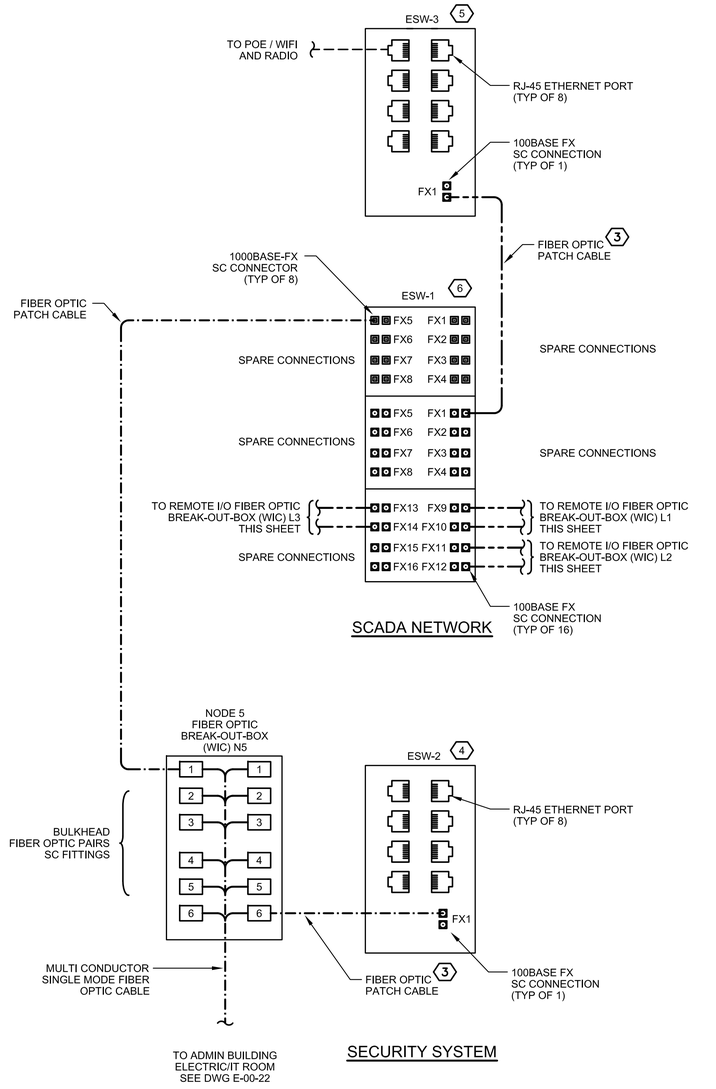
TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 5 ELEVATION & LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

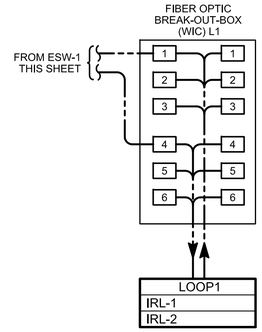
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-00-31	REV 1

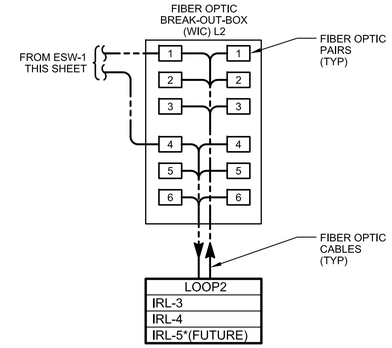
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:47:23pm
FILENAME: E-00-31.dwg
N1808

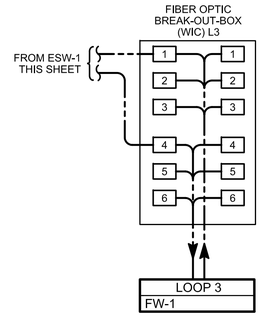


COMMUNICATIONS PANEL POWER DISTRIBUTION DIAGRAM









FIBER OPTIC SWITCH DIAGRAM

LEGEND	
SYMBOL	DESCRIPTION
——·—·——	SINGLE MODE FIBER OPTIC CABLE
———·———	MULTI-MODE FIBER OPTIC CABLE
- - - - - -	10/100BASE-TX CAT5E CABLE

DRAWING REFERENCED NOTES:

1. OBSERVE FIBER OPTIC CABLE MINIMUM BEND RADIUS.
2. LC CONNECTOR FOR SINGLEMODE FIBER.
3. PATCH CABLE SHALL BE COORDINATED WITH FIBER CONNECTOR AND ETHERNET SWITCH.
4. SWITCH MODEL NTRON 309FXE-N-SC-15 OR EQUIVALENT.
5. SWITCH MODEL NTRON 309FX-N-SC OR EQUIVALENT.
6. SWITCH MODEL NTRON NT24k-DR24 WITH (2)NT24k-FX8-SC AND (1) NT24K-GXE8-SC-10 OR EQUIVALENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOCHI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMOTE WELL COMMUNICATION PANEL 5 SCHEMATIC
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-32	REV 1

FILENAME: E-00-32.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:47:29pm

N1808

SUMMARY		
TRANSFORMER	kW	kW-hr/yr
REMEDY MCC	189.1	311203.4
PRE-INJECTION MCC	0.0	542696.7
TRANSFORMER 001	318.5	1450056.5
TRANSFORMER 002	137.5	664718.5
TRANSFORMER 003	186.2	518760.2
TRANSFORMER 004	267.6	790323.3
TRANSFORMER 005	169.6	41091.6
SUBTOTAL	1268.4	4318850.2
ELECTRICAL INEFFICIENCIES	0.85	0.85
TOTAL	1492.3	5081000.2

REMEDY MCC, ESTIMATED LOAD SCHEDULE

LOAD DESCRIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
TCS01-P0322	5.00	4.50	0.3%	3.36	88.19
TCS01-P0323	5.00	4.50	0.3%	3.36	88.19
TCS02-P0332	5.00	4.50	0.3%	3.36	88.19
TCS02-P0333	5.00	4.50	0.3%	3.36	88.19
FW02-PMP-0201	30.00	27.00	0.3%	20.13	529.13
INFLUENT TANK RECIRC PUMPS 1	30.00	27.00	20.0%	20.13	35275.17
INFLUENT TANK RECIRC PUMPS 2	30.00	27.00	20.0%	20.13	35275.17
INFLUENT TANK RECIRC PUMPS 3	30.00	27.00	20.0%	20.13	35275.17
INFLUENT TANK RECIRC PUMPS 4	30.00	27.00	20.0%	20.13	35275.17
CONDITIONED WATER TRANSFER PUMP 1	1.50	0.90	30.0%	0.67	1763.76
CONDITIONED WATER TRANSFER PUMP 2	1.50	0.90	30.0%	0.67	1763.76
FILTER FEED PUMP 1 - A SIDE	1.50	1.35	10.0%	1.01	881.88
FILTER FEED PUMP 2 - A SIDE	1.50	1.35	10.0%	1.01	881.88
FILTER FEED PUMP 1 - B SIDE	3.00	2.70	10.0%	2.01	1763.76
FILTER FEED PUMP 2 - B SIDE	3.00	2.70	10.0%	2.01	1763.76
TCS TRUCK FILL PUMP	7.50	6.75	5.0%	5.03	2204.70
AIR COMPRESSOR	25.00	22.50	20.0%	16.78	29395.97
SEAL WATER PUMP	1.50	1.35	50.0%	1.01	4409.40
TRANSFORMER XFMR LP	-	-	100.0%	10.00	87600.00
			SUBTOTAL	189.1	311203.4

PRE-INJECTION MCC, ESTIMATED LOAD SCHEDULE

LOAD DESCRIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
RECYCLE PUMP 1	0.75	0.68	10.0%	0.50	440.94
RECYCLE PUMP 2	0.75	0.68	10.0%	0.50	440.94
BACKWASH PUMP 1	20.00	18.00	30.0%	13.42	35275.17
BACKWASH PUMP 2	20.00	18.00	30.0%	13.42	35275.17
BOOSTER PUMP 1	50.00	45.00	50.0%	33.56	146979.87
BOOSTER PUMP 2	50.00	45.00	50.0%	33.56	146979.87
TREATED WATER PUMP 1 (FUTURE PROVISIONAL)	15.00	13.50	30.0%	10.07	26456.38
TREATED WATER PUMP 2 (FUTURE PROVISIONAL)	15.00	13.50	30.0%	10.07	26456.38
MCC TRANSFORMER	-	-	100.0%	10.00	87600.00
			SUBTOTAL	133.1	542696.7

XFMR 001, ESTIMATED LOAD SCHEDULE

LOAD DESCRIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
TWB01-P0341	3.00	0.90	100.0%	0.67	5900.88
TWB02-P0341	3.00	0.90	100.0%	0.67	5900.88
TWB03-P0341 [FUTURE PROVISIONAL]	3.00	0.90	0.0%	0.67	0.00
TWB04-P0341 [FUTURE PROVISIONAL]	3.00	0.90	0.0%	0.67	0.00
TWB05-P0341 [FUTURE PROVISIONAL]	0.75	0.90	0.0%	0.67	0.00
ER01-P0340	0.50	0.90	50.0%	0.67	2950.44
ER02-P0340	0.50	0.90	50.0%	0.67	2950.44
ER03-P0340	0.50	0.90	50.0%	0.67	2950.44
ER04-P0340	0.50	0.90	50.0%	0.67	2950.44
ER05-P0340 [FUTURE PROVISIONAL]	0.50	0.90	0.0%	0.67	0.00
ER06-P0340	1.00	0.90	100.0%	0.67	5900.88
IRZ39-P0443	5.00	2.60	0.3%	1.94	50.41
IRZ38-P0443 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ40-P0440 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
REMEDY OPERATIONS BUILIDING PANEL "PP-OP"	-	-	50.0%	100.00	438000.00
CONSTRUCTION TRAILER TRANSFORMER	-	-	50.0%	100.00	438000.00
CARBON AMENDMENT PANEL PNL-1A	-	-	80.0%	37.00	259296.00
			SUBTOTAL:	318.5	1450056.5

XFMR 002, ESTIMATED LOAD SCHEDULE

LOAD DESCRIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
RB03-P0540	30.00	27.00	100.0%	20.13	176375.84
RB04-P0540	30.00	27.00	100.0%	20.13	176375.84
RB05-P0540	30.00	27.00	100.0%	20.13	176375.84
RB06-P0540 [FUTURE PROVISIONAL]	30.00	27.00	0.0%	20.13	0.00
RB07-P0540 [FUTURE PROVISIONAL]	30.00	27.00	0.0%	20.13	0.00
IRZ29-P0444	5.00	2.60	100.0%	1.94	16984.34
IRZ29-P0445	5.00	2.60	100.0%	1.94	16984.34
IRZ31-P0444	5.00	2.60	100.0%	1.94	16984.34
IRZ31-P0445	5.00	2.60	100.0%	1.94	16984.34
IRZ33-P0444	5.00	2.60	0.3%	1.94	50.41
IRZ33-P0445	5.00	2.60	0.3%	1.94	50.41
IRZ35-P0443	5.00	2.60	0.3%	1.94	50.41
IRZ37-P0443	5.00	2.60	0.3%	1.94	50.41
IRZ30-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ30-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ32-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ32-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ34-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ34-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ36-P0443 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
COMMUNICATIONS EQUIPMENT	-	-	100.0%	1.20	10512.00
WELLS CPT	-	-	100.0%	6.50	56940.00
			SUBTOTAL	137.5	664718.5

XFMR 003, ESTIMATED LOAD SCHEDULE

LOAD DESCRIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
IRZ16-P0446	5.00	3.27	100.0%	2.44	21361.07
IRZ16-P0447	5.00	3.27	100.0%	2.44	21361.07
IRZ16-P0448	5.00	3.27	100.0%	2.44	21361.07
IRZ16-P0449	5.00	3.27	100.0%	2.44	21361.07
IRZ17-P0446	5.00	3.27	0.0%	2.44	0.00
IRZ17-P0447	5.00	3.27	0.0%	2.44	0.00
IRZ17-P0448	5.00	3.27	0.0%	2.44	0.00
IRZ17-P0449	5.00	3.27	0.0%	2.44	0.00
IRZ19-P0446	5.00	3.27	0.0%	2.44	0.00
IRZ19-P0447	5.00	3.27	0.0%	2.44	0.00
IRZ19-P0448	5.00	3.27	0.0%	2.44	0.00
IRZ19-P0449	5.00	3.27	0.0%	2.44	0.00
IRZ20-P0446	5.00	3.27	0.0%	2.44	0.00
IRZ20-P0447	5.00	3.27	0.0%	2.44	0.00
IRZ20-P0448	5.00	3.27	0.0%	2.44	0.00
IRZ20-P0449	5.00	3.27	0.0%	2.44	0.00
IRZ21-P0446	5.00	3.27	0.0%	2.44	0.00
IRZ21-P0447	5.00	3.27	0.0%	2.44	0.00
IRZ21-P0448	5.00	3.27	0.0%	2.44	0.00
IRZ21-P0449	5.00	3.27	0.0%	2.44	0.00
IRZ23-P0440	20.00	19.20	100.0%	14.32	125422.82
IRZ25-P0444	5.00	2.60	0.0%	1.94	0.00
IRZ25-P0445	5.00	2.60	0.0%	1.94	0.00
IRZ27-P0444	5.00	2.60	0.0%	1.94	0.00
IRZ27-P0445	5.00	2.60	0.0%	1.94	0.00
IRZ18-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ18-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ18-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ18-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ22-P0446 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ22-P0447 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ22-P0448 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ22-P0449 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ24-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ24-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ26-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ26-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ28-P0444 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ28-P0445 [FUTURE PROVISIONAL]	5.00	2.60	0.0%	1.94	0.00
IRZ00-P0640 (MW-20 BENCH)	0.75	2.60	10.0%	1.94	1698.43
IRZ00-P0641 (MW-20 BENCH)	0.75	2.60	10.0%	1.94	1698.43
IRZ00-P0642 (MW-20 BENCH)	0.75	2.60	10.0%	1.94	1698.43
IRZ00-P0643 (MW-20 BENCH)	0.75	2.60	10.0%	1.94	1698.43
IRZ00-P0644 (MW-20 BENCH)	10.00	13.70	10.0%	10.22	8949.44
IRZ00-P0645 (MW-20 BENCH)	25.00	15.60	10.0%	11.63	10190.60
IRZ00-P0646 (MW-20 BENCH)	0.50	13.70	10.0%	10.22	8949.44
IRZ00-P0647 (MW-20 BENCH)	0.50	13.70	10.0%	10.22	8949.44
IRZ00-P0648 (MW-20 BENCH)	5.00	2.60	10.0%	1.94	1698.43
COMMUNICATIONS EQUIPMENT	-	-	100.0%	1.20	10512.00
TRANSFORMER	-	-	100.0%	16.00	140160.00
WELLS CPT	-	-	75.0%	17.00	111690.00
			SUBTOTAL	186.2	518760.2

XFMR 004, ESTIMATED LOAD SCHEDULE

	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
RB01-P0540	30.00	27.00	100.0%	20.13	176375.84
RB02-P0540	30.00	27.00	0.0%	20.13	0.00
RB08-P0540	30.00	27.00	0.0%	20.13	0.00
RB09-P0540	30.00	27.00	0.0%	20.13	0.00
IRZ01-P0441	15.00	13.70	100.0%	10.22	89494.41
IRZ01-P0442	15.00	13.70	100.0%	10.22	89494.41
IRZ05-P0441	15.00	13.70	100.0%	10.22	89494.41
IRZ05-P0442	15.00	13.70	100.0%	10.22	89494.41
IRZ09-P0441	15.00	13.70	100.0%	10.22	89494.41
IRZ09-P0442	15.00	13.70	100.0%	10.22	89494.41
IRZ11-P0446	5.00	3.27	0.3%	2.44	64.08
IRZ11-P0447	5.00	3.27	0.3%	2.44	64.08
IRZ11-P0448	5.00	3.27	0.3%	2.44	64.08
IRZ11-P0449	5.00	3.27	0.3%	2.44	64.08
IRZ13-P0446	5.00	3.27	0.3%	2.44	64.08
IRZ13-P0447	5.00	3.27	0.3%	2.44	64.08
IRZ13-P0448	5.00	3.27	0.3%	2.44	64.08
IRZ13-P0449	5.00	3.27	0.3%	2.44	64.08
IRZ15-P0446	5.00	3.27	0.3%	2.44	64.08
IRZ15-P0447	5.00	3.27	0.3%	2.44	64.08
IRZ15-P0448	5.00	3.27	0.3%	2.44	64.08
IRZ15-P0449	5.00	3.27	0.3%	2.44	64.08
IRZ02-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ02-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ02-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ02-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ03-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ03-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ03-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ03-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ04-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ04-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ04-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ04-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ06-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ06-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ06-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ06-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ07-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ07-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ07-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ07-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ08-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ10-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ10-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ10-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ10-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ12-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ12-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ12-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ12-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ14-P0446 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ14-P0447 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ14-P0448 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
IRZ14-P0449 [FUTURE PROVISIONAL]	5.00	3.27	0.0%	2.44	0.00
COMMUNICATIONS EQUIPMENT	-	-	100.0%	1.20	10512.00
WELLS CPT	-	-	100.0%	7.50	65700.00
			SUBTOTAL	267.6	790323.3

XFMR 005, ESTIMATED LOAD SCHEDULE

LOAD DESCIPTION	HP	BHP	DUTY FACTOR	kW	kW-hr/yr
IRL01-P0541	30.00	29.27	0.3%	21.83	567.50
IRL02-P0541	30.00	29.99	0.3%	22.36	581.46
IRL03-P0541	30.00	29.99	0.3%	22.36	581.46
IRL03-P0541	30.00	29.99	0.3%	22.36	581.46
IRL04-P0541	40.00	34.56	0.3%	25.77	670.07
IRL04-P0541	40.00	34.56	0.3%	25.77	670.07
IRL05-P0541 [FUTURE PROVISIONAL]	30.00	32.00	0.0%	0.00	0.00
IRL06-P0541 [FUTURE PROVISIONAL]	40.00	37.80	0.0%	0.00	0.00
IRL07-P0541 [FUTURE PROVISIONAL]	40.00	27.80	0.0%	0.00	0.00
FW01	40.00	33.40	0.3%	24.91	647.58
COMMUNICATIONS EQUIPMENT	-	-	100.0%	1.20	10512.00
WELLS CPT	-	-	100.0%	3.00	26280.00
			SUBTOTAL	169.6	41091.6

DRAWING REFERENCED NOTES:

1. ENERGY USAGE CALCULATIONS ONLY INCLUDE REMEDY PROJECT FACITLTIES USING POWER FROM FOSSIL FUEL SOURCES.
2. ELECTRICAL INEFFICIENCY IS SHOWN TO ACCOUNT FOR TRANSFORMER, MOTORS, WIRE AND OTHER ELECTRICAL EQUIPMENT INEFFICINECIES THAT ARE NOT ADDRESSED IN THE ENERGY USE CALCULATIONS.

ENERGY USE CALCULATIONS (1)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDLE 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ENERGY USE CALCULATIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-33	REV 0

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:47:35pm
FILENAME: E-00-33.dwg
N1808

TOTAL REMEDY LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
REMEDY MCC	417.20 A	1	346855.1 VA	361.51 A	1	300555.0 VA	201.51 A	1	167533.5 VA	34.26 A	1	28484.5 VA
PRE-INJECTION MCC	254.41 A	1	211511.9 VA	248.27 A	1	206411.9 VA	0.00 A	0	0.0 VA	0.00 A	0	0.0 VA
TRANSFORMER 001	190.57 A	1	158440.8 VA	195.61 A	1	162629.7 VA	150.03 A	1	124733.1 VA	135.97 A	1	113043.0 VA
TRANSFORMER 002	360.62 A	1	299810.2 VA	180.66 A	1	150194.2 VA	74.60 A	1	62025.2 VA	53.48 A	1	44466.4 VA
TRANSFORMER 003	511.28 A	1	425068.7 VA	178.31 A	1	148242.6 VA	106.48 A	1	88523.1 VA	62.26 A	1	51759.3 VA
TRANSFORMER 004	755.57 A	1	628171.5 VA	255.73 A	1	212612.3 VA	115.53 A	1	96048.1 VA	103.43 A	1	85988.3 VA
TRANSFORMER 005	522.53 A	1	434421.9 VA	69.65 A	1	57904.5 VA	53.66 A	1	44610.5 VA	9.26 A	1	7697.0 VA
TOTAL LOAD =	3012.18 A		2504279.9 VA	1489.74 A		1238550.2 VA	701.81 A		583473.4 VA	398.66 A		331438.4 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
40 HP HP => 0.25 x 43230.0 VA =	13.00 A		10807.5 VA	13.00 A		10807.5 VA	13.00 A		10807.5 VA	13.00 A		10807.5 VA
1% SYSTEM LOSSES TOTAL x % =	30.12 A		25042.8 VA	14.90 A		12385.5 VA	7.02 A		5834.7 VA	3.99 A		3314.4 VA
25% BREAKER DERATING = TOTAL x % =	753.05 A		626070.0 VA	372.44 A		309637.6 VA	175.45 A		145868.4 VA	99.66 A		82859.6 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	3808.35 A		3166200.2 VA	1890.08 A		1571380.8 VA	897.28 A		745984.0 VA	515.31 A		428419.9 VA
MAIN BREAKER SIZE REQUIRED =				2000 AMP								
480 V, 3 PHASE, 3 WIRE												

LOAD CALCULATIONS - REMEDY WWTP MCC

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
5 HP TCS01-P0322	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP TCS01-P0323	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP TCS02-P0332	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP TCS02-P0333	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
30 HP FW02-PMP-0201	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA
30 HP INFLUENT TANK RECIRC PUMPS 1	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA
30 HP INFLUENT TANK RECIRC PUMPS 2	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA
30 HP INFLUENT TANK RECIRC PUMPS 3	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	40.00 A	0	0.0 VA
30 HP INFLUENT TANK RECIRC PUMPS 4	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	40.00 A	0	0.0 VA
1.5 HP CONDITIONED WATER TRANSFER PUMP 1	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	0	0.0 VA
1.5 HP CONDITIONED WATER TRANSFER PUMP 2	3.00 A	1	2494.2 VA	3.00 A	0	0.0 VA	3.00 A	0	0.0 VA	3.00 A	0	0.0 VA
1.5 HP FILTER FEED PUMP 1 - A SIDE	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	0	0.0 VA
1.5 HP FILTER FEED PUMP 2 - A SIDE	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	0	0.0 VA	3.00 A	0	0.0 VA
3 HP FILTER FEED PUMP 1 - B SIDE	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
3 HP FILTER FEED PUMP 2 - B SIDE	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
7.5 HP TCS TRUCK FILL PUMP	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA	11.00 A	0	0.0 VA	11.00 A	0	0.0 VA
25 HP AIR COMPRESSOR	34.00 A	1	28267.1 VA	34.00 A	1	28267.1 VA	34.00 A	0	0.0 VA	34.00 A	0	0.0 VA
1.5 HP SEAL WATER PUMP	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	1	2494.2 VA	3.00 A	0	0.0 VA
75 KVA TRANSFORMER XFMR LP	31.76 A	1	26406.0 VA	25.41 A	1	21124.8 VA	25.41 A	1	21124.8 VA	25.41 A	1	21124.8 VA
TOTAL LOAD =	331.76 A		275821.3 VA	287.21 A		238781.2 VA	159.21 A		132364.0 VA	25.41 A		21124.8 VA
LOAD CORRECTION FACTORS												
30 HP HP => 0.25 x 8313.8 VA =	2.50 A		2078.5 VA	2.50 A		2078.5 VA	2.50 A		2078.5 VA	2.50 A		2078.5 VA
2% SYSTEM LOSSES TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
25% BREAKER DERATING = TOTAL x % =	82.94 A		68955.3 VA	71.80 A		59695.3 VA	39.80 A		33091.0 VA	6.35 A		5281.2 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	417.20 A		346855.1 VA	361.51 A		300555.0 VA	201.51 A		167533.5 VA	34.26 A		28484.5 VA
MAIN BREAKER SIZE REQUIRED =				600 A								
480 V, 3 PHASE, 3 WIRE												

LOAD CALCULATIONS - PRE-INJECTION TREATMENT MCC

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
0.75 HP RECYCLE PUMP 1	1.6 A	1	1330.2 VA	1.60 A	1	1330.2 VA	1.60 A	1	1330.2 VA	1.60 A	0	0.0 VA
0.75 HP RECYCLE PUMP 2	1.6 A	1	1330.2 VA	1.60 A	0	1330.2 VA	1.60 A	0	0.0 VA	1.60 A	0	0.0 VA
20 HP BACKWASH PUMP 1	27.0 A	1	22447.4 VA	27.00 A	1	22447.4 VA	27.00 A	1	22447.4 VA	27.00 A	0	0.0 VA
20 HP BACKWASH PUMP 2	27.0 A	1	22447.4 VA	27.00 A	0	22447.4 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
50 HP BOOSTER PUMP 1	65.00 A	1	54040.0 VA	65.00 A	1	54040.0 VA	65.00 A	1	54040.0 VA	65.00 A	0	0.0 VA
50 HP BOOSTER PUMP 2	65.00 A	1	54040.0 VA	65.00 A	0	54040.0 VA	65.00 A	0	0.0 VA	65.00 A	0	0.0 VA
15 HP TREATED WATER PUMP 1 (FUTURE PROVISIONAL)	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	21.00 A	0	0.0 VA
15 HP TREATED WATER PUMP 2 (FUTURE PROVISIONAL)	21.00 A	1	17459.1 VA	21.00 A	0	17459.1 VA	21.00 A	0	0.0 VA	21.00 A	0	0.0 VA
30 KVA MCC TRANSFORMER	16.24 A	1	13500.0 VA	10.22 A	1	8500.0 VA	10.22 A	1	8500.0 VA	10.22 A	1	8500.0 VA
TOTAL LOAD =	245.44 A		204053.3 VA	239.42 A		199053.3 VA	124.82 A		103776.7 VA	10.22 A		8500.0 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
50 HP HP => 0.25 x 13510.0 VA =	4.06 A		3377.5 VA	4.06 A		3377.5 VA	4.06 A		3377.5 VA	4.06 A		3377.5 VA
2% SYSTEM LOSSES TOTAL x % =	4.91 A		4081.1 VA	4.79 A		3981.1 VA	2.50 A		2075.5 VA	0.20 A		170.0 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	254.41 A		211511.9 VA	248.27 A		206411.9 VA	131.38 A		109229.7 VA	14.49 A		12047.5 VA
MAIN BREAKER SIZE REQUIRED =				450 A								
480 V, 3 PHASE, 3 WIRE												

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOOTIS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
LOAD CALCULATIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY

SHEET NO. E-00-34 of SHEETS
REV 0

FILENAME: E-00-34.dwg
PLOT DATE: Oct 23, 2015
PLOT TIME: 3:47:48pm

N1808

NODE 1 LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
3 HP TWB01-P0341	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
3 HP TWB02-P0341	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
3 HP TWB03-P0341 [FUTURE PROVISIONAL]	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
3 HP TWB04-P0341 [FUTURE PROVISIONAL]	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
0.75 HP TWB05-P0341 [FUTURE PROVISIONAL]	1.60 A	1	1330.2 VA	1.60 A	0	0.0 VA	1.60 A	0	0.0 VA	1.60 A	0	0.0 VA
0.5 HP ER01-P0340	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
0.5 HP ER02-P0340	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
0.5 HP ER03-P0340	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
0.5 HP ER04-P0340	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
0.5 HP ER05-P0340 [FUTURE PROVISIONAL]	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	0	0.0 VA
1 HP ER06-P0340	2.10 A	1	1745.9 VA	2.10 A	1	1745.9 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
5 HP IRZ39-P0443	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ38-P0443 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ40-P0440 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
30 KVA REMEDY OPERATIONS BUILIDING PANEL "PP-OP"	52.32 A	1	43500.0 VA	52.32 A	1	43500.0 VA	41.86 A	1	34800.0 VA	41.86 A	1	34800.0 VA
45 KVA CONSTRUCTION TRAILER TRANSFORMER	40.29 A	1	33500.0 VA	40.29 A	1	33500.0 VA	20.15 A	1	16750.0 VA	20.15 A	1	16750.0 VA
CARBON AMENDMENT PANEL PNL-1A	31.02 A	1	25791.6 VA	31.02 A	1	25791.6 VA	24.82 A	1	20633.3 VA	24.82 A	1	20633.3 VA
TOTAL LOAD =	174.84 A		145358.5 VA	179.46 A		149201.6 VA	137.64 A		114434.0 VA	124.74 A		103709.1 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
45 HP HP => 0.25 x 0.0 VA =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
9% SYSTEM LOSSES TOTAL x % =	15.74 A		13082.3 VA	16.15 A		13428.1 VA	12.39 A		10299.1 VA	11.23 A		9333.8 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	190.57 A		158440.8 VA	195.61 A		162629.7 VA	150.03 A		124733.1 VA	135.97 A		113043.0 VA
SERVICE SIZE REQUIRED =				350 A								
480 V, 3 PHASE, 4 WIRE												

NODE 2 LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
30.0 HP RB03-P0540	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA
30.0 HP RB04-P0540	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	14.00 A	1	11639.4 VA	14.00 A	1	11639.4 VA
30.0 HP RB05-P0540	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	14.00 A	1	11639.4 VA	14.00 A	1	11639.4 VA
30.0 HP RB06-P0540 [FUTURE PROVISIONAL]	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	14.00 A	0	0.0 VA	14.00 A	0	0.0 VA
30.0 HP RB07-P0540 [FUTURE PROVISIONAL]	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	14.00 A	0	0.0 VA	14.00 A	0	0.0 VA
5.0 HP IRZ29-P0444	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5.0 HP IRZ29-P0445	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5.0 HP IRZ31-P0444	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5.0 HP IRZ31-P0445	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5.0 HP IRZ33-P0444	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ33-P0445	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ35-P0443	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ37-P0443	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ30-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ30-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ32-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ32-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ34-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ34-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5.0 HP IRZ36-P0443 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
1.5 KVA COMMUNICATIONS EQUIPMENT	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA
10 KVA WELLS CPT	12.03 A	1	10000.0 VA	12.03 A	1	10000.0 VA	7.82 A	1	6500.0 VA	7.82 A	1	6500.0 VA
TOTAL LOAD =	327.83 A		272554.7 VA	164.23 A		136540.2 VA	67.82 A		56386.6 VA	48.62 A		40424.0 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
30 HP HP => 0.25 x 0.0 VA =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
10% SYSTEM LOSSES 27255.5 TOTAL x % =	32.78 A		27255.5 VA	16.42 A		13654.0 VA	6.78 A		5638.7 VA	4.86 A		4042.4 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	360.62 A		299810.2 VA	180.66 A		150194.2 VA	74.60 A		62025.2 VA	53.48 A		44466.4 VA
SERVICE SIZE REQUIRED =				350 A								
480 V, 3 PHASE, 4 WIRE												

NODE 3 LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
5 HP IRZ16-P0446	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5 HP IRZ16-P0447	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5 HP IRZ16-P0448	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5 HP IRZ16-P0449	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	0	0.0 VA
5 HP IRZ17-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ17-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ17-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ17-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ19-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ19-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ19-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ19-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ20-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ20-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ20-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ20-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ21-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ21-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ21-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ21-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
20 HP IRZ23-P0440	27.00 A	1	22447.4 VA	27.00 A	1	22447.4 VA	21.00 A	1	17459.1 VA	21.00 A	0	0.0 VA
5 HP IRZ25-P0444	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ25-P0445	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ27-P0444	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ27-P0445	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ18-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ18-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ18-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ18-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ22-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ22-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ22-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ22-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ24-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ24-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ26-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ26-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ28-P0444 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ28-P0445 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
0.75 HP IRZ00-P0640 (MW-20 BENCH)	1.60 A	1	1330.2 VA	1.60 A	1	1330.2 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
0.75 HP IRZ00-P0641 (MW-20 BENCH)	1.60 A	1	1330.2 VA	1.60 A	1	1330.2 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
0.75 HP IRZ00-P0642 (MW-20 BENCH)	1.60 A	1	1330.2 VA	1.60 A	1	1330.2 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
0.75 HP IRZ00-P0643 (MW-20 BENCH)	1.60 A	1	1330.2 VA	1.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
10 HP IRZ00-P0644 (MW-20 BENCH) PRODUCED WATER	14.00 A	1	11639.4 VA	14.00 A	1	11639.4 VA	14.00 A	1	11639.4 VA	14.00 A	1	11639.4 VA
25 HP IRZ00-P0645 (MW-20 BENCH) CLEAN IN PLACE	34.00 A	1	28267.1 VA	34.00 A	0	0.0 VA	34.00 A	0	0.0 VA	34.00 A	0	0.0 VA
0.5 HP IRZ00-P0646 (MW-20 BENCH)	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA	1.10 A	1	914.5 VA
0.5 HP IRZ00-P0647 (MW-20 BENCH)	1.10 A	1	914.5 VA	1.10 A	0	0.0 VA	1.10 A	0	0.0 VA	1.10 A	0	0.0 VA
5 HP IRZ00-P0648 (MW-20 BENCH)	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
1.5 KVA COMMUNICATIONS EQUIPMENT	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA
45 KVA TRANSFORMER	54.13 A	1	45000.0 VA	54.13 A	1	45000.0 VA	19.25 A	1	16000.0 VA	19.25 A	1	16000.0 VA
15 KVA WELLS CPT	28.87 A	1	24000.0 VA	28.87 A	1	24000.0 VA	20.45 A	1	17000.0 VA	20.45 A	1	17000.0 VA
TOTAL LOAD =	464.8 A		386426.1 VA	162.10 A		134766.0 VA	96.80 A		80475.6 VA	56.60 A		47053.9 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
25 HP HP => 0.25 x 0.0 VA =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
10% SYSTEM LOSSES 38642.6 TOTAL x % =	46.48 A		38642.6 VA	16.21 A		13476.6 VA	9.68 A		8047.6 VA	5.66 A		4705.4 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	511.28 A		425068.7 VA	178.31 A		148242.6 VA	106.48 A		88523.1 VA	62.26 A		51759.3 VA
SERVICE SIZE REQUIRED =				350 A								
480 V, 3 PHASE, 4 WIRE												

ELECTRICAL PLAN NOTES:

1. VALUES TAKEN FROM 2011 NEC.
2. FOR SIZING PURPOSES, A MAXIMUM OF FOUR (4) BACKWASH PUMPS WILL BE IN OPERATION SIMULTANEOUSLY UNDER NORMAL OPERATIONAL SCENARIO. ONLY ONE (1) BACKWASH PUMP WILL BE IN OPERATION AT ANY GIVEN TIME. THE BACKWASH PROGRAM WILL OPERATE THE BACKWASH PUMPS IN SEQUENCE, FOR 30 MINUTES EACH WEEK.
3. FOR ENERGY USE CALCULATION PURPOSES, A MAXIMUM OF THREE (3) RB WELL PUMPS WILL BE IN OPERATION SIMULTANEOUSLY UNDER THE MAXIMUM DESIGN CONDITION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
LOAD CALCULATIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-35	REV 0

FILENAME: E-00-35.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:47:57pm

N1808

NODE 4 LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
30 HP RB01-P0540	40.00 A	1	33255.4 VA	40.00 A	1	33255.4 VA	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA
30 HP RB02-P0540	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	11.00 A	0	0.0 VA	11.00 A	0	0.0 VA
30 HP RB08-P0540	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	11.00 A	0	0.0 VA	11.00 A	0	0.0 VA
30 HP RB09-P0540	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	11.00 A	0	0.0 VA	11.00 A	0	0.0 VA
15 HP IRZ01-P0441	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA
15 HP IRZ01-P0442	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA
15 HP IRZ05-P0441	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA
15 HP IRZ05-P0442	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA
15 HP IRZ09-P0441	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	11.00 A	1	9145.2 VA	11.00 A	1	9145.2 VA
15 HP IRZ09-P0442	21.00 A	1	17459.1 VA	21.00 A	1	17459.1 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ11-P0446	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ11-P0447	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ11-P0448	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ11-P0449	7.60 A	1	6318.5 VA	7.60 A	1	6318.5 VA	4.80 A	1	3990.6 VA	4.80 A	1	3990.6 VA
5 HP IRZ13-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ13-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ13-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ13-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ15-P0446	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ15-P0447	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ15-P0448	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ15-P0449	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	4.80 A	0	0.0 VA	4.80 A	0	0.0 VA
5 HP IRZ02-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ02-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ02-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ02-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ03-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ03-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ03-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ03-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ04-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ04-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ04-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ04-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ06-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ06-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ06-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ06-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ07-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ07-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ07-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ07-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ08-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ08-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ08-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ08-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ10-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ10-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ10-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ10-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ12-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ12-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ12-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ12-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ14-P0446 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ14-P0447 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ14-P0448 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
5 HP IRZ14-P0449 [FUTURE PROVISIONAL]	7.60 A	1	6318.5 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA	7.60 A	0	0.0 VA
1.5 KVA COMMUNICATIONS EQUIPMENT	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA
27 KVA WELLS CPT	34.28 A	1	28500.0 VA	34.28 A	1	28500.0 VA	9.02 A	1	7500.0 VA	9.02 A	1	7500.0 VA
TOTAL LOAD =	686.88 A		571065.0 VA	232.48 A		193283.9 VA	105.03 A		87316.4 VA	94.03 A		78171.2 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
30 HP HP => 0.25 x 0.0 VA =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
10% SYSTEM LOSSES TOTAL x % =	68.69 A		57106.5 VA	23.25 A		19328.4 VA	10.50 A		8731.6 VA	9.40 A		7817.1 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	755.57 A		628171.5 VA	255.73 A		212612.3 VA	115.53 A		96048.1 VA	103.43 A		85988.3 VA
SERVICE SIZE REQUIRED =				450 A								
480 V, 3 PHASE, 4 WIRE												

NODE 5 LOAD CALCULATIONS

LOAD DESCRIPTION	CONNECTED LOAD LOAD	QTY	TOTAL	MAXIMUM LOAD LOAD	QTY	TOTAL	NOMINAL LOAD LOAD	QTY	TOTAL	MINIMUM LOAD LOAD	QTY	TOTAL
30 HP IRL01-P0541	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
30 HP IRL02-P0541	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
30 HP IRL03-P0541	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
30 HP IRL03-P0541	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
40 HP IRL04-P0541	52.00 A	1	43232.0 VA	52.00 A	1	43232.0 VA	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA
40 HP IRL04-P0541	52.00 A	1	43232.0 VA	52.00 A	0	0.0 VA	40.00 A	0	0.0 VA	40.00 A	0	0.0 VA
30 HP IRL05-P0541 [FUTURE PROVISIONAL]	40.00 A	1	33255.4 VA	40.00 A	0	0.0 VA	40.00 A	0	0.0 VA	40.00 A	0	0.0 VA
40 HP IRL06-P0541 [FUTURE PROVISIONAL]	52.00 A	1	43232.0 VA	52.00 A	0	0.0 VA	52.00 A	0	0.0 VA	52.00 A	0	0.0 VA
40 HP IRL07-P0541 [FUTURE PROVISIONAL]	52.00 A	1	43232.0 VA	52.00 A	0	0.0 VA	52.00 A	0	0.0 VA	52.00 A	0	0.0 VA
40 HP FW01	52.00 A	1	43232.0 VA	52.00 A	0	0.0 VA	27.00 A	0	0.0 VA	27.00 A	0	0.0 VA
1.5 KVA COMMUNICATIONS EQUIPMENT	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA	1.80 A	1	1500.0 VA
5 KVA WELLS CPT	6.01 A	1	5000.0 VA	6.01 A	1	5000.0 VA	3.61 A	1	3000.0 VA	3.61 A	1	3000.0 VA
TOTAL LOAD =	467.82 A		388936.8 VA	59.82 A		49732.0 VA	45.41 A		37755.4 VA	5.41 A		4500.0 VA
LOAD CORRECTION FACTORS												
LARGEST MOTOR LOAD x 25%:												
40 HP HP => 0.25 x 10808.0 VA =	3.25 A		2702.0 VA	3.25 A		2702.0 VA	3.25 A		2702.0 VA	3.25 A		2702.0 VA
11% SYSTEM LOSSES TOTAL x % =	51.46 A		42783.1 VA	6.58 A		5470.5 VA	5.00 A		4153.1 VA	0.60 A		495.0 VA
0% BREAKER DERATING = TOTAL x % =	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA	0.00 A		0.0 VA
FOR CONTINUOUS LOADS NEC 210-20												
SERVICE SIZE (MIN) =	522.53 A		434421.9 VA	69.65 A		57904.5 VA	53.66 A		44610.5 VA	9.26 A		7697.0 VA
SERVICE SIZE REQUIRED =				350 A								
480 V, 3 PHASE, 4 WIRE												

ELECTRICAL PLAN NOTES:

1. VALUES TAKEN FROM 2011 NEC.
2. FOR SIZING PURPOSES, A MAXIMUM OF FOUR (4) BACKWASH PUMPS WILL BE IN OPERATION SIMULTANEOUSLY UNDER NORMAL OPERATIONAL SCENARIO. ONLY ONE (1) BACKWASH PUMP WILL BE IN OPERATION AT ANY GIVEN TIME. THE BACKWASH PROGRAM WILL OPERATE THE BACKWASH PUMPS IN SEQUENCE, FOR 30 MINUTES EACH WEEK.
3. FOR ENERGY USE CALCULATION PURPOSES, A MAXIMUM OF THREE (3) RB WELL PUMPS WILL BE IN OPERATION SIMULTANEOUSLY UNDER THE MAXIMUM DESIGN CONDITION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	MBY	TPF	JMS	RAO	
0	9/8/14	PRE-FINAL (90%) DESIGN	MBY			TPF	

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
LOAD CALCULATIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. E-00-36 of SHEETS
REV 0

FILENAME: E-00-36.dwg
PLOT DATE: Oct 23, 2015
PLOT TIME: 3:48:08pm

N1808

PANEL SPECIFICATIONS AND NOTES:

1. THE PANEL MANUFACTURER SHALL HAVE A MINIMUM OF 5 YEARS EXPERIENCE MANUFACTURING SYSTEMS SPECIFICALLY FOR WASTEWATER APPLICATIONS.

2. THE CONTROL PANEL SHALL BE MANUFACTURED AND FABRICATED BY A UL 508A LISTED INDUSTRIAL CONTROL PANEL MANUFACTURER AND SHALL MEET UL 508A SAFETY STANDARDS.

3. ENCLOSURES SHALL BE UL LISTED, NEMA TYPE 4, PROPERLY SIZED TO CONTAIN THE REQUIRED COMPONENTS WITH ADDITIONAL 35% FREE SPACE UNLESS OTHERWISE INDICATED ON THE WIRING DIAGRAM. ENCLOSURES MOUNTED INSIDE VAULT SHALL BE CONSTRUCTED OF 316 STAINLESS STEEL BODY AND DOOR WITH CONTINUOUS HINGE (NEMA 4X).

4. ENCLOSURE ACCESSORIES, WHERE APPLICABLE, SHALL INCLUDE THE FOLLOWINGS:

- INNER SWING PANEL TO MOUNT OPERATOR DEVICES, INNER PANEL SIZE SHALL COVER THE ENTIRE OPENING OF THE ENCLOSURE.
- CONDENSATE HEATER, MINIMUM OF 100WATT, 120VAC WITH ADJUSTABLE THERMOSTAT
- WORK LIGHT, 12-INCH FLUORESCENT WITH A SAFETY LENS SHALL BE MOUNTED INSIDE THE TOP OF THE ENCLOSURE WITHOUT PENETRATING THE OUTSIDE OF THE PANEL. THE LIGHT SHALL BE OPERATED WITH A SWITCH ATTACHED TO THE DOOR THAT TURNS ON THE LIGHT WHEN THE DOOR IS OPEN.

7. ALL DEVICES WITHIN THE PANEL SHALL BE UL LISTED AND/ OR RECOGNIZED WHERE APPLICABLE AND SHALL BE MOUNTED AND WIRED IN ACCORDANCE WITH THE MOST CURRENT EDITION OF UL508 AND NFPA.

8. THE CONTROL PANEL SHALL BE FULLY TESTED BY THE FACTORY PRIOR TO SHIPMENT. IT SHALL INCLUDE TESTING OF BOTH POWER AND CONTROL DEVICES AS WELL AS ALL CONTROL FUNCTIONS.

9. IT IS THE PANEL BUILDER RESPONSIBILITY TO PROVIDE PANEL LAYOUT, BILL OF MATERIAL, AND SUBMIT TO ARCADIS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

10. REFER TO CONTROL TRANSFORMER NAMEPLATE FOR CONNECTIONS OF PRIMARY AND SECONDARY LEADS.

11. CABINET WITH VFDs SHALL HAVE COOLING FAN, LOUVER WITH REMOVABLE FILTER ACCESSIBLE TO OPERATOR WITHOUT OPENING PANEL DOOR. COOLING FAN SIZE SHALL BE ADEQUATE TO PREVENT VFD FROM OVERHEATING. ENCLOSURE SHALL BE CARBON STEEL NEMA 3R. ALTERNATIVELY, CABINET INSTALLED INSIDE VAULT THAT CONTAINS VFDs SHALL BE 316 SS NEMA4X WITH SIDE MOUNTED AIR CONDITIONING UNIT.

12. FOR COMBINATION MOTOR CONTROLLER WITH MOTOR CIRCUIT PROTECTION, FOLLOW MANUFACTURER'S INSTRUCTION FOR SELECTING CURRENT ELEMENTS AND SETTING THE INSTANTANEOUS TRIP CIRCUIT BREAKER.

13. FIELD WIRING CONNECTIONS SHALL BE ONLY TO TERMINALS PROVIDED.

14. SIGNAL WIRES SHALL NOT BE PLACED WITH NON-SIGNAL WIRES AFTER ENTRY INTO THE CABINET.

15. INCOMING WIRES SHALL STAY OUTSIDE AREAS OF POWER AND WHERE CONTROL COMPONENTS ARE PLACED, AND SHALL NOT BE ROUTED IN WIRE CHANNELS.

16. GROUNDING SHALL COMPLY WITH LOCAL REQUIREMENT AND NEC ARTICLE 250, GROUNDING AND BONDING.

17. OPERATOR CONTROL DEVICES SHALL BE 22MM, NEMA AND UL LISTED FOR TYPES 1, 12, 3R, 4 AND 4X. CONTACT BLOCKS SHALL BE COLOR CODED RATED AT 10AMP. CONNECTION SHALL BE SUITABLE FOR TWO 14AWG CONTROL WIRES.

18. CONTROL RELAYS AND TIME DELAY RELAYS SHALL BE DPDT RATED 10A@120VAC SOCKET MOUNT TYPE.

19. ALL COMPONENTS MOUNTED ON THE DOOR SHALL HAVE FINGER PROOF TERMINALS, OTHERWISE, THEY SHALL BE WIRED WITH INSULATED CONNECTORS TO PREVENT ACCIDENTAL SHOCK HAZARDS.

20. SELF ADHESIVE VINYL CLOTH PRINTED WIRE MARKERS SHALL BE PLACED AT BOTH ENDS OF EVERY WIRE. ALL COMPONENTS ON THE BACKPANEL SHALL BE IDENTIFIED INCLUDING RATING AND SIZE.

21. COMPONENTS ON THE DOOR OF THE ENCLOSURE SHALL BE IDENTIFIED WITH CUSTOM ENGRAVED PLASTIC LEGEND PLATES.

22. VOLTAGE IDENTIFICATION AND WARNING LABELS SHALL BE INSTALLED ON THE CABINET DOOR.

LEGEND

TERMINAL BLOCK (TB) CONNECTION.

DASHED LINES DENOTES WIRING TO FIELD DEVICES

LINE NUMBER DESCRIPTION

0000
WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS) — LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000
WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS) — WIRE NUMBER (Always 1digit); LINE NUMBER (ALWAYS 2 DIGITS)

INSTALLED IN REMOTE LOCATION

MCP	MAIN CONTROL PANEL
RCP	REMOTE CONTROL PANEL
MCE	MOTOR CONTROL ENCLOSURE
MSP	MOTOR STARTER PANEL
CMCP	COMBINATION MOTOR CIRCUIT PROTECTION
PS	POWER SUPPLY
TB	TERMINAL BLOCK
PTB	POWER TERMINAL BLOCK

(xx) SYMBOL TO IDENTIFY COMPONENT SPECIFICATIONS

xx DEVICE ID NUMBER TO IDENTIFY PART NUMBER

xxx WIRE CONNECTION CONTINUATION REFERENCE.

xxx → FIELD WIRING TO OTHER CABINETS WITH CONNECTION REFERENCE.

(DM) DOOR MOUNTED

(RM) REMOTE MOUNTED

(XP) EXPLOSION PROOF (CLASS 1, DIV 2)

PANEL MAIN DISCONNECT

GROUND

PANEL CHASSIS GROUND

PLUG-IN MOV (METAL OXIDE VARISTOR)

CIRCUIT BREAKER

PUSH BUTTON SWITCH

SWITCH

PILOT LIGHT

RELAY/ STARTER COIL

PUSH TO TEST PILOT LIGHT

FUSE

PULSE INPUT

SOLENOID VALVE

COMBINATION MOTOR STARTER AND CIRCUIT PROTECTION

MAJOR COMPONENTS SPECIFICATION:

(1) UL 498 RATED MOLDED CASE CIRCUIT BREAKER, SIZE AS INDICATED, 600VAC, 3POLE, WITH THERMAL MAGNETIC TRIP.

(2) DOOR MOUNTED HANDLE, NFPA 79 COMPLIANT.

(3) POWER DISTRIBUTION BLOCK TO ALLOW INDIVIDUAL BRANCH DISCONNECT AND SHORT CIRCUIT PROTECTION TO HAVE A UL INTERRUPTING RATING OF 14KA AT 480 VAC.

(4) INCOMING SERVICE GROUND LUG. ADDITIONAL GROUND LUGS TO BE INSTALLED FOR EACH MOTOR.

(5) SINGLE PHASE, NON-VENTILATED AUTOMATION TRANSFORMER, MOUNTED ON SIDE OF PANEL. TRANSFORMER SHALL BE STAINLESS STEEL, UL LISTED.
1KVA: SOLA CATALOG NUMBER "HSS1F1BS"
1.5KVA: SOLA CATALOG NUMBER "HSS1F1.5AS"
2KVA: SOLA CATALOG NUMBER "HSS1F2AS"

(6A) MANUAL MOTOR STARTER WITH MAGNETIC SHORT CIRCUIT PROTECTION, AND OVERLOAD. MOTOR STARTER SHALL NOT HAVE AN AMPACITY LESS THAN 125% OF THE MOTOR FLA.

(6B) COMBINATION MOTOR STARTER WITH MAGNETIC SHORT CIRCUIT PROTECTION, OVERLOAD, CONTACTOR AND (2) N.O. AUXILIARY CONTACT. MOTOR STARTER SHALL NOT HAVE AN AMPACITY LESS THAN 125% OF THE MOTOR FLA.

(7) FEED THROUGH UL LISTED TERMINAL BLOCK, RATED 600VAC, 100KA SCCR RATING, DIN RAIL MOUNT, SCREW CONNECTION, FOR COPPER WIRE. BLOCK SIZE AND COLOR TO MATCH MINIMUM CIRCUIT REQUIREMENT.

(8A) IEC MINIATURE 4 POLE CONTROL RELAY, (2) N.O. AND (2) N.C. CONTACTS.

(8B) IEC MINIATURE 4 POLE CONTROL RELAY, (4) N.O. CONTACTS.

(9) 500VA UPS WITH ALARM RELAY (PHOENIX CONTACT OR APPROVED EQUAL).

(10) 24VDC POWER SUPPLY, NEC CLASS 2 COMPLIANCE. SIZE AS INDICATED.

(11) HAND SWITCH POSITION SHALL HAVE SPRING-RETURN MECHANISM FOR MOMENTARY OPERATION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIDOTI — 20532 — Exp: 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

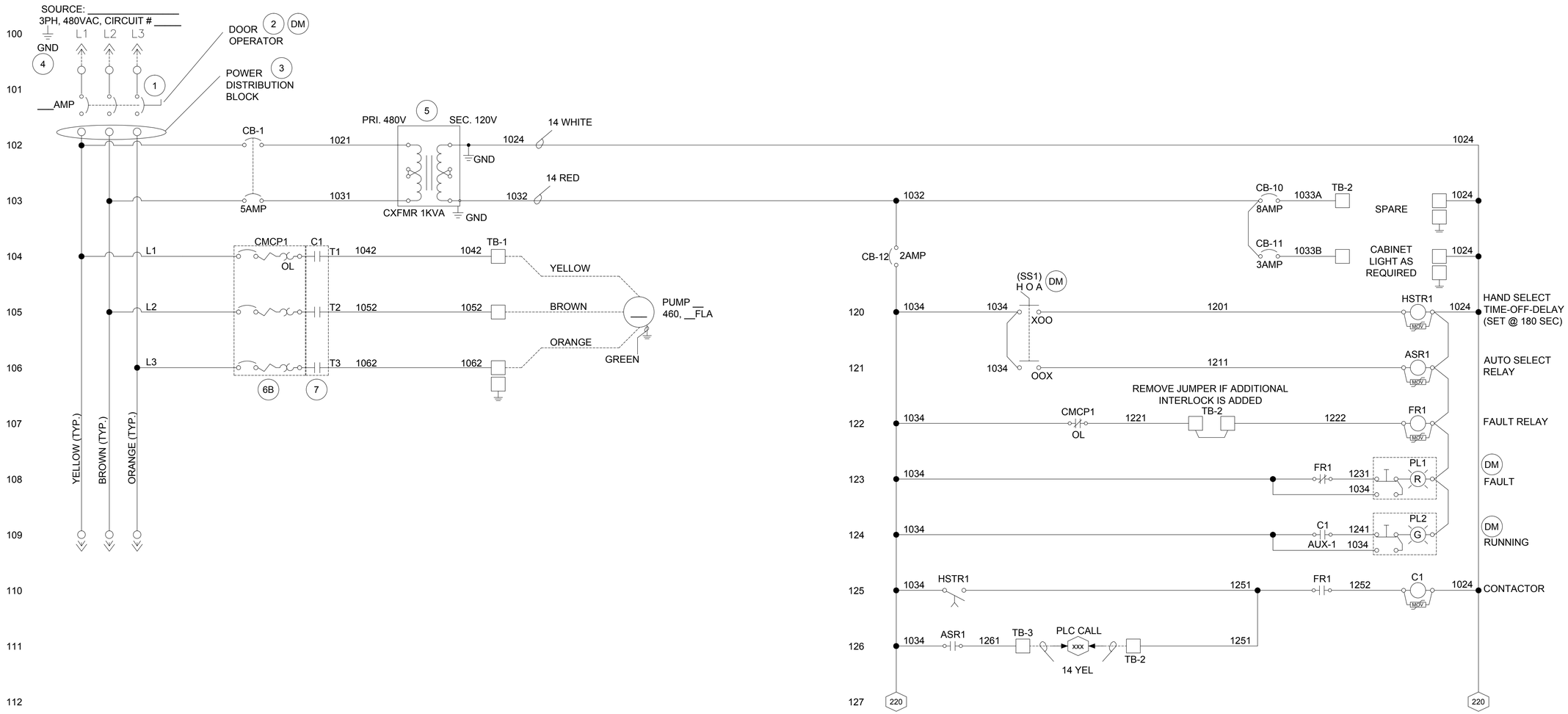
ELECTRICAL PANEL FABRICATION NOTES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
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NOTE:

REFER TO SHEET E-00-36 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) COMPONENT ID AND DESCRIPTION, SEE E-00-36.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIGOTA
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
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REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

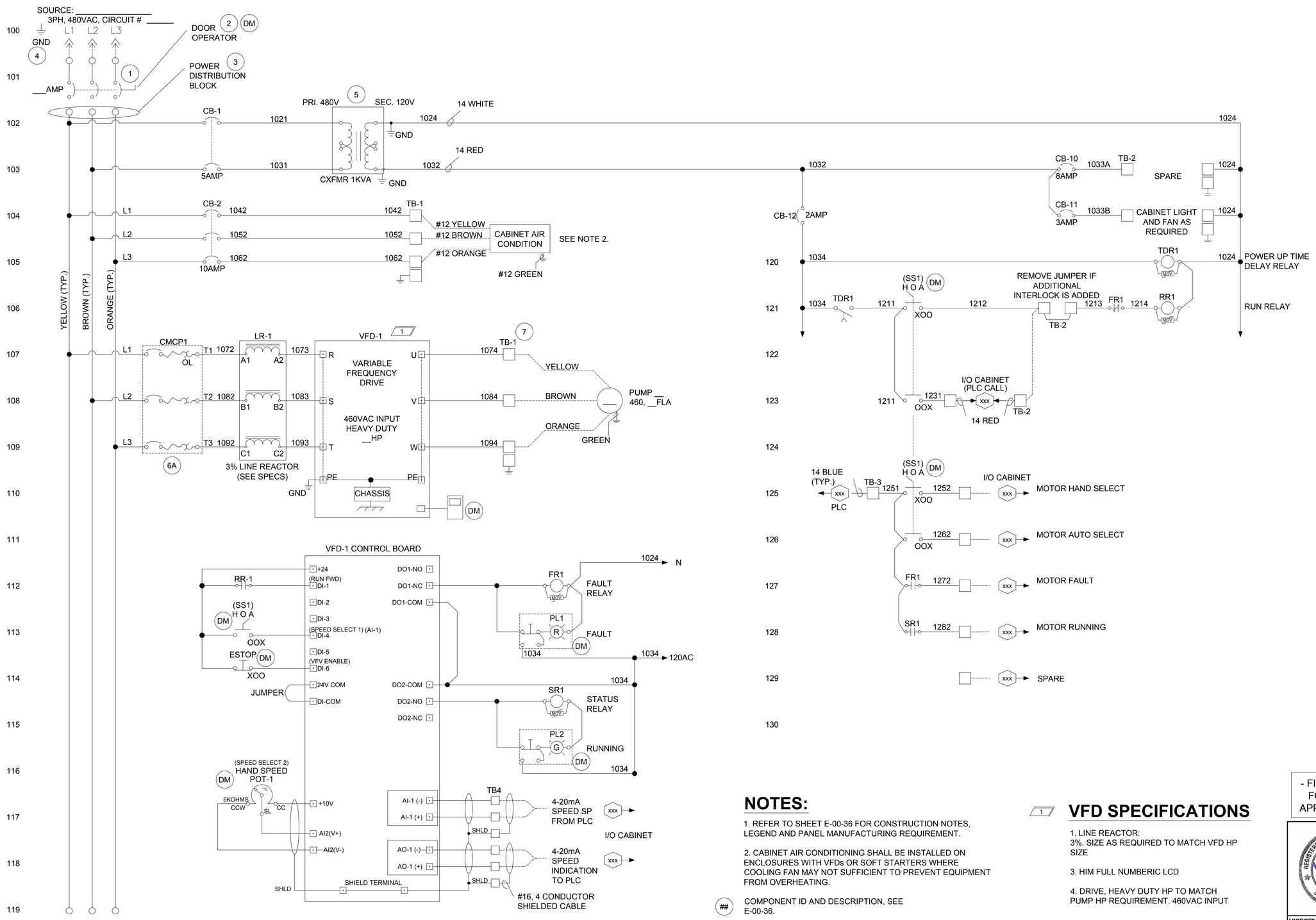
MOTOR ELECTRICAL PANEL EP1

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
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SHEET NO. E-00-38 of SHEETS
REV 2

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NOTES:

1. REFER TO SHEET E-00-36 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

2. CABINET AIR CONDITIONING SHALL BE INSTALLED ON ENCLOSURES WITH VFDs OR SOFT STARTERS WHERE COOLING FAN MAY NOT SUFFICIENT TO PREVENT EQUIPMENT FROM OVERHEATING.

(##) COMPONENT ID AND DESCRIPTION, SEE E-00-36.

1 VFD SPECIFICATIONS

1. LINE REACTOR: 3%, SIZE AS REQUIRED TO MATCH VFD HP SIZE

3. HIM FULL NUMBERIC LCD

4. DRIVE, HEAVY DUTY HP TO MATCH PUMP HP REQUIREMENT. 460VAC INPUT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDITI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

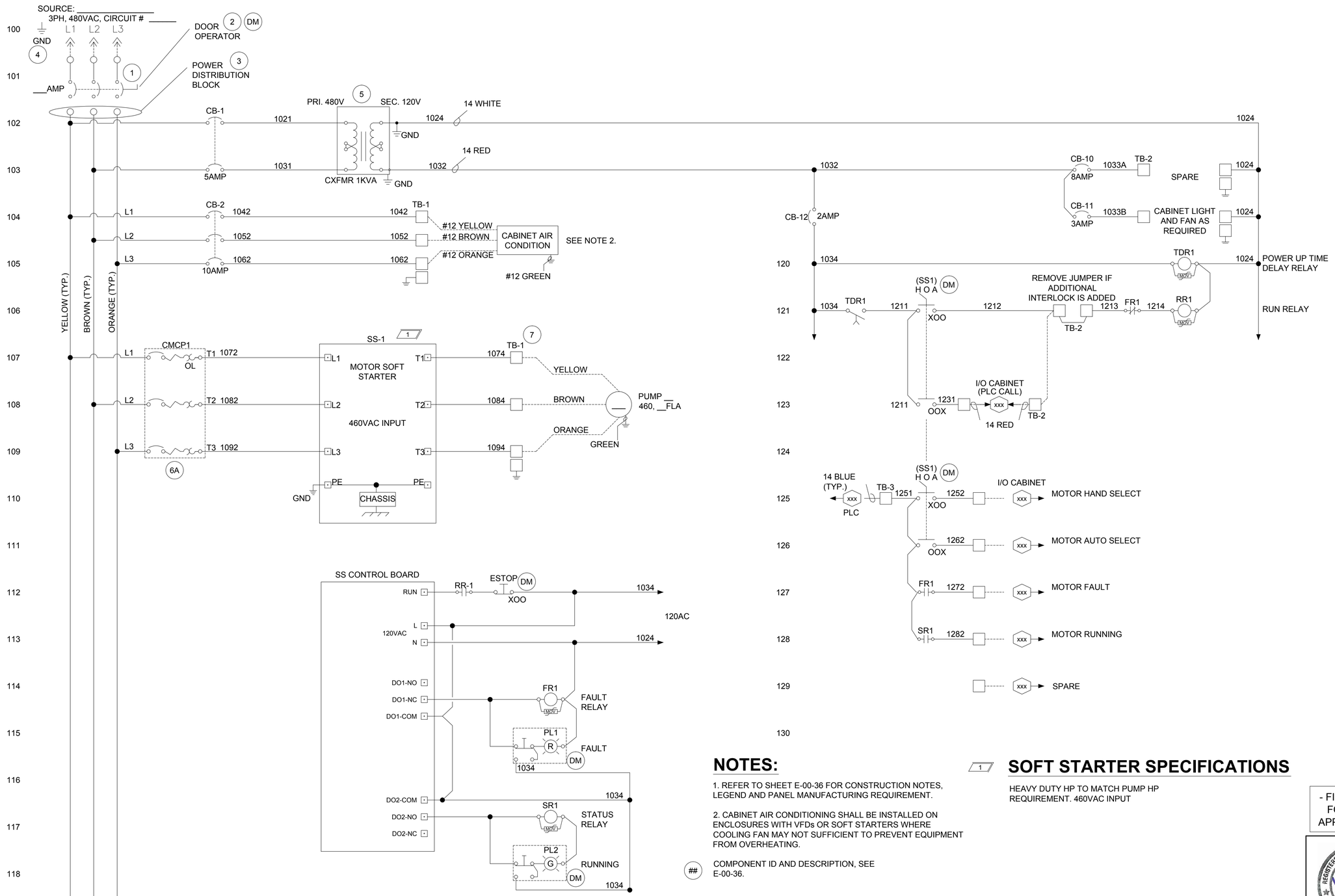
MOTOR ELECTRICAL PANEL EP2

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
E-00-39	REV 2

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NOTES:

1. REFER TO SHEET E-00-36 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

2. CABINET AIR CONDITIONING SHALL BE INSTALLED ON ENCLOSURES WITH VFDs OR SOFT STARTERS WHERE COOLING FAN MAY NOT SUFFICIENT TO PREVENT EQUIPMENT FROM OVERHEATING.

(##) COMPONENT ID AND DESCRIPTION, SEE E-00-36.

1 SOFT STARTER SPECIFICATIONS

HEAVY DUTY HP TO MATCH PUMP HP REQUIREMENT. 460VAC INPUT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOOTIS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
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0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

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RAO	SO
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	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MOTOR ELECTRICAL PANEL EP3

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-40	REV 2

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PANEL SPECIFICATIONS AND NOTES:

1. THE PANEL MANUFACTURER SHALL HAVE A MINIMUM OF 5 YEARS EXPERIENCE MANUFACTURING SYSTEMS SPECIFICALLY FOR WASTEWATER APPLICATIONS.
2. THE CONTROL PANEL SHALL BE MANUFACTURED AND FABRICATED BY A UL 508A LISTED INDUSTRIAL CONTROL PANEL MANUFACTURER AND SHALL MEET UL 508A SAFETY STANDARDS.
3. ENCLOSURES SHALL BE UL LISTED, NEMA TYPE 4, PROPERLY SIZED TO CONTAIN THE REQUIRED COMPONENTS WITH ADDITIONAL 35% FREE SPACE UNLESS OTHERWISE INDICATED ON THE WIRING DIAGRAM. ENCLOSURES MOUNTED INSIDE VAULT SHALL BE CONSTRUCTED OF 316 STAINLESS STEEL BODY AND DOOR WITH CONTINUOUS HINGE (NEMA 4X).
4. ENCLOSURE ACCESSORIES, WHERE APPLICABLE, SHALL INCLUDE THE FOLLOWINGS:

- INNER SWING PANEL TO MOUNT OPERATOR DEVICES, INNER PANEL SIZE SHALL COVER THE ENTIRE OPENING OF THE ENCLOSURE.
- CONDENSATE HEATER, MINIMUM OF 100WATT, 120VAC WITH ADJUSTABLE THERMOSTAT
- WORK LIGHT, 12-INCH FLUORESCENT WITH A SAFETY LENS SHALL BE MOUNTED INSIDE THE TOP OF THE ENCLOSURE WITHOUT PENETRATING THE OUTSIDE OF THE PANEL. THE LIGHT SHALL BE OPERATED WITH A SWITCH ATTACHED TO THE DOOR THAT TURNS ON THE LIGHT WHEN THE DOOR IS OPEN.

7. ALL DEVICES WITHIN THE PANEL SHALL BE UL LISTED AND/ OR RECOGNIZED WHERE APPLICABLE AND SHALL BE MOUNTED AND WIRED IN ACCORDANCE WITH THE MOST CURRENT EDITION OF UL508 AND NFPA.
8. THE CONTROL PANEL SHALL BE FULLY TESTED BY THE FACTORY PRIOR TO SHIPMENT. IT SHALL INCLUDE TESTING OF BOTH POWER AND CONTROL DEVICES AS WELL AS ALL CONTROL FUNCTIONS.
9. IT IS THE PANEL BUILDER RESPONSIBILITY TO PROVIDE PANEL LAYOUT, BILL OF MATERIAL, AND SUBMIT TO ARCADIS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
10. REFER TO CONTROL TRANSFORMER NAMEPLATE FOR CONNECTIONS OF PRIMARY AND SECONDARY LEADS.
11. NOT USED.
12. FOR COMBINATION MOTOR CONTROLLER WITH MOTOR CIRCUIT PROTECTION, FOLLOW MANUFACTURER'S INSTRUCTION FOR SELECTING CURRENT ELEMENTS AND SETTING THE INSTANTANEOUS TRIP CIRCUIT BREAKER.
13. FIELD WIRING CONNECTIONS SHALL BE ONLY TO TERMINALS PROVIDED.
14. SIGNAL WIRES SHALL NOT BE PLACED WITH NON-SIGNAL WIRES AFTER ENTRY INTO THE CABINET.
15. INCOMING WIRES SHALL STAY OUTSIDE AREAS OF POWER AND WHERE CONTROL COMPONENTS ARE PLACED, AND SHALL NOT BE ROUTED IN WIRE CHANNELS.
16. GROUNDING SHALL COMPLY WITH LOCAL REQUIREMENT AND NEC ARTICLE 250, GROUNDING AND BONDING.
17. OPERATOR CONTROL DEVICES SHALL BE 22MM, NEMA AND UL LISTED FOR TYPES 1, 12, 3R, 4 AND 4X. CONTACT BLOCKS SHALL BE COLOR CODED RATED AT 10AMP. CONNECTION SHALL BE SUITABLE FOR TWO 14AWG CONTROL WIRES.
18. CONTROL RELAYS AND TIME DELAY RELAYS SHALL BE DPDT RATED 10A@120VAC SOCKET MOUNT TYPE.
19. ALL COMPONENTS MOUNTED ON THE DOOR SHALL HAVE FINGER PROOF TERMINALS, OTHERWISE, THEY SHALL BE WIRED WITH INSULATED CONNECTORS TO PREVENT ACCIDENTAL SHOCK HAZARDS.
20. SELF ADHESIVE VINYL CLOTH PRINTED WIRE MARKERS SHALL BE PLACED AT BOTH ENDS OF EVERY WIRE. ALL COMPONENTS ON THE BACKPANEL SHALL BE IDENTIFIED INCLUDING RATING AND SIZE.
21. COMPONENTS ON THE DOOR OF THE ENCLOSURE SHALL BE IDENTIFIED WITH CUSTOM ENGRAVED PLASTIC LEGEND PLATES.
22. VOLTAGE IDENTIFICATION AND WARNING LABELS SHALL BE INSTALLED ON THE CABINET DOOR.

LEGEND

- TERMINAL BLOCK (TB) CONNECTION.
- DASHED LINES DENOTES WIRING TO FIELD DEVICES

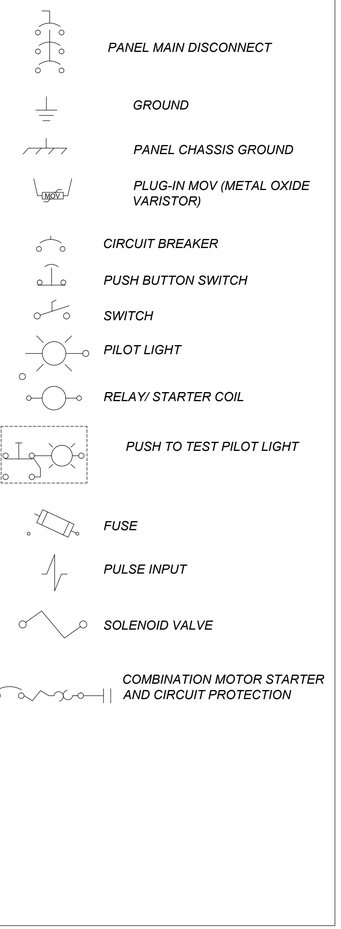
LINE NUMBER DESCRIPTION

0000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); WIRE NUMBER (Always 1digit); LINE NUMBER (ALWAYS 2 DIGITS)

- INSTALLED IN REMOTE LOCATION
- MCP — MAIN CONTROL PANEL
- RCP — REMOTE CONTROL PANEL
- MCE — MOTOR CONTROL ENCLOSURE
- MSP — MOTOR STARTER PANEL
- CMCP — COMBINATION MOTOR CIRCUIT PROTECTION
- PS — POWER SUPPLY
- TB — TERMINAL BLOCK
- PTB — POWER TERMINAL BLOCK
- (xx) — SYMBOL TO IDENTIFY COMPONENT SPECIFICATIONS
- xx — DEVICE ID NUMBER TO IDENTIFY PART NUMBER
- xxx — WIRE CONNECTION CONTINUATION REFERENCE.
- xxx → — FIELD WIRING TO OTHER CABINETS WITH CONNECTION REFERENCE.
- (DM) — DOOR MOUNTED
- (RM) — REMOTE MOUNTED
- (XP) — EXPLOSION PROOF (CLASS 1, DIV 2)



MAJOR COMPONENTS SPECIFICATION:

1. UL 498 RATED MOLDED CASE CIRCUIT BREAKER, SIZE AS INDICATED, 600VAC, 3POLE, WITH THERMAL MAGNETIC TRIP.
2. DOOR MOUNTED HANDLE, NFPA 79 COMPLIANT.
3. POWER DISTRIBUTION BLOCK TO ALLOW INDIVIDUAL BRANCH DISCONNECT AND SHORT CIRCUIT PROTECTION TO HAVE A UL INTERRUPTING RATING OF 14KA AT 480 VAC.
4. INCOMING SERVICE GROUND LUG. ADDITIONAL GROUND LUGS TO BE INSTALLED FOR EACH MOTOR.
5. SINGLE PHASE, NON-VENTILATED AUTOMATION TRANSFORMER, MOUNTED ON SIDE OF PANEL. TRANSFORMER SHALL BE STAINLESS STEEL, UL LISTED.
   1KVA: SOLA CATALOG NUMBER "HSS1F1BS"
   1.5KVA: SOLA CATALOG NUMBER "HSS1F1.5AS"
   2KVA: SOLA CATALOG NUMBER "HSS1F2AS"
6A. MANUAL MOTOR STARTER WITH MAGNETIC SHORT CIRCUIT PROTECTION, AND OVERLOAD. MOTOR STARTER SHALL NOT HAVE AN AMPACITY LESS THAN 125% OF THE MOTOR FLA.
6B. COMBINATION MOTOR STARTER WITH MAGNETIC SHORT CIRCUIT PROTECTION, OVERLOAD, CONTACTOR AND (2) N.O. AUXILIARY CONTACT. MOTOR STARTER SHALL NOT HAVE AN AMPACITY LESS THAN 125% OF THE MOTOR FLA.
7. FEED THROUGH UL LISTED TERMINAL BLOCK, RATED 600VAC, 100KA SCCR RATING, DIN RAIL MOUNT, SCREW CONNECTION, FOR COPPER WIRE. BLOCK SIZE AND COLOR TO MATCH MINIMUM CIRCUIT REQUIREMENT.
8A. IEC MINIATURE 4 POLE CONTROL RELAY, (2) N.O. AND (2) N.C. CONTACTS.
8B. IEC MINIATURE 4 POLE CONTROL RELAY, (4) N.O. CONTACTS.
9. 500VA UPS WITH ALARM RELAY (PHOENIX CONTACT OR APPROVED EQUAL).
10. 24VDC POWER SUPPLY, NEC CLASS 2 COMPLIANCE. SIZE AS INDICATED.
11. HAND SWITCH POSITION SHALL HAVE SPRING-RETURN MECHANISM FOR MOMENTARY OPERATION.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIGOTY — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

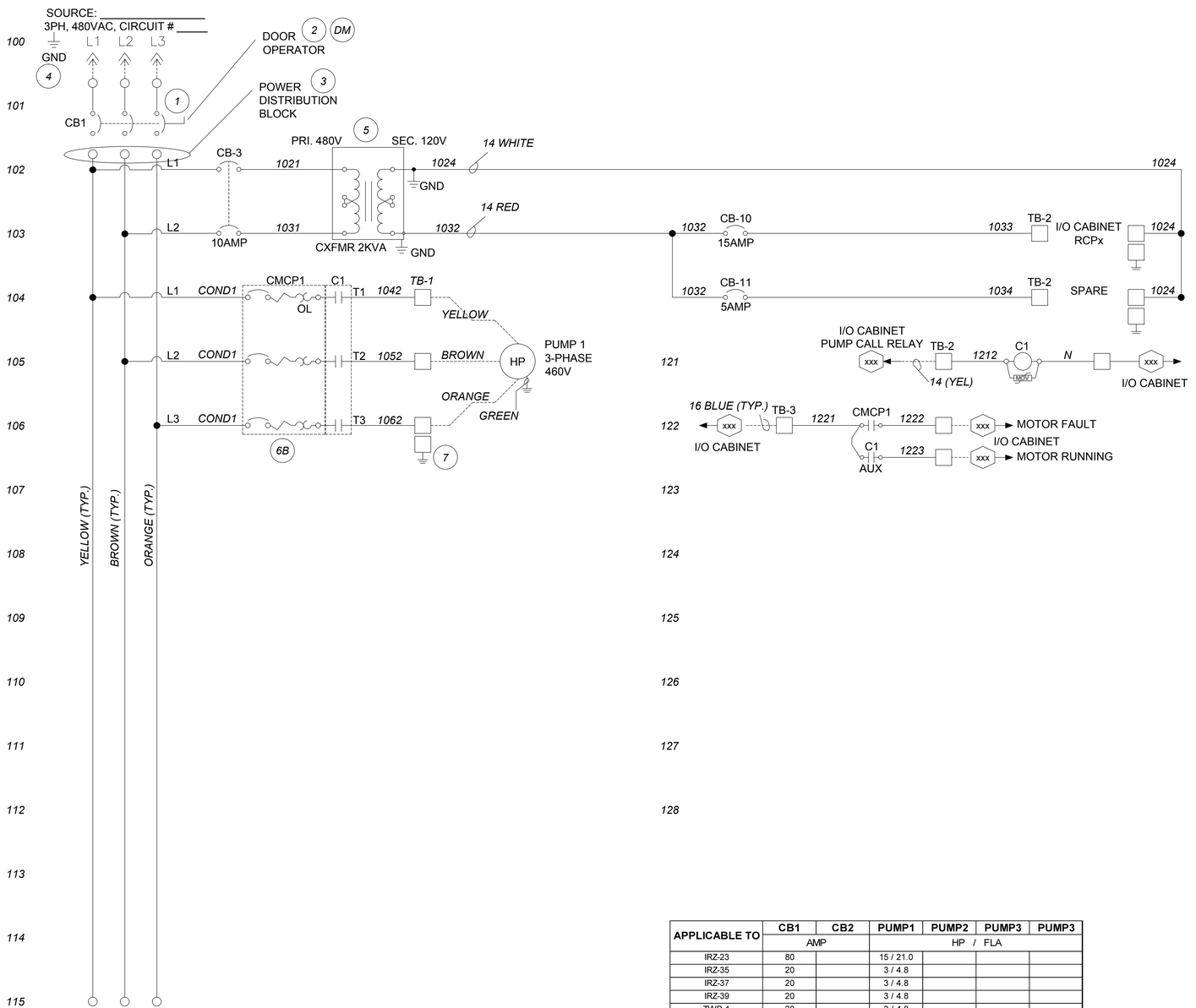
VAULT ELECTRICAL PANEL FABRICATION NOTES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRZ-23	80		15 / 21.0			
IRZ-35	20		3 / 4.8			
IRZ-37	20		3 / 4.8			
IRZ-39	20		3 / 4.8			
TWB-1	20		3 / 4.8			
TWB-2	20		3 / 4.8			
ER-1	20		0.5 / 1.1			
ER-2	20		0.5 / 1.1			
ER-3	20		0.5 / 1.1			
ER-4	20		0.5 / 1.1			
ER-6	20		0.5 / 1.1			

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

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REVISIONS

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	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

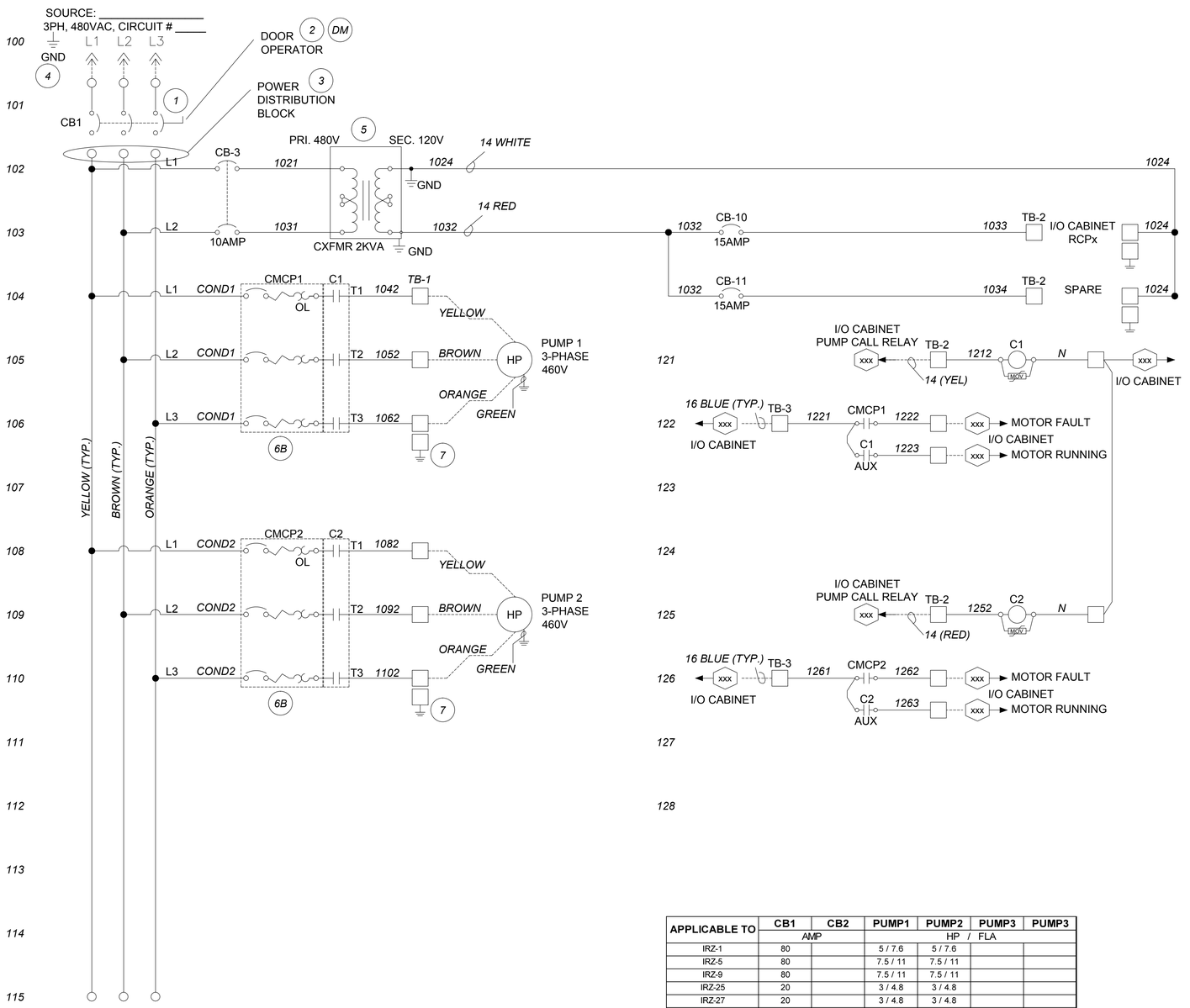
VAULT ELECTRICAL PANEL W1

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SUPSDS	
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SHEET NO.	of SHEETS
E-00-42	REV 2

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APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRZ-1	80		5 / 7.6	5 / 7.6		
IRZ-5	80		7.5 / 11	7.5 / 11		
IRZ-9	80		7.5 / 11	7.5 / 11		
IRZ-25	20		3 / 4.8	3 / 4.8		
IRZ-27	20		3 / 4.8	3 / 4.8		
IRZ-29	20		3 / 4.8	3 / 4.8		
IRZ-31	20		3 / 4.8	3 / 4.8		
TCS-1	20		3 / 4.8	3 / 4.8		
TCS-2	20		3 / 4.8	3 / 4.8		

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIGOTA — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

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REVISIONS

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RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

VAULT ELECTRICAL PANEL W2

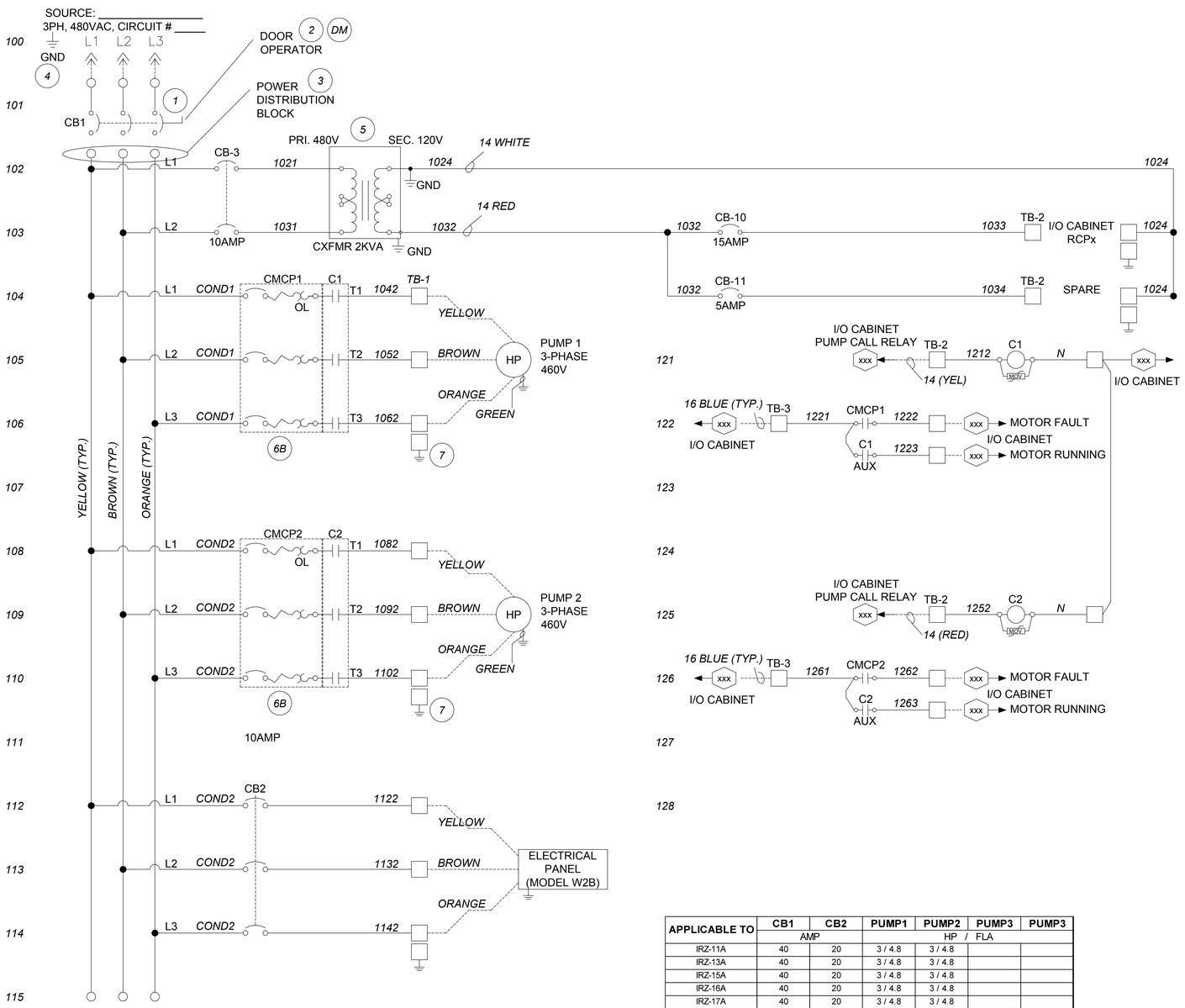
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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E-00-43	REV 2

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APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRZ-11A	40	20	3 / 4.8	3 / 4.8		
IRZ-13A	40	20	3 / 4.8	3 / 4.8		
IRZ-15A	40	20	3 / 4.8	3 / 4.8		
IRZ-16A	40	20	3 / 4.8	3 / 4.8		
IRZ-17A	40	20	3 / 4.8	3 / 4.8		
IRZ-19A	40	20	3 / 4.8	3 / 4.8		
IRZ-20A	40	20	3 / 4.8	3 / 4.8		
IRZ-21A	40	20	3 / 4.8	3 / 4.8		

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

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REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIGOTA — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

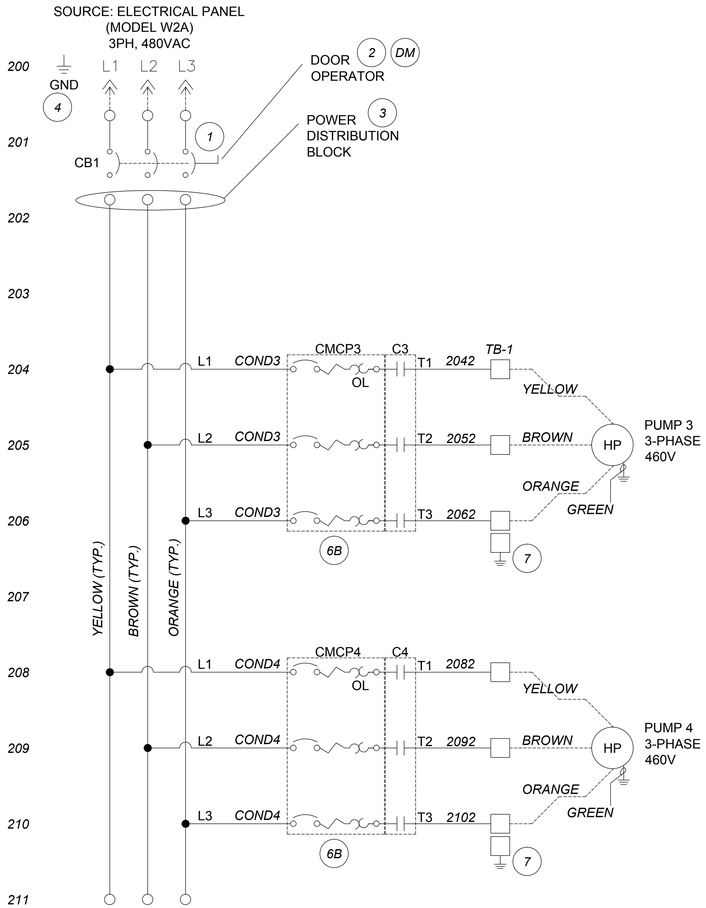
VAULT ELECTRICAL PANEL W2A

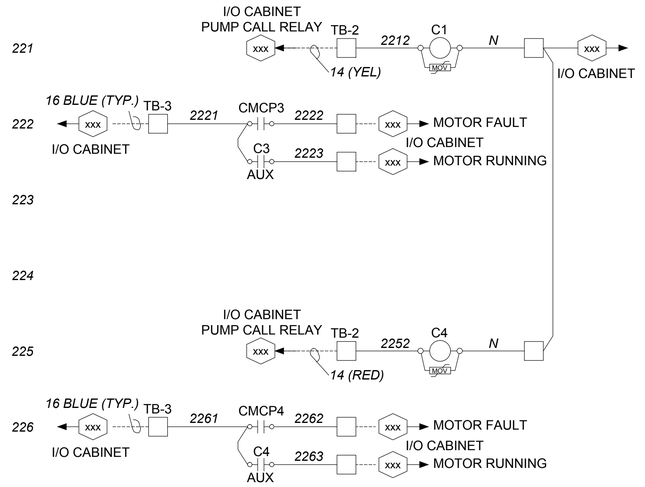
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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SHEET NO.	of SHEETS
E-00-44	REV 2

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APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRZ-11B	20				3 / 4.8	3 / 4.8
IRZ-13B	20				3 / 4.8	3 / 4.8
IRZ-15B	20				3 / 4.8	3 / 4.8
IRZ-16B	20				3 / 4.8	3 / 4.8
IRZ-17B	20				3 / 4.8	3 / 4.8
IRZ-19B	20				3 / 4.8	3 / 4.8
IRZ-20B	20				3 / 4.8	3 / 4.8
IRZ-21B	20				3 / 4.8	3 / 4.8

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIGOTA
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

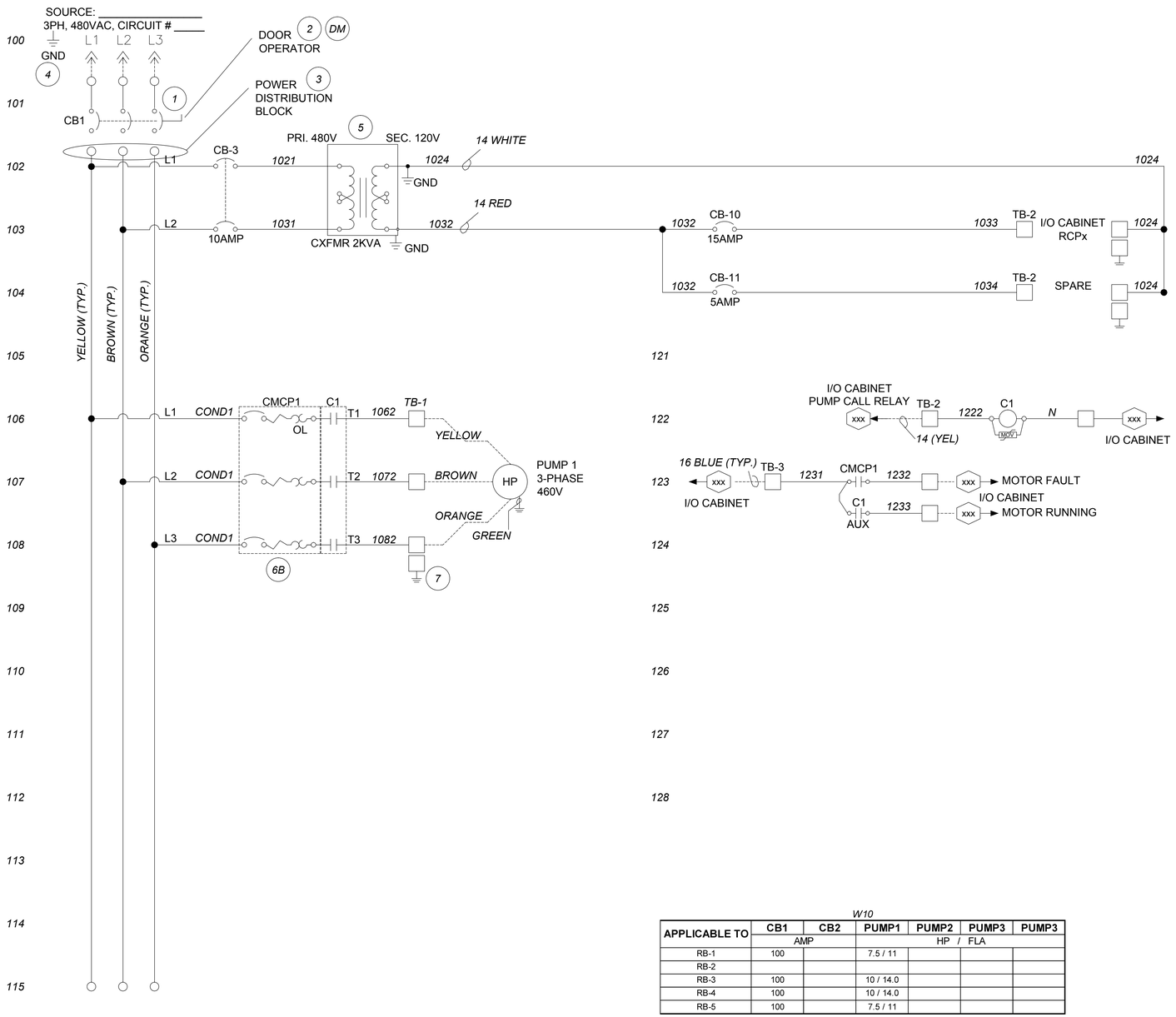
VAULT ELECTRICAL PANEL W2B

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
E-00-45	REV 2

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W10

APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
RB-1	100		7.5 / 11			
RB-2						
RB-3	100		10 / 14.0			
RB-4	100		10 / 14.0			
RB-5	100		7.5 / 11			

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIGOTY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

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	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

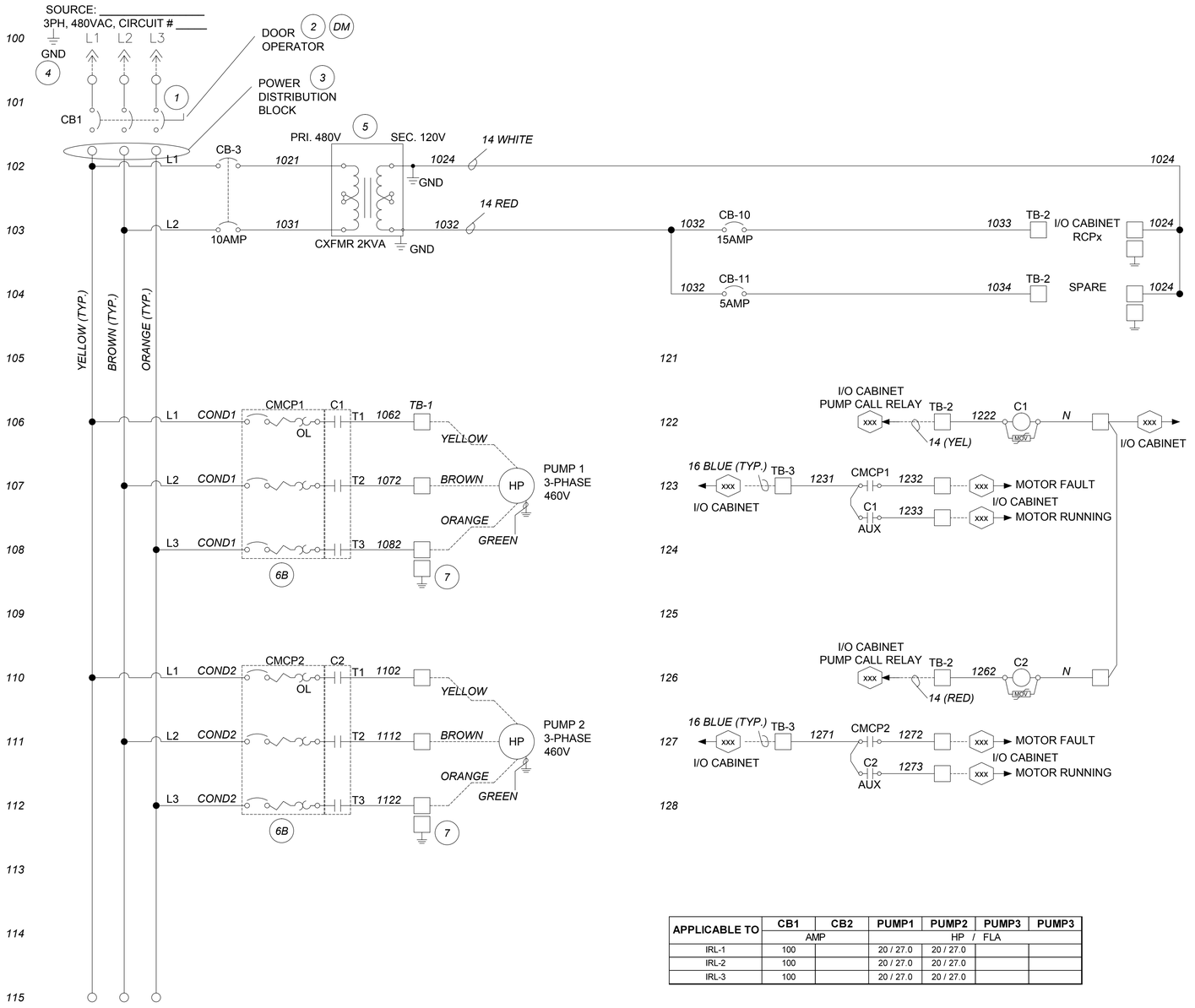
VAULT ELECTRICAL PANEL W10

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SHEET NO.	of SHEETS
E-00-46	REV 2

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APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRL-1	100		20 / 27.0	20 / 27.0		
IRL-2	100		20 / 27.0	20 / 27.0		
IRL-3	100		20 / 27.0	20 / 27.0		

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOTT 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

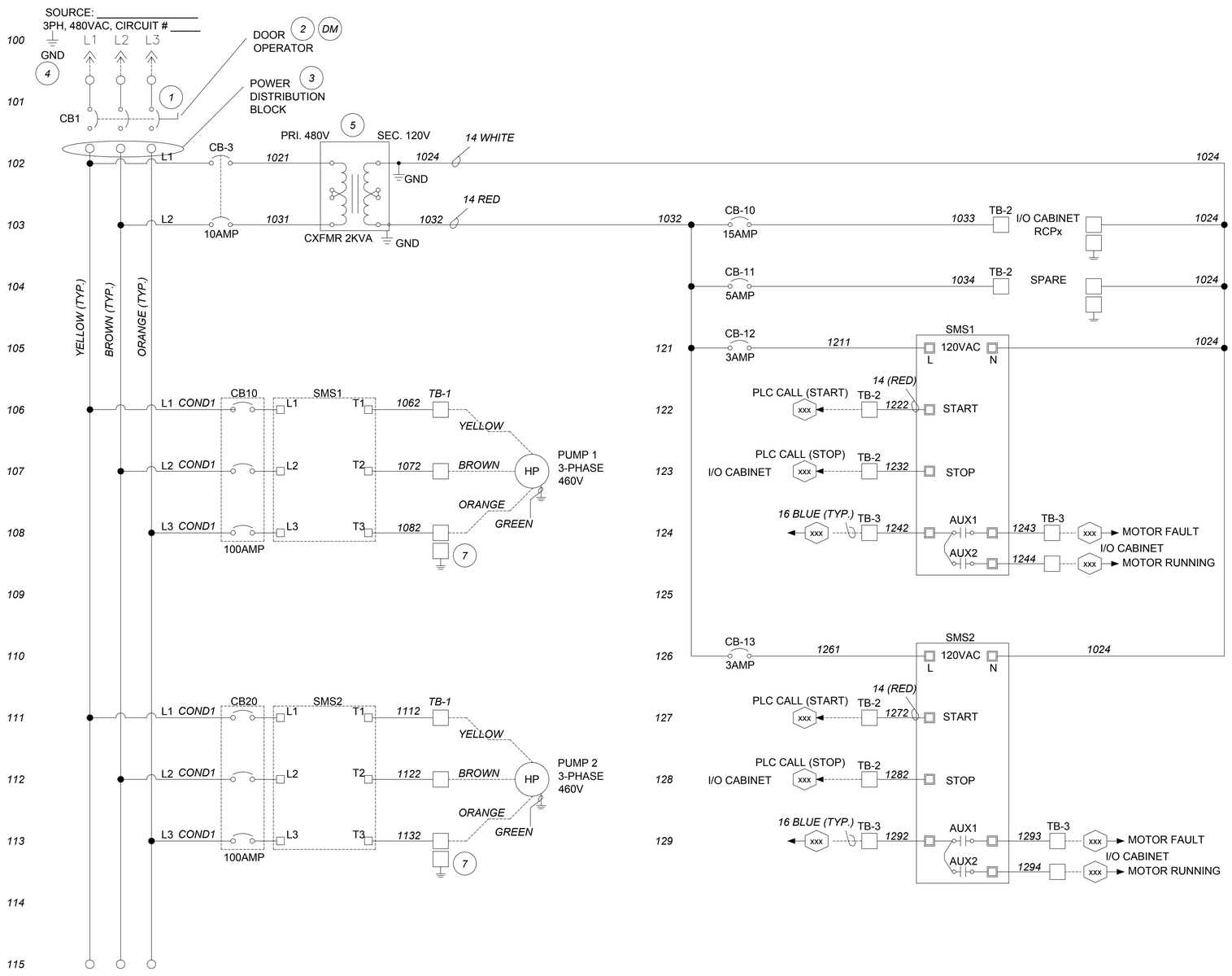
VAULT ELECTRICAL PANEL W20

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-47	REV 2

N1808

11/03/2015, 16:42, G:\Graphics\ARR\TOPOCK-01\Submittal_100%\DWG\sE-Electrical\E-00-41 thru 48.DWG, Tab: E-00-47



APPLICABLE TO	CB1	CB2	PUMP1	PUMP2	PUMP3	PUMP3
	AMP		HP / FLA			
IRL-4	125		30 / 40.0	30 / 40.0		

NOTE:

REFER TO SHEET E-00-40 FOR CONSTRUCTION NOTES, LEGEND AND PANEL MANUFACTURING REQUIREMENT.

(##) *COMPONENT ID AND DESCRIPTION, SEE E-00-40.*

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIDOTI — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

VAULT ELECTRICAL PANEL W30

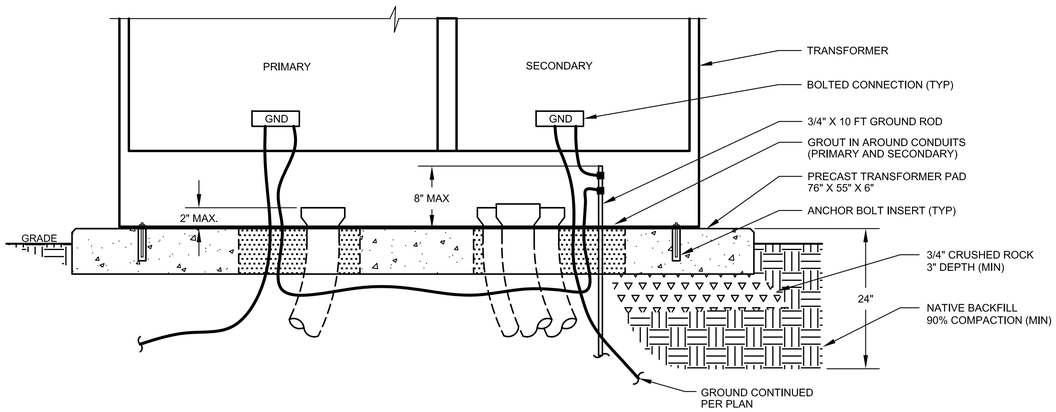
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
E-00-48	REV 2

N1808

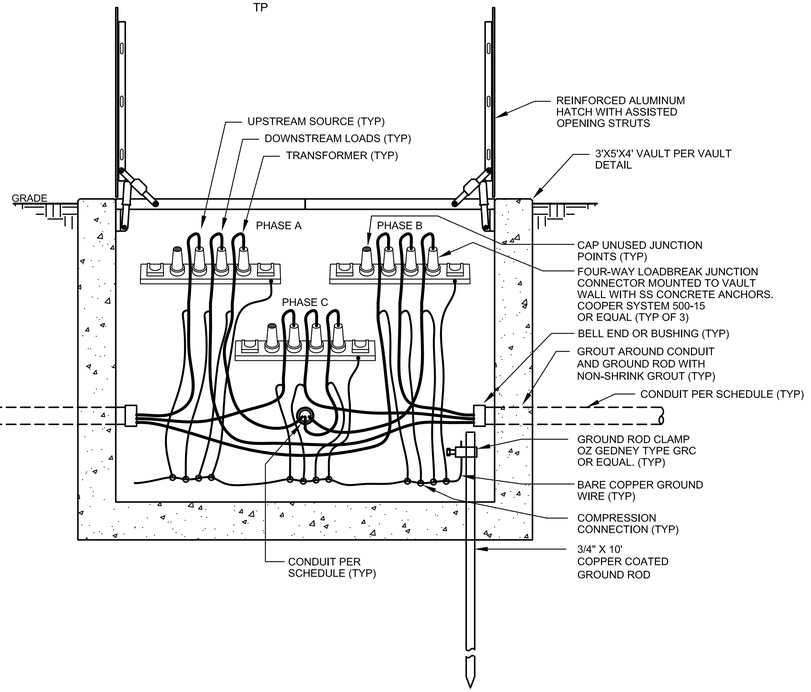
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12KV TRANSFORMER PAD

1 DETAIL NTS

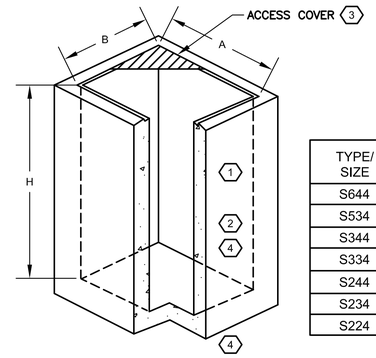
TP



12KV SECTIONALIZING PULLBOX

2 DETAIL NTS

12KPB



TYPE/ SIZE	DIMENSIONS (MIN)		
	A	B	H
S644	6'	4'	4'
S534	5'	3'	4'
S344	3'	4'	4'
S334	3'	3'	4'
S244	2'	4'	4'
S234	2'	3'	4'
S224	2'	2'	4'

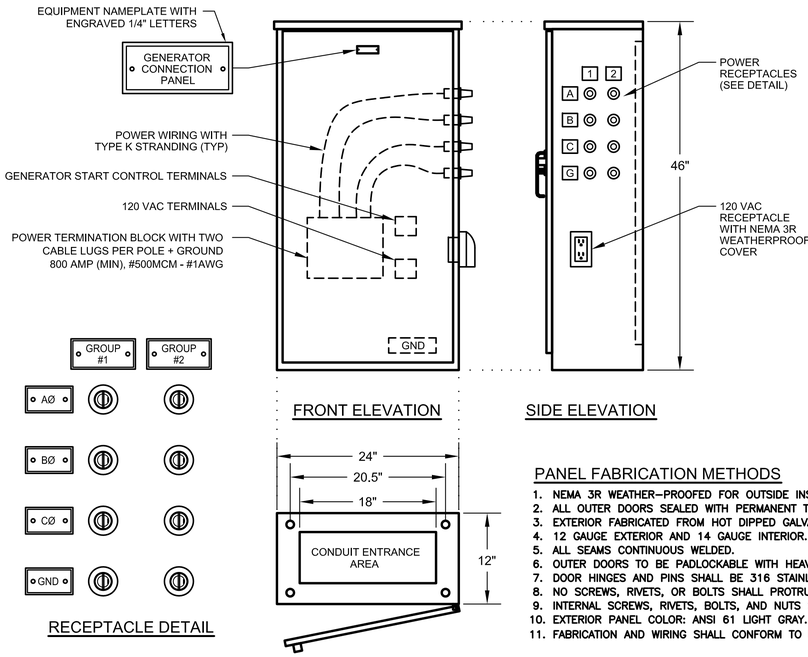
ELECTRICAL VAULT NOTES

1. WIRES IN "P", "L" & "C" SERIES CONDUITS SHALL BE SUPPORTED ON ONE SIDE OF VAULT AND WIRES FOR "A", "D" & "S" SERIES ON OTHER SIDE. ALL WIRE SHALL BE STRAPPED TO CABLE SUPPORTS.
2. VAULTS SHALL BE CONSTRUCTED OF RE-INFORCED CONCRETE. PROVIDE VAULT BASE AND GRADE RING(S) AS NECESSARY TO MEET OR EXCEED REQUIRED DEPTH.
3. ACCESS COVERS SHALL BE 1/4" GALVANIZED STEEL CHECKER PLATE, HINGED, 2 PIECE, BOLT DOWN, WITH SPRING ASSIST. COVERS SHALL BE TRAFFIC LOAD RATED. LABEL LID "ELECTRICAL" WITH WELDED LETTERING.
4. CAULK AND GROUT SEAMS AND AROUND CONDUIT ENTRIES TO SMOOTH FINISH AND PREVENT LEAKS. CONDUIT ENTRANCES SHALL BE PER ENCASED CONDUIT END DETAIL. ATTACH CONDUIT LABELS TO WALL ABOVE CONDUIT.
5. OVER-EXCAVATE AND BACKFILL 18" OF 3/4" CRUSHED ROCK BELOW VAULT. BACKFILL AROUND VAULT WALLS WITH NATIVE SOIL.

ELECTRICAL VAULT

3 DETAIL NTS

EV



PANEL FABRICATION METHODS

1. NEMA 3R WEATHER-PROOFED FOR OUTSIDE INSTALLATION.
2. ALL OUTER DOORS SEALED WITH PERMANENT TYPE GASKETING.
3. EXTERIOR FABRICATED FROM HOT DIPPED GALVANIZED SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS CONTINUOUS WELDED.
6. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCHES.
7. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE STAINLESS STEEL.
10. EXTERIOR PANEL COLOR: ANSI 61 LIGHT GRAY.
11. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.

GENERATOR CONNECTION PANEL

4 DETAIL NTS

GCON

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

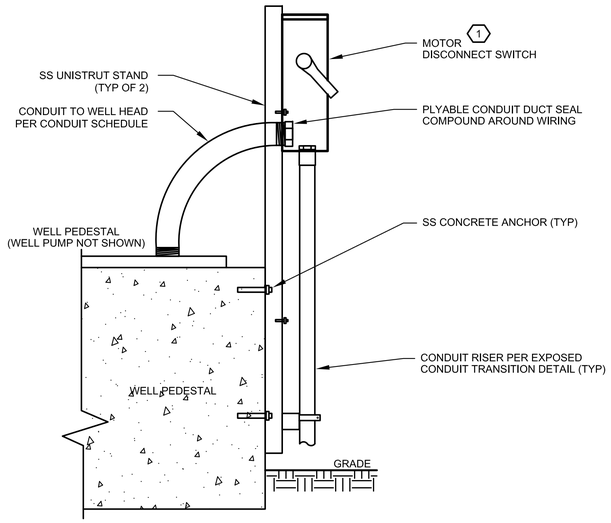
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL
DETAILS 1
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-61	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:49:03pm
FILENAME: E-00-61.dwg

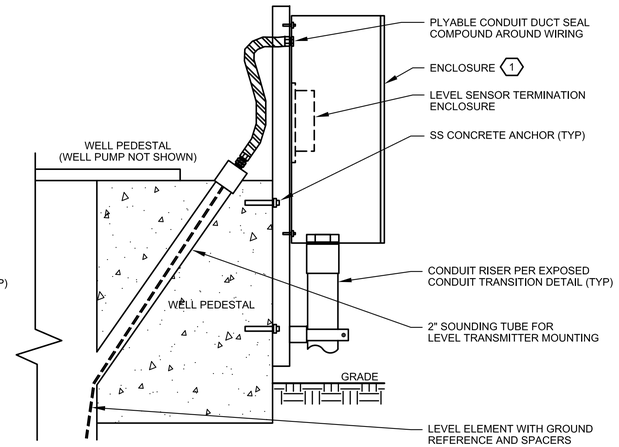
N1808



NOTES: 1 NEMA RATING SHOWN ON SITE PLAN

WELL TERMINATION

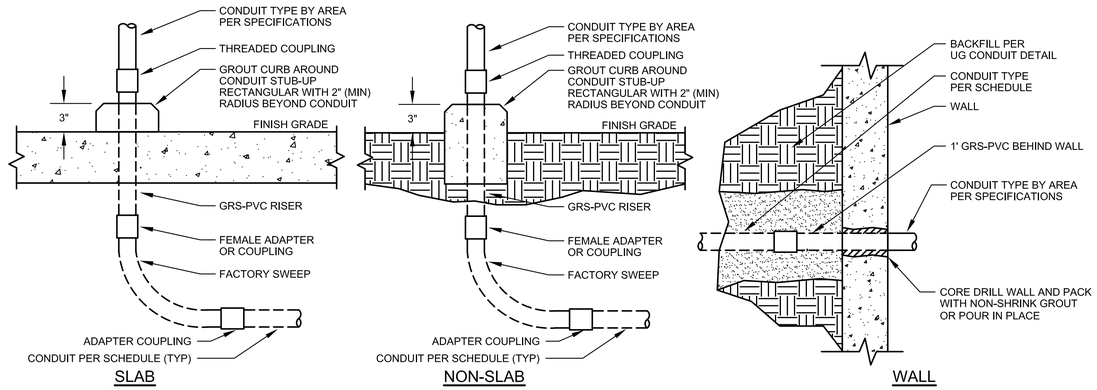
1 DETAIL NTS
WTP



NOTES: 1 16"H x 14"W x 6"D NEMA 12 PAINTED STEEL ENCLOSURE. MECHANICALLY FASTEN TRANSMITTER CABLE TO PANEL FOR STRESS RELIEF. PROVIDE HOFFMAN CONCEPT OR APPROVED EQUAL. NEMA RATING SHOWN ON SITE PLAN

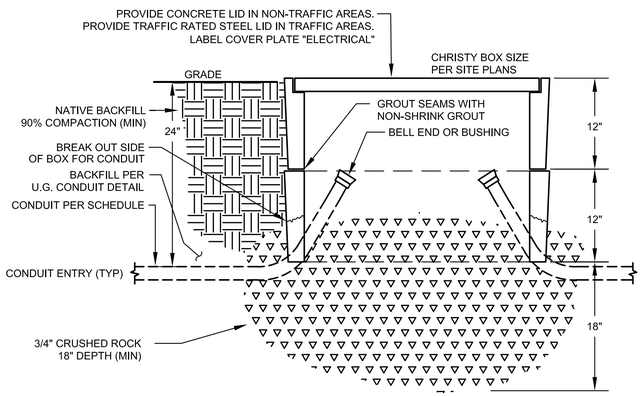
WELL LEVEL TRANSMITTER

3 DETAIL NTS
WLT



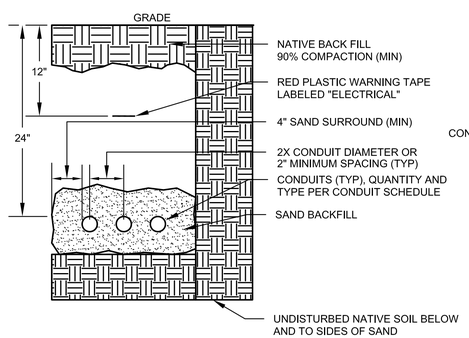
EXPOSED CONDUIT TRANSITION

5 DETAIL NTS
ECT



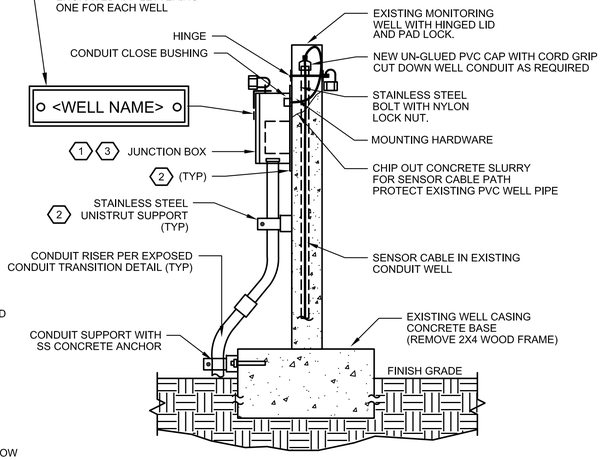
UNDERGROUND PULL BOX

2 DETAIL NTS
UPB



UNDERGROUND CONDUIT

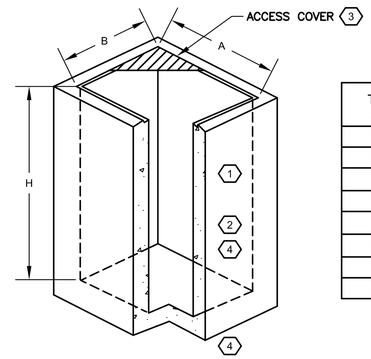
4 DETAIL NTS
UCD



NOTES:
1. 10"X8"X4" NEMA 3R LOCKABLE TYPE JUNCTION BOX. MOUNTING HARDWARE SHALL NOT BE EXPOSED. HOFFMAN A-1008CHS OR EQUAL. PROVIDE EXTERNAL PADLOCK ATTACHMENT.
2. WELD BOX AND SUPPORTS TO PEDESTAL. PAINT WELDS WITH SILVER ENAMEL PAINT.
3. SUBMERSEIBLE LEVEL TRANSMITTER TERMINATION BOX WITH DESSICANT AND LIGHTNING ARRESTER SHALL BE INSTALLED IN JUNCTION BOX PER MANUFACTURERS INSTRUCTIONS.

MONITORING WELL DETAIL

6 DETAIL NTS
MWD



TYPE/ SIZE	DIMENSIONS (MIN)		
	A	B	H
S666	6'	6'	6'
S644	6'	4'	4'
S534	5'	3'	4'
S344	3'	4'	4'
S334	3'	3'	4'
S244	2'	4'	4'
S234	2'	3'	4'
S224	2'	2'	4'

NOTES:
1. WIRES IN "P", "L" & "C" SERIES CONDUITS SHALL BE SUPPORTED ON ONE SIDE OF VAULT AND WIRES FOR "A", "D" & "S" SERIES ON OTHER SIDE. ALL WIRE SHALL BE STRAPPED TO CABLE SUPPORTS.
2. VAULTS SHALL BE CONSTRUCTED OF RE-INFORCED CONCRETE. PROVIDE VAULT BASE AND GRADE RING(S) AS NECESSARY TO MEET OR EXCEED REQUIRED DEPTH.
3. ACCESS COVERS SHALL BE 1/4" GALVANIZED STEEL CHECKER PLATE, HINGED, 2 PIECE, BOLT DOWN, WITH SPRING ASSIST. COVERS SHALL BE TRAFFIC LOAD RATED. LABEL LID "ELECTRICAL" WITH WELDED LETTERING.
4. CAULK AND GROUT SEAMS AND AROUND CONDUIT ENTRIES TO SMOOTH FINISH AND PREVENT LEAKS. CONDUIT ENTRANCES SHALL BE PER ENCASED CONDUIT END DETAIL. ATTACH CONDUIT LABELS TO WALL ABOVE CONDUIT.
5. OVER-EXCAVATE AND BACKFILL 18" OF 3/4" CRUSHED ROCK BELOW VAULT. BACKFILL AROUND VAULT WALLS WITH NATIVE SOIL.

ELECTRICAL VAULT DETAIL

7 DETAIL NTS
VLT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTA 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

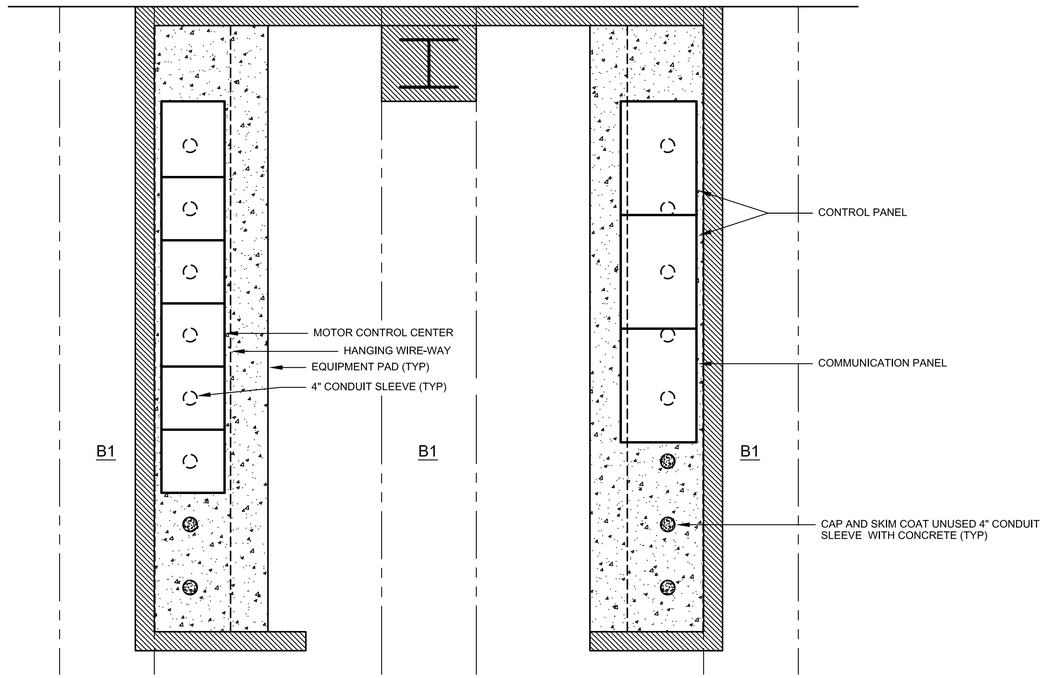
REVISIONS

APPROVED BY	
RAO	
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

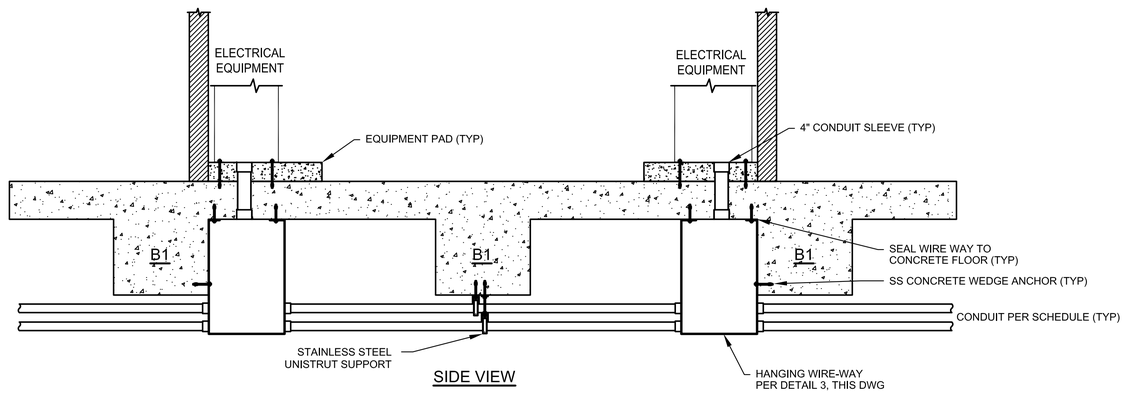
TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL DETAILS 2
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-62	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:49:10pm
FILENAME: E-00-62.dwg
N1808



TOP VIEW

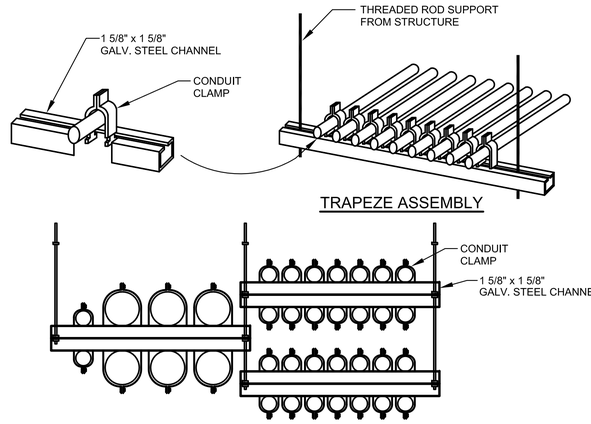


SIDE VIEW

MCC ENTRY DETAIL

1 DETAIL NTS

MED



TRAPEZE ASSEMBLY

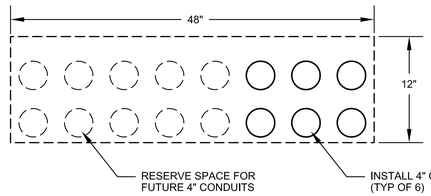
TRAPEZE LAYOUT

NOTES:
1. MATERIALS TYPE FOR CHANNEL, HARDWARE, AND ALL SUPPORT DEVICES TO BE RATED PER AREA CLASSIFICATION.
2. SUPPORT CHANNELS TO BE SPACED 5' MAXIMUM.
3. CONFIRM MOUNTING SUITABILITY AND STRUCTURAL INTEGRITY OF WALL OR CEILING TO BE USED.

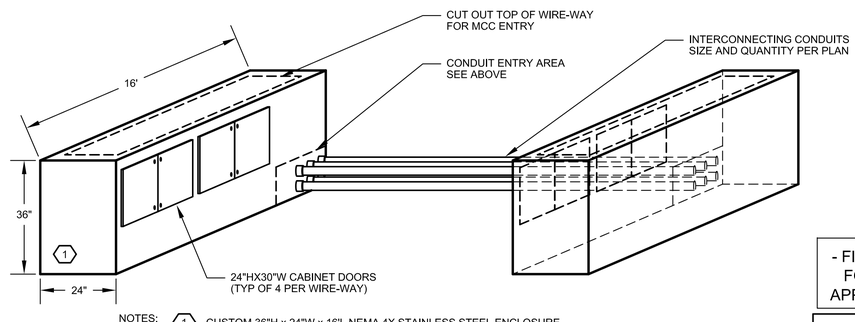
CONDUIT TRAPEZE MOUNTING

2 DETAIL NTS

HWW



CONDUIT ENTRY AREA



NOTES: 1. CUSTOM 36"H x 24"W x 16'L NEMA 4X STAINLESS STEEL ENCLOSURE.

HANGING WIRE-WAY DETAIL

3 DETAIL NTS

HWW

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOUTAS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

REVISIONS

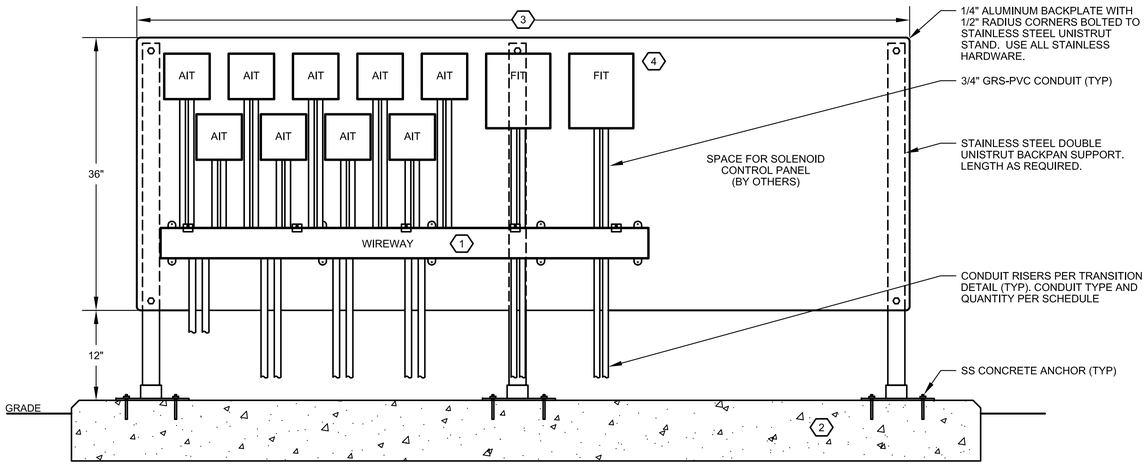
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL DETAILS 3
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-63	REV 0

FILENAME: E-00-63.DWG
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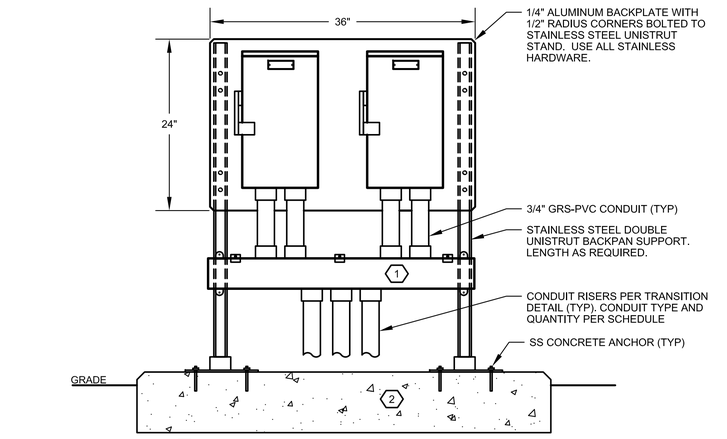
N1808



NOTES:
1. 6"H X 6"D X 84"W, NEMA 3R STAINLESS STEEL WIRING TROUGH. WIRING TROUGH SHALL BE B-LINE OR EQUAL. DOOR SHALL HAVE SEMI HINGES ON ONE SIDE AND SCREW CLAMPS ON OTHER. MOUNT TO BACKPAN USING ALL STAINLESS STEEL HARDWARE.
2. INSTALL EQUIPMENT PAD STRUCTURAL DETAILS.
3. WIDTH PER PLAN
4. DEVICE TYPE AND QUANTITY PER PLAN/P&ID

EQUIPMENT STACHION DETAIL

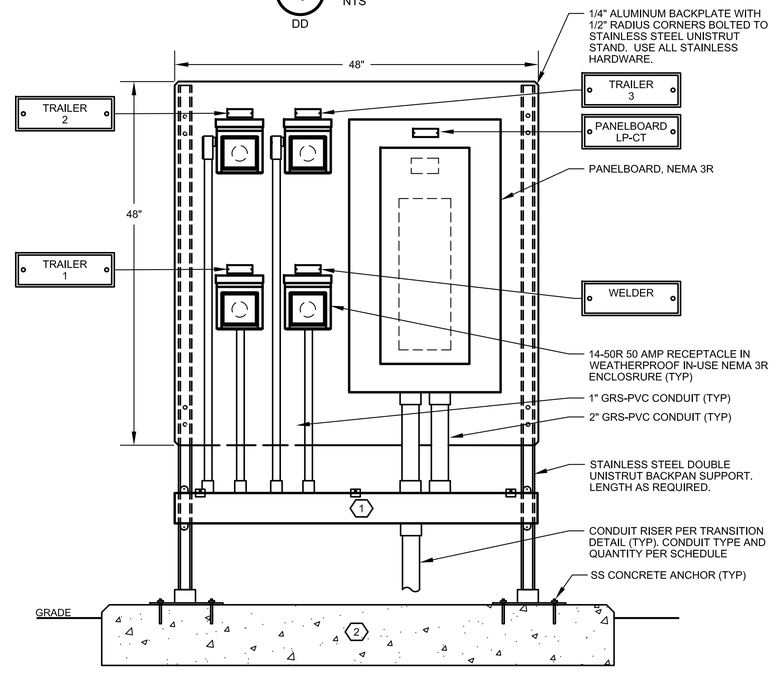
1 DETAIL NTS
ES



NOTES:
1. 6"H X 6"D X 36"W, NEMA 3R STAINLESS STEEL WIRING TROUGH. WIRING TROUGH SHALL BE B-LINE OR EQUAL. DOOR SHALL HAVE SEMI HINGES ON ONE SIDE AND SCREW CLAMPS ON OTHER. MOUNT TO UNISTRUT USING ALL STAINLESS STEEL HARDWARE.
2. INSTALL EQUIPMENT PAD STRUCTURAL DETAILS.

DISCONNECT DETAIL

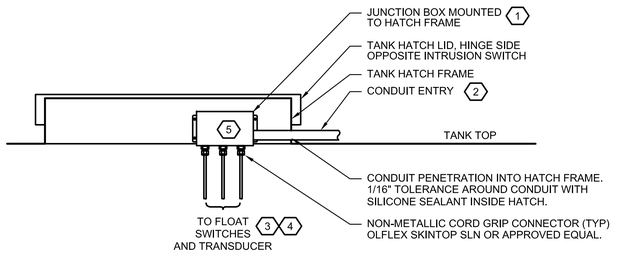
4 DETAIL NTS
DD



NOTES:
1. 4"H X 4"D X 48"W, NEMA 3R STAINLESS STEEL WIRING TROUGH. WIRING TROUGH SHALL BE B-LINE OR EQUAL. DOOR SHALL HAVE SEMI HINGES ON ONE SIDE AND SCREW CLAMPS ON OTHER. MOUNT TO UNISTRUT USING ALL STAINLESS STEEL HARDWARE.
2. INSTALL EQUIPMENT PAD STRUCTURAL DETAILS.

CONSTRUCTION TRAILER POWER DISTRIBUTION DETAIL

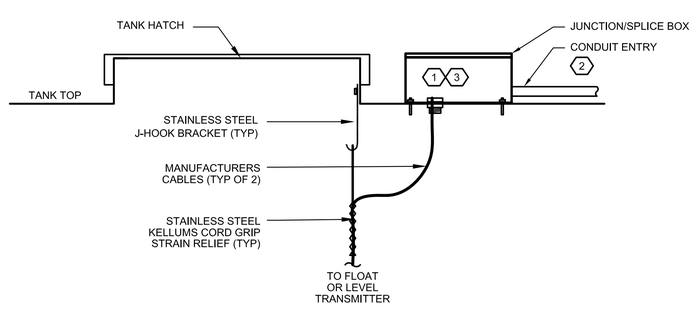
5 DETAIL NTS
CTP



NOTES:
1. 6"H X 4"W X 4"D, NEMA 4X PVC JUNCTION/SPLICE BOX. JUNCTION BOX SHALL BE HOFFMAN JFGQRR OR EQUAL. MOUNT BOX ON WALL OF HATCH FRAME USING STAINLESS STEEL HARDWARE. MOUNT BOX WITH HINGE ON BOTTOM. APPLY SILICONE SEALANT TO PENETRATION BACKS TO SEAL BOX COMPLETELY.
2. CONDUIT ON TANK SHALL BE GRS AND PAINTED WITH TANK. SUPPORT CONDUIT WITH SINGLE BOLT CLAMPS WITH CLAMP-BACK SPACERS. DRILL AND TAP TANK FOR STAINLESS STEEL BOLT. COMPLETE CONDUIT INSTALLATION PRIOR TO TANK BEING PAINTED.
3. FLOAT SWITCH CABLES SHALL BE ATTACHED TO LADDER INSIDE TANK. USE ALL-PLASTIC ZIP TIES ON 2 FOOT CENTERS. HIGH FLOAT SHALL TRIP 4 INCHES BELOW OVERFLOW OUTLET. LOW FLOAT SHALL (UN)TRIP 6 INCHES ABOVE PUMP SUCTION OUTLET.
4. SUBMERSIBLE LEVEL TRANSDUCER SHALL HANG FREELY AND EXTEND TO 6" ABOVE BOTTOM OF TANK. DO NOT ATTACH TO LADDER.
5. SPLICES IN SPLICE BOX SHALL BE WATERPROOF. AFTER TESTING, INSTALL EPOXY RESIN SPLICE KITS, 3M SCOTCH-CAST OR APPROVED EQUAL.

TANK HATCH DETAIL

2 DETAIL NTS
TH



NOTES:
1. 14"W X 12"H X 8"D, NEMA 4X STAINLESS STEEL JUNCTION/SPLICE BOX. JUNCTION BOX SHALL BE HOFFMAN CHNFSS OR EQUAL.
2. CONDUIT ON TANK SHALL BE GRS AND PAINTED WITH TANK. SUPPORT CONDUIT WITH SINGLE BOLT CLAMPS WITH CLAMP-BACK SPACERS. DRILL AND TAP TANK FOR STAINLESS STEEL BOLT. COMPLETE CONDUIT INSTALLATION PRIOR TO TANK BEING PAINTED.
3. SPLICES IN SPLICE BOX SHALL BE WATERPROOF. AFTER TESTING, INSTALL EPOXY RESIN SPLICE KITS, 3M SCOTCH-CAST OR APPROVED EQUAL.

TANK HATCH JUNCTION BOX DETAIL

3 DETAIL NTS
THJ

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCOS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

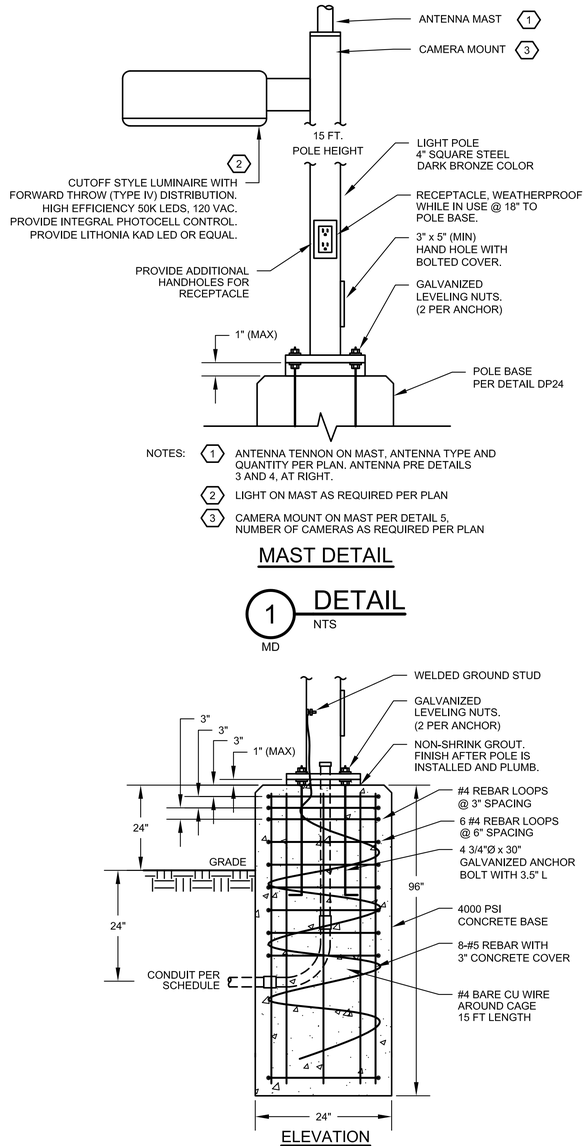
APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL DETAILS 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-64	REV 0

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:49:24pm
FILENAME: E-00-64.dwg
N1808



NOTES:
1. ANTENNA TENNON ON MAST, ANTENNA TYPE AND QUANTITY PER PLAN. ANTENNA PRE DETAILS 3 AND 4, AT RIGHT.
2. LIGHT ON MAST AS REQUIRED PER PLAN
3. CAMERA MOUNT ON MAST PER DETAIL 5, NUMBER OF CAMERAS AS REQUIRED PER PLAN

MAST DETAIL

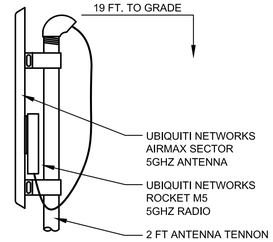
1 DETAIL NTS
MD

ELEVATION

TOP VIEW

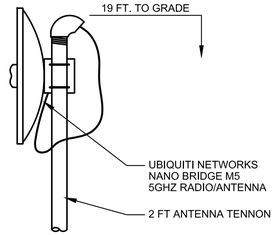
DRILLED PIER DETAIL

2 DETAIL NTS
DP



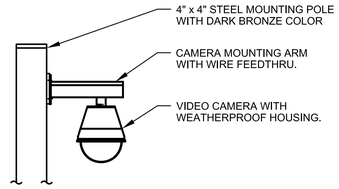
AIRMAX SECTOR ANTENNA

3 DETAIL NTS
ASA



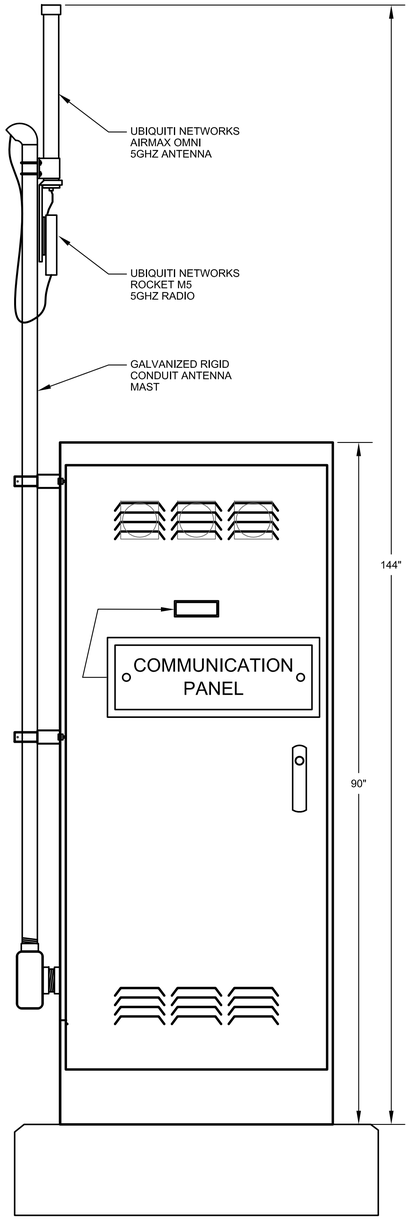
NANO BRIDGE ANTENNA

4 DETAIL NTS
NBA



CAMERA MOUNT DETAIL

5 DETAIL NTS
CAM



NODE ANTENNA DETAIL

6 DETAIL NTS
NAD

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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY		TPF	

REVISIONS

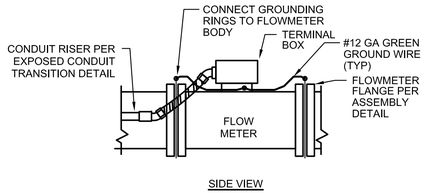
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL
DETAILS 5
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-00-65	REV 1

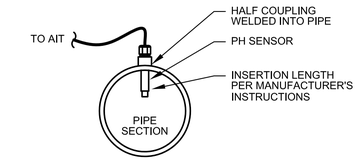
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N1808



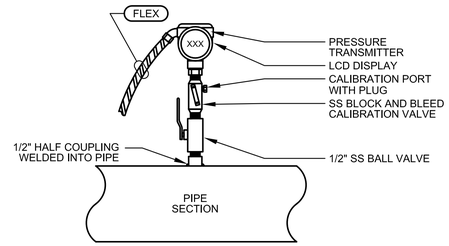
FLOWMETER DETAIL

1 DETAIL NTS
FM



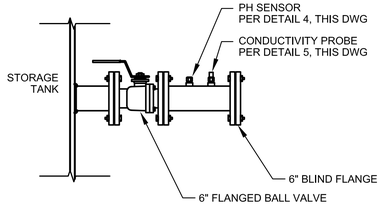
INLINE PH SENSOR DETAIL

4 DETAIL NTS
IPH



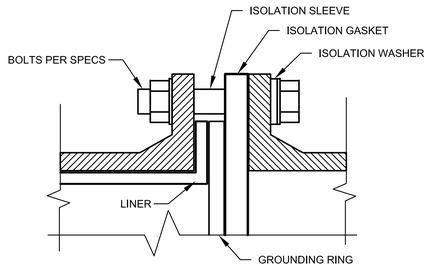
PRESSURE TRANSMITTER DETAIL

7 DETAIL NTS
PT



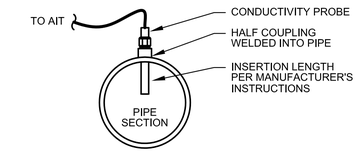
TANK PROBE DETAIL

10 DETAIL NTS
TP



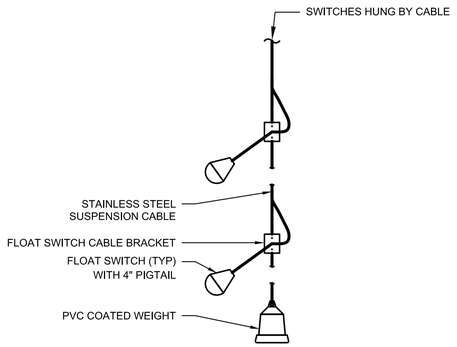
FLOWMETER FLANGE ASSEMBLY

2 DETAIL NTS
FMF



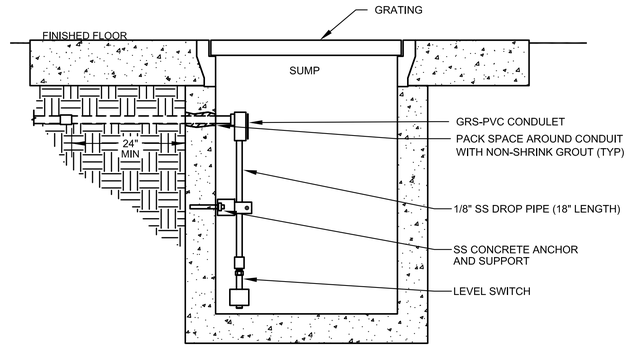
INLINE CONDUCTIVITY PROBE DETAIL

5 DETAIL NTS
ICP



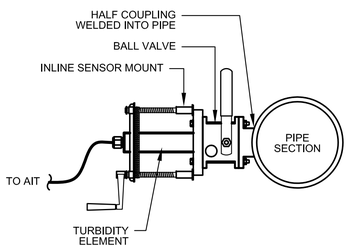
FLOAT SWITCH DETAIL

8 DETAIL NTS
FS



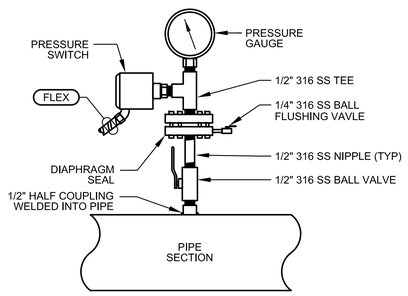
SUMP FLOAT SWITCH DETAIL

11 DETAIL NTS
FS



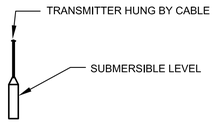
INLINE TURBIDITY PROBE DETAIL

3 DETAIL NTS
ITA



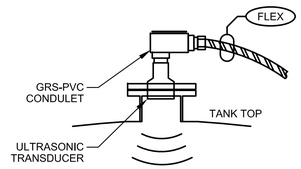
PRESSURE SWITCH DETAIL

6 DETAIL NTS
PS



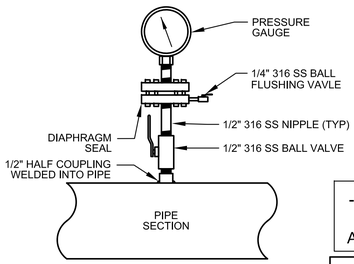
LEVEL TRANSMITTER DETAIL

9 DETAIL NTS
LT



ULTRASONIC LEVEL DETAIL

12 DETAIL NTS
USL



PRESSURE GAUGE DETAIL

13 DETAIL NTS
PG

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REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOOTIS
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

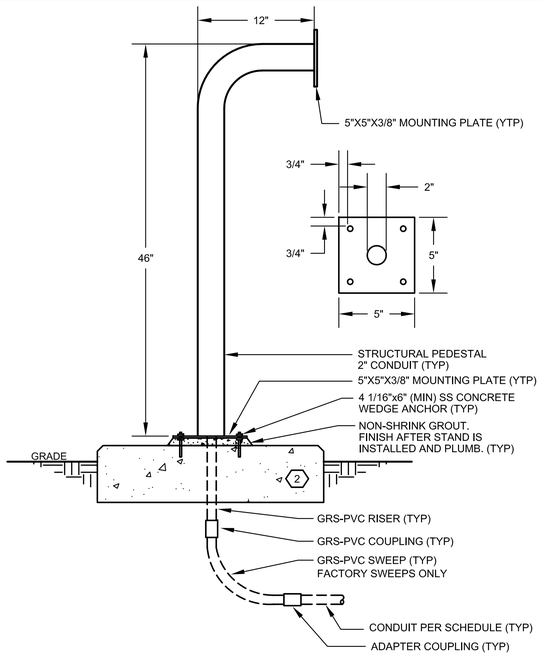
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL DETAILS 6
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-00-66	REV 1

PLOT TIME: 3:49:36pm
PLOT DATE: Oct 23, 2015
FILENAME: E-00-66.DWG

N1808

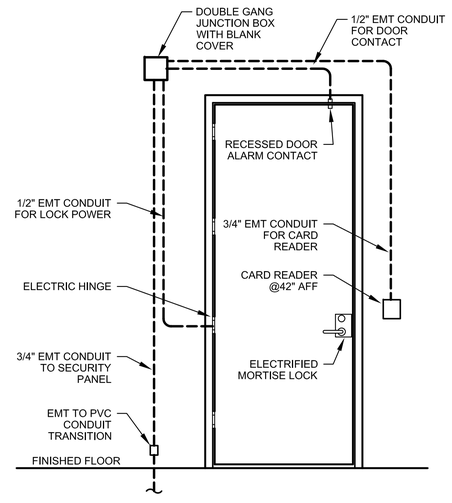


NOTES: 1 2' X 3' X 6" CONCRETE PAD WITH CHAMFERED CORNERS.

GATE ACCESS CONTROL SINGLE HEIGHT GOOSENECK

1 DETAIL NTS

ARG

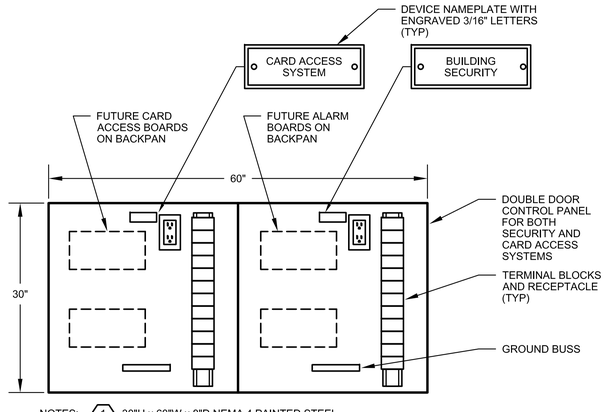


ACCESS CONTROL DOOR

SECURE SIDE, MIRROR FOR RIGHT HINGE

2 DETAIL NTS

ACD



NOTES: 1 30"H x 60"W x 8"D NEMA 4 PAINTED STEEL ENCLOSURE WITH BACKPAN FOR MOUNTING OF SECURITY ELECTRONICS

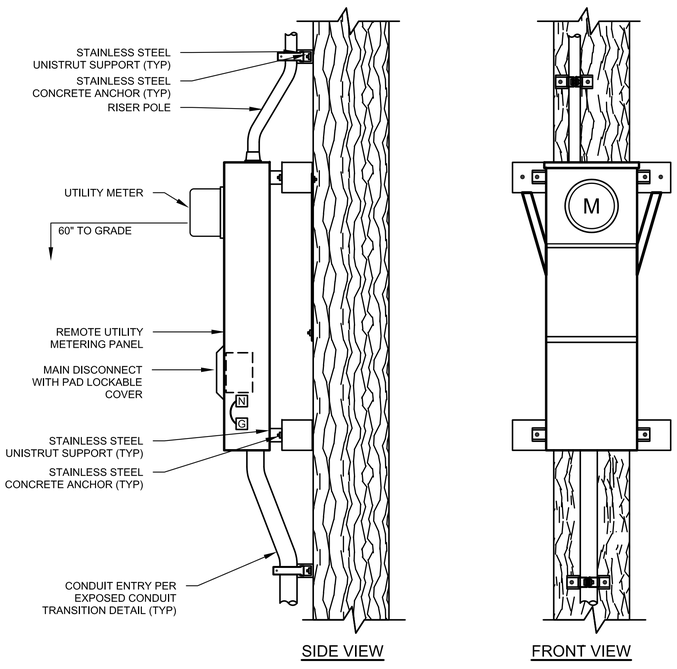
2 WIRE SENSORS TO TERMINAL BLOCKS FOR FUTURE CONNECTION BY OTHERS.

SECURITY ENCLOSURE

OUTER DOOR NOT SHOWN

3 DETAIL NTS

SED

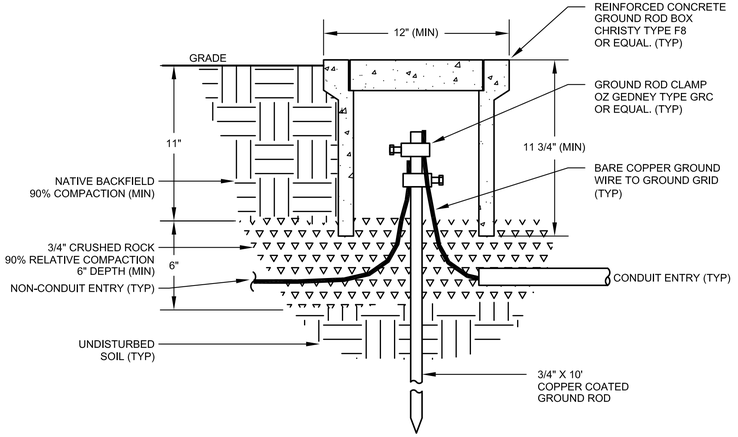


SIDE VIEW FRONT VIEW

METER/MAIN DISCONNECT DETAIL

4 DETAIL NTS

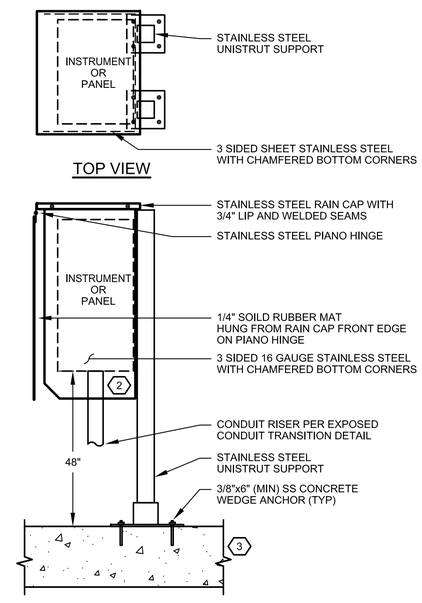
MMD



GROUND INSPECTION BOX DETAIL

5 DETAIL NTS

GIB



SIDE VIEW

NOTES: 1 ALL STAINLESS STEEL CONSTRUCTION WITH STAINLESS MACHINE HARDWARE.

2 SUNSHADE SHALL BE CUSTOM SIZED FOR INSTRUMENT OR CONTROL PANEL. PROVIDE 3" SPACE AROUND ALL SIDES OF PROTECTED EQUIPMENT

3 2' X 3' X 6" CONCRETE PAD (MINIMUM) WITH CHAMFERED CORNERS.

SUN SHADE DETAIL

6 DETAIL NTS

SS

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REVISIONS

APPROVED BY		
RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

ELECTRICAL DETAILS 7

GAS TRANSMISSION & DISTRIBUTION

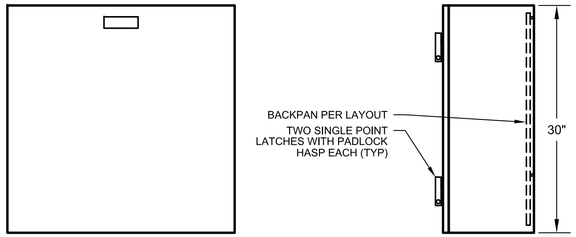
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-67	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:49:43pm

FILENAME: E-00-67.dwg

N1808

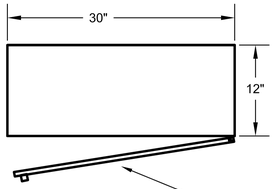


DOOR FRONT VIEW

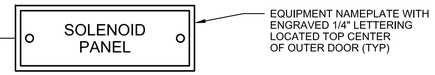
SIDE ELEVATION

PANEL FABRICATION METHODS

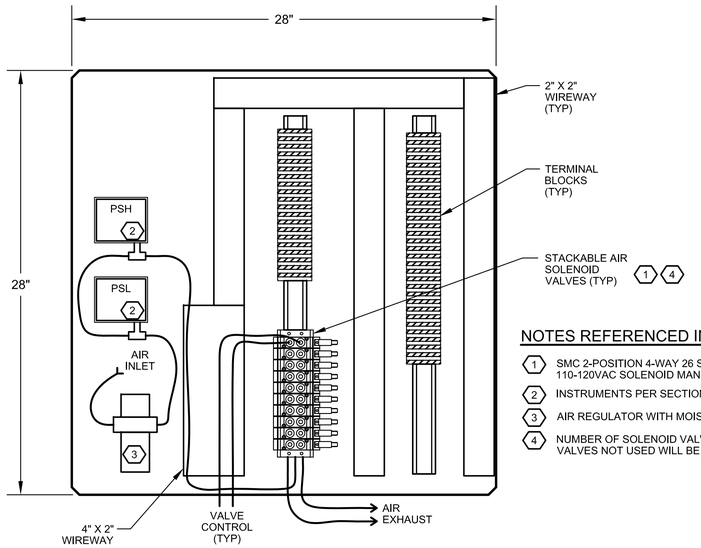
1. NEMA 4, SS, FOR INDOOR OR OUTDOOR WALLMOUNT INSTALLATION.
2. ALL SEAMS CONTINUOUS WELDED.
3. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY SINGLE POINT LATCHES.
4. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
5. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
6. INTERNAL SCREWS, BOLTS, AND NUTS SHALL BE MACHINE THREAD.
7. PLASTIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL DEVICES ON DEADFRONT SCREWS SHALL BE STAINLESS STEEL.
8. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
9. ALL WIRING SHALL BE PERMANENTLY LABELLED WITH WIRE MARKERS ON BOTH ENDS.
10. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
11. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.



TOP VIEW



SOLENOID VALVE PANEL ELEVATION



NOTES REFERENCED IN DRAWING:

1. SMC 2-POSITION 4-WAY 26 SCFM @ 80PSIG. 110-120VAC SOLENOID MANIFOLD VALVE. (TYP)
2. INSTRUMENTS PER SECTION 16940 AND P&IDS
3. AIR REGULATOR WITH MOISTURE TRAP
4. NUMBER OF SOLENOID VALVES PER P&ID, VALVES NOT USED WILL BE SPARE.

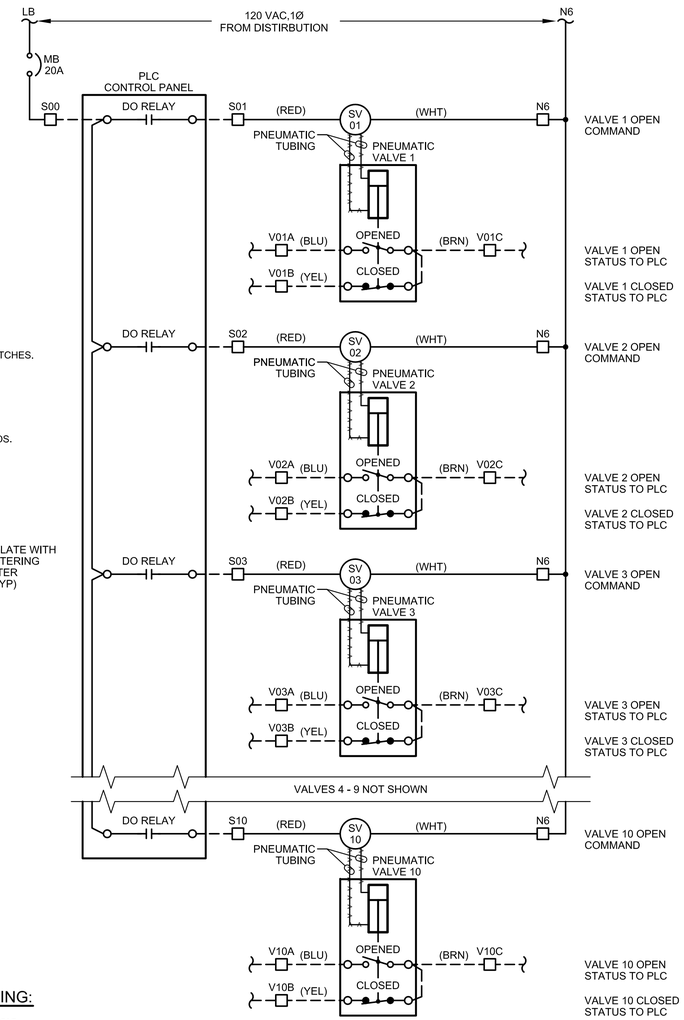
SOLENIOD VALVE PANEL BACKPAN LAYOUT

SOLENIOD VALVE PANEL

NOT TO SCALE

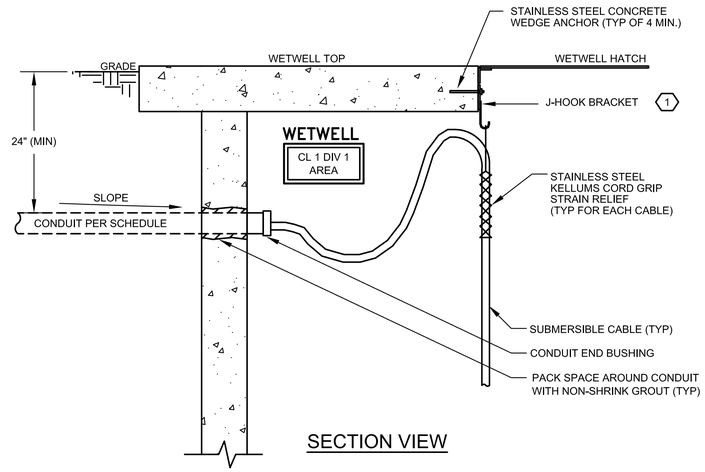
1 DETAIL NTS

ACD



VALVE CONTROL (TYPICAL)

(TYPICAL FOR ALL 10 PNEUMATIC VALVES)



SECTION VIEW

NOTES: 1 CUSTOM MANUFACTURERED J-HOOK ASSEMBLY CONSISTING OF STAINLESS STEEL PLATE WITH STAINLESS STEEL J-HOOKS WELDED TO PLATE. PROVIDE ONE HOOK PER WETWELL CABLE.

WETWELL CONDUIT ENTRANCE DETAIL

NOT TO SCALE

2 DETAIL NTS

WWD

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REVISIONS

APPROVED BY	RAO
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
ELECTRICAL DETAILS 8
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-68	REV 0

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:49:49pm
FILENAME: E-00-68.dwg

N1808

12KV AND FIBER OPTIC CONDUIT & WIRE ROUTING SCHEDULE

	CONDUIT DETAILS						POWER WIRE		CONTROL WIRE		GROUND	NOTES
REV	TAG NO.	FROM	TO	QTY	SIZE	TYPE	QTY	SIZE	QTY	SIZE	SIZE	
	F 00 A	NODE 1 COMMUNICATIONS PANEL	PBX-D1C	1	4"	SPEC	-	-	4	FIBER	-	
	F 00 B	PBX-D1C	(E) ADMIN/PHONE NETWORK	1	2"	SPEC	-	-	1	FIBER	-	
	F 00 C	PBX-D1C	PBX-D1B	1	4"	SPEC	-	-	3	FIBER	-	
	F 01	PBX-D1C	PBX-D2B	1	4"	SPEC	-	-	4	FIBER	-	
	F 02	PBX-D2B	PBX-D2A	1	2"	SPEC	-	-	1	FIBER	-	
	F 03	PBX-D2B	PBX-D3A	1	4"	SPEC	-	-	3	FIBER	-	
	F 04	PBX-D3A	NODE 3 COMMUNICATIONS PANEL	1	2"	SPEC	-	-	1	FIBER	-	IN MW-20 BENCH CA BUILDING
	F 05	PBX-D3A	PBX-D3B	1	4"	SPEC	-	-	2	FIBER	-	
	F 06	PBX-D3B	NODE 4 COMMUNICATIONS PANEL	1	2"	SPEC	-	-	1	FIBER	-	
	F 07	PBX-D3B	NODE 5 COMMUNICATIONS PANEL	1	2"	SPEC	-	-	1	FIBER	-	
	F 099 A	PBX-D1B	(E) SCADA/SECURITY NETWORK	1	4"	SPEC	-	-	2	FIBER	-	
	F 099 B	PBX-D1B	REMEDY COMMUNICATIONS PANEL	1	2"	SPEC	-	-	1	FIBER	-	
	T 00	PBX-T1C	PBX-T3K	1	4"	SPEC	3	#2	-	-	#8	
	T 01	PBX-T1C	XFMR 1	1	4"	SPEC	3	#2	-	-	#8	NODE 1
	T 02	PBX-T2B	XFMR 2	1	4"	SPEC	3	#2	-	-	#8	NODE 2
	T 03	PBX-T3A	XFMR 3	1	4"	SPEC	3	#2	-	-	#8	NODE 3 AT MW-20 BENCH
	T 04	PBX-T3B	XFMR 4	1	4"	SPEC	3	#2	-	-	#8	NODE 4
	T 05	PBX-T3K	XFMR 5	1	4"	SPEC	3	#2	-	-	#8	NODE 5
	T 99 A	XFMR-99	MV MAIN BREAKER	1	4"	SPEC	3	#2	-	-	#6	
	T 99 B	MV MAIN BREAKER	PBX-T1A	1	4"	SPEC	3	#2	-	-	#8	
	T 99 C	PBX-T1A	PBX-T1C	1	-	SPEC	1	MC CBL	-	-	-	DIRECT BURY 12KV CABLE, #2

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOOTIS
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

REVISIONS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN		MBY			TPF

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
				MBY	TPF	JMS	RAO

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONDUIT AND CABLE SCHEDULE

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY

SHEET NO.	of	SHEETS	REV
E-00-69			0

FILENAME: E-00-69.dwg
PLOT DATE: Oct 30, 2015
PLOT TIME: 11:34:16am

N1808

NODE 01 CONDUIT & CABLE SCHEDULE

CONDUIT SECTION	CONDUIT TAG	CONDUIT SIZE	ORIGIN	DESTINATION	CONDUCTOR	NOTES
P1-3	A	2"	PBX-P2A	HH1-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-3A
P1-3	B	2"	PBX-P2A	HH1-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-3B
P1-3	C	2"	PBX-P2A	HH1-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-3D
P1-3	D	2"	PBX-P2A	HH1-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-3C
P1-3	E	2"	PBX-P2A	HH1-3	(3) #8, (1) #8 G.	
P1-3	F	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	G	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	H	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	I	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	J	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	K	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-3	L	2"	PBX-P2A	HH1-3	N/A	SPARE W/ PULL LINE
P1-4	A	2"	HH1-3	HH1-4	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-4A
P1-4	B	2"	HH1-3	HH1-4	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-4B
P1-4	C	2"	HH1-3	HH1-4	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-4D
P1-4	D	2"	HH1-3	HH1-4	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-4C
P1-4	E	2"	HH1-3	HH1-4	(3) #8, (1) #8 G.	
P1-4	F	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	G	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	H	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	I	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	J	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	K	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-4	L	2"	HH1-3	HH1-4	N/A	SPARE W/ PULL LINE
P1-5	A	2"	HH1-4	HH1-5	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-5A
P1-5	B	2"	HH1-4	HH1-5	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-5B
P1-5	C	2"	HH1-4	HH1-5	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-5D
P1-5	D	2"	HH1-4	HH1-5	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-5C
P1-5	F	2"	HH1-4	HH1-5	N/A	SPARE W/ PULL LINE
P1-5	G	2"	HH1-4	HH1-5	N/A	SPARE W/ PULL LINE
P1-5	H	2"	HH1-4	HH1-5	N/A	SPARE W/ PULL LINE
P1-5	I	2"	HH1-4	HH1-5	N/A	SPARE W/ PULL LINE
P1-6	A	2"	HH1-5	HH1-6	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-6A
P1-6	B	2"	HH1-5	HH1-6	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-6B
P1-6	C	2"	HH1-5	HH1-6	(3) #8, (1) #8 G.	
P1-6	F	2"	HH1-5	HH1-6	N/A	SPARE W/ PULL LINE
P1-6	G	2"	HH1-5	HH1-6	N/A	SPARE W/ PULL LINE
P1-6	H	2"	HH1-5	HH1-6	N/A	SPARE W/ PULL LINE
P1-6	I	2"	HH1-5	HH1-6	N/A	SPARE W/ PULL LINE
P1-7	A	2"	HH1-6	HH1-7	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-7A
P1-7	B	2"	HH1-6	HH1-7	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-7B
P1-7	F	2"	HH1-6	HH1-7	N/A	SPARE W/ PULL LINE
P1-7	G	2"	HH1-6	HH1-7	N/A	SPARE W/ PULL LINE
P1-7	H	2"	HH1-6	HH1-7	N/A	SPARE W/ PULL LINE
P1-8	A	2"	HH1-7	HH1-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-8A
P1-8	B	2"	HH1-7	HH1-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-8B
P1-8	F	2"	HH1-7	HH1-8	N/A	SPARE W/ PULL LINE
P1-8	G	2"	HH1-7	HH1-8	N/A	SPARE W/ PULL LINE
P1-8	H	2"	HH1-7	HH1-8	N/A	SPARE W/ PULL LINE
P1-9	A	2"	HH1-8	HH1-9	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-9A
P1-9	B	2"	HH1-8	HH1-9	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P1-9B
P1-9	F	2"	HH1-8	HH1-9	N/A	SPARE W/ PULL LINE
P1-9	G	2"	HH1-8	HH1-9	N/A	SPARE W/ PULL LINE
P1-9	H	2"	HH1-8	HH1-9	N/A	SPARE W/ PULL LINE
P1-10	A	2"	HH1-9	HH1-10	(3) #8, (1) #8 G.	
P1-10	F	2"	HH1-9	HH1-10	N/A	SPARE W/ PULL LINE
P1-10	G	2"	HH1-9	HH1-10	N/A	SPARE W/ PULL LINE
P1-10	H	2"	HH1-9	HH1-10	N/A	SPARE W/ PULL LINE
P1-11	E	2"	HH1-4	HH1-11	(3) #8, (1) #8 G.	
P1-11	J	2"	HH1-4	HH1-11	N/A	SPARE W/ PULL LINE
P1-11	K	2"	HH1-4	HH1-11	N/A	SPARE W/ PULL LINE
P1-11	L	2"	HH1-4	HH1-11	N/A	SPARE W/ PULL LINE
P1-12	E	2"	HH1-11	HH1-12	(3) #8, (1) #8 G.	
P1-12	J	2"	HH1-11	HH1-12	N/A	SPARE W/ PULL LINE
P1-12	K	2"	HH1-11	HH1-12	N/A	SPARE W/ PULL LINE
P1-12	L	2"	HH1-11	HH1-12	N/A	SPARE W/ PULL LINE
P1-13	E	2"	HH1-12	HH1-13	(3) #8, (1) #8 G.	
P1-13	J	2"	HH1-12	HH1-13	N/A	SPARE W/ PULL LINE
P1-13	K	2"	HH1-12	HH1-13	N/A	SPARE W/ PULL LINE
P1-13	L	2"	HH1-12	HH1-13	N/A	SPARE W/ PULL LINE
P1-14	E	2"	HH1-13	HH1-14	N/A	SPARE W/ PULL LINE
P1-14	J	2"	HH1-13	HH1-14	N/A	SPARE W/ PULL LINE

CONTINUED

NODE 01 CONTINUED

P1-20	M	2"	PBX-P2C	HH-19	(3) #8, (1) #8 G.	
P1-20	N	2"	PBX-P2C	HH-19	N/A	SPARE W/ PULL LINE
P1-20	O	2"	PBX-P2C	HH-19	N/A	SPARE W/ PULL LINE
P1-21	M	2"	HH-19	HH-20	(3) #8, (1) #8 G.	
P1-21	N	2"	HH-19	HH-20	N/A	SPARE W/ PULL LINE
P1-21	O	2"	HH-19	HH-20	N/A	SPARE W/ PULL LINE
P1-22	M	2"	HH-20	HH-21	(3) #8, (1) #8 G.	
P1-22	N	2"	HH-20	HH-21	N/A	SPARE W/ PULL LINE
P1-22	O	2"	HH-20	HH-21	N/A	SPARE W/ PULL LINE
P1-23	M	2"	HH-21	HH-22	(3) #8, (1) #8 G.	
P1-23	N	2"	HH-21	HH-22	N/A	SPARE W/ PULL LINE
P1-23	O	2"	HH-21	HH-22	N/A	SPARE W/ PULL LINE
P1-24	M	2"	HH-22	HH-23	(3) #8, (1) #8 G.	
P1-24	N	2"	HH-22	HH-23	N/A	SPARE W/ PULL LINE
P1-24	O	2"	HH-22	HH-23	N/A	SPARE W/ PULL LINE
P1-25	M	2"	HH-23	HH-24	(3) #8, (1) #8 G.	
P1-25	N	2"	HH-23	HH-24	N/A	SPARE W/ PULL LINE
P1-25	O	2"	HH-23	HH-24	N/A	SPARE W/ PULL LINE
P1-26	G	2"	HH1-10	CONDUIT STUB	N/A	SPARE STUB W/ PULL LINE, CAP
P1-26	H	2"	HH1-10	CONDUIT STUB	N/A	SPARE STUB W/ PULL LINE, CAP

P=power, F=fiber optic, C=controls
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONDUIT & CABLE SCHEDULES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-70	REV 2

N1808

11/03/2015, 15:40, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWG\E-Electric\E-00-70 thru 73.dwg, Tab: E-00-70

NODE 02 CONDUIT & CABLE SCHEDULE

CONDUIT SECTION	CONDUIT TAG	CONDUIT SIZE	ORIGIN	DESTINATION	CONDUCTOR	NOTES
P2-1	A	3"	PNL-2A	HH2-1	(3) #2/0, (1) #3 G.	
P2-1	B	3"	PNL-2A	HH2-1	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-1B
P2-1	C	3"	PNL-2A	HH2-1	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-1C
P2-1	D	2"	PNL-2A	HH2-1	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-1E
P2-1	E	2"	PNL-2A	HH2-1	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-1D
P2-1	F	3"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	G	3"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	H	3"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	I	3"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	J	2"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	K	2"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-1	L	2"	PNL-2A	HH2-1	N/A	SPARE W/ PULL LINE
P2-2	A	3"	HH2-1	HH2-2	(3) #2/0, (1) #3 G.	
P2-2	B	3"	HH2-1	HH2-2	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-2B
P2-2	C	3"	HH2-1	HH2-2	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-2C
P2-2	D	2"	HH2-1	HH2-2	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-2E
P2-2	E	2"	HH2-1	HH2-2	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-2D
P2-2	F	3"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	G	3"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	H	3"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	I	3"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	J	2"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	K	2"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-2	L	2"	HH2-1	HH2-2	N/A	SPARE W/ PULL LINE
P2-3	D	2"	HH2-2	HH2-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-3E
P2-3	E	2"	HH2-2	HH2-3	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-3D
P2-3	J	2"	HH2-2	HH2-3	N/A	SPARE W/ PULL LINE
P2-3	K	2"	HH2-2	HH2-3	N/A	SPARE W/ PULL LINE
P2-3	L	2"	HH2-2	HH2-3	N/A	SPARE W/ PULL LINE
P2-4	D	2"	HH2-3	HH2-4	(3) #8, (1) #8 G.	
P2-4	J	2"	HH2-3	HH2-4	N/A	SPARE W/ PULL LINE
P2-4	K	2"	HH2-3	HH2-4	N/A	SPARE W/ PULL LINE
P2-4	L	2"	HH2-3	HH2-4	N/A	SPARE W/ PULL LINE
P2-5	D	2"	HH2-4	HH2-5	(3) #8, (1) #8 G.	
P2-5	J	2"	HH2-4	HH2-5	N/A	SPARE W/ PULL LINE
P2-6	M	2"	PNL-2A	HH2-6	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-6N,O
P2-6	N	2"	PNL-2A	HH2-6	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-6M,O
P2-6	O	2"	PNL-2A	HH2-6	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-6M,N
P2-6	P	2"	PNL-2A	HH2-6	N/A	SPARE W/ PULL LINE
P2-6	Q	2"	PNL-2A	HH2-6	N/A	SPARE W/ PULL LINE
P2-6	R	2"	PNL-2A	HH2-6	N/A	SPARE W/ PULL LINE
P2-7	M	2"	HH2-6	HH2-7	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-7N
P2-7	N	2"	HH2-6	HH2-7	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-7M
P2-7	P	2"	HH2-6	HH2-7	N/A	SPARE W/ PULL LINE
P2-7	Q	2"	HH2-6	HH2-7	N/A	SPARE W/ PULL LINE
P2-7	R	2"	HH2-6	HH2-7	N/A	SPARE W/ PULL LINE
P2-8	M	2"	HH2-7	HH2-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-7N
P2-8	N	2"	HH2-7	HH2-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P2-7M
P2-8	P	2"	HH2-7	HH2-8	N/A	SPARE W/ PULL LINE
P2-8	Q	2"	HH2-7	HH2-8	N/A	SPARE W/ PULL LINE
P2-8	R	2"	HH2-7	HH2-8	N/A	SPARE W/ PULL LINE
P2-9	M	2"	HH2-8	HH2-9	(3) #8, (1) #8 G.	
P2-9	P	2"	HH2-8	HH2-9	N/A	SPARE W/ PULL LINE
P2-9	Q	2"	HH2-8	HH2-9	N/A	SPARE W/ PULL LINE
P2-9	R	2"	HH2-8	HH2-9	N/A	SPARE W/ PULL LINE
P2-10	M	2"	HH2-9	HH2-10	(3) #8, (1) #8 G.	
P2-10	Q	2"	HH2-9	HH2-10	N/A	SPARE W/ PULL LINE
P2-11	A	3"	H2-1	HH2-11	(3) #2/0, (1) #3 G.	
P2-11	B	3"	H2-1	HH2-11	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-11B
P2-11	C	3"	H2-1	HH2-11	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-11C
P2-11	F	3"	H2-1	HH2-11	N/A	SPARE W/ PULL LINE
P2-11	G	3"	H2-1	HH2-11	N/A	SPARE W/ PULL LINE
P2-11	H	3"	H2-1	HH2-11	N/A	SPARE W/ PULL LINE
P2-11	I	3"	H2-1	HH2-11	N/A	SPARE W/ PULL LINE
P2-12	A	3"	HH2-11	HH2-12	(3) #2/0, (1) #3 G.	
P2-12	B	3"	HH2-11	HH2-12	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-12B
P2-12	C	3"	HH2-11	HH2-12	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-12C
P2-12	F	3"	HH2-11	HH2-12	N/A	SPARE W/ PULL LINE
P2-12	G	3"	HH2-11	HH2-12	N/A	SPARE W/ PULL LINE
P2-12	H	3"	HH2-11	HH2-12	N/A	SPARE W/ PULL LINE
P2-12	I	3"	HH2-11	HH2-12	N/A	SPARE W/ PULL LINE
P2-13	A	3"	HH2-12	HH2-13	(3) #2/0, (1) #3 G.	
P2-13	B	3"	HH2-12	HH2-13	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-13B
P2-13	C	3"	HH2-12	HH2-13	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-13C
P2-13	F	3"	HH2-12	HH2-13	N/A	SPARE W/ PULL LINE
P2-13	G	3"	HH2-12	HH2-13	N/A	SPARE W/ PULL LINE
P2-13	H	3"	HH2-12	HH2-13	N/A	SPARE W/ PULL LINE
P2-13	I	3"	HH2-12	HH2-13	N/A	SPARE W/ PULL LINE
P2-14	A	3"	HH2-13	HH2-14	(3) #2/0, (1) #3 G.	
P2-14	B	3"	HH2-13	HH2-14	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-14B
P2-14	C	3"	HH2-13	HH2-14	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-14C
P2-14	F	3"	HH2-13	HH2-14	N/A	SPARE W/ PULL LINE
P2-14	G	3"	HH2-13	HH2-14	N/A	SPARE W/ PULL LINE
P2-14	H	3"	HH2-13	HH2-14	N/A	SPARE W/ PULL LINE
P2-14	I	3"	HH2-13	HH2-14	N/A	SPARE W/ PULL LINE

CONTINUED

NODE 02 CONTINUED

P2-15	A	3"	HH2-14	HH2-15	(3) #2/0, (1) #3 G.	
P2-15	B	3"	HH2-14	HH2-15	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-15B
P2-15	C	3"	HH2-14	HH2-15	(3) #2/0, (1) #3 G.	COMMON CONDUIT W/ P2-15C
P2-15	F	3"	HH2-14	HH2-15	N/A	SPARE W/ PULL LINE
P2-15	G	3"	HH2-14	HH2-15	N/A	SPARE W/ PULL LINE
P2-15	H	3"	HH2-14	HH2-15	N/A	SPARE W/ PULL LINE
P2-15	I	3"	HH2-14	HH2-15	N/A	SPARE W/ PULL LINE
P2-16	A	3"	HH2-15	HH2-16	(3) #2/0, (1) #3 G.	
P2-16	B	3"	HH2-15	HH2-16	(3) #2/0, (1) #3 G.	
P2-16	F	3"	HH2-15	HH2-16	N/A	SPARE W/ PULL LINE
P2-16	G	3"	HH2-15	HH2-16	N/A	SPARE W/ PULL LINE
P2-16	H	3"	HH2-15	HH2-16	N/A	SPARE W/ PULL LINE
P2-16	I	3"	HH2-15	HH2-16	N/A	SPARE W/ PULL LINE
P2-17	A	3"	HH2-16	HH2-17	(3) #2/0, (1) #3 G.	
P2-17	B	3"	HH2-16	HH2-17	(3) #2/0, (1) #3 G.	
P2-17	F	3"	HH2-16	HH2-17	N/A	SPARE W/ PULL LINE
P2-17	G	3"	HH2-16	HH2-17	N/A	SPARE W/ PULL LINE
P2-17	H	3"	HH2-16	HH2-17	N/A	SPARE W/ PULL LINE
P2-17	I	3"	HH2-16	HH2-17	N/A	SPARE W/ PULL LINE
P2-18	A	3"	HH2-17	HH2-18	(3) #2/0, (1) #3 G.	
P2-18	F	3"	HH2-17	HH2-18	N/A	SPARE W/ PULL LINE
P2-18	G	3"	HH2-17	HH2-18	N/A	SPARE W/ PULL LINE
P2-18	H	3"	HH2-17	HH2-18	N/A	SPARE W/ PULL LINE
P2-19	A	3"	HH2-18	HH2-19	(3) #2/0, (1) #3 G.	
P2-19	F	3"	HH2-18	HH2-19	N/A	SPARE W/ PULL LINE
P2-19	G	3"	HH2-18	HH2-19	N/A	SPARE W/ PULL LINE
P2-19	H	3"	HH2-18	HH2-19	N/A	SPARE W/ PULL LINE

P=power, F=fiber optic, C=controls
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONDUIT & CABLE SCHEDULES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY | SHEET NO. of SHEETS

E-00-71 | REV 2

N1808

11/03/2015, 16:40, G:\Graphics\ART\TOPOCK-011\Submittal_100%\DWG\E-Electrical\E-00-70 thru 73.dwg, Tab: E-00-71

NODE 03 CONDUIT & CABLE SCHEDULE

CONDUIT SECTION	CONDUIT TAG	CONDUIT SIZE	ORIGIN	DESTINATION	CONDUCTOR	NOTES
P3-1	A	2"	PNL-3A	HH3-1	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-1B
P3-1	B	2"	PNL-3A	HH3-1	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-1A
P3-1	C	3"	PNL-3A	HH3-1	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-1D,E
P3-1	D	3"	PNL-3A	HH3-1	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-1C,E
P3-1	E	3"	PNL-3A	HH3-1	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-1C,D
P3-1	F	2"	PNL-3A	HH3-1	N/A	SPARE W/ PULL LINE
P3-1	G	2"	PNL-3A	HH3-1	N/A	SPARE W/ PULL LINE
P3-1	H	2"	PNL-3A	HH3-1	N/A	SPARE W/ PULL LINE
P3-1	I	2"	PNL-3A	HH3-1	N/A	SPARE W/ PULL LINE
P3-1	J	2"	PNL-3A	HH3-1	N/A	SPARE W/ PULL LINE
P3-2	A	2"	HH3-1	HH3-2	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-2B
P3-2	B	2"	HH3-1	HH3-2	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-2A
P3-2	C	2"	HH3-1	HH3-2	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-2D
P3-2	D	2"	HH3-1	HH3-2	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-2C
P3-2	F	2"	HH3-1	HH3-2	N/A	SPARE W/ PULL LINE
P3-2	G	2"	HH3-1	HH3-2	N/A	SPARE W/ PULL LINE
P3-2	H	2"	HH3-1	HH3-2	N/A	SPARE W/ PULL LINE
P3-2	I	2"	HH3-1	HH3-2	N/A	SPARE W/ PULL LINE
P3-2	J	2"	HH3-1	HH3-2	N/A	SPARE W/ PULL LINE
P3-3	A	2"	HH3-2	HH3-3	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-3B
P3-3	B	2"	HH3-2	HH3-3	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-3A
P3-3	C	2"	HH3-2	HH3-3	(3) #4, (1) #6 G.	
P3-3	F	2"	HH3-2	HH3-3	N/A	SPARE W/ PULL LINE
P3-3	G	2"	HH3-2	HH3-3	N/A	SPARE W/ PULL LINE
P3-3	H	2"	HH3-2	HH3-3	N/A	SPARE W/ PULL LINE
P3-3	I	2"	HH3-2	HH3-3	N/A	SPARE W/ PULL LINE
P3-4	A	2"	HH3-3	HH3-4A	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-4B
P3-4	B	2"	HH3-3	HH3-4A	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-4A
P3-3	C	2"	HH3-3	HH3-4A	(3) #4, (1) #6 G.	
P3-4	G	2"	HH3-3	HH3-4A	N/A	SPARE W/ PULL LINE
P3-4	H	2"	HH3-3	HH3-4A	N/A	SPARE W/ PULL LINE
P3-5	A	2"	HH3-4A	HH3-4	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-5B
P3-5	B	2"	HH3-4A	HH3-4	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P3-5A
P3-5	G	2"	HH3-4A	HH3-4	N/A	SPARE W/ PULL LINE
P3-5	H	2"	HH3-4A	HH3-4	N/A	SPARE W/ PULL LINE
P3-6	A	2"	HH3-4	HH3-5	(3) #4, (1) #6 G.	
P3-6	G	2"	HH3-4	HH3-5	N/A	SPARE W/ PULL LINE
P3-7	G	2"	HH3-5	HH3-6	N/A	SPARE W/ PULL LINE
P3-7	Q	2"	HH3-5	HH3-6	N/A	SPARE W/ PULL LINE
P3-8	R	2"	HH3-7	HH3-8	N/A	SPARE W/ PULL LINE
P3-8	S	2"	HH3-7	HH3-8	N/A	SPARE W/ PULL LINE
P3-9	K	2"	PNL-3A	HH3-8	(3) #1, (1) #6 G.	
P3-9	L	2"	PNL-3A	HH3-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P3-9M
P3-9	M	2"	PNL-3A	HH3-8	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P3-9L
P3-9	N	2"	PNL-3A	HH3-8	N/A	SPARE W/ PULL LINE
P3-9	O	2"	PNL-3A	HH3-8	N/A	SPARE W/ PULL LINE
P3-9	P	2"	PNL-3A	HH3-8	N/A	SPARE W/ PULL LINE
P3-10	L	2"	HH3-8	HH3-9	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P3-10M
P3-10	M	2"	HH3-8	HH3-9	(3) #8, (1) #8 G.	COMMON CONDUIT W/ P3-10L
P3-10	N	2"	HH3-8	HH3-9	N/A	SPARE W/ PULL LINE
P3-10	O	2"	HH3-8	HH3-9	N/A	SPARE W/ PULL LINE
P3-10	P	2"	HH3-8	HH3-9	N/A	SPARE W/ PULL LINE
P3-11	M	2"	HH3-9	HH3-10	(3) #8, (1) #8 G.	
P3-11	N	2"	HH3-9	HH3-10	N/A	SPARE W/ PULL LINE
P3-11	O	2"	HH3-9	HH3-10	N/A	SPARE W/ PULL LINE
P3-11	P	2"	HH3-9	HH3-10	N/A	SPARE W/ PULL LINE
P3-12	M	2"	HH3-10	HH3-11	(3) #8, (1) #8 G.	
P3-12	N	2"	HH3-10	HH3-11	N/A	SPARE W/ PULL LINE
P3-12	O	2"	HH3-10	HH3-11	N/A	SPARE W/ PULL LINE
P3-12	P	2"	HH3-10	HH3-11	N/A	SPARE W/ PULL LINE
P3-13	N	2"	HH3-11	CONDUIT STUB	N/A	SPARE STUB W/ PULL LINE, CAP
P3-13	O	2"	HH3-11	CONDUIT STUB	N/A	SPARE STUB W/ PULL LINE, CAP
P3-14	T	2"	HH3-4A	HH3-12	N/A	SPARE W/ PULL LINE
P3-14	U	2"	HH3-4A	HH3-12	N/A	SPARE W/ PULL LINE
P3-14	T	2"	HH3-4A	HH3-12	N/A	SPARE W/ PULL LINE
P3-14	U	2"	HH3-4A	HH3-12	N/A	SPARE W/ PULL LINE
P3-15	T	2"	HH3-12	HH3-13	N/A	SPARE W/ PULL LINE
P3-15	U	2"	HH3-12	HH3-13	N/A	SPARE W/ PULL LINE
P3-16	T	2"	HH3-13	HH3-14	N/A	SPARE W/ PULL LINE
P3-16	U	2"	HH3-13	HH3-14	N/A	SPARE W/ PULL LINE
P3-17	T	2"	HH3-14	HH3-15	N/A	SPARE W/ PULL LINE
P3-17	U	2"	HH3-14	HH3-15	N/A	SPARE W/ PULL LINE
P3-18	T	2"	HH3-15	HH3-16	N/A	SPARE W/ PULL LINE
P3-18	U	2"	HH3-15	HH3-16	N/A	SPARE W/ PULL LINE
P3-19	T	2"	HH3-16	HH2-13	N/A	SPARE W/ PULL LINE
P3-19	U	2"	HH3-16	HH2-13	N/A	SPARE W/ PULL LINE

P=power, F=fiber optic, C=controls
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

NODE 04 CONDUIT & CABLE SCHEDULE

CONDUIT SECTION	CONDUIT TAG	CONDUIT SIZE	ORIGIN	DESTINATION	CONDUCTOR	NOTES
P4-1	A	2"	PNL-4	HH4-1	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-1B
P4-1	B	2"	PNL-4	HH4-1	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-1A
P4-1	C	3"	PNL-4	HH4-1	(3) #2/0, (1) #3 G.	
P4-1	D	2"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	E	2"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	F	2"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	G	2"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	H	2"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	I	3"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-1	J	3"	PNL-4	HH4-1	N/A	SPARE W/ PULL LINE
P4-2	A	2"	HH4-1	HH4-2	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-2B
P4-2	B	2"	HH4-1	HH4-2	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-2A
P4-2	C	3"	HH4-1	HH4-2	(3) #2/0, (1) #3 G.	
P4-2	D	2"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-2	E	2"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-2	F	2"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-1	G	2"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-1	H	2"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-2	I	3"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-2	J	3"	HH4-1	HH4-2	N/A	SPARE W/ PULL LINE
P4-3	A	2"	HH4-2	HH4-16	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-3B
P4-3	B	2"	HH4-2	HH4-16	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-3A
P4-3	C	3"	HH4-2	HH4-16	(3) #2/0, (1) #3 G.	
P4-3	D	2"	HH4-2	HH4-16	N/A	SPARE W/ PULL LINE
P4-3	E	2"	HH4-2	HH4-16	N/A	SPARE W/ PULL LINE
P4-3	F	2"	HH4-2	HH4-16	N/A	SPARE W/ PULL LINE
P4-3	I	3"	HH4-2	HH4-16	N/A	SPARE W/ PULL LINE
P4-3	J	3"	HH4-2	HH4-16	N/A	SPARE W/ PULL LINE
P4-4	A	2"	HH4-16	HH4-3	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-4B
P4-4	B	2"	HH4-16	HH4-3	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-4A
P4-4	D	2"	HH4-16	HH4-3	N/A	SPARE W/ PULL LINE
P4-4	E	2"	HH4-16	HH4-3	N/A	SPARE W/ PULL LINE
P4-4	F	2"	HH4-16	HH4-3	N/A	SPARE W/ PULL LINE
P4-5	A	2"	HH4-3	HH4-4	(3) #1, (1) #6 G.	
P4-5	D	2"	HH4-3	HH4-4	N/A	SPARE W/ PULL LINE
P4-5	E	2"	HH4-3	HH4-4	N/A	SPARE W/ PULL LINE
P4-5	F	2"	HH4-3	HH4-4	N/A	SPARE W/ PULL LINE
P4-6	A	2"	HH4-4	HH4-5	(3) #1, (1) #6 G.	
P4-6	D	2"	HH4-4	HH4-5	N/A	SPARE W/ PULL LINE
P4-6	E	2"	HH4-4	HH4-5	N/A	SPARE W/ PULL LINE
P4-6	F	2"	HH4-4	HH4-5	N/A	SPARE W/ PULL LINE
P4-7	A	2"	HH4-5	HH4-6	(3) #1, (1) #6 G.	
P4-7	D	2"	HH4-5	HH4-6	N/A	SPARE W/ PULL LINE
P4-7	E	2"	HH4-5	HH4-6	N/A	SPARE W/ PULL LINE
P4-7	F	2"	HH4-5	HH4-6	N/A	SPARE W/ PULL LINE
P4-8	A	2"	HH4-6	HH4-7	(3) #1, (1) #6 G.	
P4-8	D	2"	HH4-6	HH4-7	N/A	SPARE W/ PULL LINE
P4-9	K	2"	PNL-4	HH4-8	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-9L
P4-9	L	2"	PNL-4	HH4-8	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-9K
P4-9	M	2"	PNL-4	HH4-8	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-9N
P4-9	N	2"	PNL-4	HH4-8	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-9M
P4-9	O	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-9	P	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-9	Q	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-9	R	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-9	S	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-9	T	2"	PNL-4	HH4-8	N/A	SPARE W/ PULL LINE
P4-10	K	2"	HH4-8	HH4-9	(3) #1, (1) #6 G.	COMMON CONDUIT W/ P4-10L
P4-10	L	2"	HH4-8	HH4-9	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-10K
P4-10	M	2"	HH4-8	HH4-9	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-10N
P4-10	N	2"	HH4-8	HH4-9	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-10M
P4-10	O	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-10	P	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-10	Q	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-10	R	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-10	S	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-10	T	2"	HH4-8	HH4-9	N/A	SPARE W/ PULL LINE
P4-11	L	2"	HH4-9	HH4-10	(3) #4, (1) #6 G.	
P4-11	M	2"	HH4-9	HH4-10	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-11N
P4-11	N	2"	HH4-9	HH4-10	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-11M
P4-11	O	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-11	P	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-11	Q	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-11	R	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-11	S	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-11	T	2"	HH4-9	HH4-10	N/A	SPARE W/ PULL LINE
P4-12	L	2"	HH4-10	HH4-11	(3) #4, (1) #6 G.	
P4-12	M	2"	HH4-10	HH4-11	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-12N
P4-12	N	2"	HH4-10	HH4-11	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-12M
P4-12	O	2"	HH4-10	HH4-11	N/A	SPARE W/ PULL LINE
P4-12	P	2"	HH4-10	HH4-11	N/A	SPARE W/ PULL LINE
P4-12	Q	2"	HH4-10	HH4-11	N/A	SPARE W/ PULL LINE
P4-12	R	2"	HH4-10	HH4-11	N/A	SPARE W/ PULL LINE

CONTINUED

NODE 04 CONTINUED

P4-13	M	2"	HH4-11	HH4-12	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-13N
P4-13	N	2"	HH4-11	HH4-12	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-13M
P4-13	O	2"	HH4-11	HH4-12	N/A	SPARE W/ PULL LINE
P4-13	P	2"	HH4-11	HH4-12	N/A	SPARE W/ PULL LINE
P4-13	Q	2"	HH4-11	HH4-12	N/A	SPARE W/ PULL LINE
P4-14	M	2"	HH4-12	HH4-13	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-14N
P4-14	N	2"	HH4-12	HH4-13	(3) #4, (1) #6 G.	COMMON CONDUIT W/ P4-14M
P4-14	O	2"	HH4-12	HH4-13	N/A	SPARE W/ PULL LINE
P4-14	P	2"	HH4-12	HH4-13	N/A	SPARE W/ PULL LINE
P4-14	Q	2"	HH4-12	HH4-13	N/A	SPARE W/ PULL LINE
P4-15	N	2"	HH4-13	HH4-14	(3) #4, (1) #6 G.	
P4-15	O	2"	HH4-13	HH4-14	N/A	SPARE W/ PULL LINE
P4-15	P	2"	HH4-13	HH4-14	N/A	SPARE W/ PULL LINE
P4-15	Q	2"	HH4-13	HH4-14	N/A	SPARE W/ PULL LINE
P4-16	N	2"	HH4-14	HH4-15	(3) #4, (1) #6 G.	
P4-16	O	2"	HH4-14	HH4-15	N/A	SPARE W/ PULL LINE
P4-18	C	3"	HH4-16	HH4-17	(3) #2/0, (1) #3 G.	
P4-18	I	3"	HH4-16	HH4-17	N/A	SPARE W/ PULL LINE
P4-18	J	3"	HH4-16	HH4-17	N/A	SPARE W/ PULL LINE
P4-19	C	3"	HH4-17	HH4-18	(3) #2/0, (1) #3 G.	
P4-19	I	3"	HH4-17	HH4-18	N/A	SPARE W/ PULL LINE
P4-19	J	3"	HH4-17	HH4-18	N/A	SPARE W/ PULL LINE
P4-20	I	3"	HH4-18	HH4-19	N/A	SPARE W/ PULL LINE
P4-20	J	3"	HH4-18	HH4-19	N/A	SPARE W/ PULL LINE
P4-21	I	3"	HH4-19	HH4-20	N/A	SPARE W/ PULL LINE
P4-21	J	3"	HH4-19	HH4-20	N/A	SPARE W/ PULL LINE

P=power, F=fiber optic, C=controls
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDOTI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MMS	JMS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MMS	JMS	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONDUIT & CABLE SCHEDULES

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-00-72	REV 2

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NODE 05 CONDUIT & CABLE SCHEDULE

CONDUIT SECTION	CONDUIT TAG	CONDUIT SIZE	ORIGIN	DESTINATION	CONDUCTOR	NOTES
P5-1	A	2"	PNL-5	HH5-1	1 FO CABLE	F TO FW-1
P5-1	B	2"	PNL-5	HH5-1	1 FO CABLE	F TO P641
P5-1	C	2"	PNL-5	HH5-1	1 FO CABLE	F TO P642
P5-1	D	2"	PNL-5	HH5-1	1 FO CABLE	F TO P643
P5-1	E	2"	PNL-5	HH5-1	1 FO CABLE	F TO P644
P5-1	F	2"	PNL-5	HH5-1	1 FO CABLE	F TO P645
P5-1	G	2"	PNL-5	HH5-1	P TO FW-1	
P5-1	H	2"	PNL-5	HH5-1	P TO P641	
P5-1	I	2"	PNL-5	HH5-1	P TO P642	
P5-1	J	2"	PNL-5	HH5-1	P TO P643	
P5-1	K	2"	PNL-5	HH5-1	P TO P644	
P5-1	L	2"	PNL-5	HH5-1	N/A	SP TO FW-1
P5-1	M	2"	PNL-5	HH5-1	N/A	SP TO P641
P5-1	N	2"	PNL-5	HH5-1	N/A	SP TO P642
P5-1	P	2"	PNL-5	HH5-1	N/A	SP TO P643
P5-1	Q	2"	PNL-5	HH5-1	N/A	SP TO P644
P5-1	R	2"	PNL-5	HH5-1	N/A	SP TO (F) P645
P5-1	S	2"	PNL-5	HH5-1	N/A	SP TO (F) P645
P5-1	T	2"	PNL-5	HH5-1	N/A	SP TO (F) P645
P5-2	A	2"	HH5-1	HH5-2	1 FO CABLE	F TO FW-1
P5-2	B	2"	HH5-1	HH5-2	1 FO CABLE	F TO P643
P5-2	C	2"	HH5-1	HH5-2	1 FO CABLE	F TO P644
P5-2	D	2"	HH5-1	HH5-2	1 FO CABLE	F TO P645
P5-2	E	2"	HH5-1	HH5-2	P TO FW-1	
P5-2	F	2"	HH5-1	HH5-2	P TO P643	
P5-2	G	2"	HH5-1	HH5-2	P TO P644	
P5-2	H	2"	HH5-1	HH5-2	N/A	SP TO FW-1
P5-2	I	2"	HH5-1	HH5-2	N/A	SP TO P643
P5-2	J	2"	HH5-1	HH5-2	N/A	SP TO P644
P5-2	K	2"	HH5-1	HH5-2	N/A	SP TO (F) P645
P5-2	L	2"	HH5-1	HH5-2	N/A	SP TO (F) P645
P5-2	M	2"	HH5-1	HH5-2	N/A	SP TO (F) P645
P5-3	A	2"	HH5-2	HH5-3	1 FO CABLE	F TO FW-1
P5-3	B	2"	HH5-2	HH5-3	1 FO CABLE	F TO P644
P5-3	C	2"	HH5-2	HH5-3	1 FO CABLE	F TO P645
P5-3	D	2"	HH5-2	HH5-3	P TO FW-1	
P5-3	E	2"	HH5-2	HH5-3	P TO P643	
P5-3	F	2"	HH5-2	HH5-3	P TO P644	
P5-3	G	2"	HH5-2	HH5-3	N/A	SP TO FW-1
P5-3	H	2"	HH5-2	HH5-3	N/A	SP TO P644
P5-3	I	2"	HH5-2	HH5-3	N/A	SP TO (F) P645
P5-3	J	2"	HH5-2	HH5-3	N/A	SP TO (F) P645
P5-3	K	2"	HH5-2	HH5-3	N/A	SP TO (F) P645
P5-4	A	2"	HH5-3	HH5-4	1 FO CABLE	F TO FW-1
P5-4	B	2"	HH5-3	HH5-4	1 FO CABLE	F TO P645
P5-4	C	2"	HH5-3	HH5-4	P TO FW-1	
P5-4	D	2"	HH5-3	HH5-4	N/A	SP TO FW-1
P5-4	E	2"	HH5-3	HH5-4	N/A	SP TO (F) P645
P5-4	F	2"	HH5-3	HH5-4	N/A	SP TO (F) P645
P5-4	G	2"	HH5-3	HH5-4	N/A	SP TO (F) P645
P5-5	A	2"	HH5-4	HH5-5	1 FO CABLE	
P5-5	B	2"	HH5-4	HH5-5	P TO FW-1	
P5-5	C	2"	HH5-4	HH5-5	N/A	
P5-6	A	2"	HH5-5	HH5-6	1 FO CABLE	
P5-6	B	2"	HH5-5	HH5-6	P TO FW-1	
P5-6	C	2"	HH5-5	HH5-6	N/A	
P5-7	A	2"	HH5-6	HH5-7	1 FO CABLE	
P5-7	B	2"	HH5-6	HH5-7	P TO FW-1	
P5-7	C	2"	HH5-6	HH5-7	N/A	
P5-8	A	2"	HH5-7	HH5-8	1 FO CABLE	
P5-8	B	2"	HH5-7	HH5-8	P TO FW-1	
P5-8	C	2"	HH5-7	HH5-8	N/A	
P5-9	A	2"	HH5-8	HH5-9	1 FO CABLE	
P5-9	B	2"	HH5-8	HH5-9	P TO FW-1	
P5-9	C	2"	HH5-8	HH5-9	N/A	
P5-10	A	2"	HH5-9	HH5-10	1 FO CABLE	
P5-10	B	2"	HH5-9	HH5-10	P TO FW-1	
P5-10	C	2"	HH5-9	HH5-10	N/A	
P5-11	A	2"	HH5-3	HH5-11	1 FO CABLE	
P5-11	B	2"	HH5-3	HH5-11	P TO P644	
P5-11	C	2"	HH5-3	HH5-11	N/A	
P5-12	A	2"	HH5-11	HH5-12	1 FO CABLE	
P5-12	B	2"	HH5-11	HH5-12	P TO P644	
P5-12	C	2"	HH5-11	HH5-12	N/A	
P5-13	A	2"	HH5-12	HH5-13	1 FO CABLE	
P5-13	B	2"	HH5-12	HH5-13	P TO P644	
P5-13	C	2"	HH5-12	HH5-13	N/A	
P5-14	A	2"	HH5-13	HH5-14	1 FO CABLE	
P5-14	B	2"	HH5-13	HH5-14	P TO P644	
P5-14	C	2"	HH5-13	HH5-14	N/A	

CONTINUED

NODE 05 CONTINUED

P5-15	A	2"	HH5-1	HH5-15	1 FO CABLE	F TO P641
P5-15	B	2"	HH5-1	HH5-15	1 FO CABLE	F TO P642
P5-15	C	2"	HH5-1	HH5-15	P TO P641	
P5-15	D	2"	HH5-1	HH5-15	P TO P642	
P5-15	E	2"	HH5-1	HH5-15	N/A	SP TO P641
P5-15	F	2"	HH5-1	HH5-15	N/A	SP TO P642
P5-16	A	2"	HH5-15	HH5-16	1 FO CABLE	
P5-16	B	2"	HH5-15	HH5-16	P TO P642	
P5-16	C	2"	HH5-15	HH5-16	N/A	
P5-17	A	2"	HH5-15	HH5-17	1 FO CABLE	
P5-17	B	2"	HH5-15	HH5-17	P TO P641	
P5-17	C	2"	HH5-15	HH5-17	N/A	
P5-18	A	2"	HH5-17	HH5-18	1 FO CABLE	
P5-18	B	2"	HH5-17	HH5-18	P TO P641	
P5-18	C	2"	HH5-17	HH5-18	N/A	
P5-19	A	2"	HH5-18	HH5-19	1 FO CABLE	
P5-19	B	2"	HH5-18	HH5-19	P TO P641	
P5-19	C	2"	HH5-18	HH5-19	N/A	
P5-20	A	2"	HH5-19	HH5-20	1 FO CABLE	
P5-20	B	2"	HH5-19	HH5-20	P TO P641	
P5-20	C	2"	HH5-19	HH5-20	N/A	

P=power, F=fiber optic, C=controls, SP=spare
ALL POWER CONDUCTORS ARE AWG XHHW UNLESS OTHERWISE NOTED

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY: RAO

SO / SUPV / DSGN / DWN / CHKD / OK / DATE / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

CONDUIT & CABLE SCHEDULES

GAS TRANSMISSION & DISTRIBUTION
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SHEET NO. of SHEETS

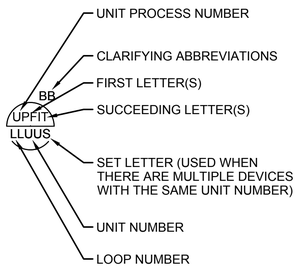
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INSTRUMENT IDENTIFICATION

EXAMPLE SYMBOLS



DIGITAL SYSTEM INTERFACES

- ▲ ANALOG INPUT
- ▼ ANALOG OUTPUT
- △X DISCRETE INPUT
- ▽X DISCRETE OUTPUT

INSTRUMENT IDENTIFICATION LETTERS TABLE

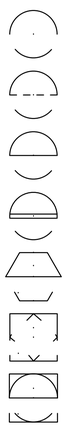
ANALOG IND.

LETTER	FIRST-LETTER		SUCCEEDING-LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	READOUT OR PASSIVE FUNCTION	READOUT OR PASSIVE FUNCTION
A	ANALYSIS (+)		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE (*)	USER'S CHOICE (*)	USER'S CHOICE (*)
C	USER'S CHOICE (*)			CONTROL	
D	DENSITY (S.G.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT, SENSOR		
	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE (*)		GLASS, GAUGE VIEWING DEVICE	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE		USER'S CHOICE (*)	USER'S CHOICE (*)	USER'S CHOICE (*)
O	USER'S CHOICE (*)		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD OR PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTI VARIABLE		MULTI FUNCTION	MULTI FUNCTION	MULTI FUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED (*)	X AXIS	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION	Z AXIS		DRIVE, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

TABLE BASED ON THE INSTRUMENTATION, SYSTEMS, AND AUTOMATION SOCIETY (ISA) STANDARD.

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.
(*) WHEN USED, DEFINE THE MEANING HERE FOR THE PROJECT.

GENERAL INSTRUMENT OR FUNCTIONAL SYMBOLS



- FIELD MOUNTED
- REAR-OF-PANEL MOUNTED (OPERATOR INACCESSIBLE)
- PANEL MOUNTED (OPERATOR ACCESSIBLE)
- MCC MOUNTED
- COMPUTER FUNCTION
- PLC FUNCTION
- SHARED DISPLAY, SHARED CONTROL

TRANSDUCERS

A	ANALOG	I	CURRENT
D	DIGITAL	P	PNEUMATIC
E	VOLTAGE	PF	PULSE FREQUENCY
F	FREQUENCY	PD	PULSE DURATION
H	HYDRAULIC	R	RESISTANCE

EXAMPLE



CURRENT TO PNEUMATIC TRANSDUCER (BACK OF PANEL, IN A FLOW LOOP)

ACCESSORY DEVICES

A	ALARM
C	CONTROLLER
I	INDICATOR
R	RECORDER
S	SWITCH
T	TRANSMITTER
X	UNCLASSIFIED

EXAMPLE



TRANSMITTER AS AN ACCESSORY TO A FLOW ELEMENT

SPECIAL CASES



ON AND OFF EVENT LIGHTS

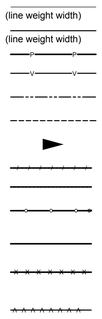


ON-OFF HAND SWITCH, MAINTAINED CONTACT SWITCH (CONTROLLED DEVICE WILL RESTART ON RETURN OF POWER AFTER POWER FAILURE).



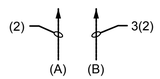
STOP-START HAND SWITCH MOMENTARY CONTACT SWITCHES (CONTROLLED DEVICE WILL NOT RESTART ON RETURN OF POWER AFTER POWER FAILURE).

LINE LEGEND



- PRIMARY PROCESS LINE
- SECONDARY PROCESS LINE
- PACKAGE PROCESS LINE
- VENDOR PROCESS LINE
- EXISTING PROCESS LINE
- FUTURE PROCESS LINE
- PROCESS FLOW DIAGRAM
- DISCRETE SIGNAL LINE
- ANALOG SIGNAL LINE
- SOFTWARE LINK SIGNAL LINE
- PNUEMATIC SYMBOL LINE
- FILLED SYSTEM SIGNAL LINE
- INSTRUMENT AIR SIGNAL LINE

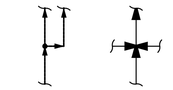
PARALLELING LINES



(A) TOTAL OF 2 SIGNALS

(B) 3 TYPICAL SETS OF 2 SIGNALS EACH. TOTAL OF 6 SIGNALS.

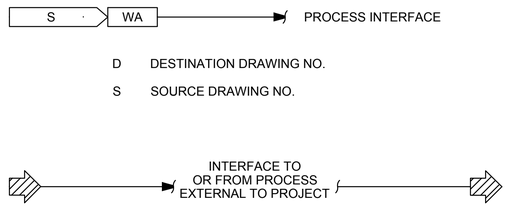
CONNECTING LINES



NON-CONNECTING LINES



INTERFACE SYMBOLS

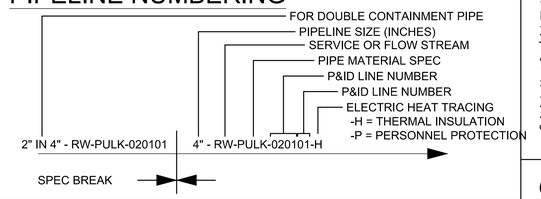


D DESTINATION DRAWING NO.

S SOURCE DRAWING NO.

INTERFACE TO OR FROM PROCESS EXTERNAL TO PROJECT

PIPELINE NUMBERING



SELF CONTAINED VALVE & EQUIPMENT TAG NUMBERS

X-DDD-EFF

X	LOCATION ID
DDD	EQUIPMENT DESIGNATION
ARV	AIR RELEASE VALVE
AVRV	AIR AND VACUUM RELEASE VALVE
CMP	AIR COMPRESSOR
DRM	EXTRACTION WELL
EXT	DRUM/VESSEL
FIL	FILTER
INJ	INJECTION WELL
LPS	LIQUID PHASE SEPARATOR
MOV	MOTOR OPERATED VALVE
MTR	MOTOR
PMP	PUMPS
TNK	ATMOSPHERIC STORAGE TANK
V	PACKAGE EQUIPMENT
X	MISCELLANEOUS EQUIPMENT
E	AREA
FF	TWO DIGIT EQUIPMENT IDENTIFIER

X	LOCATION ID
XV	PNEUMATIC VALVE (OPEN/CLOSE, NO MODULATING)
FCV	FLOW CONTROL VALVE (ANALOG MODULATING)
FV	FLOW VALVE (OPEN/CLOSE, NO MODULATING)

SEE SPECIFICATIONS SECTION 40 27 02 FOR VALVE TYPE

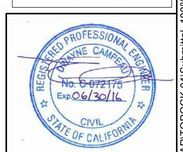
ABBREVIATIONS & LETTER SYMBOLS

AC	ALTERNATING CURRENT
AM	AUTO-MANUAL
CAM	COMPUTER-AUTO-MANUAL
CCS	CENTRAL CONTROL SYSTEM
CL_2 etc.	CHLORINE (TYPICAL: USE STANDARD CHEMICAL ELEMENT ABBREVIATIONS)
CM	COMPUTER-MANUAL
COD	CHEMICAL OXYGEN DEMAND
CP-X	CONTROL PANEL NO. X
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DCU	DISTRIBUTED CONTROL UNIT
DO	DISSOLVED OXYGEN
FCL_2	FREE CHLORINE RESIDUAL
FOS	FAST-OFF-SLOW
FOSA	FAST-OFF-SLOW-AUTO
FOSR	FAST-OFF-SLOW-REMOTE
FP-W-X	FIELD PANEL NO. WX (W=UNIT PROCESS NUMBER X=PANEL NUMBER)
FR	FORWARD-REVERSE
HC	HAND CONTROL
HDPE	HIGH DENSITY POLYETHYLENE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HS	HAND-SWITCH
ISR	INTRINSICALLY SAFE RELAY
LEL	LOWER EXPLOSIVE LIMIT
LOS	LOCKOUT STOP
LR	LOCAL-REMOTE
MA	MANUAL-AUTO
MC	MODULATE-CLOSE
MCC-X	MOTOR CONTROL CENTER NO. X
MSC	MANUFACTURER SUPPLIED CABLE
OC	OPEN-CLOSE(D)
OCA	OPEN-CLOSE-AUTO
OCR	OPEN-CLOSE-REMOTE
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
pH	HYDROGEN ION CONCENTRATION
PLC	PROGRAMMABLE LOGIC CONTROLLER
RIO	REMOTE I/O UNIT
RM-X	REMOTE MULTIPLEXING MODULE NO. X
RTU-X	REMOTE TELEMETRY UNIT NO. X
SF	SLOWER-FASTER
SS	START-STOP
SSC	SUPERVISORY SET POINT CONTROL
STL	CARBON STEEL
TCL2	TOTAL CHLORINE RESIDUAL
TOC	TOTAL ORGANIC CARBON
TOD	TOTAL OXYGEN DEMAND
TURB	TURBIDITY
VHC	VOLATILE HYDROCARBONS
VIB	VIBRATION
△	DIFFERENCE
Σ	SUM
×	MULTIPLY
÷	DIVIDE
F(X)	CHARACTERIZED
X^n	RAISED TO THE Nth POWER
√‾	SQUARE ROOT
AVG	AVERAGE
1:1	REPEAT OR BOOST
>	SELECT HIGHEST SIGNAL
<	SELECT LOWEST SIGNAL
}	BIAS
%	GAIN OR ATTENUATE

GENERAL NOTES

1. COMPONENTS AND PANELS SHOWN WITH A SINGLE ASTERISK (✳) ARE TO BE PROVIDED AS PART OF A PACKAGE SYSTEM.
2. COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (✳✳) ARE TO BE PROVIDED UNDER DIVISION 40, ELECTRICAL.
3. THIS IS A STANDARD LEGEND. THEREFORE, NOT ALL OF THIS INFORMATION MAY BE USED ON THE PROJECT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY



ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

P&ID INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 1

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
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VALVE SYMBOLS

- GATE
- KNIFE GATE
- BUTTERFLY
- GLOBE
- BALL
- DIAPHRAGM
- WEIR
- PINCH
- NEEDLE
- SWING CHECK
- BACKFLOW PREVENTER
- SAMPLE (S)
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE PRESSURE CONTROL
- MULTI-PORT VALVE (GATE VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN.) SEAT PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- ANGLE GATE

ACTUATOR SYMBOLS

- PNEUMATIC DIAPHRAGM SPRING-OPPOSED, SINGLE OR DOUBLE ACTING
- VALVE POSITIONER
- MANUAL
- PNEUMATIC CYLINDER SINGLE OR DOUBLE ACTING ACTUATED BY ONE INPUT
- HYDRAULIC (H)
- ELECTRIC MOTOR (M)
- DIAPHRAGM, DIFFERENTIAL PRESSURE
- SOLENOID (S)
- ELECTROHYDRAULIC (E/H)

NOTE:
ON LOSS OF PRIMARY POWER (PNEUMATIC, ELECTRICAL, OR HYDRAULIC)

XX: FO FAIL OPEN
FC FAIL CLOSED
FLP FAIL TO LAST POSITION

PRIMARY ELEMENT SYMBOLS

- ELECTROMAGNETIC FLOWMETER (M)
- LEVEL (BUBBLER TUBE)
- LEVEL (FLOAT) (LS)
- ROTAMETER (FI)
- DENSITY METER (DE)
- GENERIC (XX)
- LEVEL (LE)

TANKS, VESSEL AND VEHICLES

- DOUBLE CONTAINED TANK
- DISHED HEAD FLAT BOTTOM
- 55 GALLON DRUM
- FRAC TANK
- TANK TRUCK - END
- DRUM / VESSEL

MISCELLANEOUS SYMBOLS

- VENT TO ATMOSPHERE (V)
- AIR GAP
- DRIP TRAP (T)
- SELF CONTAINED AIR SUPPLY (A)
- AIR PURGE SET (AP)
- FLUSHING CONNECTION (F)
- SEAL WATER SET (S)
- WATER PURGE SET (WP)
- FLEXIBLE CONNECTION
- DIAPHRAGM SEAL
- ANNULAR DIAPHRAGM SEAL
- CALIBRATION COLUMN
- BLIND FLANGE
- PIPE CAP
- STRAINER
- PULSATION DAMPENER
- HOSE CONNECTION
- DOUBLE NOZZLE
- SPECIALTY ITEM (SP 201A)
- WALL PLUG/SOCKET (120V)
- CARTRIDGE FILTER
- DOWN HOLE FLOW CONTROL VALVE
- BASKET FILTER
- PANEL CONTINUED ON SAME OR OTHER DRAWING (FFLCPLLLX)
- PANEL OUTLINE
- PANEL NAME
- 120V — 120 VOLT, 60 HZ POWER
- 480V — 480 VOLT, 60 HZ POWER
- XX — AIR SET XX = SUPPLY PRESSURE IN PSIG.
- PLUG
- RECEPTACLE
- TV MONITOR
- TV CAMERA
- A, B → AND → C — LOGIC ELEMENT: IF A AND NOT B THEN C
- A, B → OR → C — LOGIC ELEMENT: IF A OR B THEN C
- RADIO ANTENNA
- INTERLOCK, SEE CONTROL DIAGRAMS (OR)
- VOICE COMMUNICATION POINT
- REDUCER (2" x 4")
- EJECTOR
- SECONDARY CONTAINMENT
- AIR INLET FILTER
- MAN WAY
- STATIC MIXER

LINE SIZE AND MATERIAL IDENTIFICATION

(FOR REFERENCE ONLY. SEE SITE AND MECHANICAL DRAWINGS AND SPECIFICATIONS)

CSLF	A53 B CS, CLASS 125
HALE	HDPE, SDR 11
HLAD	HDPE, SOLVAY ELTEX TUB 124
HSLF	HDPE, SDR 9 (FM APPROVED)
LCLF	A53 B CEMENT LINED CS, CLASS 125
PULK	CPVC, CLASS 150
PVLK	PVC, CLASS 150
SABD	A312 TP304/304L SS, CLASS 300
SUTK	A213 TYPE 316L, SS TUBING

FLOW STREAM IDENTIFICATION

ACD	19% HCl OR 93% H2SO4
CA	RIVERBANK EXTRACTION WATER (MAY BE CARBON AMENDED)
CAU	25% CAUSTIC
CO2	CARBON DIOXIDE
COG	COAGULANT
DR	DRAIN
EW	EMERGENCY/FIRE WATER
EX	EXTRACTED GROUNDWATER (TRANSWESTERN OR EAST RAVINE)
FW	FRESH WATER
IA	INSTRUMENT AIR
HC	HYPOCHLORITE
DCL	DECHLORINATION
RW	REMEDY PRODUCED WATER
SL	SLURRY/SOLIDS
TFW	TREATED FRESHWATER
TW	TREATED (FILTERED) REMEDY PRODUCED WATER
UA	UTILITY AIR
VT	VENT
WS	WASTE STREAM
LW	LAB WASTE
PW	POTABLE WATER
BWS	BACKWASH SUPPLY
BWW	BACKWASH WASTE
UW	UTILITY WATER

PUMP AND COMPRESSOR SYMBOLS

- CENTRIFUGAL PUMP
- METERING PUMP (POSITIVE DISPLACEMENT)
- CENTRIFUGAL COMPRESSOR
- SCREW COMPRESSOR
- SUBMERSIBLE SUMP PUMP
- WELL PUMP (M)
- PERISTALTIC PUMP
- AIR DIAPHRAGM PUMP

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — DWAYNE CAMPBELL — No. C 67276 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

SO, SUPV, DSGN, DWN, CHKD, OK, DATE, SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

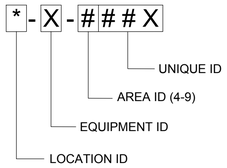
P&ID INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 2

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
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INTERLOCKS

400 TCS LOOP WELL HEAD VAULT FLOAT SWITCH INTERLOCK
DISABLE PUMPS P-4XX. DISABLE FLOW CONTROL VALVES FV-4XX.

401 TCS LOOP PIPELINE LEAK DETECTION
DISABLE PUMPS P-4XX. DISABLE FLOW CONTROL VALVES FV-4XX.

402 TCS LOOP PACKER PRESSURE LOW
DISABLE PUMPS P-4XX. DISABLE FLOW CONTROL VALVES FV-4XX.

500 IRZ WELL HEAD VAULT FLOAT SWITCH INTERLOCK
DISABLE PUMPS P-5XX. DISABLE FLOW CONTROL VALVES FV-5XX.

501 IRZ PIPELINE LEAK DETECTION
DISABLE PUMPS P-5XX. DISABLE FLOW CONTROL VALVES FV-5XX.

502 IRZ PACKER PRESSURE LOW
DISABLE PUMPS P-5XX. DISABLE FLOW CONTROL VALVES FV-5XX.

600 IRL LOOP WELL HEAD VAULT FLOAT SWITCH INTERLOCK
DISABLE PUMPS P-6XX. DISABLE FLOW CONTROL VALVES FV-6XX.

601 IRL LOOP PIPELINE LEAK DETECTION
DISABLE PUMPS P-6XX. DISABLE FLOW CONTROL VALVES FV-6XX.

602 IRL PACKER PRESSURE LOW
DISABLE PUMPS P-6XX. DISABLE FLOW CONTROL VALVES FV-6XX.

700 MW-20 CARBON AMENDMENT ROOM LEAK DETECTION
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

701 MW-20 CARBON AMENDMENT ROOM LEAK DETECTION
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.
DISABLE WELLS IRZXX-, IRLXX-, AND RBXX-.

702 MW-20 CARBON AMENDMENT ROOM PRESSURE DETECTION
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

703 MW-20 ETHANOL TANK HIGH LEVEL
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

704 MW-20 ETHANOL TANK LOW LEVEL
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

705 MW-20 WELL MAINTENANCE ROOM LEAK DETECTION
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

706 MW-20 WELL MAINTENANCE ROOM PRESSURE DETECTION
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

707 MW-20 WELL MAINTENANCE DAY TANK HIGH LEVEL
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

708 MW-20 WELL MAINTENANCE DAY TANK LOW LEVEL
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

709 MW-20 EYEWASH STATION INTERLOCK
DISABLE PUMPS P-7XX. DISABLE FLOW CONTROL VALVES FV-7XX.

900 TWB CARBON AMENDMENT ROOM LEAK DETECTION
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

901 TWB CARBON AMENDMENT ROOM LEAK DETECTION
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.
DISABLE WELLS TCSXX-, TWBXX-, AND ERXX-.

902 TWB CARBON AMENDMENT ROOM PRESSURE DETECTION
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

903 TWB ETHANOL TANK HIGH LEVEL
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

904 TWB ETHANOL TANK LOW LEVEL
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

905 TWB WELL MAINTENANCE ROOM LEAK DETECTION
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

906 TWB WELL MAINTENANCE ROOM PRESSURE DETECTION
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

907 TWB WELL MAINTENANCE DAY TANK HIGH LEVEL
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

908 TWB WELL MAINTENANCE DAY TANK LOW LEVEL
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

909 TWB EYEWASH STATION INTERLOCK
DISABLE PUMPS P-8XX. DISABLE FLOW CONTROL VALVES FV-8XX.

IRZ (AREA ID 5)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	PHYSICAL WELL ID
IRZ-1	IRZ01-	1	IRZ01-A
IRZ-1	IRZ01-	3	IRZ01-A
IRZ-5	IRZ05-	1	IRZ05-A
IRZ-5	IRZ05-	3	IRZ05-A
IRZ-9	IRZ09-	1	IRZ09-A
IRZ-9	IRZ09-	3	IRZ09-A
IRZ-11	IRZ11-	1	IRZ11-A
IRZ-11	IRZ11-	2	IRZ11-A
IRZ-11	IRZ11-	3	IRZ11-B
IRZ-11	IRZ11-	4	IRZ11-B
IRZ-13	IRZ13-	1	IRZ13-A
IRZ-13	IRZ13-	2	IRZ13-A
IRZ-13	IRZ13-	3	IRZ13-B
IRZ-13	IRZ13-	4	IRZ13-B
IRZ-15	IRZ15-	1	IRZ15-A
IRZ-15	IRZ15-	2	IRZ15-A
IRZ-15	IRZ15-	3	IRZ15-B
IRZ-15	IRZ15-	4	IRZ15-B
IRZ-16	IRZ16-	1	IRZ16-A
IRZ-16	IRZ16-	2	IRZ16-A
IRZ-16	IRZ16-	3	IRZ16-B
IRZ-16	IRZ16-	4	IRZ16-B
IRZ-17	IRZ17-	1	IRZ17-A
IRZ-17	IRZ17-	2	IRZ17-A
IRZ-17	IRZ17-	3	IRZ17-B
IRZ-17	IRZ17-	4	IRZ17-B
IRZ-19	IRZ19-	1	IRZ19-A
IRZ-19	IRZ19-	2	IRZ19-A
IRZ-19	IRZ19-	3	IRZ19-B
IRZ-19	IRZ19-	4	IRZ19-B
IRZ-20	IRZ20-	1	IRZ20-A
IRZ-20	IRZ20-	2	IRZ20-A
IRZ-20	IRZ20-	3	IRZ20-B
IRZ-20	IRZ20-	4	IRZ20-B
IRZ-21	IRZ21-	1	IRZ21-A
IRZ-21	IRZ21-	2	IRZ21-A
IRZ-21	IRZ21-	3	IRZ21-B
IRZ-21	IRZ21-	4	IRZ21-B
IRZ-23	IRZ23-	1	IRZ23-A
IRZ-25	IRZ25-	1	IRZ25-A
IRZ-25	IRZ25-	3	IRZ25-A
IRZ-27	IRZ27-	1	IRZ27-A
IRZ-27	IRZ27-	3	IRZ27-A
IRZ-29	IRZ29-	1	IRZ29-A
IRZ-29	IRZ29-	3	IRZ29-A
IRZ-31	IRZ31-	1	IRZ31-A
IRZ-31	IRZ31-	3	IRZ31-A
IRZ-33	IRZ33-	1	IRZ33-A
IRZ-33	IRZ33-	3	IRZ33-A
IRZ-35	IRZ35-	1	IRZ35-A
IRZ-37	IRZ37-	1	IRZ37-A
IRZ-39	IRZ39-	1	IRZ39-A

NOTES

1. AREA ID 7 DENOTES NTH IRZ CARBON AMENDMENT FACILITY AT MW-20 BENCH.
2. AREA 9 DENOTES CARBON AMENDMENT FACILITY AT TRANSWESTERN BENCH.

FUTURE PROVISIONAL IRZ (AREA ID 5)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	PHYSICAL WELL ID
IRZ-2	IRZ02-	1	IRZ02-A
IRZ-2	IRZ02-	2	IRZ02-A
IRZ-2	IRZ02-	3	IRZ02-B
IRZ-2	IRZ02-	4	IRZ02-B
IRZ-3	IRZ03-	1	IRZ03-A
IRZ-3	IRZ03-	2	IRZ03-A
IRZ-3	IRZ03-	3	IRZ03-B
IRZ-3	IRZ03-	4	IRZ03-B
IRZ-4	IRZ04-	1	IRZ04-A
IRZ-4	IRZ04-	2	IRZ04-A
IRZ-4	IRZ04-	3	IRZ04-B
IRZ-4	IRZ04-	4	IRZ04-B
IRZ-6	IRZ06-	1	IRZ06-A
IRZ-6	IRZ06-	2	IRZ06-A
IRZ-6	IRZ06-	3	IRZ06-B
IRZ-6	IRZ06-	4	IRZ06-B
IRZ-7	IRZ07-	1	IRZ07-A
IRZ-7	IRZ07-	2	IRZ07-A
IRZ-7	IRZ07-	3	IRZ07-B
IRZ-7	IRZ07-	4	IRZ07-B
IRZ-8	IRZ08-	1	IRZ08-A
IRZ-8	IRZ08-	2	IRZ08-A
IRZ-8	IRZ08-	3	IRZ08-B
IRZ-8	IRZ08-	4	IRZ08-B
IRZ-10	IRZ10-	1	IRZ10-A
IRZ-10	IRZ10-	2	IRZ10-A
IRZ-10	IRZ10-	3	IRZ10-B
IRZ-10	IRZ10-	4	IRZ10-B
IRZ-12	IRZ12-	1	IRZ12-A
IRZ-12	IRZ12-	2	IRZ12-A
IRZ-12	IRZ12-	3	IRZ12-B
IRZ-12	IRZ12-	4	IRZ12-B
IRZ-14	IRZ14-	1	IRZ14-A
IRZ-14	IRZ14-	2	IRZ14-A
IRZ-14	IRZ14-	3	IRZ14-B
IRZ-14	IRZ14-	4	IRZ14-B
IRZ-18	IRZ18-	1	IRZ18-A
IRZ-18	IRZ18-	2	IRZ18-A
IRZ-18	IRZ18-	3	IRZ18-B
IRZ-18	IRZ18-	4	IRZ18-B
IRZ-22	IRZ22-	1	IRZ22-A
IRZ-22	IRZ22-	2	IRZ22-A
IRZ-22	IRZ22-	3	IRZ22-B
IRZ-22	IRZ22-	4	IRZ22-B
IRZ-24	IRZ24-	1	IRZ24-A
IRZ-24	IRZ24-	3	IRZ24-A
IRZ-26	IRZ26-	1	IRZ26-A
IRZ-26	IRZ26-	3	IRZ26-A
IRZ-28	IRZ28-	1	IRZ28-A
IRZ-28	IRZ28-	3	IRZ28-A
IRZ-30	IRZ30-	1	IRZ30-A
IRZ-30	IRZ30-	3	IRZ30-A
IRZ-32	IRZ32-	1	IRZ32-A
IRZ-32	IRZ32-	3	IRZ32-A
IRZ-34	IRZ34-	1	IRZ34-A
IRZ-36	IRZ36-	1	IRZ36-A
IRZ-38	IRZ38-	1	IRZ38-A
IRZ-40	IRZ40-	1	IRZ40-A

TCS LOOP (AREA ID 4)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	UNIQUE ID
TCS-1	TCS01-	1	TCS01-A
TCS-1	TCS01-	3	TCS01-A
TCS-2	TCS02-	1	TCS02-A
TCS-2	TCS02-	3	TCS02-A

EAST RAVINE (AREA ID 4)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	UNIQUE ID
ER-1	ER01-	1	ER01-A
ER-2	ER02-	1	ER02-A
ER-3	ER03-	1	ER03-A
ER-4	ER04-	1	ER04-A
ER-6	ER06-	1	ER06-A

TRANSWESTERN BENCH (AREA ID 4)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	UNIQUE ID
TWB-1	TWB01-	1	TWB01-A
TWB-2	TWB02-	1	TWB02-A

INNER RECIRCULATION LOOP (AREA ID 6)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	UNIQUE ID
IRL-1	IRL01-	1	IRL01-A
IRL-2	IRL02-	1	IRL02-A
IRL-3	IRL03-	1	IRL03-A
IRL-4	IRL04-	1	IRL04-A

RIVERBANK (AREA ID 6)			
WELL NUMBER	LOCATION ID	WELL SCREEN INTERVAL	PHYSICAL WELL ID
RB-1	RB01-	1	RB01-A
RB-2	RB02-	1	RB02-A
RB-3	RB03-	1	RB03-A
RB-4	RB04-	1	RB04-A
RB-5	RB05-	1	RB05-A

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

REMEDY WELL ID SCHEDULE

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-00-03	REV 2

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N1808

CO. HWY 10 - OATMAN-TOPOCK HWY

BEGIN CONTINGENT PORTION OF PIPELINE, STA 77+35, SEE NOTE

N 2104205.54
E 7619738.31

54'

12" TEE WITH FUSED CAP FOR FUTURE CONNECTION.

ELEV 463

N 2104151.06
E 7619735.54

PIPELINE "B"
SEE DWG C-07-34

N 2104245.41
E 7619735.05

40' R

FOR TERMINATION IF CONTINGENT PORTION IS NOT BUILT
SEE DETAIL 5 C-00-05

N 2104156.36
E 7619730.73

EXISTING EDGE OF PAVEMENT

PIPELINE "B"
SEE DWG C-07-33

N 2104174.38
E 7619721.43

STA 77+05.43
PROVIDE 12" TEE WITH VALVE AND BLIND FLANGE FOR FUTURE CONNECTION

PROPOSED OVERHEAD ELECTRICAL SERVICE

STA 77+35.42
45 DEGREE WYE TO SITE B WELL AND HNWR-1A WELL

2 C-07-09 BURIED VALVE SEE DETAIL

2 C-07-09 BURIED VALVE SEE DETAIL

50' R

N 2104248.51
E 7619695.17

N 2104198.14
E 7619695.30

INCREASE WIDTH OF EXISTING GRAVEL ENTRANCE ROAD SEE NOTE 3 AND SEE DETAIL 2 C-00-05

N 2104137.35
E 7619687.70

N 2104315.51
E 7619686.22

ROAD TO HNWR REVEGETATION AREA

12" SDR11 HDPE (MIN 3-FEET OF COVER)

36' R

N 2104259.91
E 7619675.44

NEW WELL CONCRETE PAD SEE DWG S-01-01

N 2104224.91
E 7619680.27

ELEV 464

N 2104206.62
E 7619679.06

N 2104194.66
E 77619678.29

N 2104171.81
E 7619671.22

FUTURE WELL HEAD PIPING

FUTURE WELL CONCRETE PAD

20' SLIDING GATE. SEE DWG C-00-06 AND C-00-07, SEE NOTE 4

FOR WELLHEAD PIPING SEE DWG M-01-01

POWER POLE AND METER

N 2104276.41
E 7619660.89

N 2104278.95
E 7619659.99

N 2104249.33
E 7619663.44

EXISTING HNWR-1 WELL AND PUMPHOUSE SEE NOTE 2

SAND COLLECTION SYSTEM SEE DWG S-01-07

NEW FENCE SEE DWG C-00-06 AND C-00-07, SEE NOTE 5

N 2104286.45
E 7619653.37

HNWR-1A FRESH WATER SUPPLY WELL
N 2104262.57
E 7619655.77

PLACE AGGREGATE INSIDE FENCE SEE NOTE 1

EXISTING UNDERGROUND ELECTRICAL LINE

N 2104277.19
E 7619642.87

REFUGE CONNECTION

N 2104265.83
E 7619648.89

N 2104269.69
E 7619649.49

EXISTING ELECTRICAL CONTROL BUILDING

REMOVABLE GUARD POST (TYP 6 PLCS) SEE DWG C-00-05 TO BE FIELD LOCATED

EXISTING FENCE

N 2104256.15
E 7619622.07

N 2104248.16
E 7619621.55

EXTEND OVERHEAD ELECTRICAL SERVICE TO NEW ELECTRICAL PANEL

N 2104256.80
E 7619612.09

N 2104248.82
E 7619611.57

NEW ELECTRICAL CONCRETE PAD (8'X10') AND SUNSHADE, SEE DWG S-01-02

NEW ELECTRICAL PANEL, SEE ELEC SITE PLAN DWG E-01-01

N 2104320.76
E 7619606.27

REMOVABLE GUARD POST (TYP 6 PLCS) SEE DWG C-00-05 TO BE FIELD LOCATED

N 2104174.39
E 7619596.66

CONNECT NEW FENCE TO EXISTING FENCE SEE SHEET C-00-06

0 10 20 30
SCALE: 1"=10'

NOTES:

1. PLACE MIN. 6" OF AGGREGATE BASE LEVELING COURSE INSIDE FENCE AREA SURROUNDING HNWR-1A.
2. PROTECT EXISTING WELL SITE DURING CONSTRUCTION.
3. CROWN GRAVEL ENTRANCE ROAD ON CENTER LINE WITH 4% SLOPE IN EACH PERPENDICULAR DIRECTION. PLACE 3 INCHES OF GRAVEL ON TOP, SEE SHEET C-00-05.
4. TOTAL HEIGHT OF FENCE = 8' WITH 6' OF FABRIC PLUS 1' OF BARBED WIRE ON TOP, SEE SHEETS C-00-06 AND C-00-07.

NOTE:

THE EQUIPMENT AND FACILITY SHOWN HATCHED IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

Professional Engineer — CERTIFICATE NO. 38480 — BRIAN J. BUBELA — State of ARIZONA, U.S.A.

EXPIRES: 9/30/2018

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BJB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

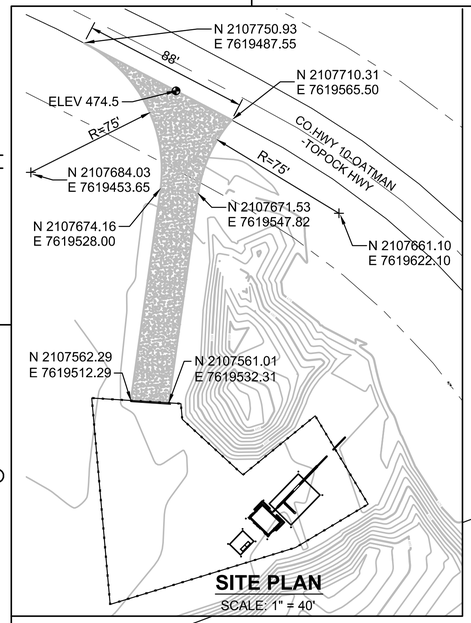
HNWR FRESHWATER SUPPLY WELL SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-01-01	REV 2

N1808

11/11/2015, 13:53, G:\Graphics\AR\TOPOCK-01\Submittal_100%\DWG&C-Civil\C-01-01.dwg, Tab: C-01-01



INCREASE WIDTH OF EXISTING GRAVEL ROAD FROM 14' TO 20' SEE NOTE 3 AND DETAIL 2 C-00-05

N 2107563.60
E 7619491.65

N 2107560.61
E 7619538.67

N 2107552.38
E 7619539.40

ELEV 477

20' SLIDING GATE SEE DWG C-00-06 AND C-00-07 SEE NOTE 4

PLACE AGGREGATE INSIDE FENCE SEE NOTE 1

N 2107554.18
E 7619609.59

MATCH LINE FOR CONTINUATION STA. 112+52.69 SEE SHEET C-07-37

PIPELINE "B"
12" SDR11 HDPE

N 2107523.51
E 7619600.66

NEW WELL CONCRETE PAD SEE DWG S-01-04

N 2107523.05
E 7619571.46

N 2107507.71
E 7619581.68

N 2107507.75
E 7619585.31

N 2107507.59
E 7619637.49

SAND COLLECTION SYSTEM SEE DWG S-01-07

N 2107512.34
E 7619612.12

FOR WELLHEAD PIPING SEE DWG M-01-02

NEW UNDERGROUND UTILITY SERVICE, SEE DWG E-01-05 FOR CONTINUATION

NEW ELECTRICAL CONCRETE PAD (8'X10') AND SUNSHADE, SEE DWG S-01-05

N 2107500.51
E 7619574.74

N 2107496.58
E 7619596.77

EXISTING SITE "B" FRESH WATER SUPPLY WELL
N 2107503.17
E 7619599.26
SEE NOTE 2

REMOVABLE GUARD POST (TYP 4 PLCS) SEE DWG C-00-05 TO BE FIELD VERIFIED

N 2107497.98
E 7619591.75

N 2107490.79
E 7619584.81

N 7619637.49
E 7619599.22

REMOVABLE GUARD POST (TYP 6 PLCS) SEE DWG C-00-05 TO BE FIELD VERIFIED

NEW FENCE SEE DWG C-00-06 AND C-00-07 SEE NOTE 5

NEW ELECTRICAL PANEL, SEE ELEC SITE PLAN DWG E-01-05

N 2107454.68
E 7619501.36

EDGE OF EXISTING PAVEMENT

CO.HWY 10-OATMAN-TOPOCK HWY

APPROXIMATE RIGHT OF WAY LINE

R/W

NOTES:

1. PLACE MIN. 6" OF AGGREGATE BASE LEVELING COURSE INSIDE FENCE AREA TO UNIFORM ELEVATION OF 477'
2. PROTECT EXISITING WELL IN PLACE DURING CONSTRUCTION.
3. CROWN GRAVEL ROAD ON CENTER LINE WITH 4% SLOPE IN EACH PERPENDICULAR DIRECTION. PLACE 3 INCHES OF GRAVEL ON TOP.
4. TOTAL HEIGHT OF FENCE = 7' WITH 6' OF FABRIC PLUS 1' OF BARBED WIRE ON TOP, SEE SHEETS C-00-06 AND C-00-07.

NOTE:
THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

CONTINGENT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

N

0 10 20 30
SCALE: 1" = 10'

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	AJW	WLM	BJB	RAO	
0	9/8/14	PRE-FINAL (90%) DESIGN	PH	PT	PT	VMB	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

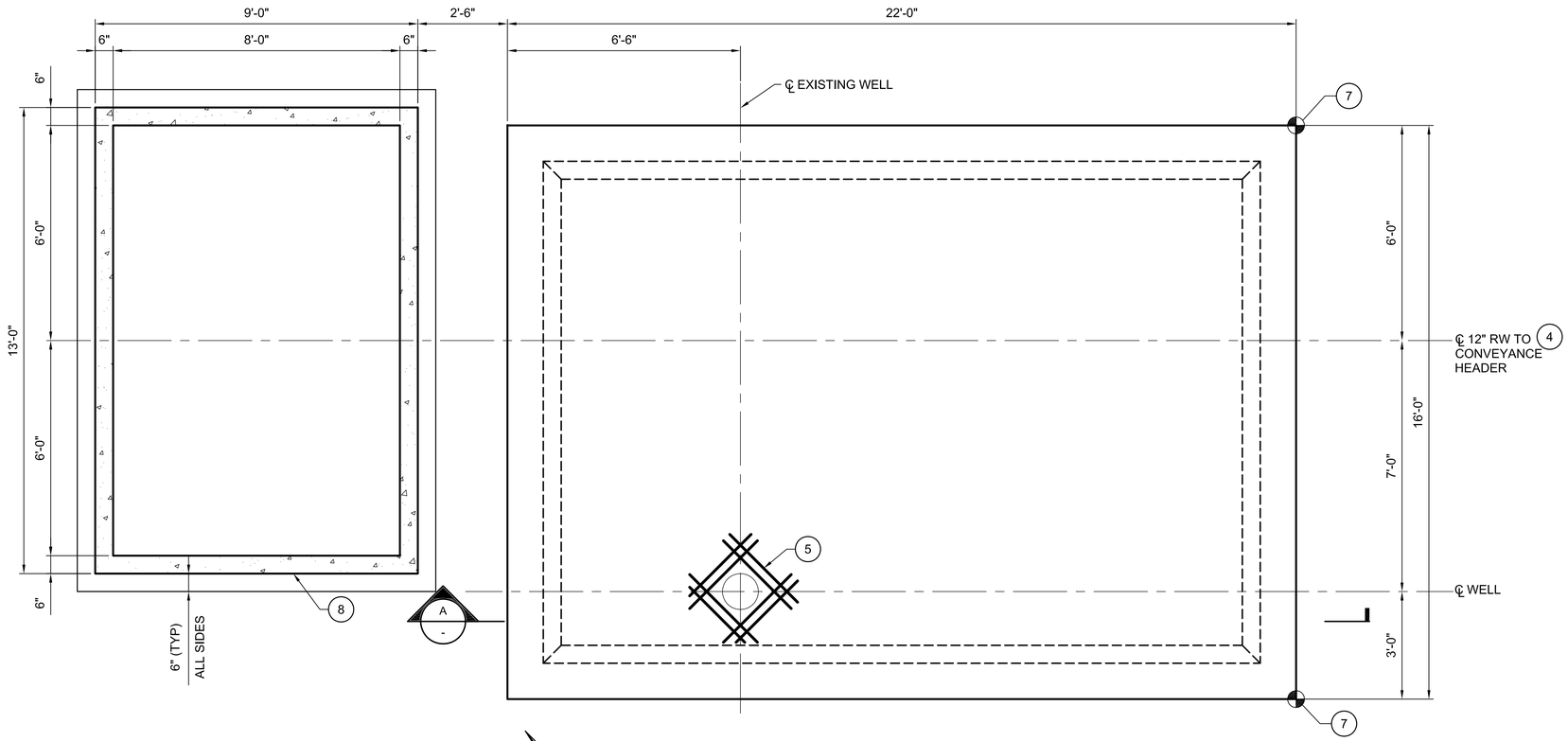
FRESH WATER SUPPLY WELL SITE B - SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-01-02	REV 1

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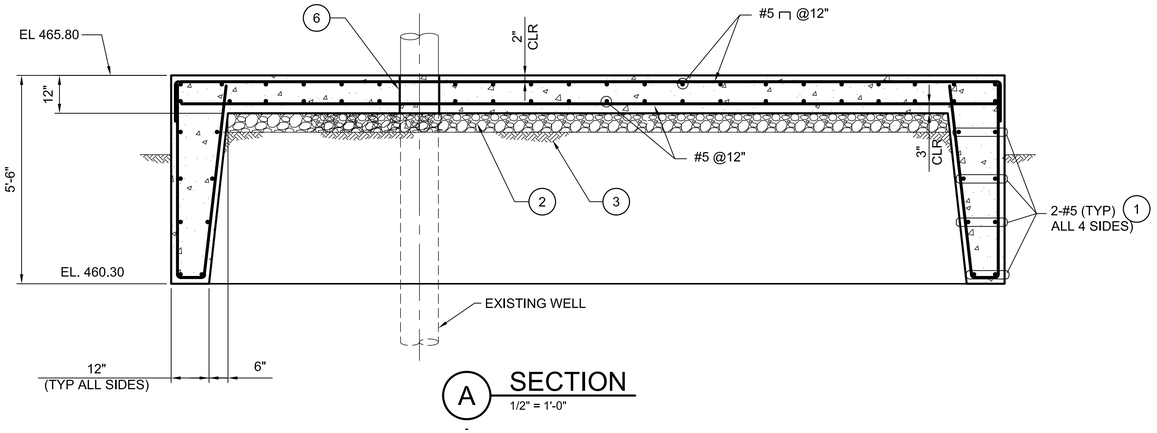


KEY NOTES

1. PROVIDE CORNER REINFORCING PER DETAIL 5 ON DWG. S-00-02
2. 6" THICK, CRUSHED ROCK
3. STRUCTURAL FILL, 95% COMPACTION (MIN) PER ASTM D 1557
4. FOR PIPE SUPPORTS, SEE DWG M-01-02
5. PROVIDE ADDITIONAL REINFORCING PER DETAIL 4 ON DWG. S-00-02
6. PROVIDE 1/2" EXPANSION JOINT MATERIAL AROUND EXISTING WELL W/ 1/2"x1/2" JOINT SEALANT AT TOP
7. FOR COORDINATES, SEE DWG. C-01-01.
8. SAND COLLECTION SYSTEM, SEE DWG. S-01-07.

FOUNDATION AND FLOOR PLAN

1/2" = 1'-0"



A SECTION

1/2" = 1'-0"

SCALE: 1/2"=1'

2' 0 2' 4'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
VINOD M. BADANI
C-041281
EXP. DATE 3/31/17
CIVIL
STATE OF CALIFORNIA

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB
0	04//05/13	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY: RAO

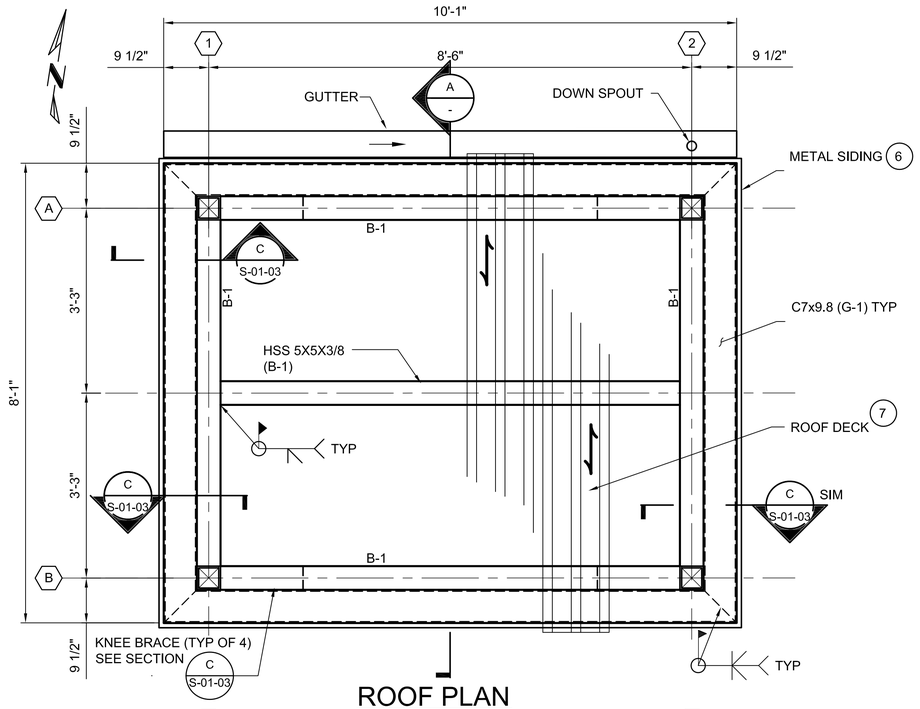
SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES: 1/2=1'-0"

TOPOCK GROUNDWATER REMEDIATION PROJECT
HNWR-1A FRESHWATER SUPPLY WELL
FOUNDATION PLAN AND SECTION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. S-01-01 of SHEETS
REV 1

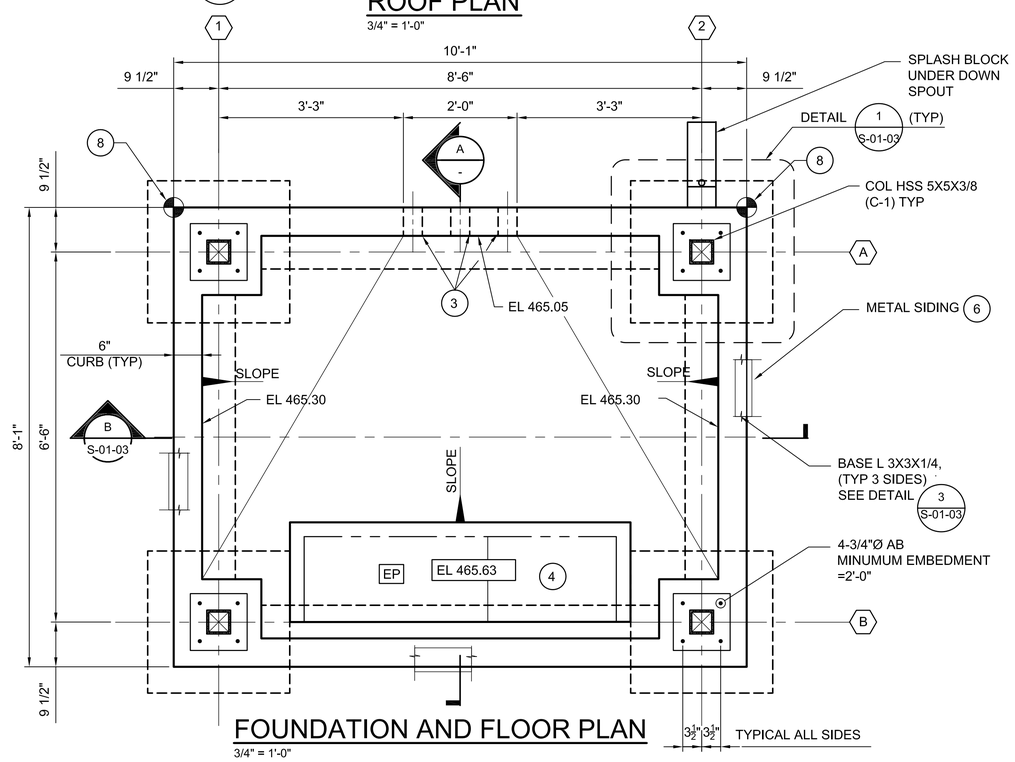
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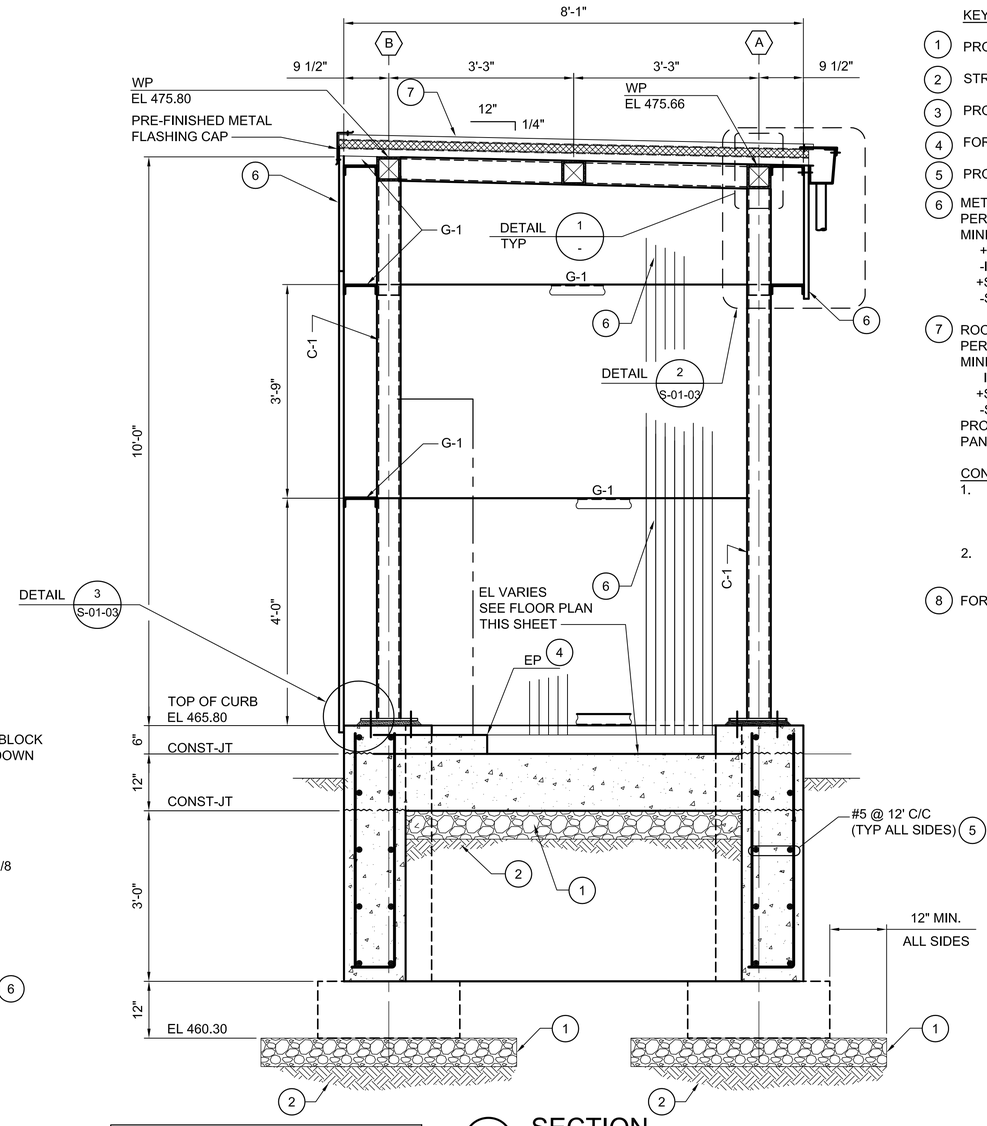
ROOF PLAN

3/4" = 1'-0"



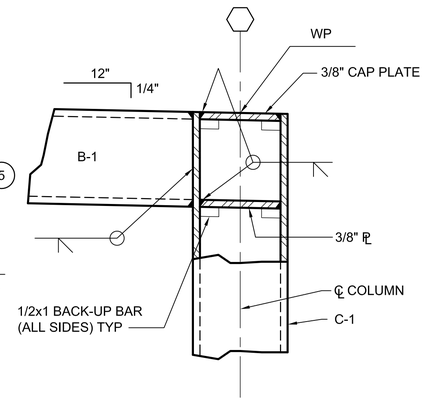
FOUNDATION AND FLOOR PLAN

3/4" = 1'-0"



A SECTION

3/4" = 1'-0"



1 DETAIL

3" = 1'-0"

KEY NOTES

1. PROVIDE 6" THICK CRUSHED ROCK
2. STRUCTURAL FILL ~ 95% COMPACTION PER ASTM D 1557
3. PROVIDE 3-4"Ø HALF ROUND PVC PIPE IN CURB FOR DRAINAGE
4. FOR EQUIPMENT PAD (EP) SEE DETAIL 10 ON DWG.S-00-02
5. PROVIDE CORNER REINFORCING PER DETAIL 5 ON DWG.S-00-02
6. METAL SIDING: 3/4" DEEP X 36" WIDE PANEL (6 RIBS @ 6" C/C PER PANEL) GALVANIZED. (24 GAUGE)
   MINIMUM PROPERTIES/LF OF WIDTH:
   $+I = 0.0323\ IN^4$
   $-I = 0.0220\ IN^3$
   $+S = 0.0592\ IN^3$
   $-S = 0.0538\ IN^3$
7. ROOF DECK: 1 1/2" DEEP X 36" WIDE PANEL (6 RIBS @ 6" C/C PER PANEL) GALVANIZED. (18 GAUGE)
   MINIMUM PROPERTIES/LF OF WIDTH:
   $I = 0.29\ IN^4/LF$
   $+S = 0.315\ IN^3/LF$
   $-S = 0.316\ IN^3/LF$
   PROVIDE 2" RIGID INSULATION AND STANDING SEAM ROOF PANELS.

   CONNECTION:
   1. USE #2 GALVANIZED SCREWS OR 1/2"Ø PUDDLE WELDS AT 6" C/C (6 PER SHEET MIN. FOR 36" WIDE PANELS) TO ATTACH ROOF DECK TO SUPPORTING MEMBERS.
   2. USE # 2 GALVANIZED SCREWS @ 12" C/C FOR SIDE CONNECTIONS.
8. FOR COORDINATES, SEE DWG. C-01-01.

DESIGN LOADS

1. WIND LOADS

   DESIGN HORIZONTAL WIND LOADS ON VERTICAL SURFACES:

   20 PSF (MINIMUM)
   BASIC WIND SPEED: 100 MPH
   IMPORTANCE FACTOR: 1.25

2. SEISMIC LOADS

   CBC, 2013 SITE CLASS: D
   SEISMIC DESIGN CATEGORY: D

   $S_S = 0.230$
   $S_1 = 0.120$
   $S_{MS} = 0.368$
   $S_{M1} = 0.279$
   $S_{DS} = 0.245$
   $S_{D1} = 0.168$

   IMPORTANCE FACTOR: 1.25

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER VINOD M. BADANI C-041281 EXP. DATE 3/31/17 CIVIL STATE OF CALIFORNIA

1' 0 1' 2'

SCALE: 3/4"=1'-0"

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

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0	04/05/13	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	MD

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

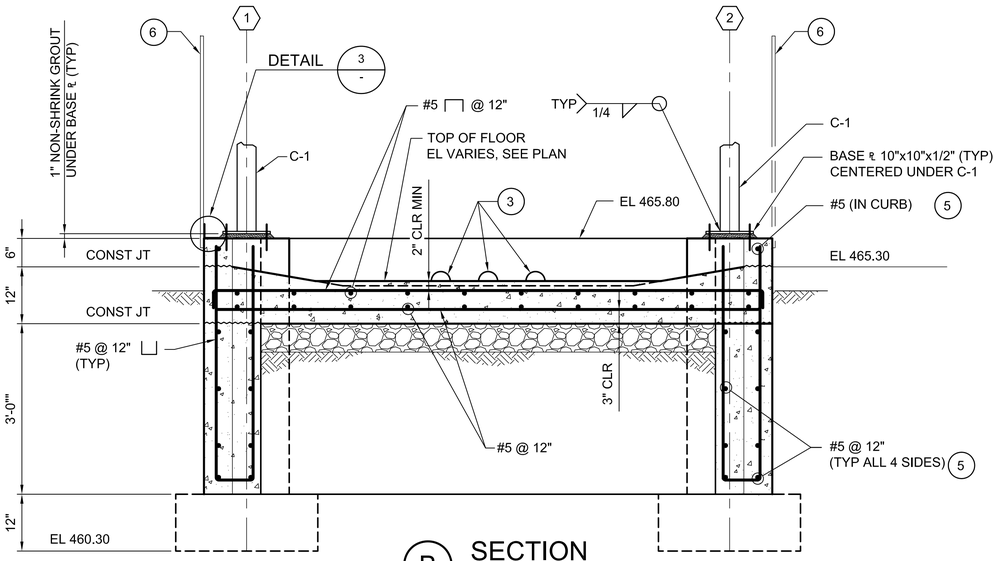
AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT
HNWR-1A FRESHWATER SUPPLY WELL ELECTRICAL PAD
FLOOR & ROOF PLAN AND SECTIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
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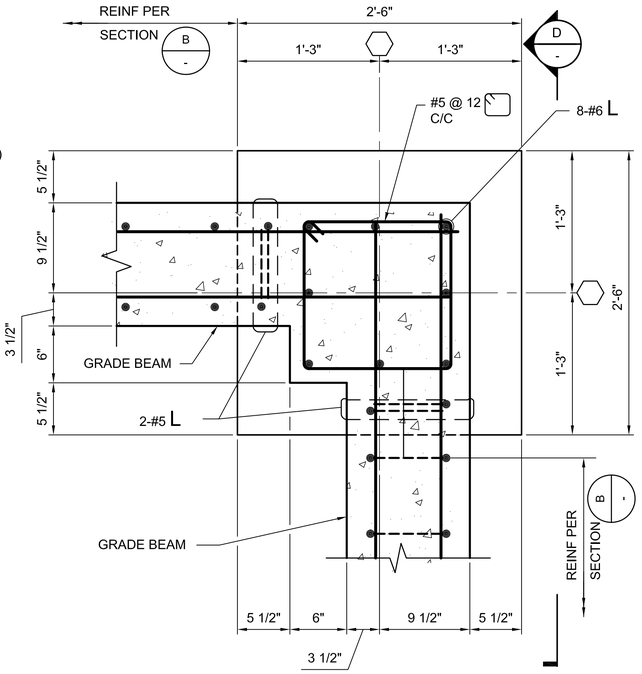
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-01-02	REV 1

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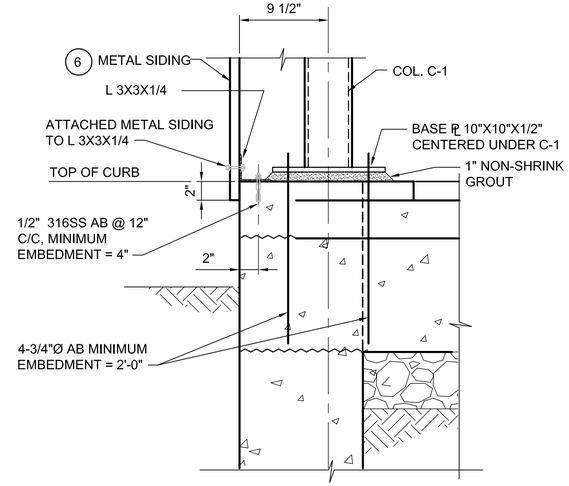


B SECTION
3/4" = 1'-0"
S-01-02

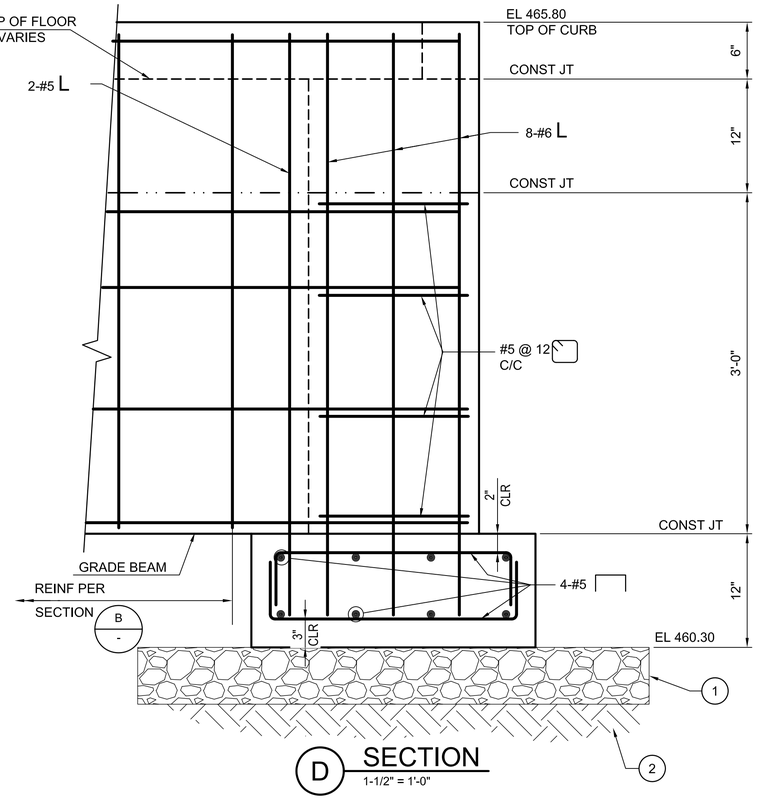


1 DETAIL
1-1/2" = 1'-0"
S-01-02

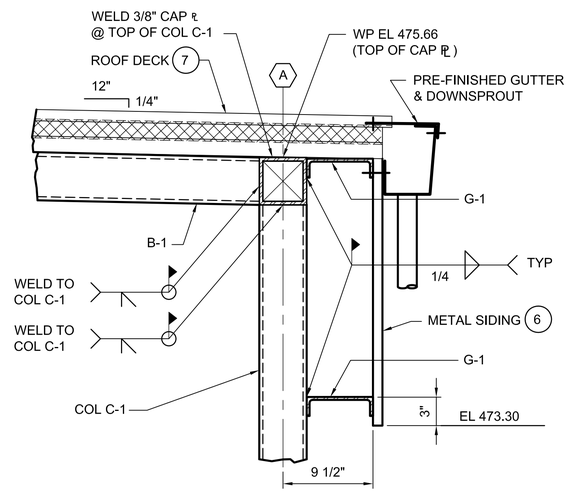
FOR KEY NOTES, SEE SHEET S-01-02



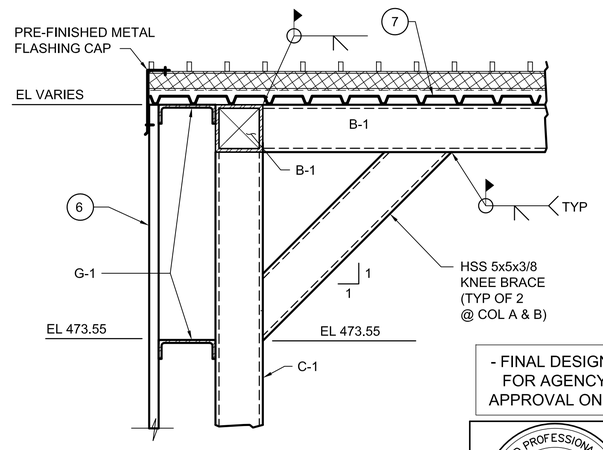
3 DETAIL
1-1/2" = 1'-0"
S-01-02



D SECTION
1-1/2" = 1'-0"



2 DETAIL
1-1/2" = 1'-0"
S-01-02



C SECTION
1-1/2" = 1'-0"
S-01-02

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REVISIONS

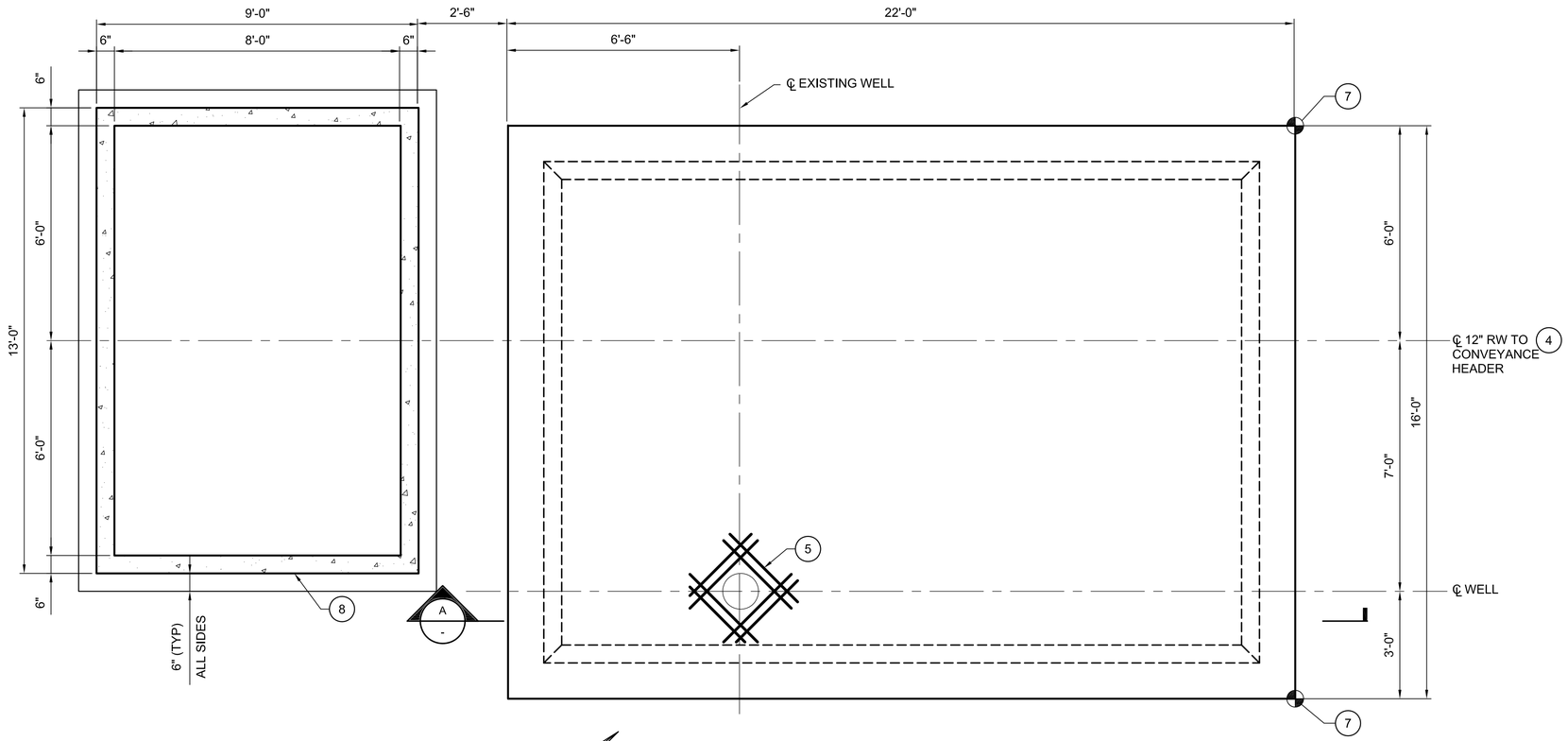
APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
SCALES	AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT
HNWR-1A FRESHWATER SUPPLY WELL ELECTRICAL PAD SECTIONS AND DETAILS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-01-03	REV 1

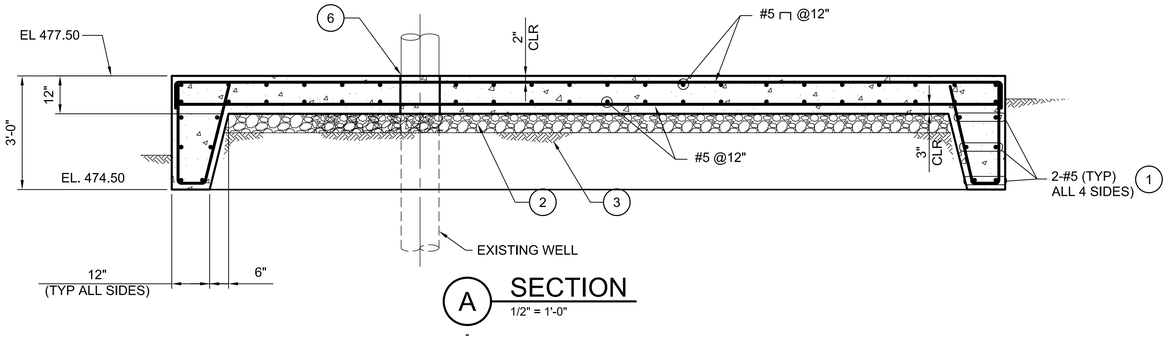
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N1808



FOUNDATION AND FLOOR PLAN

1/2" = 1'-0"



A SECTION

1/2" = 1'-0"

KEY NOTES

1. PROVIDE CORNER REINFORCING PER DETAIL 5 ON DWG. S-00-02
2. 6" THICK, CRUSHED ROCK.
3. STRUCTURAL FILL, 95% COMPACTION (MIN) PER ASTM D 1557
4. FOR PIPE SUPPORTS, SEE DWG M-01-02
5. PROVIDE ADDITIONAL REINFORCING PER DETAIL 4 ON DWG. S-00-02
6. PROVIDE 1/2" EXPANSION JOINT MATERIAL AROUND EXISTING WELL W/ 1/2"x1/2" JOINT SEALANT AT TOP
7. FOR COORDINATES, SEE DWG. C-01-01.
8. SAND COLLECTION SYSTEM, SEE DWG. S-01-07.

CONTINGENT

NOTE:

THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

2' 0 2' 4'

SCALE: 1/2"=1'

REGISTERED PROFESSIONAL ENGINEER — VINOD M. BADANI — C-041281 — EXP. DATE 3/31/17 — CIVIL — STATE OF CALIFORNIA

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES 1/2=1'-0"

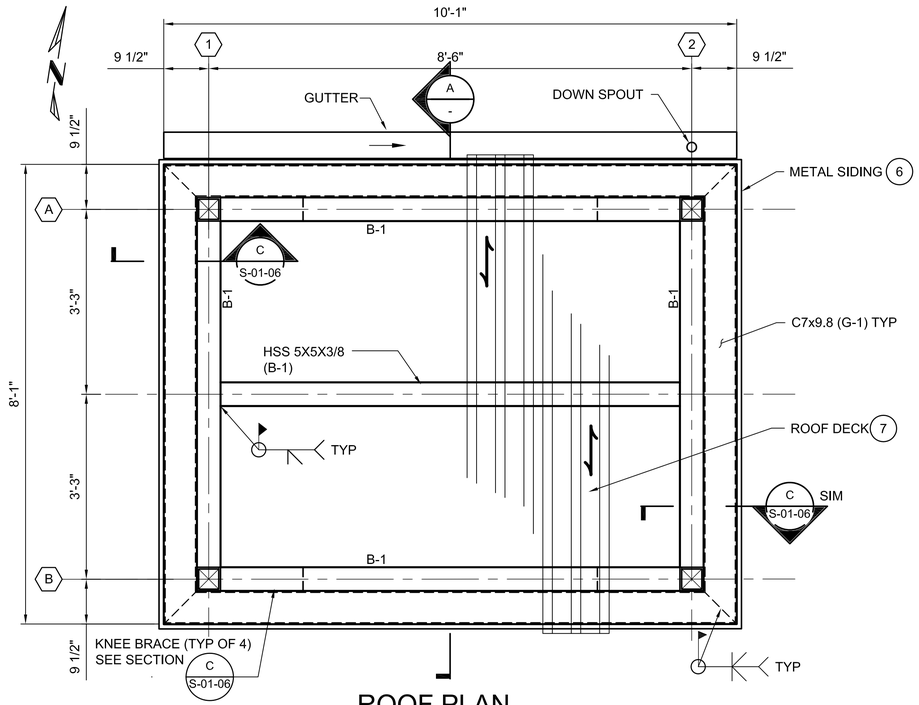
TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL SITE B
FOUNDATION PLAN AND SECTION

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-01-04	REV 0

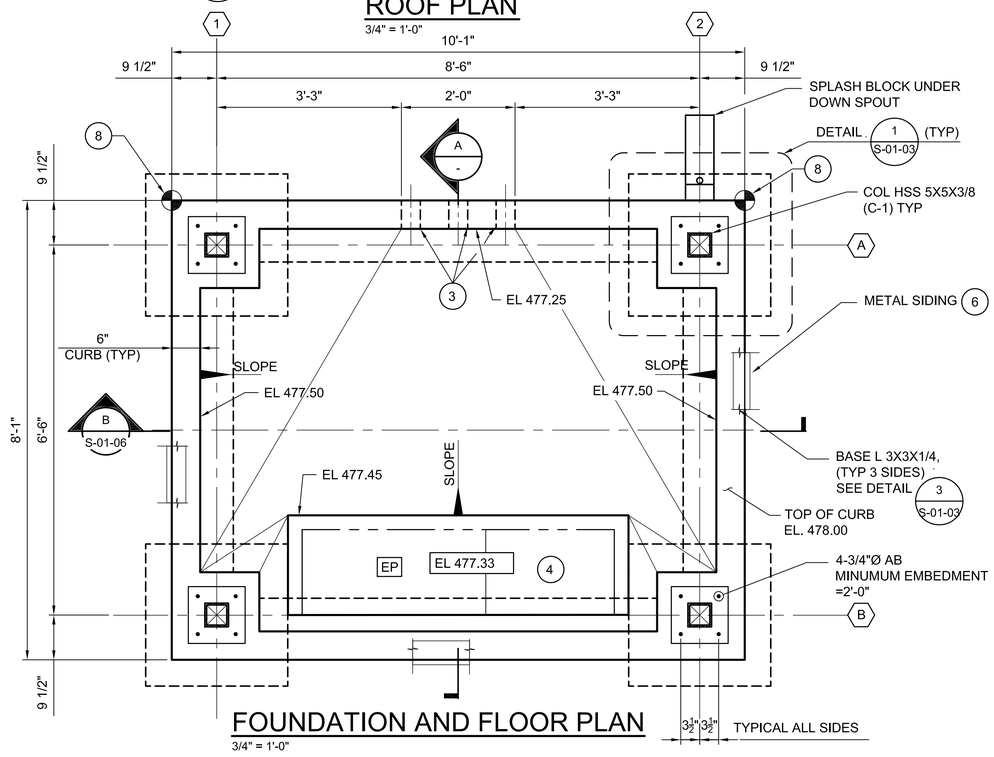
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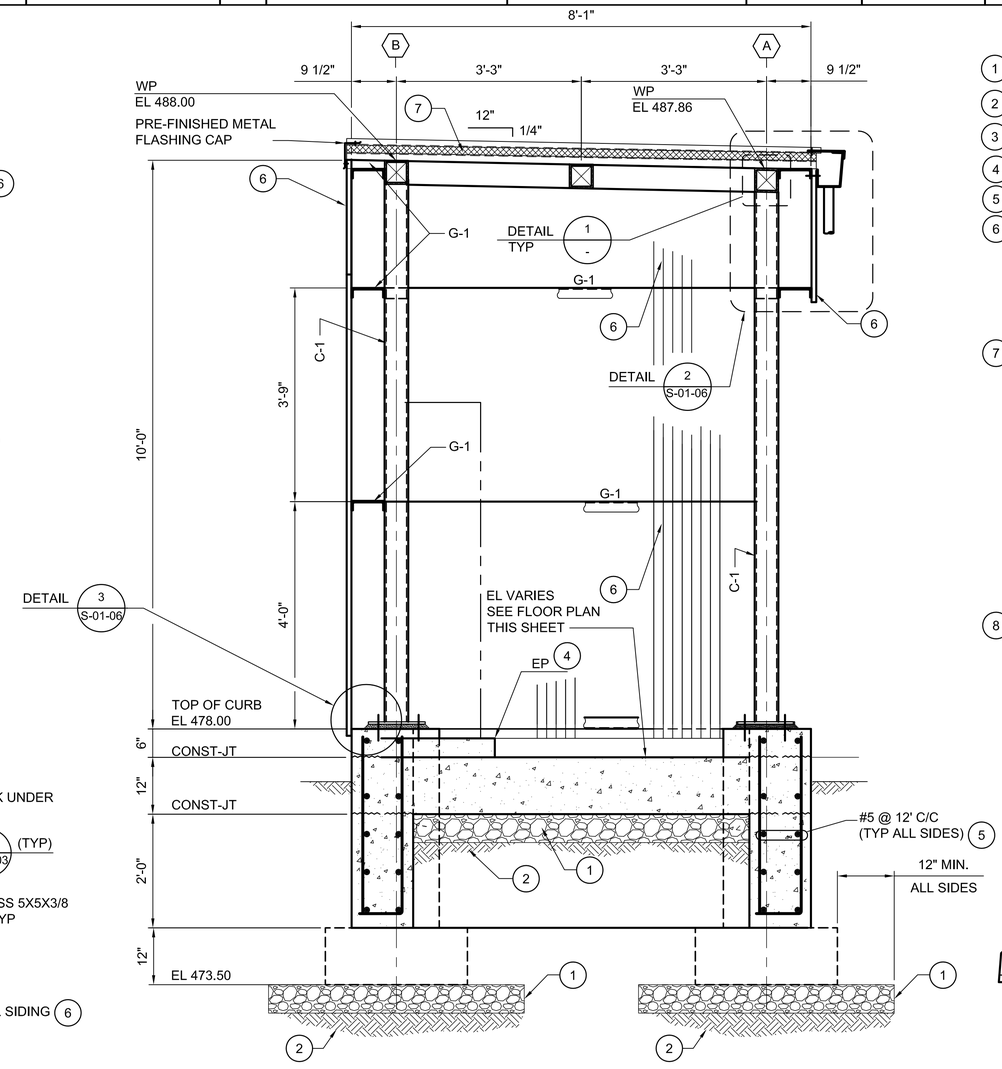
ROOF PLAN

3/4" = 1'-0"



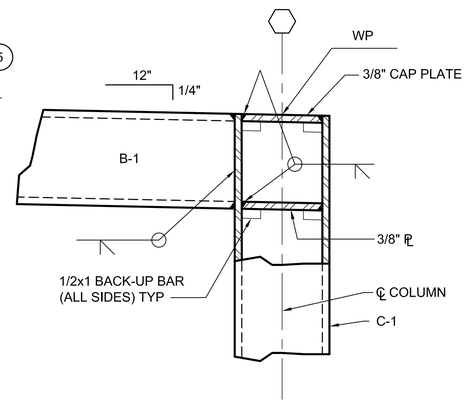
FOUNDATION AND FLOOR PLAN

3/4" = 1'-0"



A SECTION

3/4" = 1'-0"



1 DETAIL

3" = 1'-0"

KEY NOTES

1. PROVIDE 6" THICK, CRUSHED ROCK
2. STRUCTURAL FILL ~ 95% COMPACTION PER ASTM D 1557
3. PROVIDE 3-4"Ø HALF ROUND PVC PIPE IN CURB FOR DRAINAGE
4. FOR EQUIPMENT PAD (EP) SEE DETAIL 10 ON DWG.S-00-02
5. PROVIDE CORNER REINFORCING PER DETAIL 5 ON DWG. S-00-02
6. METAL SIDING: 3/4" DEEP X 36" WIDE PANEL (6 RIBS @ 6" C/C PER PANEL) GALVANIZED. (24 GAUGE)
   MINIMUM PROPERTIES/LF OF WIDTH:
   +I = 0.0323 IN^4
   -I = 0.0220 IN^3
   +S = 0.0592 IN^3
   -S = 0.0538 IN^3
7. ROOF DECK: 1 1/2" DEEP X 36" WIDE PANEL (6 RIBS @ 6" C/C PER PANEL) GALVANIZED. (18 GAUGE)
   MINIMUM PROPERTIES/LF OF WIDTH:
   I = 0.29 IN^4/LF
   +S = 0.315 IN^3/LF
   -S = 0.316 IN^3/LF
   PROVIDE 2" RIGID INSULATION AND STANDING SEAM ROOF PANELS.

   CONNECTION:
   1. USE #2 GALVANIZED SCREWS OR 1/2"Ø PUDDLE WELDS AT 6" C/C (6 PER SHEET MIN. FOR 36" WIDE PANELS) TO ATTACH ROOF DECK TO SUPPORTING MEMBERS.
   2. USE # 2 GALVANIZED SCREWS @ 12" C/C FOR SIDE I CONNECTIONS.
8. FOR COORDINATES, SEE DWG. C-01-02.

DESIGN LOADS

1. WIND LOADS
   DESIGN HORIZONTAL WIND LOADS ON VERTICAL SURFACES:
   20 PSF (MINIMUM)
   BASIC WIND SPEED: 100 MPH
   IMPORTANCE FACTOR: 1.25
2. SEISMIC LOADS
   CBC, 2013 SITE CLASS: D
   SEISMIC DESIGN CATEGORY: D
   S_S = 0.230
   S_1 = 0.120
   S_{MS} = 0.368
   S_{M1} = 0.279
   S_{DS} = 0.245
   S_{D1} = 0.168
   IMPORTANCE FACTOR: 1.25

CONTINGENT

NOTE:

THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

SCALE: 3/4"=1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER VINOD M. BADANI C-041281 EXP. DATE 3/31/17 CIVIL STATE OF CALIFORNIA

E2-S-XXX-0101AD.dwg

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
0	09/08/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB

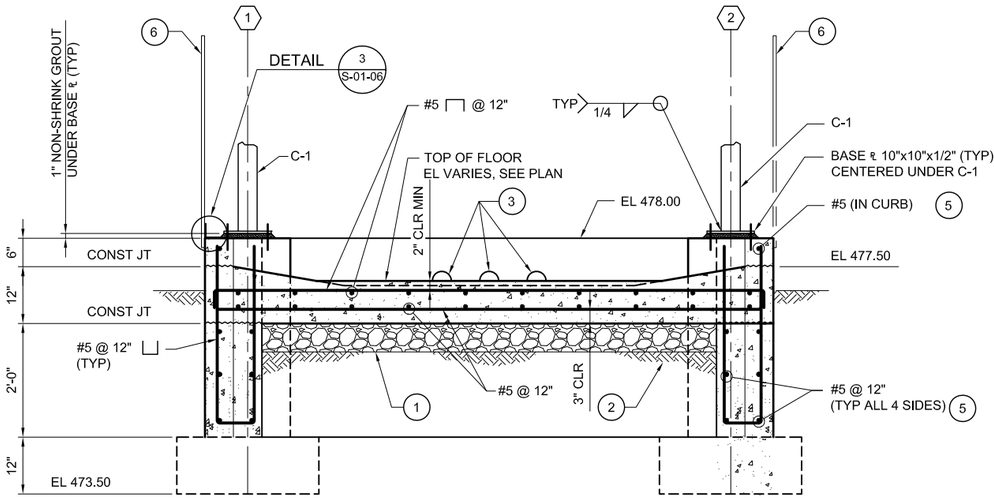
REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES
	AS NOTED

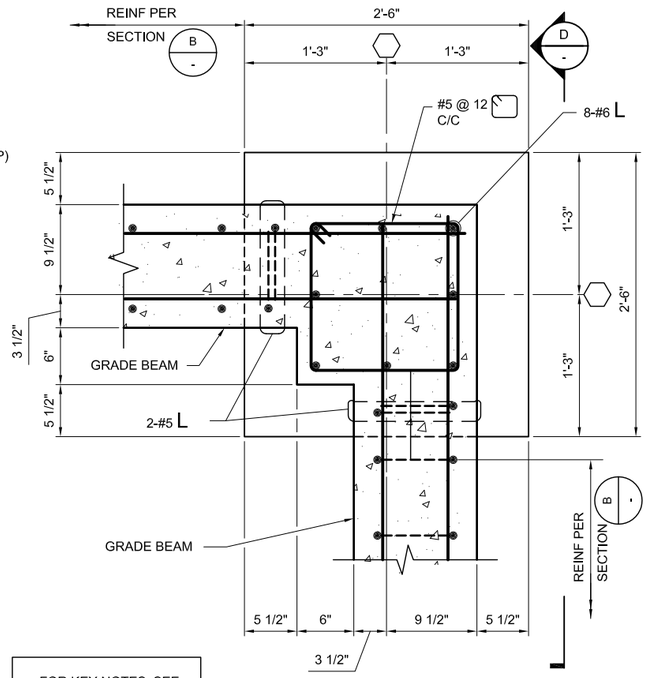
TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL SITE B
ELECTRICAL PAD
FLOOR & ROOF PLAN AND SECTION
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-01-05	REV 0

N180B

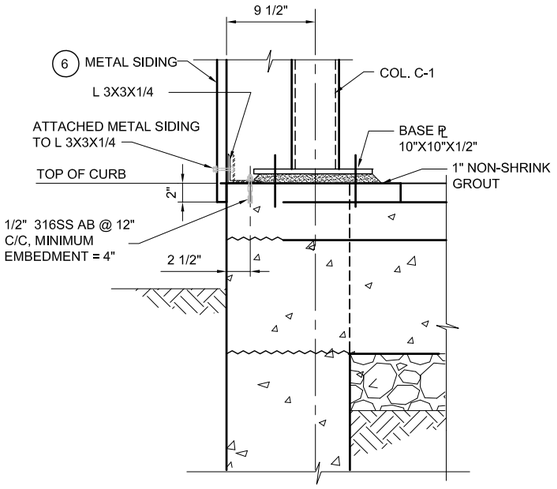


B SECTION
3/4" = 1'-0"
S-01-05



FOR KEY NOTES, SEE SHEET S-01-05

1 DETAIL
1-1/2" = 1'-0"
S-01-05

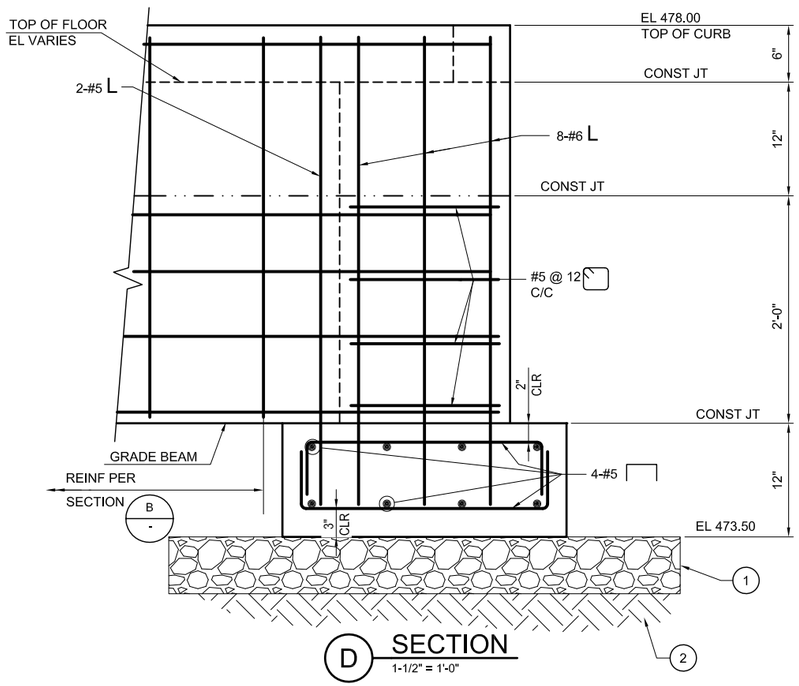


3 DETAIL
1-1/2" = 1'-0"
S-01-05

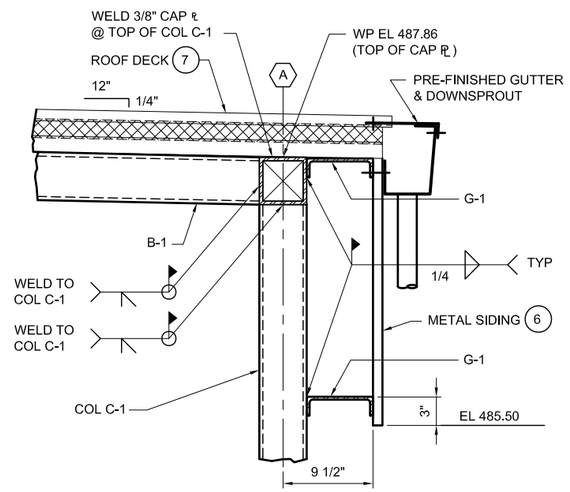
CONTINGENT

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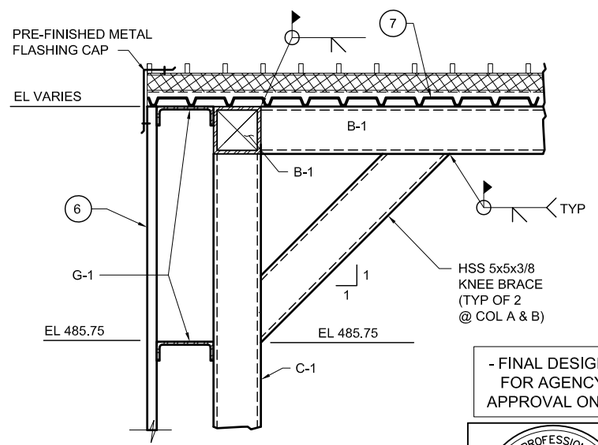
THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.



D SECTION
1-1/2" = 1'-0"



2 DETAIL
1-1/2" = 1'-0"
S-01-05



C SECTION
1-1/2" = 1'-0"
S-01-05

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER VINOD M. BADANI C-041281 EXP. DATE 3/31/17 CIVIL STATE OF CALIFORNIA

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
0	09/08/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

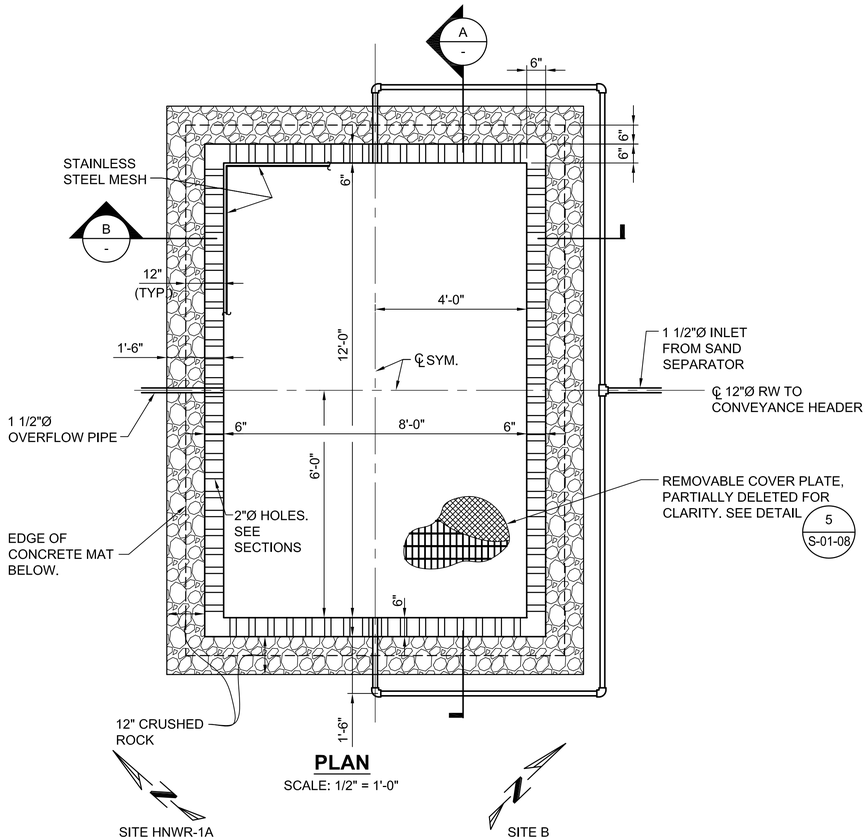
APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL SITE B ELECTRICAL PAD SECTIONS AND DETAILS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-01-06	REV 0

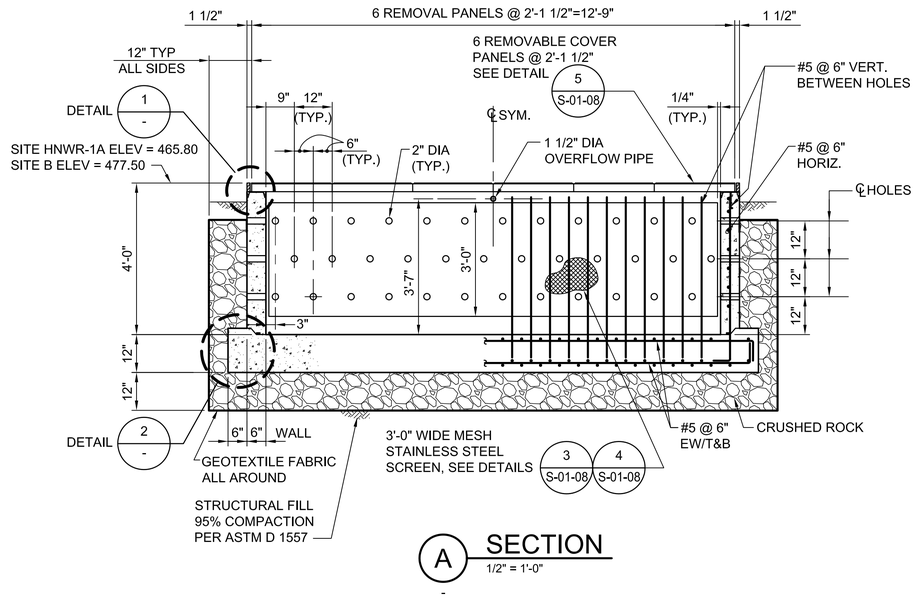
E2-S-XXX-0101AD.dwg

N1808



PLAN

SCALE: 1/2" = 1'-0"



A SECTION

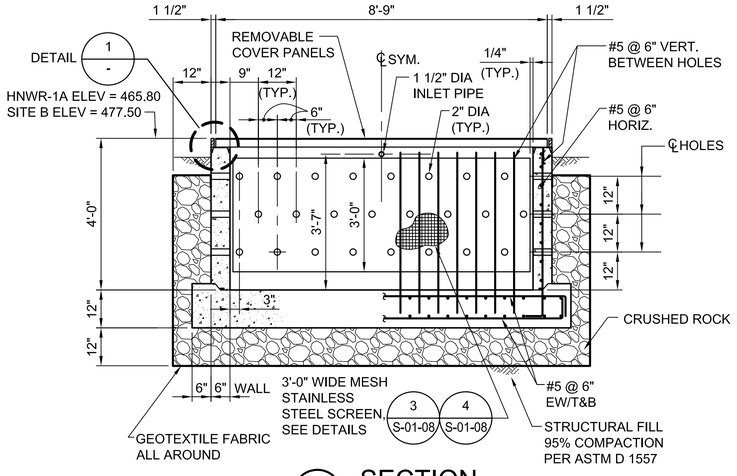
1/2" = 1'-0"

-

CONTINGENT

NOTE:

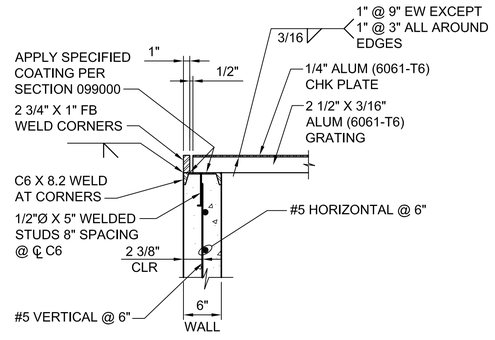
EQUIPMENT AND FACILITY SHOWN FOR SITE B IS A PART OF CONTINGENT SYSTEM AND MAY NOT BE CONSTRUCTED IN FUTURE.



B SECTION

1/2" = 1'-0"

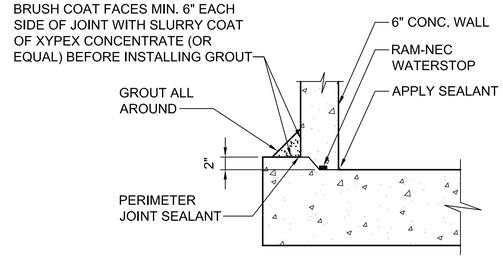
-



1 DETAIL

1" = 1'-0"

-



2 DETAIL

1" = 1'-0"

-

- DRAFT -
NOT FOR
CONSTRUCTION

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	9/8/14	PRE-FINAL (90%) DESIGN		PH	VMB	VMB	VMB

REVISIONS

APPROVED BY		
	SO	
	SUPV	VMB
	DSGN	PT/KJ
	DWN	PH
	CHKD	VMB
	OK	VMB
	DATE	09/08/14
	SCALES	AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER WELL SAND COLLECTION SYSTEM PLAN, SECTIONS AND DETAILS

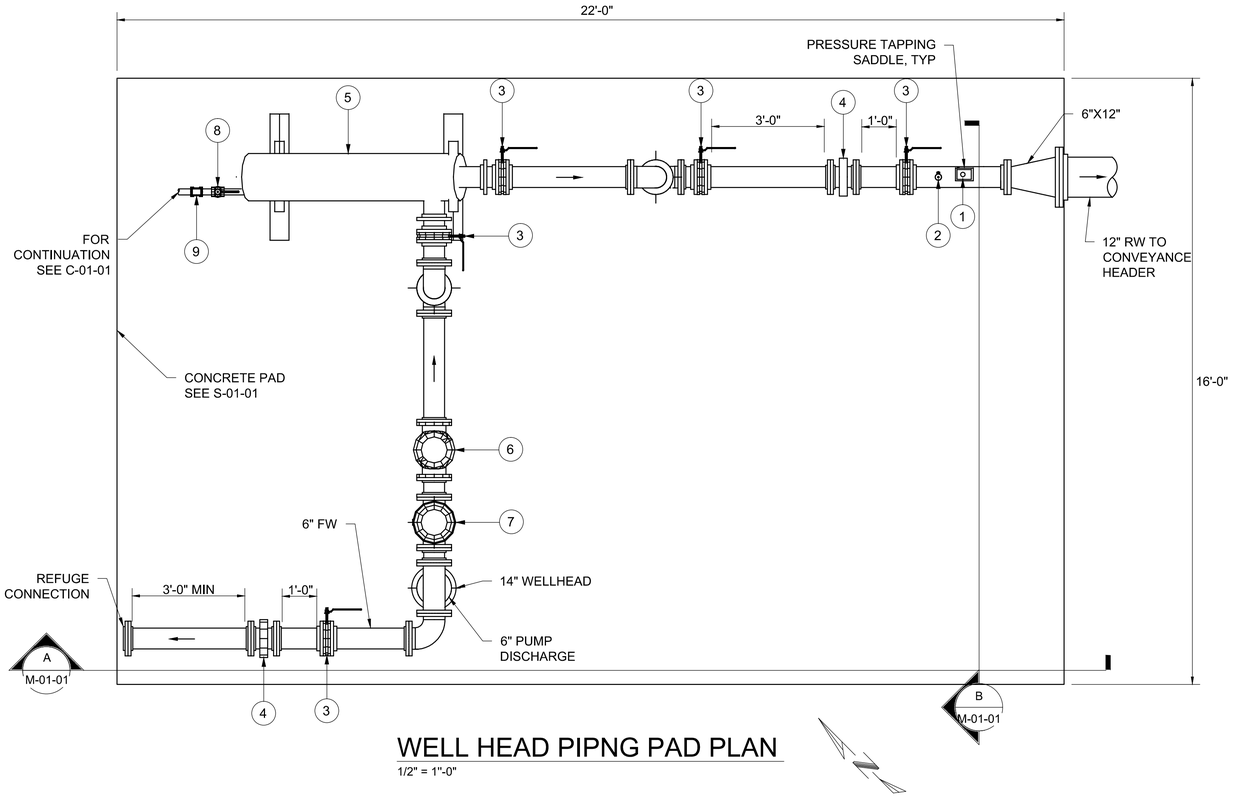
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-01-07	REV 0

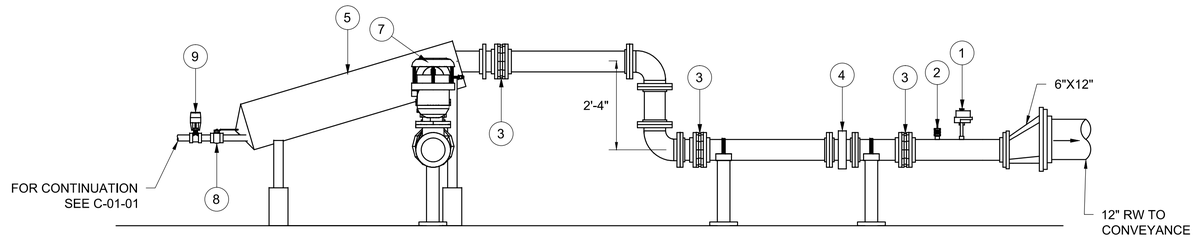
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N180B



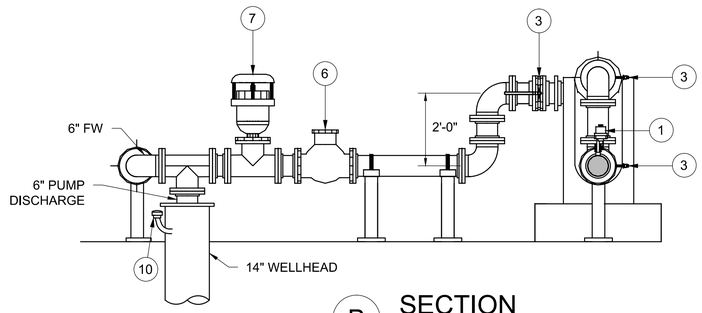
WELL HEAD PIPNG PAD PLAN

1/2" = 1'-0"



A M-01-01 SECTION

1/2"=1'-0"



B M-01-01 SECTION

1/2"=1'-0"

LEGEND

(1) REFERENCE ITEM # IN WELL HEAD PIPING PAD SCHEDULE BELOW.

NOTES:

1. LAKOS SEPARATOR MODEL IHB-0500 (GROOVED JOINTS). PROVIDE 1 1/2" BRONZE COMPACT MOTORIZED BALL VALVE FOR PURGE LINE. VALVE SHALL HAVE OPERATOR ADJUSTABLE SETTINGS FOR PURGE FRQUENCY AND DURATION. ELECTRIC ACTUATOR (120V) SHALL HAVE NEMA 4 HOUSING SUITABLE FOR OUTDOOR INSTALLATION. INSTALL PIPE SUPPORT FOR VALVE.
2. SEE SHEET M-00-01 FOR PIPE SUPPORTS.
3. SET WELL PUMP AT DEPTH OF 154 FEET. WELL PUMP SHALL BE GRUNDFOS 800S1000 OR APPROVED EQUAL. DROP PIPE SHALL BE ASTM A53 GR B, SCH 40 OR API 5CT J55 OR BETTER. NPT ENDS WITH API OR EQUAL COUPLINGS. WELLHEAD SEAL/FLANGE SHALL BE FURNISHED WITH PRE-CUT HOLES FOR DROP PIPE (6"), 1" STILLING WELL, 1" AND 3" NPT SPARE, AND 1" FOR PUMP CABLES. CONTRACTOR SHALL FURNISH STILLING WELL WITH SCH 40 PVC PIPE SECURED TO PUMP DROP PIPE WITH DRILLERS TAPE. STILLING WELL SHALL EXTEND TO 120 FEET DEEP. CONTRACTOR SHALL FURNISH THREADED END CAPS ON EACH OF THE PORTS WITH 2" NIPPLES EXCEPT FOR THE PUMP CABLES AND PUMP DROP PIPE.
4. EQUIPMENT TAGS SHOWN ARE UNIQUELY IDENTIFIED WITH THE ADDITION OF THE LOCATION ID CODE OF "HNWR1A" BEFORE THE NUMERIC CODE.

WELL HEAD PIPING PAD SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	TBD	TBD	FRESH WATER	1	PRESSURE TRANSMITTER	PIT-*0161
2	1/4"	TBD	FRESH WATER	1	SAMPLE PORT	SP-*0161B
3	6"	TBD	FRESH WATER	1	BUTTERFLY VALVE	V-*0110B/0161A/ 0171A/0172A
4	6"	TBD	FRESH WATER	1	MAGNETIC FLOW METER	FE-*0171/0172
5	NA	NA			SAND SEPARATOR	STR-*0110
6	6"	TBD	FRESH WATER	1	CHECK VALVE	V-*0110A
7	6"	TBD	FRESH WATER	1	AIR/VACUUM RELEASE ASSEMBLY	AVRV-*0111
8	1-1/2"	TBD	FRESH WATER	1	BALL VALVE	V-*0110E
9	1-1/2"	TBD	FRESH WATER	1	ACTUATED BALL VALVE	FV-*0110
10	2"	TBD			VENT CAP WITH SCREEN	

0 1 2 3

SCALE 1/2" 1

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer, Matthew Ross Militello, 47415, Arizona, U.S.A. Expires: 3/31/2017

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	MM	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LW	WF	JP	CH
0	09/2012	INTERMEDIATE (60%) DESIGN		DS	WF	JP	CH

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

HNWR-1A WELL HEAD PIPING AND ELECTRICAL PAD PLAN AND SECTIONS

GAS TRANSMISSION & DISTRIBUTION

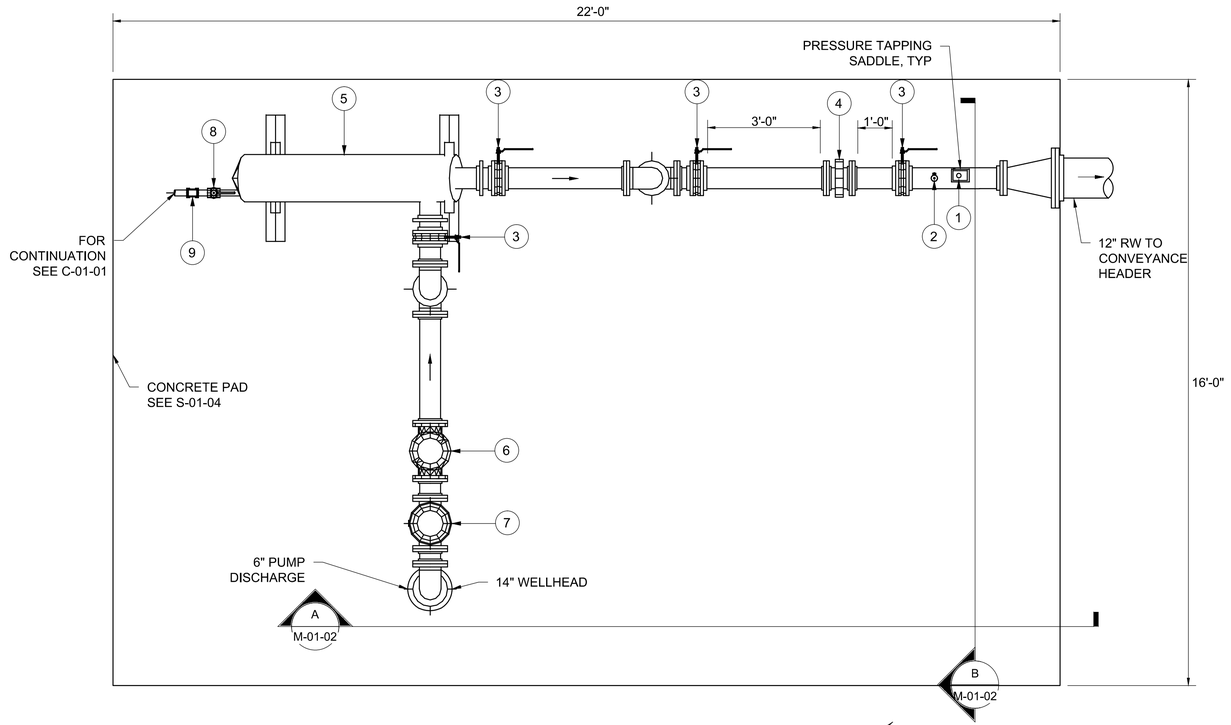
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-01-01	REV 2

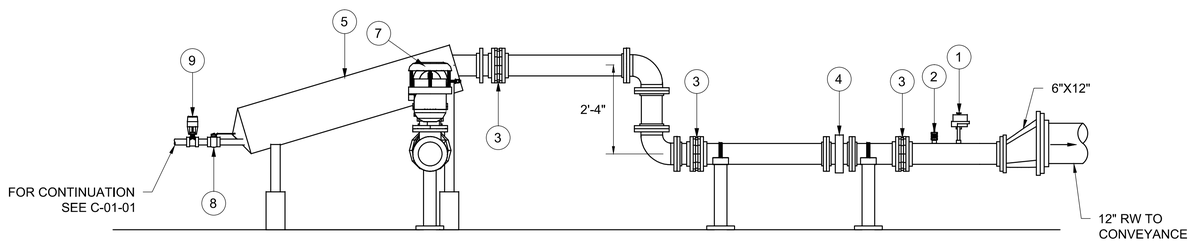
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N1808



WELL HEAD PIPNG PAD PLAN

1/2" = 1'-0"



A SECTION

1/2"=1'-0"

M-01-02

LEGEND

(1) REFERENCE ITEM # IN WELL HEAD PIPING PAD SCHEDULE BELOW.

NOTES:

1. LAKOS SEPARATOR MODEL IHB-0500 (GROOVED JOINTS). PROVIDE 1 1/2" BRONZE COMPACT MOTORIZED BALL VALVE FOR PURGE LINE. VALVE SHALL HAVE OPERATOR ADJUSTABLE SETTINGS FOR PURGE FRQUENCY AND DURATION. ELECTRIC ACTUATOR (120V) SHALL HAVE NEMA 4 HOUSING SUITABLE FOR OUTDOOR INSTALLATION. INSTALL PIPE SUPPORT FOR VALVE.
2. SEE SHEET M-00-01 FOR PIPE SUPPORTS.
3. SET WELL PUMP AT DEPTH OF 154 FEET. WELL PUMP SHALL BE GRUNDFOS 800S1000 OR APPROVED EQUAL. DROP PIPE SHALL BE ASTM A53 GR B, SCH 40 OR API 5CT J55 OR BETTER. NPT ENDS WITH API OR EQUAL COUPLINGS. WELLHEAD SEAL/FLANGE SHALL BE FURNISHED WITH PRE-CUT HOLES FOR DROP PIPE (6"), 1" STILLING WELL, 1" AND 3" NPT SPARE, AND 1" FOR PUMP CABLES. CONTRACTOR SHALL FURNISH STILLING WELL WITH SCH 40 PVC PIPE SECURED TO PUMP DROP PIPE WITH DRILLERS TAPE. STILLING WELL SHALL EXTEND TO 120 FEET DEEP. CONTRACTOR SHALL FURNISH THREADED END CAPS ON EACH OF THE PORTS WITH 2" NIPPLES EXCEPT FOR THE PUMP CABLES AND PUMP DROP PIPE.
4. EQUIPMENT TAGS SHOWN ARE UNIQUELY IDENTIFIED WITH THE ADDITION OF THE LOCATION ID CODE OF "HNWR1A" BEFORE THE NUMERIC CODE.

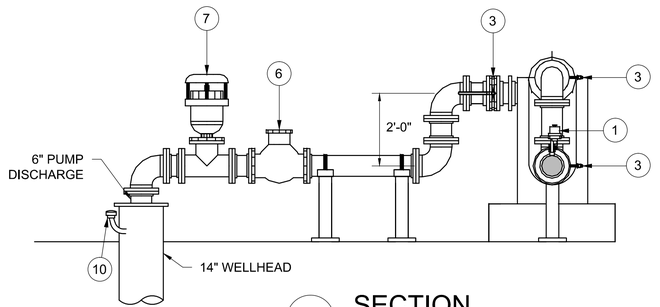
WELL HEAD PIPING PAD SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	TBD	TBD	FRESH WATER	1	PRESSURE TRANSMITTER	PIT-*0161
2	1/4"	TBD	FRESH WATER	1	SAMPLE PORT	SP-*0161B
3	6"	TBD	FRESH WATER	1	BUTTERFLY VALVE	V-*0161A/0171A/0110D
4	6"	TBD	FRESH WATER	1	MAGNETIC FLOW METER	FE-*0171
5	NA	NA			SAND SEPARATOR	STR-*0110
6	6"	TBD	FRESH WATER	1	CHECK VALVE	V-*0110C
7	6"	TBD	FRESH WATER	1	AIR/VACUUM RELEASE ASSEMBLY	AVRV-*0111
8	1-1/2"	TBD	FRESH WATER	1	BALL VALVE	V-*0110F
9	1-1/2"	TBD	FRESH WATER	1	ACTUATED BALL VALVE	FV-*0110
10	2"	TBD			VENT CAP WITH SCREEN	

CONTINGENT

NOTE:

1. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.



B SECTION

1/2"=1'-0"

M-01-02

SCALE 1/2" 1

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer 47418 MATTHEW ROSS MILITELLO Civil Arizona, U.S.A. 05/31/2017

Expires: 3/31/2017

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		LUK	KLD	MM	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		LW	WF	JP	CP

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

SITE B WELL HEAD PIPING PLAN AND SECTIONS

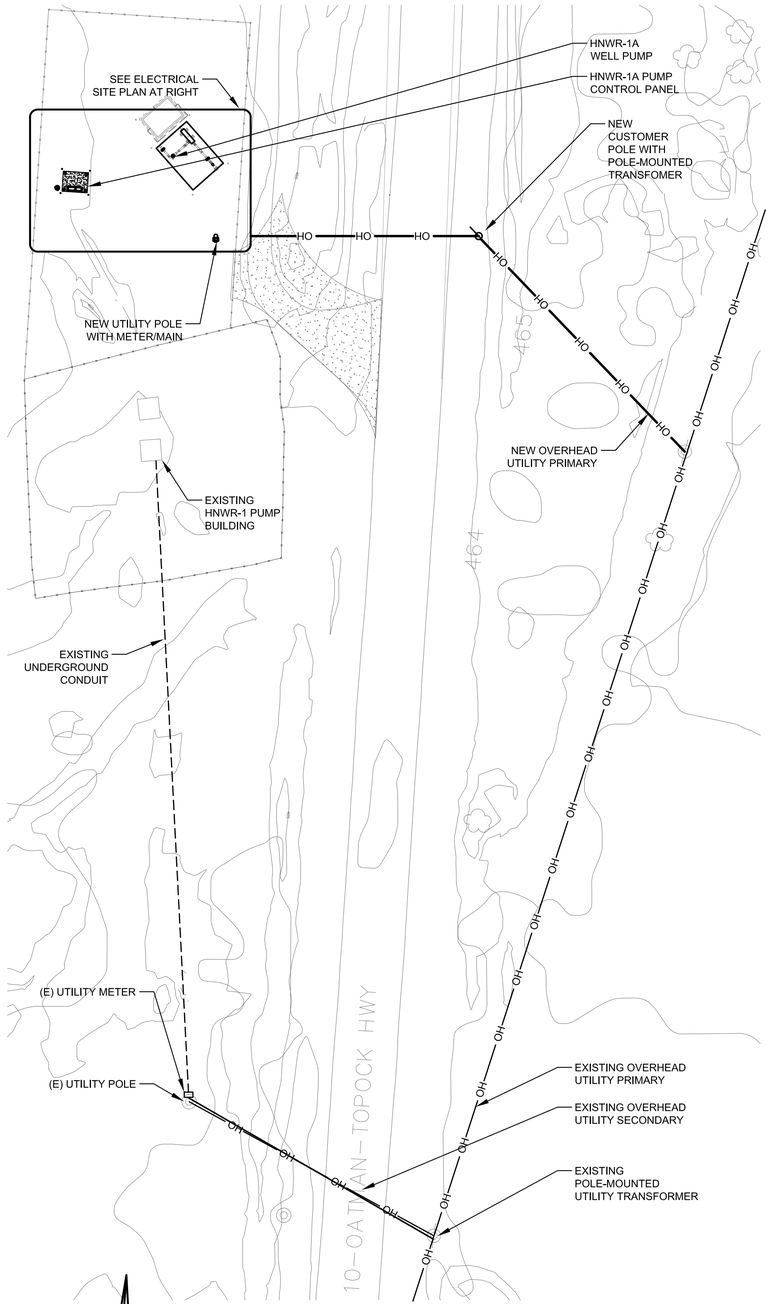
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. M-01-02 of SHEETS | REV 1

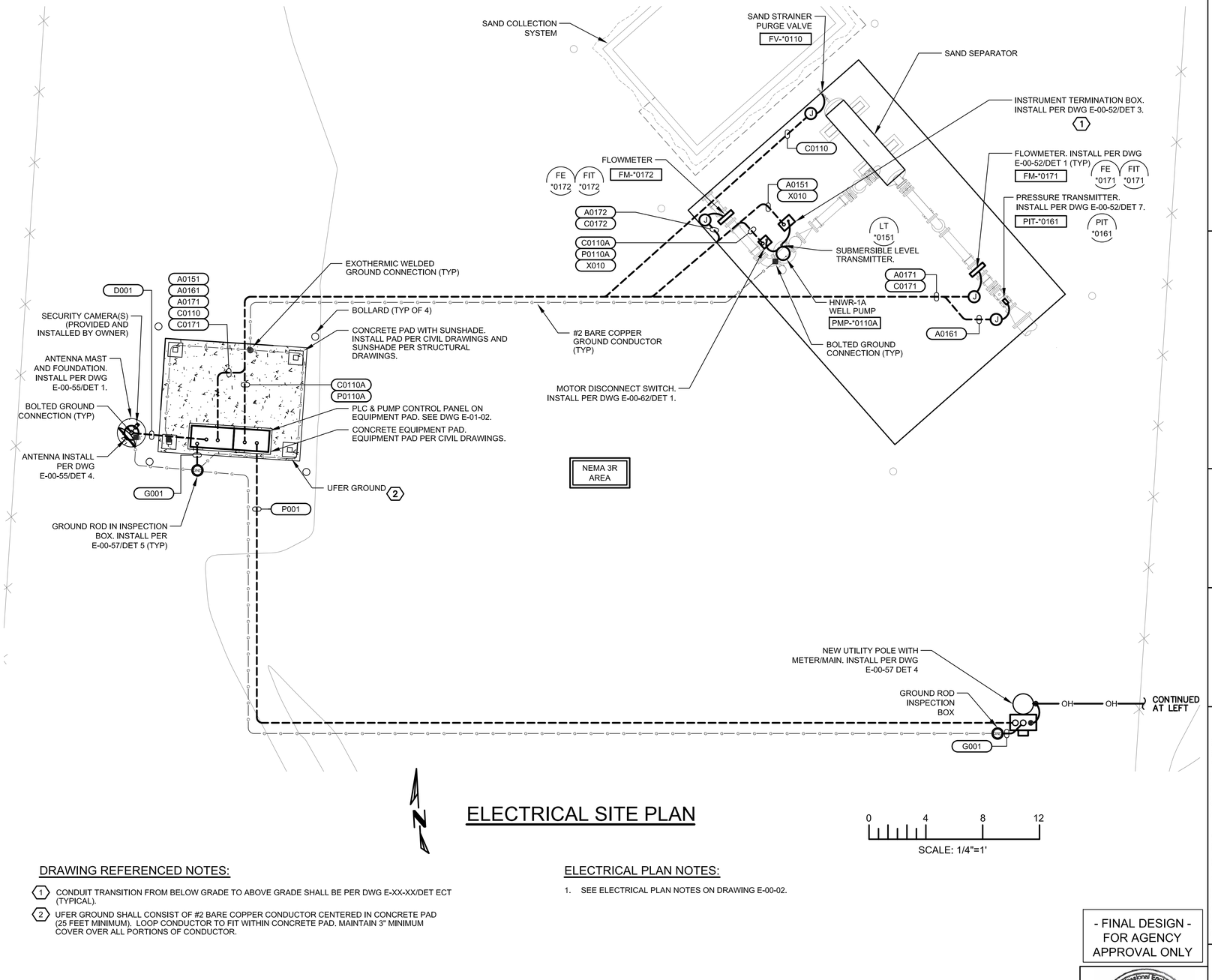
N1808



ELECTRICAL AREA PLAN

0 30 60 90

SCALE: 1"=30'



ELECTRICAL SITE PLAN

0 4 8 12

SCALE: 1/4"=1'

DRAWING REFERENCED NOTES:

1. CONDUIT TRANSITION FROM BELOW GRADE TO ABOVE GRADE SHALL BE PER DWG E-XX-XX/DET ECT (TYPICAL).
2. UFER GROUND SHALL CONSIST OF #2 BARE COPPER CONDUCTOR CENTERED IN CONCRETE PAD (25 FEET MINIMUM). LOOP CONDUCTOR TO FIT WITHIN CONCRETE PAD. MAINTAIN 3" MINIMUM COVER OVER ALL PORTIONS OF CONDUCTOR.

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer (Electrical) CERTIFICATE NO. 59617 JOHN M. SIDOTI DATE SIGNED 10/29/15 ARIZONA U.S.A.

Exp. 3-31-18

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

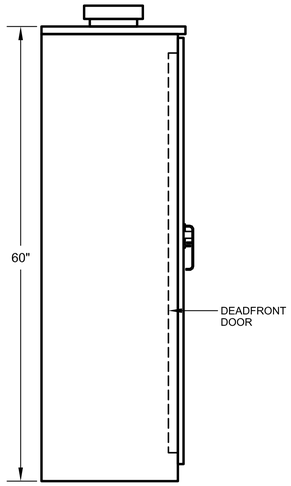
APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

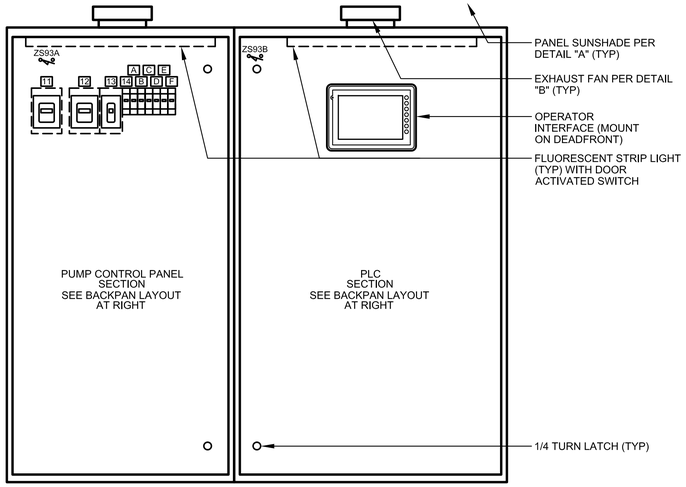
TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (HNWR-1A) ELECTRICAL SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-01	REV 1

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PLOT DATE: Oct 29, 2015 PLOT TIME: 3:50:56pm
N1808



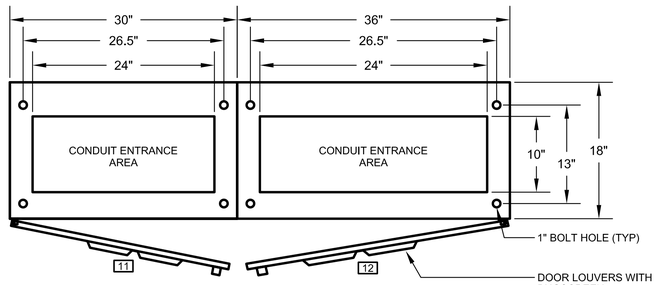
SIDE ELEVATION



1 FRONT ELEVATION

OUTER DOORS REMOVED FOR CLARITY

PEDESTAL ELEVATION



TOP VIEW

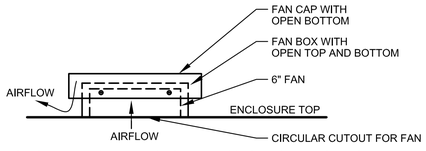
PEDESTAL BASE PLAN

PEDESTAL FABRICATION METHODS

1. NEMA 3R WEATHER-PROOF FOR OUTDOOR INSTALLATION.
2. OUTER DOORS SHALL BE SEALED WITH RUBBERIZED FOAM GASKET.
3. EXTERIOR FABRICATED FROM STAINLESS STEEL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
6. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCHES.
7. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE STAINLESS STEEL.
10. POWER METERING SHALL PER USERC AND SERVING UTILITY'S REQUIREMENTS.
11. PAINT APPLICATION SHALL BE AS FOLLOWS:
    - A. TWO STAGE CHEMICAL BATH CLEANING.
    - B. ELECTROSTATICALLY APPLIED POWDER COAT PAINT FINISH.
    - C. OVEN CURED FOR TWO HOURS.
    - D. INTERIOR DEADFRONT DOOR COLOR: WHITE.
    - E. EXTERIOR COLOR SHALL BE: AUTUMN WHITE
12. PHENOLIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL OUTER DOOR SECTIONS AND DEVICES ON DEADFRONT.
13. FABRICATION AND WIRING SHALL CONFORM TO UL, NEC AND NEMA STANDARDS.
14. ALL WIRING SHALL BE LABELLED ON BOTH ENDS OF WIRE.
15. AS-BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH PANEL.
16. PROVIDE DRAWING POCKET ON INSIDE OF CONTROL PANEL DOOR.
17. UPS SHELF SHALL BE 14 GA WELDED STEEL BOLTED TO BACKPAN.

DRAWING REFERENCED NOTES:

1. ITEMS DRAWN IN DASHED LINES ARE TO BE LOCATED BEHIND DEADFRONT DOORS OUTER DOORS ARE NOT SHOWN ON FRONT VIEWS FOR ELEVATION CLARITY
2. PROVIDE METER PER SERVING UTILITY REQUIREMENTS.

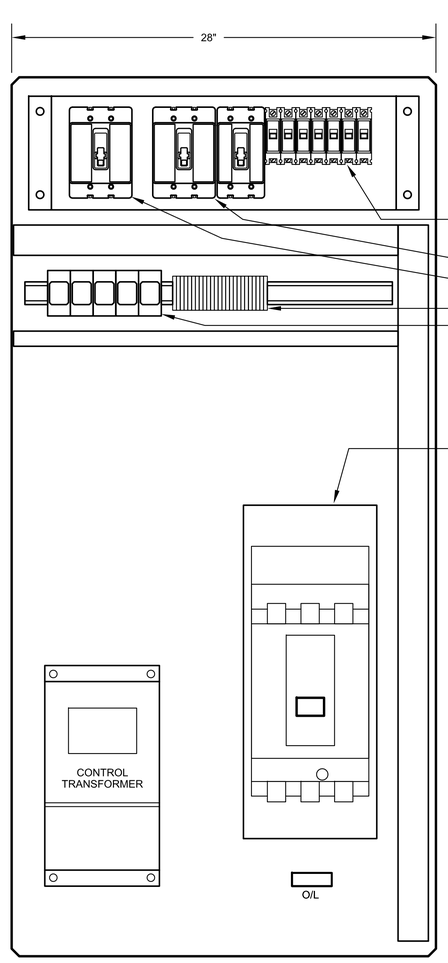


NOTES:
1. FAN CAP AND BOX SHALL BE CONSTRUCTED FROM 14GA GALVANIZED STEEL AND PAINTED WITH CONTROL PANEL.
2. PROVIDE CIRCULAR CUTOUT IN TOP OF ENCLOSURE. SEAL FAN BOX TO ENCLOSURE WITH SILICONE SEALANT.

EXHAUST FAN

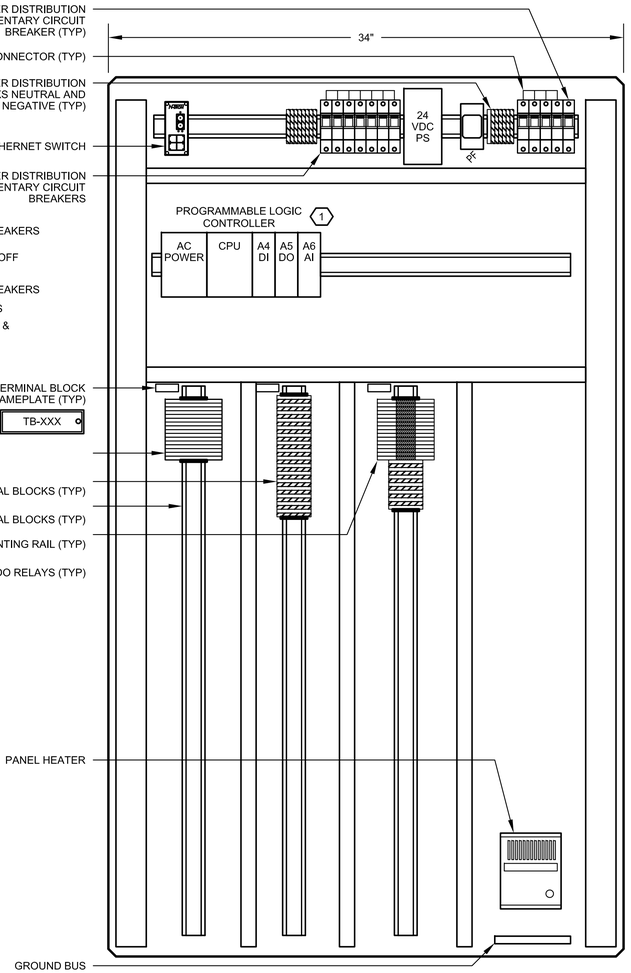
B DETAIL

NTS



PUMP CONTROL PANEL BACKPAN LAYOUT

NAMEPLATE SCHEDULE			
KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
11	MAIN	DISCONNECT	3/16"
12	PUMP	DISCONNECT	3/16"
13	TRANSFORMER	DISCONNECT	3/16"
14	PANEL LP	DISCONNECT	3/16"
A	RTU	DISCONNECT	3/16"
B	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
C	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
D	MOTOR CONTROL		3/16"
E	SPARE BREAKER		3/16"
F	SPARE BREAKER		3/16"



PLC PANEL BACKPAN LAYOUT

1. WIRE I/O TO TERMINAL BLOCK PER EXAMPLE I/O WIRING DIAGRAMS.
2. RUN #12 GROUND WIRE DIRECT TO GROUND BUS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer (Electrical) CERTIFICATE NO. 59617 JOHN M. SIDOTI 10/29/15 STATE OF ARIZONA U.S.A.

Exp. 3-31-18

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

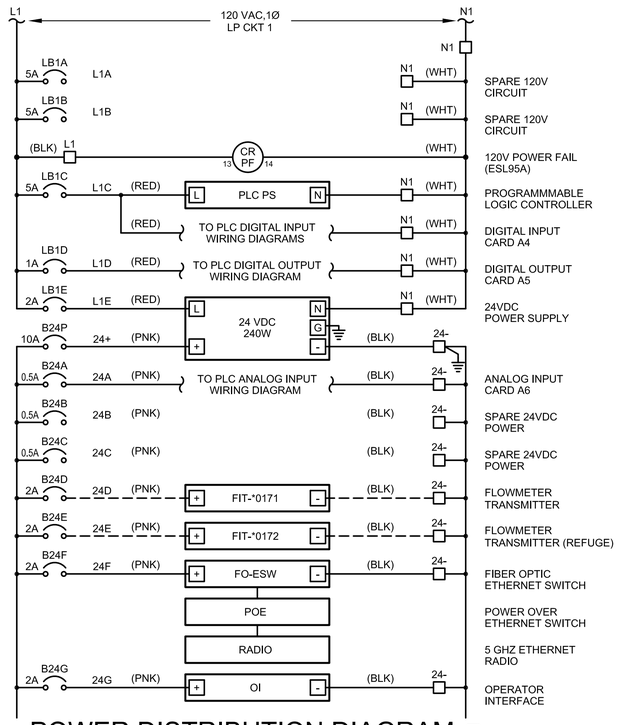
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (HNWR-1A)
PLC CONTROL PANEL
ELEVATION & BACKPAN LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-02	REV 1

PLOT TIME: 3:51:03pm
PLOT DATE: Oct 29, 2015
FILENAME: E-01-02.dwg

N1808



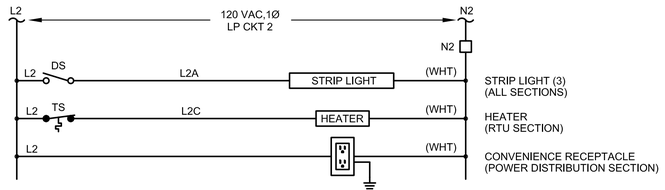
POWER DISTRIBUTION DIAGRAM (1)

SCHEMATIC REFERENCED NOTES:

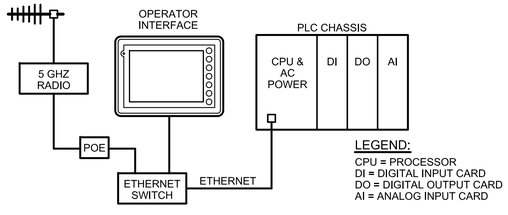
(1) DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.

GENERAL NOTES:

1. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.

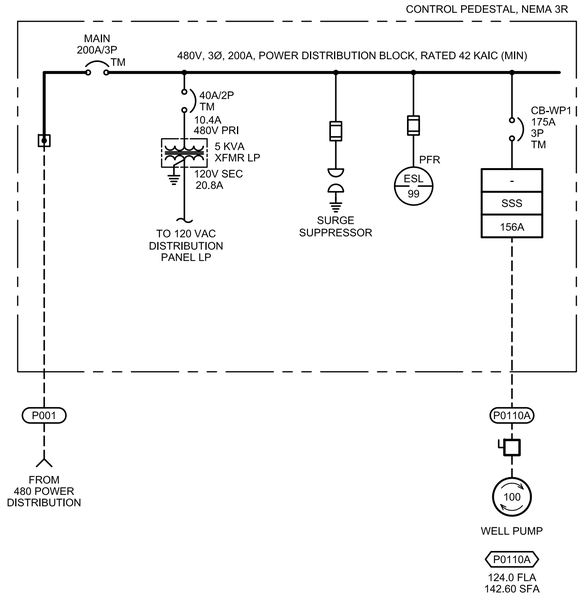


PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM

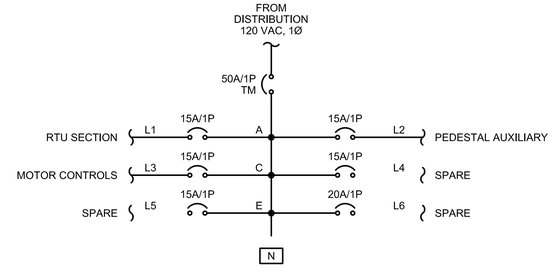


PLC BLOCK DIAGRAM

HNWR-1A - LOAD CALCULATIONS						
LOAD DESCRIPTION				LOAD	QTY	TOTAL
100 HP	WELL PUMP			124.00 A	1	103091.7 VA
5	KVA PANELBOARD TRANSFORMER			10.42 A	1	5000.0 VA
			TOTAL LOAD =	130.01 A		108091.7 VA
LOAD CORRECTION FACTORS						
	LARGEST MOTOR LOAD x 25%:					
100	HP => 0.25 x	103091.7 VA	=	31.00 A		25772.9 VA
	80% BREAKER DERATING =	TOTAL x 0.25 =		40.25 A		33466.1 VA
	FOR CONTINUOUS LOADS NEC 210-20					
			UTILITY SERVICE SIZE (MIN) =	201.27 A		167330.7 VA
			480 V, 3 PHASE, 4 WIRE			
			UTILITY SERVICE SIZE REQUIRED =	200 AMP		



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer (Electrical) CERTIFICATE NO. 59617 JOHN M. SIDOTI DATE SIGNED 10/29/15 ARIZONA U.S.A.
Exp. 3-31-18

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

FRISCH ENGINEERING, INC.
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WWW.FRISCHENGINEERING.COM

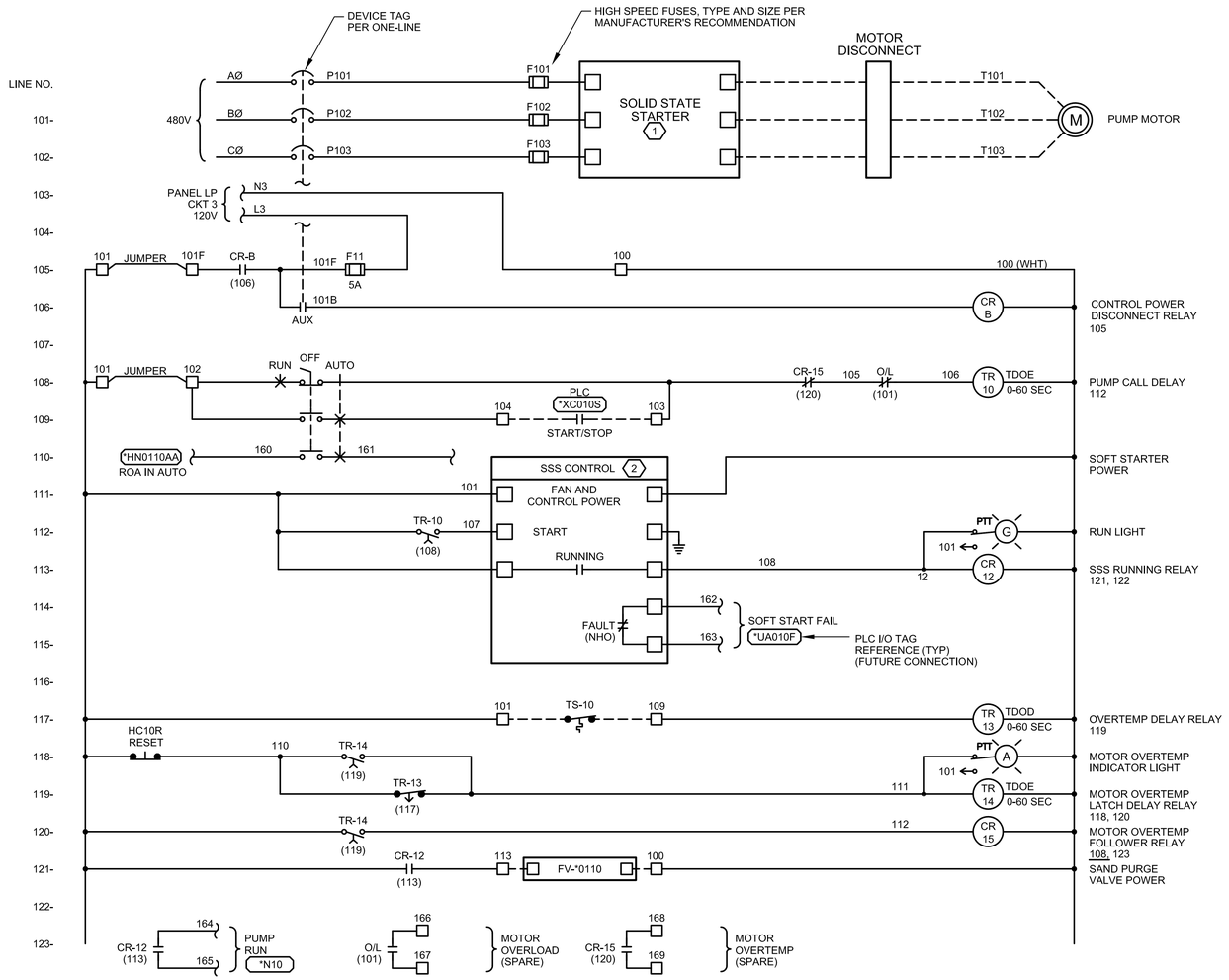
ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (HNWR-1A) CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-03	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:51:10pm
FILENAME: E-01-03.DWG

N1808



WELL PUMP ELEMENTARY DIAGRAM

EQUIPMENT NAMEPLATE WITH ENGRAVED 1/4" LETTERS (SEE ONE-LINE FOR LABEL)

HNWR-1A
WELL PUMP

DEVICE NAMEPLATE WITH ENGRAVED 3/16" LETTERS

PUMP RUNNING
G

OFF
RUN AUTO

OVERLOAD RESET
(RED)

DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:

VOLTAGE	CURRENT	MOTOR PARAMETERS
PHASE REVERSAL	OVERLOAD	OVERLOAD CLASS
	UNBALANCE	FULL LOAD CURRENT

2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineering Services — CERTIFICATE NO. 59617 — JOHN M. SIDOTI — 10/29/15 — STATE REGISTERED — ARIZONA U.S.A.

Exp. 3-31-18

MICROFILM

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ARCADIS

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1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (HNWR-1A)
PUMP ELEMENTARY DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-04	REV 1

FILENAME: E-01-04.DWG
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:51:17pm

N1808

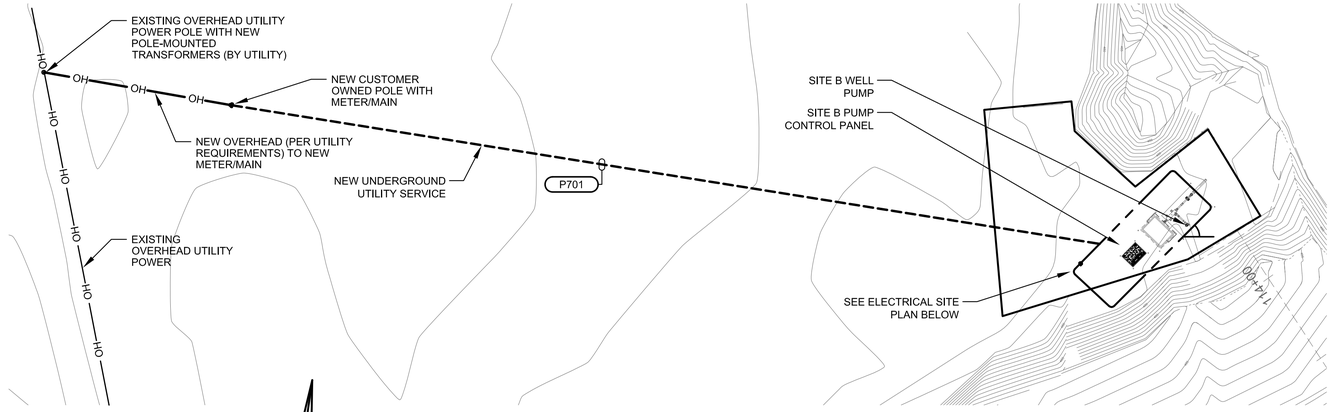
ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.
2. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

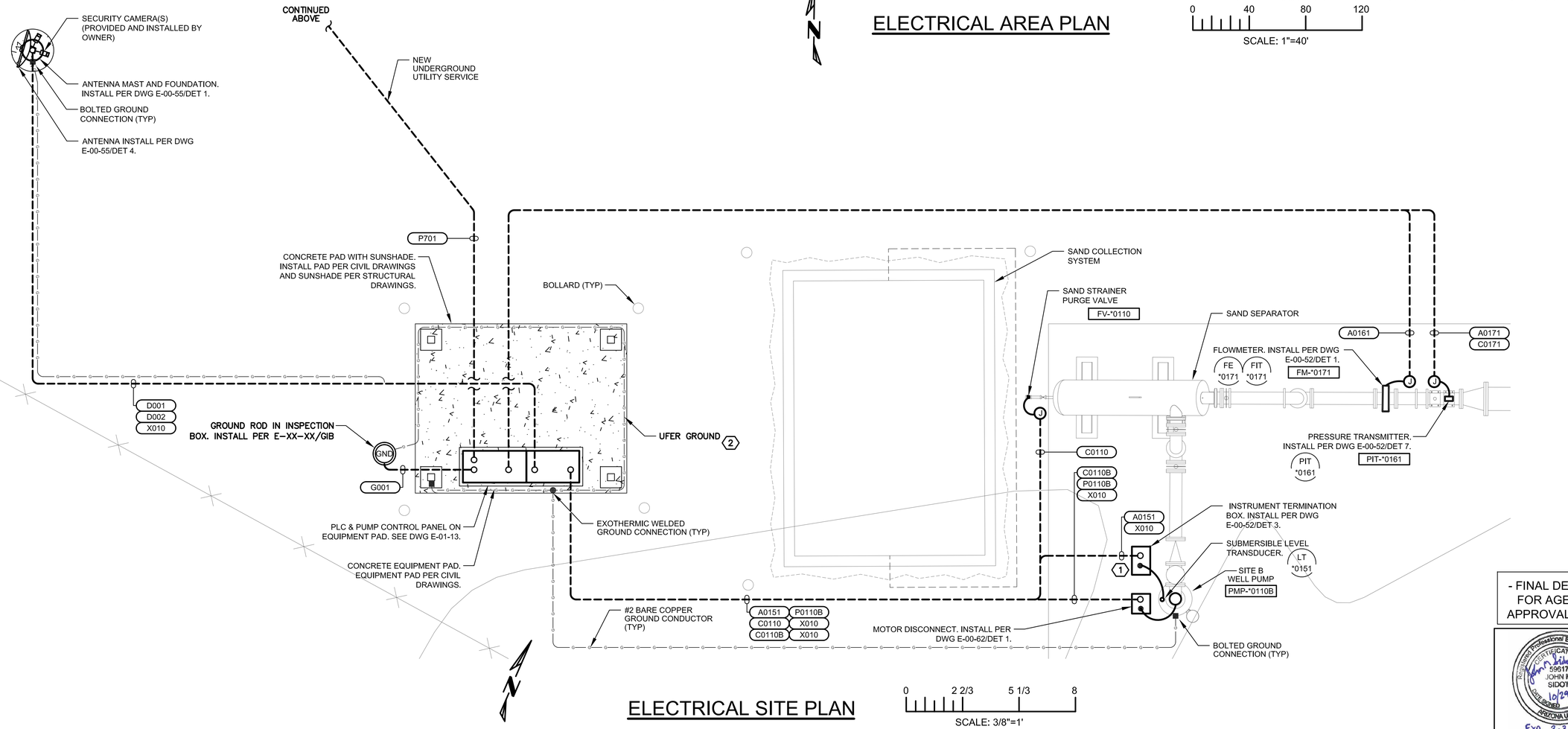
DRAWING REFERENCED NOTES:

(1) CONDUIT TRANSITION FROM BELOW GRADE TO ABOVE GRADE SHALL BE PER DWG E-00-52/DET 5 (TYPICAL).

(2) UFER GROUND SHALL CONSIST OF #2 BARE COPPER CONDUCTOR CENTERED IN CONCRETE PAD (25 FEET MINIMUM). LOOP CONDUCTOR TO FIT WITHIN CONCRETE PAD. MAINTAIN 3" MINIMUM COVER OVER ALL PORTIONS OF CONDUCTOR.



ELECTRICAL AREA PLAN



ELECTRICAL SITE PLAN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer (Electrical) CERTIFICATE NO. 59617 JOHN M. SIDOTI 10/29/15 ARIZONA U.S.A. Exp. 3-31-18

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FOLSOM, CA 95630
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WWW.FRISCHENGINEERING.COM

ARCADIS

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1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

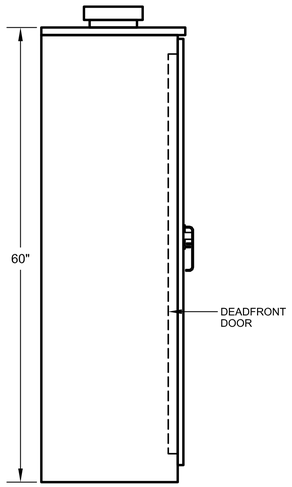
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (SITE B)
ELECTRICAL SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

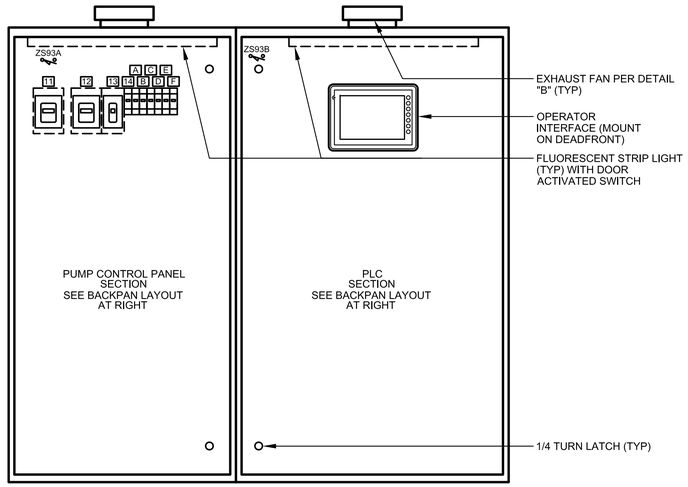
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-05	REV 0

FILENAME: E-01-05.DWG
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:51:29pm

N1808



SIDE ELEVATION



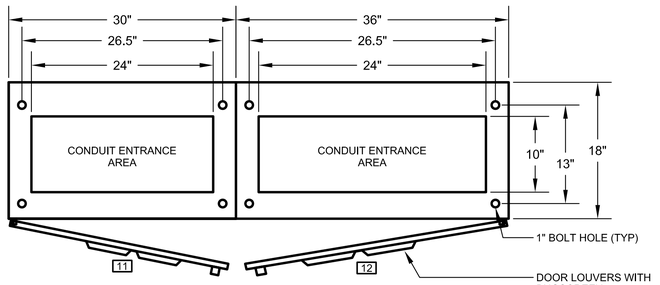
1 FRONT ELEVATION

OUTER DOORS REMOVED FOR CLARITY

PEDESTAL ELEVATION

PEDESTAL FABRICATION METHODS

1. NEMA 3R WEATHER-PROOF FOR OUTDOOR INSTALLATION.
2. OUTER DOORS SHALL BE SEALED WITH RUBBERIZED FOAM GASKET.
3. EXTERIOR FABRICATED FROM STAINLESS STEEL SHEET STEEL.
4. 12 GAUGE EXTERIOR AND 14 GAUGE INTERIOR.
5. ALL SEAMS SHALL HAVE CONTINUOUS WELD GROUND SMOOTH.
6. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY 3 POINT LATCHES.
7. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
8. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
9. INTERNAL SCREWS, RIVETS, BOLTS, AND NUTS SHALL BE STAINLESS STEEL.
10. POWER METERING SHALL PER USERC AND SERVING UTILITY'S REQUIREMENTS.
11. PAINT APPLICATION SHALL BE AS FOLLOWS:
    A. TWO STAGE CHEMICAL BATH CLEANING.
    B. ELECTROSTATICALLY APPLIED POWDER COAT PAINT FINISH.
    C. OVEN CURED FOR TWO HOURS.
    D. INTERIOR DEADFRONT DOOR COLOR: WHITE.
    E. EXTERIOR COLOR SHALL BE: AUTUMN WHITE
12. PHENOLIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL OUTER DOOR SECTIONS AND DEVICES ON DEADFRONT.
13. FABRICATION AND WIRING SHALL CONFORM TO UL, NEC AND NEMA STANDARDS.
14. ALL WIRING SHALL BE LABELLED ON BOTH ENDS OF WIRE.
15. AS-BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH PANEL.
16. PROVIDE DRAWING POCKET ON INSIDE OF CONTROL PANEL DOOR.
17. UPS SHELF SHALL BE 14 GA WELDED STEEL BOLTED TO BACKPAN.

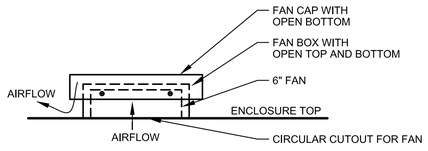


TOP VIEW

PEDESTAL BASE PLAN

DRAWING REFERENCED NOTES:

1 ITEMS DRAWN IN DASHED LINES ARE TO BE LOCATED BEHIND DEADFRONT DOORS OUTER DOORS ARE NOT SHOWN ON FRONT VIEWS FOR ELEVATION CLARITY

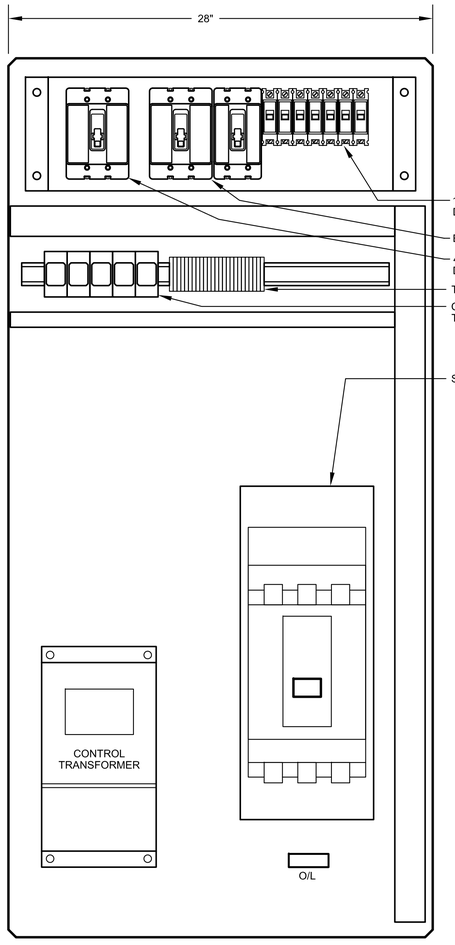


NOTES:
1. FAN CAP AND BOX SHALL BE CONSTRUCTED FROM 14GA GALVANIZED STEEL AND PAINTED WITH CONTROL PANEL.
2. PROVIDE CIRCULAR CUTOUT IN TOP OF ENCLOSURE. SEAL FAN BOX TO ENCLOSURE WITH SILICONE SEALANT.

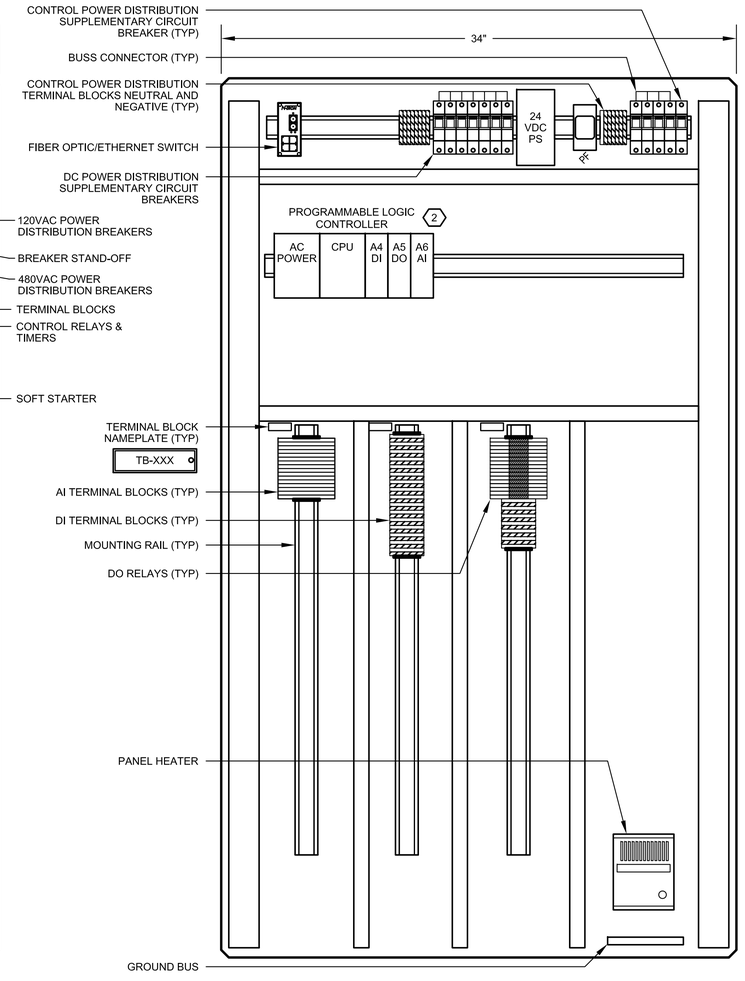
EXHAUST FAN

B DETAIL

NTS



PUMP CONTROL PANEL BACKPAN LAYOUT



PLC PANEL BACKPAN LAYOUT 1

1 WIRE I/O TO TERMINAL BLOCK PER EXAMPLE I/O WIRING DIAGRAMS.

2 RUN #12 GROUND WIRE DIRECT TO GROUND BUS.

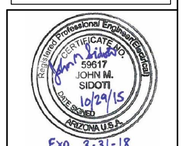
NAMEPLATE SCHEDULE

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11	MAIN	DISCONNECT	3/16"
12	PUMP	DISCONNECT	3/16"
13	TRANSFORMER	DISCONNECT	3/16"
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A	RTU	DISCONNECT	3/16"
B	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
C	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
D	MOTOR CONTROL		3/16"
E	SPARE BREAKER		3/16"
F	SPARE BREAKER		3/16"

GENERAL NOTES:

1. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY



Exp. 3-31-18

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ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY: RAO

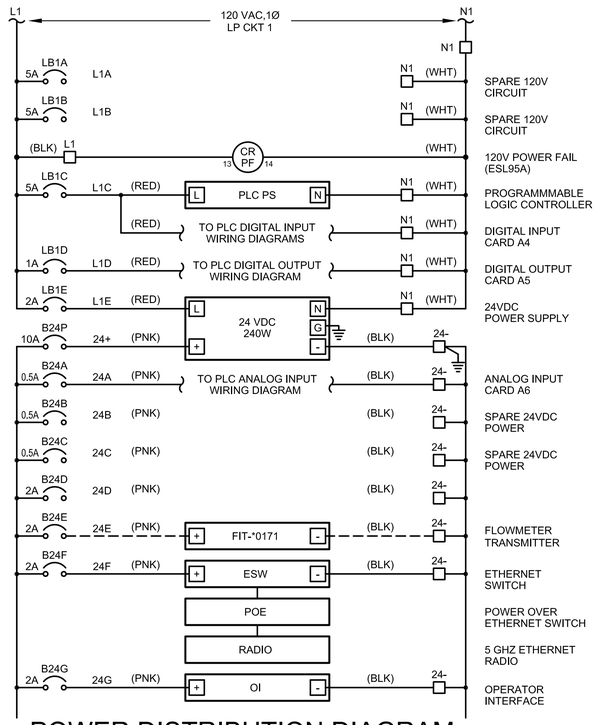
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (SITE B)
PLC CONTROL PANEL
ELEVATION & BACKPAN LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-06	REV 0

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:51:39pm
FILENAME: E-01-06.dwg

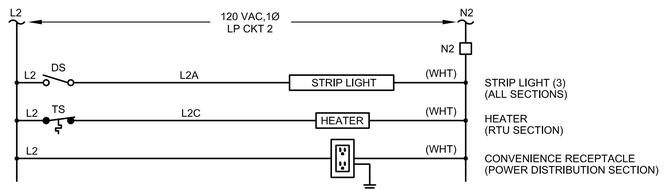
N1808



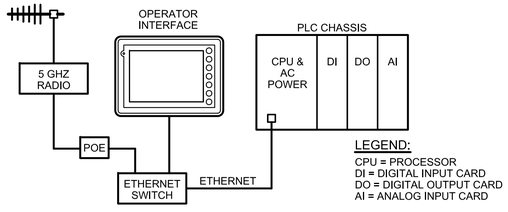
POWER DISTRIBUTION DIAGRAM

SCHEMATIC REFERENCED NOTES:

1. DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.
2. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.

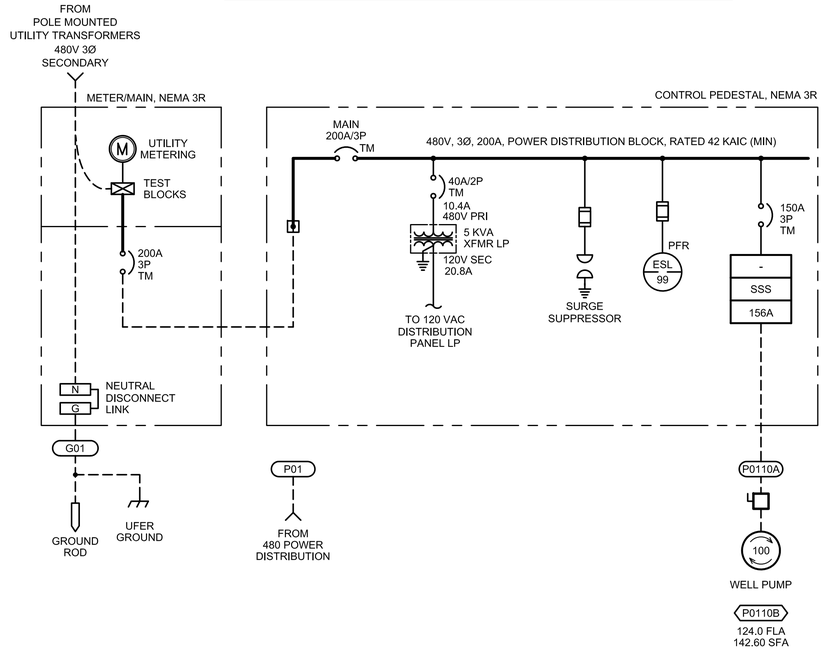


PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM

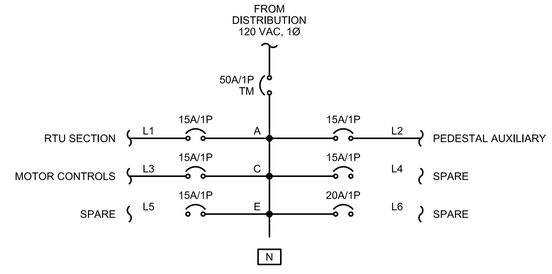


PLC BLOCK DIAGRAM

WELL SITE B - LOAD CALCULATIONS					
LOAD DESCRIPTION			LOAD	QTY	TOTAL
100 HP	WELL PUMP		124.00 A	1	103091.7 VA
5	KVA PANELBOARD TRANSFORMER		10.42 A	1	5000.0 VA
		TOTAL LOAD =	130.01 A		108091.7 VA
LOAD CORRECTION FACTORS					
	LARGEST MOTOR LOAD x 25%:				
100	HP => 0.25 x 22447.4 VA	=	6.75 A		5611.8 VA
	80% BREAKER DERATING =	TOTAL x 0.25 =	34.19 A		28425.9 VA
	FOR CONTINUOUS LOADS NEC 210-20				
		UTILITY SERVICE SIZE (MIN) =	170.96 A		142129.4 VA
		480 V, 3 PHASE, 4 WIRE			
		UTILITY SERVICE SIZE REQUIRED =	200 AMP		



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

GENERAL NOTES:

1. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer (Electrical) CERTIFICATE NO. 59617 JOHN M. SIDOTI 10/29/15 ARIZONA U.S.A.
Exp. 3-31-18

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

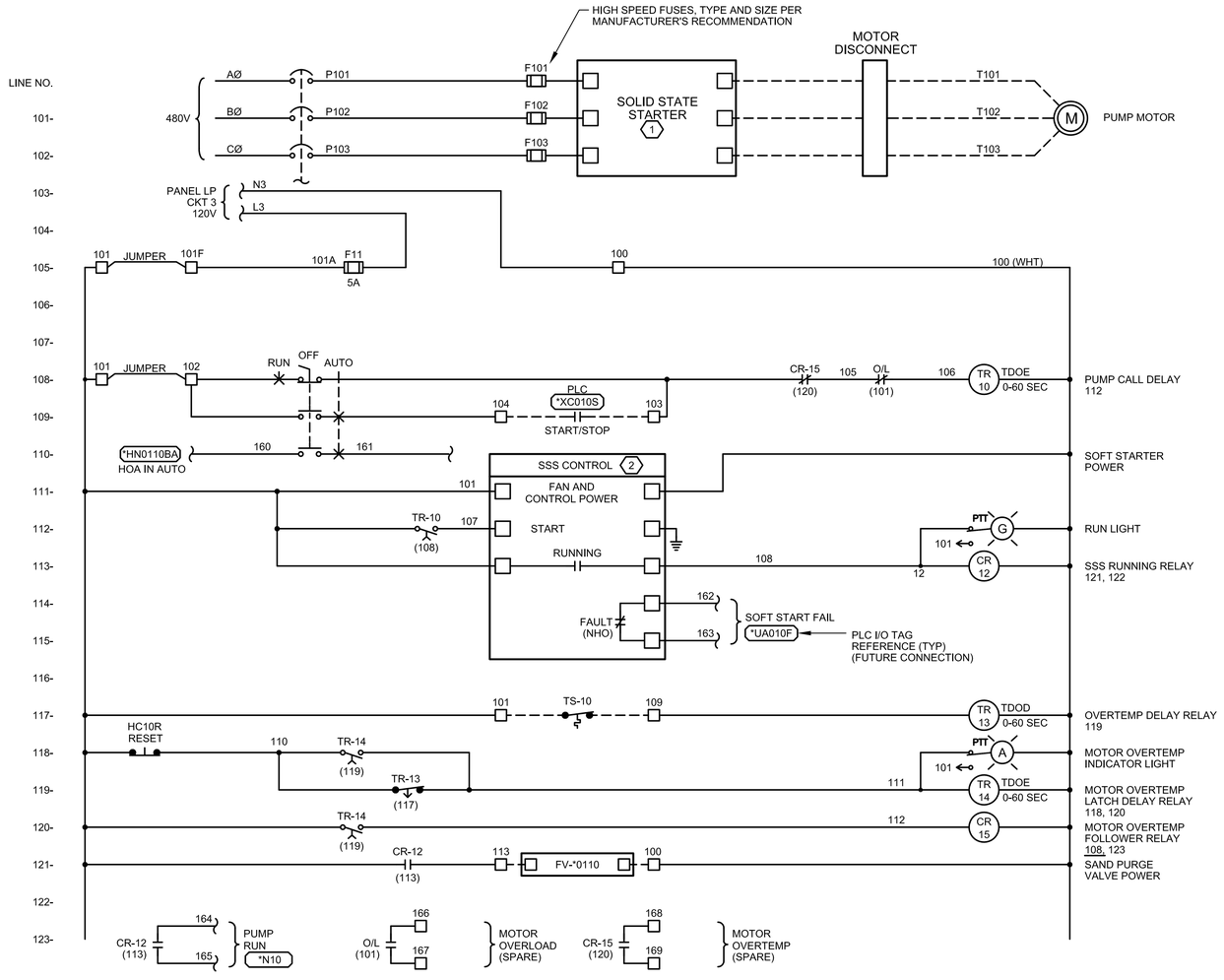
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RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (SITE B) CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

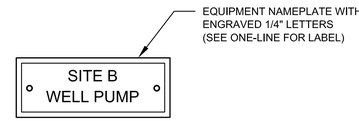
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BILL OF MATL	
DWG LIST	
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SHEET NO.	of SHEETS
E-01-07	REV 0

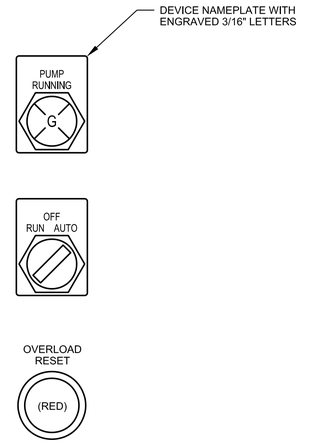
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PLOT TIME: 3:51:56pm
PLOT DATE: Oct 29, 2015

N1808



WELL PUMP ELEMENTARY DIAGRAM





DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:
   VOLTAGE: PHASE REVERSAL
   CURRENT: OVERLOAD, UNBALANCE
   MOTOR PARAMETERS: OVERLOAD CLASS, FULL LOAD CURRENT
2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.
2. THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

Registered Professional Engineer(Specialty) CERTIFICATE NO. 59617 JOHN M. SIDOTI 10/29/15 ARIZONA U.S.A.
Exp. 3-31-18

MICROFILM

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

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1	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

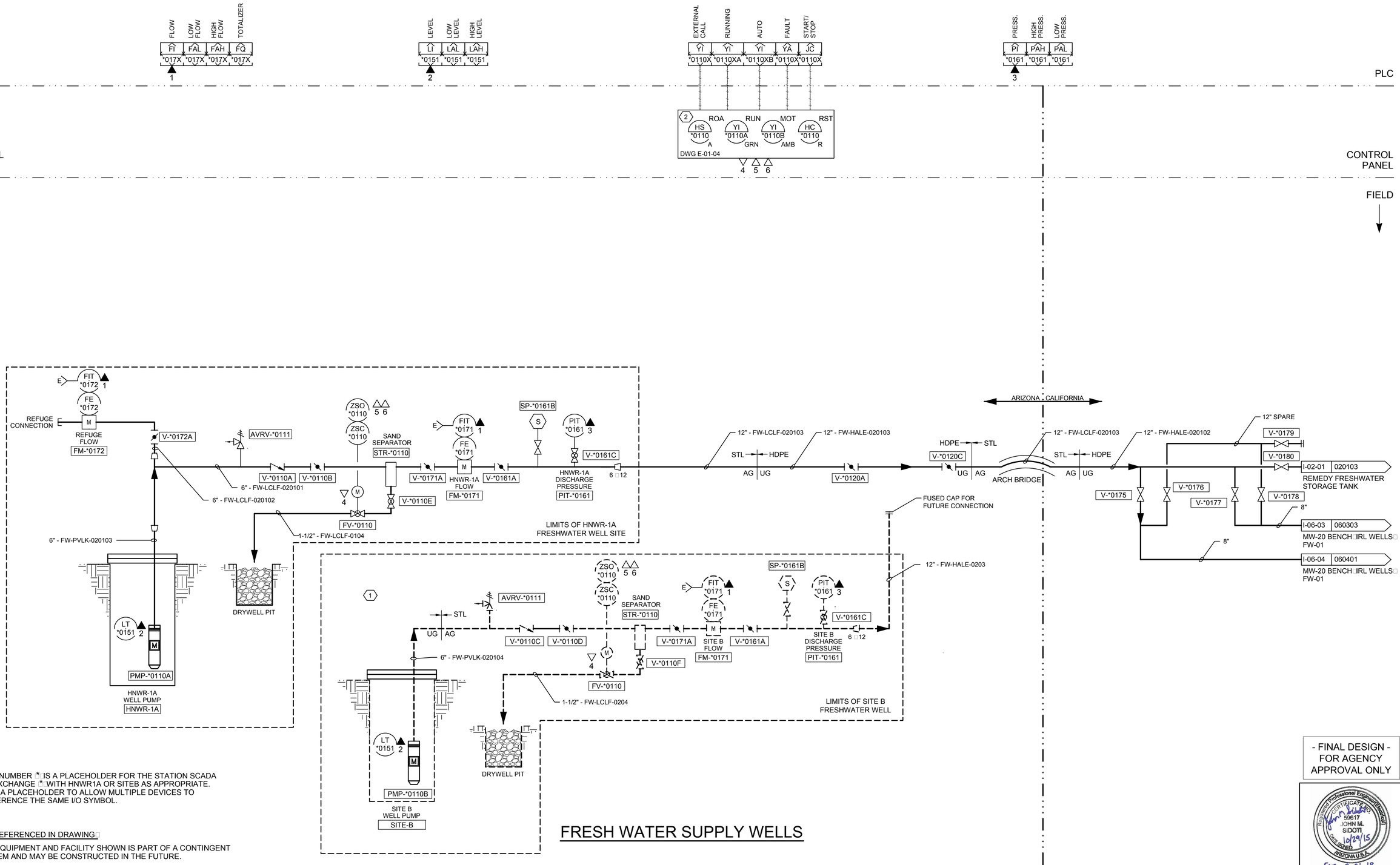
TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER WELL (SITE B)
PUMP ELEMENTARY DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-01-08	REV 0

FILENAME: E-01-08.DWG
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:52:02pm

N1808



FRESH WATER SUPPLY WELLS

NOTES:
1. TAG NUMBER *□IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE *□WITH HNWR1A OR SITEB AS APPROPRIATE.
2. X□IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.

NOTES REFERENCED IN DRAWING□

1 THE EQUIPMENT AND FACILITY SHOWN IS PART OF A CONTINGENT SYSTEM AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

CERTIFICATE NO. 59617 JOHN M. SIDOTI Date Expires 10/29/15 Registered Professional Engineer (Electrical) ARIZONA U.S.A.

Exp. 3-31-18

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

P□ID
FRESH WATER SUPPLY WELLS

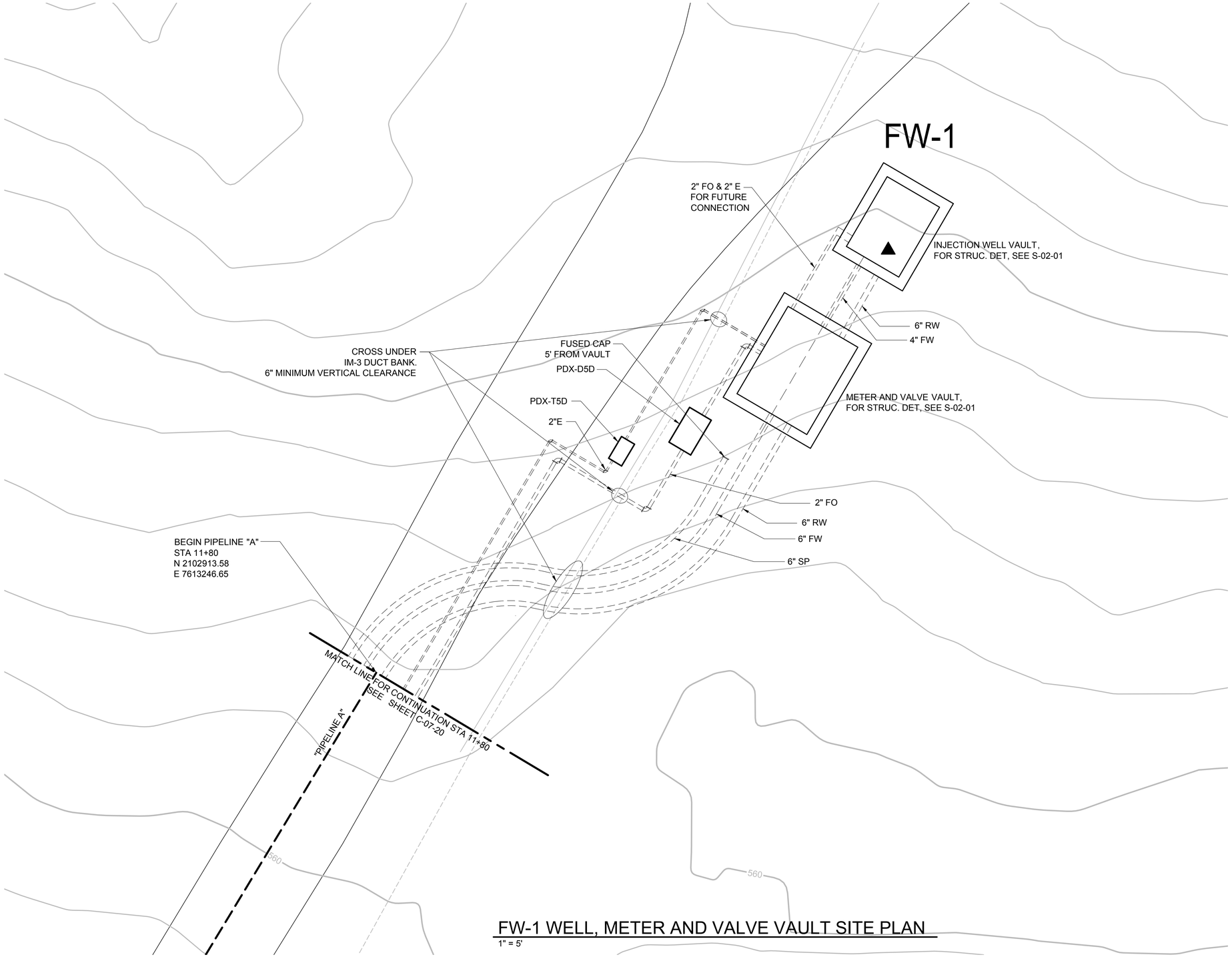
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
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SUPSDS	
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11/02/2015 13:52 G:\GI□□□□AR\TOPOCK-01\S□□□□□□□□100% DWG\H-I-01-01.d□□T□□I-01-01

N180B

NOTES:
1. FOR STANDARD PLANS OF WELL VAULT AND METER VAULT, SEE DWG S-02-01.
2. FOR MECHANICAL PLANS OF WELL VAULT AND METER VAULT, SEE DWG M-02-01.
3. FOR PLC PANEL, SEE DWG E-02-01.



FW-1 WELL, METER AND VALVE VAULT SITE PLAN
1" = 5'

N

0 5 10 15
SCALE: 1"=5'

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUGAL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
2	8/5/15	90% RTC RESOLUTION		PH	PT	PT	VMB
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	PT	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC/EE	PT	PT	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER INJECTION WELL FW-1 - SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

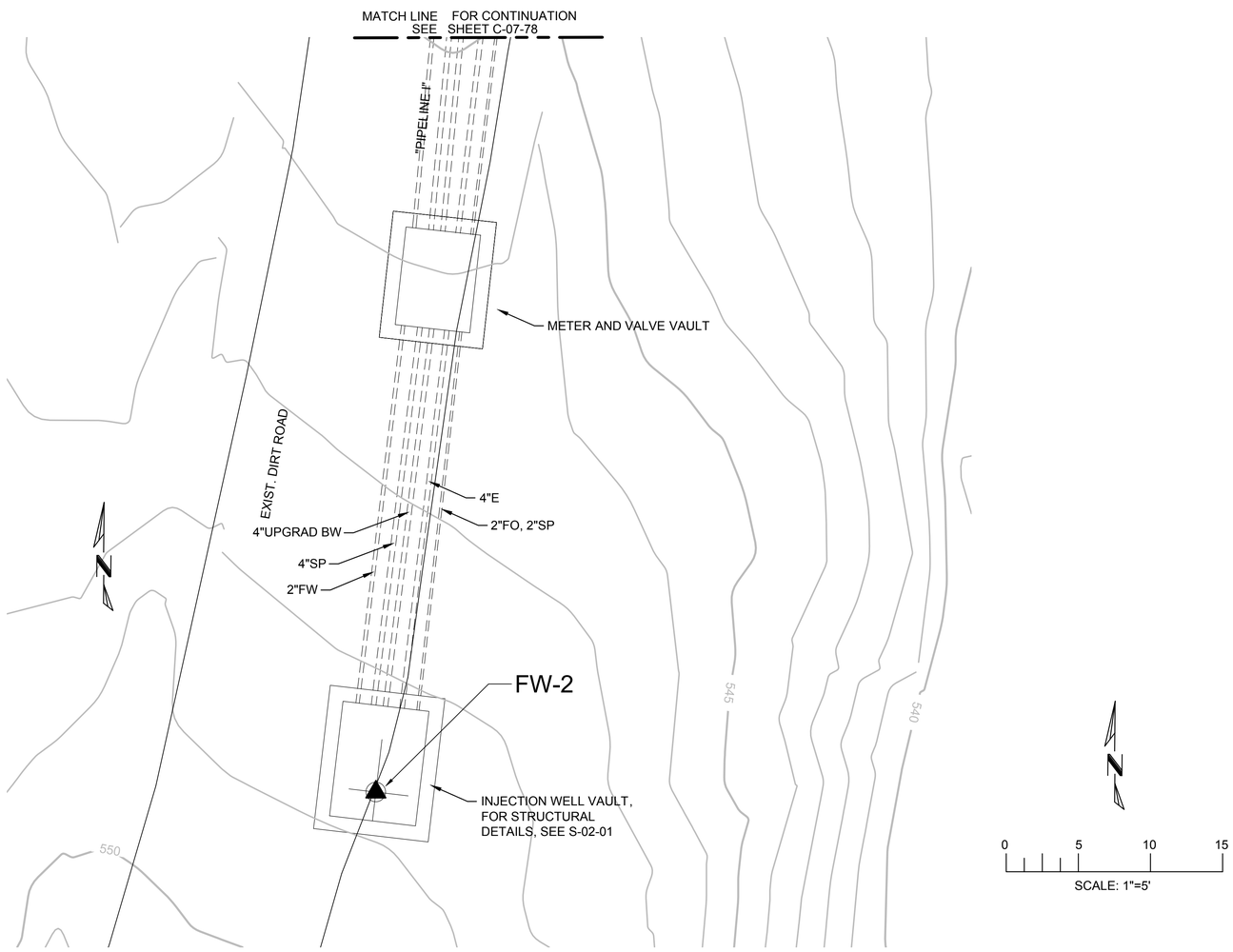
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DWG LIST	
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SUPSD BY	
SHEET NO. of	SHEETS
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NOTES:

1. FOR STANDARD PLANS OF WELL VAULT AND METER VAULT, SEE DWG S-02-01.
2. FOR MECHANICAL PLANS OF WELL VAULT AND METER VAULT, SEE DWG M-02-01.
3. FOR PLC PANEL, SEE DWG E-02-01.
4. FOR STRUCTURAL PLANS OF VALVE BOX, SEE DWG S-02-XX



A FW-2 WELL VAULT SITE PLAN
1" = 5'
C-07-78

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
2	8/5/15	90% RTC RESOLUTION	AJW	KLD	WLM	BJW	
1	9/8/14	PRE-FINAL (90%) DESIGN	PH	PT	PT	VMB	
0	4/5/13	INTERMEDIATE (60%) DESIGN	PC/EE	PT	PT	VMB	

REVISIONS

APPROVED BY	
	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

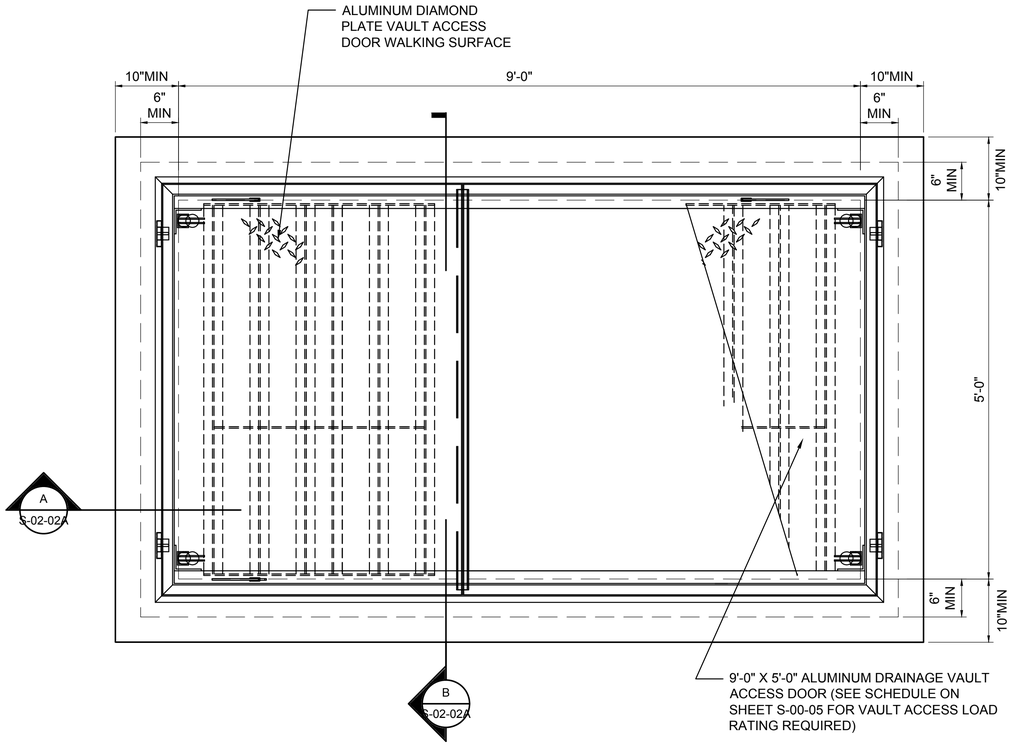
FRESHWATER INJECTION WELL FW-2 - SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

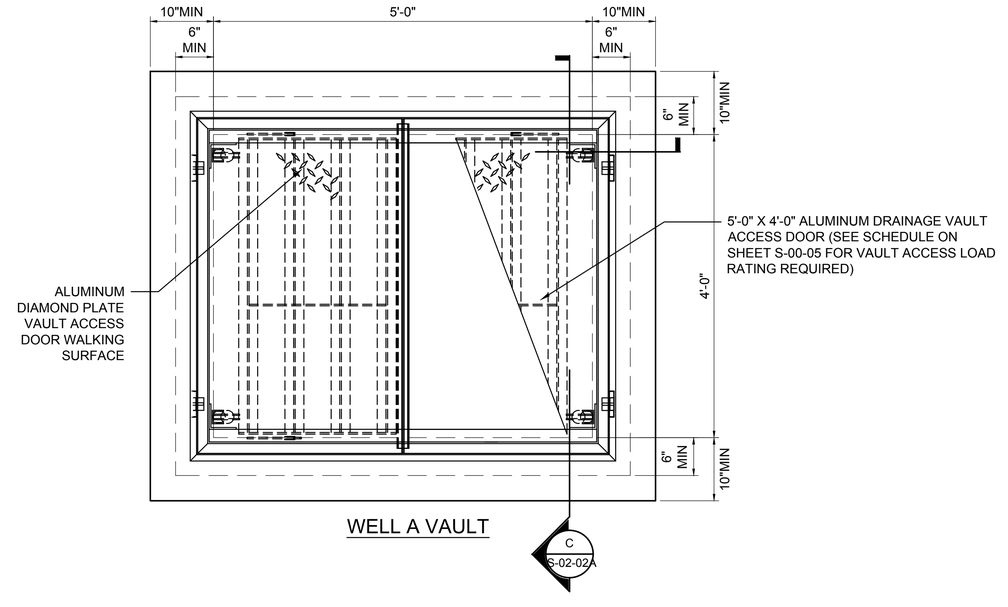
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SHEET NO.	of SHEETS
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WELL METER VAULT



WELL A VAULT

WELL A AND B VAULT NOTE:
1. SEE SCHEDULE ON SHEET S-00-05 TO DETERMINE IF AND WHERE WELL A AND B VAULTS ARE REQUIRED.

NOTES:
1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

FW INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - TOP PLAN

1" = 1'-0"

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOUIS
No. C 61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	MD	KJ	VMB	VMB	
0	4/5/13	INTERMEDIATE (60%) DESIGN	MD	KJ	VMB	VMB	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

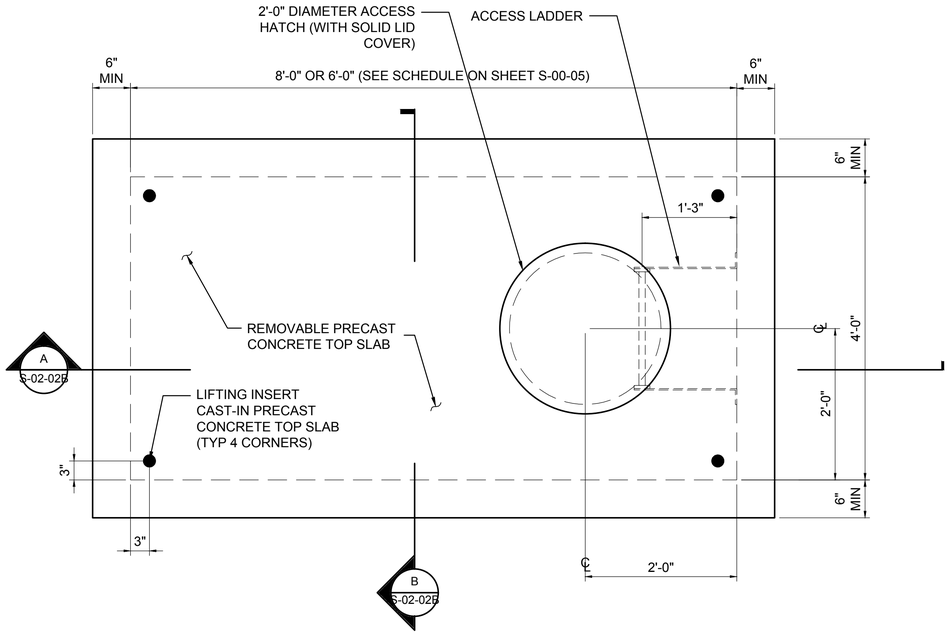
FW INJECTION WELL VAULTS-TYPE 1 - TOP PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

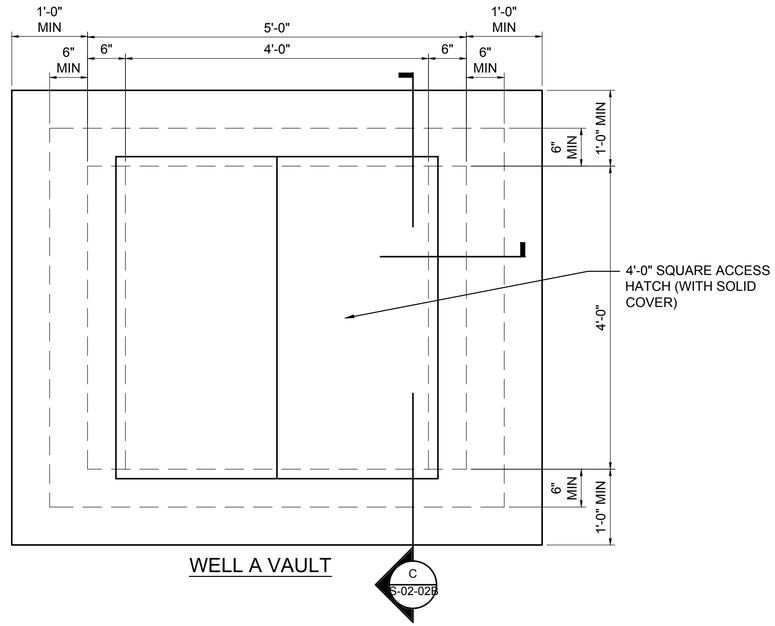
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WELL METER VAULT



WELL A VAULT

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. ACCESS HATCH, SOLID LID, AND FRAME TO BE HIGHWAY RATED (HS20-44) AND MANUFACTURED BY NEENAH FOUNDRY OR EAST JORDAN IRON WORKS.
8. PROVIDE 90° HOOK AT ENDS OF TOP AND BOTTOM RESTEEL IN WELL METER VAULT TOP SLAB WITHIN 1'-6" OF LIFTING INSERTS.

FW INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - TOP PLAN

1"=1'-0"

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWES
61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

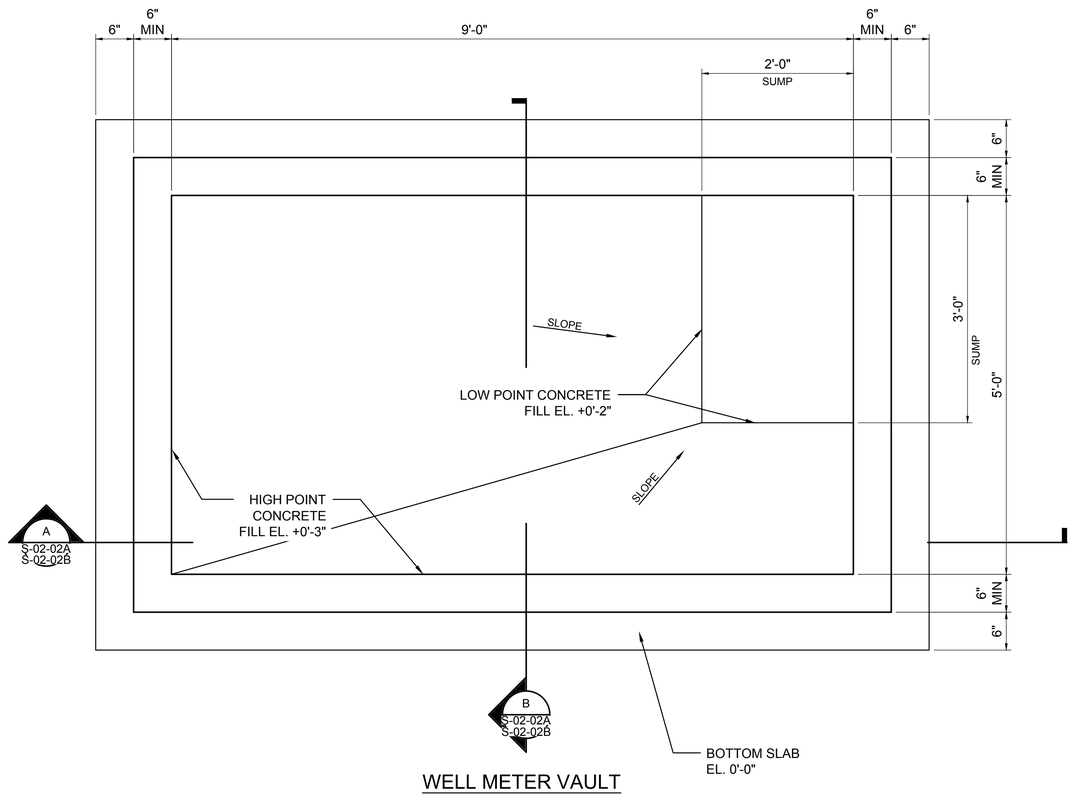
FW INJECTION WELL VAULTS
TYPE 2 - TOP PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

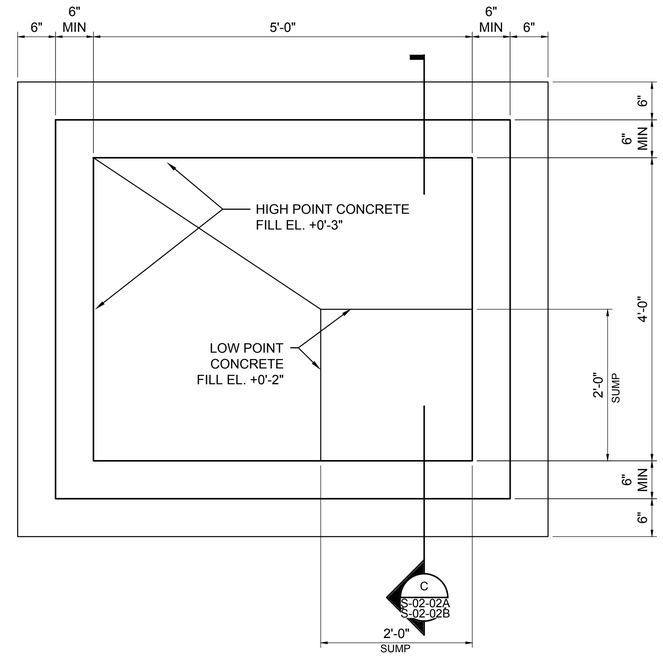
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BILL OF MATL	
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WELL METER VAULT



WELL A VAULT

FW INJECTION WELL METER VAULT AND WELL VAULT TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
No. C61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FW INJECTION WELL VAULTS TYPES 1 AND 2- FOUNDATION PLAN

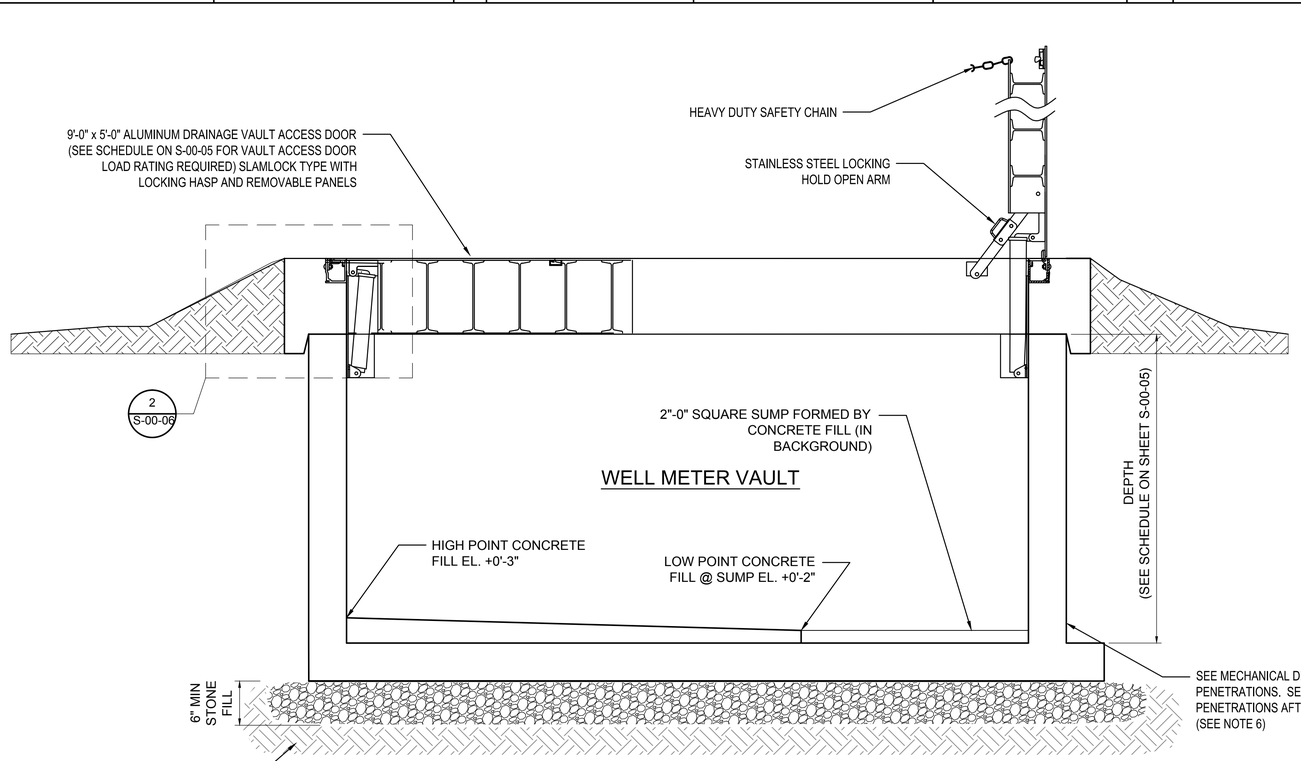
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-02-02	REV 2

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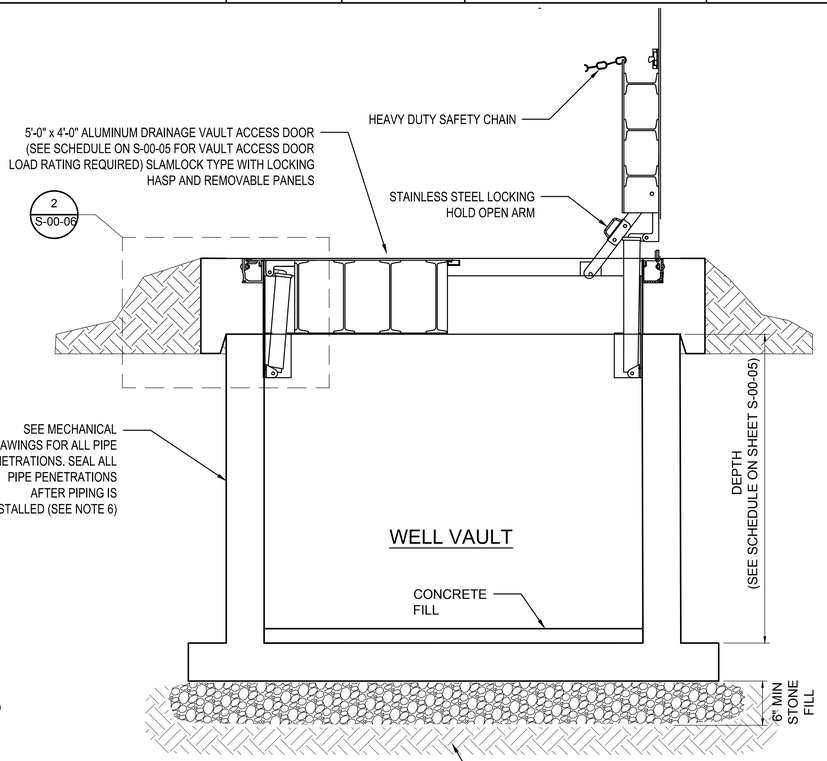
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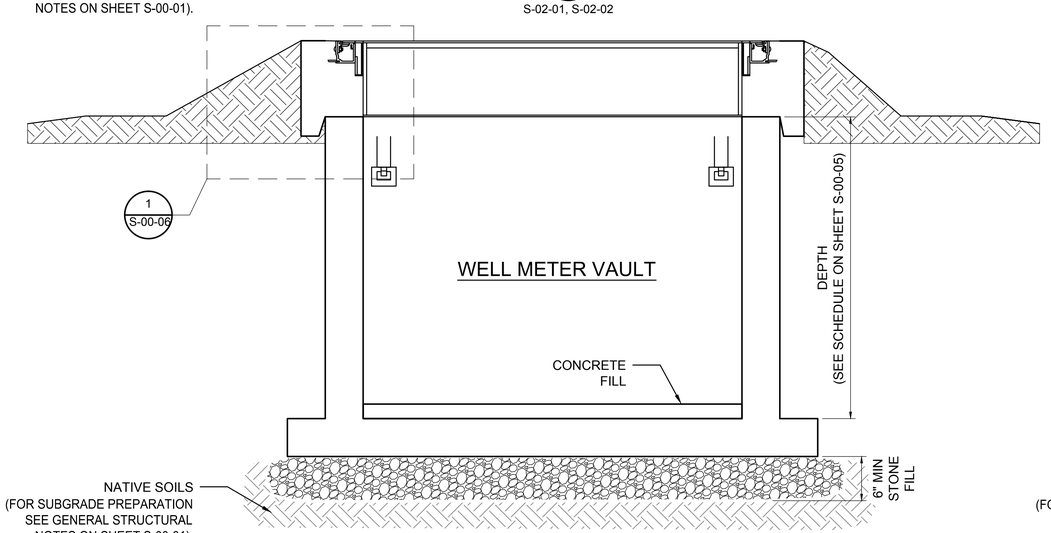


A FW INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

S-02-01, S-02-02

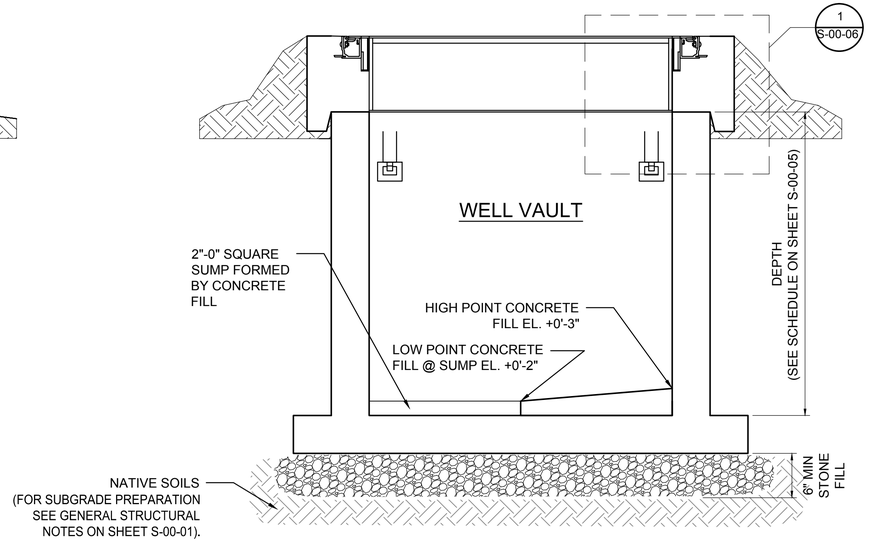




B FW INJECTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-02-01, S-02-02



C FW INJECTION WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

S-02-01, S-02-02

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FW INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

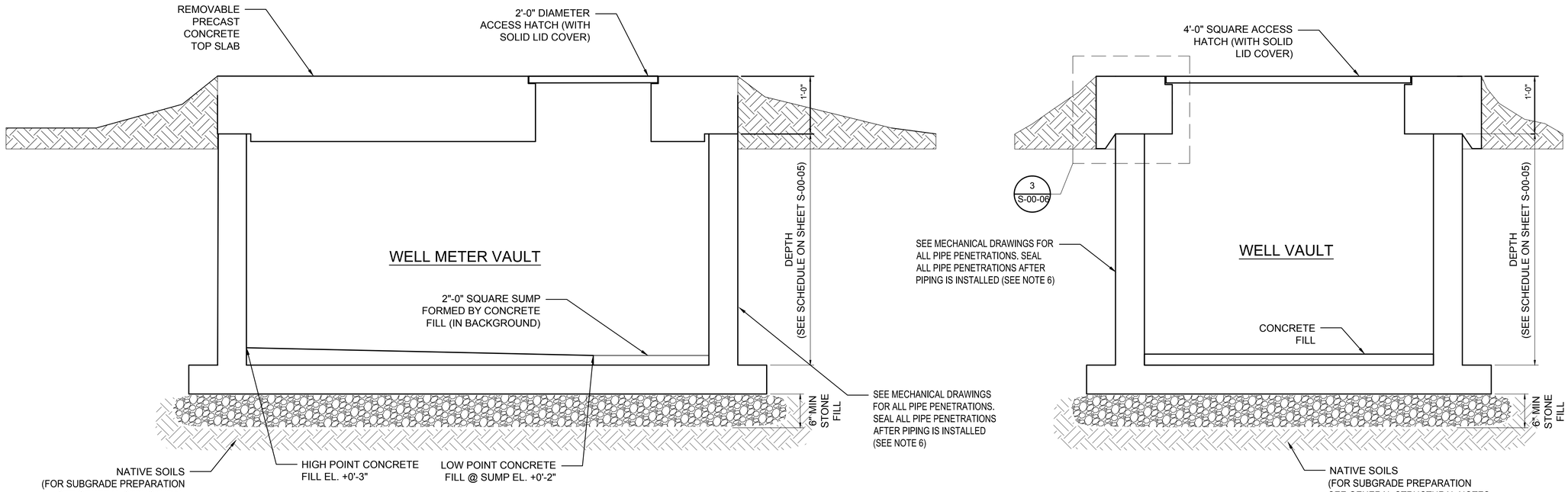
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-02-02A	REV 0

N1808

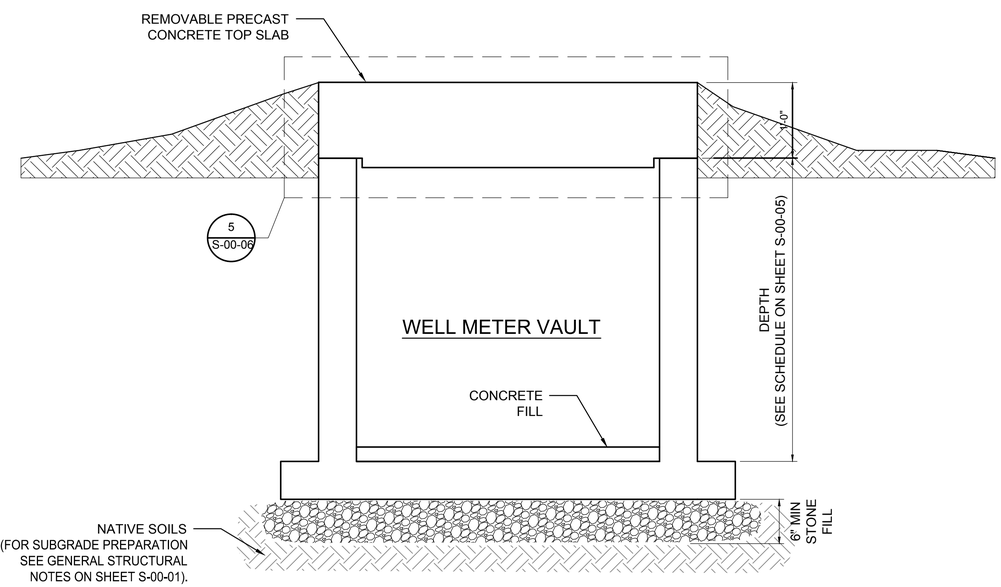
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A FW INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

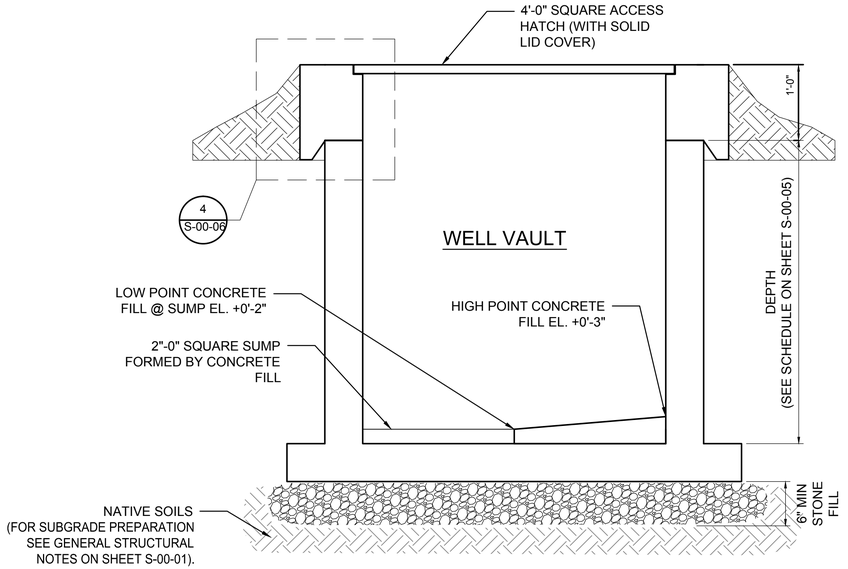
S-02-01A, S-02-02



B FW INJECTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-02-01A, S-02-02



C FW INJECTION WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-02-01A, S-02-02

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOMBARDI No. 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

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	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FW INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

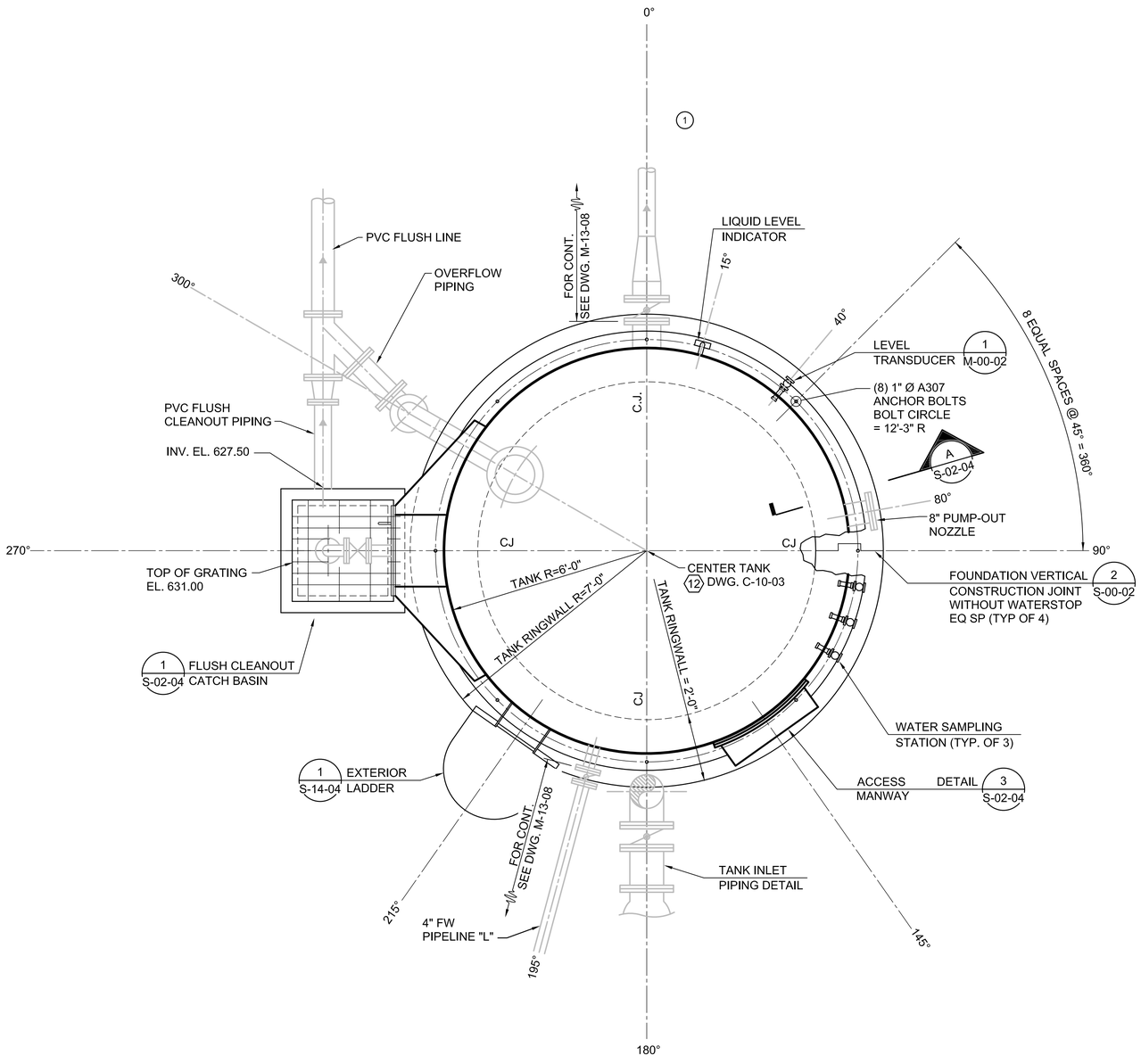
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
S-02-02B	REV 0

N1808

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DESIGN LOADS

1. WIND LOADS

DESIGN HORIZONTAL WIND LOADS ON VERTICAL SURFACES:

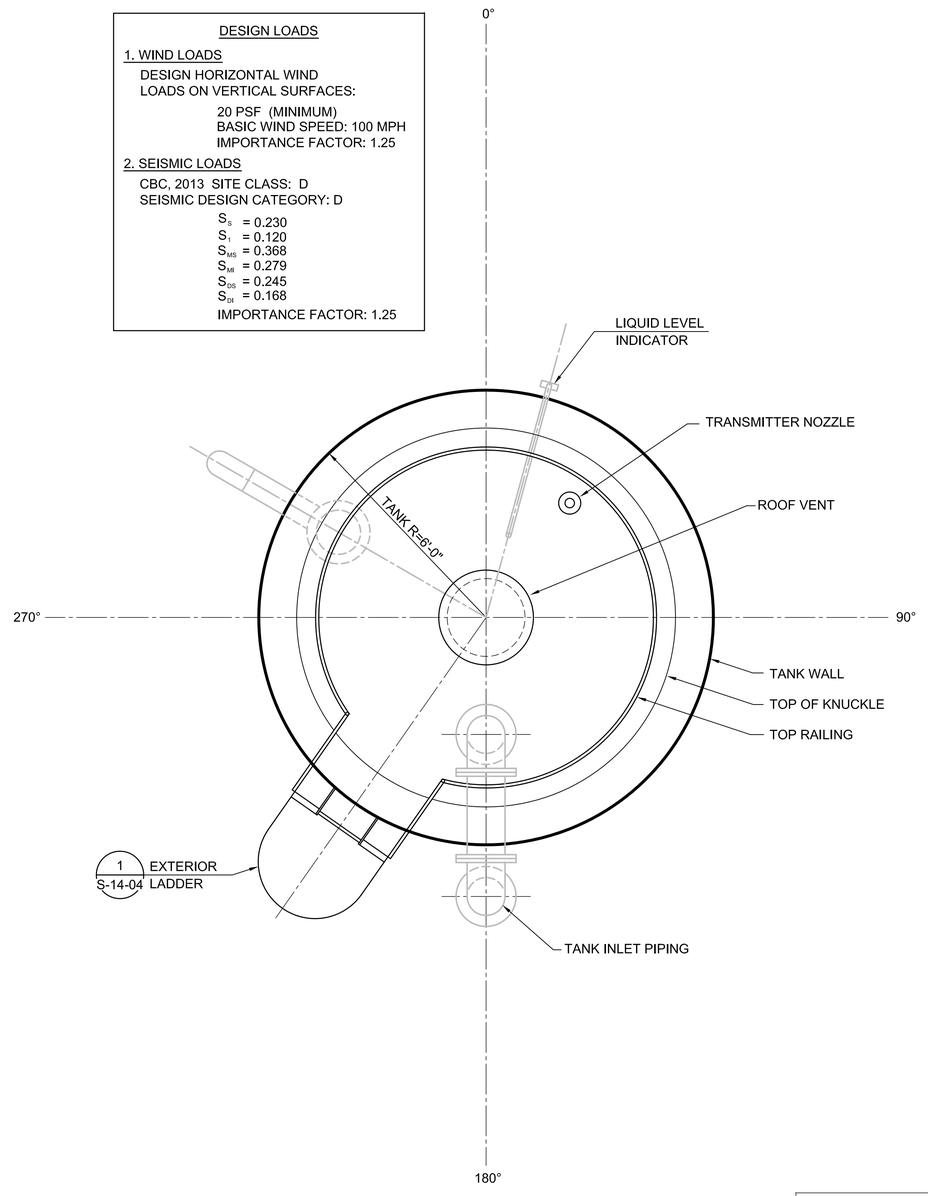
20 PSF (MINIMUM)
BASIC WIND SPEED: 100 MPH
IMPORTANCE FACTOR: 1.25

2. SEISMIC LOADS

CBC, 2013 SITE CLASS: D
SEISMIC DESIGN CATEGORY: D

S_s = 0.230
S_1 = 0.120
S_{MS} = 0.368
S_M = 0.279
S_{DS} = 0.245
S_{D1} = 0.168

IMPORTANCE FACTOR: 1.25



KEY NOTE:

1. ◯ FOR TANK LOCATION AND EQUIPMENT PAD, SEE DWG. C-10-03.
2. FOR TANK MECHANICAL DETAILS, SEE DWG. M-02-04.

1 TANK FOUNDATION PLAN

1/2" = 1'-0"

C-10-03

2 TANK TOP PLAN

1/2" = 1'-0"

C-10-03

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
VINOD M. BADANI
C-041281
EXP. DATE 3/31/17
CIVIL
STATE OF CALIFORNIA

E2 Consulting Engineers, Inc.
1900 Powell Street, Ste. 250
Emeryville, CA 94608
(510) 652-1164

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		MD	KJ	VMB	RAO
0	9/08/14	PRE-FINAL (90%%%) DESIGN		WTH	KJ	VMB	VMB

REVISIONS

APPROVED BY
RAO

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	AS SHOWN

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMEDY FRESHWATER STORAGE TANK PLANS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

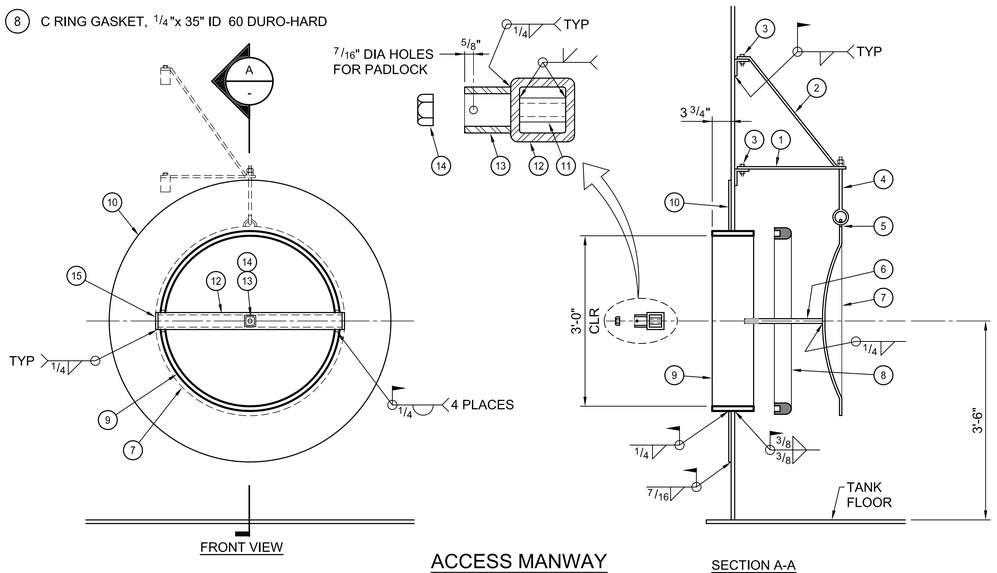
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BILL OF MATL	
DWG LIST	
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SUPSD BY	
SHEET NO.	of SHEETS
S-02-03	REV 0

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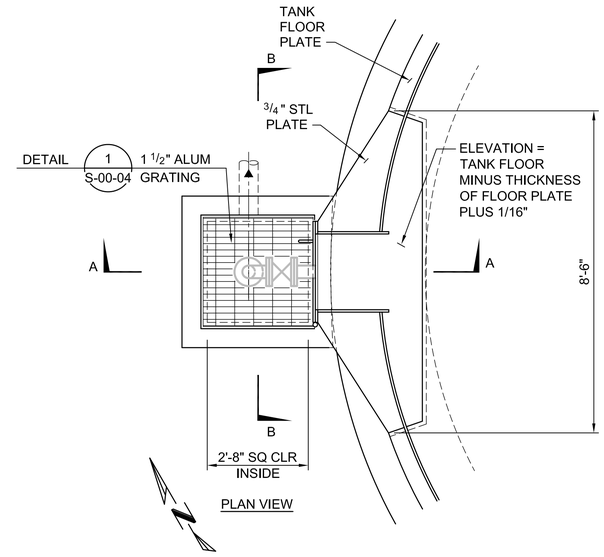
KEY NOTES:

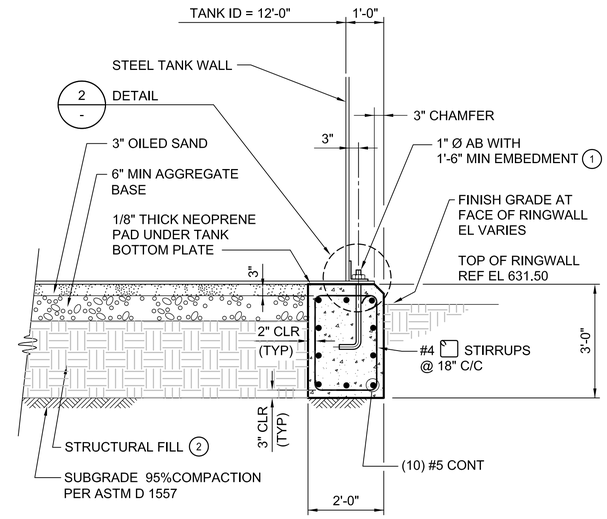
1. FLAT BAR SS 316 3/8"x 28" LONG
2. FLAT BAR SS 316 3/8"x 45" LONG
3. ANGLE SS 316, 3"x 3"x 3/8"x 2" LONG WITH:
   BOLT SS 316, 1/2"-13 NC x 1 1/2" LONG WITH NYLOCK NUT AND WASHER
4. EYEBOLT SS 316, 3/8"x 12" WITH (2) NUTS
5. HALF RING SS 316, 5/16"x 2 1/4"
6. ROUND BAR STL, 3/4" DIA x LENGTH AS REQ'D WITH 3" NC TOE
7. 40 x 32 FLARED AND DISHED STL PLATE HEAD, 3/8"x 32" DISH RADIUS, 4" FLANGE
8. C RING GASKET, 1/4"x 35" ID 60 DURO-HARD
9. STL PLATE, 1"x 8 1/2"x 9'-8 1/4" LONG ROLLED TO 36" ID
10. STL PLATE, 7/16"x 59 1/2" OD x SHOP TRACE ID (ITEM NO. 9 OD)
11. PIPE SS 304, 3/4"x STD WT x 3" LONG
12. STL TUBE STRUCT, 3"x 3"x 1/4"x 39" LONG
13. STL TUBE SQ, 2 1/2"x 2 1/2"x 3/16"x 3" LONG WITH 7/16 "Ø HOLES
14. BRONZE NUT, 3/4" HEAVY HEX AND WASHER
15. STL FLAT BAR, 2 1/2 "x 1/4 "x 2 1/2 " LONG



ACCESS MANWAY

3 DETAIL
3/4" = 1'-0"
S-02-03

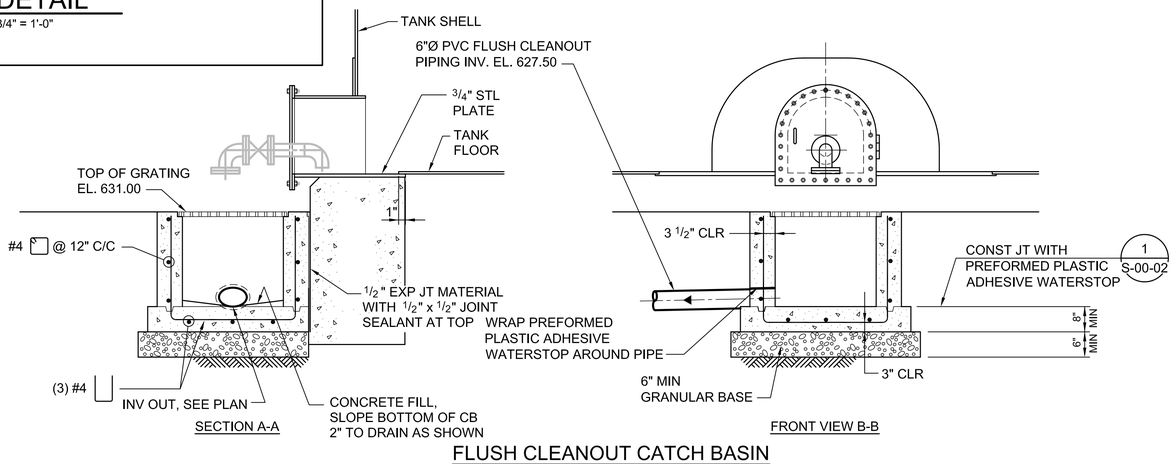




KEY NOTES:

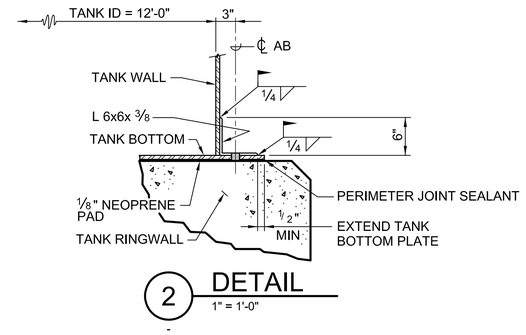
1. PROVIDE WASHER AND NUT. NUT SHALL BE FINGER TIGHT ONLY, DO NOT TORQUE IT.
2. ALL EXISTING SOIL TO THE ELEVATION OF 628.50 SHALL BE REMOVED AND BACKFILLED WITH STRUCTURAL FILL MATERIAL PER SPECS AND AS INDICATED ON DRAWINGS.

A SECTION
1/2" = 1'-0"
S-02-03



FLUSH CLEANOUT CATCH BASIN

1 DETAIL
1/2" = 1'-0"
S-02-03



2 DETAIL
1" = 1'-0"
-

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
VINOD M. BADANI
C-041281
EXP. DATE 3/31/17
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0	9/08/14	PRE-FINAL (90%) DESIGN	WTH	KJ	VMB	VMB	

REVISIONS

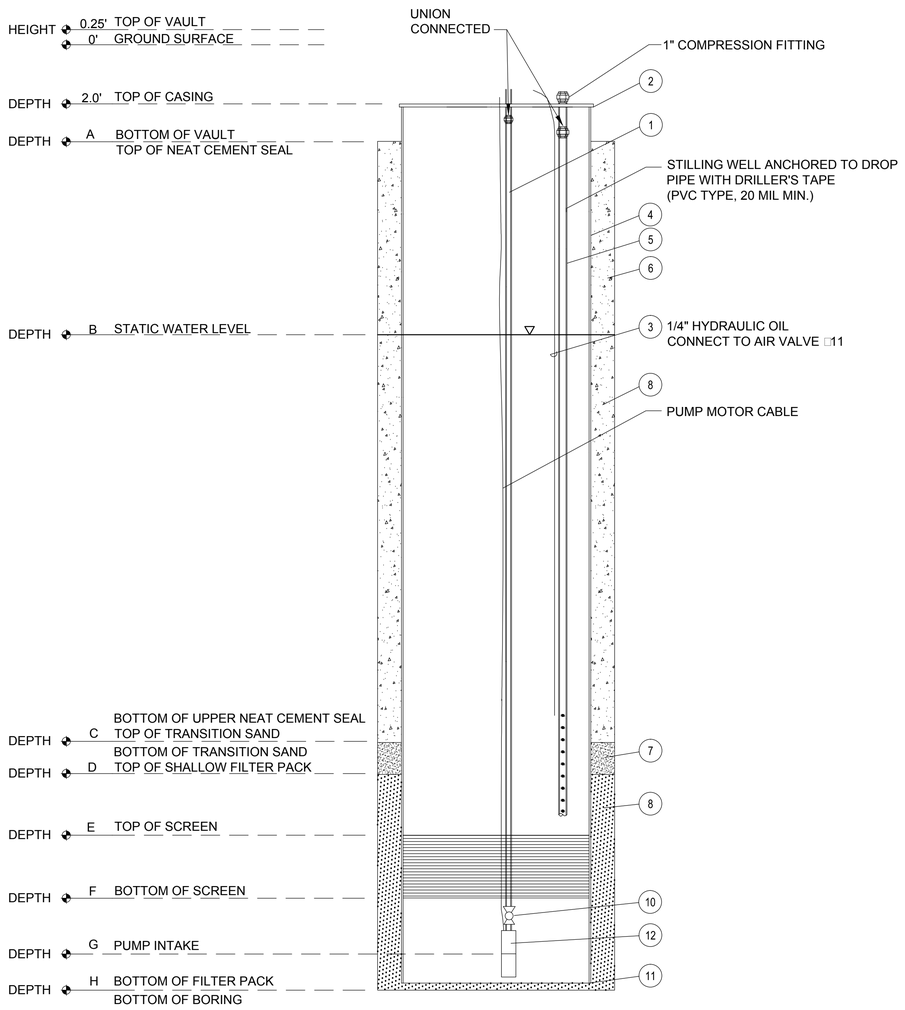
APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES AS NOTED

TOPOCK GROUNDWATER REMEDIATION PROJECT
REMEDY FRESH WATER STORAGE TANK
SECTIONS AND DETAILS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-02-04	REV 0

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N180B



A FRESHWATER INJECTION WELL WITH BACKWASH PUMP DETAIL
NTS

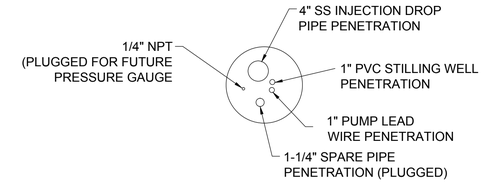
LEGEND:

(1) REFERENCE ITEM NUMBER IN SCHEDULE.

NOTES:
1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER EXAGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

ITEM	DESCRIPTION
1	4" DROP PIPE
2	CUSTOM TAPPED WELL FLANGE
3	1/4" DIAMETER HYDRAULIC OIL TO VALVE
4	WELL CASING (SEE NOTE 3)
5	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
6	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
7	ANNULAR SPACE, TRANSITION SAND (SI□E TBD)
8	ANNULAR SPACE, FILTER PACK (TYPE TBD)
9	WELL SCREEN (316L SS, WIRE-WRAP)
10	ASR VALVE
11	SUMP
12	BACKWASH PUMP



B FRESHWATER SINGLE SCREEN WELL FLANGE DETAIL
NTS

- FINAL DESIGN -
FOR AGENCY
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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

N1808

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
2	09/08/14	PRE-FINAL (90%) DESIGN		LW	WF	JP	CH
1	09/2012	INTERMEDIATE (60%) DESIGN		GJ	ML	JP	CH
0	11/2011	PRELIMINARY (30%) DESIGN		PC	EL	JP	CH

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

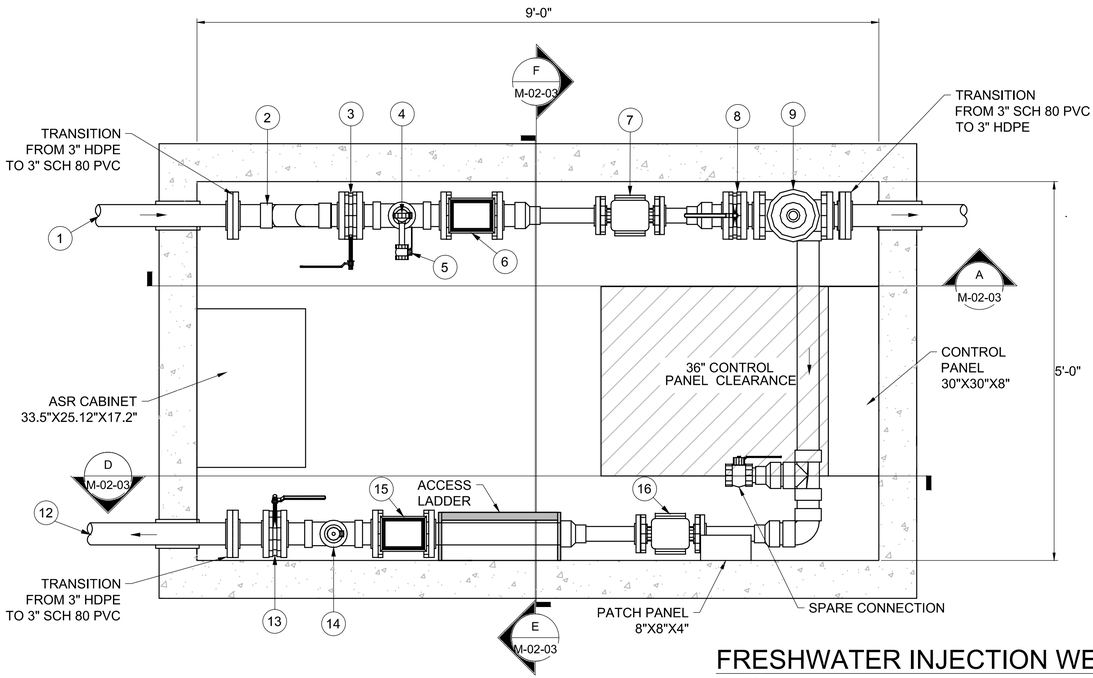
TOPOCK GROUNDWATER REMEDIATION PROJECT

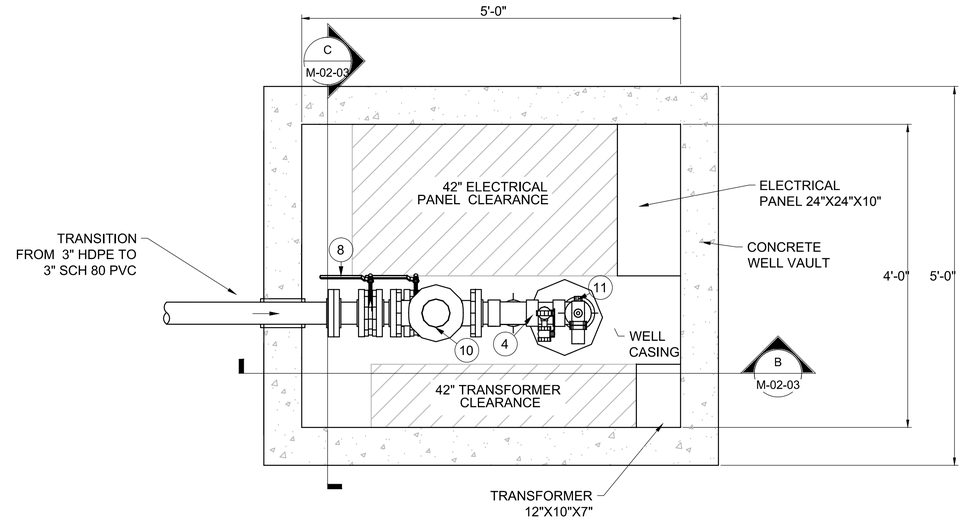
FRESHWATER INJECTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
M-02-01	REV 3

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FRESHWATER INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"

INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	3"	HDPE	FRESH WATER	1	FRESH WATER CONVEYANCE LINE	
2	3"	PVC	FRESH WATER	1	WYE STRAINER	
3	3"	PVC	FRESH WATER	1	ISOLATION BUTTERFLY VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0201A
4	1/2"	TBD	FRESH WATER	1	PRESSURE GAUGE ASSEMBLY	PIT-*0261/0262
5	1/4"	PVC	FRESH WATER	1	SAMPLE PORT	SP-*0201A
6	3"	TBD	FRESH WATER	1	ACTUATED GATE VALVE	FV-*0211
7	2"	TEFLON	FRESH WATER	1	MAGNETIC FLOW METER	FE-*0271
8	3"	PVC	FRESH WATER	1	BUTTERFLY VALVE	V-*0201G/0270
9	3"	TBD	FRESH WATER	1	PRESSURE REGULATOR	PCV-*0270
10	3"	PVC	FRESH WATER	1	CHECK VALVE	V-*0271
11	1/2"	TBD	FRESH WATER	1	AIR/VAC RELEASE ASSEMBLY	ARV-*0214
12	3"	PVC	BACKWASH WATER	3	BACKWASH CONVEYANCE LINE	
13	3"	PVC	BACKWASH WATER	3	BUTTERFLY VALVE	V-*0010/0201F
14	1/4"	PVC	BACKWASH WATER	3	SAMPLE PORT	SP-*0208
15	3"	TBD	BACKWASH WATER	3	ACTUATED GATE VALVE	FV-*0213
16	3"	TBD	BACKWASH WATER	3	MAGNETIC FLOW METER	FE-*0272

LEGEND

(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

0' 1' 2' 3'

SCALE: 0'-1" = 1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

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1	09/2012	INTERMEDIATE (60%) DESIGN		GJ	ML	JP	CH
0	11/2011	PRELIMINARY (30%) DESIGN		PC	EL	JP	CH

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

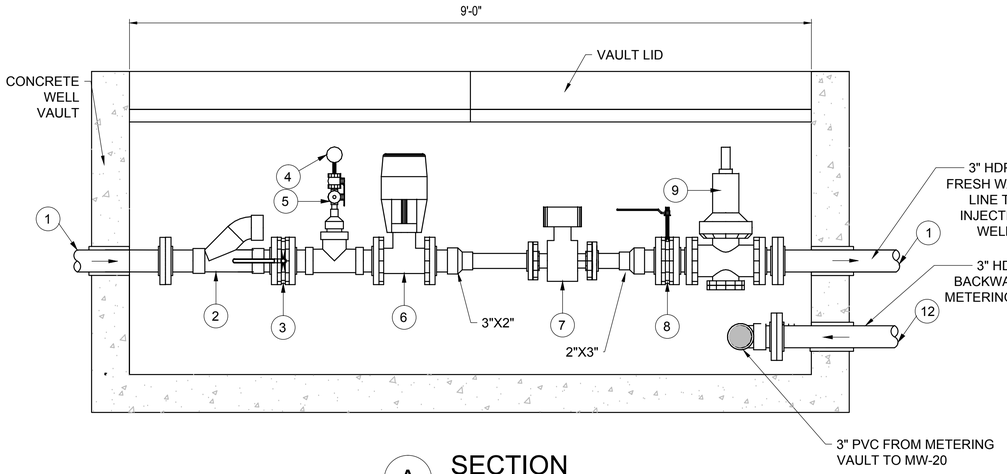
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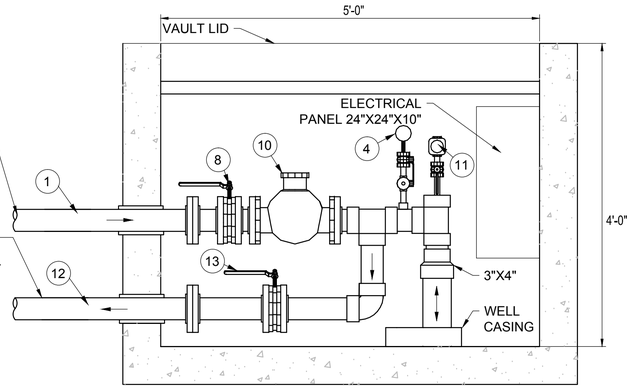
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LEGEND

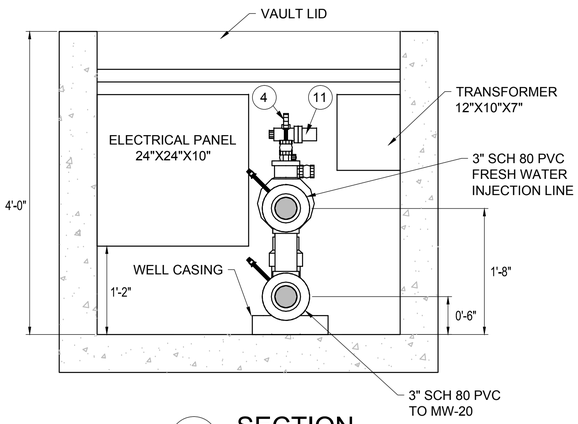
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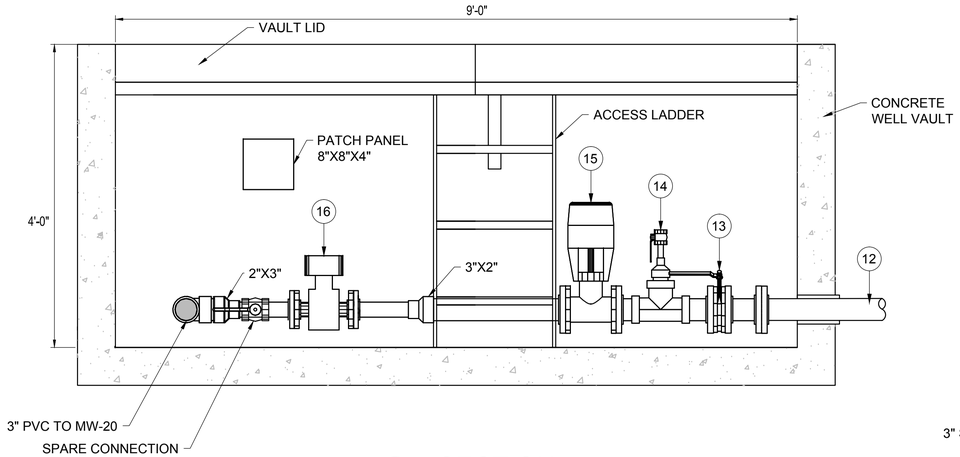
A SECTION
1"=1'-0"
M-02-02



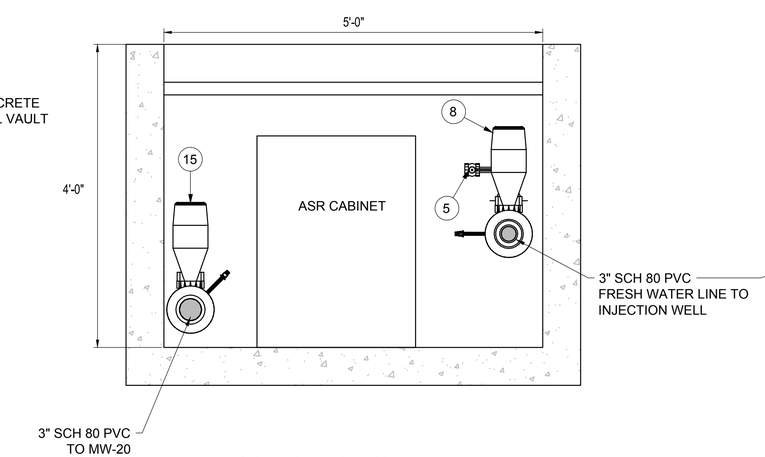
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1"=1'-0"
M-02-02



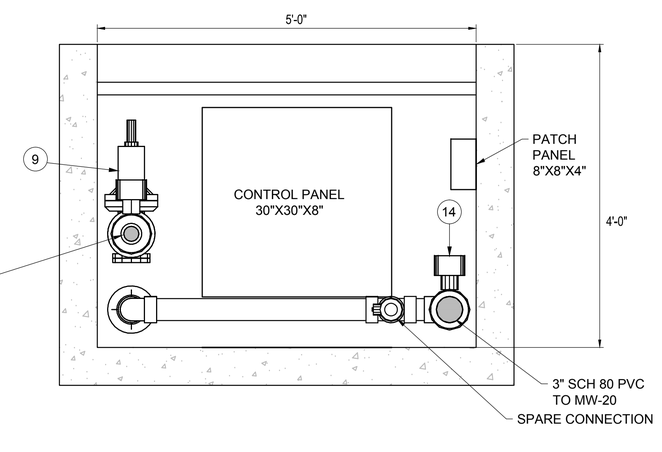
C SECTION
1"=1'-0"
M-02-02



D SECTION
1"=1'-0"
M-02-02



E SECTION
1"=1'-0"
M-02-02



F SECTION
1"=1'-0"
M-02-02

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

0' 1' 2' 3'
SCALE: 0'-1" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUEST
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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0	11/18/15	FINAL DESIGN	LUK	KLD	BW	RAO	

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RAO	SO
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	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

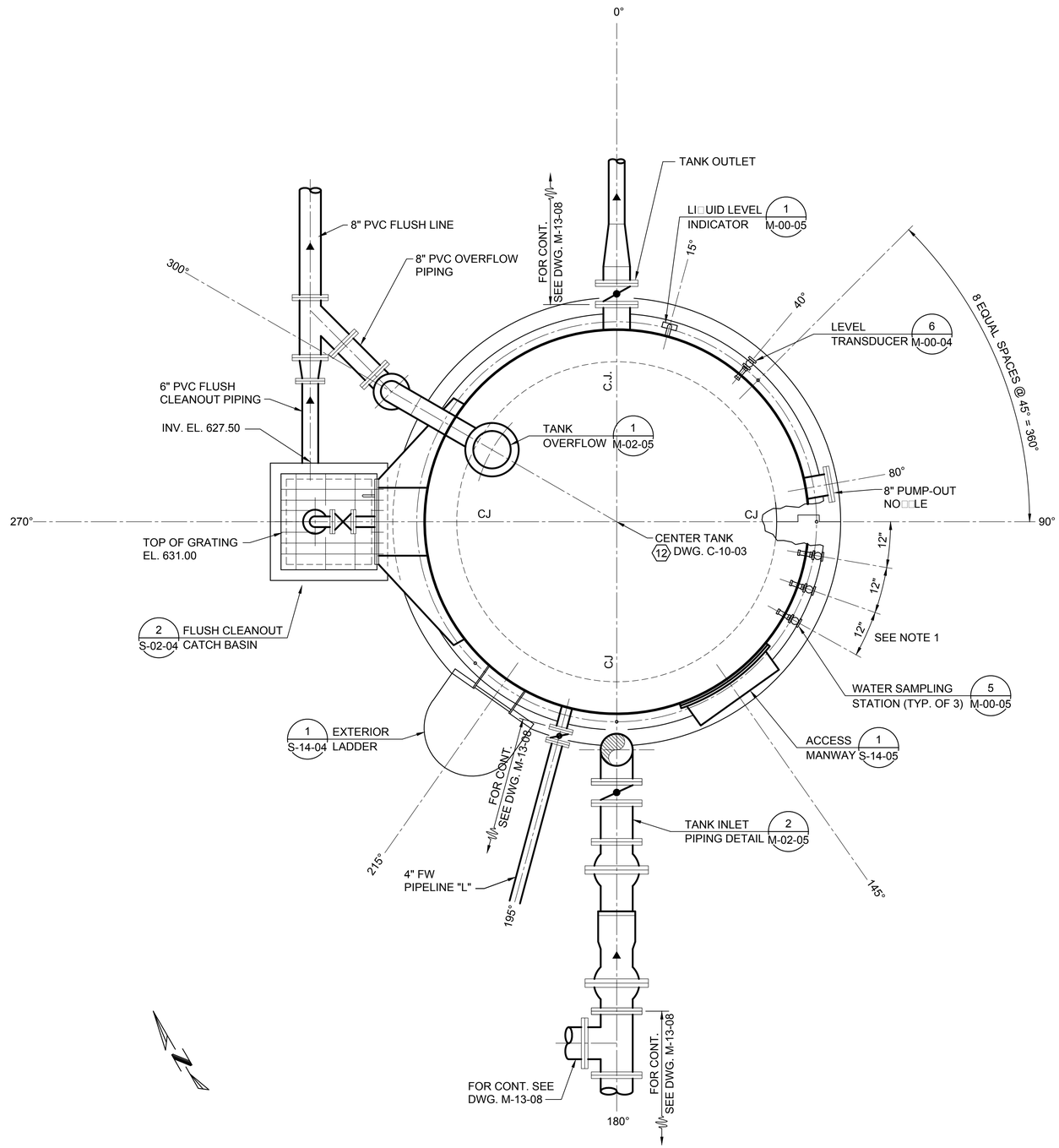
FRESHWATER INJECTION WELL VAULTS MECHANICAL SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-02-03	REV 0

N1808

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1 TANK PLAN
1/2" = 1'-0"
C-10-03

TANK SUPPLIER SCOPE OF WORK

1. PROVIDE AND INSTALL TANK SHELL, FLOOR AND ROOF
2. PROVIDE AND INSTALL (2) SHELL MANWAYS
3. PROVIDE AND INSTALL EXTERIOR LADDER
4. PROVIDE AND INSTALL ROOF PLATFORM AND HANDRAIL
5. PROVIDE AND INSTALL ROOF VENT
6. PROVIDE AND INSTALL FLUSH CLEANOUT
7. PROVIDE AND INSTALL TANK OVERFLOW PIPING TO DUCKBILL CV
8. PROVIDE AND INSTALL LIQUID LEVEL INDICATOR
9. PROVIDE AND INSTALL TRANSDUCER
10. PROVIDE AND INSTALL WATER SAMPLING STATION
11. PROVIDE AND INSTALL PAINTING AND COATING SYSTEM FOR TANK
12. PROVIDE AND INSTALL CATHODIC PROTECTION SYSTEM

NOTES:

1. MEASURED ALONG OUTSIDE FACE OF TANK WALL.
2. FOR TANK LOCATION AND EQUIPMENT PAD, SEE DWG. C-10-03.

0 1/2 1
SCALE: 1/2"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
0	9/8/14	PRE-FINAL (90%) DESIGN		WTH	KJ	VMB	VMB

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

REMEDY FRESHWATER STORAGE TANK MECHANICAL PLAN AND DETAILS

GAS TRANSMISSION & DISTRIBUTION

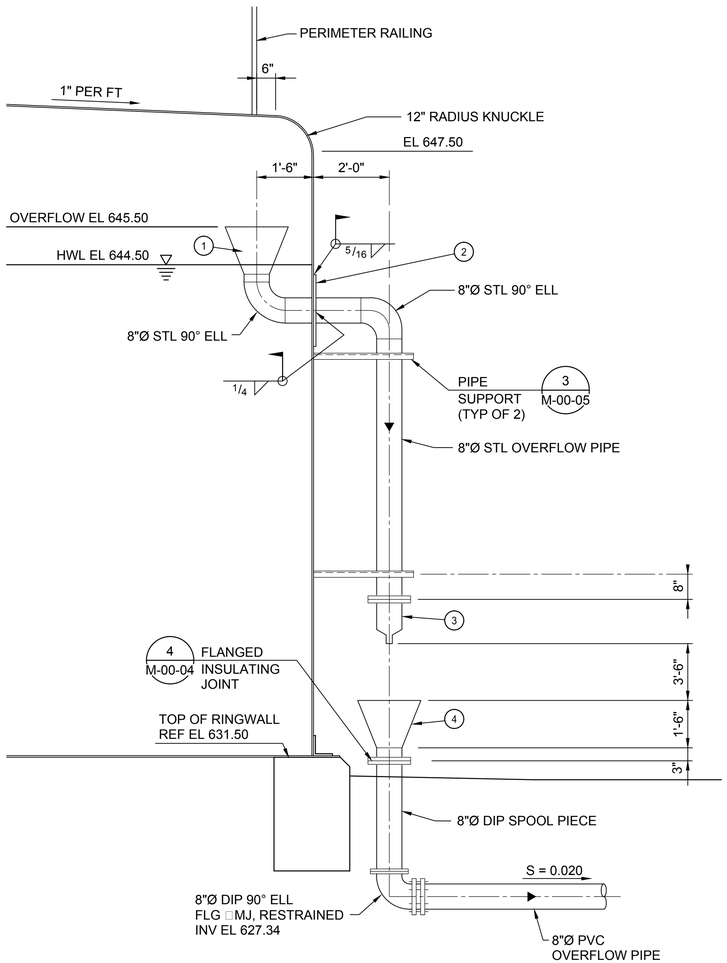
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. M-02-04 of SHEETS | REV 1

N1808

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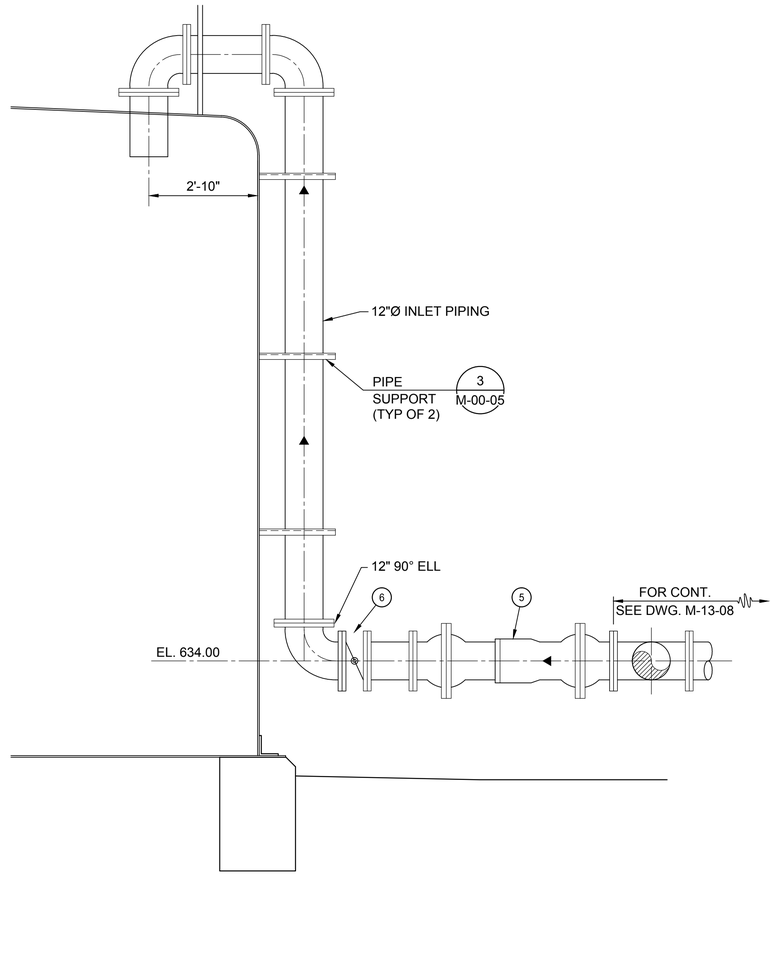


OVERFLOW PIPING

1 DETAIL

1/2" = 1'-0"

M-02-04



INLET PIPING

2 DETAIL

1/2" = 1'-0"

M-02-04

LEGEND:

(5) REFERENCE NUMBER IN SCHEDULE

SCHEDULE

ITEM	DESCRIPTION
1	20" □8" STEEL CONE, 3/8" WALL
2	3/8" MIN THK STL PLATE, 24" OD
3	ONYX VALVE CO 8" FLANGED "DUCKBILL" CHECK VALVE,
4	20" □8" STEEL CONE, 3/8" WALL, EPOXY COATED WITH SS 316 BIRDSCREEN ON WIDE END (TOP)
5	12" EBAA IRON "FLEXTEND" DOUBLE BALL EXPANSION JOINT, FLG □FLG
6	12" BFV, FLG □FLG

NOTES:

1. DIMENSIONS, WELDING, AND DETAILS NOT SHOWN SHALL BE AS PER TANK MANUFACTURER'S APPROVED SUBMITTALS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESEL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

0 1/2 1

SCALE: 1/2"=1'

ETIC ENGINEERING

ARCADIS

N1808

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
0	9/8/14	PRE-FINAL (90%) DESIGN	WTH	KJ	VMB	VMB	

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

REMEDY FRESH WATER STORAGE TANK MECHANICAL PLANS AND DETAILS

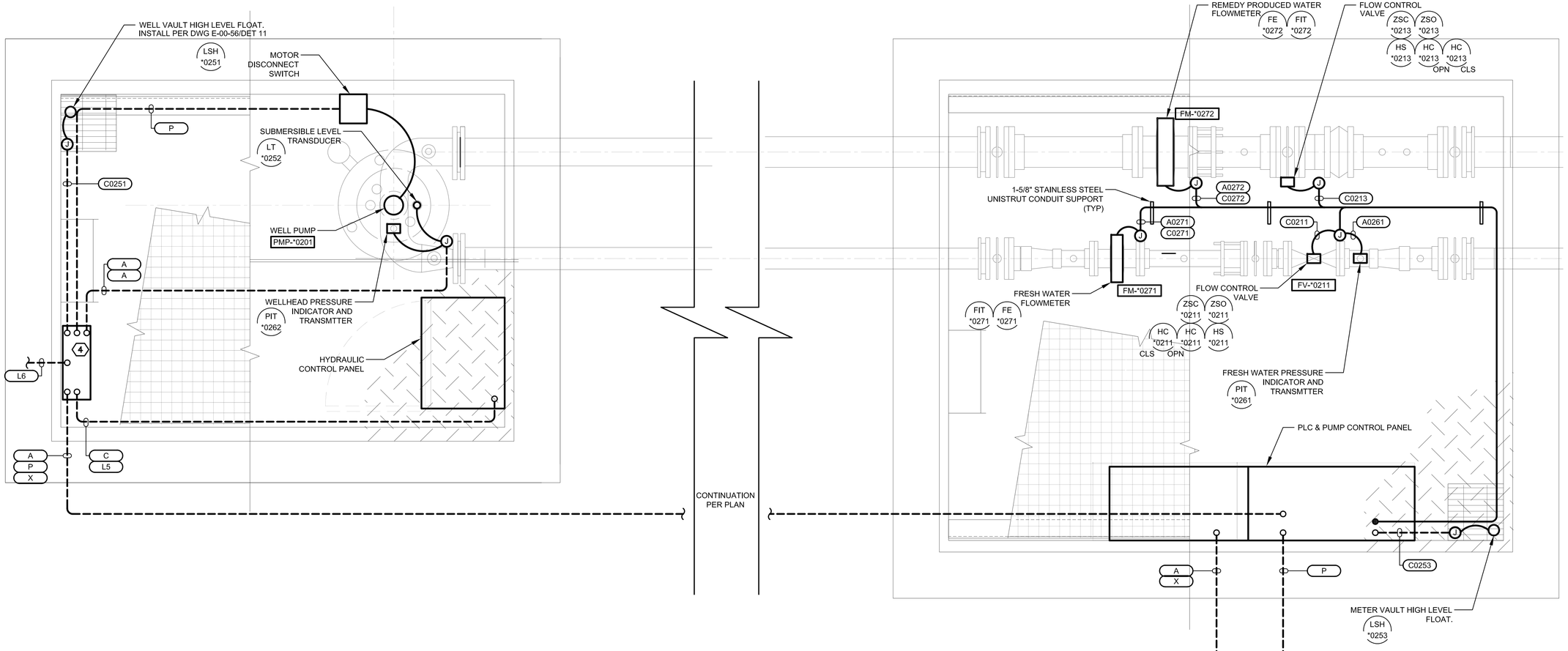
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-02-05	REV 1

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TYPICAL WELL AND METER VAULTS ELECTRICAL PLAN (1)(2)(3)

0 1 2 3

SCALE: 1"=1'

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) DRAWING TYPICAL FOR EQUIPMENT REQUIREMENTS AND LAYOUT WITHIN THE VAULTS. VAULT ORIENTATIONS ARE SITE SPECIFIC. SEE CIVIL DRAWINGS AND ELECTRICAL SITE PLANS FOR ORIENTATION.

(2) SIMILAR FOR FW-1 AND FW-2. SEE DRAWINGS E-02-02 THRU E-02-10 FOR FW ELECTRICAL SITE PLANS AND PLC & PUMP CONTROL PANEL.

(3) SIMILAR FOR IRL-1, 2, 3 & 4. SEE DRAWINGS E-05-01 THRU E-05-13 FOR IRL ELECTRICAL SITE PLANS AND PLC & PUMP CONTROL PANEL.

(4) 16"H X 14"W X 6"D, NEMA 4X STAINLESS STEEL JUNCTION BOX. JUNCTION BOX SHALL BE HOFFMAN CHNFSS OR EQUAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTA 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY		TPF	

REVISIONS

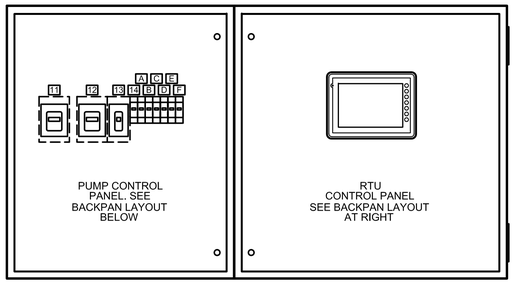
APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
TYPICAL INJECTION WELL WELL AND METER VAULTS ELECTRICAL PLAN (TYPICAL)
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

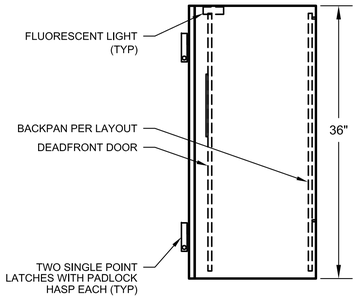
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-01	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:52:50pm
FILENAME: E-02-01.DWG
N1808



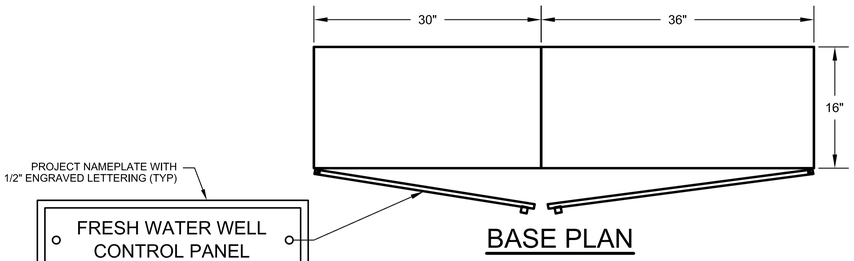
DEADFRONT DOOR ELEVATION

(SHOWN WITH OUTER DOOR REMOVED)

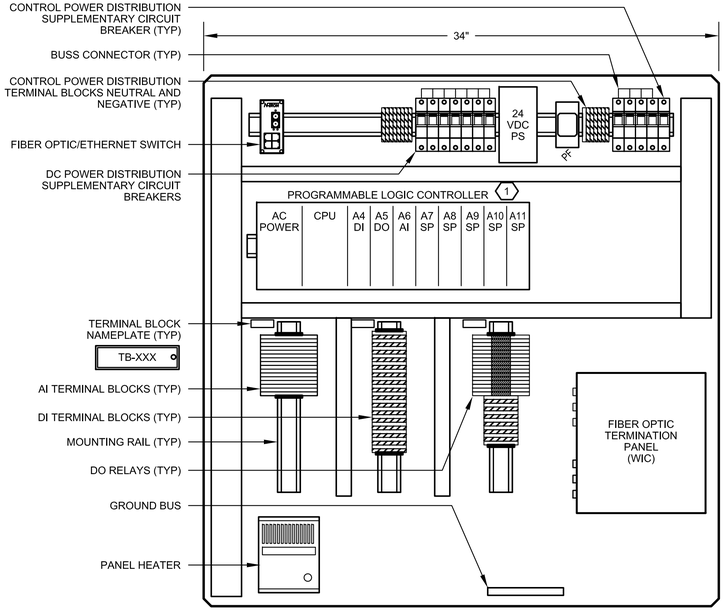


SIDE ELEVATION

ELEVATION

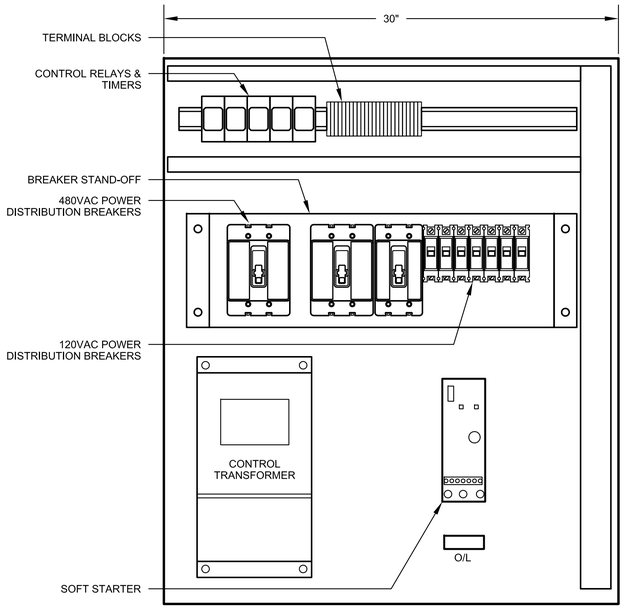


BASE PLAN



PLC PANEL BACKPAN LAYOUT

1 WIRE I/O TO TERMINAL BLOCK PER EXAMPLE I/O WIRING DIAGRAMS.



PUMP CONTROL PANEL BACKPAN LAYOUT

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
11	MAIN	DISCONNECT	3/16"
12	PUMP	DISCONNECT	3/16"
13	TRANSFORMER	DISCONNECT	3/16"
14	PANEL LP	DISCONNECT	3/16"
A	RTU	DISCONNECT	3/16"
B	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
C	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
D	MOTOR CONTROL		3/16"
E	SPARE BREAKER		3/16"
F	SPARE BREAKER		3/16"

PANEL FABRICATION METHODS

1. NEMA 4, SS, FOR INDOOR OR OUTDOOR WALLMOUNT INSTALLATION.
2. ALL SEAMS CONTINUOUS WELDED.
3. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY SINGLE POINT LATCHES.
4. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
5. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
6. INTERNAL SCREWS, BOLTS, AND NUTS SHALL BE MACHINE THREAD.
7. PLASTIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL DEVICES ON DEADFRONT SCREWS SHALL BE STAINLESS STEEL.
8. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
9. ALL WIRING SHALL BE PERMANENTLY LABELLED WITH WIRE MARKERS ON BOTH ENDS.
10. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
11. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOSTROM 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT

FRESHWATER INJECTION WELL FW-1 PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT

GAS TRANSMISSION & DISTRIBUTION

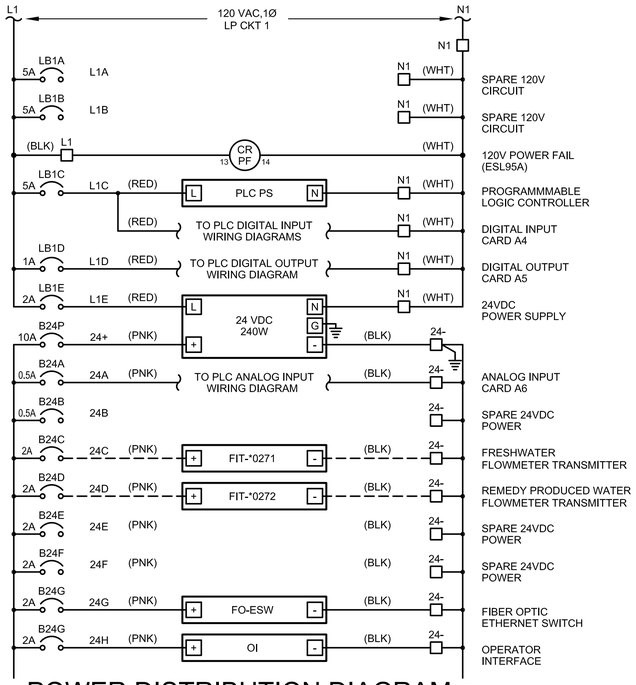
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-02	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:53:08pm

FILENAME: E-02-02.DWG

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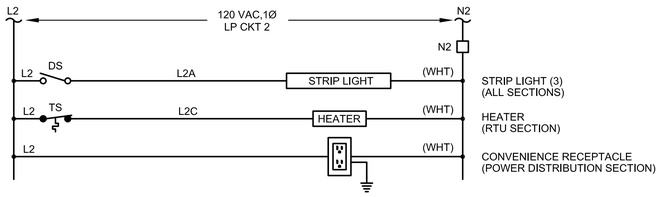
POWER DISTRIBUTION DIAGRAM 1

SCHEMATIC REFERENCED NOTES:

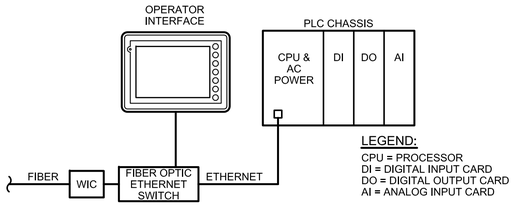
1. DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.

GENERAL NOTES:

1. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.

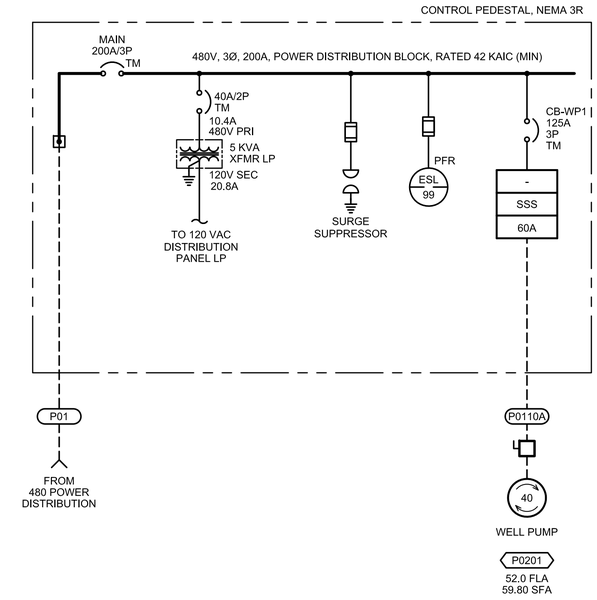


PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM

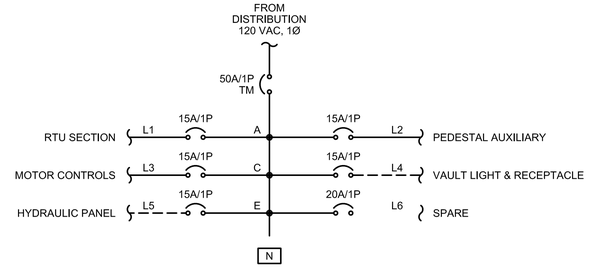


PLC BLOCK DIAGRAM

FW-1 - LOAD CALCULATIONS						
LOAD DESCRIPTION				LOAD	QTY	TOTAL
40 HP	INJECTION WELL			52.00 A	1	43232.0 VA
5	KVA PANELBOARD TRANSFORMER			10.42 A	1	5000.0 VA
			TOTAL LOAD =	58.01 A		48232.0 VA
LOAD CORRECTION FACTORS						
	LARGEST MOTOR LOAD x 25%:					
40	HP => 0.25 x	43232.0 VA	=	13.00 A		10808.0 VA
	80% BREAKER DERATING =	TOTAL x 0.25 =		17.75 A		14760.0 VA
	FOR CONTINUOUS LOADS NEC 210-20					
			UTILITY SERVICE SIZE (MIN) =	88.77 A		73800.0 VA
			480 V, 3 PHASE, 4 WIRE			
			UTILITY SERVICE SIZE REQUIRED =	200 AMP		



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDLE 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
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FOLSOM, CA 95630
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WWW.FRISCHENGINEERING.COM

ARCADIS

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REVISIONS

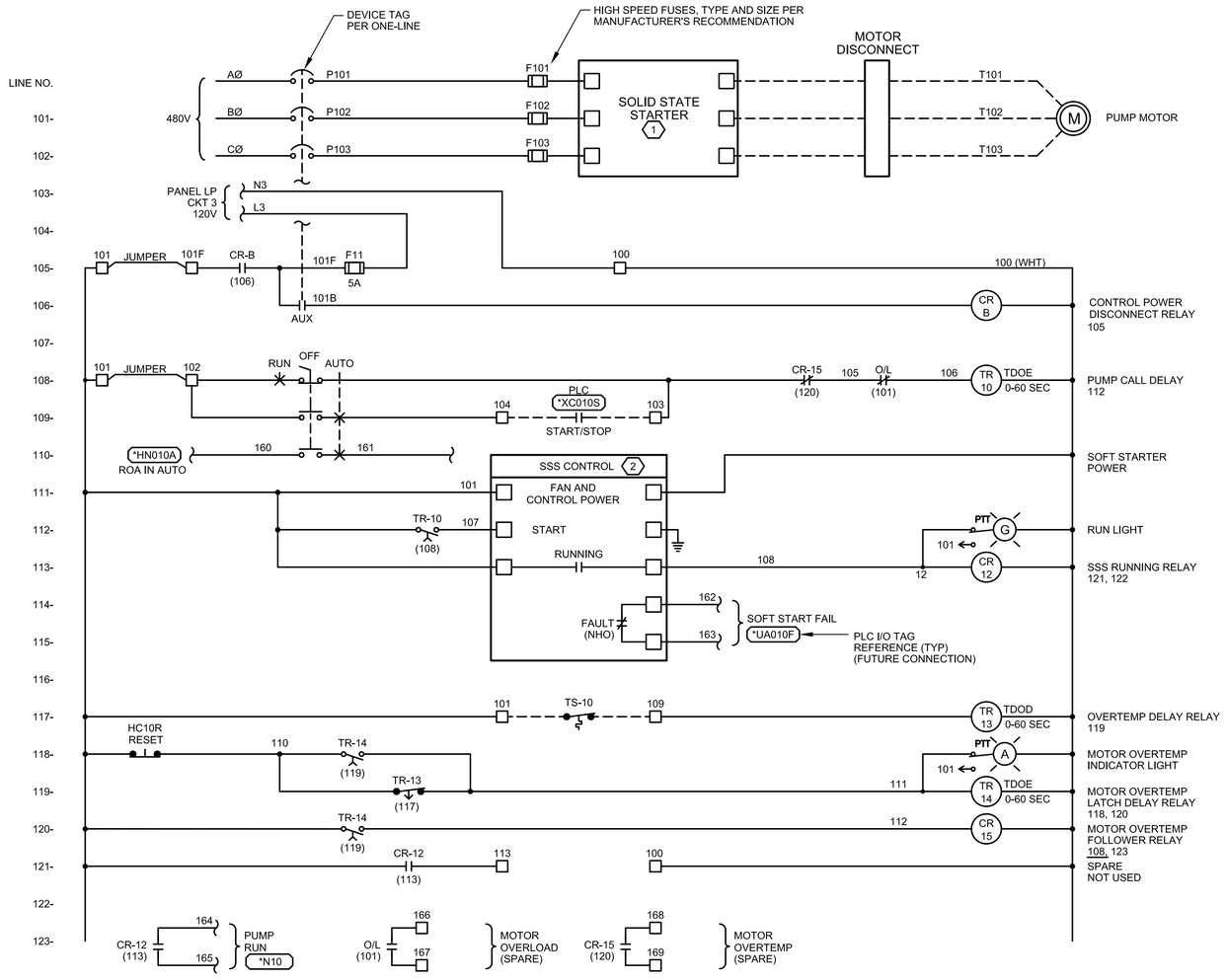
APPROVED BY		
RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-1 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

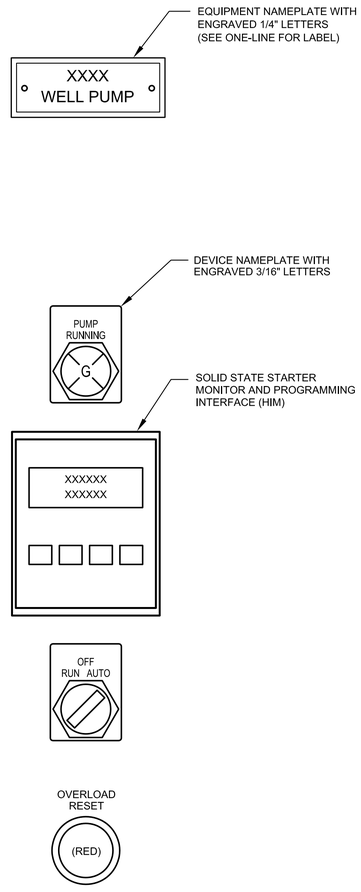
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-03	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:53:14pm
FILENAME: E-02-03.DWG

N1808



WELL PUMP ELEMENTARY DIAGRAM



DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:

VOLTAGE	CURRENT	MOTOR PARAMETERS
PHASE REVERSAL	OVERLOAD	OVERLOAD CLASS
	UNBALANCE	FULL LOAD CURRENT

2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDLE 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

MICROFILM

FRISCH ENGINEERING, INC.
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REVISIONS

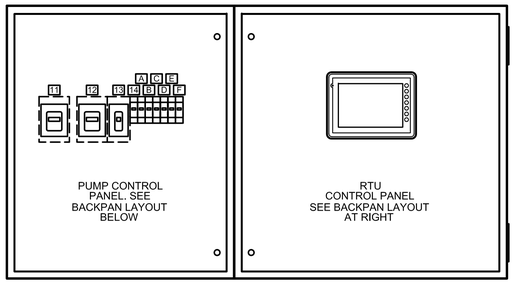
APPROVED BY		
RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-1 PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-04	REV 1

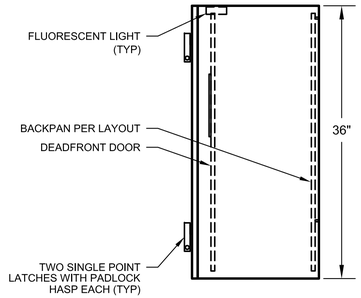
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PLOT DATE: Oct 29, 2015
PLOT TIME: 3:53:21pm

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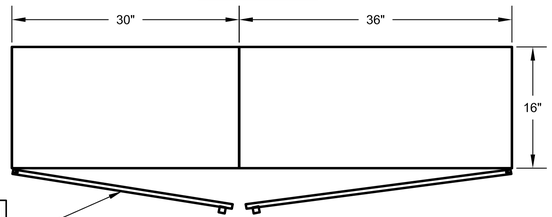
DEADFRONT DOOR ELEVATION

(SHOWN WITH OUTER DOOR REMOVED)

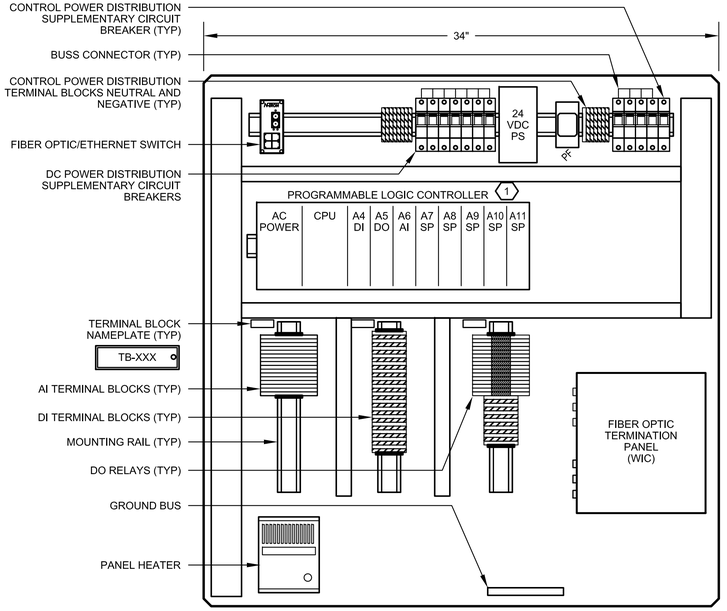


SIDE ELEVATION

ELEVATION

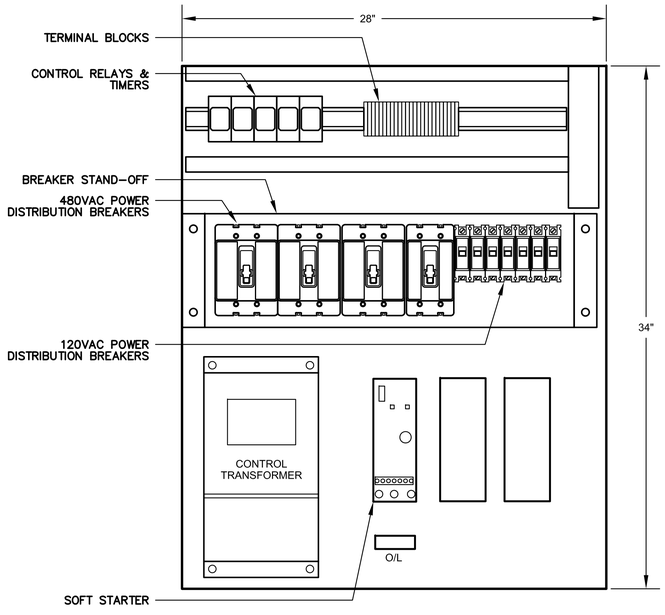


BASE PLAN



PLC PANEL BACKPAN LAYOUT

1 WIRE I/O TO TERMINAL BLOCK PER EXAMPLE I/O WIRING DIAGRAMS.



PUMP CONTROL PANEL BACKPAN LAYOUT

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
11	MAIN	DISCONNECT	3/16"
12	PUMP	DISCONNECT	3/16"
13	TRANSFORMER	DISCONNECT	3/16"
14	PANEL LP	DISCONNECT	3/16"
A	RTU	DISCONNECT	3/16"
B	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
C	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
D	MOTOR CONTROL		3/16"
E	SPARE BREAKER		3/16"
F	SPARE BREAKER		3/16"

PANEL FABRICATION METHODS

1. NEMA 4, SS, FOR INDOOR OR OUTDOOR WALLMOUNT INSTALLATION.
2. ALL SEAMS CONTINUOUS WELDED.
3. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY SINGLE POINT LATCHES.
4. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
5. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
6. INTERNAL SCREWS, BOLTS, AND NUTS SHALL BE MACHINE THREAD.
7. PLASTIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL DEVICES ON DEADFRONT SCREWS SHALL BE STAINLESS STEEL.
8. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
9. ALL WIRING SHALL BE PERMANENTLY LABELLED WITH WIRE MARKERS ON BOTH ENDS.
10. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
11. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDOWAY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

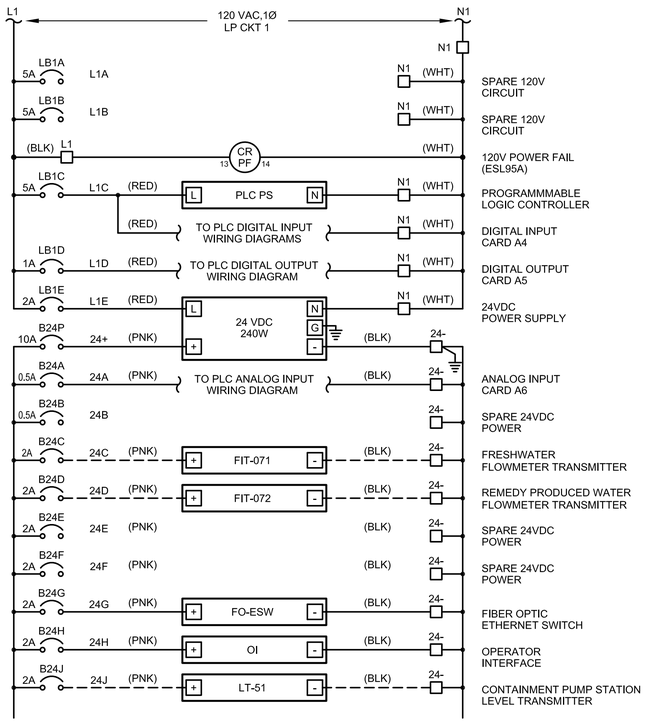
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-2 PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-05	REV 1

FILENAME: E-02-05.DWG
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:53:27pm

N1808



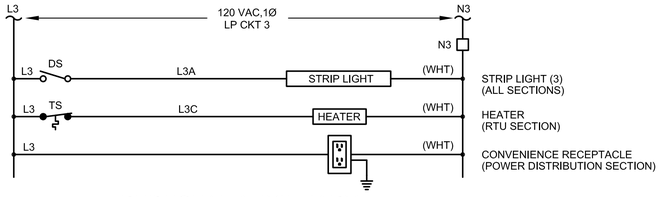
POWER DISTRIBUTION DIAGRAM (1)

SCHEMATIC REFERENCED NOTES:

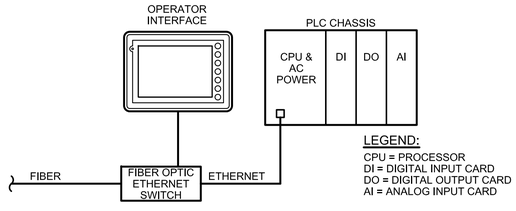
(1) DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.

GENERAL NOTES:

1. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.

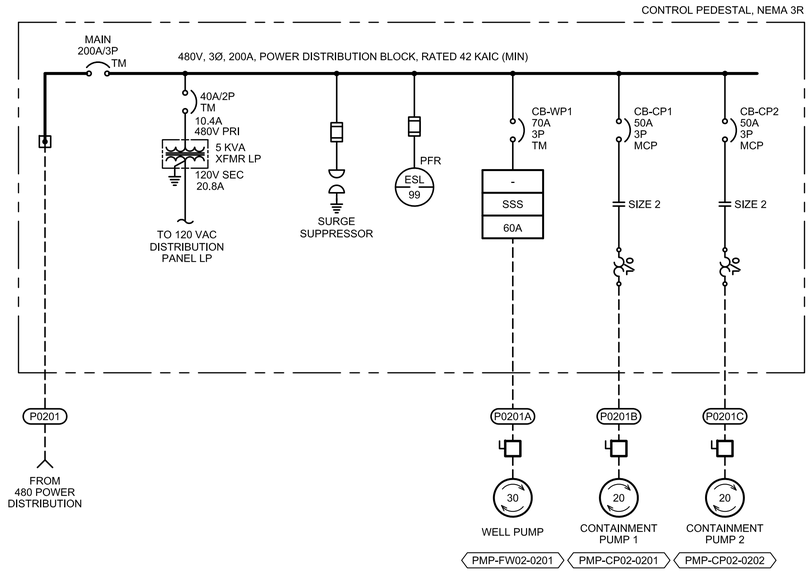


PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM

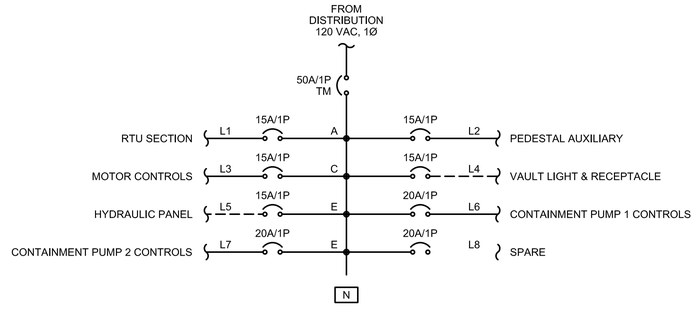


PLC BLOCK DIAGRAM

FW-2 - LOAD CALCULATIONS					
LOAD DESCRIPTION			LOAD	QTY	TOTAL
30 HP	INJECTION WELL		40.00 A	1	33255.4 VA
20 HP	CONTAINMENT PUMPS		27.00 A	2	44894.8 VA
5	KVA PANELBOARD TRANSFORMER		10.42 A	1	5000.0 VA
		TOTAL LOAD =	100.01 A		83150.1 VA
LOAD CORRECTION FACTORS					
	LARGEST MOTOR LOAD x 25%:				
30	HP => 0.25 x 33255.4 VA	=	10.00 A		8313.8 VA
	80% BREAKER DERATING =	TOTAL x 0.25 =	27.50 A		22866.0 VA
	FOR CONTINUOUS LOADS NEC 210-20				
		UTILITY SERVICE SIZE (MIN) =	137.52 A		114330.0 VA
		480 V, 3 PHASE, 4 WIRE			
		UTILITY SERVICE SIZE REQUIRED =	200 AMP		



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

REVISIONS																	
NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY	NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
								2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
								1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
								0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

APPROVED BY	RAO
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

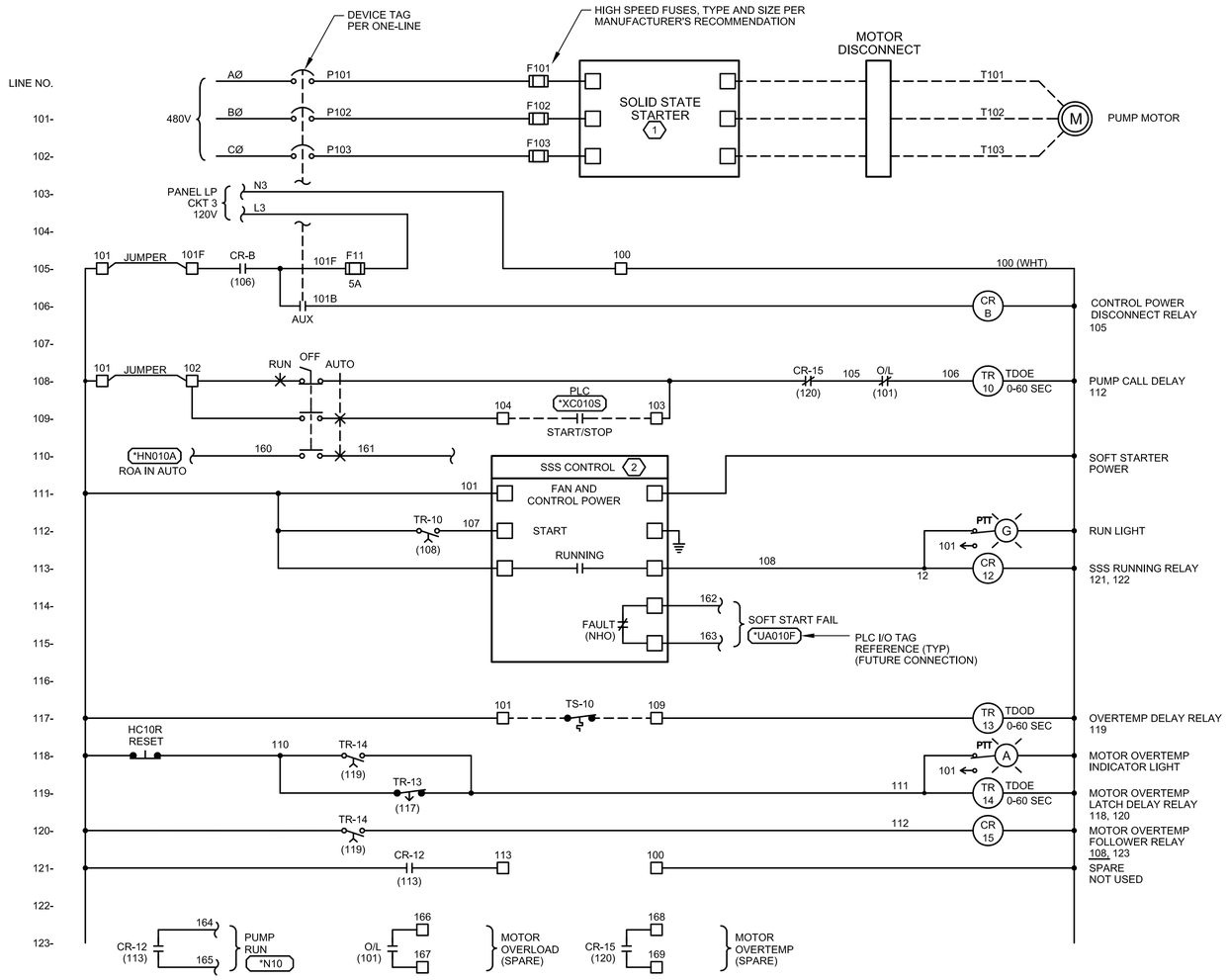
FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
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FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

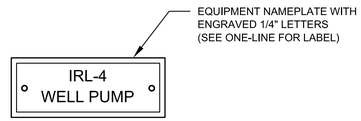
TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-2 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

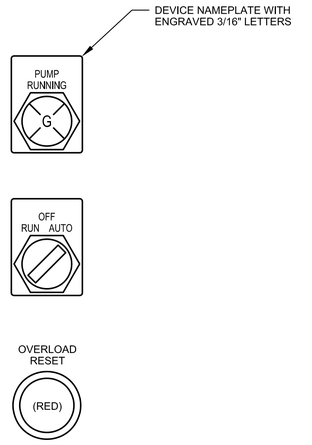
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-06	REV 1

FILENAME: E-02-06.DWG
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:53:33pm
N1808



WELL PUMP ELEMENTARY DIAGRAM





DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:

VOLTAGE	CURRENT	MOTOR PARAMETERS
PHASE REVERSAL	OVERLOAD	OVERLOAD CLASS
	UNBALANCE	FULL LOAD CURRENT

2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDOWAY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

MICROFILM

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FOLSOM, CA 95630
PH 916 353 1025
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NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

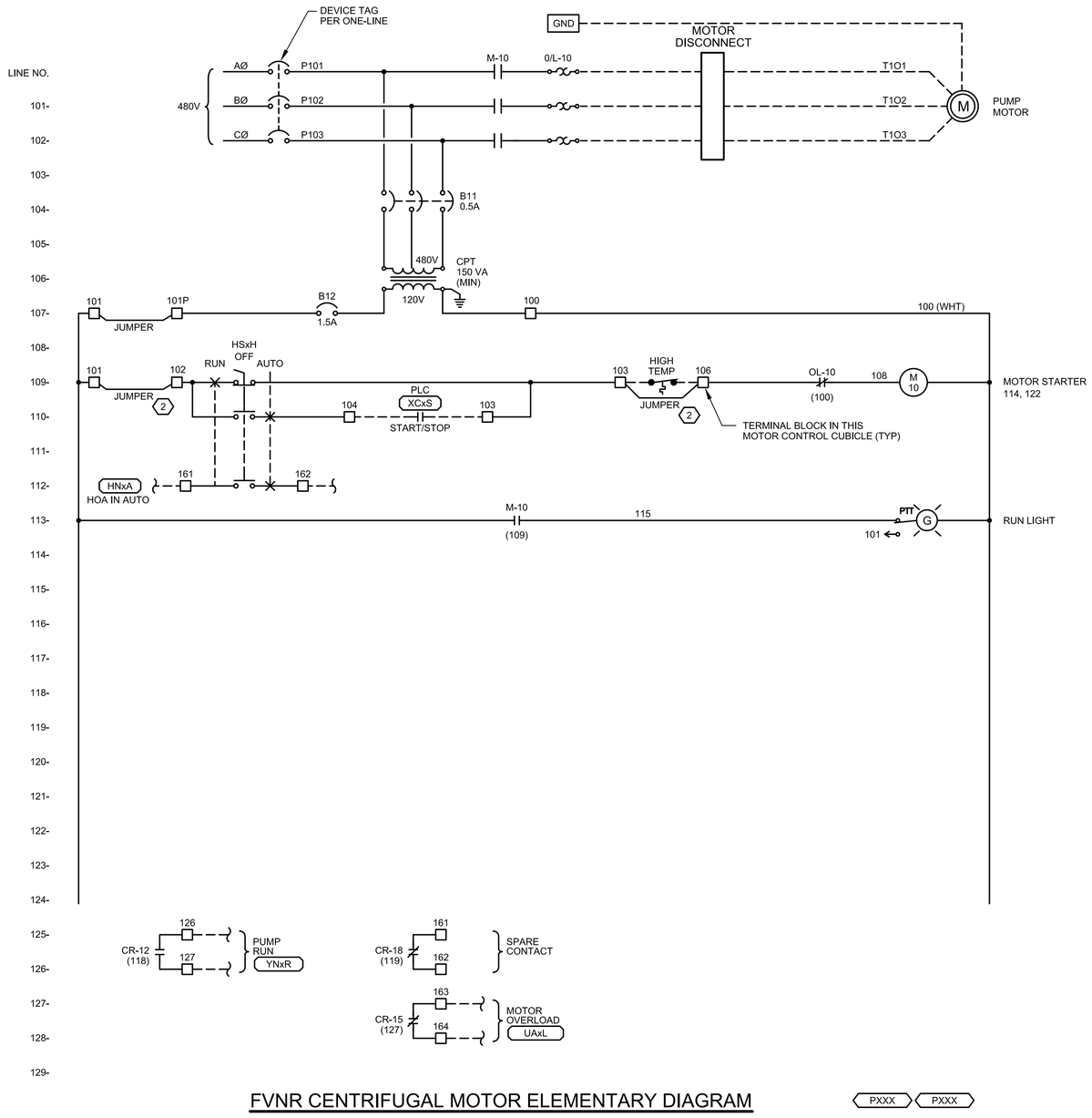
SO	
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DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-2 SSS PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-07	REV 1

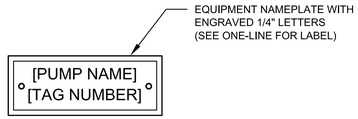
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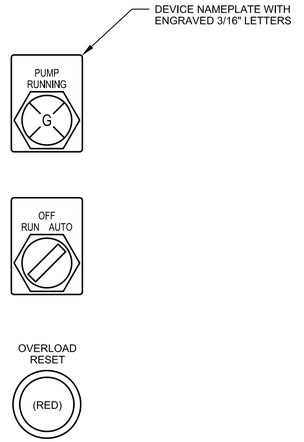
N1808



FVNR CENTRIFUGAL MOTOR ELEMENTARY DIAGRAM

PXXX PXXX





DOOR LAYOUT (PARTIAL)

DOOR LAYOUT

NOTES REFERENCED IN DRAWING:

1. SET TIME DELAY ON DROP TO 0.5 SECONDS.
2. REMOVE JUMPER FOR DEVICE WHEN CONNECTED.

GENERAL NOTES:

1. SIMILAR DIAGRAM FOR PUMPS LISTED AND PER P&IDS.
2. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOOTIS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

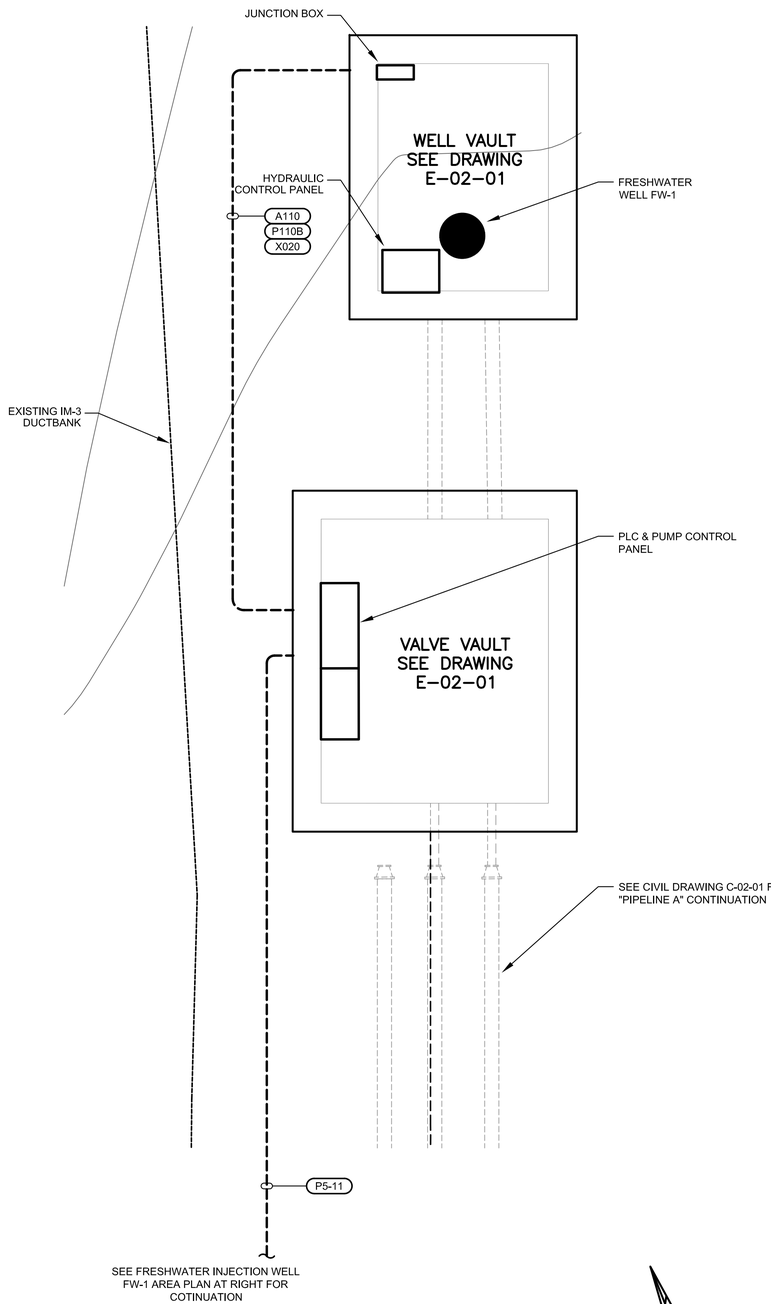
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESHWATER INJECTION WELL FW-2 FVNR PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-08	REV 1

FILENAME: E-02-08.DWG
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:53:47pm

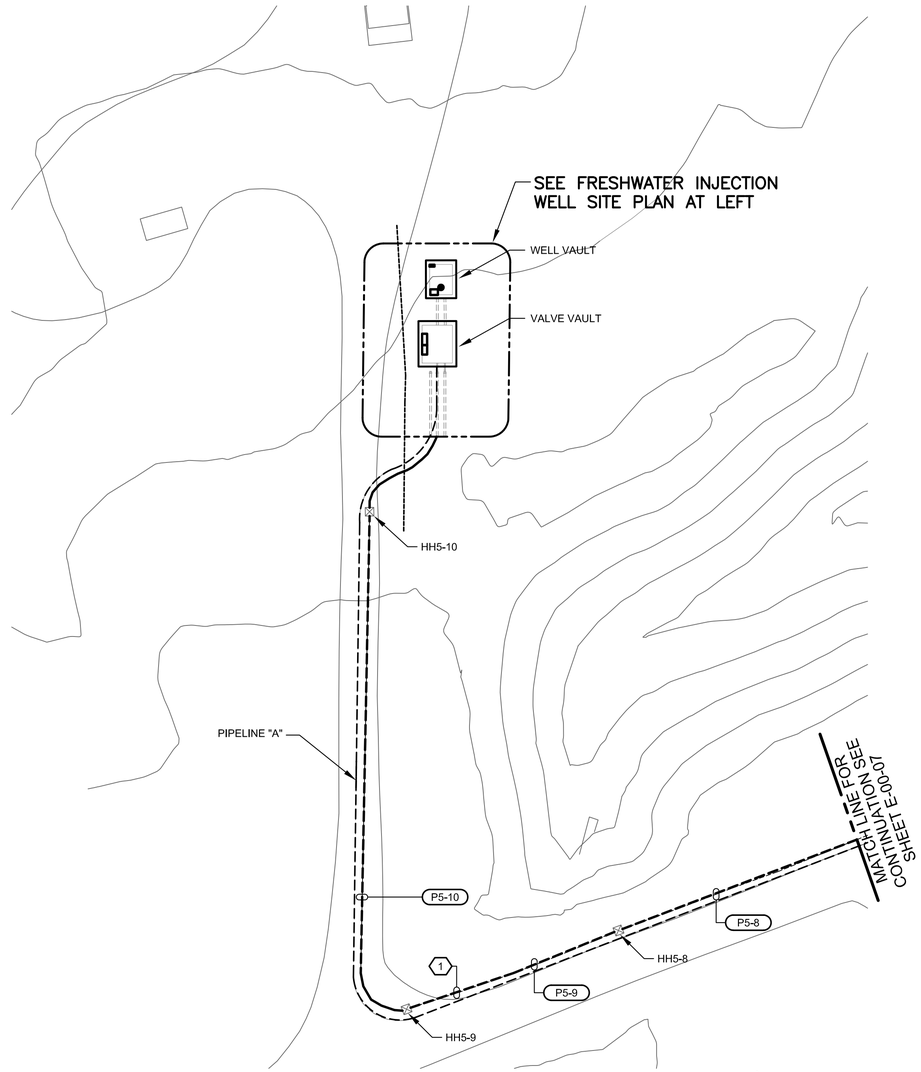
N1808



0 2.6 5.2 7.8

SCALE: 3/8"=1'

FRESHWATER INJECTION WELL FW-1 SITE PLAN



0 20 40 60

SCALE: 1"=20'

FRESHWATER INJECTION WELL FW-1 AREA PLAN

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-02-01.

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDDOWAY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.CO

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

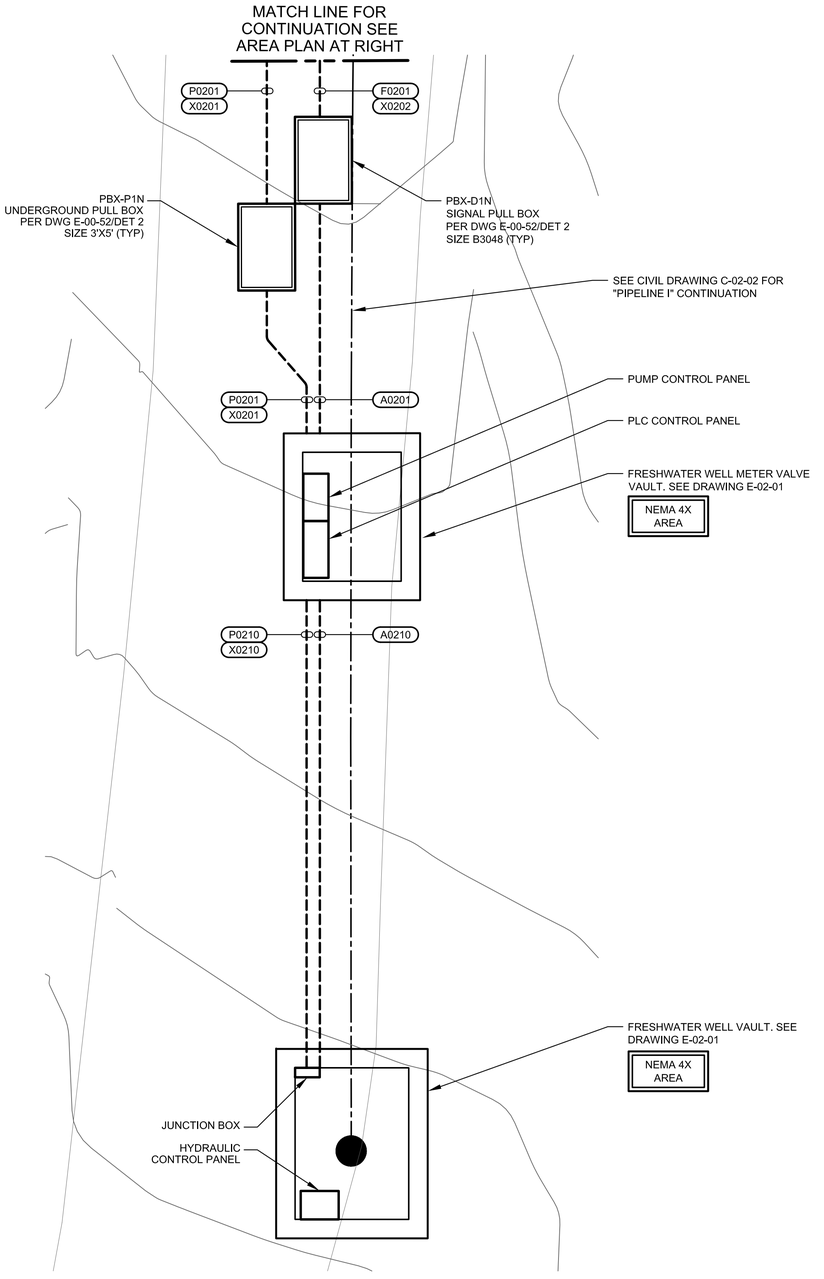
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESH WATER
INJECTION WELL FW-1
SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-02-09	REV 1

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:53:52pm
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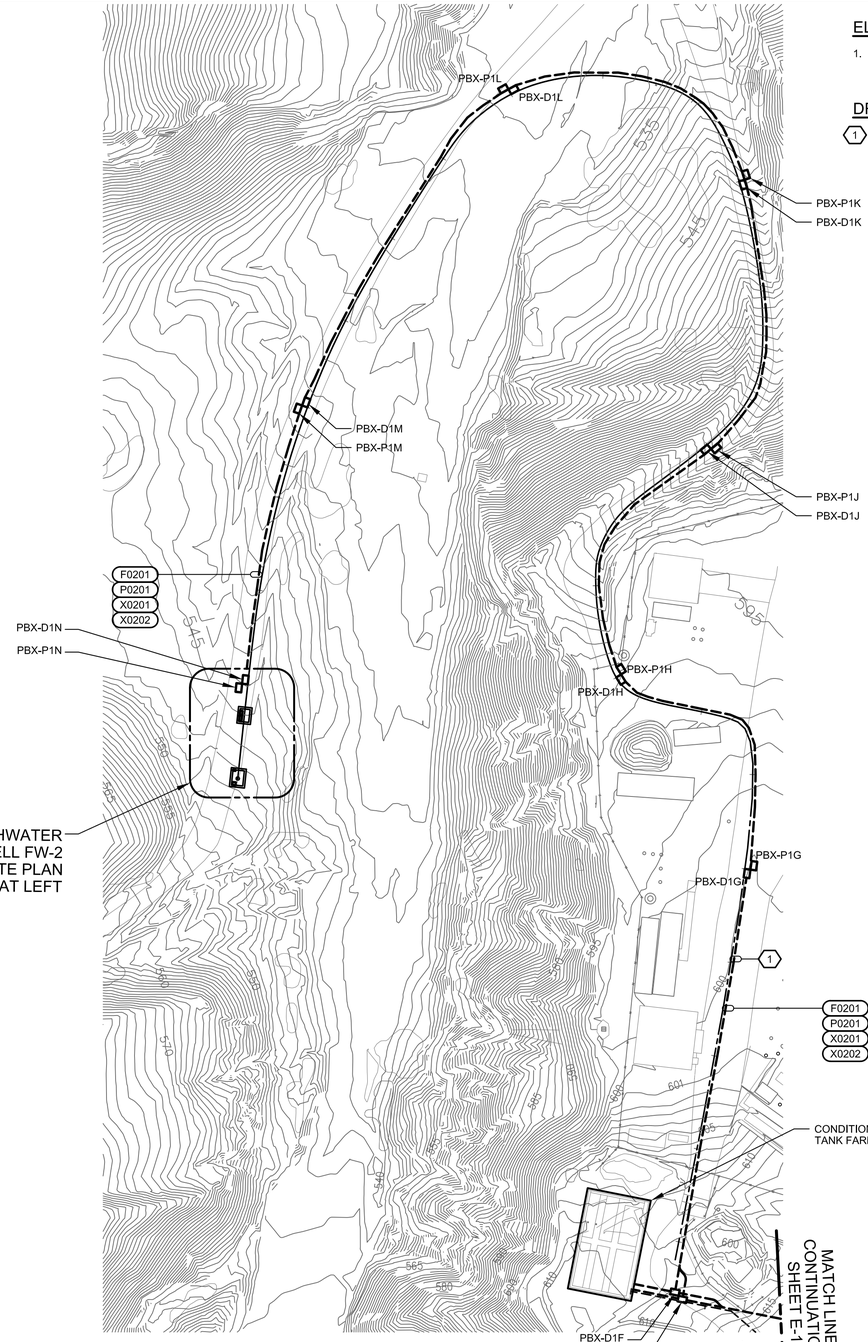
N1808



FRESHWATER INJECTION WELL FW-2 ELECTRICAL SITE PLAN

0 4 8 12

SCALE: 1/4"=1'



SEE FRESHWATER INJECTION WELL FW-2 ELECTRICAL SITE PLAN AT LEFT

0 20 40 60

SCALE: 1"=20'

FRESHWATER INJECTION WELL FW-2 AREA PLAN

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-02-02.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY		TPF	

REVISIONS

APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
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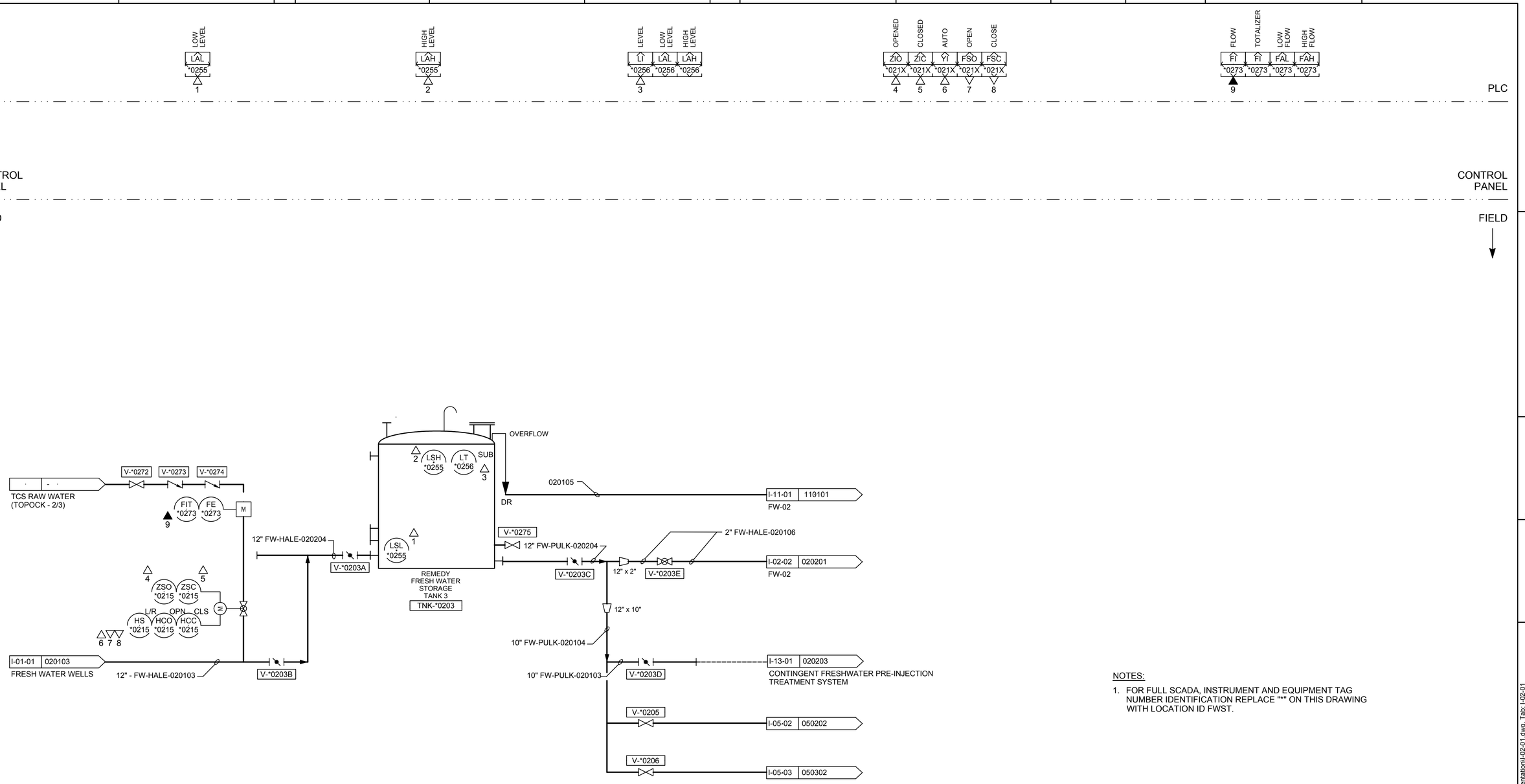
ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT
FRESH WATER INJECTION WELL FW-2 SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-02-10	REV 1

FILENAME: E-02-10.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:53:58pm

N1808



NOTES:

1. FOR FULL SCADA, INSTRUMENT AND EQUIPMENT TAG NUMBER IDENTIFICATION REPLACE "*" ON THIS DRAWING WITH LOCATION ID FWST.

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOANNE CAMPBELL
No. C 072178
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

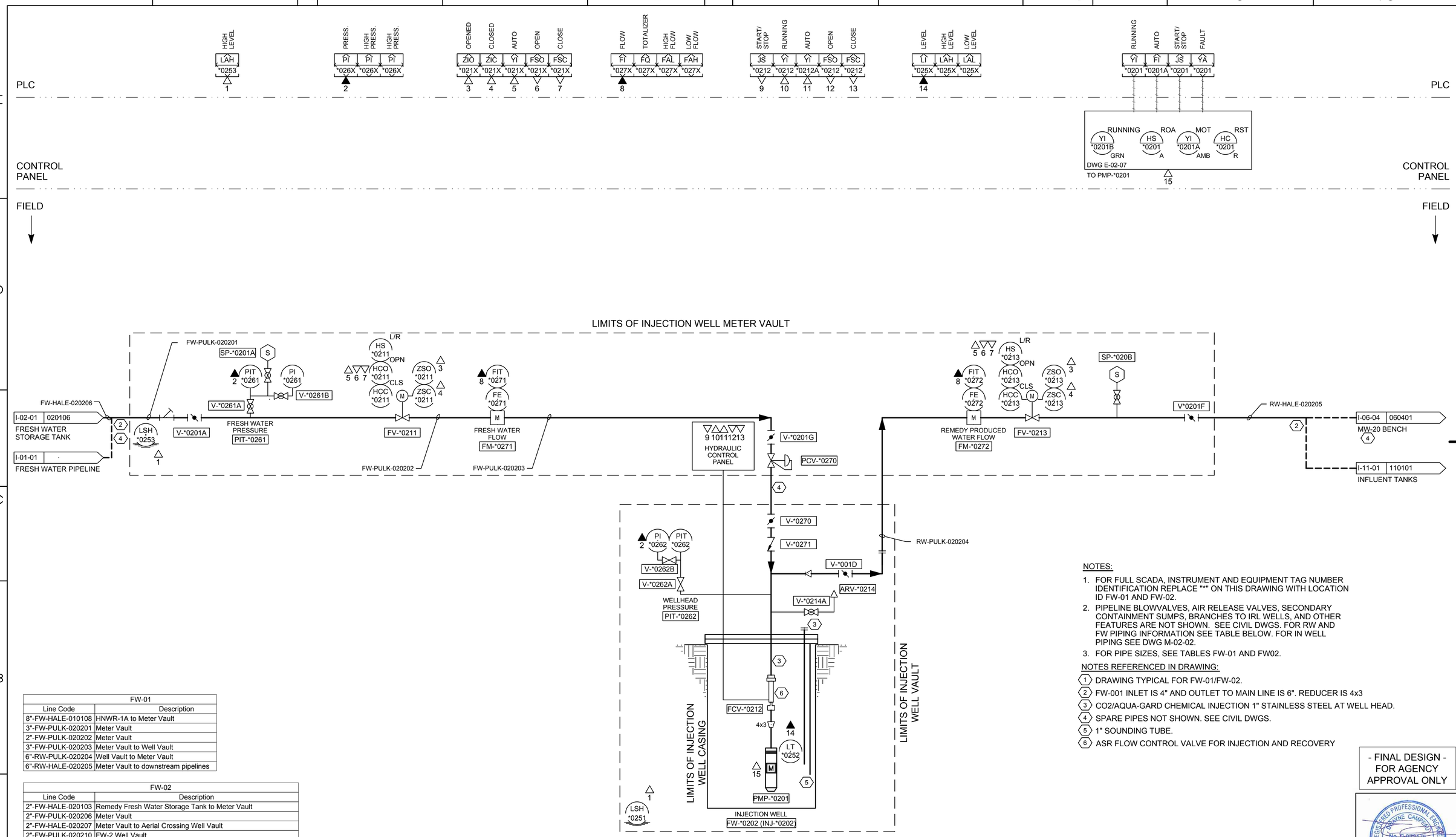
P&ID
FRESHWATER TANK

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-02-01	REV 2

N1808

11/03/2015, 17:13, G:\Graphics\ARI\TOPOCK-01\Submittal_100%\DWG\s\I-Instrumentation\I-02-01.dwg, Tab: I-02-01



FW-01	
Line Code	Description
8"-FW-HALE-010108	HNWR-1A to Meter Vault
3"-FW-PULK-020201	Meter Vault
2"-FW-PULK-020202	Meter Vault
3"-FW-PULK-020203	Meter Vault to Well Vault
6"-RW-PULK-020204	Well Vault to Meter Vault
6"-RW-HALE-020205	Meter Vault to downstream pipelines

FW-02	
Line Code	Description
2"-FW-HALE-020103	Remedy Fresh Water Storage Tank to Meter Vault
2"-FW-PULK-020206	Meter Vault
2"-FW-HALE-020207	Meter Vault to Aerial Crossing Well Vault
2"-FW-PULK-020210	FW-2 Well Vault
4"-RW-PULK-020211	FW-2 Well Vault
4"-RW-HALE-020212	Well Vault to Meter Vault
4"-RW-PULK-020215	Meter Vault
4"-RW-HALE-020216	Meter Vault to Influent Tank Farm

NOTES:

1. FOR FULL SCADA, INSTRUMENT AND EQUIPMENT TAG NUMBER IDENTIFICATION REPLACE "*" ON THIS DRAWING WITH LOCATION ID FW-01 AND FW-02.
2. PIPELINE BLOWVALVES, AIR RELEASE VALVES, SECONDARY CONTAINMENT SUMPS, BRANCHES TO IRL WELLS, AND OTHER FEATURES ARE NOT SHOWN. SEE CIVIL DWGS. FOR RW AND FW PIPING INFORMATION SEE TABLE BELOW. FOR IN WELL PIPING SEE DWG M-02-02.
3. FOR PIPE SIZES, SEE TABLES FW-01 AND FW02.

NOTES REFERENCED IN DRAWING:

1. DRAWING TYPICAL FOR FW-01/FW-02.
2. FW-001 INLET IS 4" AND OUTLET TO MAIN LINE IS 6". REDUCER IS 4x3
3. CO2/AQUA-GARD CHEMICAL INJECTION 1" STAINLESS STEEL AT WELL HEAD.
4. SPARE PIPES NOT SHOWN. SEE CIVIL DWGS.
5. 1" SOUNDING TUBE.
6. ASR FLOW CONTROL VALVE FOR INJECTION AND RECOVERY

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHNNIE CAMPBELL No. 6072176 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
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2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF	
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

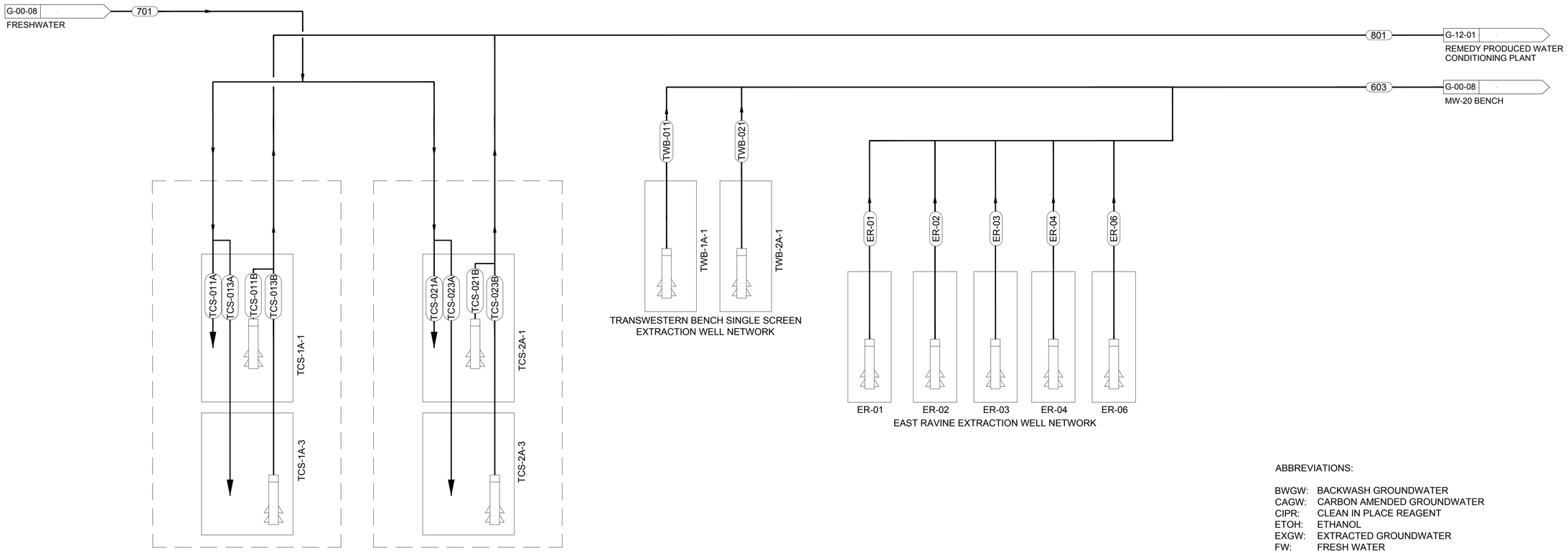
P&ID INJECTION WELL

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-02-02	REV 3

N1808

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ABBREVIATIONS:

BWGW:	BACKWASH GROUNDWATER
CAGW:	CARBON AMENDED GROUNDWATER
CIPR:	CLEAN IN PLACE REAGENT
ETOH:	ETHANOL
EXGW:	EXTRACTED GROUNDWATER
FW:	FRESH WATER
GPD:	GALLONS PER DAY
GPM:	GALLONS PER MINUTE
IRL:	INNER RECIRCULATION LOOP
IRZ:	IN-SITU REACTIVE ZONE
lbs/day	POUNDS PER DAY
mg/L:	MILLIGRAMS PER LITER
NTH:	NATIONAL TRAIL HIGHWAY
TOC:	TOTAL ORGANIC CARBON
TW:	TREATED WATER
WMR:	WELL MAINTENANCE REAGENT
µg/L:	MICROGRAMS PER LITER

Design Basis and Mass Balance[a]

Stream ID:	601	602	603	801	701	TWB-011	TWB-021	ER-01	ER-02	ER-03	ER-04	ER-06	TCS-011A	TCS-013A	TCS-021A	TCS-023A	TCS-XXXB
Stream Description:	**EXGW**	**EXGW**	**EXGW**	**BWGW**	**FW**	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW	CAGW	CAGW	CAGW	CAGW	BWGW[f]
Nominal Design Parameters																	
Flow Rate (GPM):	**5**	**22**	**27**	**12**	**TBD**	13	9	0.5	0.5	0.5	0.5	3	6	6	6	6	g
Carbon Substrate[b,c] (GPD):	**---**	**---**		**---**	**---**	---	---	---	---	---	---	---	2.1	2.1	2.1	2.1	---
TOC[b,c] (mg/L):	**---**	**---**		**---**	**---**	---	---	---	---	---	---	---	100	100	100	100	---
Chromium[d] (µg/L):	**77**	**3,914**	**3,189**	**---**	**---**	4,200	3,500	400	250	65	55	2460	---	---	---	---	---
Chromium[d] (lbs/day):	**4.6E-03**	**1.0E+00**	**1.0E+00**	**---**	**---**	6.5E-01	3.8E-01	2.4E-03	1.5E-03	3.9E-04	3.3E-04	8.8E-02	---	---	---	---	---
Maximum Design Parameters																	
Flow Rate (GPM):	**9**	**30**	**39**	**40**	**TBD**	15	15	1	1	1	1	5	20	20	20	20	g
Carbon Substrate[b,c] (GPD):	**---**	**---**		**---**	**---**	---	---	---	---	---	---	---	35	35	35	35	---
TOC[b,c] (mg/L):	**---**	**---**		**---**	**---**	---	---	---	---	---	---	---	500	500	500	500	---
Chromium[d] (µg/L):	**86**	**3,850**	**2,981**	**---**	**---**	4,200	3,500	400	250	65	55	2460	---	---	---	---	---
Chromium[d] (lbs/day):	**9.2E-03**	**1.4**	**1.4**	**---**	**---**	7.5E-01	6.3E-01	4.8E-03	3.0E-03	7.8E-04	6.6E-04	1.5E-01	---	---	---	---	---

Typ. For XXX = 011 to 023

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Maximum delivered volume = 2,700 gallons.
f - Single pump operation, in succession.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		KLD	BJW	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		KLD	BJW	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO / SUPV / DSGN / DWN / CHKD / OK / DATE / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

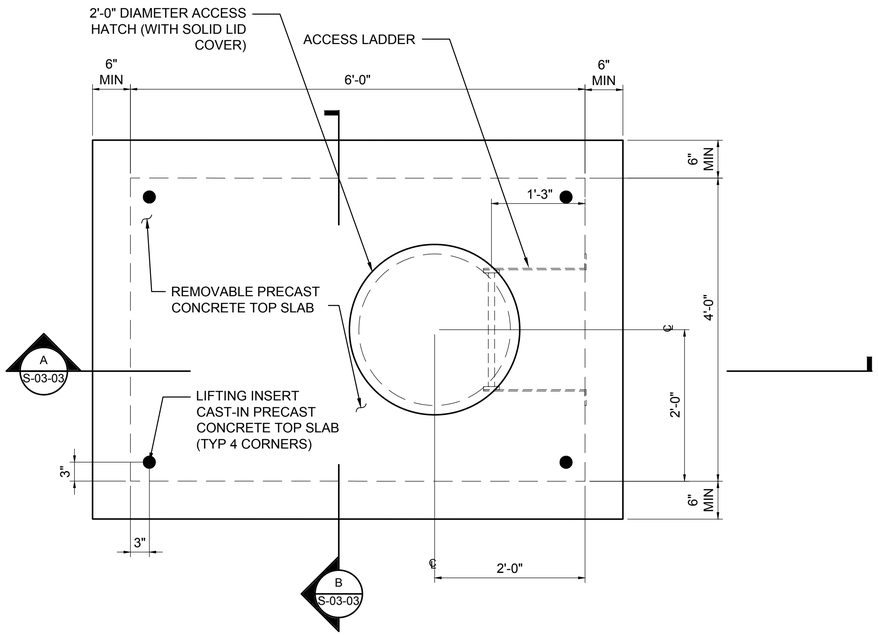
SHEET NO. of SHEETS

G-03-01 | REV 2

ETIC ENGINEERING | ARCADIS

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WELL METER VAULT

TCS LOOP EXTRACTION WELL METER VAULT TYPE 2 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. ACCESS HATCH, SOLID LID, AND FRAME TO BE HIGHWAY RATED (HS20-44) AND MANUFACTURED BY NEENAH FOUNDRY OR EAST JORDAN IRON WORKS.
8. PROVIDE 90° HOOK AT ENDS OF TOP AND BOTTOM RESTEEL IN WELL METER VAULT TOP SLAB WITHIN 1'-6" OF LIFTING INSERTS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWES
61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EXTRACTION WELL METER VAULTS - TYPE 2 TOP PLAN

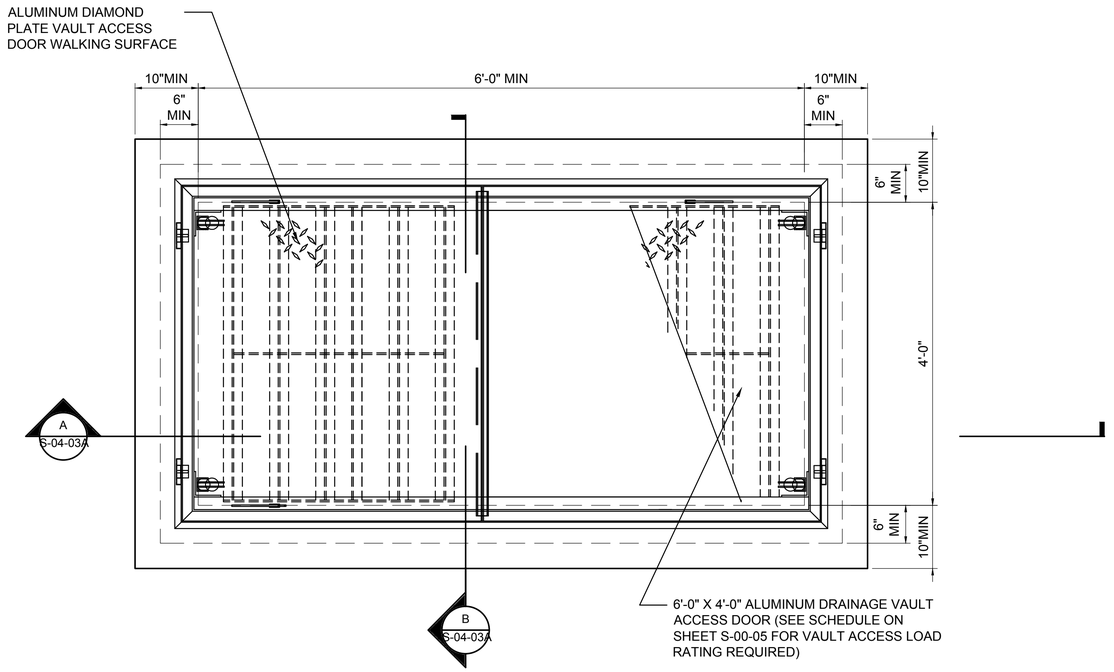
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-03-01	REV 2

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N1808



WELL METER VAULT

TCS LOOP EXTRACTION WELL METER VAULT TYPE 1 - TOP PLAN

1" = 1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOUIS
No. C 61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
REVISIONS							
0	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
REVISIONS							

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EXTRACTION WELL METER VAULTS - TYPE 1 TOP PLAN

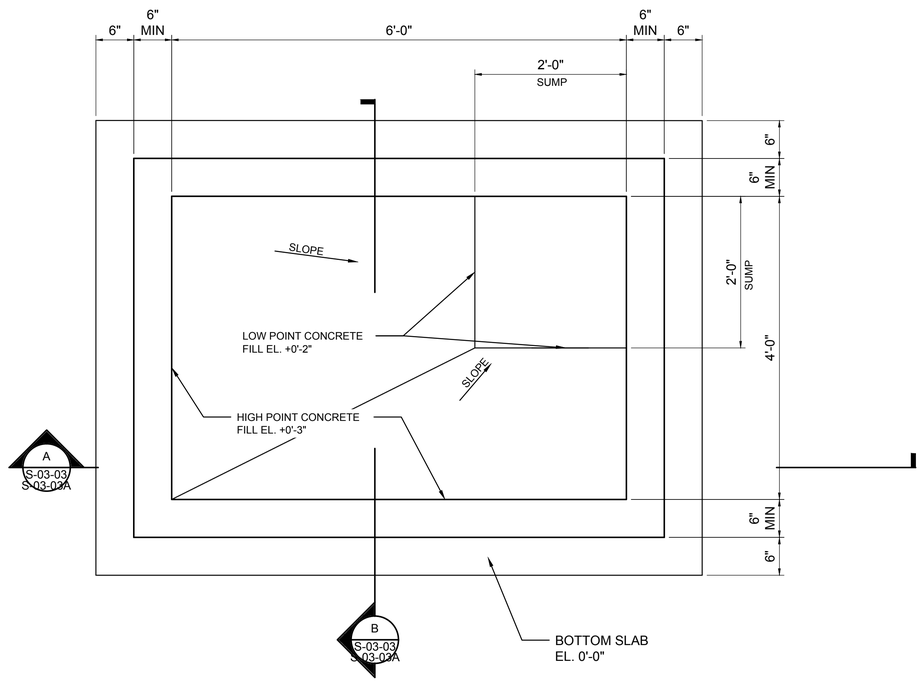
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
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WELL METER VAULT

TCS LOOP EXTRACTION WELL METER VAULT- TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWES
No. 81650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	GWE	MSL	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EXTRACTION WELL METER VAULTS - TYPES 1 AND 2 - FOUNDATION PLAN

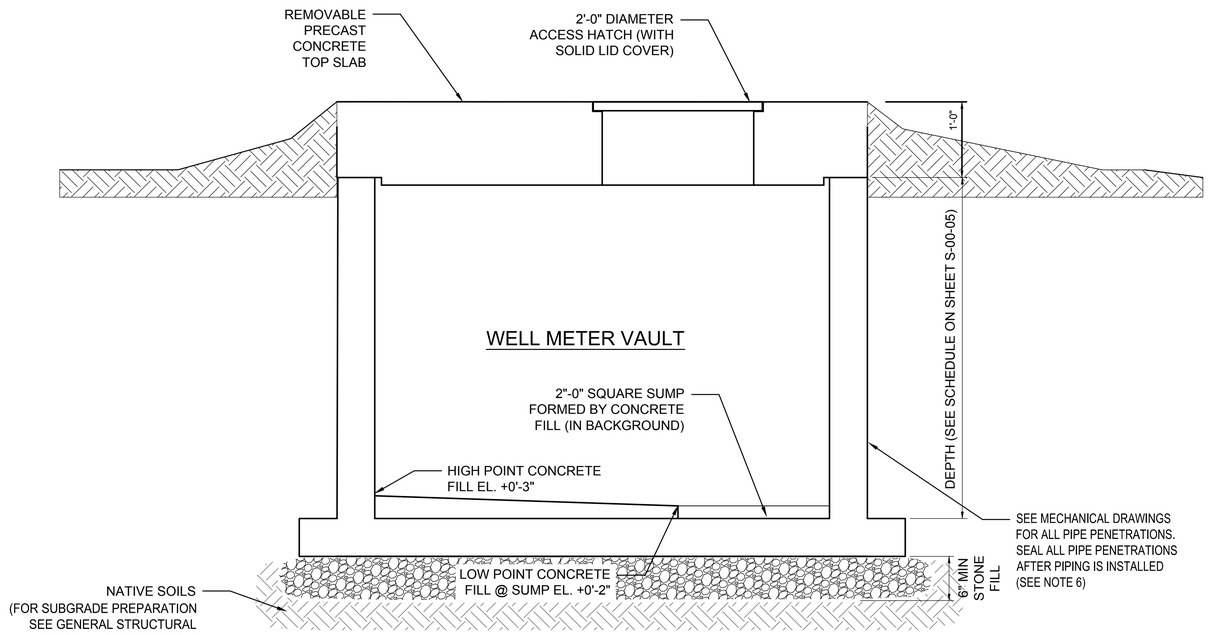
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
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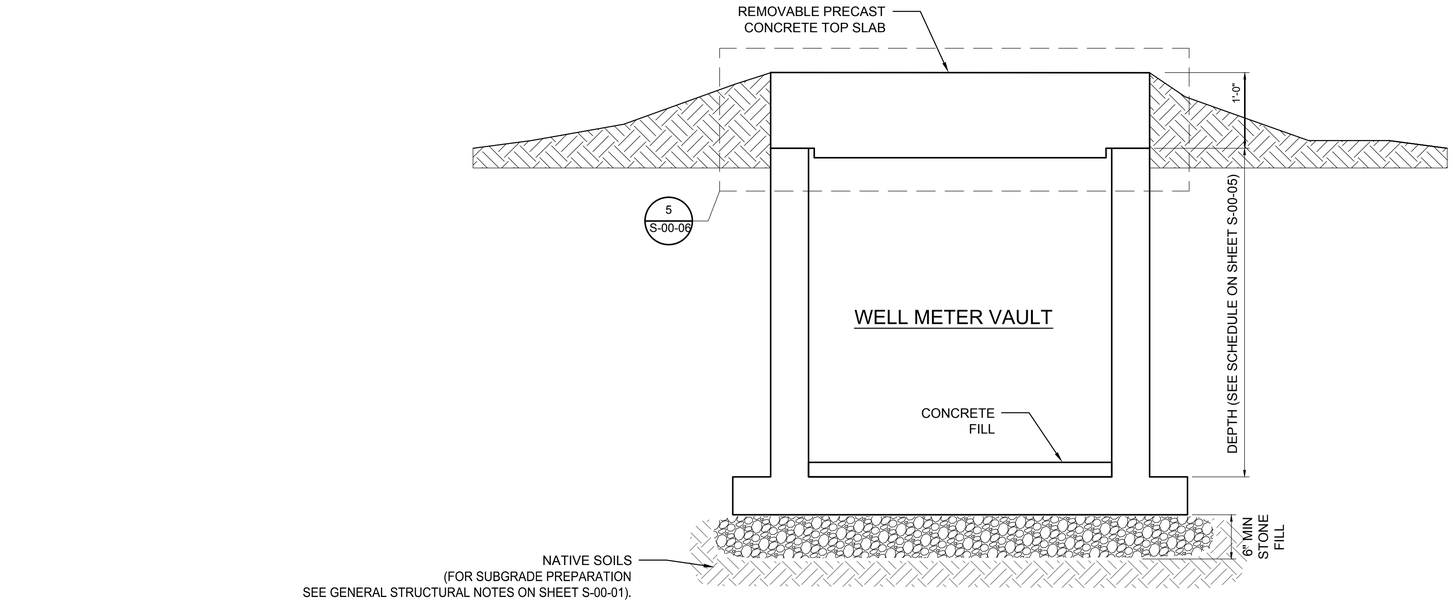
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A TCS LOOP EXTRACTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-03-01, S-03-02



B TCS LOOP EXTRACTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-03-01, S-03-02

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EXTRACTION WELL VAULTS - SECTIONS SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

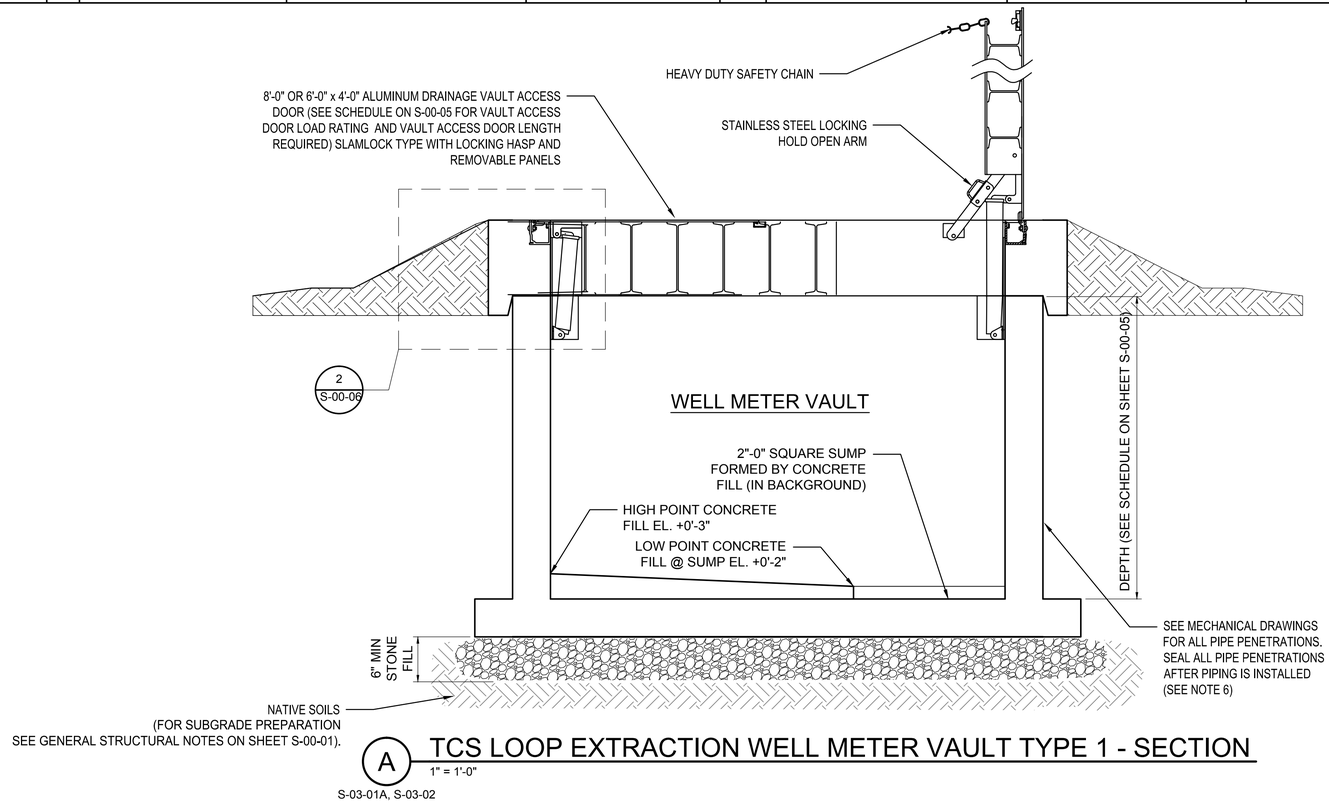
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
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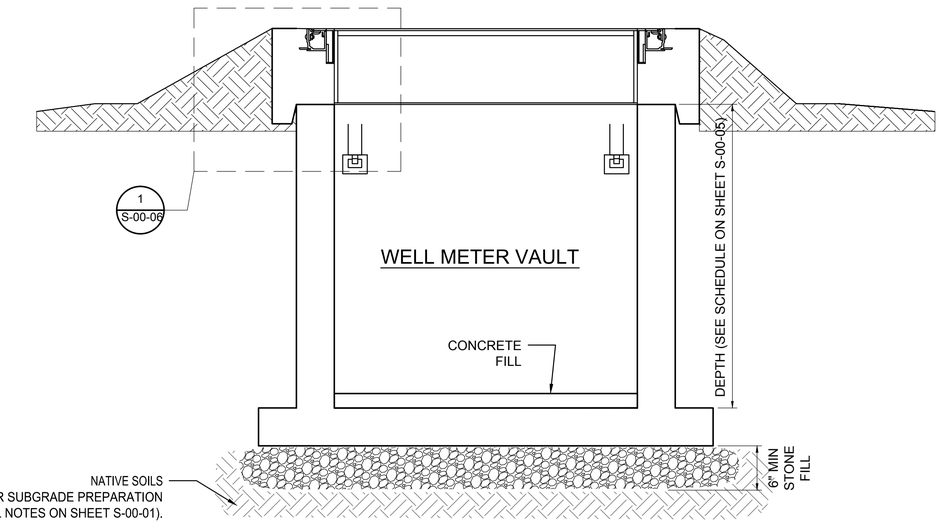
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A TCS LOOP EXTRACTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-03-01A, S-03-02



B TCS LOOP EXTRACTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-03-01A, S-03-02

NOTES:

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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY No. C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
0	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EXTRACTION WELL METER VAULTS - SECTIONS SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

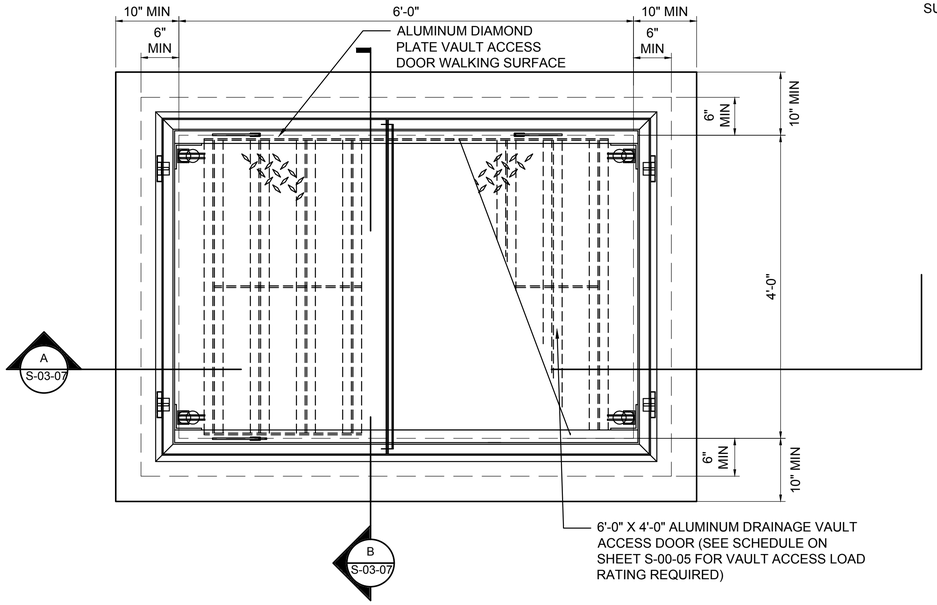
PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY | SHEET NO. of SHEETS

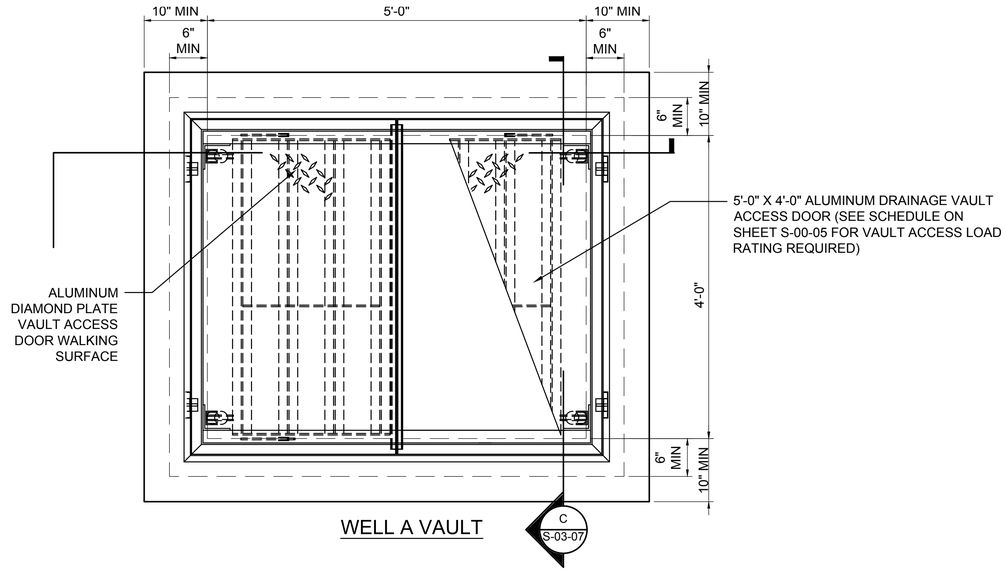
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WELL METER VAULT



WELL A VAULT

TCS LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOVELAND
No. C65078
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	GWE	MSL	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL METER VAULTS - TYPE 1 TOP PLAN

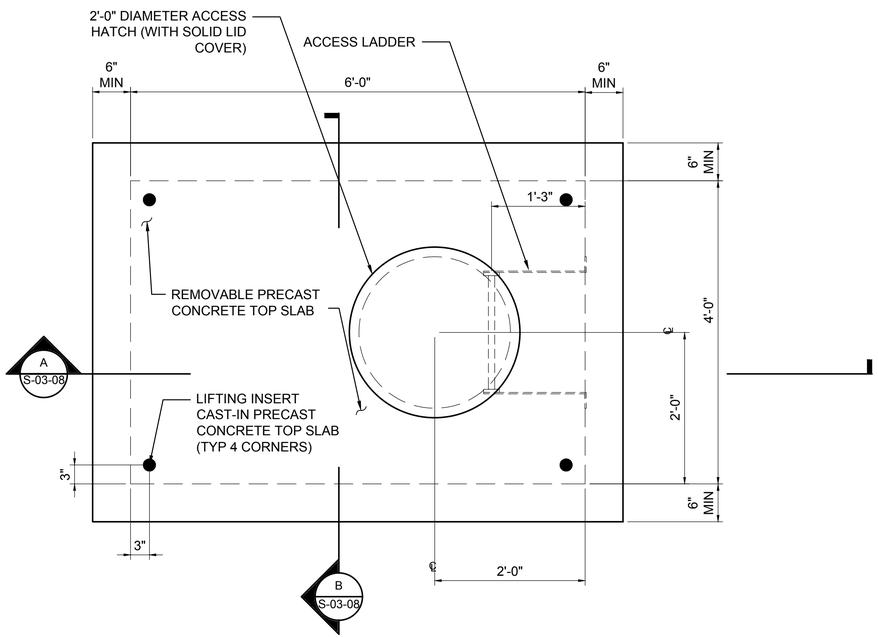
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

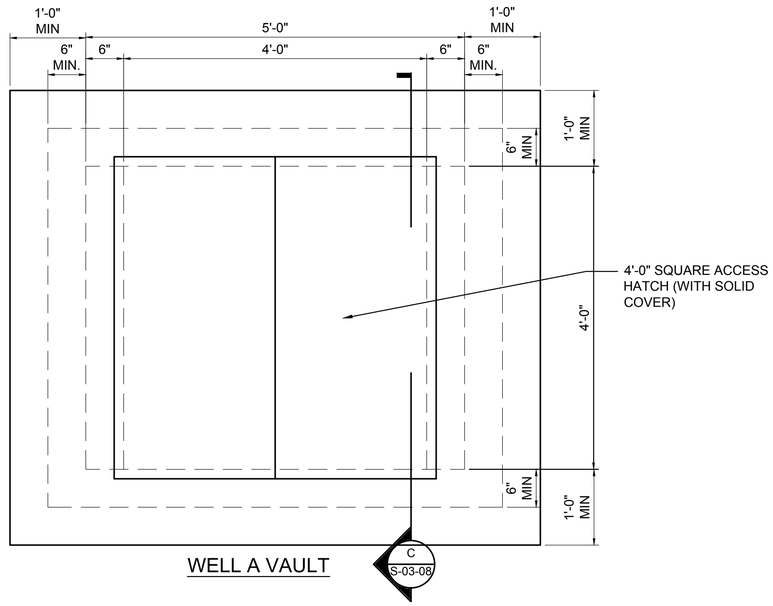
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-03-04	REV 2

N1808

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WELL METER VAULT



WELL A VAULT

TCS LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - TOP PLAN

1"=1'-0"

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. ACCESS HATCH, SOLID LID, AND FRAME TO BE HIGHWAY RATED (HS20-44) AND MANUFACTURED BY NEENAH FOUNDRY OR EAST JORDAN IRON WORKS.
8. PROVIDE 90° HOOK AT ENDS OF TOP AND BOTTOM RESTEEL IN WELL METER VAULT TOP SLAB WITHIN 1'-6" OF LIFTING INSERTS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRIE C 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL VAULTS - TYPE 2 - TOP PLAN

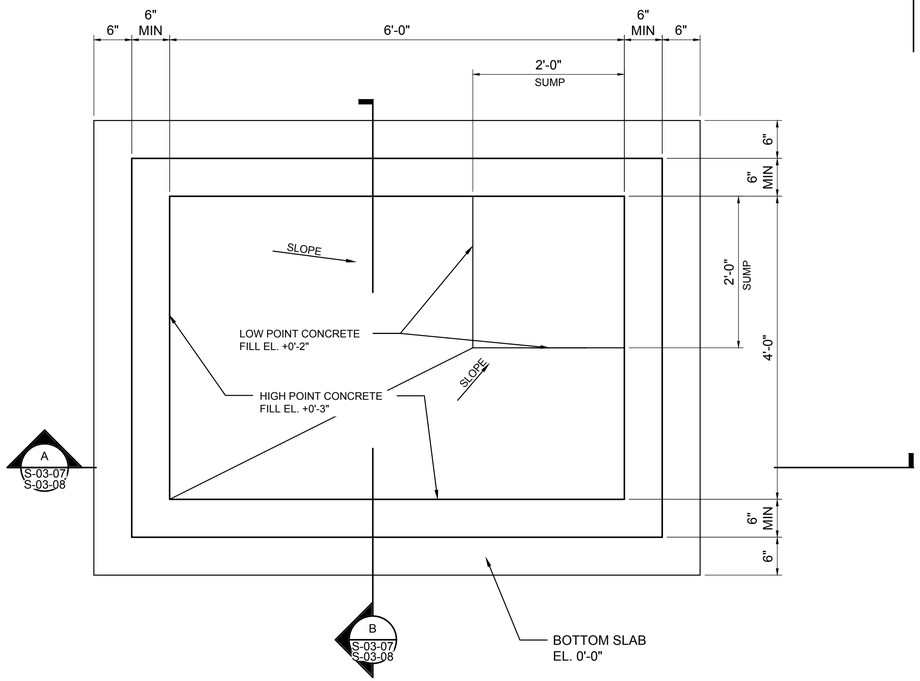
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

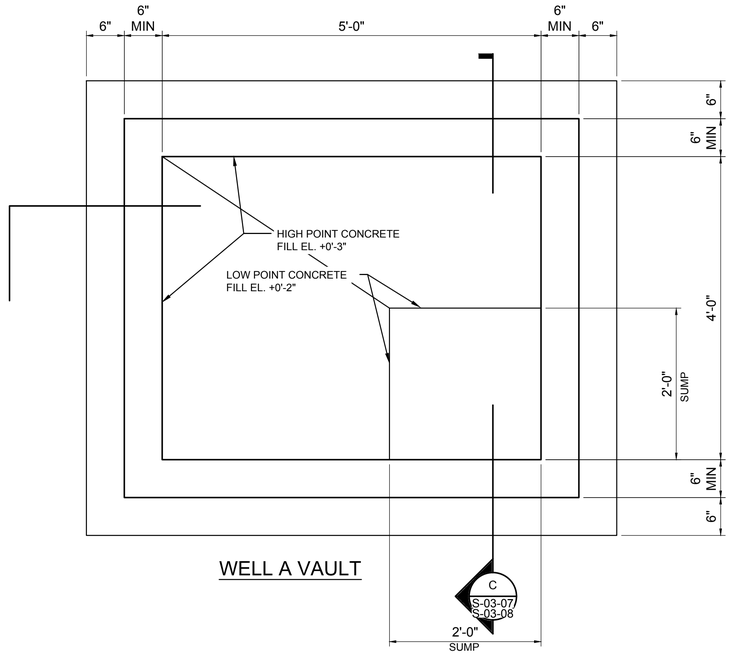
SHEET NO. S-03-05 of SHEETS | REV 2

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WELL METER VAULT



WELL A VAULT

TCS LOOP INJECTION WELL METER VAULT AND WELL VAULTS TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
No. C 61600
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	GWE	MSL	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL VAULTS - TYPES 1 AND 2 FOUNDATION PLAN

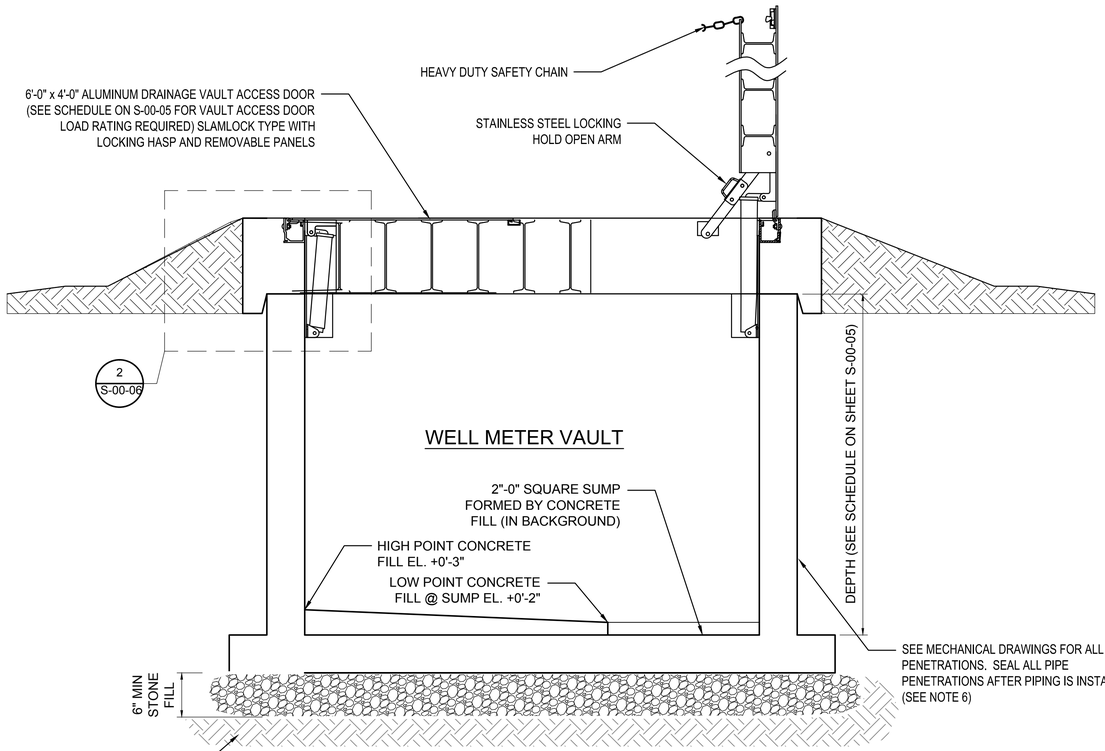
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

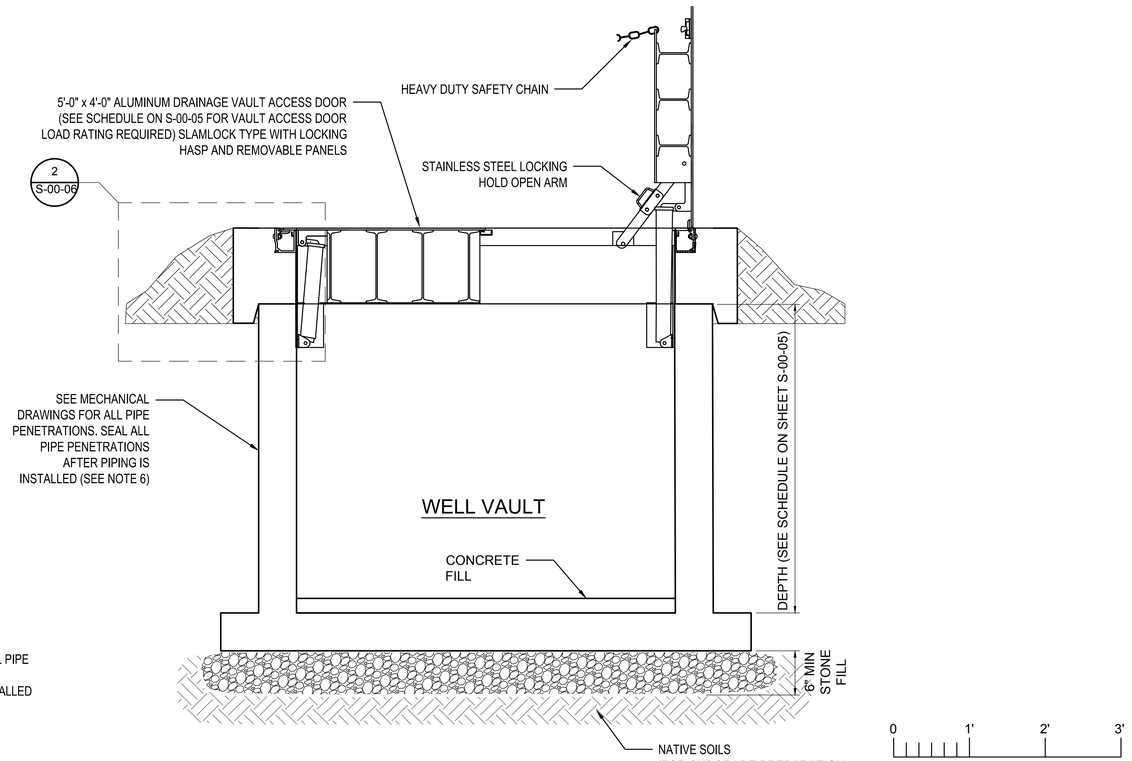
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-03-06	REV 2

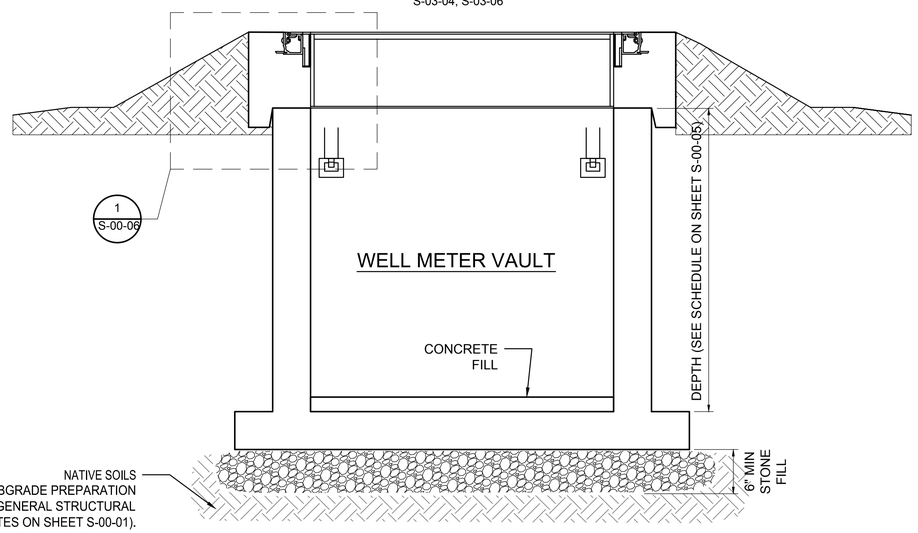
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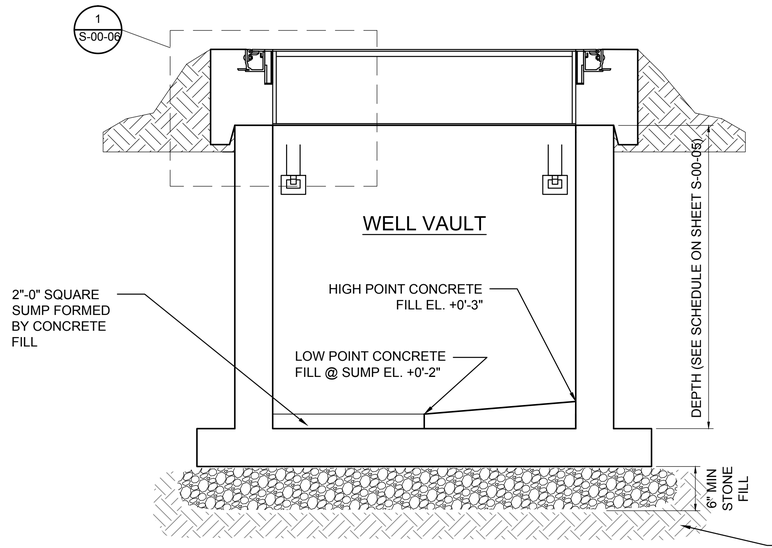


A TCS LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - SECTION
1" = 1'-0"
S-03-04, S-03-06





B TCS LOOP INJECTION WELL METER VAULT TYPE 1 - SECTION
1" = 1'-0"
S-03-04, S-03-06



C TCS LOOP INJECTION WELL VAULT TYPE 1 - SECTION
1" = 1'-0"
S-03-04, S-03-06

0 1' 2' 3'
SCALE: 1"=1'-0"

NOTES:
1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

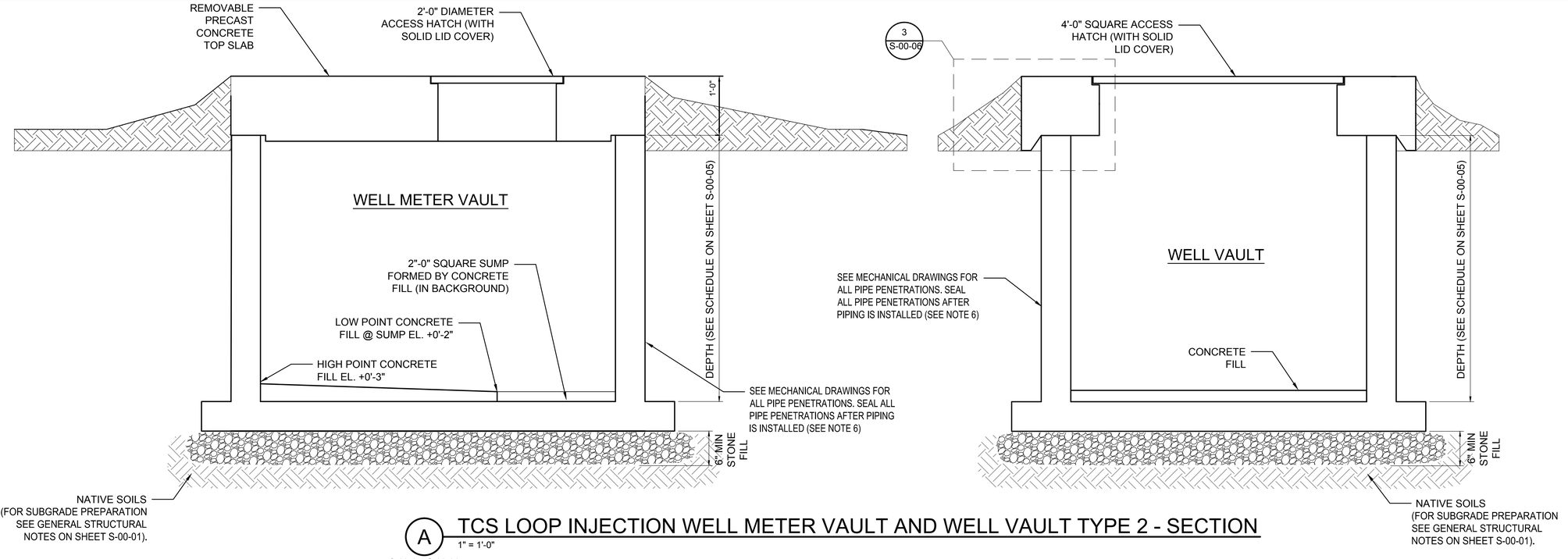
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. of SHEETS: S-03-07 | REV 2

N1808

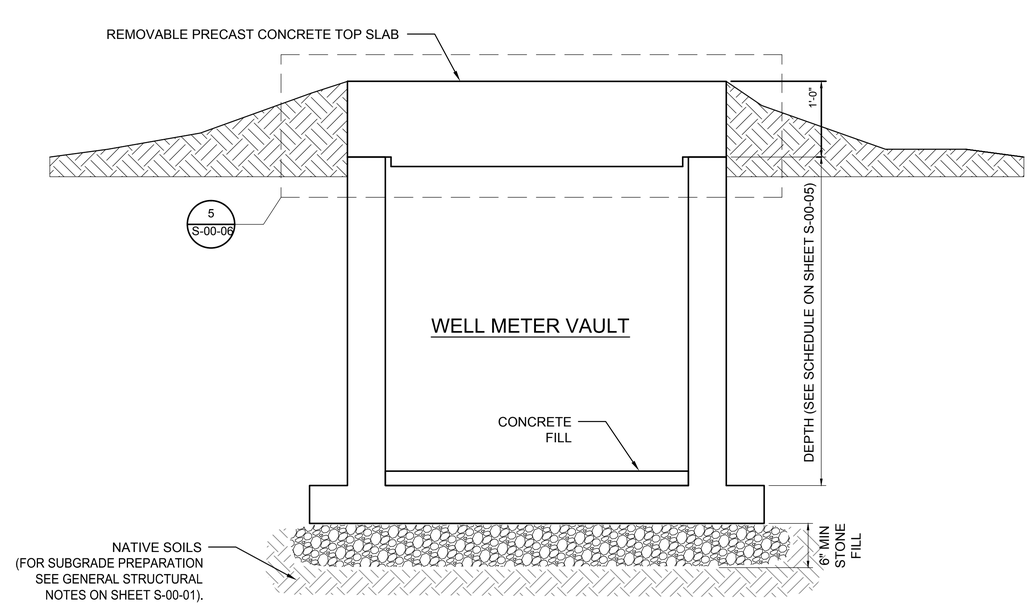
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A TCS LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

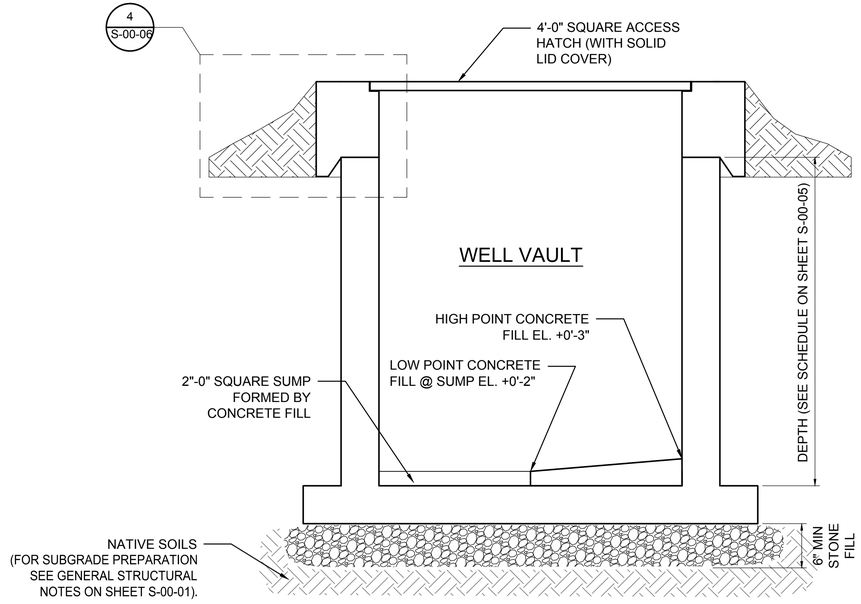
S-03-05, S-03-06



B TCS LOOP INJECTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-03-05, S-03-06



C TCS LOOP INJECTION WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-03-05, S-03-06

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOVETT No. 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
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0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL VAULTS - SECTIONS SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA

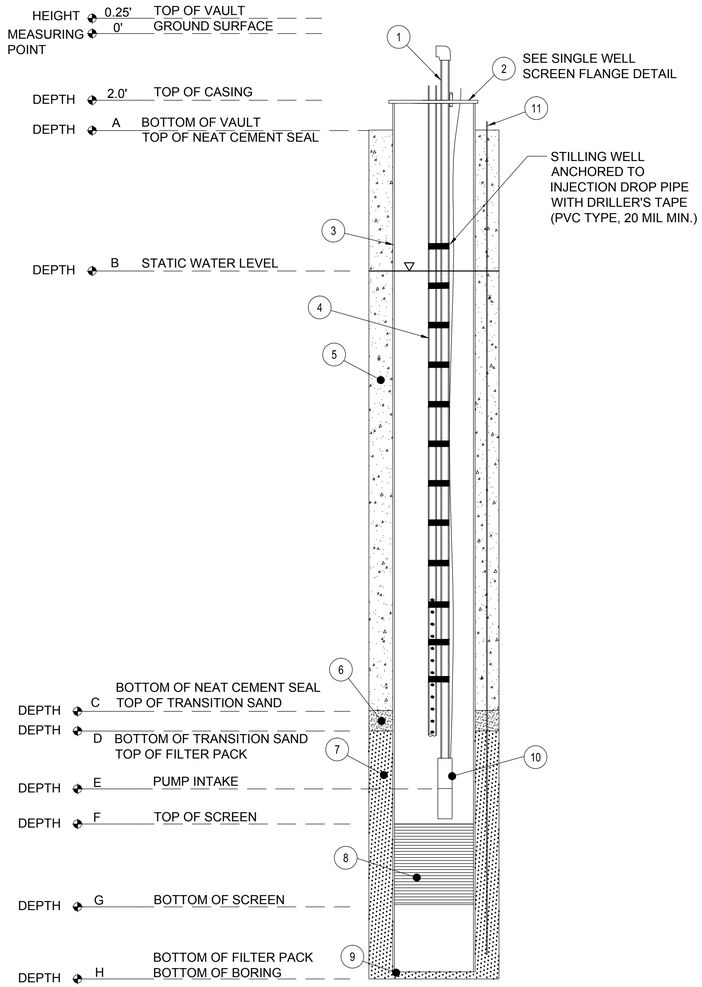
MICROFILM

BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. S-03-08 of SHEETS | REV 2

N1808

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A SINGLE SCREEN EXTRACTION WELL DETAIL
NTS

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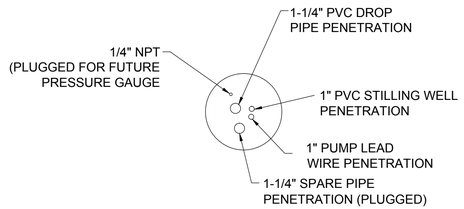
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NOTES:

1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER EXAGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

ITEM	DESCRIPTION
1	1-1/4" PVC DROP PIPE
2	CUSTOM TAPERED WELL FLANGE
3	WELL CASING (SEE NOTE 3)
4	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
5	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
6	ANNULAR SPACE, TRANSITION SAND (SI□E TBD)
7	ANNULAR SPACE, FILTER PACK (SI□E TBD)
8	WELL SCREEN (316L SS, WIRE-WRAP)
9	SUMP
10	GROUNDWATER EXTRACTION PUMP
11	1" PIE□OMETER



B SINGLE SCREEN WELL FLANGE DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUESTL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	LUK	JPB	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	BEH	JPB	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

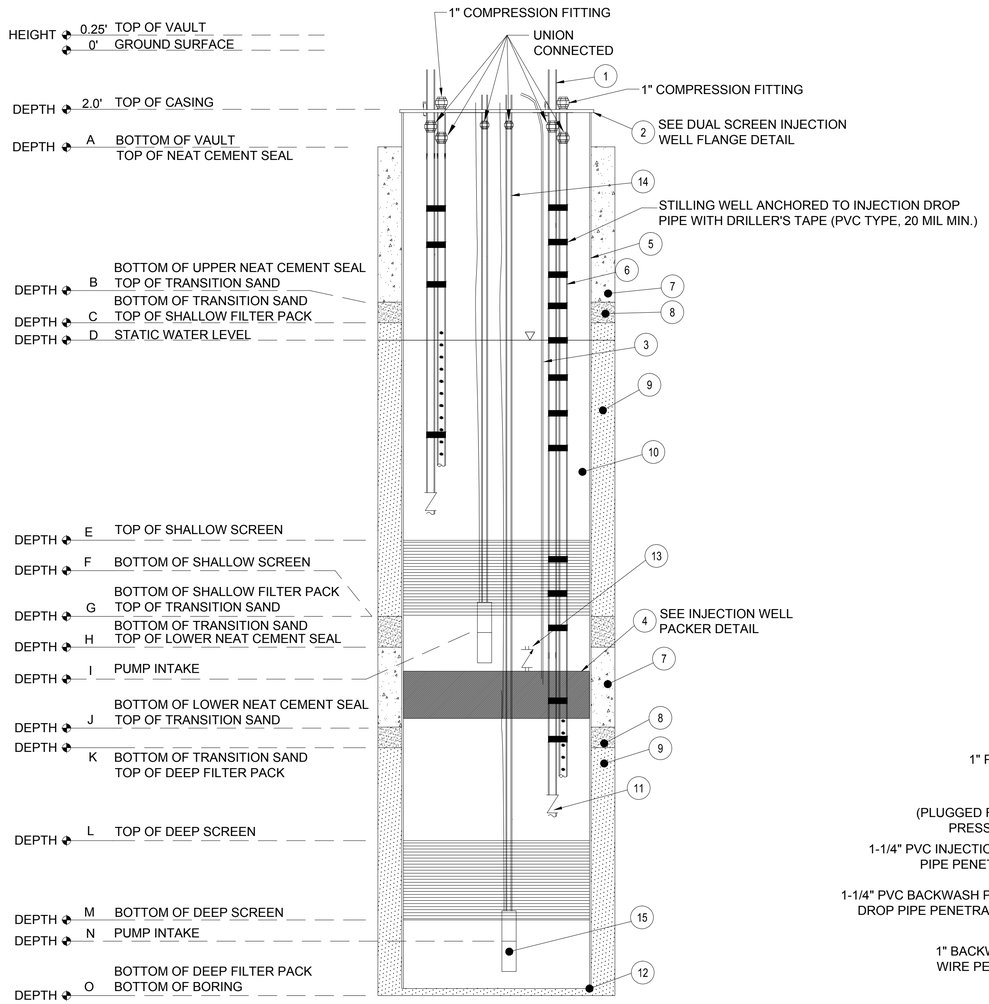
TCS LOOP EXTRACTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-03-01	REV 2

N1808

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A DUAL SCREEN INJECTION WELL WITH BACKWASH PUMPS DETAIL
NTS

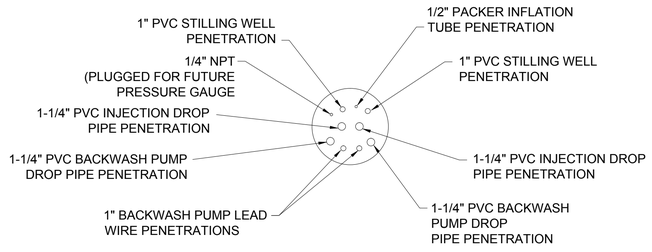
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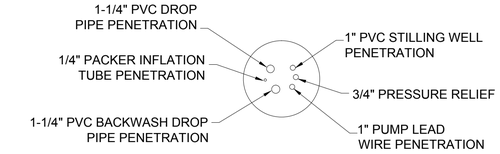
NOTES:
1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER EXAGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

ITEM	DESCRIPTION
1	1-1/4" PVC DROP PIPE
2	CUSTOM TAPPED WELL FLANGE
3	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
4	PNEUMATIC WELL PACKER
5	WELL CASING (SEE NOTE 3)
6	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
7	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
8	ANNULAR SPACE, TRANSITION SAND (SI□E TBD)
9	ANNULAR SPACE, FILTER PACK (TYPE TBD)
10	WELL SCREEN (316L SS WIRE-WRAP)
11	SPRING CHECK VALVE
12	SUMP
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE
14	1-1/4" BACKWASH PIPING
15	BACKWASH PUMP



B DUAL SCREEN INJECTION WELL FLANGE DETAIL
NTS



C INJECTION WELL PACKER DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEFEL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

N1808

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	BEH	JPB	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	BEH	JPB	JPB	JEF	

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

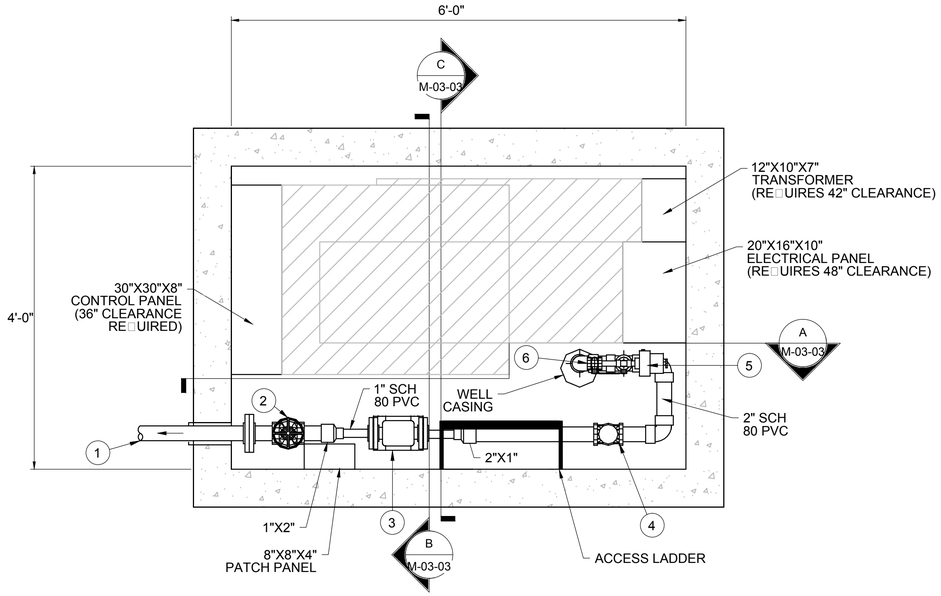
TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP INJECTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-03-02	REV 2

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EXTRACTON WELL VAULT PLAN VIEW

1" = 1'-0"

LEGEND:

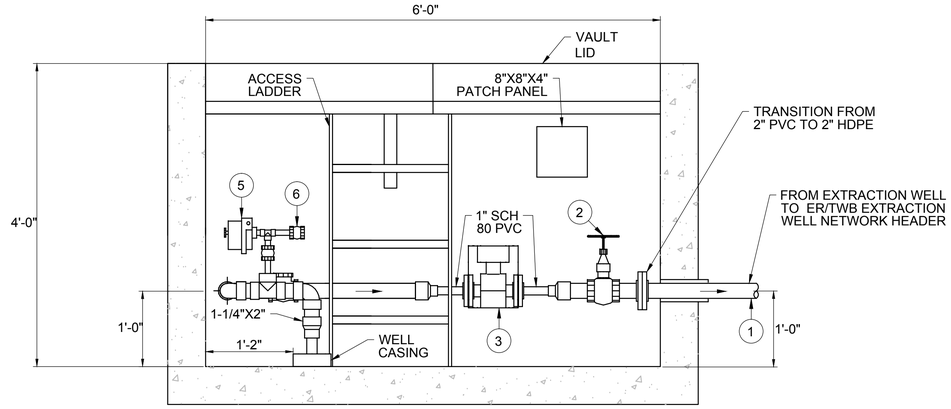
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NOTES:

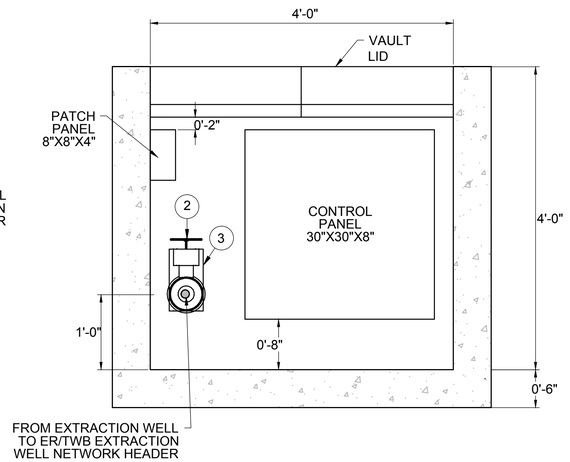
1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

EXTRACTION WELL VAULT SCHEDULE

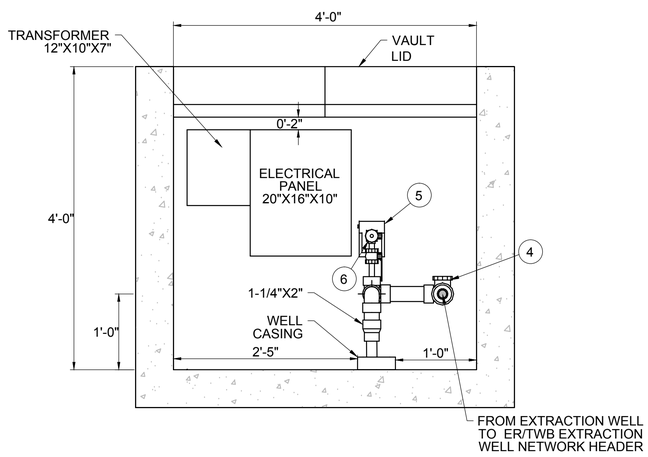
ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	EXTRACTED GROUNDWATER	25	EXTRACTED WATER CONVEYANCE LINE	-
2	2"	PVC	EXTRACTED GROUNDWATER	25	ISOLATION GLOBE VALVE - EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE THE VAULT	V-*0302D/0301D
3	1"	TEFLON	EXTRACTED GROUNDWATER	25	MAGNETIC FLOWMETER	FE-*0371A/0370A
4	2"	PVC	EXTRACTED GROUNDWATER	25	CHECK VALVE	/0301C
5	1/2"	PVC	EXTRACTED GROUNDWATER	25	PRESSURE TRANSMITTER	PIT-*0361A/0306B
6	1/4"	PVC	EXTRACTED GROUNDWATER	25	SAMPLE PORT	V-*0361A/0301A



A SECTION
1"=1'-0"
M-03-03



B SECTION
1"=1'-0"
M-03-03



C SECTION
1"=1'-0"
M-03-03

0 1 2 3
SCALE: 1"=1'

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
Exp 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

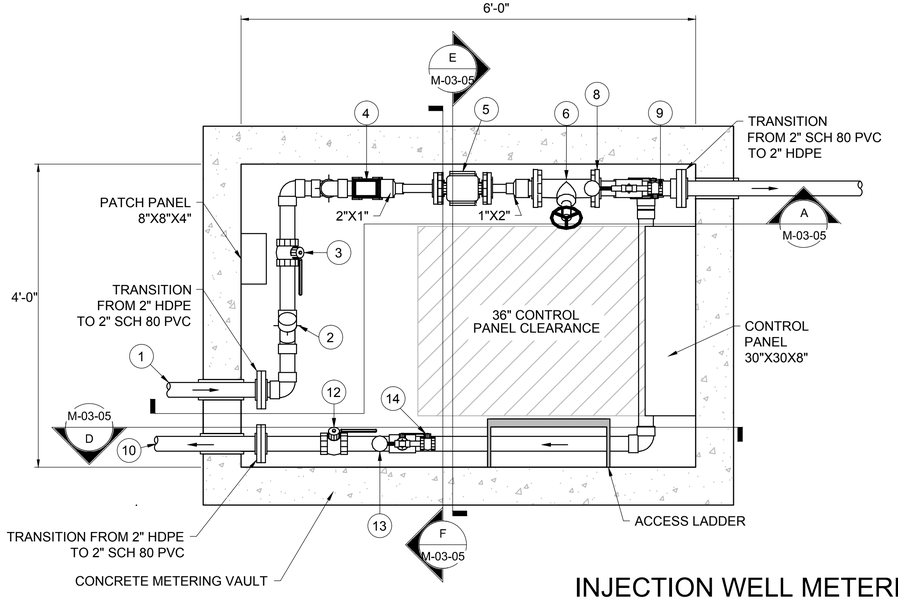
TCS LOOP EXTRACTION WELL VAULTS MECHANICAL DETAILS

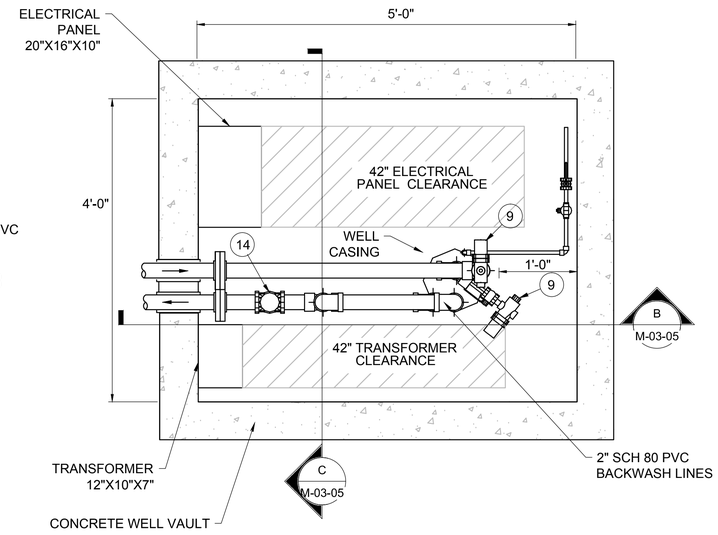
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-03-03	REV 2

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INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"

LEGEND:

(1) REFERENCE ITEM # INJECTION WELL VAULT SCHEDULE.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	TAG ID
1	2"	HDPE	CARBON AMENDED GROUNDWATER	13	CARBON AMENDED GROUNDWATER CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	13	WYE STRAINER	F-*0303
3	2"	PVC	CARBON AMENDED GROUNDWATER	13	BALL VALVE	V-*0303A
4	2"	TBD	CARBON AMENDED GROUNDWATER	13	ACTUATED BALL VALVE	FV-*0307/*0308
5	1"	TEFLON	CARBON AMENDED GROUNDWATER	13	MAGNETIC FLOW METER	FE-*0372A/B
6	2"	PVC	CARBON AMENDED GROUNDWATER	13	DIAPHRAGM VALVE	V-*0303B/0304G
7	1/4"	TBD	CARBON AMENDED GROUNDWATER	13	PRESSURE GAUGE ASSEMBLY	PI-*0362A/E
8	1/4"	TBD	CARBON AMENDED GROUNDWATER	13	SAMPLE PORT	V-*0362B/F
9	1"	TBD	CARBON AMENDED GROUNDWATER	13	AIR/VAC RELEASE ASSEMBLY	
10	2"	HDPE	BACKWASH WATER	14	BACKWASH WATER CONVEYANCE LINE	
11	2"	PVC	BACKWASH WATER	14	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0305B
12	1/4"	TBD	BACKWASH WATER	14	PRESSURE GAUGE ASSEMBLY	PI-*0362B
13	1/4"	TBD	BACKWASH WATER	14	SAMPLE PORT	V-*0362H
14	2"	PVC	BACKWASH WATER	14	CHECK VALVE	V-*0305A

0 1 2 3

SCALE: 1"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUESTL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP
INJECTION WELL VAULTS
MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

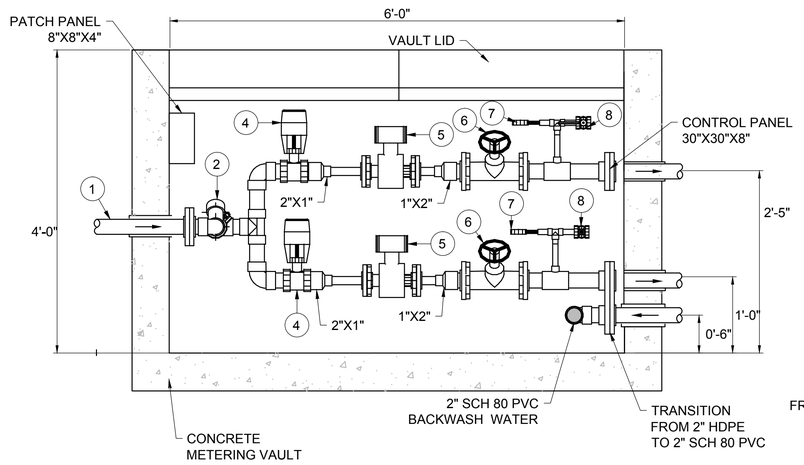
SHEET NO. M-03-04 of SHEETS | REV 2

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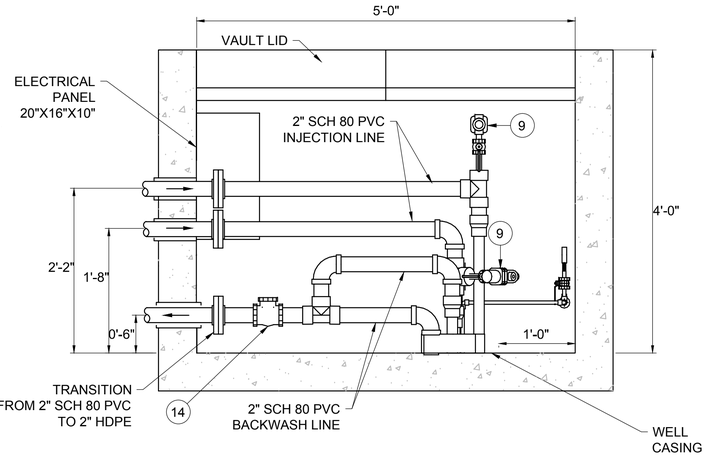
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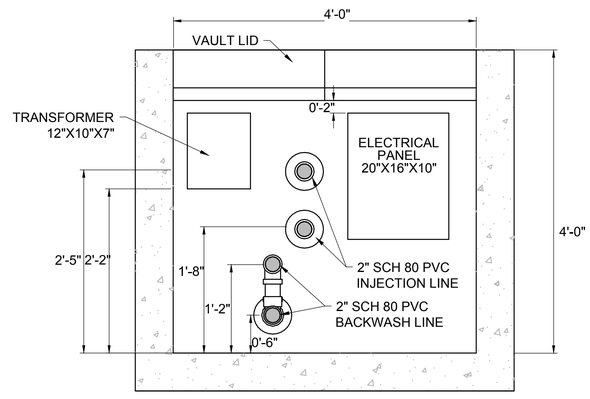
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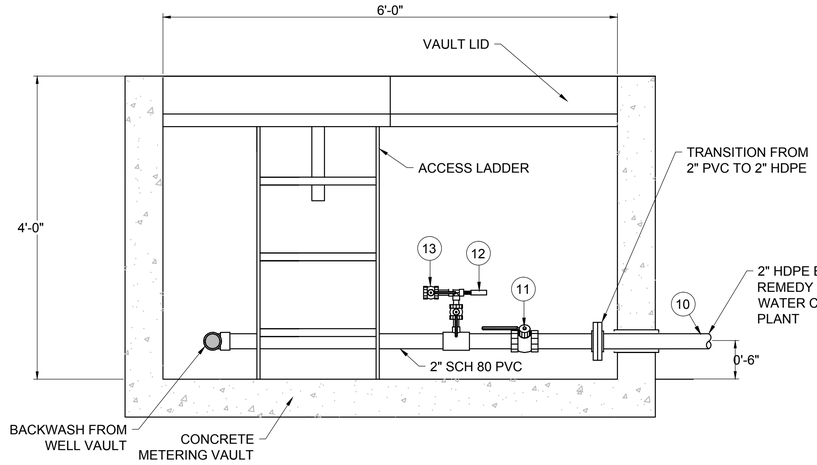
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1"=1'-0"
M-03-04



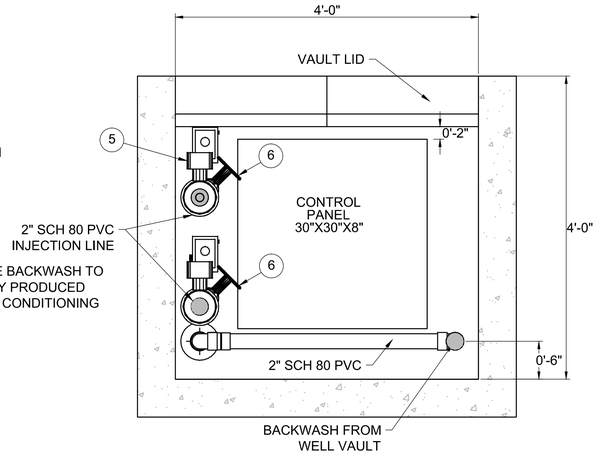
B SECTION
1"=1'-0"
M-03-04



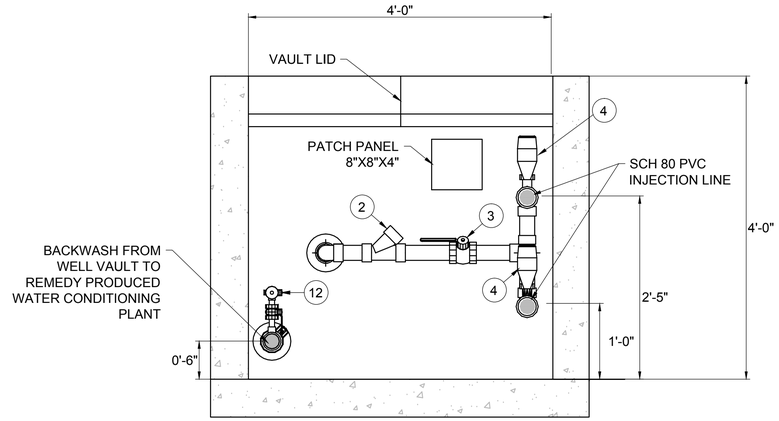
C SECTION
1"=1'-0"
M-03-04



D SECTION
1"=1'-0"
M-03-04



E SECTION
1"=1'-0"
M-03-04



F SECTION
1"=1'-0"
M-03-04

0 1 2 3
SCALE: 1"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
Exp 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

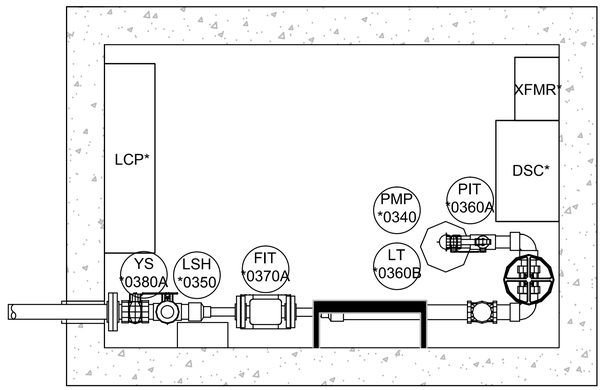
TCS LOOP INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
M-03-05	REV 2

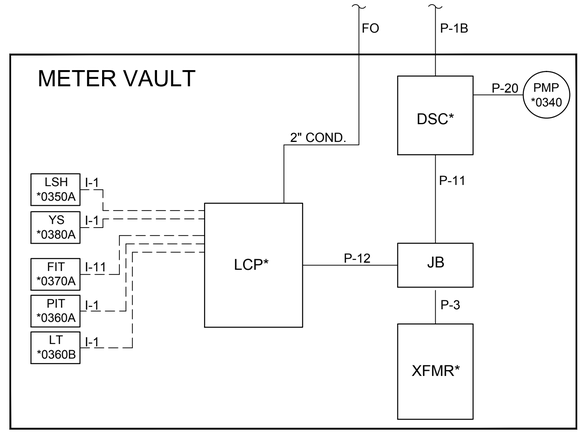
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WELL VAULT ELECTRICAL & INSTRUMENTATION PLAN

1" = 1'-0"



WELL VAULT RISER DIAGRAM

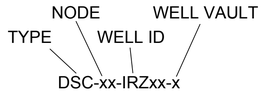
NOT TO SCALE

NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
_ _ _ _ _ _	MUTLICONDUCTOR SHIELDED CABLE



WELL RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM		
P-1B			
P-11	(2)#12 BLK, (1)#12 GRN,(2)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (2)14YEL, (1)#14WHT	XHHW	1
P-2	(3) #12 BLK, (1) #12 GRN, (2)#12 RED, (2)#14YEL, (1)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (1)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (2)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC	XHHW	2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP EAST RAVINE EXTRACTION WELL ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

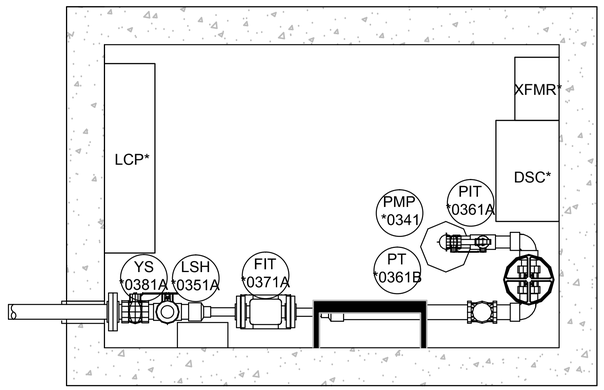
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DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

E-03-01

REV 2

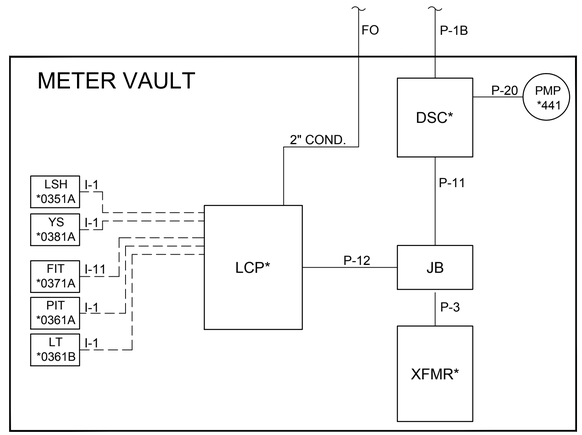
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N1808



WELL VAULT ELECTRICAL & INSTRUMENTATION PLAN

1" = 1'-0"



WELL VAULT RISER DIAGRAM

NOT TO SCALE

NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
_ _ _ _ _ _	MUTLICONDUCTOR SHIELDED CABLE

NODE TYPE — WELL VAULT WELL ID

DSC-xx-IRZxx-x

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)#14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE ITEMS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP TRANSWESTERN BENCH EXTRACTION WELL ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

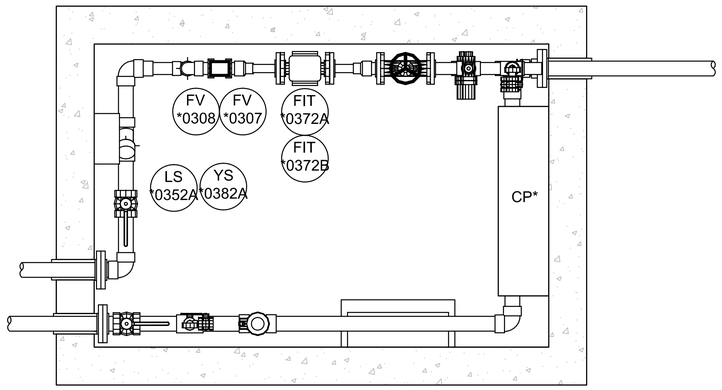
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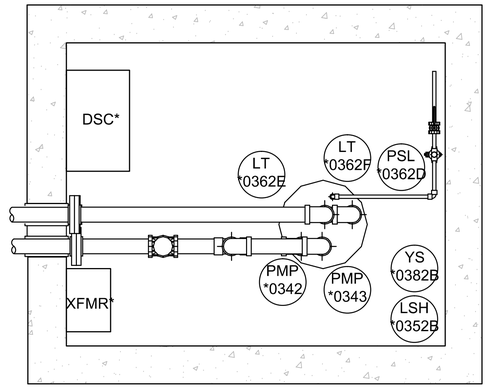
BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. E-03-02 of SHEETS | REV 2

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NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEET E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

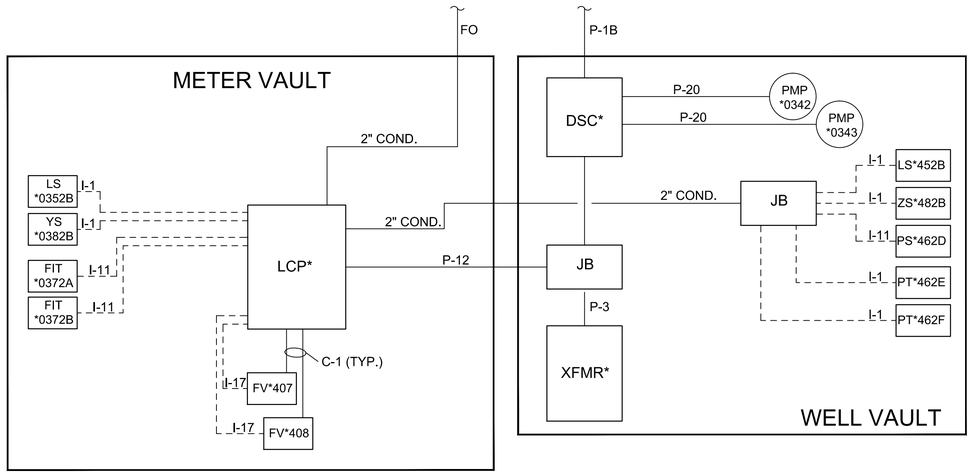
LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
- - - - - -	MULTICONDUCTOR SHIELDED CABLE

NODE — WELL VAULT
TYPE — WELL ID
DSC-xx-IRZxx-x

METER AND WELL VAULT ELECTRICAL & INSTRUMENTATION PLAN

1" = 1'-0"



METER AND WELL VAULT RISER DIAGRAM

NOT TO SCALE

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC	XHHW	2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWINFG.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	JMS	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	LUK	KLD	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	LUK	KLD	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

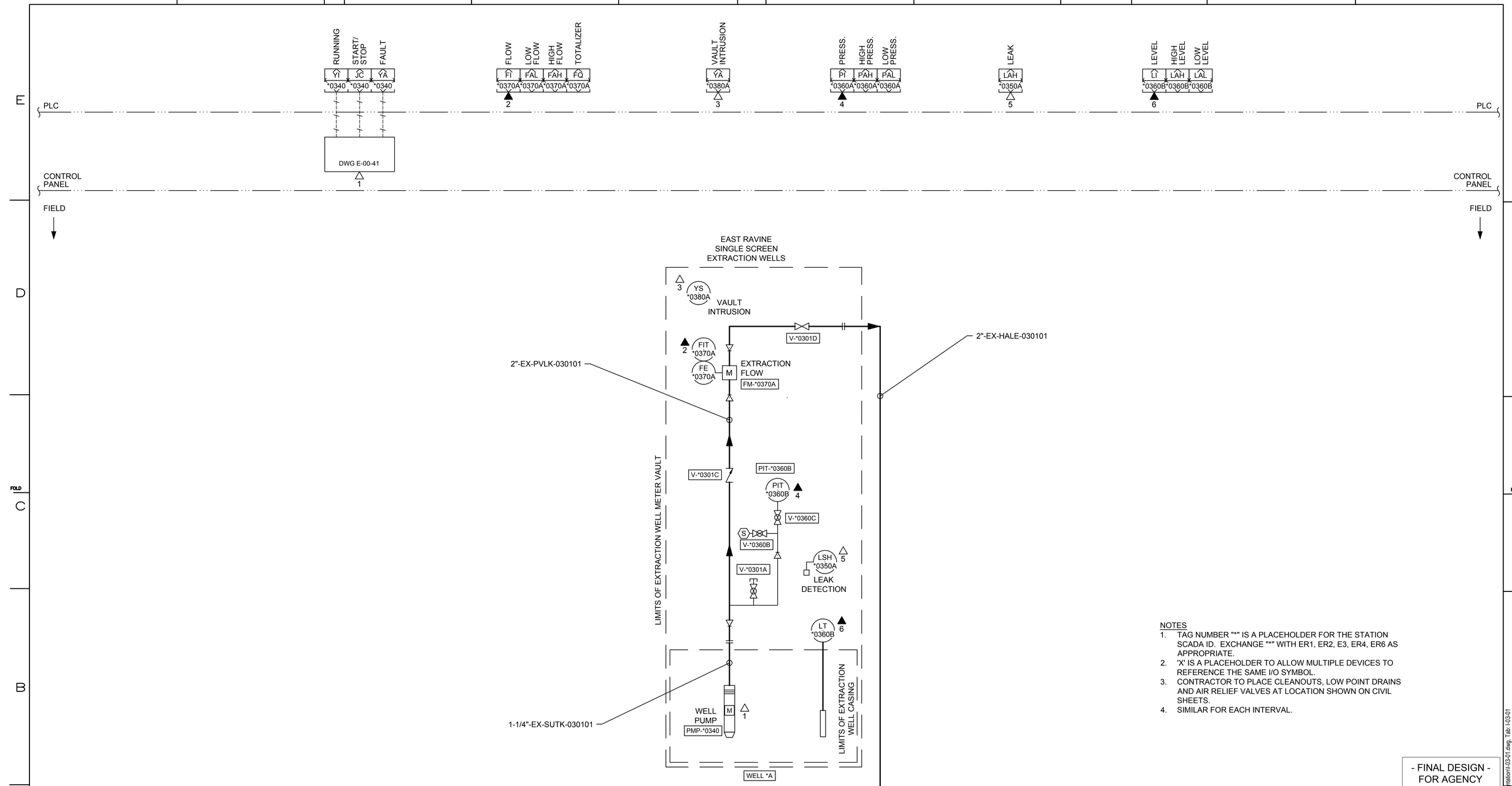
TCS LOOP
INJECTION WELL
ELECTRICAL PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY | SHEET NO. of SHEETS

E-03-03 | REV 2

N1808

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE "*" WITH ER1, ER2, E3, ER4, ER6 AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DWAYNE CAMPBELL No. C 072178 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

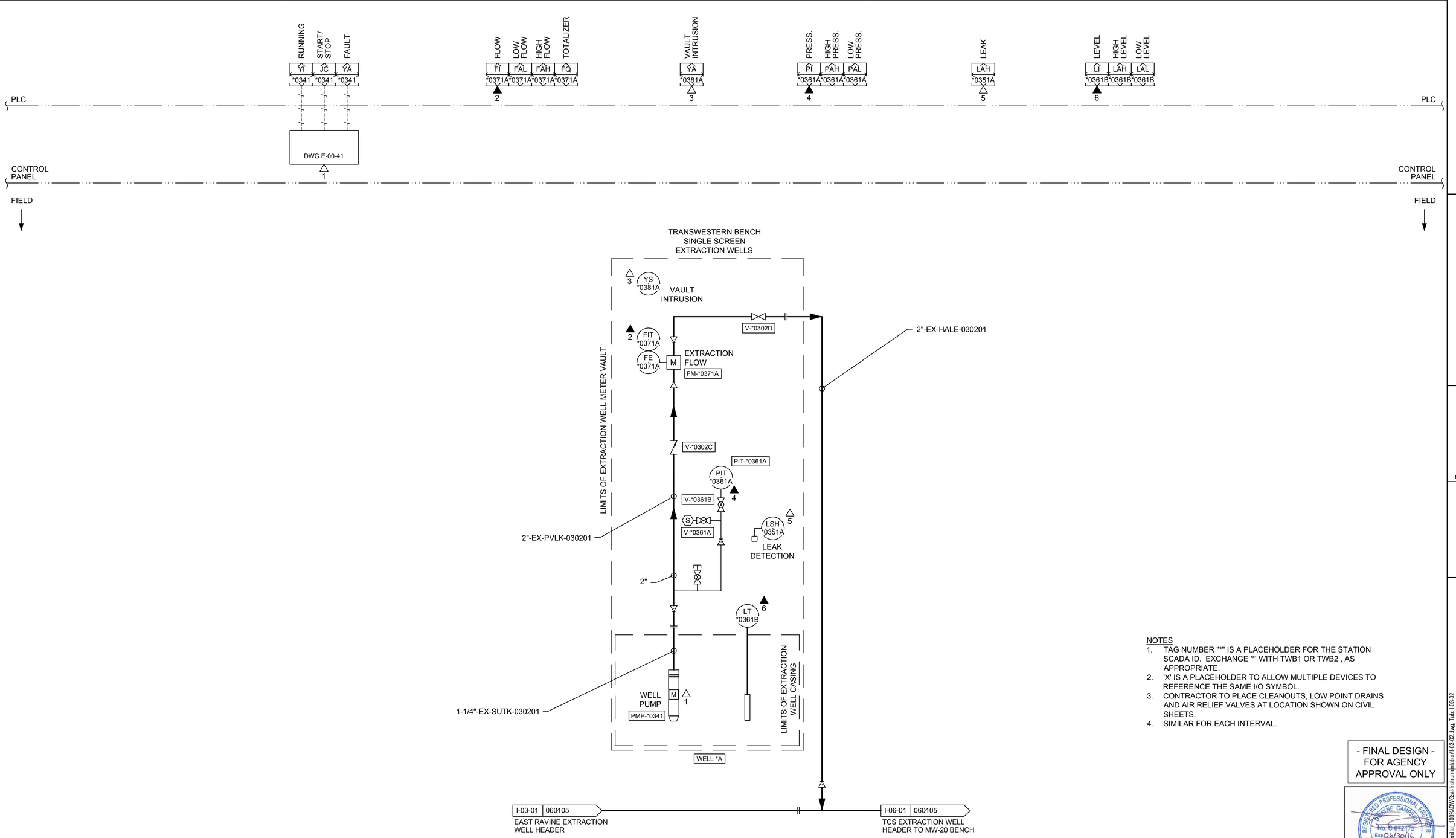
TCS LOOP EAST RAVINE EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-03-01	REV 2

N1808

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH TWB1 OR TWB2 , AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DIANNE CAMPBELL No. S-017178 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

TCS LOOP TRANSWESTERN BENCH EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION

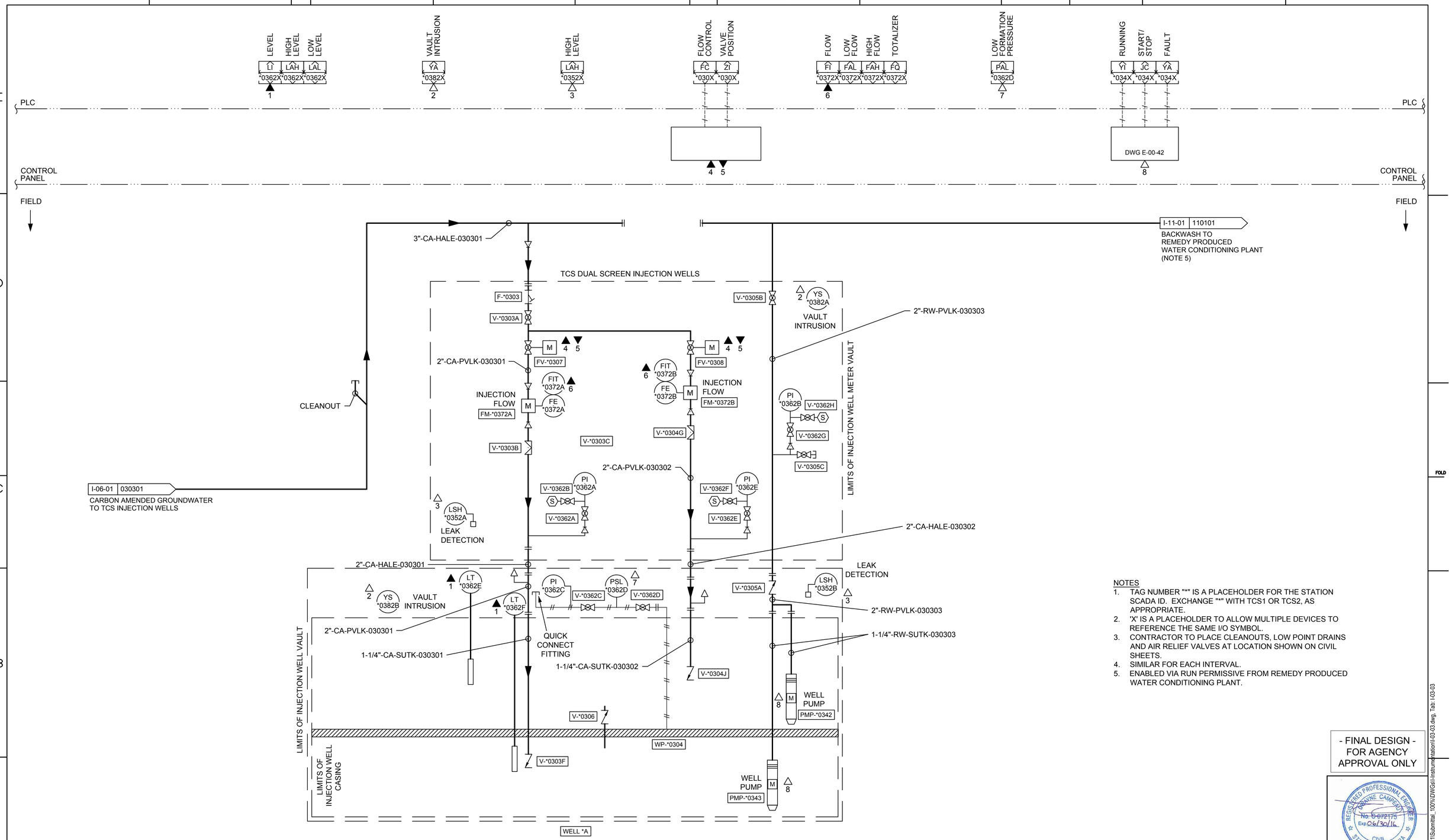
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

I-03-02 | REV 2

N1808

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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE "*" WITH TCS1 OR TCS2, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.
5. ENABLED VIA RUN PERMISSIVE FROM REMEDY PRODUCED WATER CONDITIONING PLANT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOANNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

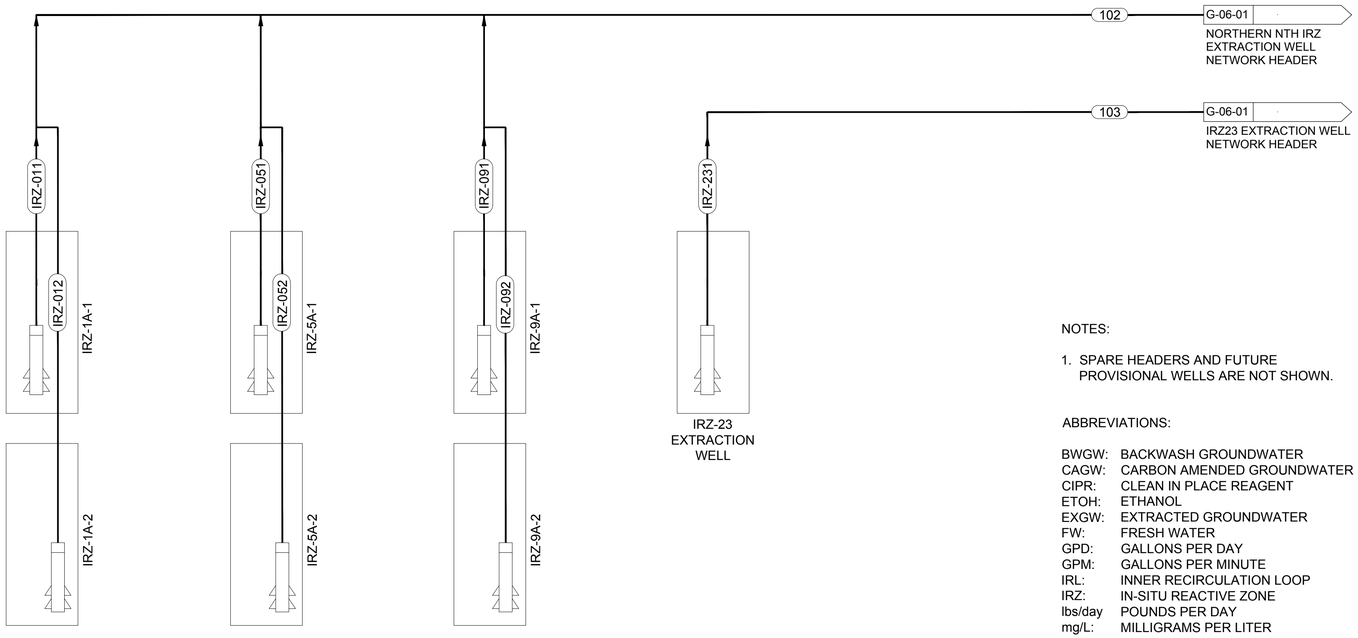
TCS LOOP INJECTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-03-03	REV 2

N1808

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NATIONAL TRAILS HWY IRZ EXTRACTION WELL NETWORK

NOTES:

1. SPARE HEADERS AND FUTURE PROVISIONAL WELLS ARE NOT SHOWN.

ABBREVIATIONS:

BWGW:	BACKWASH GROUNDWATER
CAGW:	CARBON AMENDED GROUNDWATER
CIPR:	CLEAN IN PLACE REAGENT
ETOH:	ETHANOL
EXGW:	EXTRACTED GROUNDWATER
FW:	FRESH WATER
GPD:	GALLONS PER DAY
GPM:	GALLONS PER MINUTE
IRL:	INNER RECIRCULATION LOOP
IRZ:	IN-SITU REACTIVE ZONE
lbs/day	POUNDS PER DAY
mg/L:	MILLIGRAMS PER LITER
NTH:	NATIONAL TRAIL HIGHWAY
TOC:	TOTAL ORGANIC CARBON
TW:	TREATED WATER
WMR:	WELL MAINTENANCE REAGENT
µg/L:	MICROGRAMS PER LITER

Design Basis and Mass Balance[a]

Stream ID:	102	103	IRZ-011	IRZ-012	IRZ-051	IRZ-052	IRZ-091	IRZ-092	IRZ-231
Stream Description:	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW	EXGW
Nominal Design Parameters									
Flow Rate (GPM):	**200**	**100**	20	20	40	40	40	40	100
Carbon Substrate[b,c] (GPD):	**---**	**---**	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	**---**	**---**	---	---	---	---	---	---	---
Chromium[d] (µg/L):	**26**	**2,300**	29	38	36	39	13	10	2,300
Chromium[d] (lbs/day):	**6.3E-02**	**2.8**	6.9E-03	9.1E-03	1.7E-02	1.9E-02	6.2E-03	4.8E-03	2.8
Maximum Design Parameters									
Flow Rate (GPM):	**400[e]**		80	80	80	80	80	80	160
Carbon Substrate[b,c] (GPD):	**---**	**---**	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	**---**	**---**	---	---	---	---	---	---	---
Chromium[d,f] (µg/L):	**26**	**2,300**	29	38	36	39	13	10	2,300
Chromium[d,f] (lbs/day):	**3.7**		2.8E-02	3.6E-02	3.4E-02	3.7E-02	1.2E-02	9.6E-03	4.4

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Total maximum NTH IRZ extracted groundwater flow limited to 400 gpm.
f - Maximum design parameters assume chromium concentrations and general flow distribution similar to nominal design parameters.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUSEL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		KLD	BJW	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		KLD	BJW	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

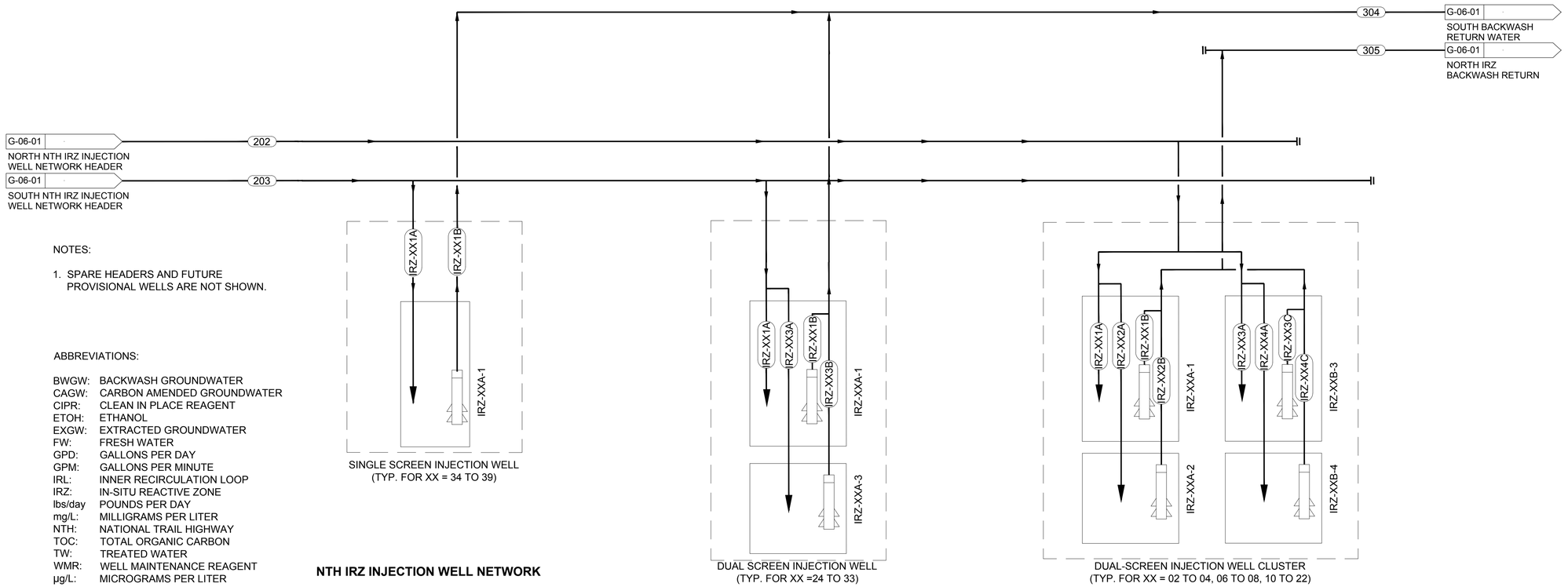
IRZ EXTRACTION WELL PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-04-01	REV 2

N1808

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NOTES:

1. SPARE HEADERS AND FUTURE PROVISIONAL WELLS ARE NOT SHOWN.

ABBREVIATIONS:

BWGW:	BACKWASH GROUNDWATER
CAGW:	CARBON AMENDED GROUNDWATER
CIPR:	CLEAN IN PLACE REAGENT
ETOH:	ETHANOL
EXGW:	EXTRACTED GROUNDWATER
FW:	FRESH WATER
GPD:	GALLONS PER DAY
GPM:	GALLONS PER MINUTE
IRL:	INNER RECIRCULATION LOOP
IRZ:	IN-SITU REACTIVE ZONE
lbs/day	POUNDS PER DAY
mg/L:	MILLIGRAMS PER LITER
NTH:	NATIONAL TRAIL HIGHWAY
TOC:	TOTAL ORGANIC CARBON
TW:	TREATED WATER
WMR:	WELL MAINTENANCE REAGENT
µg/L:	MICROGRAMS PER LITER

NTH IRZ INJECTION WELL NETWORK

Design Basis and Mass Balance[a]

Stream ID:	202	203	304[f]	305[f]	IRZ-111A	IRZ-112A	IRZ-113A	IRZ-114A	IRZ-131A	IRZ-132A	IRZ-133A	IRZ-134A	IRZ-151A	IRZ-152A	IRZ-153A	IRZ-154A	IRZ-161A	IRZ-162A	IRZ-163A	IRZ-164A	IRZ-171A	IRZ-172A	IRZ-173A	IRZ-174A
Stream Description:	CAGW	CAGW	BWGW	BWGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW
Nominal Design Parameters																								
Flow Rate (GPM):	**300**		17	20	10	10	10	10	9	9	9	9	7	7	7	7	6	6	6	6	7	7	7	7
Carbon Substrate[b,c] (GPD):	**104**		---	---	3.5	3.5	3.5	3.5	3.1	3.1	3.1	3.1	2.4	2.4	2.4	2.4	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
TOC[b,c] (mg/L):	**100**		---	---	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Chromium[d] (µg/L):	**---**		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	**---**		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum Design Parameters																								
Flow Rate (GPM):	**400[e]**		35	40	20	20	20	20	20	20	20	20	15	15	15	15	15	15	15	15	15	15	15	15
Carbon Substrate[b,c] (GPD):	**694**		---	---	35	35	35	35	35	35	35	35	26	26	26	26	26	26	26	26	26	26	26	26
TOC[b,c] (mg/L):	**500**		---	---	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Chromium[d] (µg/L):	**---**		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	**---**		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Stream ID:	IRZ-191A	IRZ-192A	IRZ-193A	IRZ-194A	IRZ-201A	IRZ-202A	IRZ-203A	IRZ-204A	IRZ-211A	IRZ-212A	IRZ-213A	IRZ-214A	IRZ-251A	IRZ-253A	IRZ-271A	IRZ-273A	IRZ-291A	IRZ-293A	IRZ-311A	IRZ-313A	IRZ-331A	IRZ-333A	IRZ-351A	IRZ-371A	IRZ-391A	IRZ-XXXB	IRZ-XXXB
Stream Description:	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	CAGW	BWGW[g]	BWGW[g]
Nominal Design Parameters																											
Flow Rate (GPM):	7	7	7	7	4	4	4	4	5	5	5	5	8	8	8	8	7	7	6	6	4	4	6	4	4	h	h
Carbon Substrate[b,c] (GPD):	2.4	2.4	2.4	2.4	1.4	1.4	1.4	1.4	1.7	1.7	1.7	1.7	2.8	2.8	2.8	2.8	2.4	2.4	2.1	2.1	1.4	1.4	2.1	1.4	1.4	---	---
TOC[b,c] (mg/L):	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	---	---
Chromium[d] (µg/L):	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum Design Parameters																											
Flow Rate (GPM):	13	13	13	13	13	13	13	13	10	10	10	10	18	18	18	18	15	15	13	13	13	13	15	10	5	h	h
Carbon Substrate[b,c] (GPD):	23	23	23	23	23	23	23	23	17	17	17	17	31	31	31	31	26	26	23	23	23	23	26	17	8.7	---	---
TOC[b,c] (mg/L):	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	---	---
Chromium[d] (µg/L):	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
																										Typ. For XXX = 111 to 391	Typ. For XXX = 111 to 214

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Total maximum NTH IRZ injection well flow limited to 400 gpm.
f - Total backwash return water volume per week from NTH IRZ injection will network is approximately 18,000 gallons.
g - Single pump operation, in succession.
h - Backwash flow rate equals twice the nominal injection flow rate and twice the maximum injection flow rate.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		KLD	BJW	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		KLD	BJW	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

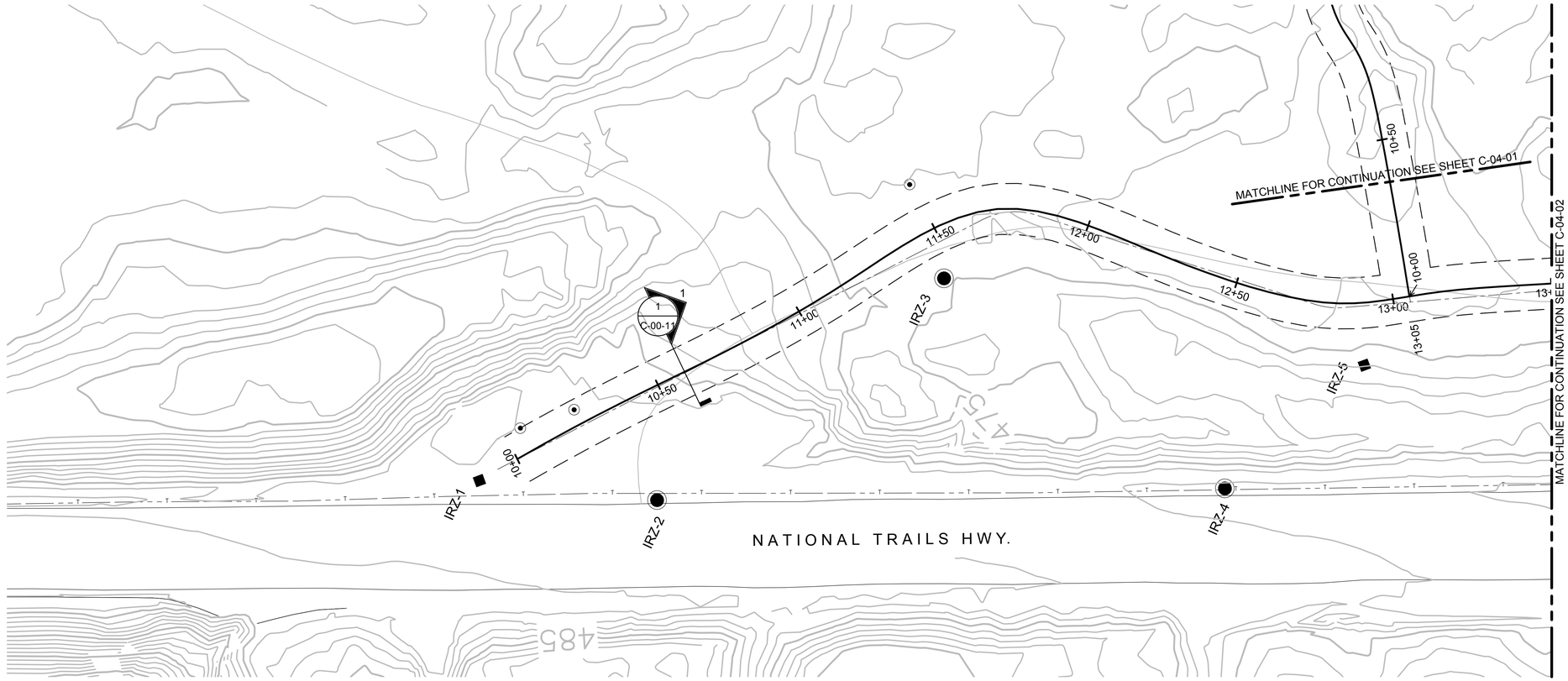
IRZ INJECTION WELL PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-04-02	REV 2

N1808

11/04/2015, 12:10, G:\Graphics\ARI\TOPOCK\011\Submittal - 100%\DWGs\G-General\G-03-01_04-01_04-02_05-01_06-01.dwg, Tab: G-04-02



NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

0 20 40 60

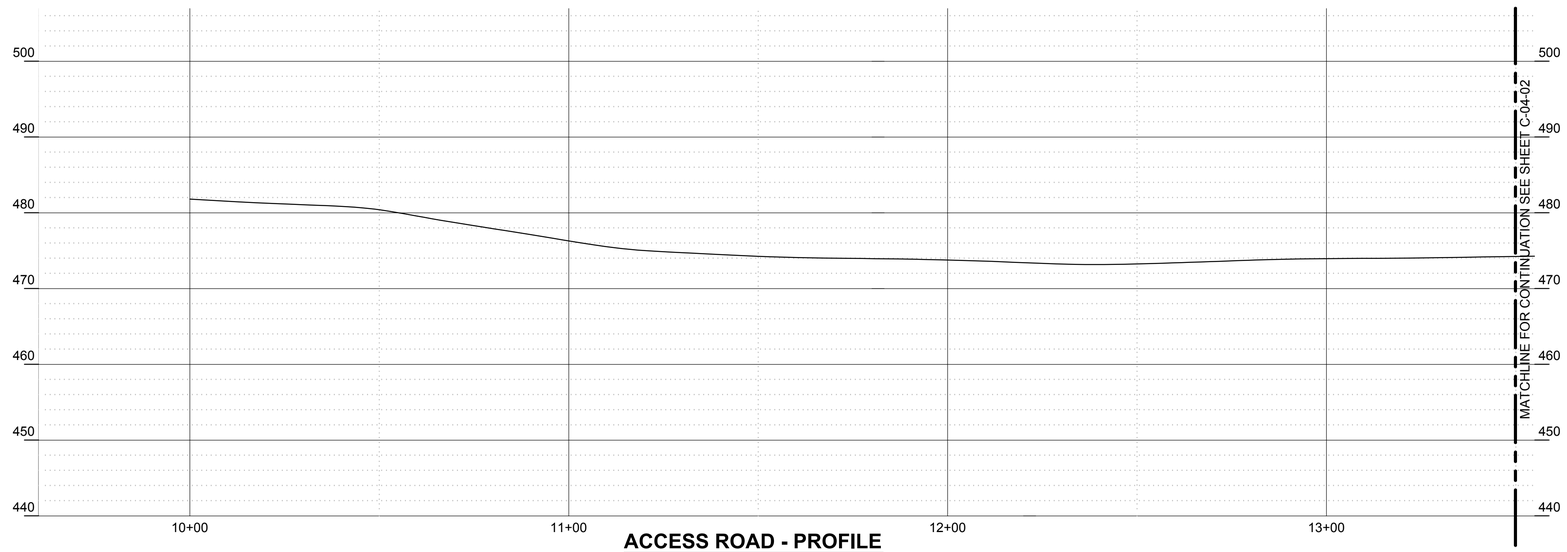
HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'

ACCESS ROAD - PLAN

(SCALE: 1" = 20')



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/14
CIVIL
STATE OF CALIFORNIA

MICROFILM

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

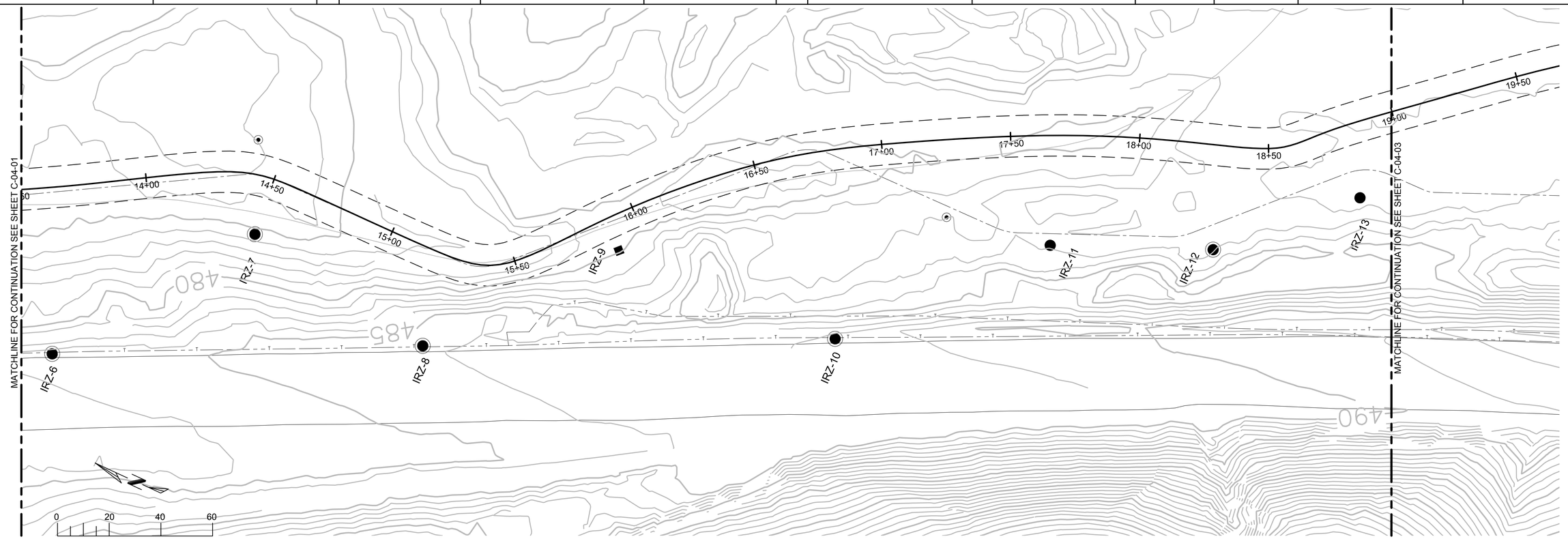
ACCESS ROAD-
PLAN AND PROFILE - PIPELINE "C"
STA 10+00 TO STA 13+50

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-01	REV 2

N1808

11/02/2015, 13:20, G:\Graphics\AR\TOPOCK-011Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-01

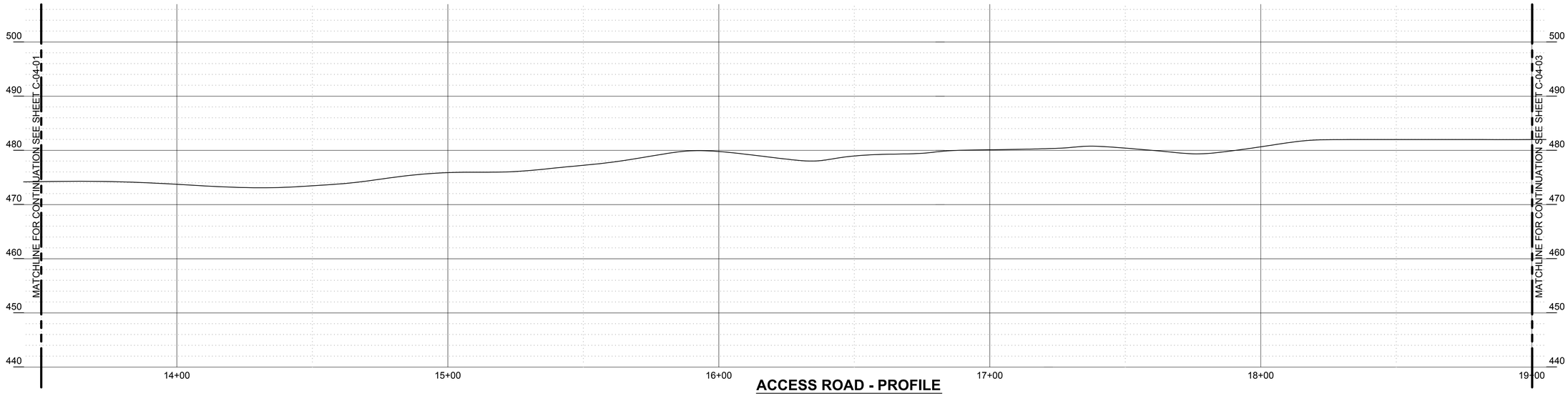


ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 13+50 TO STA 19+00

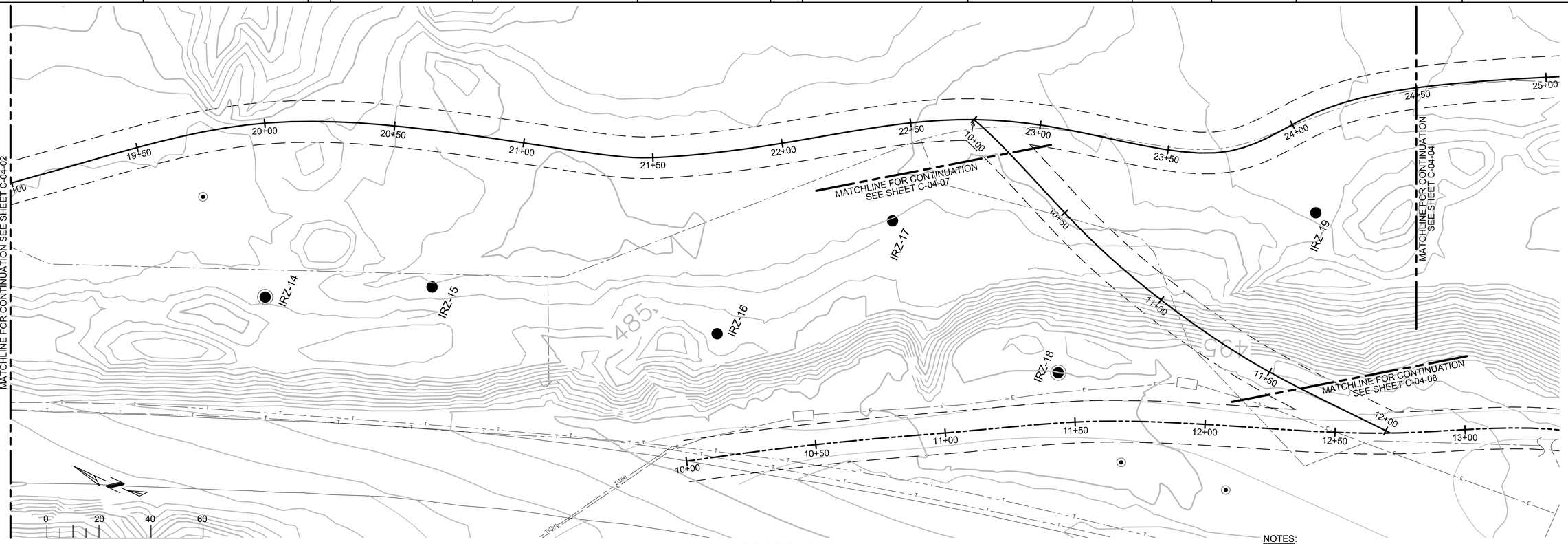
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-02	REV 2

11/02/2015, 13:21, G:\Graphics\ART\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-02

N1808

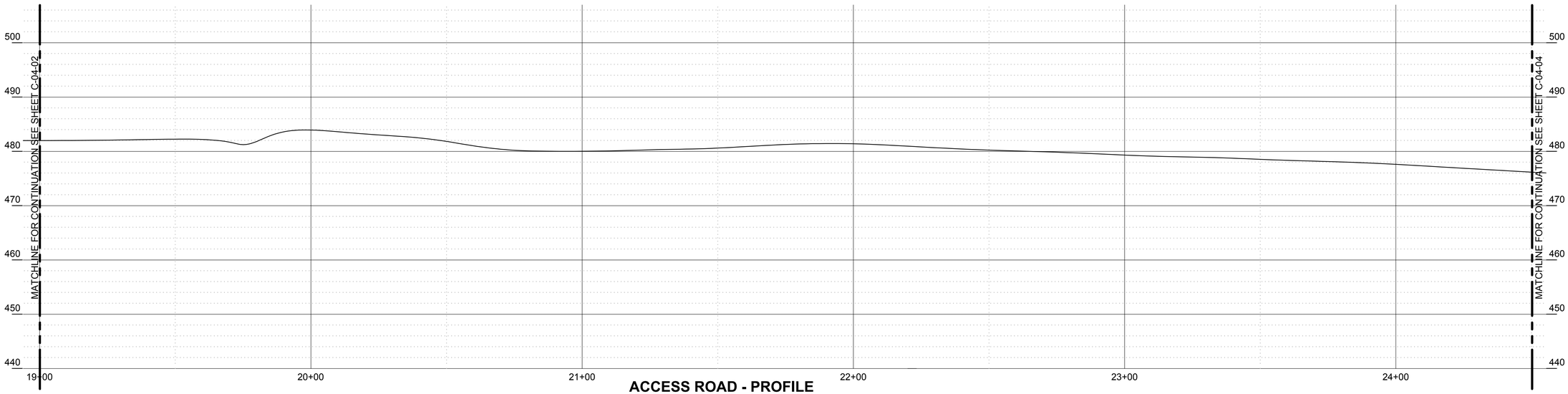


ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 19+00 TO STA 24+50

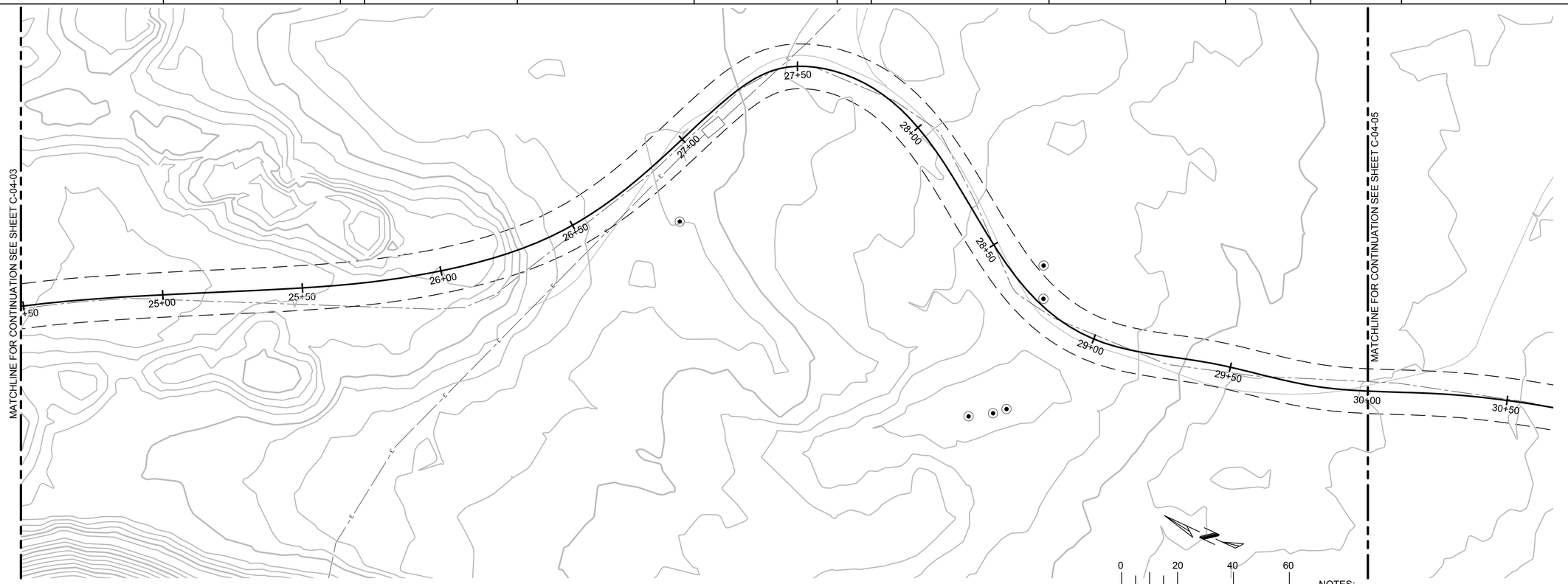
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-03	REV 2

11/02/2015, 13:21, G:\Graphics\ART\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-03

N1808



ACCESS ROAD - PLAN

(SCALE: 1" = 20')

0 20 40 60

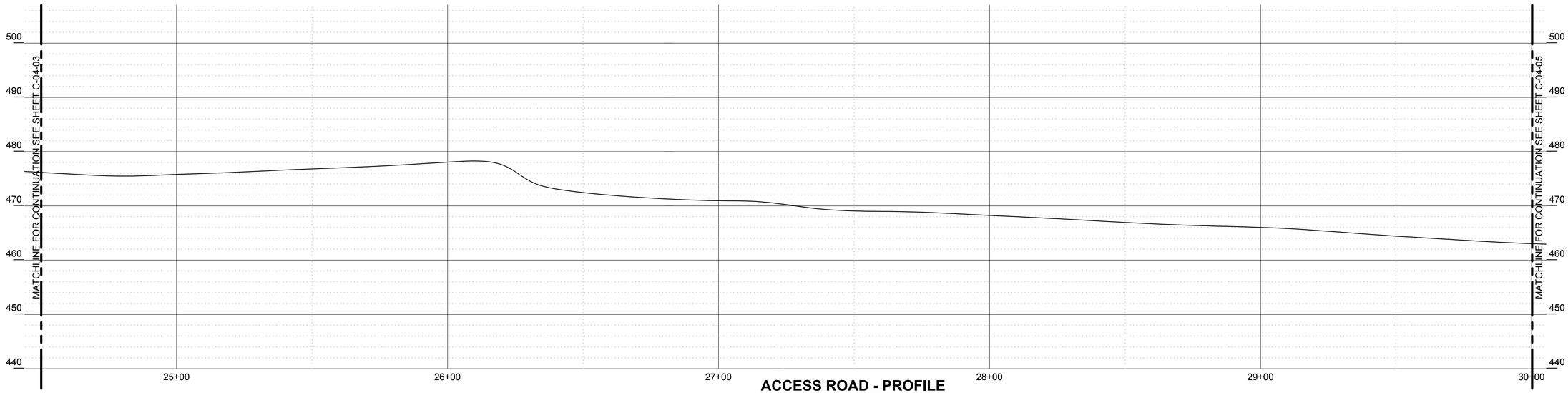
HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'

NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

N1808

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 24+50 TO STA 30+00

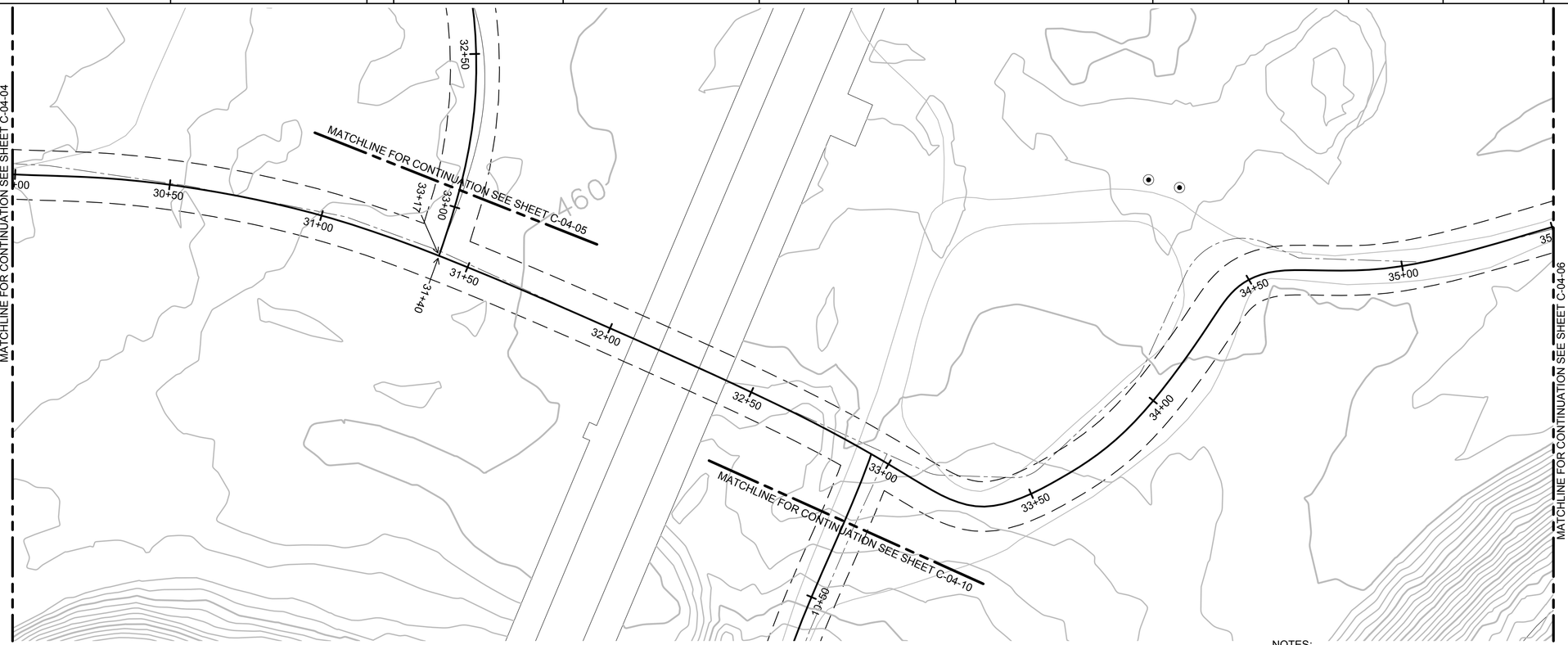
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-04	REV 2

11/02/2015, 13:21, G:\Graphics\ARI\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-04



ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

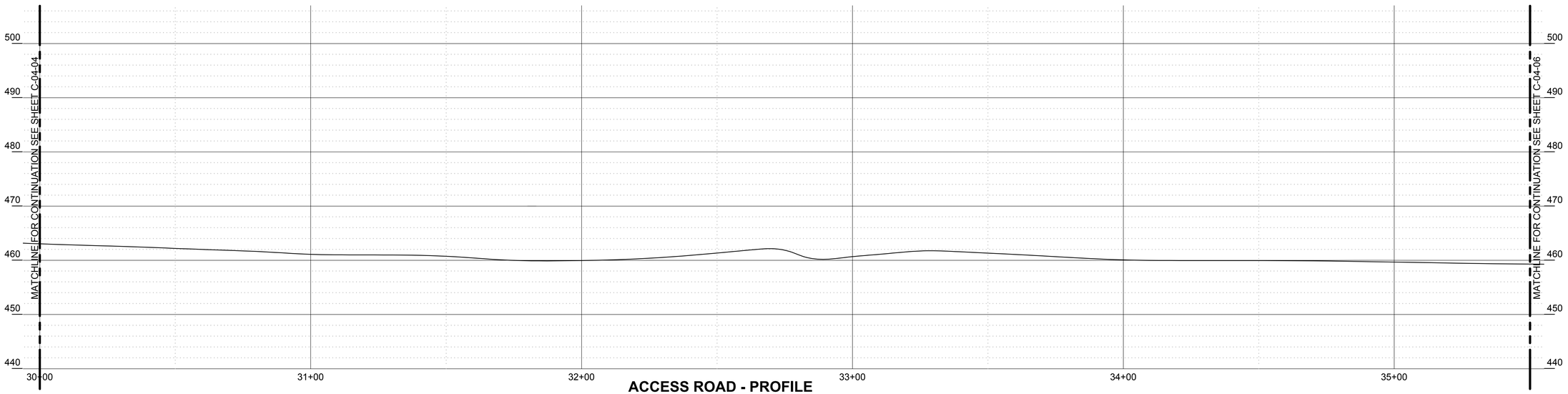
1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

0 20 40 60

HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 30+00 TO STA 35+50

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

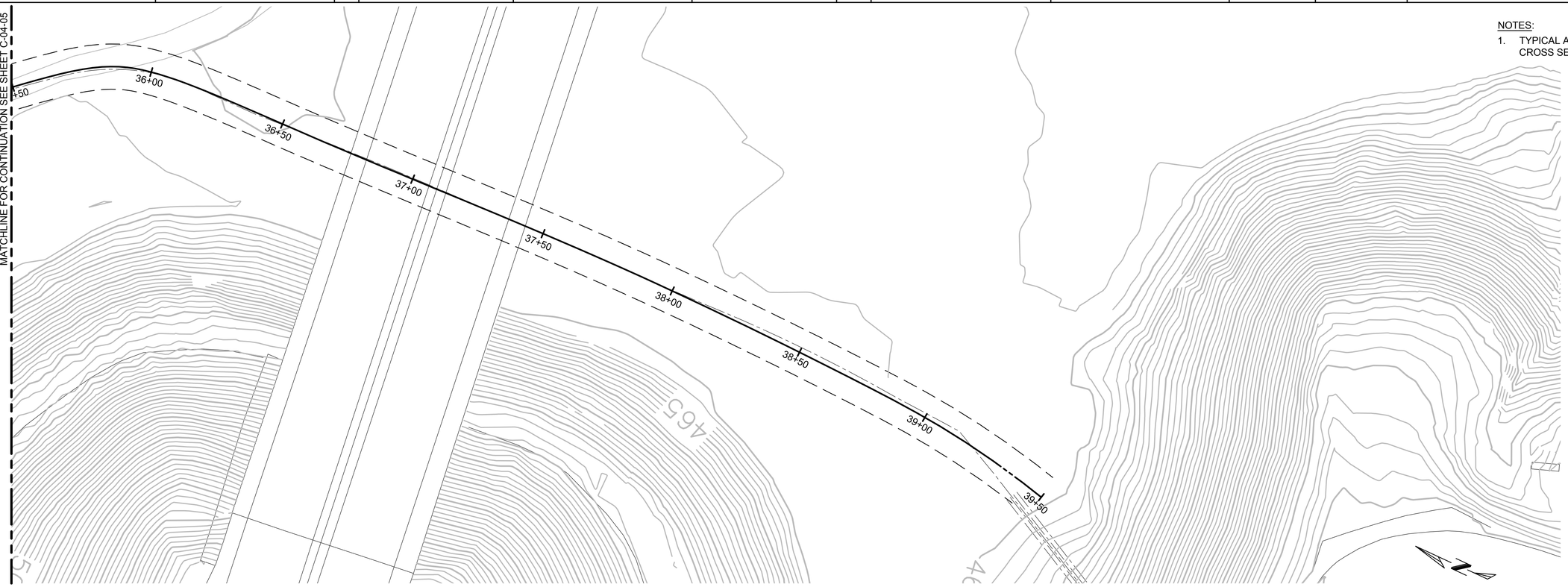
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-05	REV 2

N1608

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MATCHLINE FOR CONTINUATION SEE SHEET C-04-05

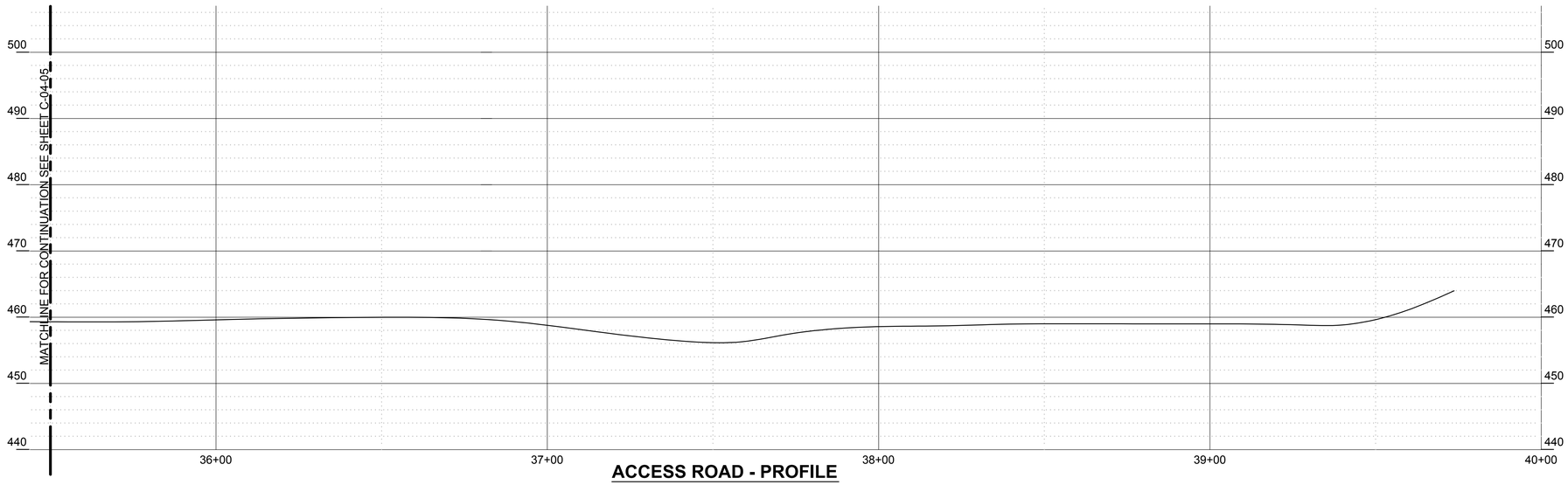
NOTES:
1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PLAN
(SCALE: 1" = 20')

0 20 40 60
HORIZ: SCALE: 1"=20'

0 10 20 30
VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE
(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUEST
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

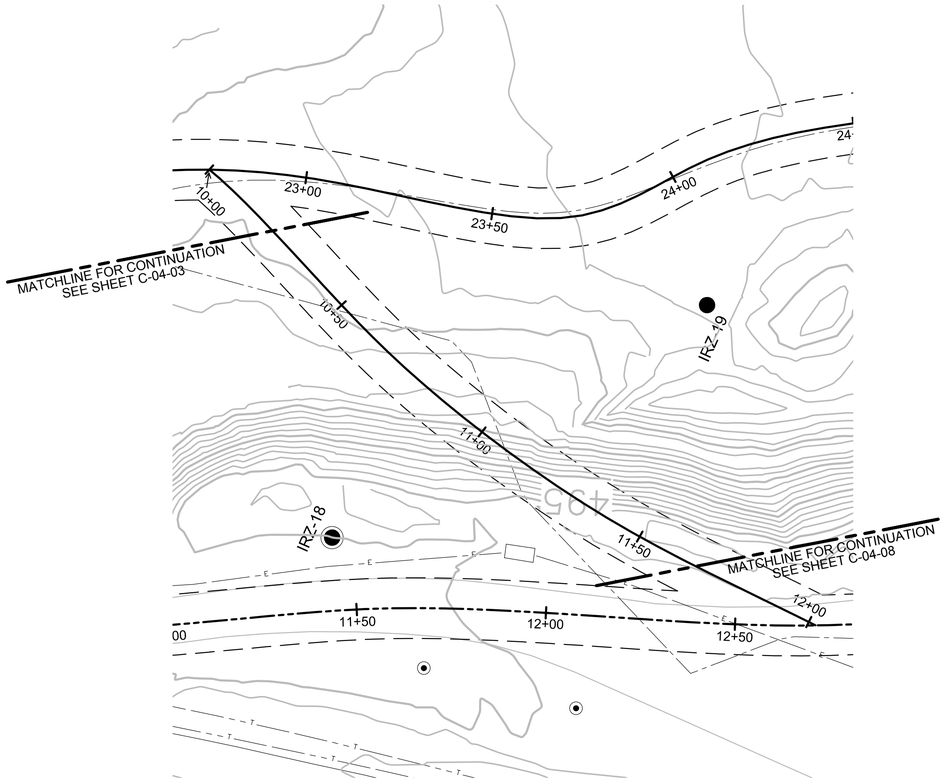
ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 35+50 TO STA 39+50

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-06	REV 2

N1808

11/02/2015, 13:22, G:\Graphics\ARITOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-06



ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

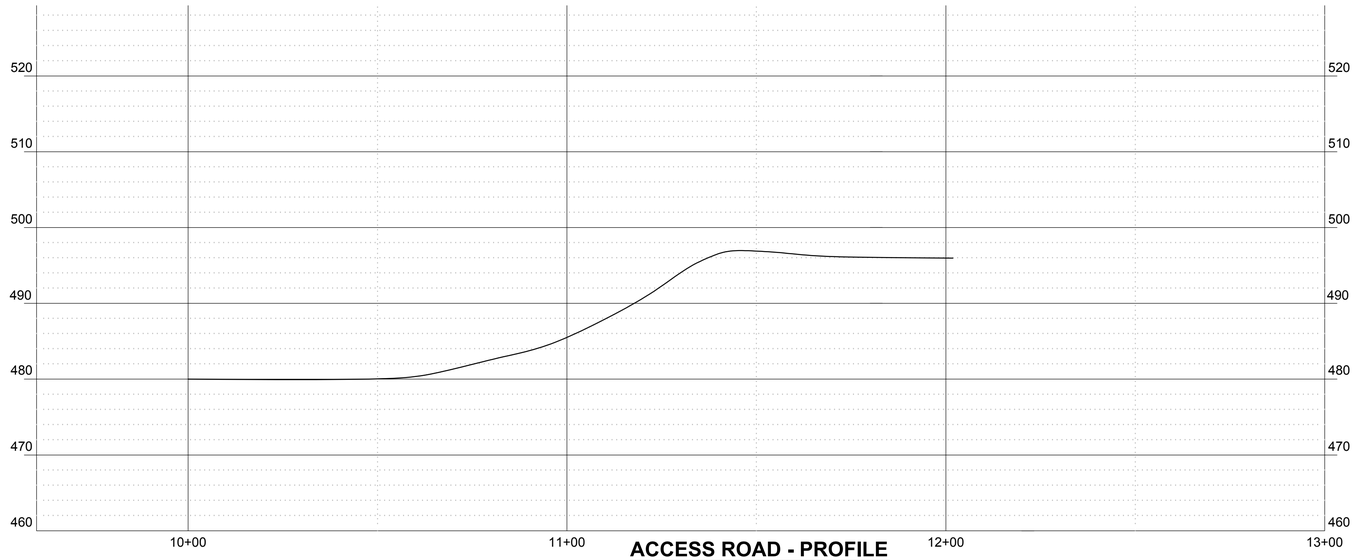
1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

0 20 40 60

HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 12+02

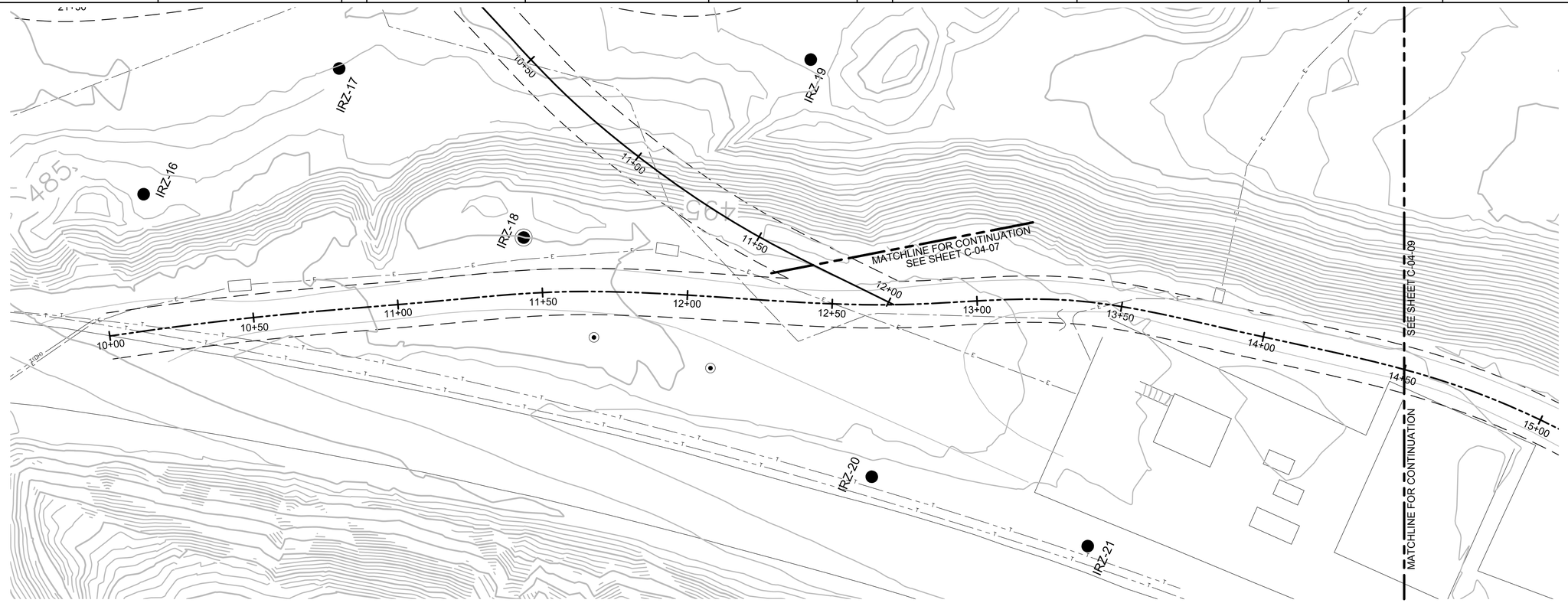
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-07	REV 2

N1808

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NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

ACCESS ROAD - PLAN

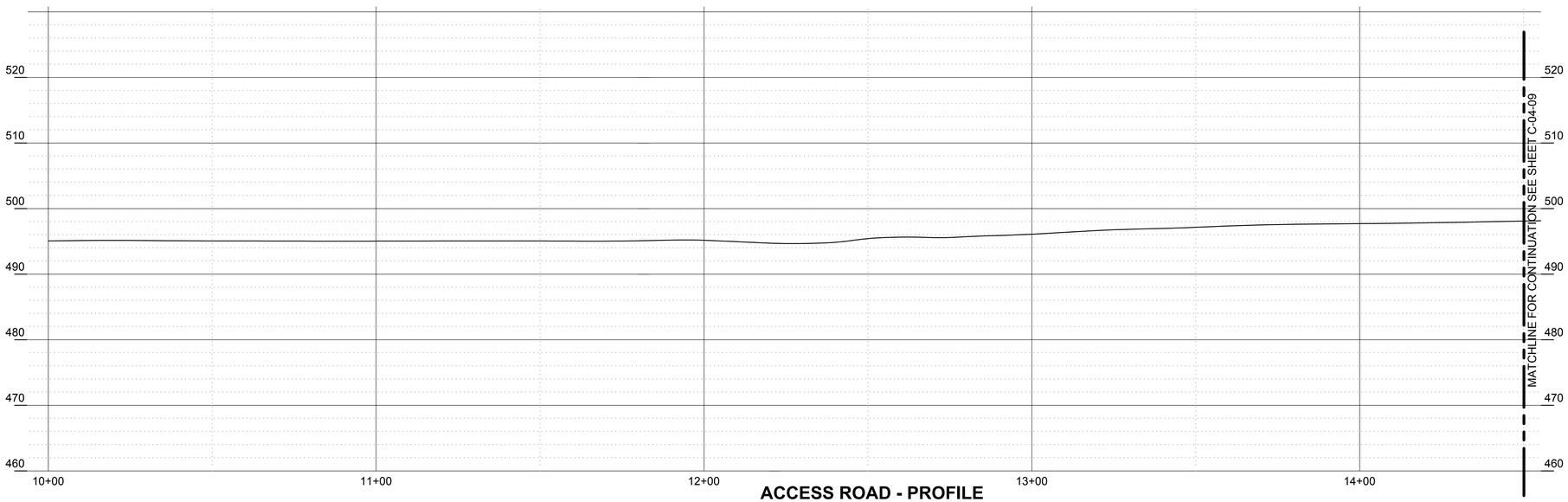
(SCALE: 1" = 20')

0 20 40 60

HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 14+50

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

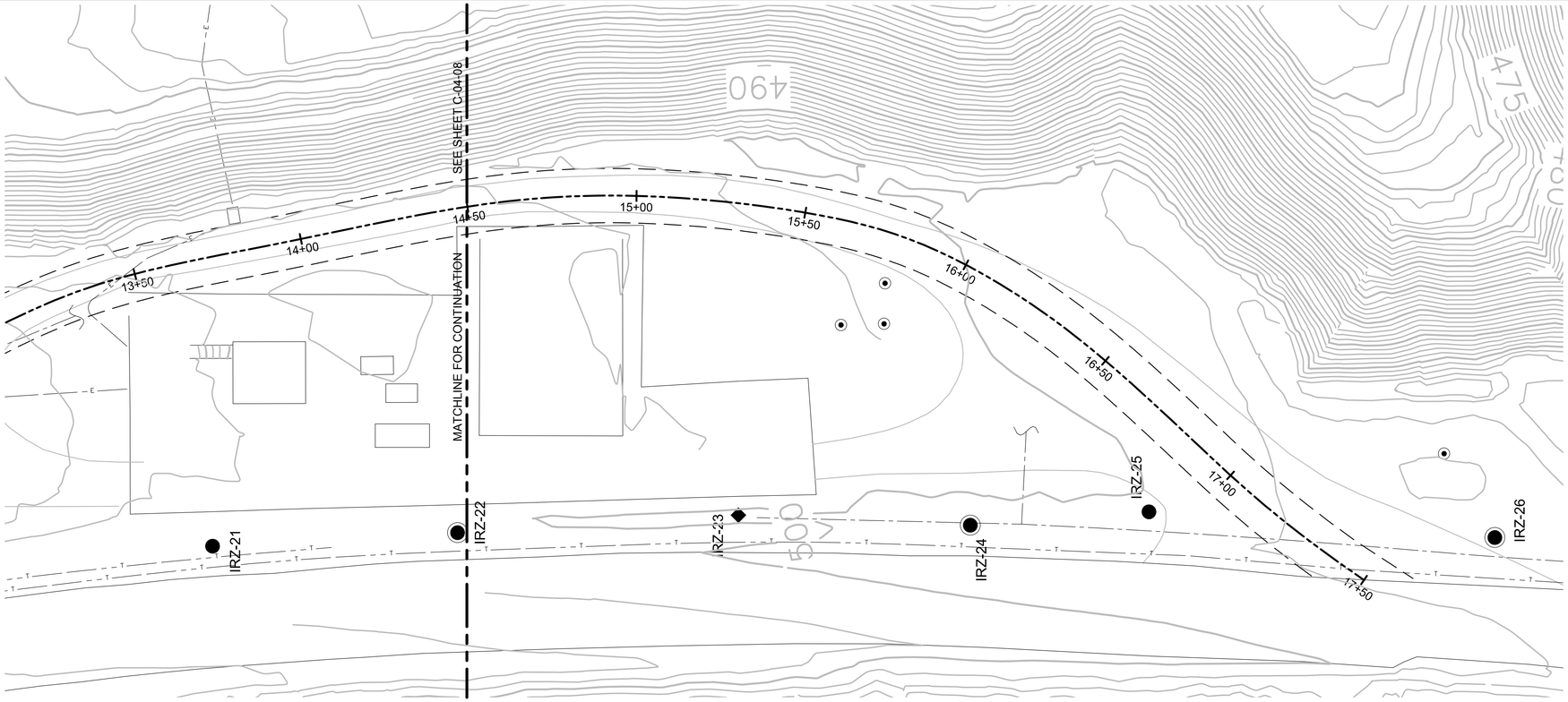
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-08	REV 2

N1808

11/02/2015, 13:22, G:\Graphics\ART\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-08

NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PLAN

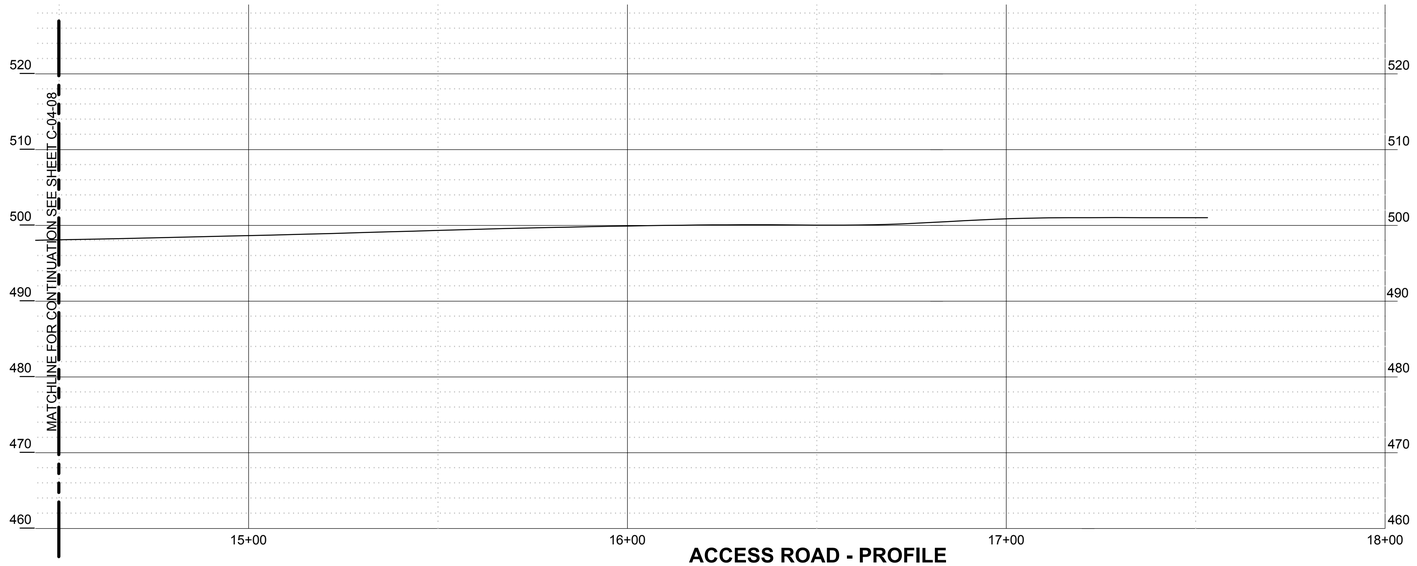
(SCALE: 1" = 20')

0 20 40 60

HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 14+50 TO STA 17+50

GAS TRANSMISSION & DISTRIBUTION

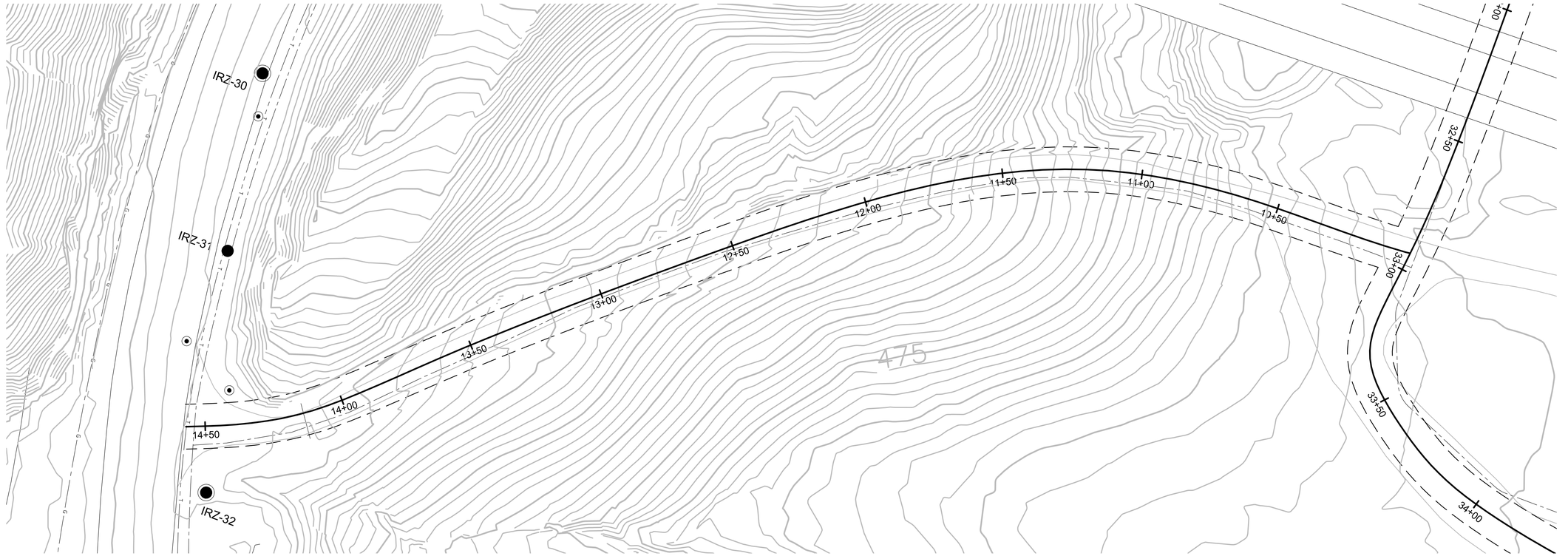
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-09	REV 2

11/02/2015, 13:22, G:\Graphics\ART\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-09

N1808



0 20 40 60
HORIZ: SCALE: 1"=20'

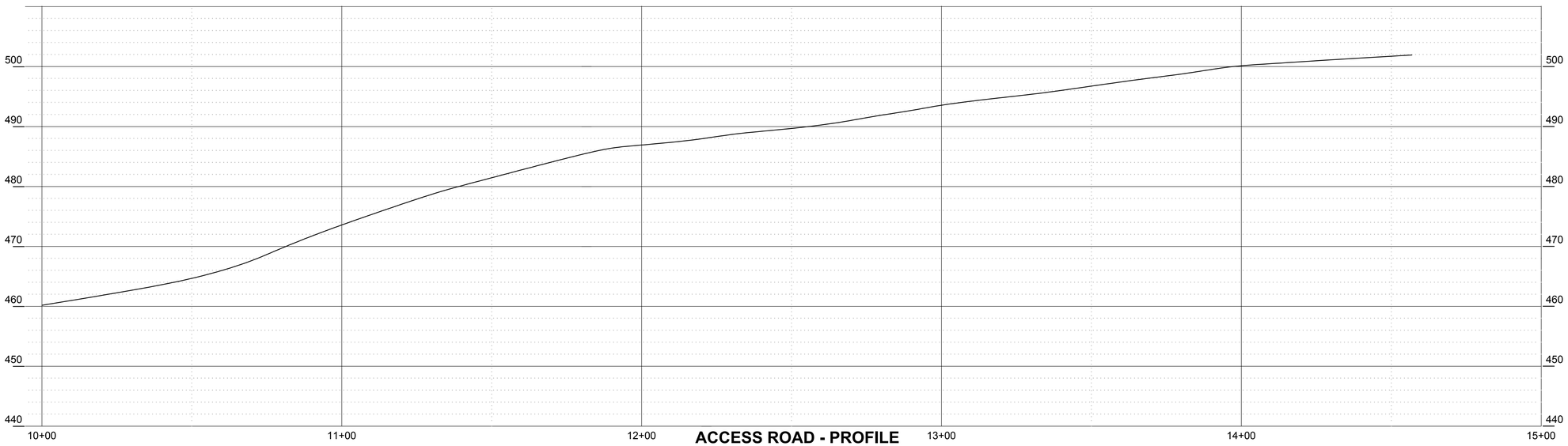
0 10 20 30
VERT: SCALE: 1"=10'

ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUSEL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "C" STA 10+00 TO STA 14+58

GAS TRANSMISSION & DISTRIBUTION

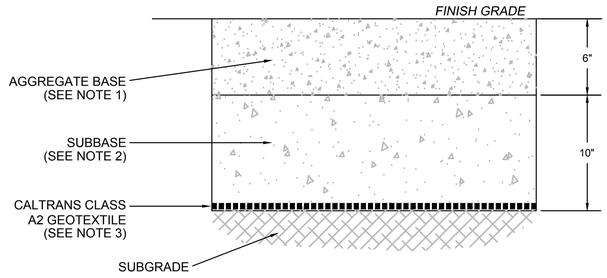
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-04-10	REV 2

N1808

11/02/2015, 13:23, G:\Graphics\ARI\TOPOCK-01\Submittal_100%\DWGs\C-Civil\C-04-01 to 11_C-05-08 to 13AccessRoad.dwg, Tab: C-04-10



NOTES:
1. AGGREGATE BASE MATERIAL SHOULD MEET CALTRANS SPECIFICATION FOR CLASS 2 AGGREGATE BASE.
2. SUBBASE MATERIAL SHOULD MEET CALTRANS SPECIFICATION FOR CLASS 2 AGGREGATE BASE OR CLASS 1 OR 2 AGGREGATE SUBBASE.
3. IF ONLY CLASS 2 AGGREGATE BASE IS USED IN THE ROAD SECTION, THE GEOTEXTILE MAY BE OMITTED.

1 SECTION
NOT TO SCALE

C-04-01 THRU' C-04-10

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- TYPICAL ROAD SECTION

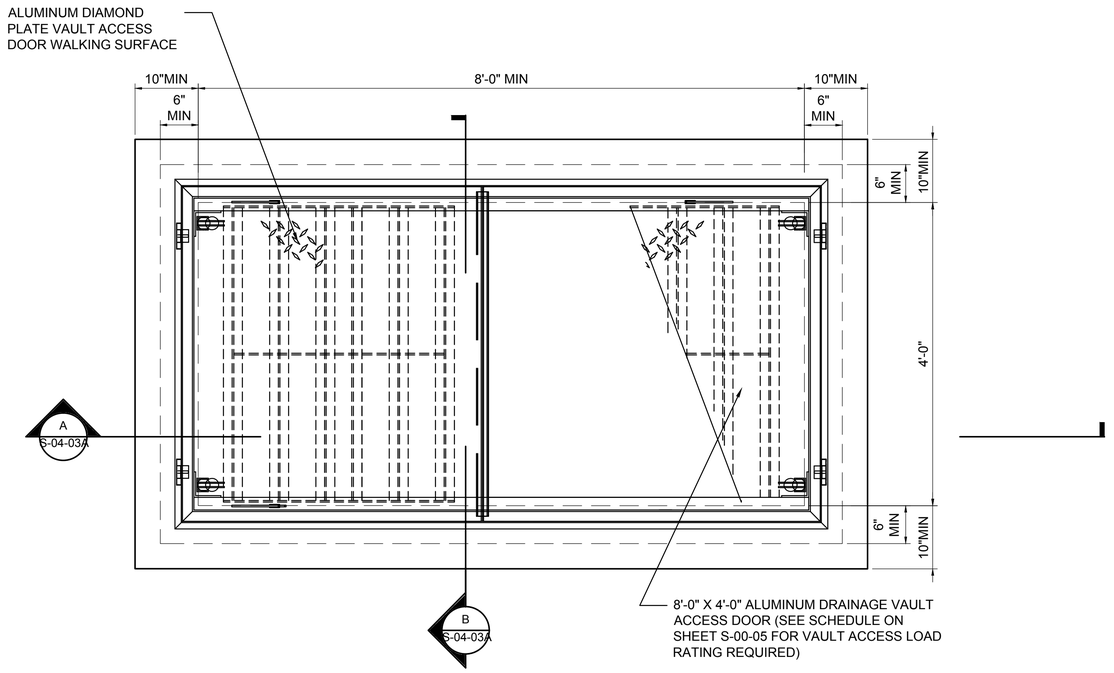
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY

SHEET NO.	of	SHEETS	REV
C-04-11			2

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WELL METER VAULT

IRZ EXTRACTION WELL METER VAULT TYPE 1 - TOP PLAN

1" = 1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOMBARDI
No. C 61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ EXTRACTION WELL METER VAULTS - TYPE 1 TOP PLAN

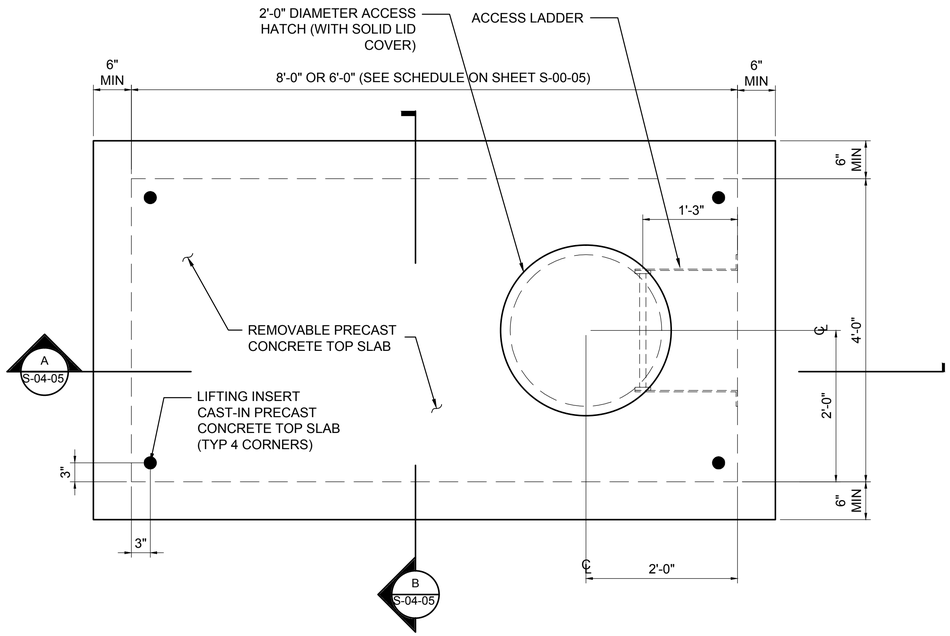
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-04-01	REV 2

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WELL METER VAULT

IRZ EXTRACTION WELL METER VAULT TYPE 2 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. ACCESS HATCH, SOLID LID, AND FRAME TO BE HIGHWAY RATED (HS20-44) AND MANUFACTURED BY NEENAH FOUNDRY OR EAST JORDAN IRON WORKS.
8. PROVIDE 90° HOOK AT ENDS OF TOP AND BOTTOM RESTEEL IN WELL METER VAULT TOP SLAB WITHIN 1'-6" OF LIFTING INSERTS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOVE
No. C 65017
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO	
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0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ EXTRACTION WELL METER VAULTS - TYPE 2 - TOP PLAN

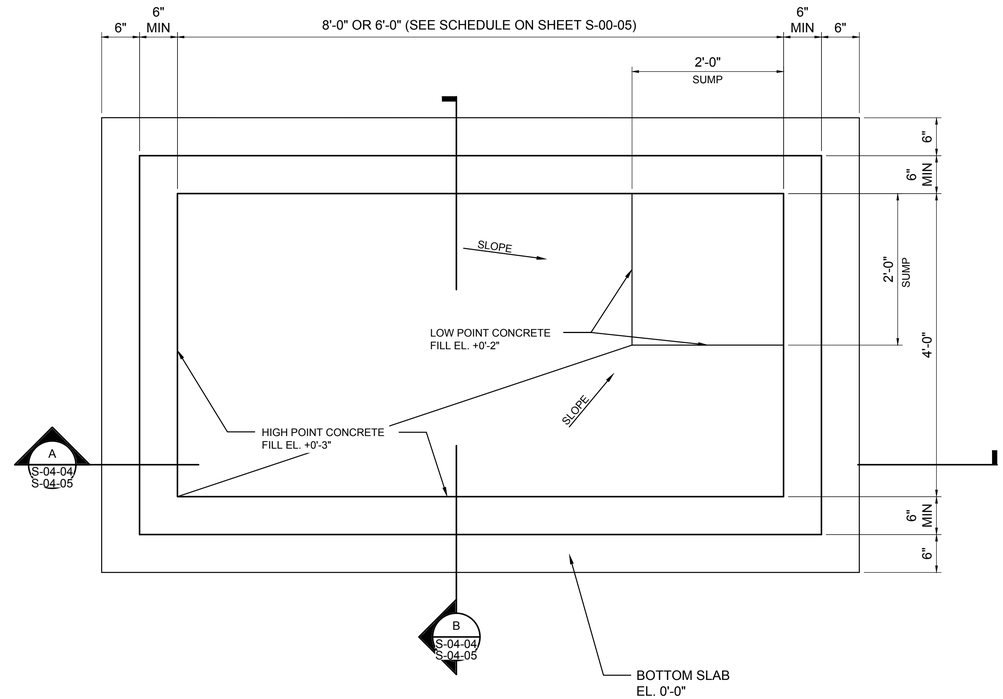
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
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SHEET NO. of SHEETS

S-04-02 | REV 2

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WELL METER VAULT

IRZ EXTRACTION WELL METER VAULT TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWNEY No. C 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ EXTRACTION WELL METER VAULTS - TYPES 1 AND 2 FOUNDATION PLAN

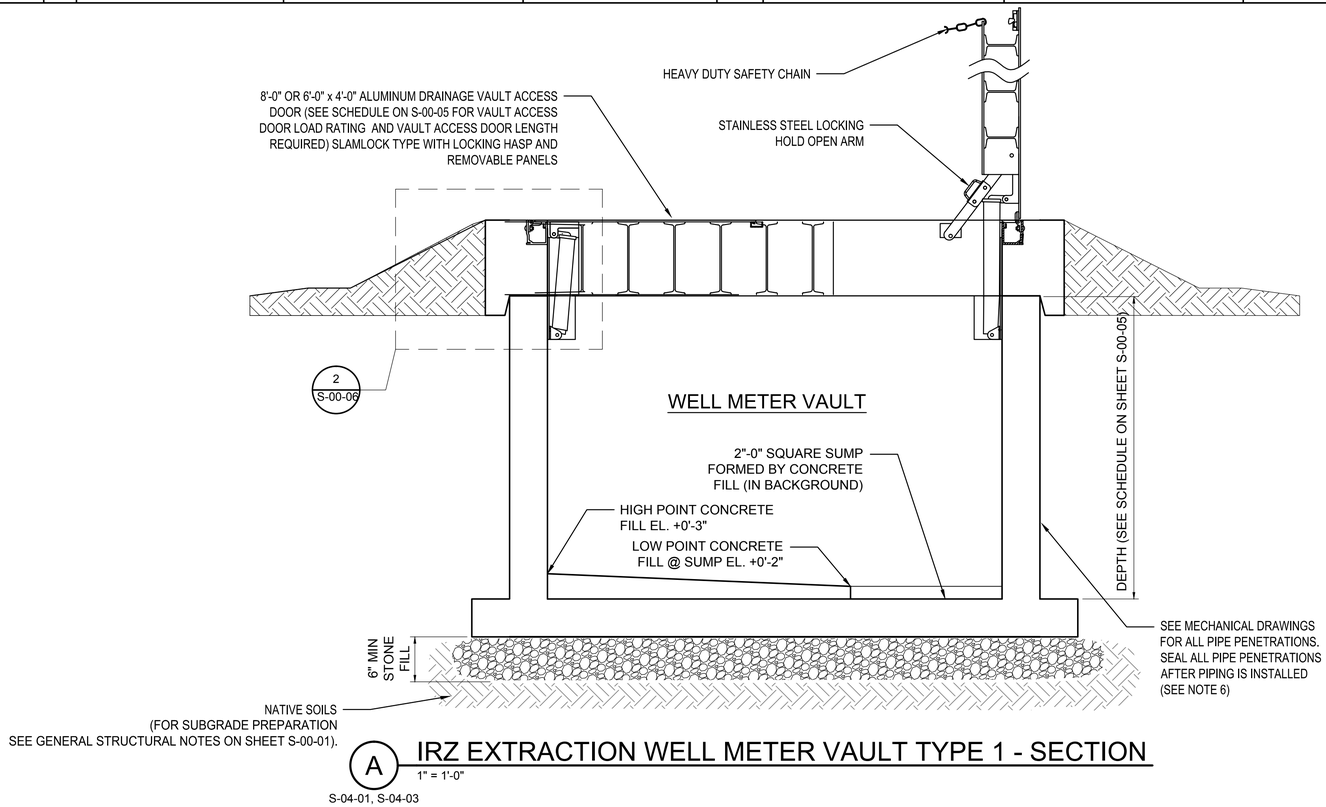
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-04-03	REV 2

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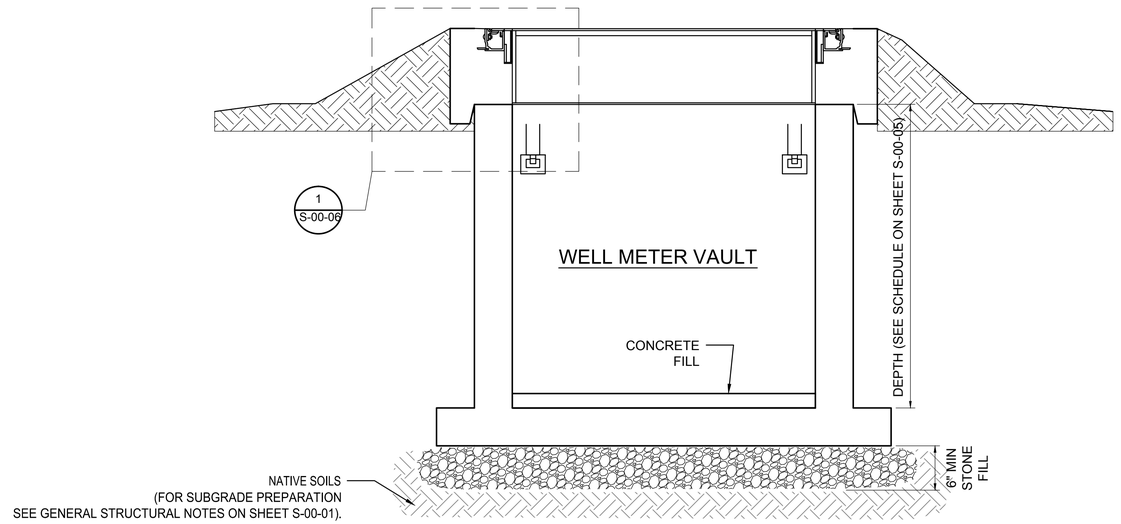
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A IRZ EXTRACTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-04-01, S-04-03



B IRZ EXTRACTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-04-01, S-04-03

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY No. C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

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REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ EXTRACTION WELL VAULTS - SECTIONS SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

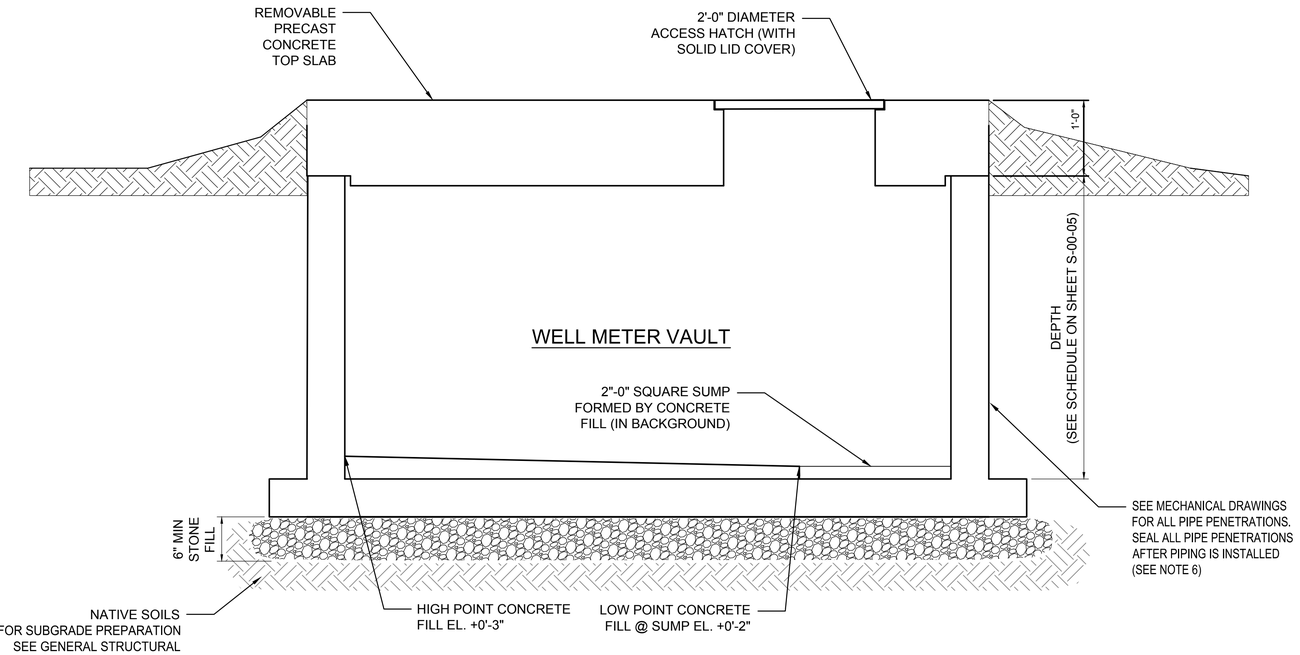
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

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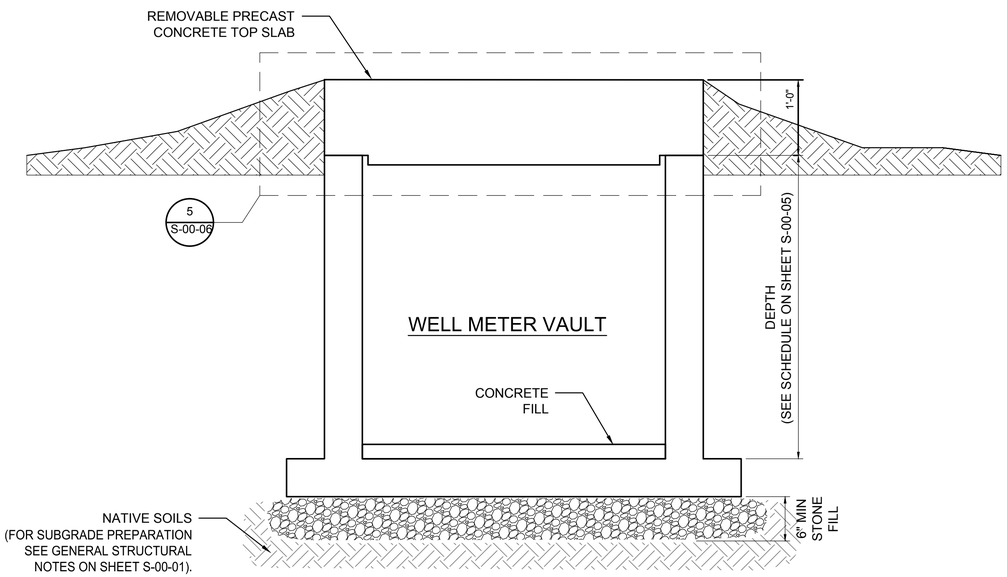
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A IRZ EXTRACTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-04-02, S-04-03



B IRZ EXTRACTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-04-02, S-04-03

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOVETT 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ EXTRACTION WELL VAULTS - SECTIONS SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

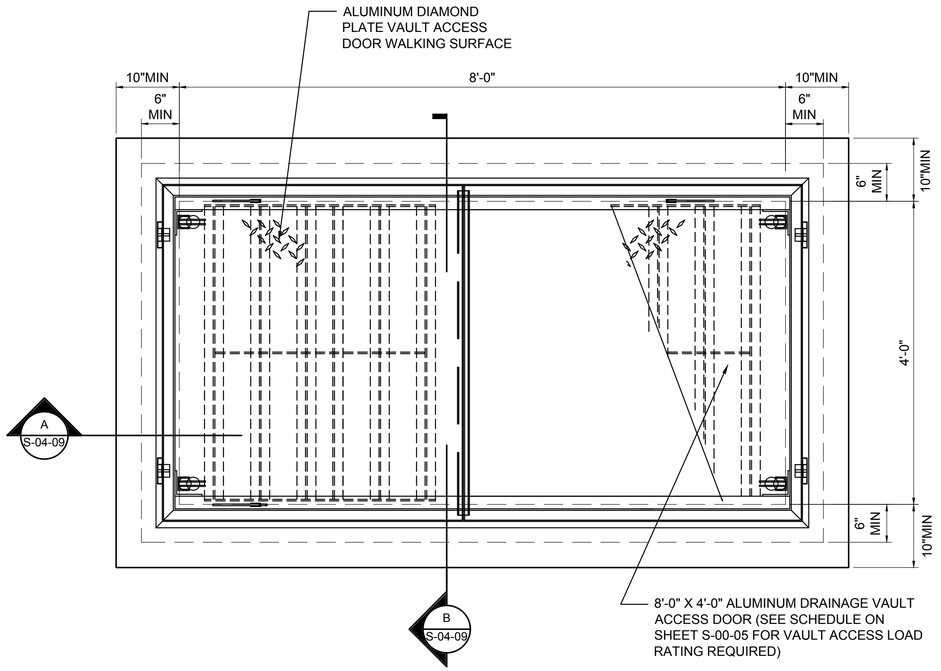
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

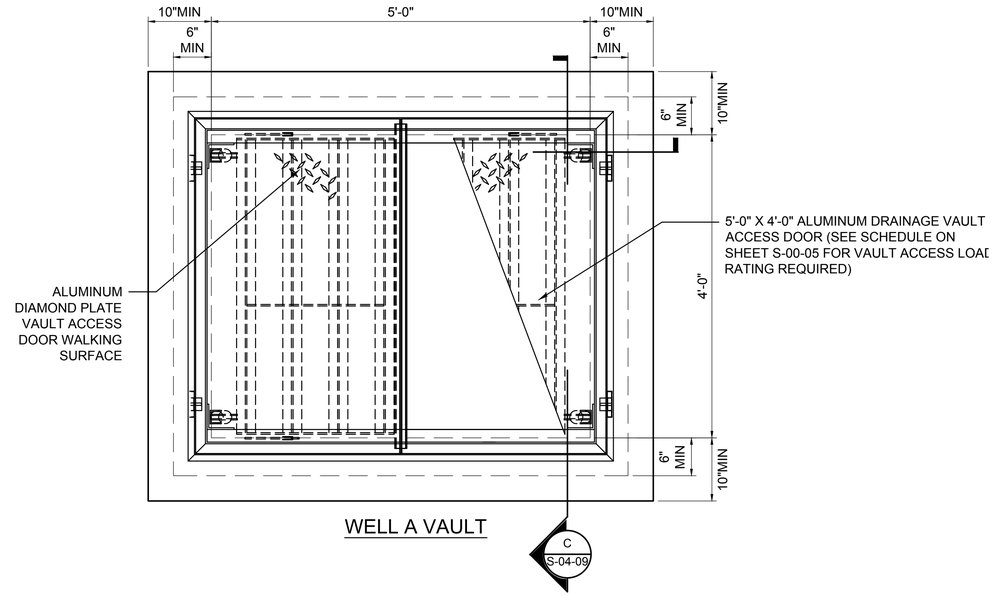
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BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
S-04-05	REV 2

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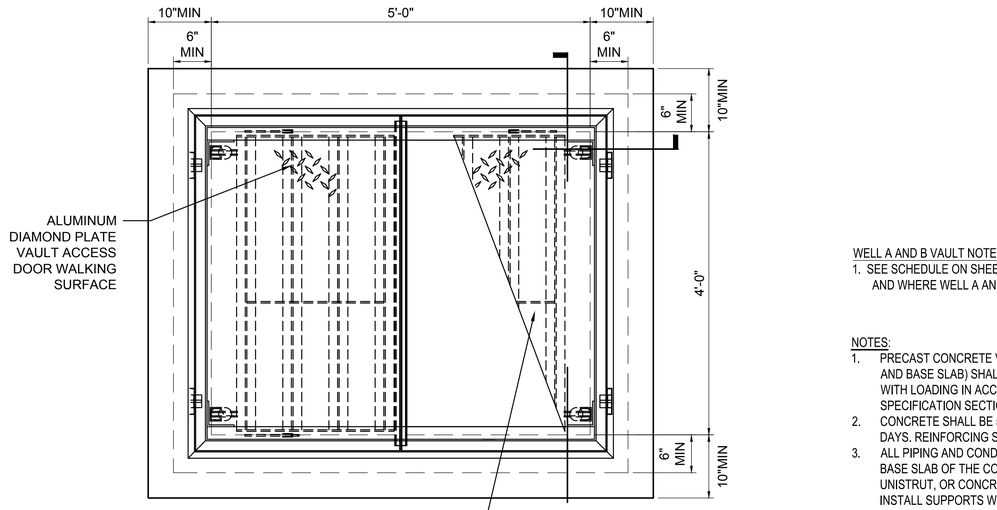
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WELL METER VAULT



WELL A VAULT



WELL B VAULT

WELL A AND B VAULT NOTE:
1. SEE SCHEDULE ON SHEET S-00-05 TO DETERMINE IF AND WHERE WELL A AND B VAULTS ARE REQUIRED.

NOTES:
1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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IRZ INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - TOP PLAN

1" = 1'-0"

0 1' 2' 3'
SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOVE
C61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ INJECTION WELL VAULTS-
TYPE 1 - TOP PLAN

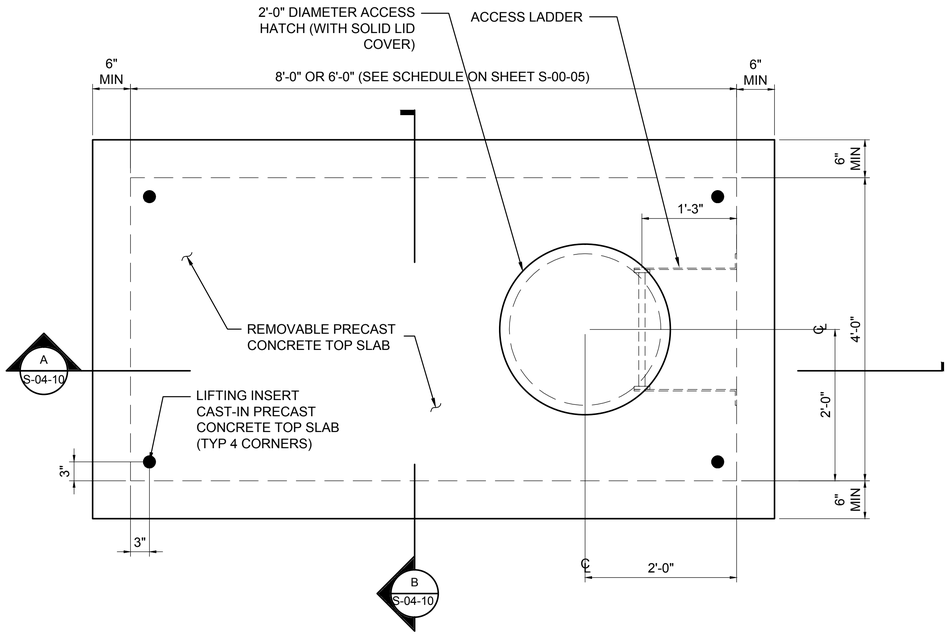
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

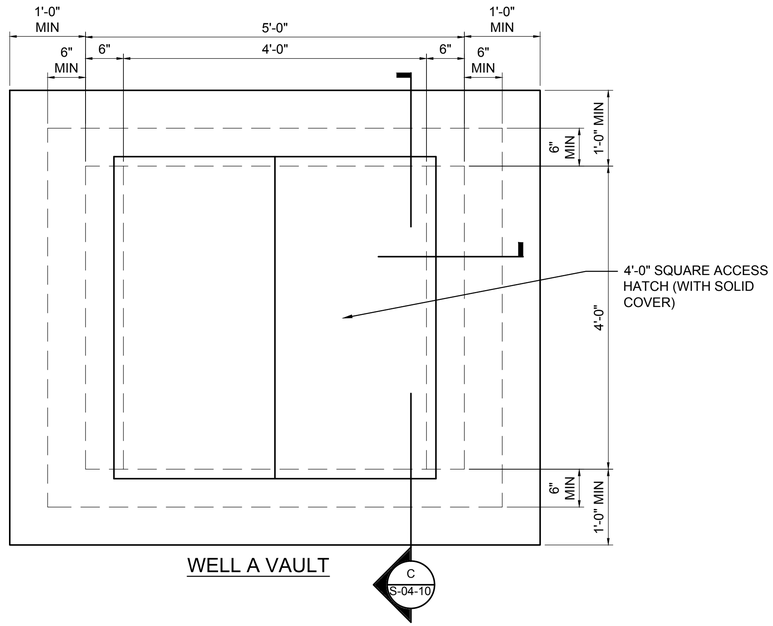
SHEET NO. S-04-06 of SHEETS | REV 2

N1808

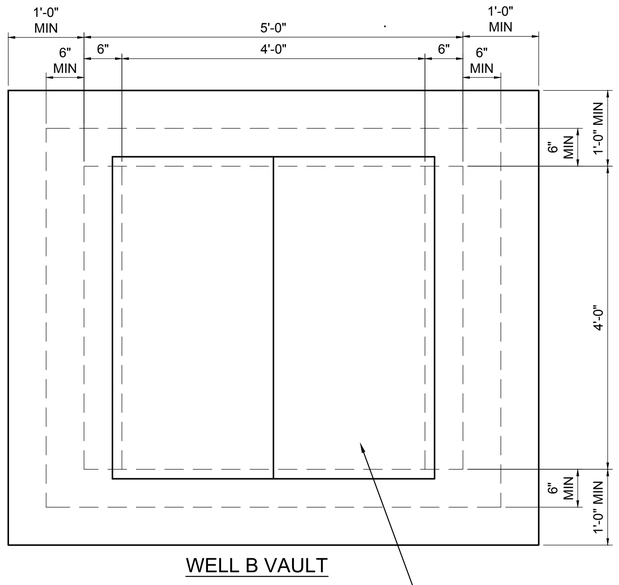
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WELL METER VAULT



WELL A VAULT



WELL B VAULT

WELL A AND B VAULT NOTE:
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IRZ INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - TOP PLAN

1"=1'-0"

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWES
61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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REVISIONS

APPROVED BY	
	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

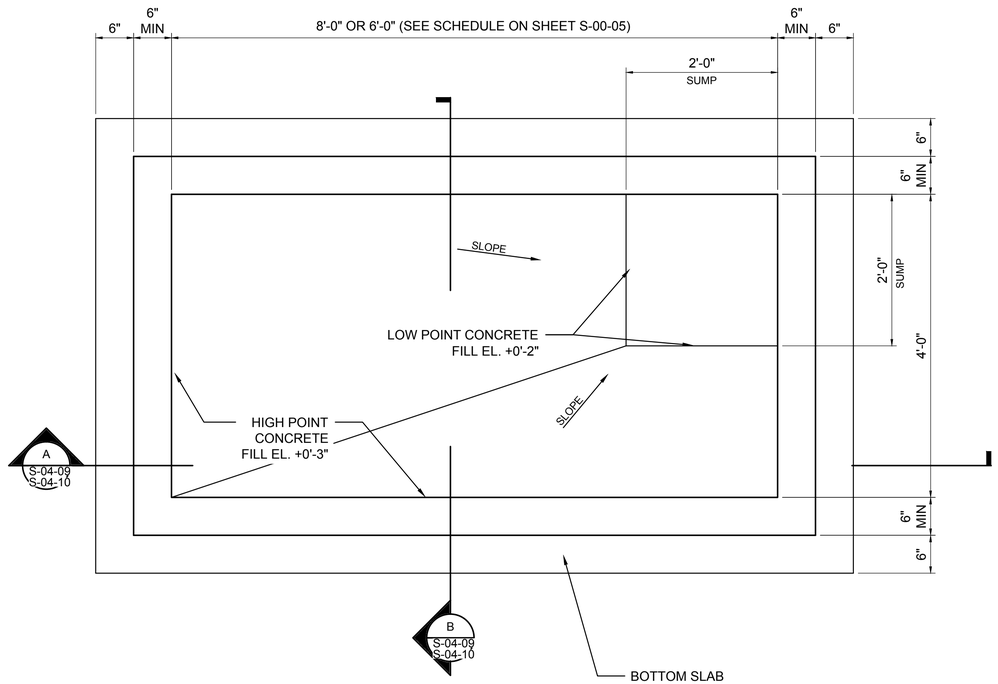
IRZ INJECTION WELL VAULTS
TYPE 2 - TOP PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

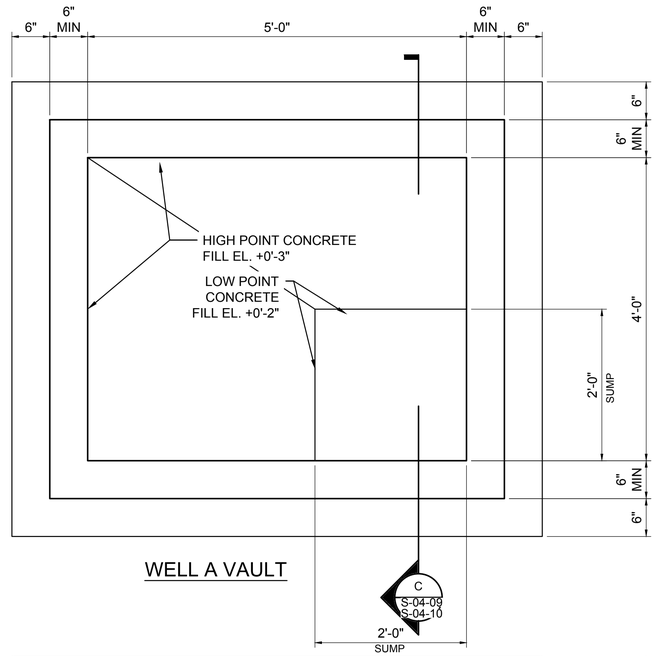
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-04-07	REV 2

N1808

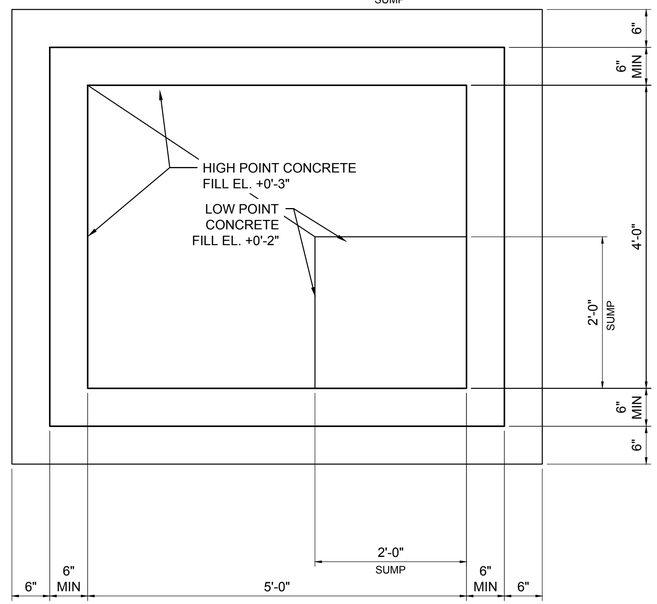
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WELL METER VAULT



WELL A VAULT



WELL B VAULT

WELL A AND B VAULT NOTE:
1. SEE SCHEDULE ON SHEET S-00-05 TO DETERMINE IF AND WHERE WELL A AND B VAULTS ARE REQUIRED.

NOTES:
1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'
SCALE: 1"=1'-0"

IRZ INJECTION WELL METER VAULT AND WELL VAULT TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
STEPHEN S. LOWE
61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

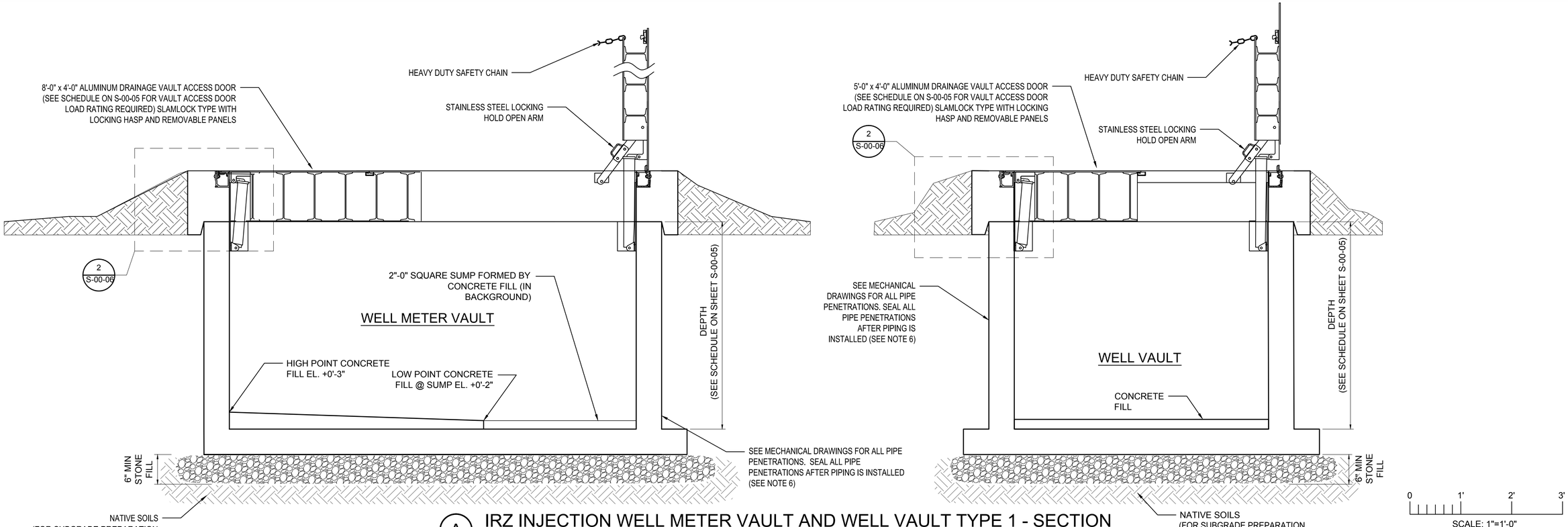
APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
IRZ INJECTION WELL VAULTS TYPES 1 AND 2 FOUNDATION PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-04-08	REV 2

N1808

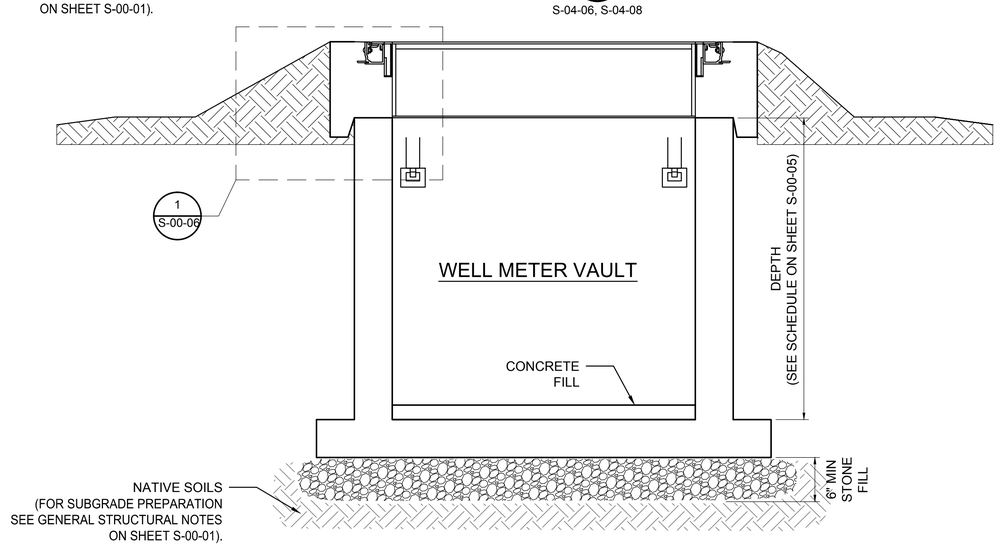
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A IRZ INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

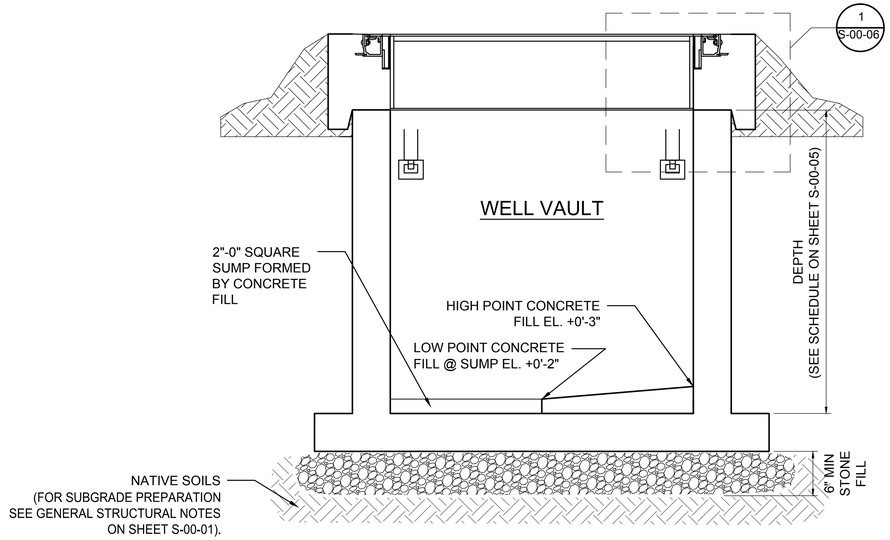
S-04-06, S-04-08



B IRZ INJECTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-04-06, S-04-08



C IRZ INJECTION WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

S-04-06, S-04-08

WELL A AND B VAULT NOTE:

1. SEE SCHEDULE ON SHEET S-00-05 TO DETERMINE IF AND WHERE WELL A AND B VAULTS ARE REQUIRED.

NOTES:

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4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY	
SO	
SUPV	
DSGN	RAO
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ INJECTION WELL VAULTS - SECTIONS SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

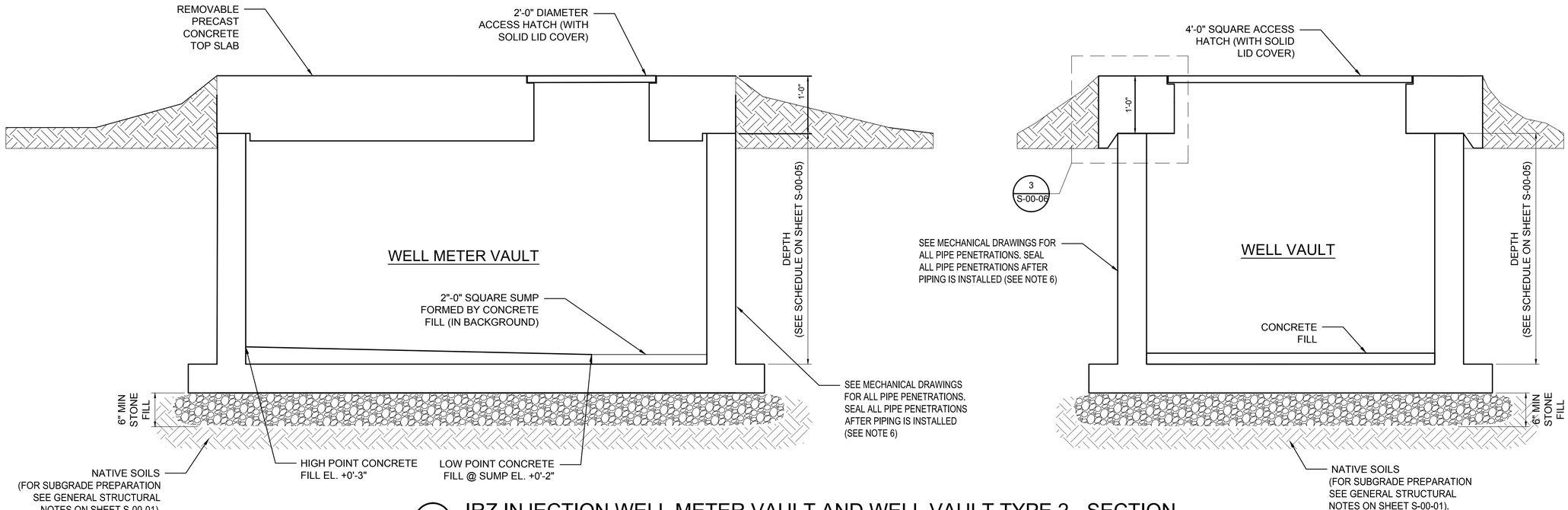
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-04-09	REV 2

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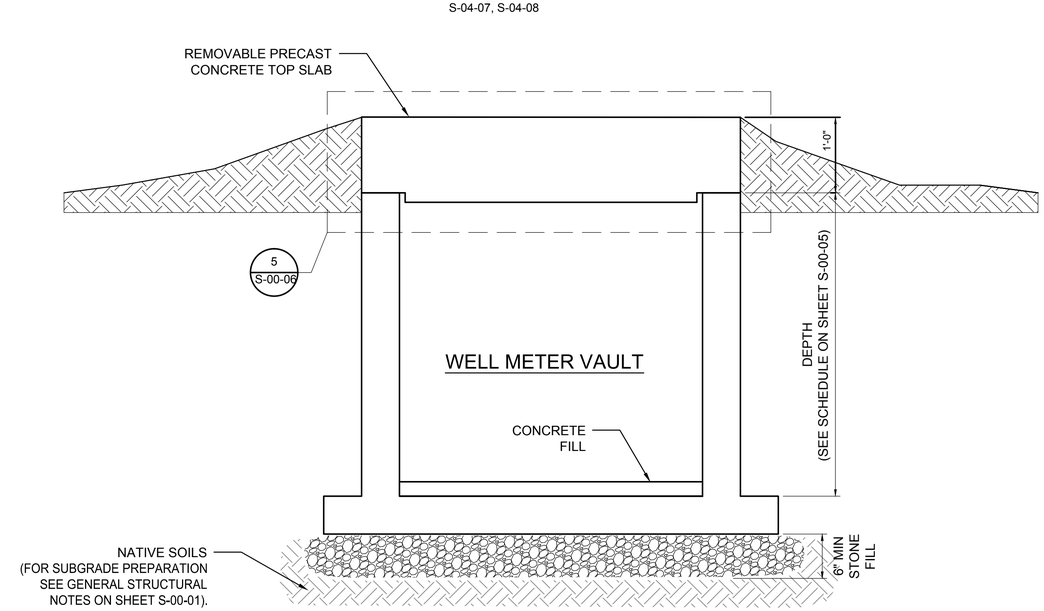
A IRZ INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-04-07, S-04-08

0 1' 2' 3'

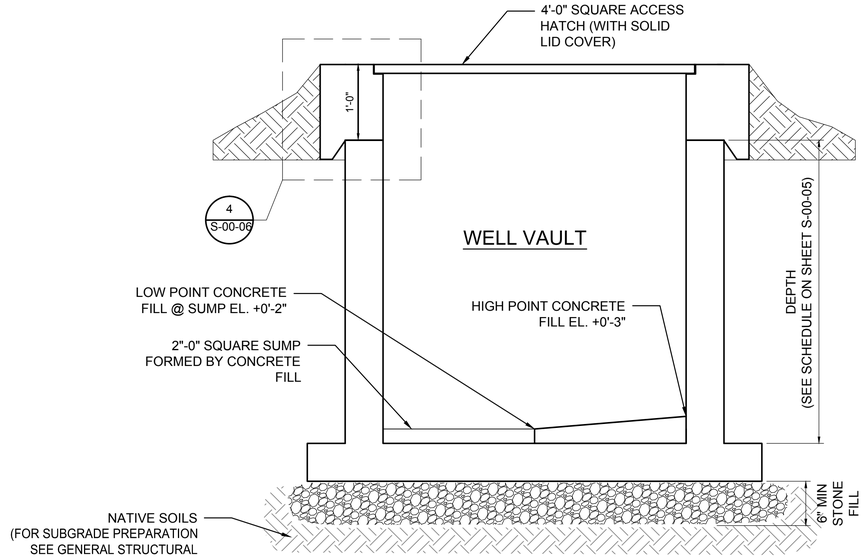
SCALE: 1"=1'-0"



B IRZ INJECTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-04-07, S-04-08



C IRZ INJECTION WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-04-07, S-04-08

WELL A AND B VAULT NOTE:

1. SEE SCHEDULE ON SHEET S-00-05 TO DETERMINE IF AND WHERE WELL A AND B VAULTS ARE REQUIRED.

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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOVETT C 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ INJECTION WELL VAULTS- SECTIONS SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

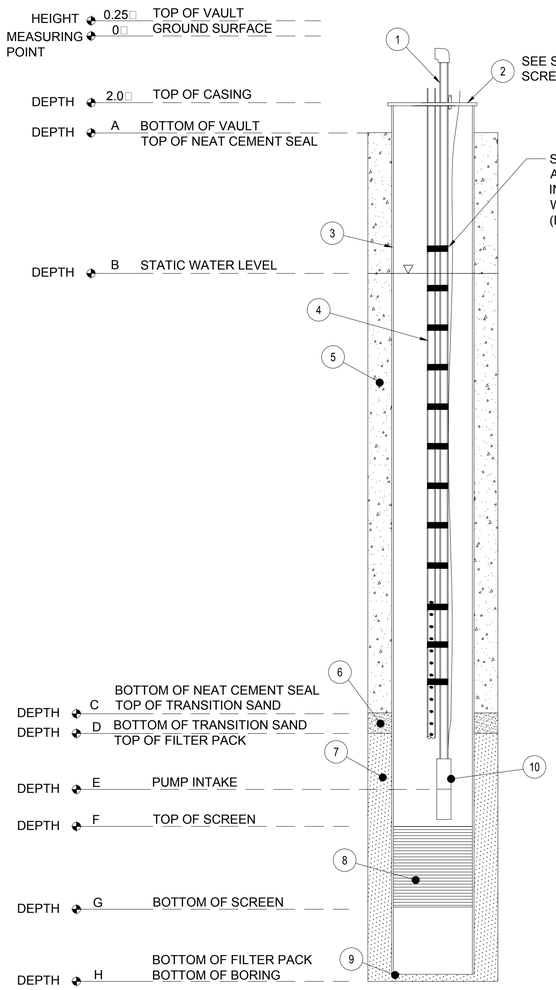
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

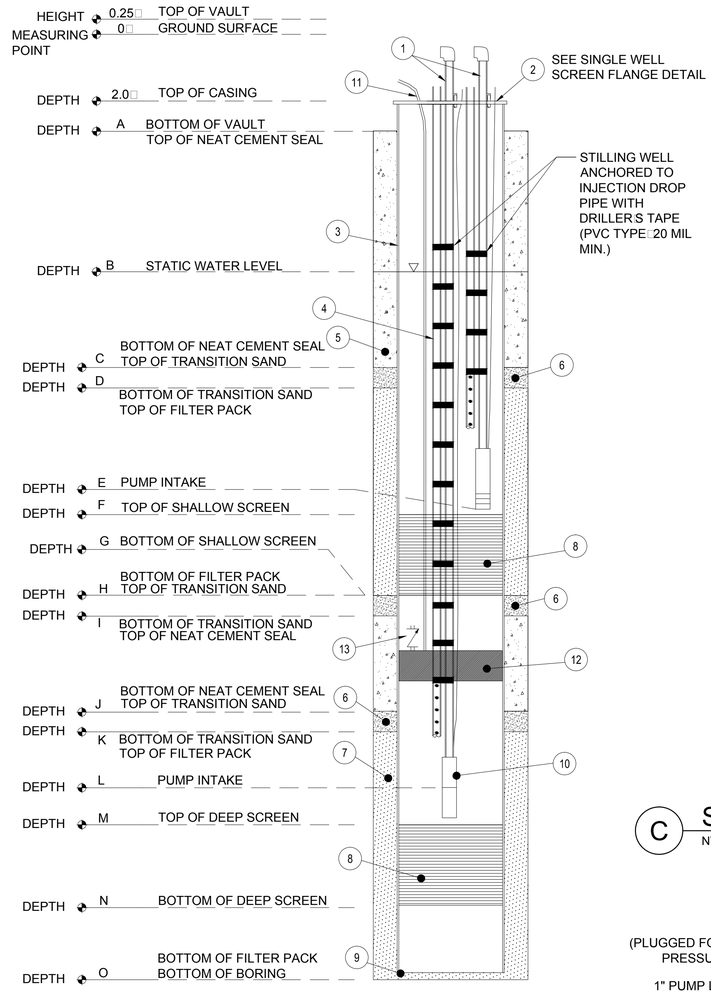
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
S-04-10	REV 2

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A SINGLE SCREEN EXTRACTION WELL DETAIL
NTS



B DUAL SCREEN EXTRACTION WELL DETAIL
NTS

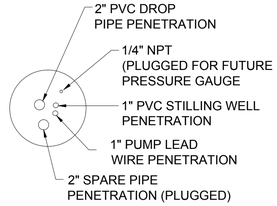
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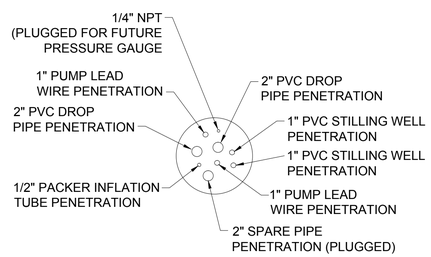
NOTES:
1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER EXAGGERATED TO SHOW DETAIL.
3. WELL CASING 150 OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150 SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

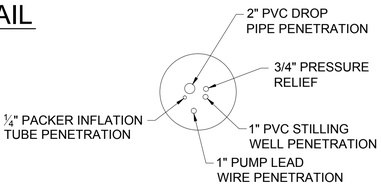
ITEM	DESCRIPTION
1	2" PVC DROP PIPE
2	CUSTOM TAPERED WELL FLANGE
3	WELL CASING (SEE NOTE 3)
4	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
5	ANNULAR SPACE NEAT CEMENT GROUT (SEE NOTE 4)
6	ANNULAR SPACE TRANSITION SAND (SIZE TBD)
	ANNULAR SPACE FILTER PACK (SIZE TBD)
8	WELL SCREEN (316L SS WIRE-WRAP)
9	SUMP
10	GROUNDWATER EXTRACTION PUMP
11	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
12	PNEUMATIC WELL PACKER
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE



C SINGLE SCREEN WELL FLANGE DETAIL
NTS



D DUAL SCREEN WELL FLANGE DETAIL
NTS



E EXTRACTION WELL PACKER DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
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REVISIONS

APPROVED BY RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

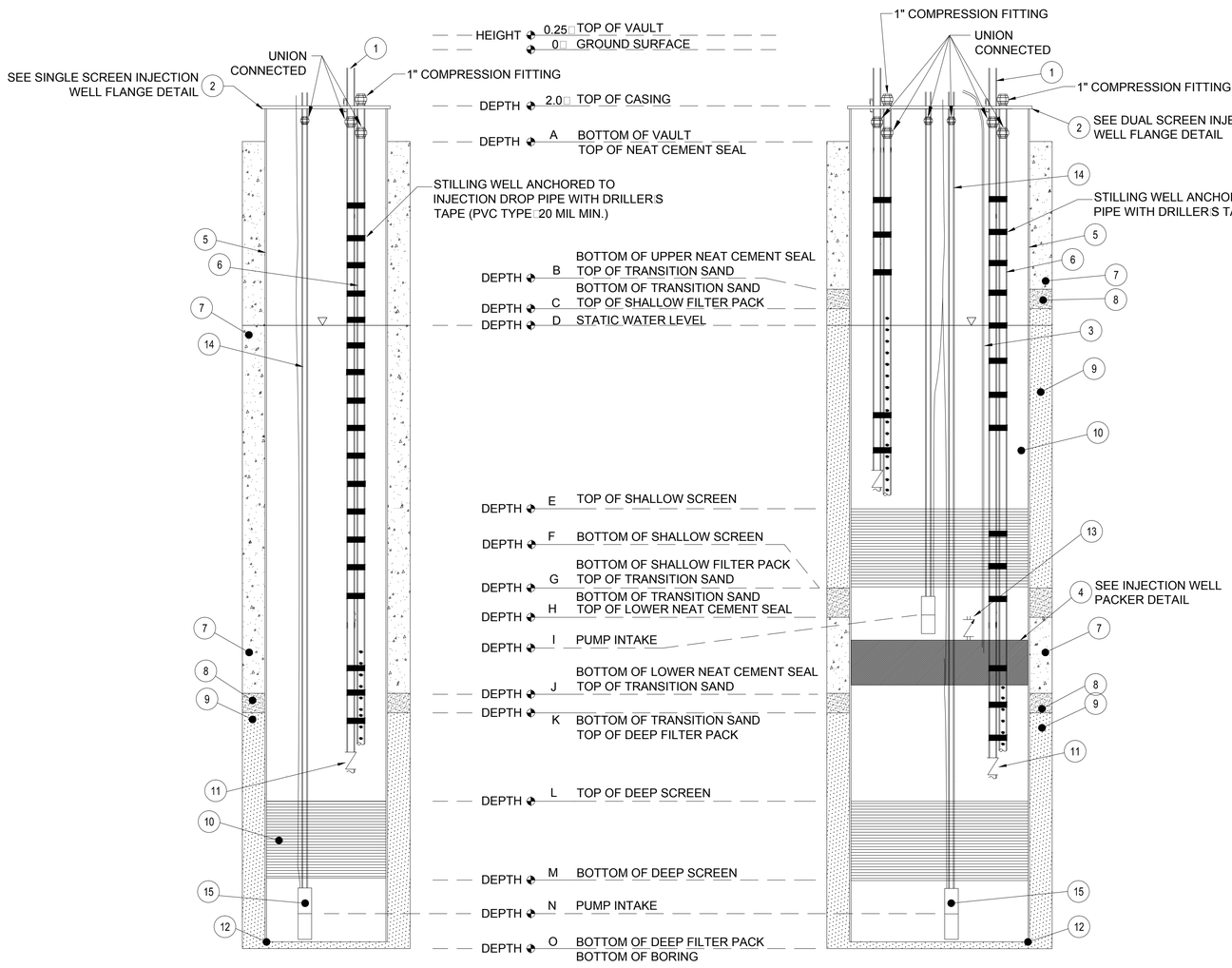
IRZ EXTRACTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
M-04-01
REV 2

N1808

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A SINGLE SCREEN INJECTION WELL WITH BACKWASH PUMP DETAIL
NTS

B DUAL SCREEN INJECTION WELL WITH BACKWASH PUMPS DETAIL
NTS

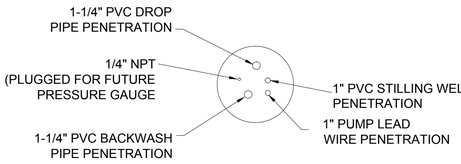
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(1) REFERENCE ITEM NUMBER IN SCHEDULE.

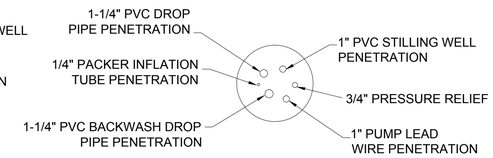
NOTES:
1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER EXAGGERATED TO SHOW DETAIL.
3. WELL CASING 150 OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150 SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

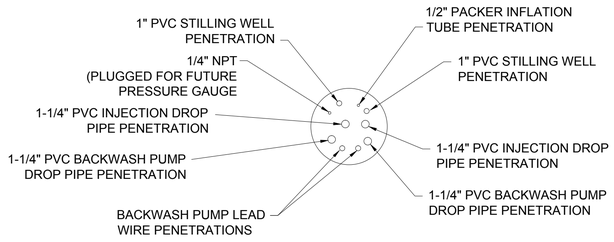
ITEM	DESCRIPTION
1	1-1/4" PVC DROP PIPE
2	CUSTOM TAPPED WELL FLANGE
3	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
4	PNEUMATIC WELL PACKER
5	WELL CASING (SEE NOTE 3)
6	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
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8	ANNULAR SPACE TRANSITION SAND (SIZE TBD)
9	ANNULAR SPACE FILTER PACK (TYPE TBD)
10	WELL SCREEN (316L SS WIRE-WRAP)
11	SPRING CHECK VALVE
12	SUMP
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE
14	1-1/4" BACKWASH PIPING
15	BACKWASH PUMP



C SINGLE SCREEN WELL FLANGE DETAIL
NTS



D INJECTION WELL PACKER DETAIL
NTS



E DUAL SCREEN INJECTION WELL FLANGE DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEST C 67811 EXP 6/30/17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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0	04/05/13	INTERMEDIATE (60%) DESIGN		BEH	JPB	JPB	JEF	

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

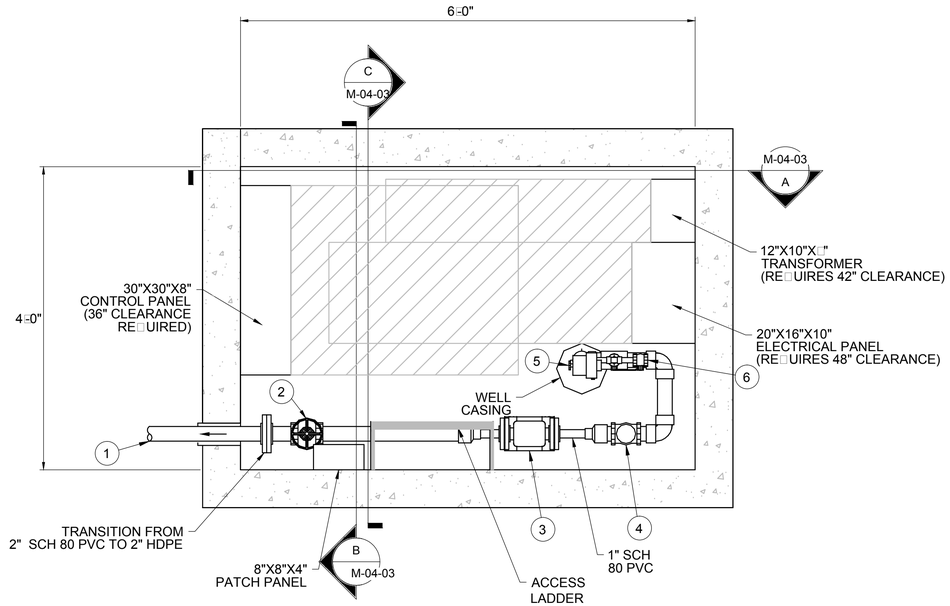
IRZ INJECTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-04-02	REV 2

N1808

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EXTRACTON WELL VAULT PLAN VIEW

1" □1'-0"

LEGEND:

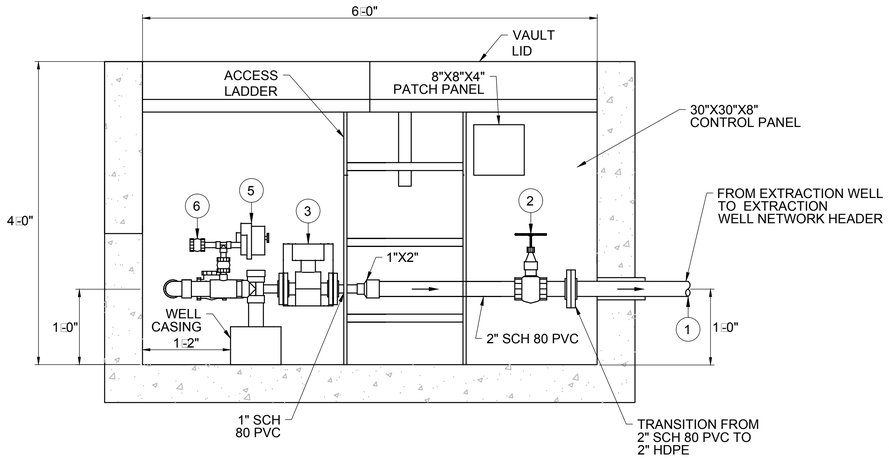
(1) REFERENCE ITEM □EXTRACTION WELL VAULT SCHEDULE BELOW.

NOTES:

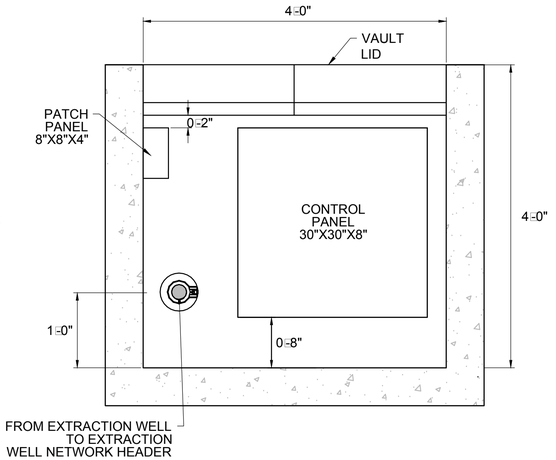
1. ALL PIPING□INSTRUMENTATION□AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P□IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE RE□UIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P□IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. □ ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P□IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

EXTRACTION WELL VAULT SCHEDULE

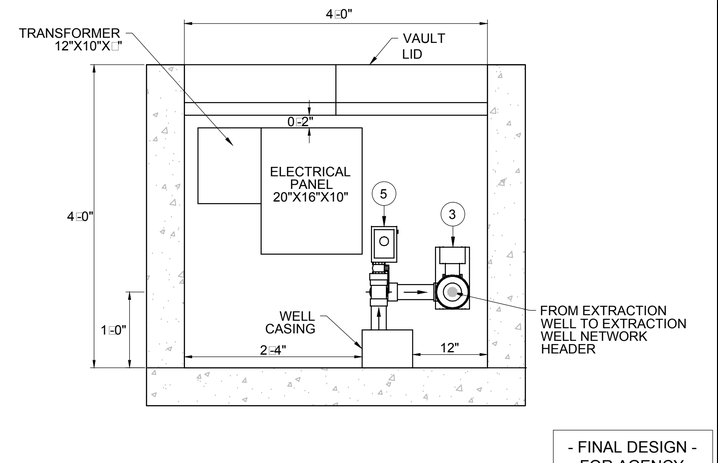
ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	EXTRACTED GROUNDWATER	□	EXTRACTION WELL CONVEYANCE LINE	
2	2"	PVC	EXTRACTED GROUNDWATER	□	GLOBE VALVE	V-□0401D
3	1"	TEFLON	EXTRACTED GROUNDWATER	□	MAGNETIC FLOWMETER	FE-□04□0A
4	2□	PVC	EXTRACTED GROUNDWATER	□	CHECK VALVE	V-□0401C
5	1/2"	TBD	EXTRACTED GROUNDWATER	□	PRESSURE INDICATING TRANSMITTER	PIT-□0460A
6	1/4"	TBD	EXTRACTED GROUNDWATER	□	SAMPLE PORT	V-□0401F



A SECTION
1"=1'-0"
M-04-03



B SECTION
1"=1'-0"
M-04-03



C SECTION
1"=1'-0"
M-04-03

0 1 2 3

SCALE: 1"□1□

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
Exp 6/30/15
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NTH IRZ-23 SINGLE SCREEN EXTRACTION WELL VAULTS MECHANICAL DETAILS

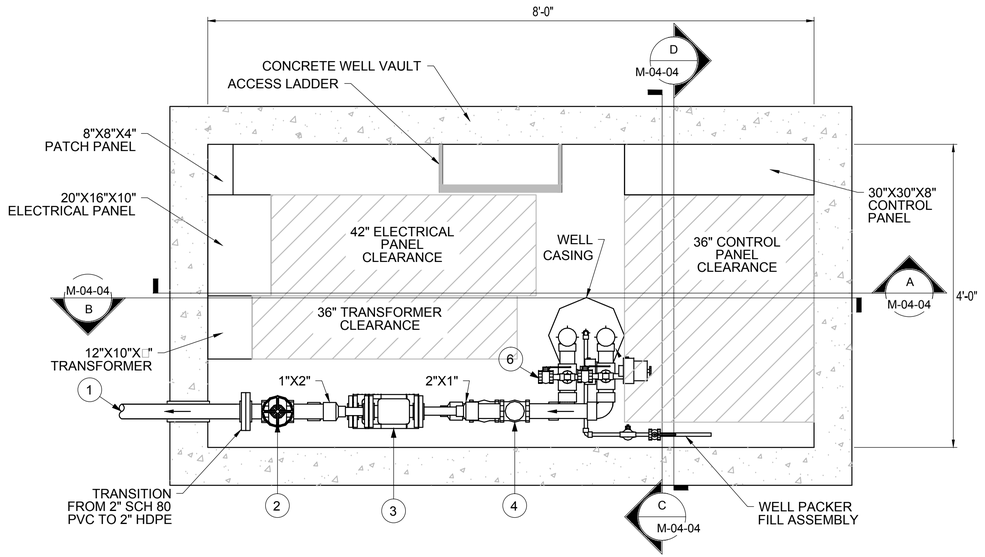
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-04-03	REV 2

N1808

11/02/2015 09:55 G:\Gra□□s\AR-TOPOCK-01\S□bm□□al\ 100% DWGs\M-M□□a□□al\M-04-03.d□g Tab: M-04-03

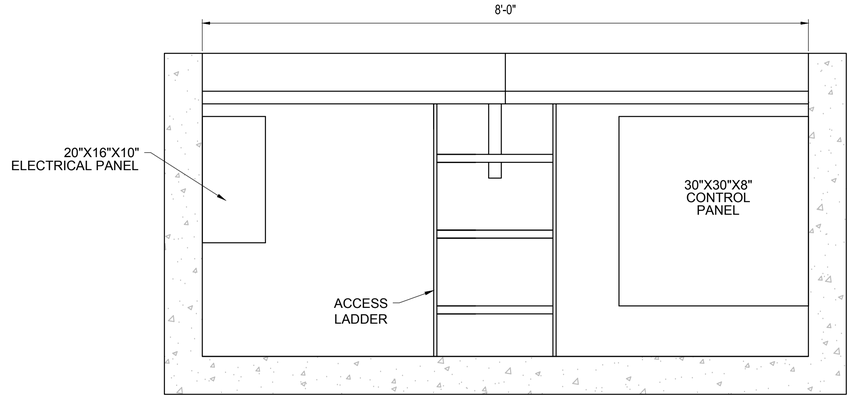


EXTRACTON WELL VAULT PLAN VIEW

1" □ 1'-0"

LEGEND:

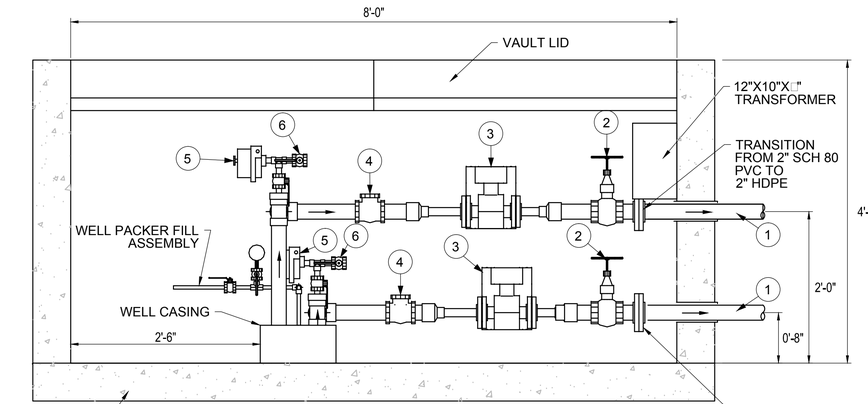
(1) REFERENCE ITEM # EXTRACTION WELL VAULT SCHEDULE BELOW.



A SECTION

1"=1'-0"

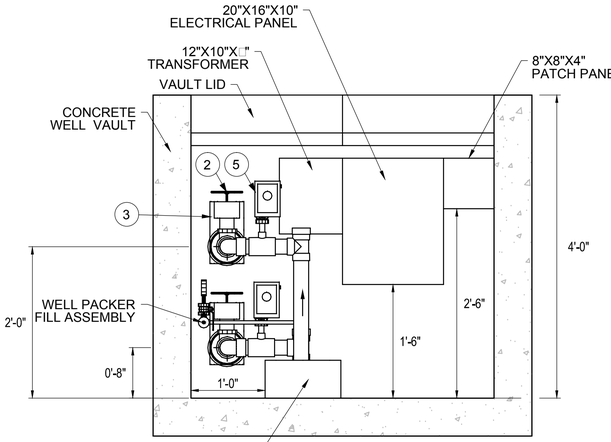
M-04-04



B SECTION

1"□1'-0"

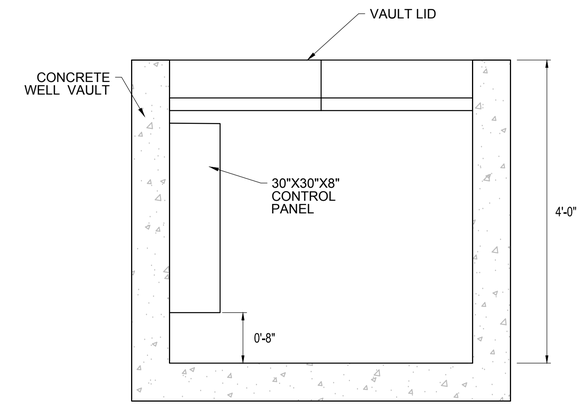
M-04-04



C SECTION

1"□1'-0"

M-04-04



D SECTION

1"□1'-0"

M-04-04

EXTRACTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	EXTRACTED GROUNDWATER	6	EXTRACTION WELL CONVEYANCE LINE	
2	2"	PVC	EXTRACTED GROUNDWATER	6	GLOBE VALVE	V-*0402D/H
3	1"	TEFLON	EXTRACTED GROUNDWATER	6	MAGNETIC FLOW METER	FE-□04□1A/B
4	2"	PVC	EXTRACTED GROUNDWATER	6	CHECK VALVE	V-□0402C/G
5	1/2"	TBD	EXTRACTED GROUNDWATER	6	PRESSURE INDICATING TRANSMITTER	PIT-□0461A/D
6	1/4"	TBD	EXTRACTED GROUNDWATER	6	SAMPLE PORT	V-□0402L/M

NOTES:

1. ALL PIPING□INSTRUMENTATION□AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P□IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE RE□UIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P□IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. □ ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P□IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

0 1 2 3

SCALE: 1"□1□

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEGL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN EXTRACTION WELL VAULTS MECHANICAL DETAILS

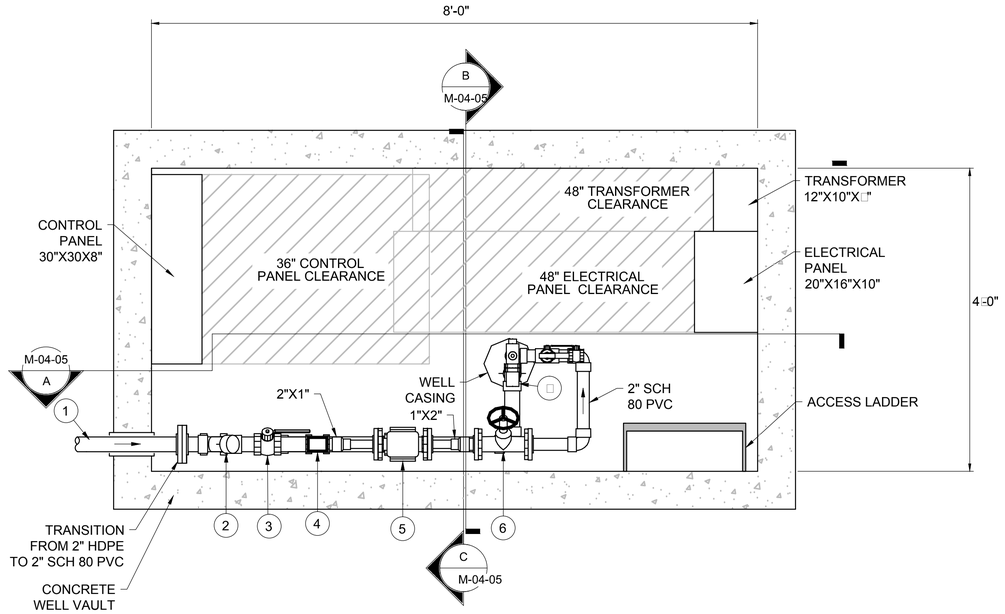
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-04-04	REV 2

N1808

11/02/2015 10:02 G:\Gra□ics\AR TOPOCK-01\S□bmi□al\100% DWGs\M-04 □a□ial\M-04-04.d□g Tab: M-04-04



INJECTION WELL VAULT PLAN VIEW

1" = 1'-0"

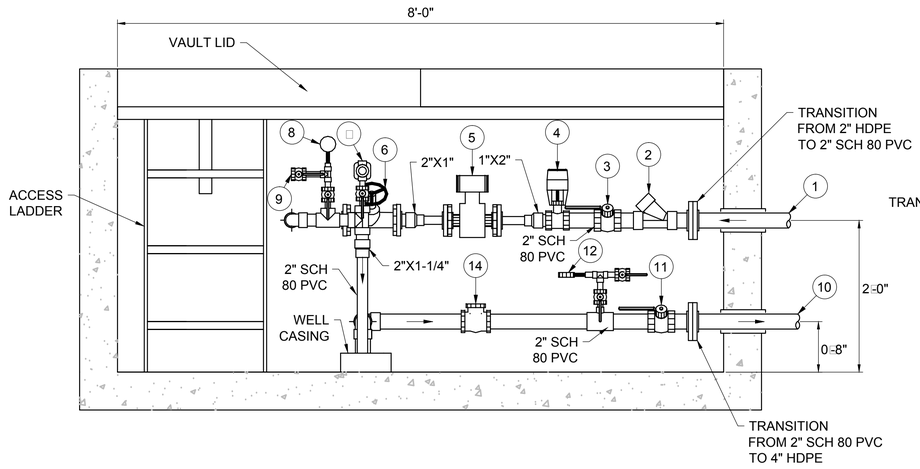
INJECTION WELL VAULT SCHEDULE						
ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	CARBON AMENDED GROUNDWATER	5	CARBON AMENDED GROUNDWATER CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	5	WYE STRAINER	F-□0403
3	2"	PVC	CARBON AMENDED GROUNDWATER	5	ISOLATION BALL VALVE E□UIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-□0403A
4	2"	TBD	CARBON AMENDED GROUNDWATER	5	ACTUATED BALL VALVE	FCV-□0404
5	1"	TEFLON	CARBON AMENDED GROUNDWATER	5	MAGNETIC FLOW METER	FE-□04□2A
6	2"	PVC	CARBON AMENDED GROUNDWATER	5	DIAPHRAGM VALVE	V-□0403B
□	2"	TBD	CARBON AMENDED GROUNDWATER	5	AIR/VAC RELEASE ASSEMBLY	V-□0403C
8	1/2"	TBD	CARBON AMENDED GROUNDWATER	5	PRESSURE GAUGE ASSEMBLY	PI-□0462A
9	1/4"	TBD	CARBON AMENDED GROUNDWATER	5	SAMPLE PORT	V-□0403F
10	2"	HDPE	BACKWASH WATER	10	BACKWASH WATER CONVEYANCE LINE	
11	2"	PVC	BACKWASH WATER	10	ISOLATION BALL VALVE E□UIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-□0405B
12	1/2"	TBD	BACKWASH WATER	10	PRESSURE GAUGE ASSEMBLY	PI-□0462B
13	1/4"	TBD	BACKWASH WATER	10	SAMPLE PORT	V-□0405E
14	2"	PVC	BACKWASH WATER	10	CHECK VALVE	V-□0405A

LEGEND:

(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE.

NOTES:

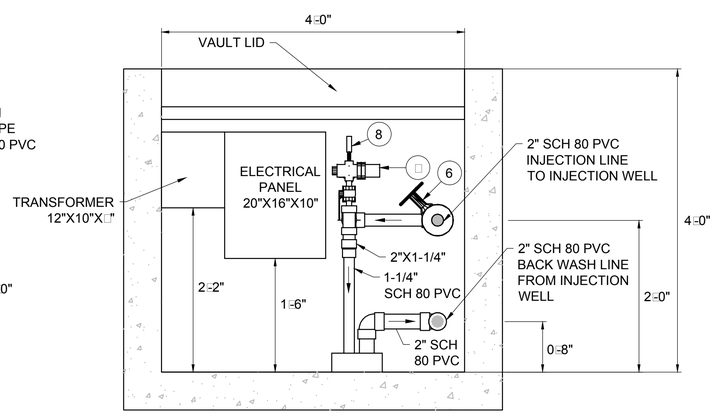
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10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.



A SECTION

1"□1□0"

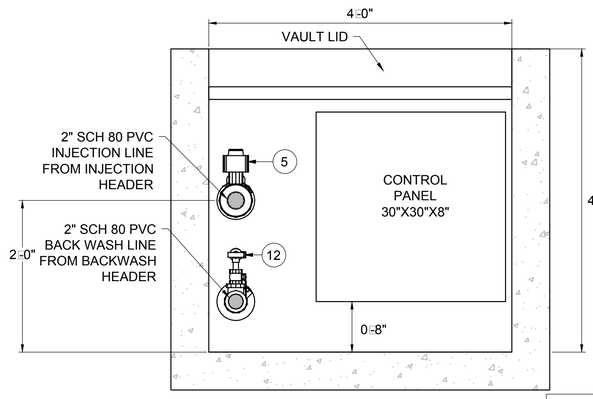
M-04-05



B SECTION

1"□1□0"

M-04-05



C SECTION

1"□1□0"

M-04-05

SCALE: 1"□1□

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ SINGLE SCREEN INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

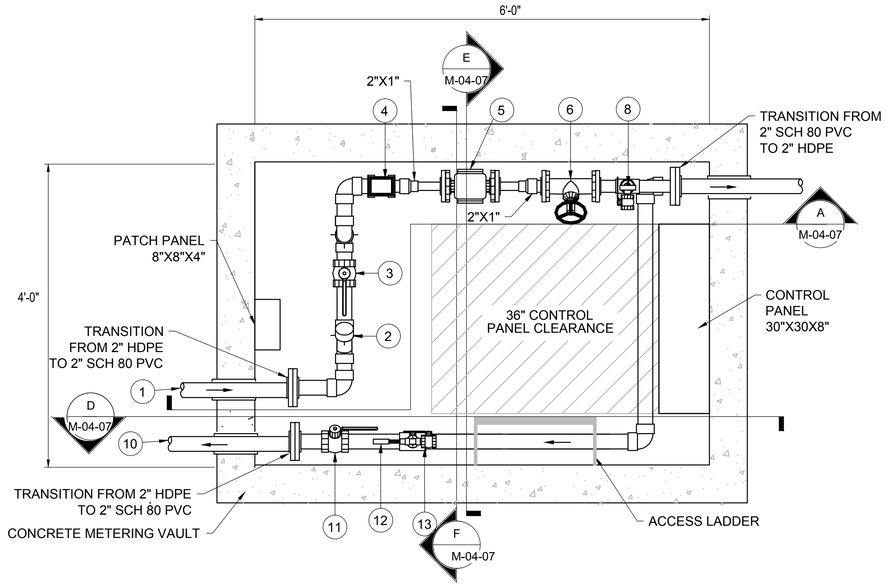
PACIFIC GAS AND ELECTRIC COMPANY

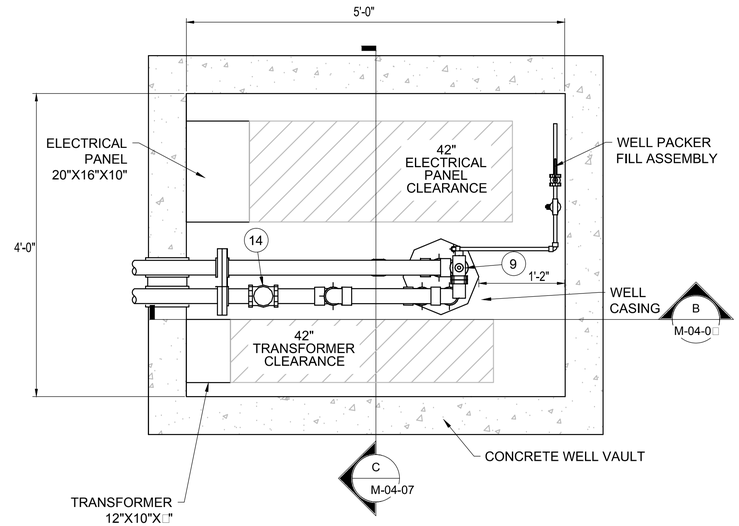
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-04-05	REV 2

N1808

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LEGEND:

(1) REFERENCE ITEM INJECTION WELL VAULT SCHEDULE.

NOTES:

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INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"

INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	CARBON AMENDED GROUNDWATER	4/5	CARBON AMENDED GROUNDWATER CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	4/5	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0407A
3	2"	PVC	CARBON AMENDED GROUNDWATER	4/5	WYE STRAINER	F-*0408A/B
4	2"	TBD	CARBON AMENDED GROUNDWATER	4/5	ACTUATED BALL VALVE	FCV-*0408/0409
5	1"	TEFLON	CARBON AMENDED GROUNDWATER	4/5	MAGNETIC FLOW METER	FM-*0473A/B
6	2"	PVC	CARBON AMENDED GROUNDWATER	4/5	DIAPHRAGM VALVE	V-*0407B/E
7	1/4"	TBD	CARBON AMENDED GROUNDWATER	4/5	SAMPLE PORT	V-*0407H/O
8	1/2"	TBD	CARBON AMENDED GROUNDWATER	4/5	PRESSURE GAUGE ASSEMBLY	PI-*0463A/B
9	2"	TBD	CARBON AMENDED GROUNDWATER	4/5	AIR/VAC RELEASE ASSEMBLY	V-*0407C/F
10	2"	HDPE	BACKWASH WATER	9/10	BACKWASH WATER CONVEYANCE LINE	
11	2"	PVC	BACKWASH WATER	9/10	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0410C
12	1/2"	TBD	BACKWASH WATER	9/10	PRESSURE GAUGE ASSEMBLY	PI-*0463C
13	1/4"	TBD	BACKWASH WATER	9/10	SAMPLE PORT	V-*0407J
14	2"	PVC	BACKWASH WATER	9/10	CHECK VALVE	V-*0410A

SCALE: 1"=1

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEST C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
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0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

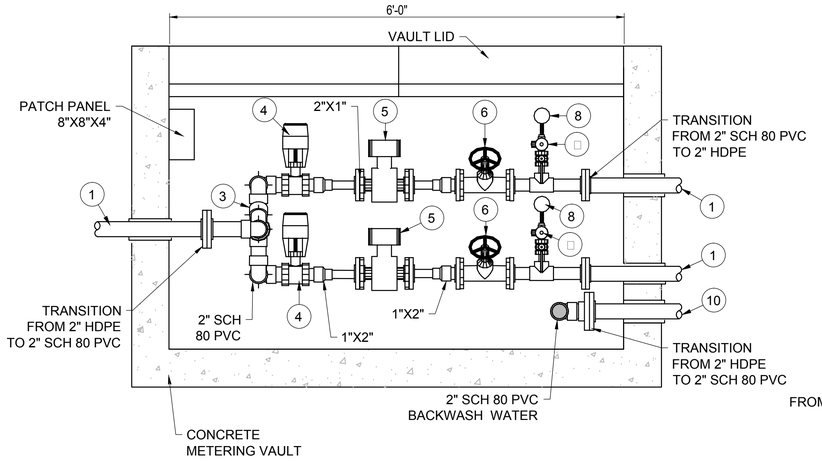
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BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. M-04-06 of SHEETS
REV 2

11/02/2015 10:04 G:\Gra...s\ARTOPOCK-01S bm...ial 100% DWGs M-M...a...al\M-04-06.d g Tab: M-04-06

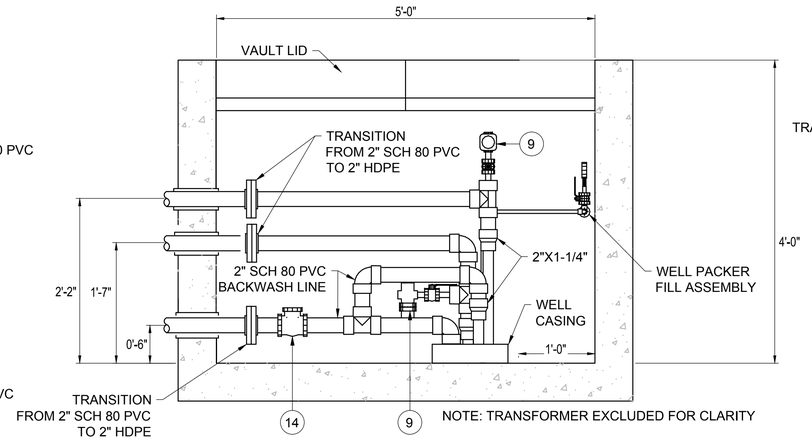
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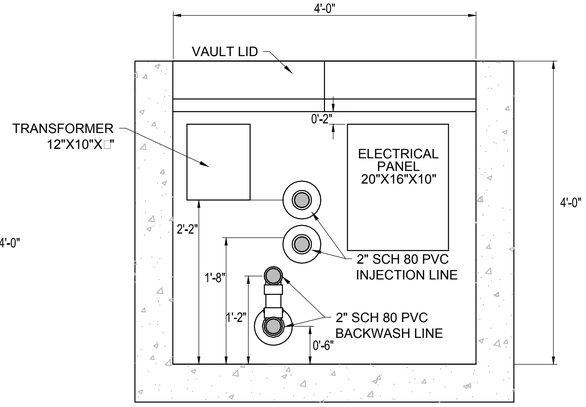
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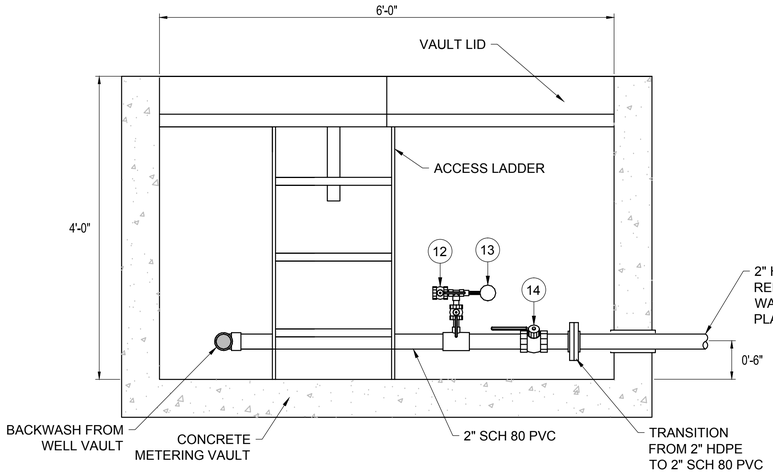
A SECTION
1"□1=0"
M-04-06



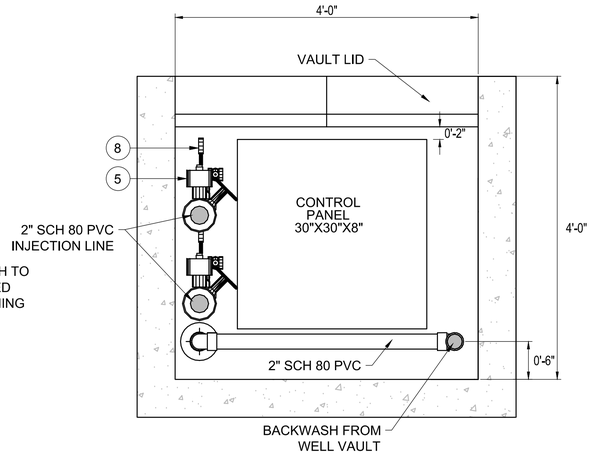
B SECTION
1"□1=0"
M-04-06



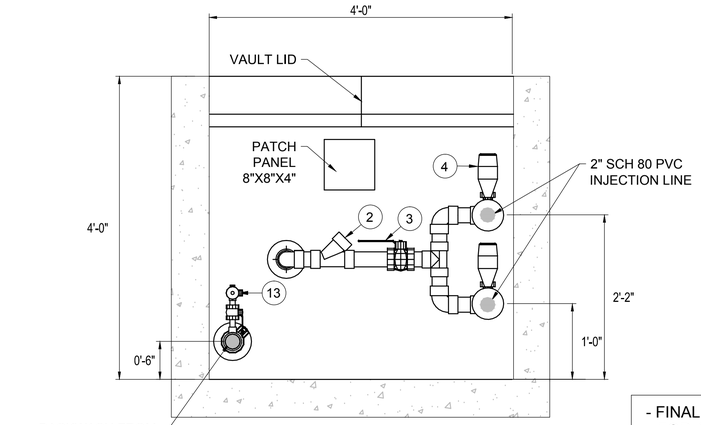
C SECTION
1"□1=0"
M-04-06



D SECTION
1"□1=0"
M-04-06



E SECTION
1"□1=0"
M-04-06



F SECTION
1"□1=0"
M-04-06

SCALE: 1"□1□

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/14 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
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0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN INJECTION WELL VAULTS MECHANICAL DETAILS

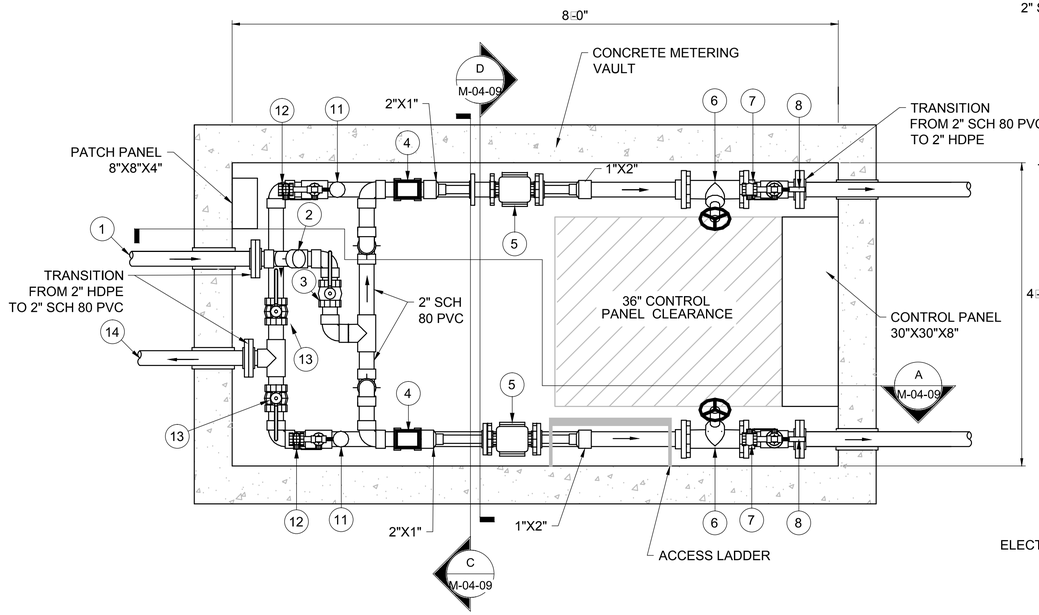
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. M-04-07 of SHEETS	REV 2

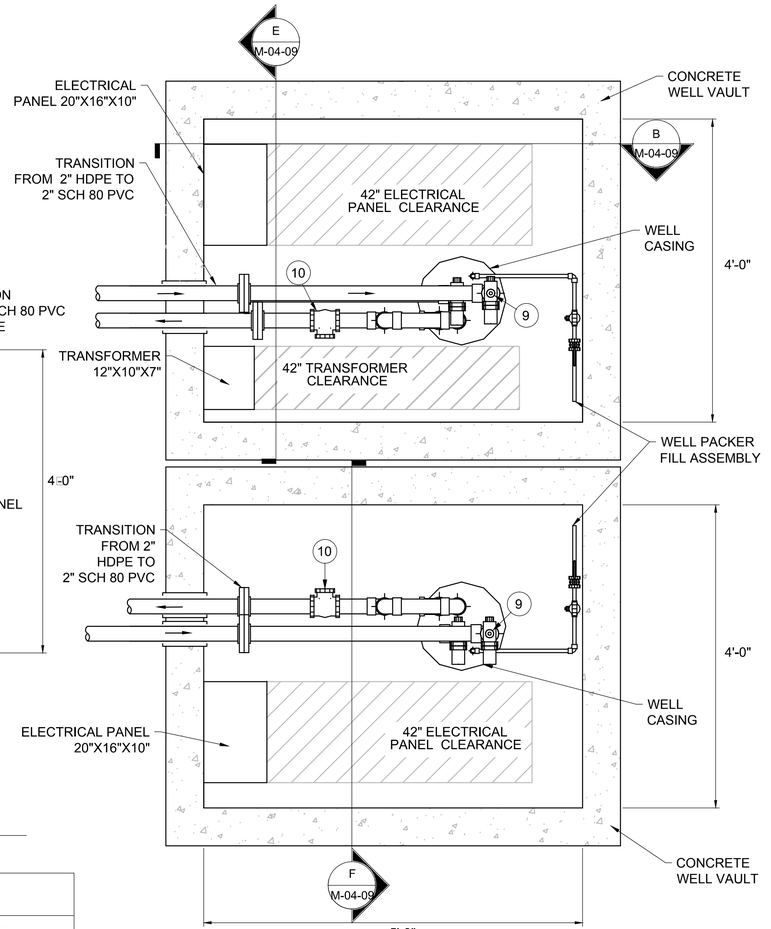
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INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"



INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	CARBON AMENDED GROUNDWATER	4	CARBON AMENDED CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	4	WYE STRAINER	F-0413
3	2"	PVC	CARBON AMENDED GROUNDWATER	4	BALL VALVE	V-0413A
4	2"	PVC	CARBON AMENDED GROUNDWATER	4	PROPORTIONAL ACTUATED BALL VALVE	FV-0414/0415/0416/041
5	1"	TEFLON	CARBON AMENDED GROUNDWATER	4	MAGNETIC FLOWMETER	FE-04 4A/B / 04 5A/B
6	2"	PVC	CARBON AMENDED GROUNDWATER	4	DIAPHRAGM VALVE	V-0413B/E / 0418A/D
	1/4"	PVC	CARBON AMENDED GROUNDWATER	4	SAMPLE PORT	V-0413J/M / 0418K/H
8	1/2"	TBD	CARBON AMENDED GROUNDWATER	4	PRESSURE GAUGE ASSEMBLY	PI-0464A/B / 0465A/B
9	2"	TBD	CARBON AMENDED GROUNDWATER	4	AIR/VAC RELEASE ASSEMBLY	V-0413C/F / 0418B/E
10	2"	PVC	BACKWASH WATER	9	CHECK VALVE	V-0419B/0420A
11	1/2"	TBD	BACKWASH WATER	9	PRESSURE GAUGE ASSEMBLY	PI-0464C/0465C
12	1/4"	TBD	BACKWASH WATER	9	SAMPLE PORT	V-0419F/0420F
13	2"	PVC	BACKWASH WATER	9	ISOLATION BALL VALVE E UIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-0419C/0420C
14	2"	PVC	BACKWASH WATER	9	BACKWASH WATER CONVEYANCE LINE	

LEGEND:

(1) REFERENCE ITEM INJECTION WELL VAULT SCHEDULE.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

0 1 2 3

SCALE: 1" 1

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN CLUSTER INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

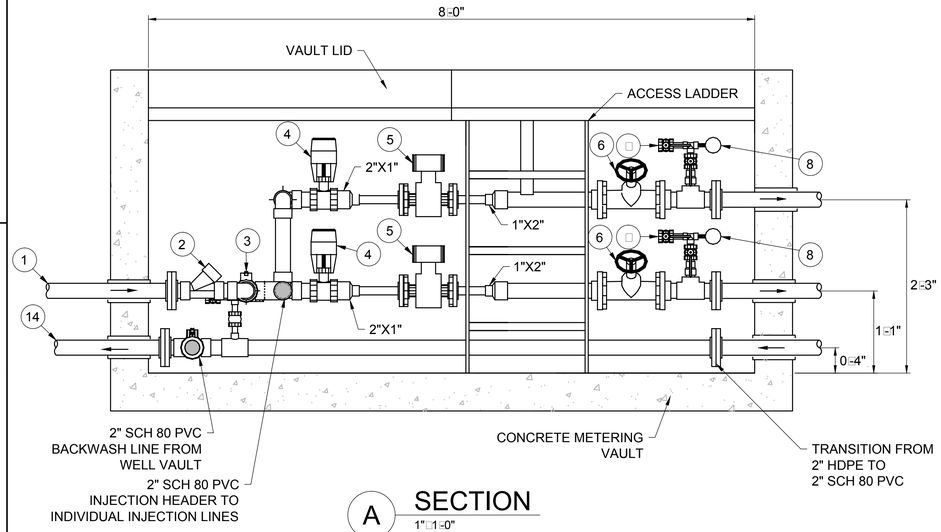
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-04-08	REV 2

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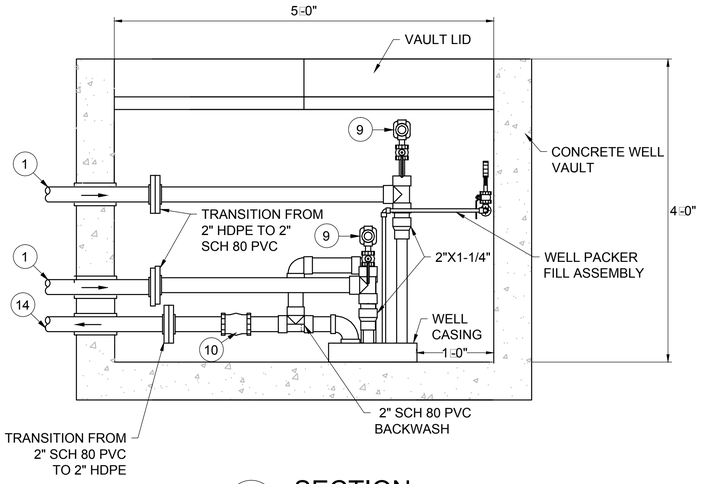
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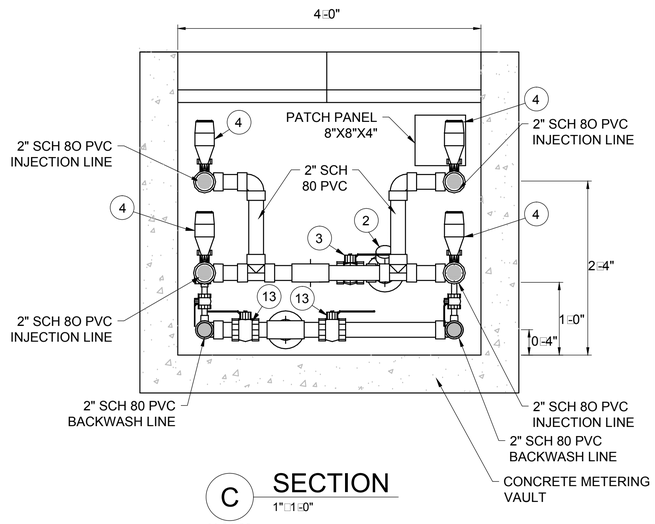
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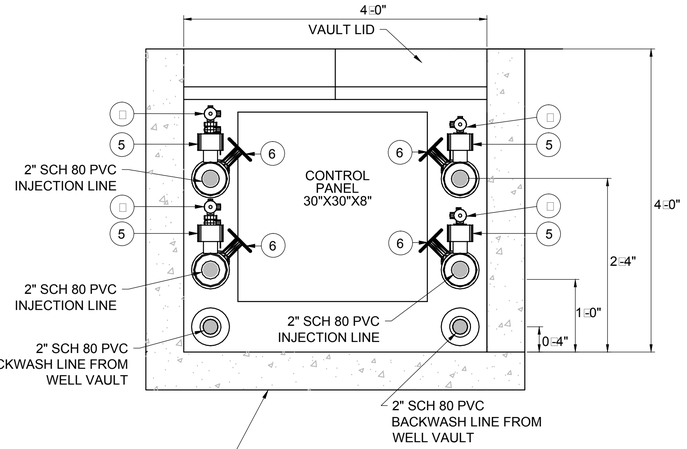
A SECTION 1"□1'-0"
M-04-08



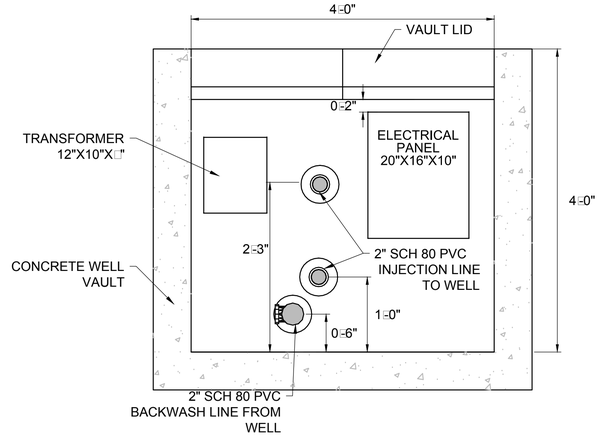
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M-04-08



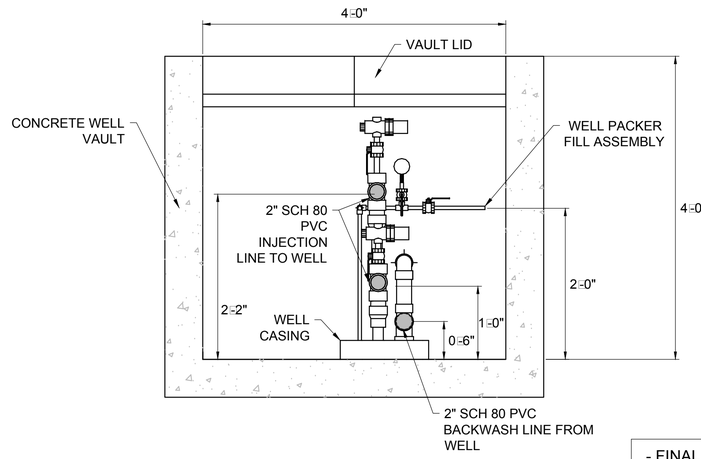
C SECTION 1"□1'-0"
M-04-08



D SECTION 1"□1'-0"
M-04-08



E SECTION 1"□1'-0"
M-04-08



F SECTION 1"□1'-0"
M-04-08

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

0 1 2 3
SCALE: 1"□1□

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WIEBE C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

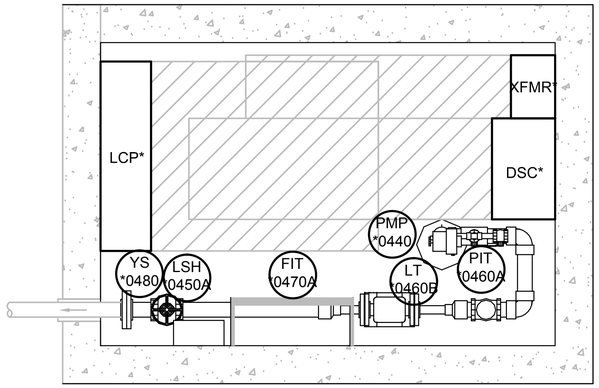
IRZ DUAL SCREEN CLUSTER INJECTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-04-09	REV 2

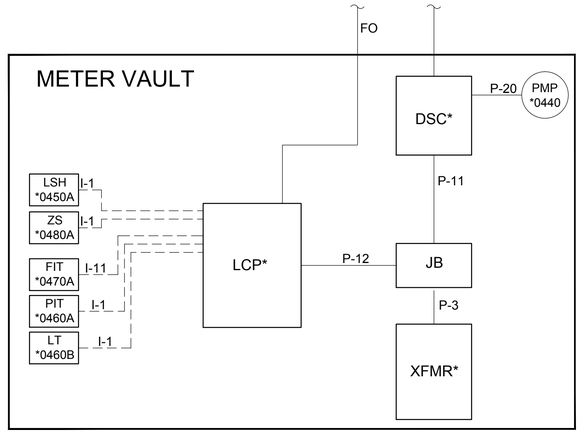
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WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1'-0"



WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

NOT TO SCALE

NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
_ _ _ _	MULTICONDUCTOR SHIELDED CABLE

NODE WELL VAULT
TYPE WELL ID
DSC-xx-IRZxx-x

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIGOTY
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ SINGLE SCREEN EXTRACTION WELL ELECTRICAL PLAN

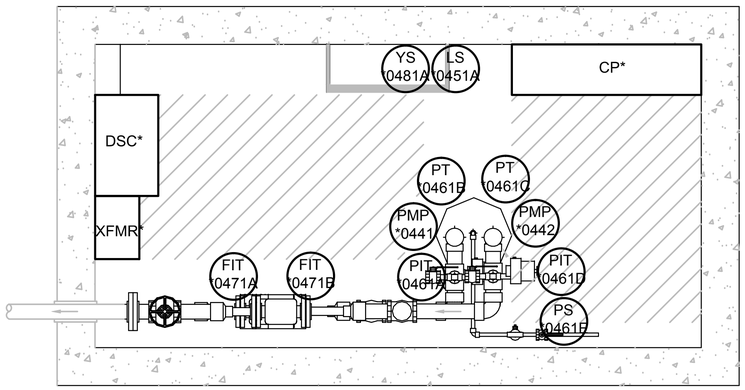
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
E-04-01	REV 2

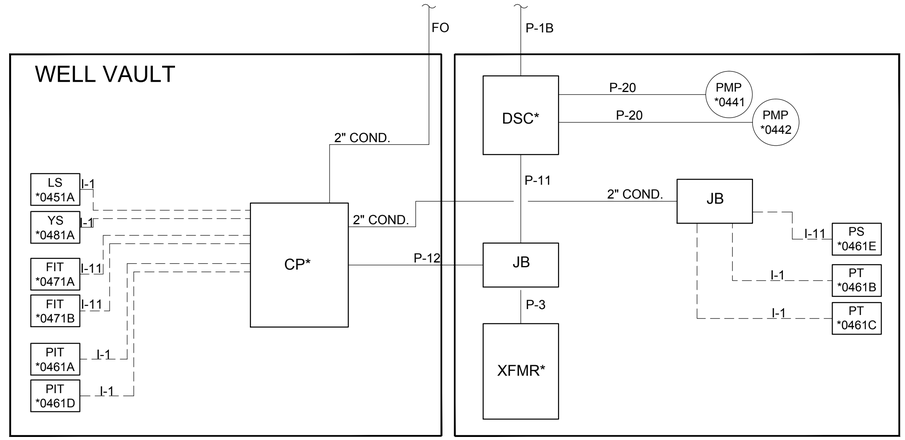
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EXTRACTON WELL VAULT ELECTRICAL AND INSTRUMENTATION DETAILS

1" = 1'-0"



EXTRACTON WELL VAULT RISER DIAGRAM

NOT TO SCALE

NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
_ _ _	MULTICONDUCTOR SHIELDED CABLE



WELL RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	(3) #4 BLK, (1) #6 GRN	XHHW	2
P-1B	(3) #10 BLK, (1) #10 GRN	XHHW	1
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC	XHHW	2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN EXTRACTION WELL ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

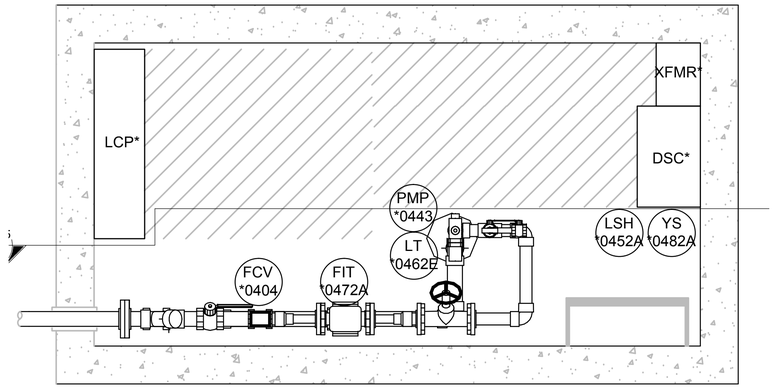
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. E-04-02 of SHEETS | REV 2

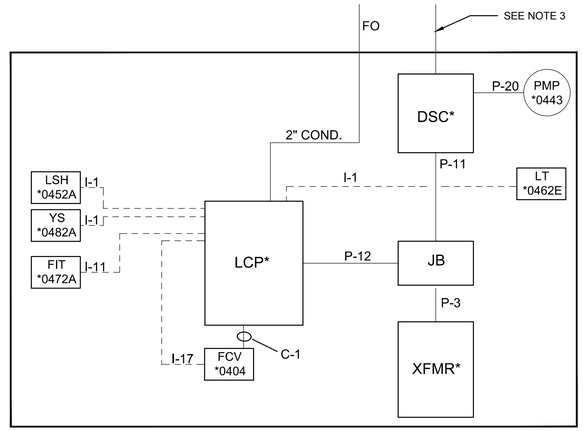
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WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1'-0"



WELL VAULT RISER DIAGRAM

NOT TO SCALE

NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
- - - - - - -	MULTICONDUCTOR SHIELDED CABLE

NODE TYPE — WELL ID — WELL VAULT

DSC-xx-IRZxx-x

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
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NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHN M. SIGOTA — 20532 — Exp. 9-30-17 — ELECTRICAL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NTH IRZ SINGLE SCREEN INJECTION WELL ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

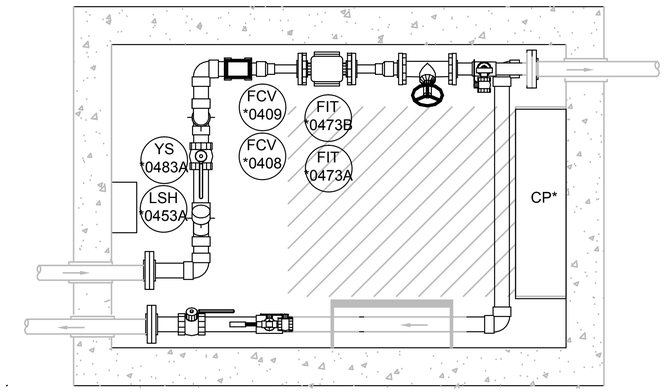
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-04-03	REV 2

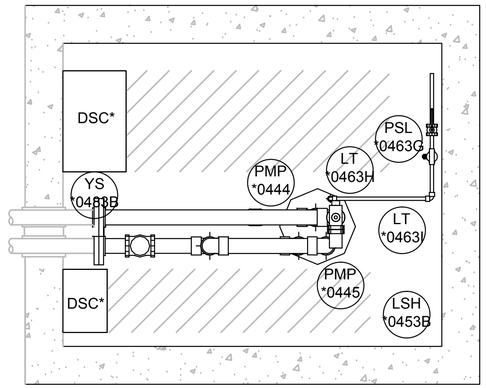
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METER AND WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1"-0"



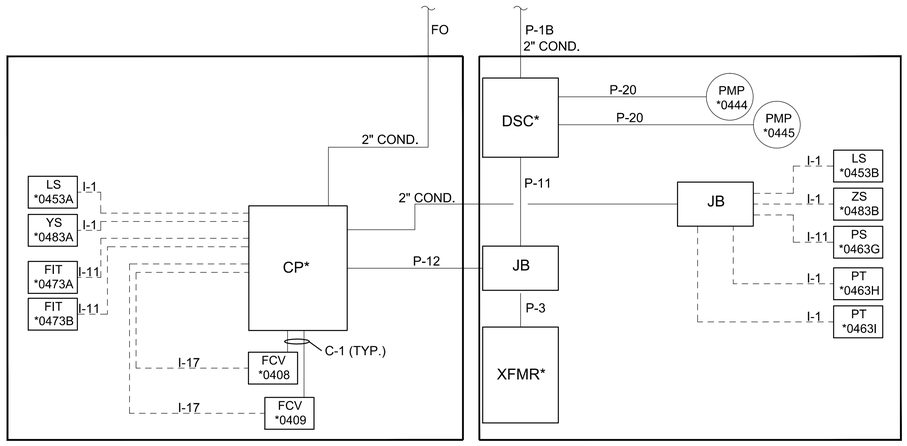
NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
- - - -	MULTICONDUCTOR SHIELDED CABLE

NODE — WELL VAULT
TYPE — WELL ID
DSC-xx-IRZxx-x



METER AND WELL VAULT RISER DIAGRAM

NTS

WELL RISER DIAGRAM CONDUCTOR SCHEDULE			
SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	(3) #4 BLK, (1) #6 GRN	XHHW	2
P-1B	(3) #10 BLK, (1) #10 GRN	XHHW	1
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC	XHHW	2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDOTI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
IRZ DUAL SCREEN INJECTION WELL ELECTRICAL PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. E-04-04 of SHEETS
REV 2

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NOTES:

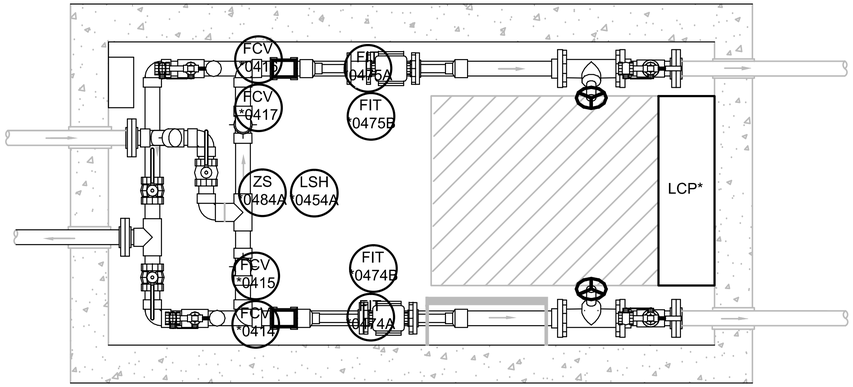
1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

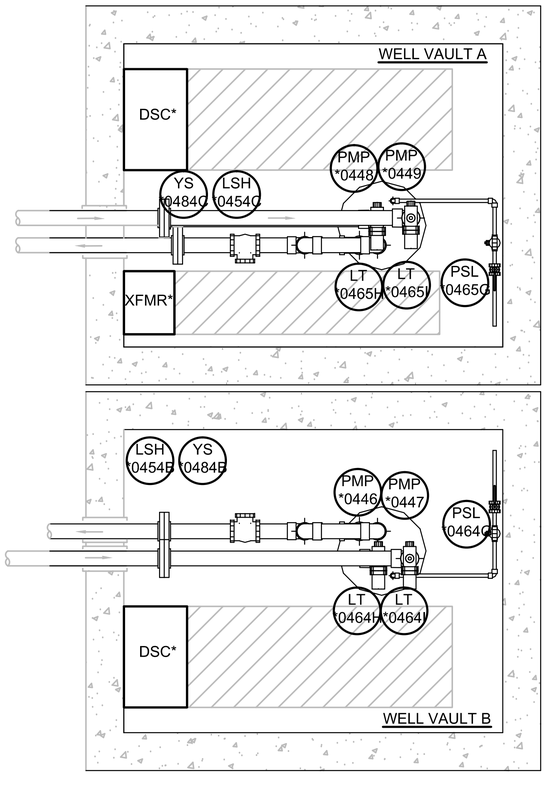
LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
- - - - -	MULTICONDUCTOR SHIELDED CABLE

TYPE — NODE — WELL ID — WELL VAULT

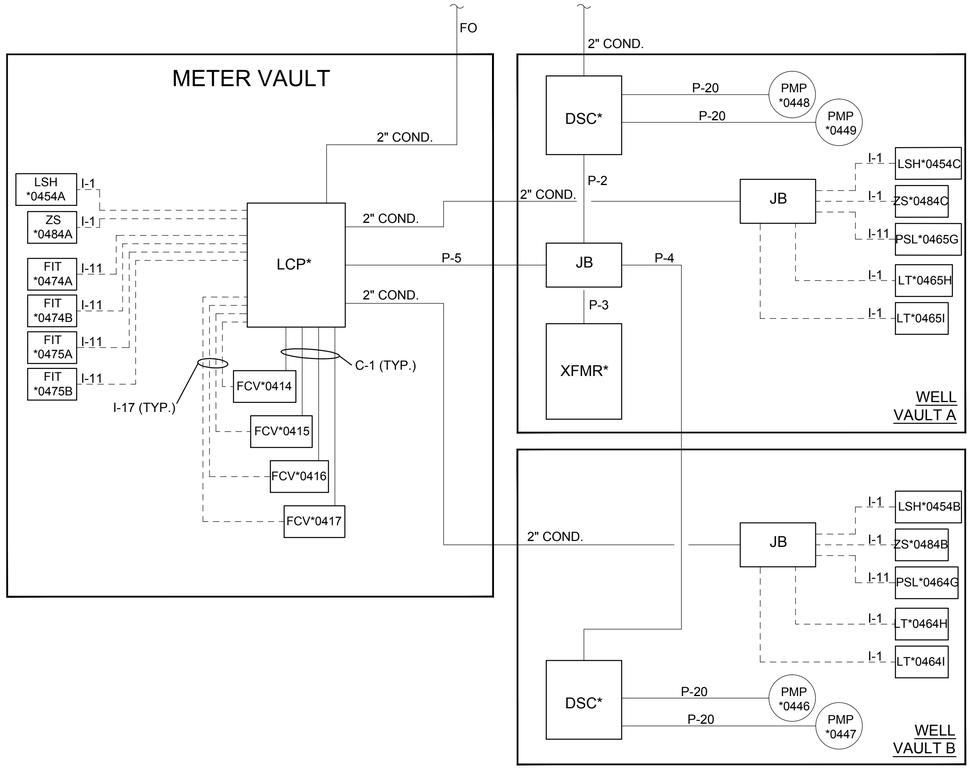
DSC-xx-IRZxx-x





METER AND WELL VAULT ELECTRICAL & INSTRUMENTATION PLAN

1" = 1'-0"



METER AND WELL VAULT RISER DIAGRAM

NTS

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN CLUSTER INJECTION WELL VAULTS ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

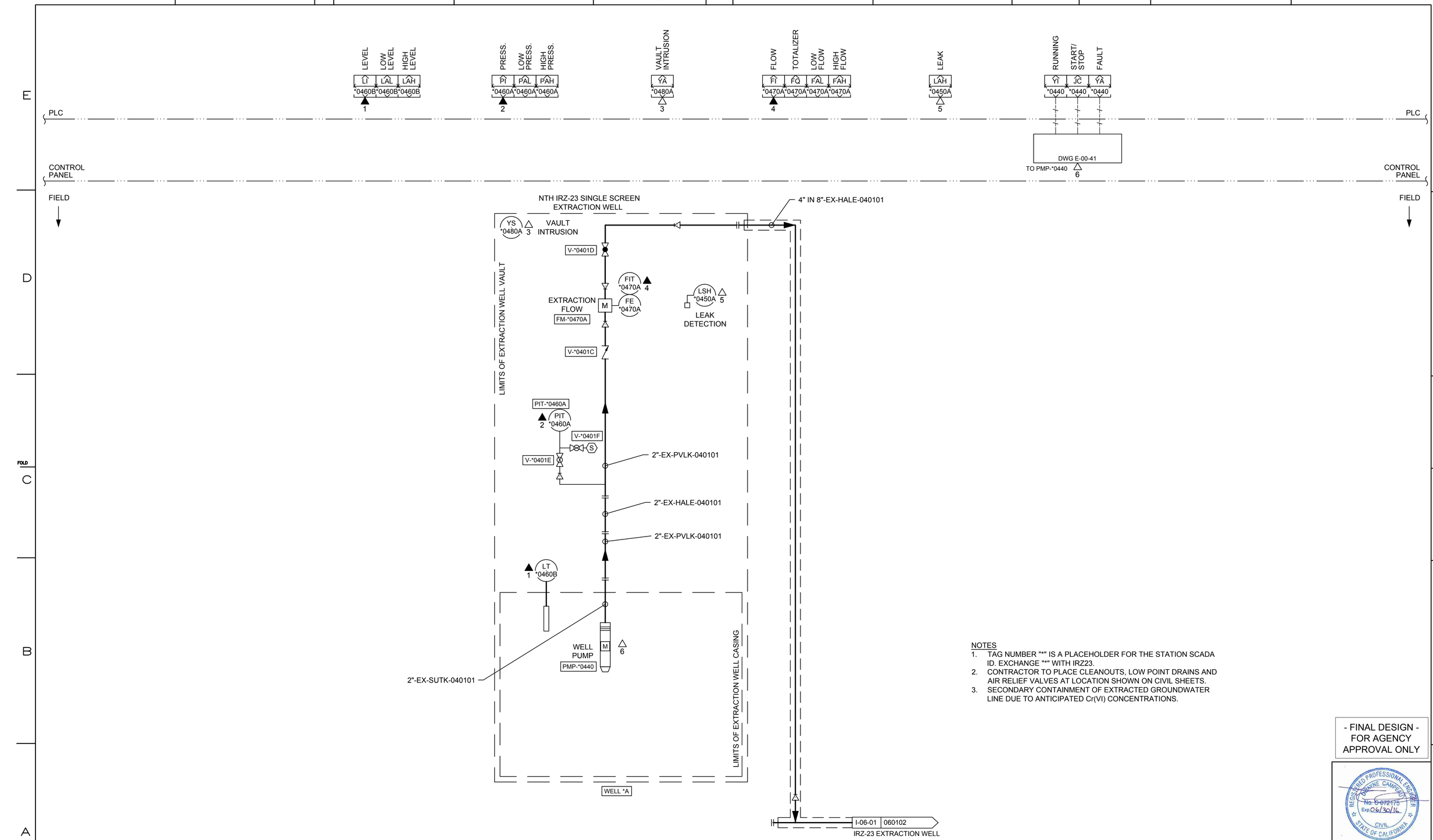
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
E-04-05	REV 2

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE "*" WITH IRZ23.
2. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
3. SECONDARY CONTAINMENT OF EXTRACTED GROUNDWATER LINE DUE TO ANTICIPATED Cr(VI) CONCENTRATIONS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

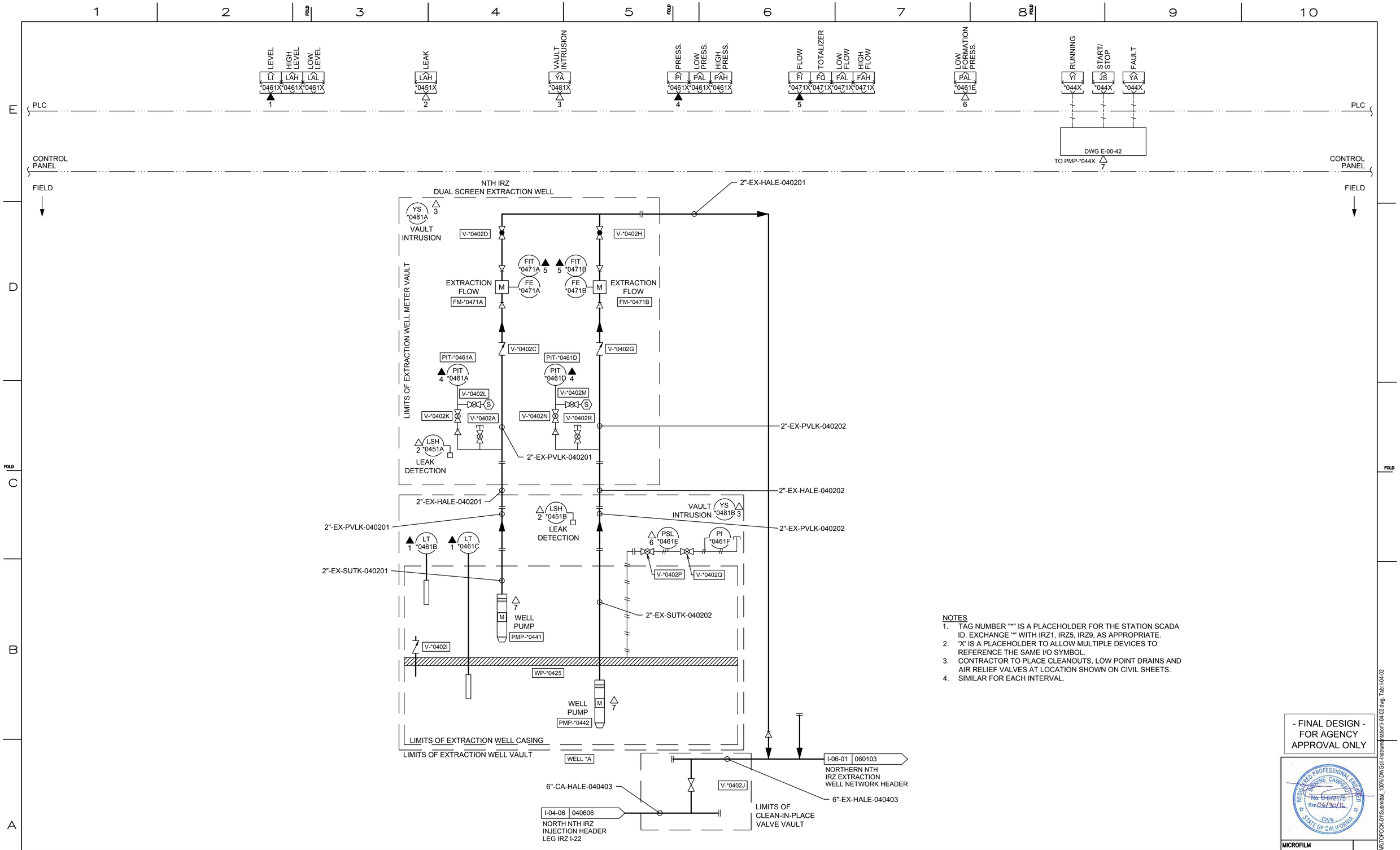
IRZ SINGLE SCREEN EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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SHEET NO.	of SHEETS
I-04-01	REV 2

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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE "*" WITH IRZ1, IRZ5, IRZ9, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. C-072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

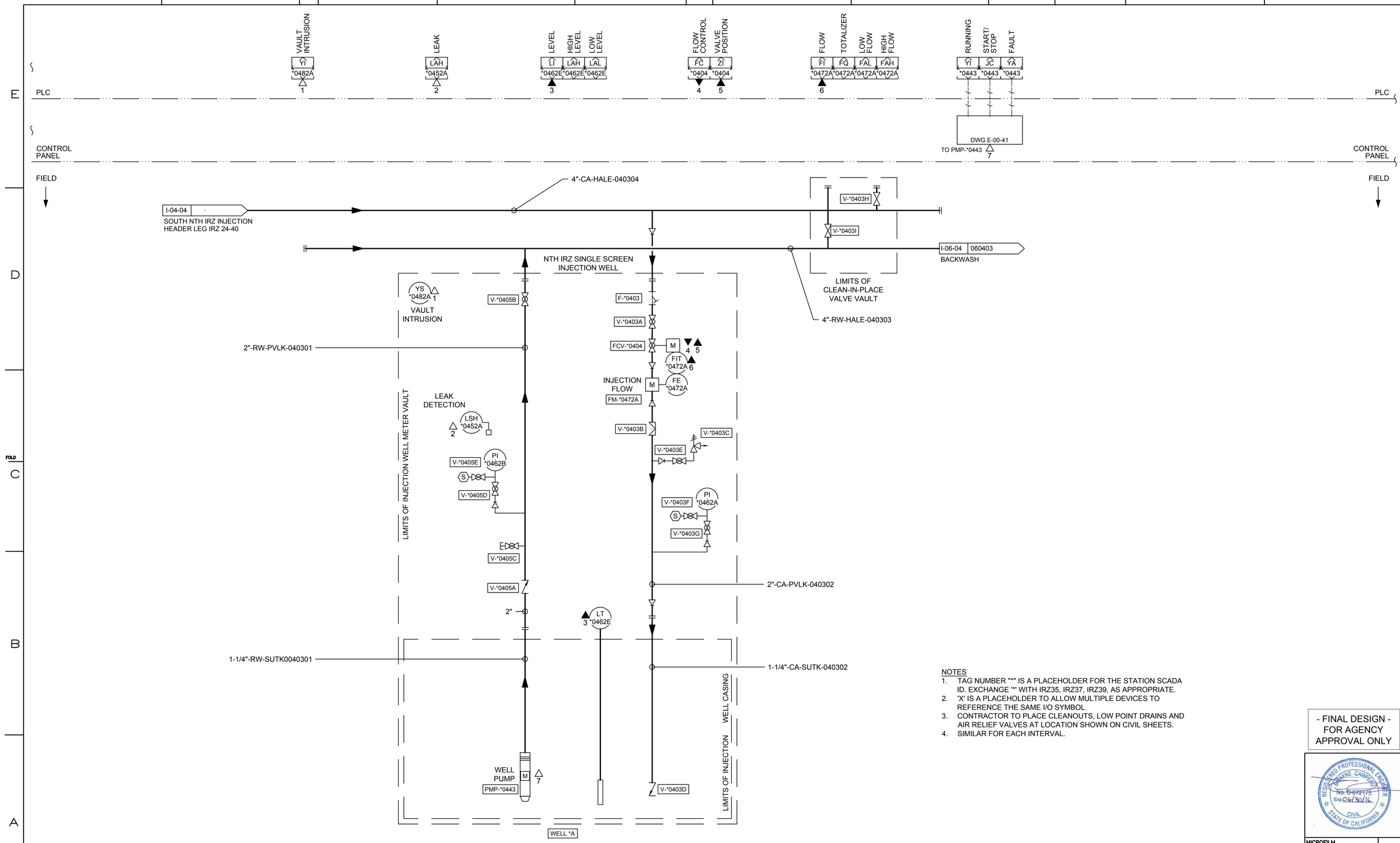
IRZ DUAL SCREEN EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
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SHEET NO.	of SHEETS
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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ35, IRZ37, IRZ39, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — DWAYNE CAMPBELL — No. C 072175 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ SINGLE SCREEN INJECTION WELLS P&ID

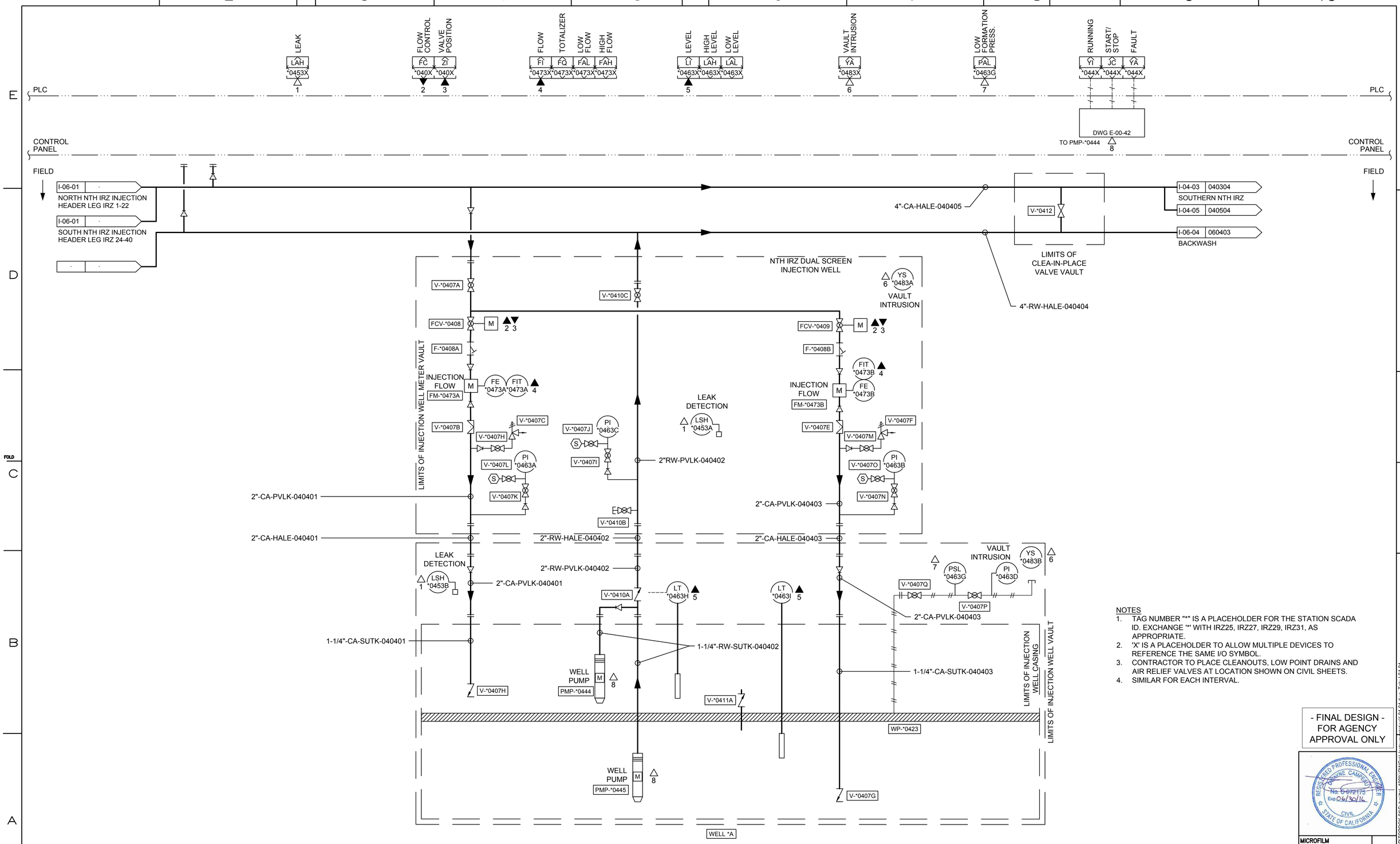
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. I-04-03 of SHEETS | REV 2

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ25, IRZ27, IRZ29, IRZ31, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DWAYNE CAMPBELL No. C 072178 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

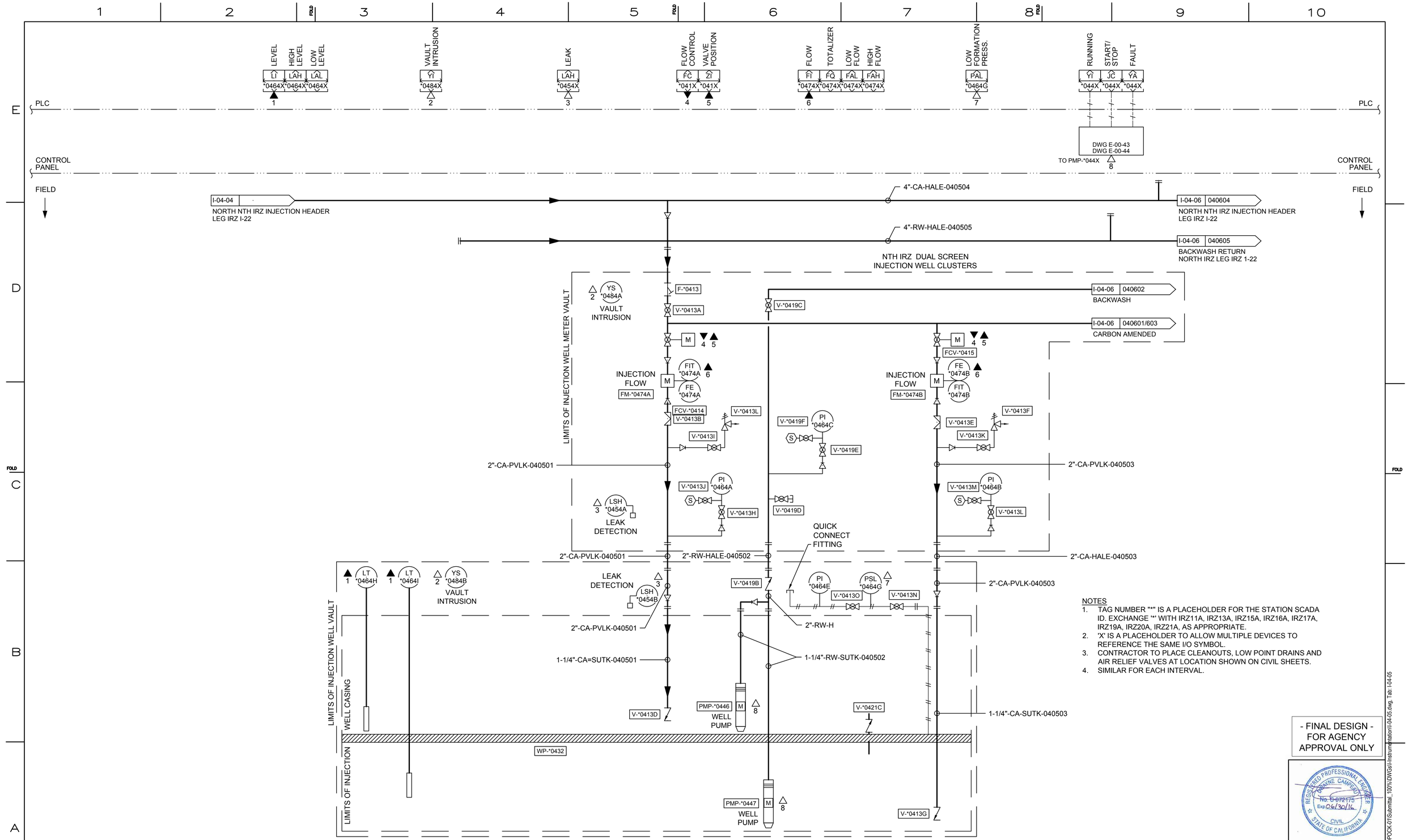
IRZ DUAL SCREEN EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ11A, IRZ13A, IRZ15A, IRZ16A, IRZ17A, IRZ19A, IRZ20A, IRZ21A, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — WAYNE CAMPBELL — No. C 072175 — Exp. 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN CLUSTER INJECTION WELLS P&ID SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

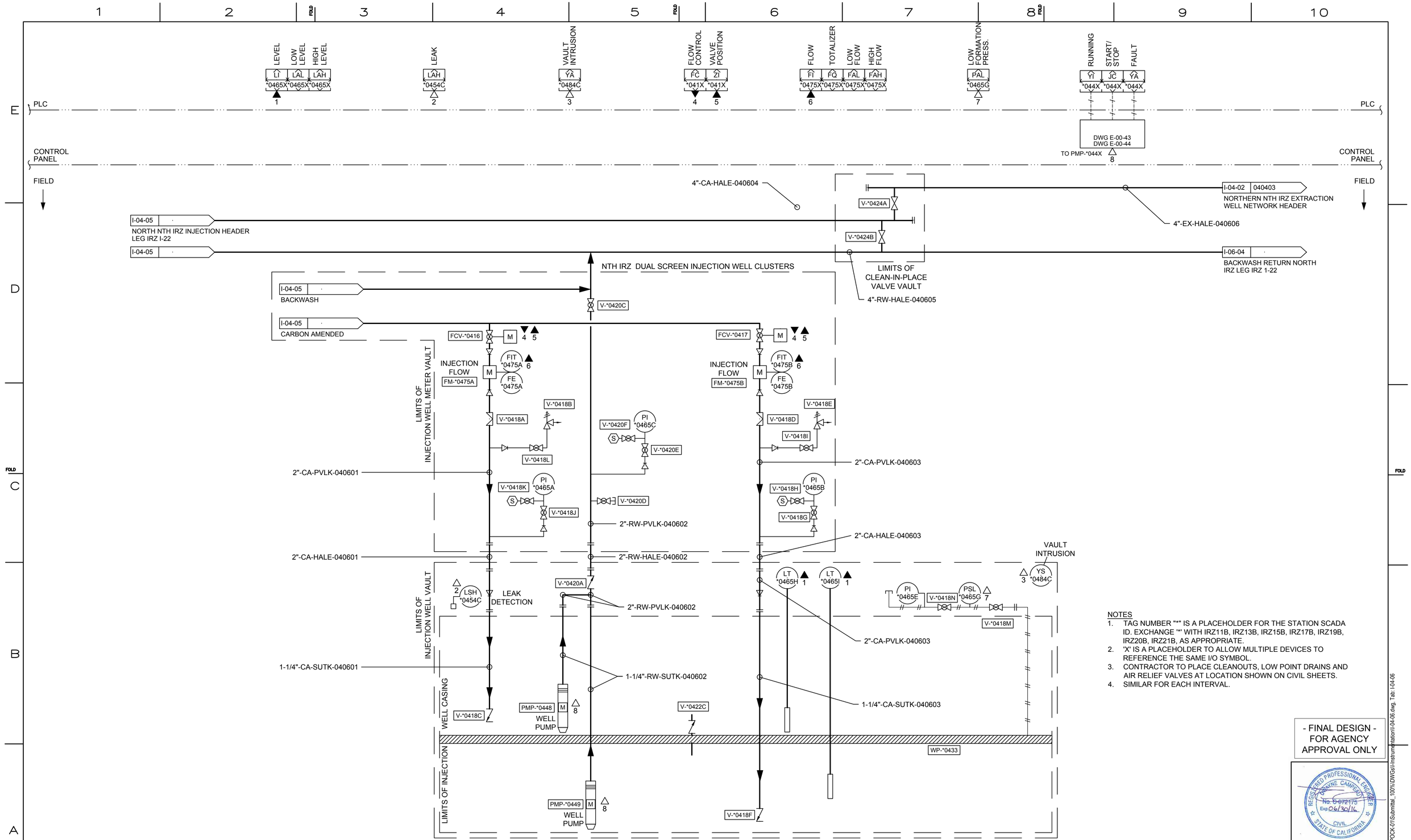
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ11B, IRZ13B, IRZ15B, IRZ17B, IRZ19B, IRZ20B, IRZ21B, AS APPROPRIATE.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DWAYNE CAMPBELL No. C 072175 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
	RAO

SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ DUAL SCREEN CLUSTER INJECTION WELLS P&ID SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

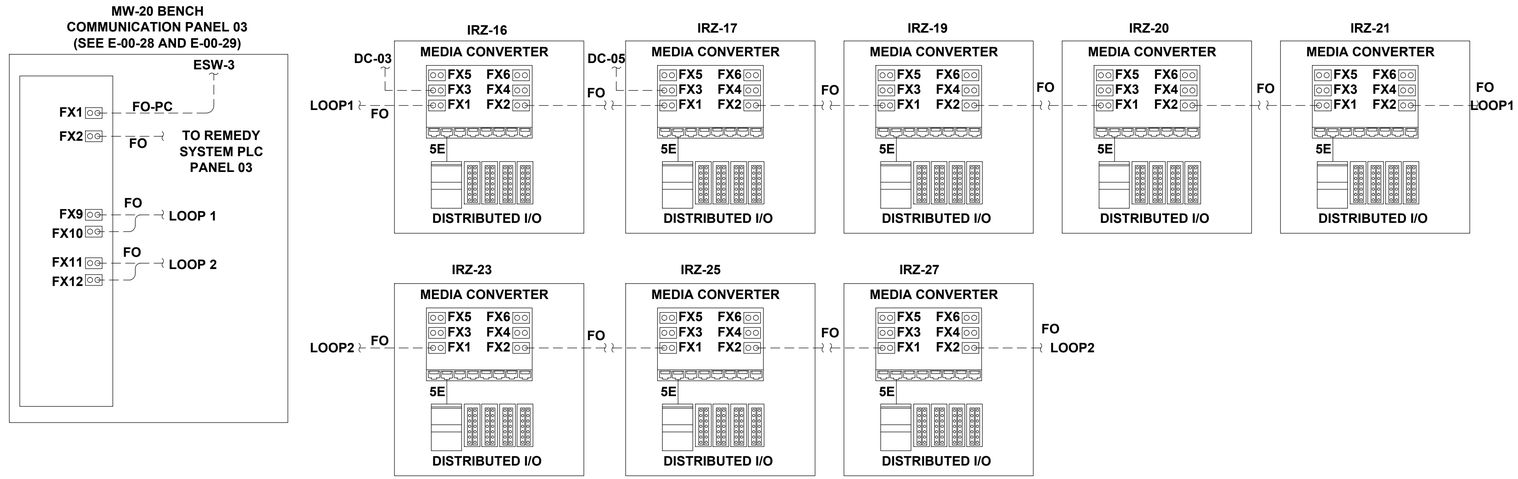
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
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LEGEND

FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE
FOD	FIBER OPTIC DROP
PLC	PROGRAMMABLE LOGIC CONTROLLER
I/O	INPUT/OUTPUT

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
SO	
SUPV	RAO
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 03
FIBER OPTIC NETWORK

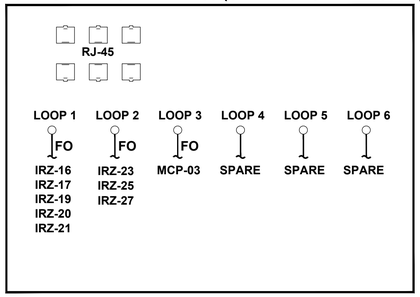
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

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BILL OF MATL	
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SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-04-07	REV 2

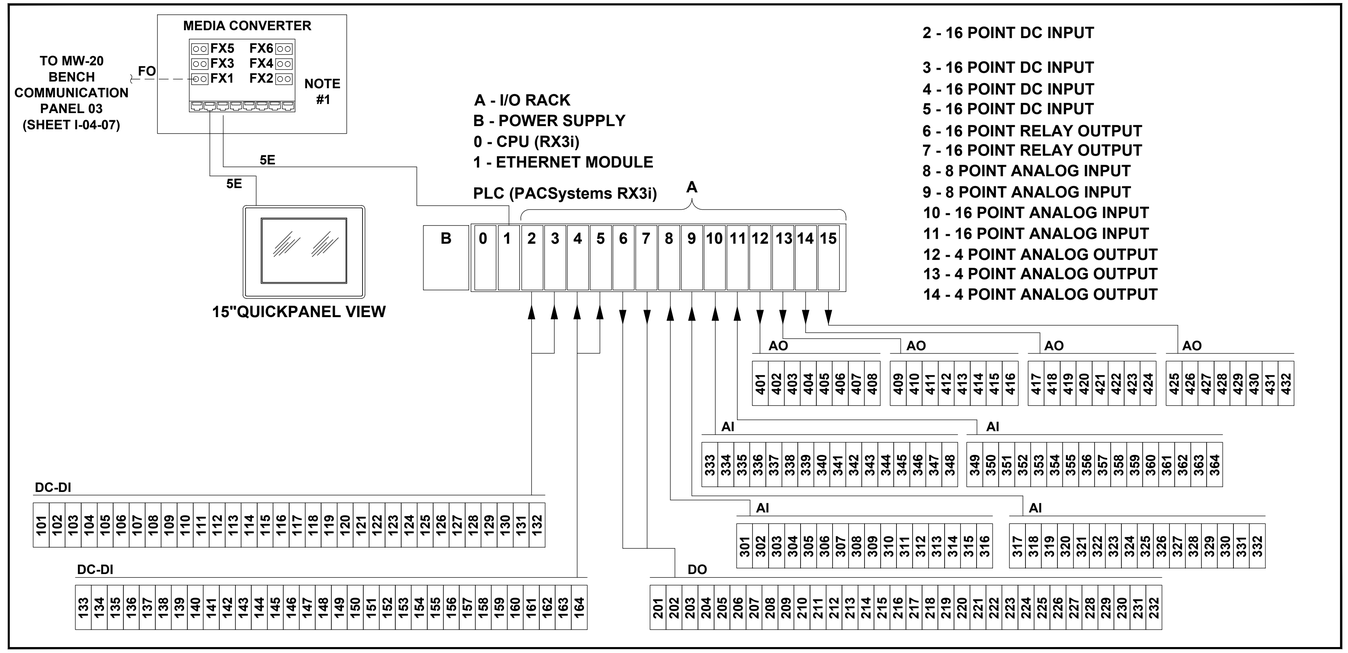
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LIMITS OF MW-20 BENCH
COMMUNICATION PANEL 03 (SEE E-00-28 AND E-00-29)



LIMITS OF REMEDY SYSTEM PLC PANEL 03



LEGEND

AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
DC-DI	DC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
PLC	PROGRAMMABLE LOGIC CONTROLLER
FOD	FIBER OPTIC DROP
I/O	INPUT/OUTPUT
MCP	MAIN CONTROL PANEL
FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOANNE CAMPEAU
No. C-072176
Exp. 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	0908/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

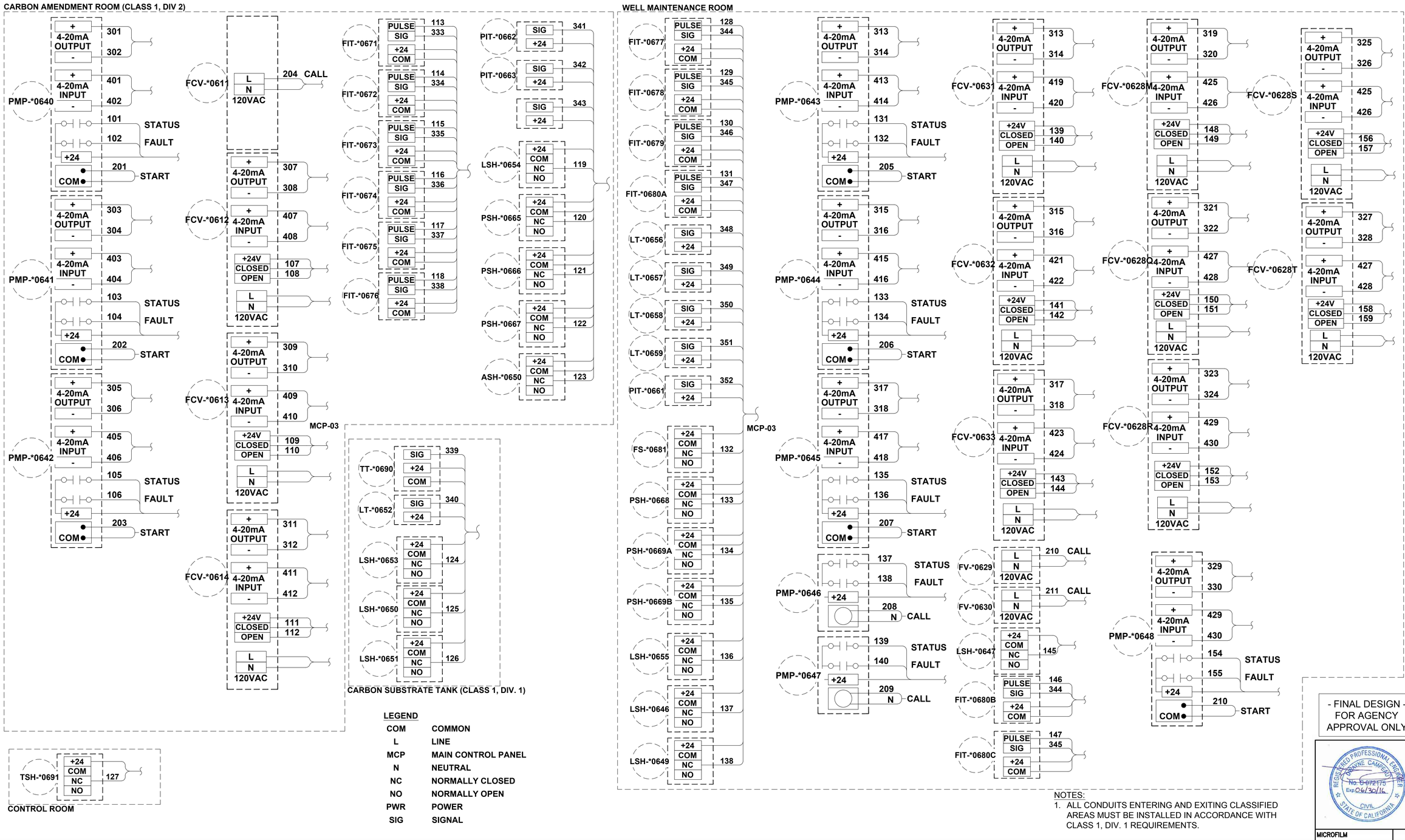
APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 03 PLC PANELS
INSTRUMENTATION CONNECTION
SHEET 1 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-04-08	REV 2

N1808

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ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 4

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

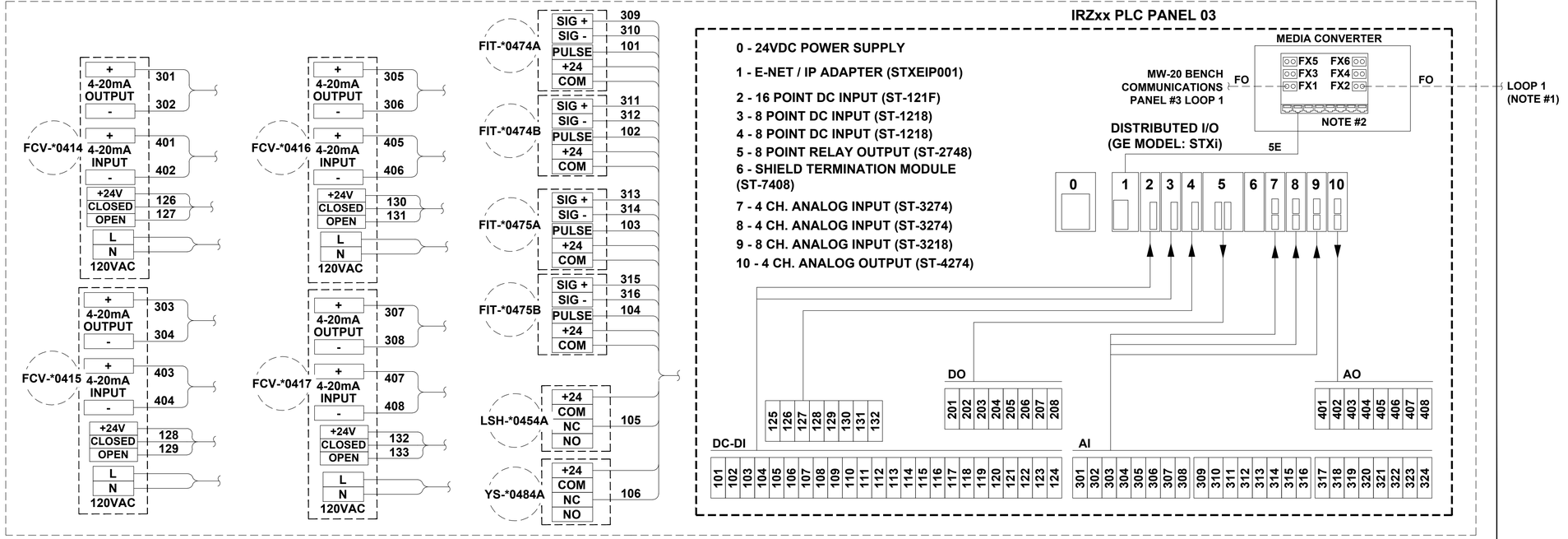
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-04-09	REV 2

N1808

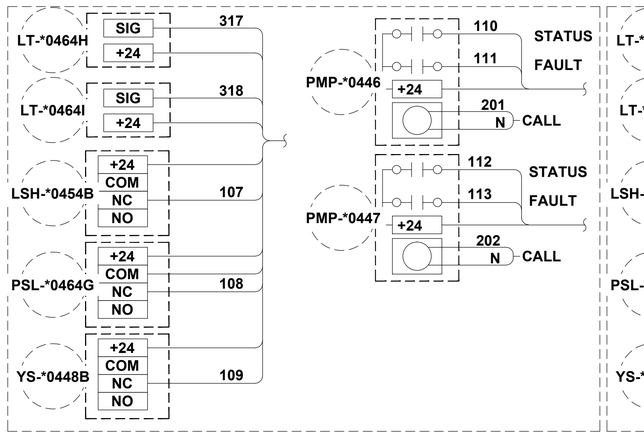
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(TYP. IRZ-16, IRZ-17, IRZ-19, IRZ-20, IRZ-21)

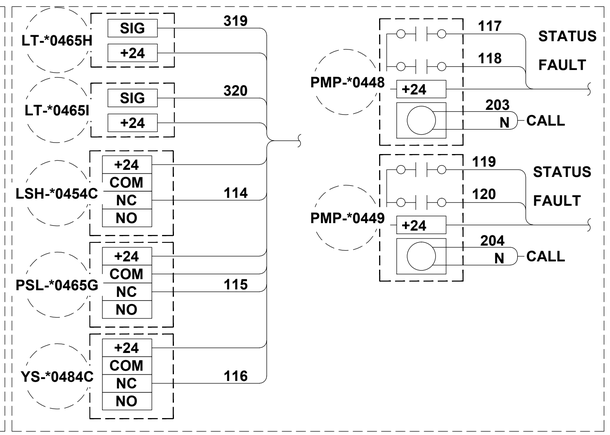
(METER VAULT)



(WELL VAULT A)



(WELL VAULT B)



LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
5E	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:
1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — DWAYNE CAMPBELL — No. C 072175 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 03 PLC PANELS INSTRUMENTATION CONNECTION SHEET 3 OF 4

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM

BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. | of SHEETS

I-04-10 | REV 2

N1608

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(IRZ-23)

(WELL VAULT)

IRZ-23 PLC PANEL 03

0 - 24VDC POWER SUPPLY
1 - E-NET / IP ADAPTER (STXEIP001)
2 - 8 POINT DC INPUT (ST-1218)
3 - 8 POINT DC INPUT (ST-1218)
4 - 4 POINT RELAY OUTPUT (ST-2744)
5 - SHIELD TERMINATION MODULE (ST-7408)
6 - 4 CH. ANALOG INPUT (ST-3274)
7 - 4 CH. ANALOG INPUT (ST-3214)

MEDIA CONVERTER
LOOP 2 FO FX5 FX6 FX3 FX4 FX1 FX2 FO LOOP 2

DISTRIBUTED I/O (GE MODEL: STXi)
0 1 2 3 4 5 6 7

FIT-*0470A: SIG + 301, SIG - 302, PULSE 101, +24, COM
PIT-*0460A: SIG 309, +24
LSH-*0450A: +24, COM, NC, NO 102
YS-*0480A: +24, COM, NC, NO 103
LT-*0460B: SIG 310, +24

DC-DI 101 102 103 104 105 106 107 108
DC-DI 109 110 111 112 113 114 115 116
DO 201 202 203 204
AI 301 302 303 304 305 306 307 308
AI 309 310 311 312

PMP-*0440: 106 STATUS, 107 FAULT, +24, 201 N CALL

(TYP. IRZ-25, IRZ-27)

(METER VAULT)

IRZxx PLC PANEL 03

0 - 24VDC POWER SUPPLY
1 - E-NET / IP ADAPTER (STXEIP001)
2 - 8 POINT DC INPUT (ST-1218)
3 - 8 POINT DC INPUT (ST-1218)
4 - 4 POINT RELAY OUTPUT (ST-2744)
5 - SHIELD TERMINATION MODULE (ST-7408)
6 - 4 CH. ANALOG INPUT (ST-3274)
7 - 4 CH. ANALOG INPUT (ST-3214)
8 - 4 CH. ANALOG OUTPUT (ST-4274)

MEDIA CONVERTER
LOOP 2 FO FX5 FX6 FX3 FX4 FX1 FX2 FO LOOP 2
5E

DISTRIBUTED I/O (GE MODEL: STXi)
NOTE 3
0 1 2 3 4 5 6 7 8

FIT-*0473A: SIG + 301, SIG - 302, PULSE 101, +24, COM
FIT-*0473B: SIG + 303, SIG - 304, PULSE 102, +24, COM
LSH-*0453A: +24, COM, NC, NO 103
YS-*0483A: +24, COM, NC, NO 104

FCV-*0408: + 4-20mA OUTPUT - 305 306; + 4-20mA INPUT - 401 402; +24V CLOSED OPEN 112 113; L N 120VAC
FCV-*0409: + 4-20mA OUTPUT - 307 308; + 4-20mA INPUT - 403 404; +24V CLOSED OPEN 114 115; L N 120VAC

DC-DI 101 102 103 104 105 106 107 108
DC-DI 109 110 111 112 113 114 115 116
DO 201 202 203 204
AI 301 302 303 304 305 306 307 308
AI 309 310 311 312
AO 401 402 403 404 405 406 407 408

LT-*0463H: SIG 309, +24
LT-*0463I: SIG 310, +24
LSH-*0453B: +24, COM, NC, NO 105
PSL-*0463G: +24, COM, NC, NO 106
YS-*0483B: +24, COM, NC, NO 107

PMP-*0444: 108 STATUS, 109 FAULT, +24, 201 N CALL
PMP-*0445: 110 STATUS, 111 FAULT, +24, 202 N CALL

(WELL VAULT)

LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
E5	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:
1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DIANNE CAMPBELL No. C 67275 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	MS	MWM	JPB	JEF	

REVISIONS

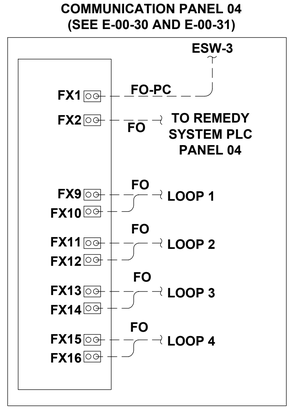
APPROVED BY: RAO
SO, SUPV, DSGN, DWN, CHKD, OK, DATE, SCALES

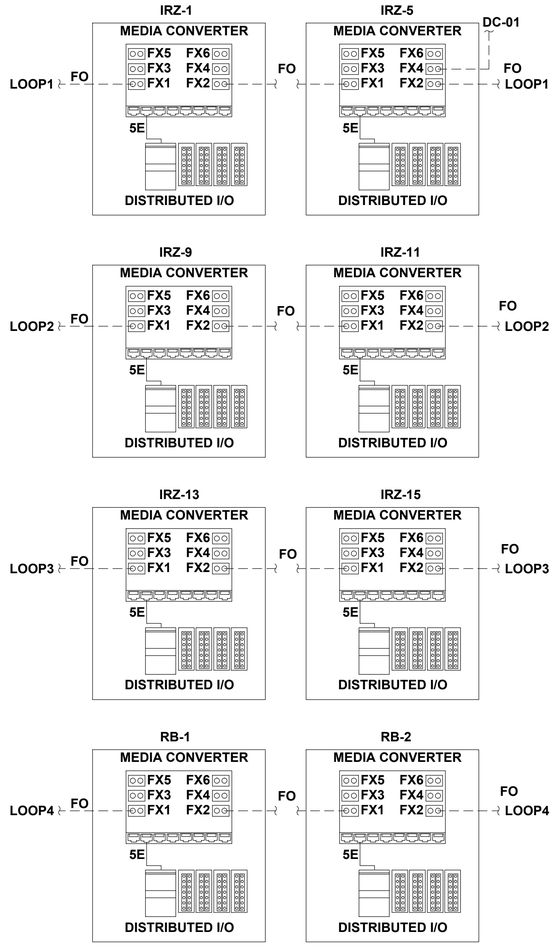
TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 03 PLC PANELS 03 INSTRUMENTATION CONNECTION SHEET 4 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
I-04-11
REV 2

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LEGEND

FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE
FOD	FIBER OPTIC DROP
PLC	PROGRAMMABLE LOGIC CONTROLLER
I/O	INPUT/OUTPUT

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

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REGISTERED PROFESSIONAL ENGINEER
JOHNNIE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY

REVISIONS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	0405/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

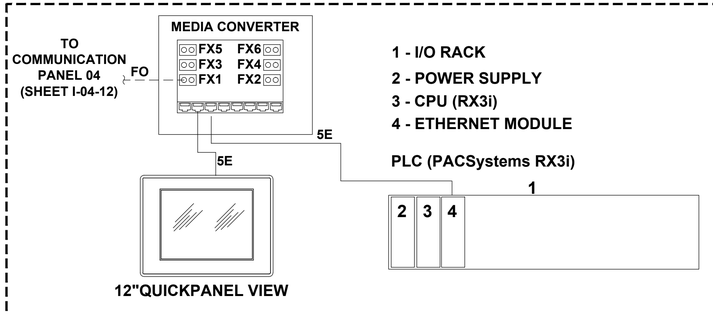
NODE 04
FIBER OPTIC NETWORK

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-04-12	REV 2

N1808

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LEGEND

AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
DC-DI	DC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
PLC	PROGRAMMABLE LOGIC CONTROLLER
FOD	FIBER OPTIC DROP
I/O	INPUT/OUTPUT
MCP	MAIN CONTROL PANEL
FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DIANNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	RAO

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 04 PLC PANELS
INSTRUMENTATION CONNECTION
SHEET 1 OF 3
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

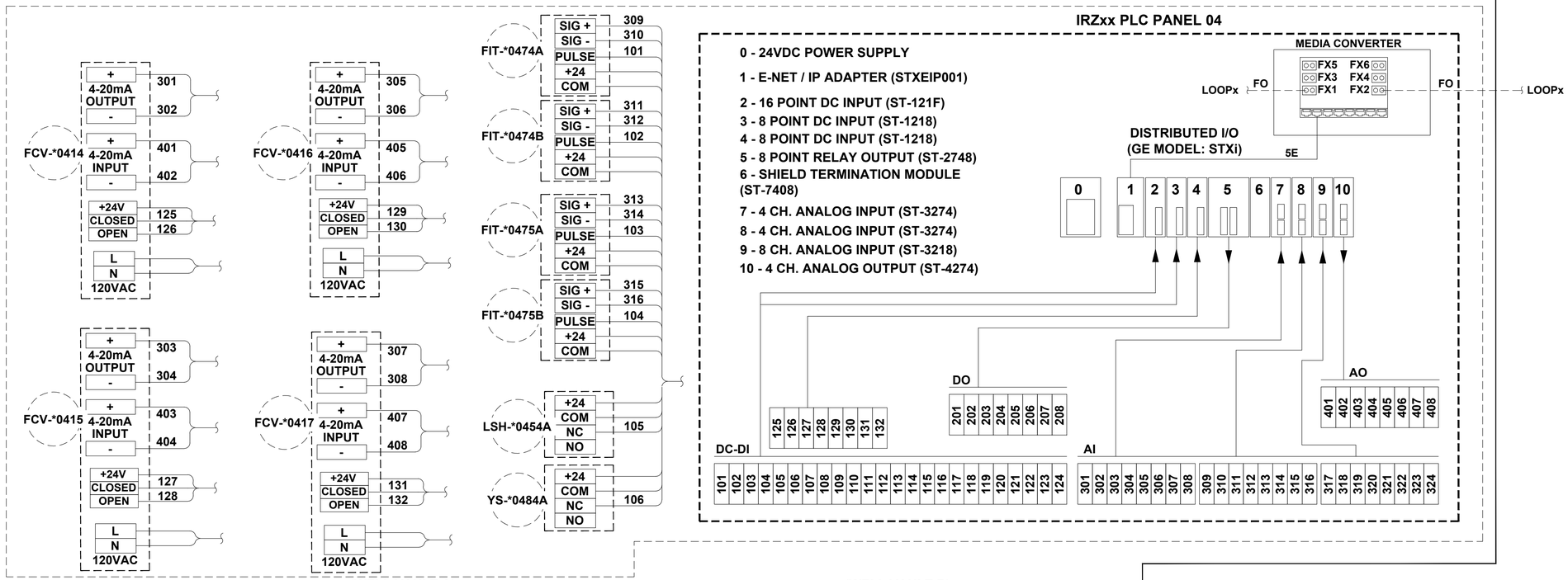
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I-04-13	REV 2

N1808

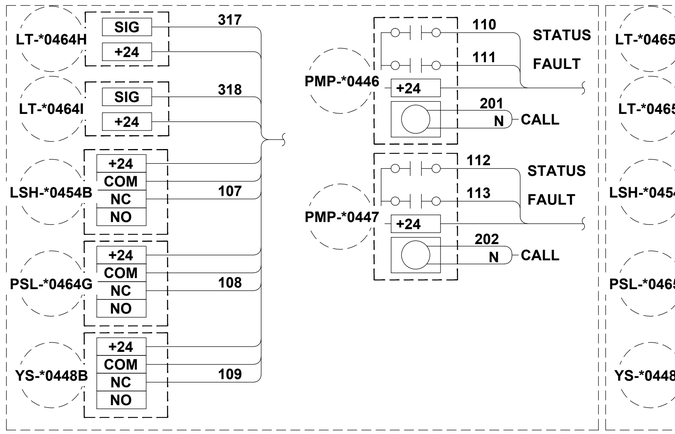
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(TYP. IRZ-11, IRZ-13, IRZ-15 VAULTS)

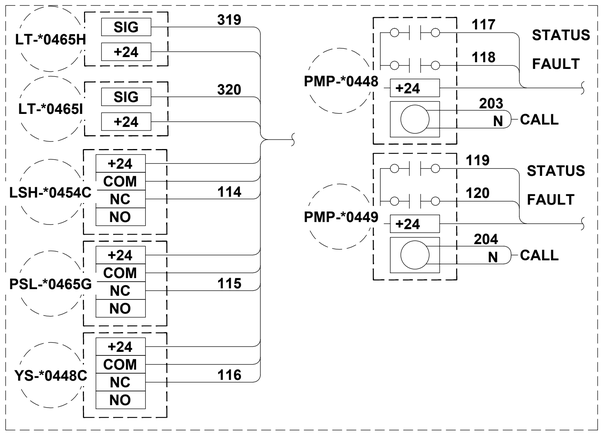
(METER VAULT)



(WELL VAULT A)



(WELL VAULT B)



LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
E5	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:
1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DIANNE CAMPBELL
No. C 61714
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 04 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 3

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

I-04-14 | REV 2

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(TYP. RB-1, RB-2)

(METER VAULT)

RBxx PLC PANEL 04

0 - 24VDC POWER SUPPLY

1 - E-NET / IP ADAPTER (STXEIP001)

2 - 8 POINT DC INPUT (ST-1218)

3 - 8 POINT DC INPUT (ST-1218)

4 - 4 POINT RELAY OUTPUT (ST-2744)

5 - SHIELD TERMINATION MODULE (ST-7408)

6 - 4 CH. ANALOG INPUT (ST-3274)

7 - 4 CH. ANALOG INPUT (ST-3214)

MEDIA CONVERTER

FX5 FX6 FX3 FX4 FX1 FX2

FO LOOP 4 — FO LOOP 4

5E

DISTRIBUTED I/O (GE MODEL: STXi)

0 1 2 3 4 5 6 7

DC-DI 101 102 103 104 105 106 107 108

DC-DI 109 110 111 112 113 114 115 116

DO 201 202 203 204

AI 301 302 303 304 305 306 307 308

AI 309 310 311 312

FIT-*0570A: SIG + 301, SIG - 302, PULSE 101, +24, COM

LSH-*0550A: +24, COM, NC, NO — 102

YS-*0580A: +24, COM, NC, NO — 103

LT-*0560B: SIG 309, +24

PSL-*0560C: +24, COM, NC, NO — 106

PMP-*0540: +24; 107 STATUS; 108 FAULT; 201 N CALL

(TYP. IRZ-1, IRZ-5, IRZ-9)

(METER VAULT)

IRZxx PLC PANEL 04

0 - 24VDC POWER SUPPLY

1 - E-NET / IP ADAPTER (STXEIP001)

2 - 8 POINT DC INPUT (ST-1218)

3 - 8 POINT DC INPUT (ST-1218)

4 - 4 POINT RELAY OUTPUT (ST-2744)

5 - SHIELD TERMINATION MODULE (ST-7408)

6 - 4 CH. ANALOG INPUT (ST-3274)

7 - 4 CH. ANALOG INPUT (ST-3214)

MEDIA CONVERTER

FX5 FX6 FX3 FX4 FX1 FX2

LOOPx FO — FO LOOPx

5E

DISTRIBUTED I/O (GE MODEL: STXi)

0 1 2 3 4 5 6 7

DC-DI 101 102 103 104 105 106 107 108

DC-DI 109 110 111 112 113 114 115 116

DO 201 202 203 204

AI 301 302 303 304 305 306 307 308

AI 309 310 311 312

FIT-*0471A: SIG + 301, SIG - 302, PULSE 101, +24, COM

FIT-*0471B: SIG + 303, SIG - 304, PULSE 102, +24, COM

LSH-*0451A: +24, COM, NC, NO — 103

YS-*0481A: +24, COM, NC, NO — 104

PIT-*0461A: SIG 309, +24

PIT-*0461D: SIG 310, +24

LT-*0461B: SIG 311, +24

LT-*0461C: SIG 312, +24

LSH-*0451B: +24, COM, NC, NO — 105

PSL-*0461E: +24, COM, NC, NO — 106

YS-*0481B: +24, COM, NC, NO — 107

PMP-*0441: +24; 108 STATUS; 109 FAULT; 201 N CALL

PMP-*0442: +24; 110 STATUS; 111 FAULT; 202 N CALL

(WELL VAULT)

LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
E5	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHANNE CAMPBELL — No. C 072178 Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO, SUPV, DSGN, DWN, CHKD, OK, DATE, SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 04 PLC PANELS INSTRUMENTATION CONNECTION SHEET 3 OF 3

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM

BILL OF MATL

DWG LIST

SUPSDS

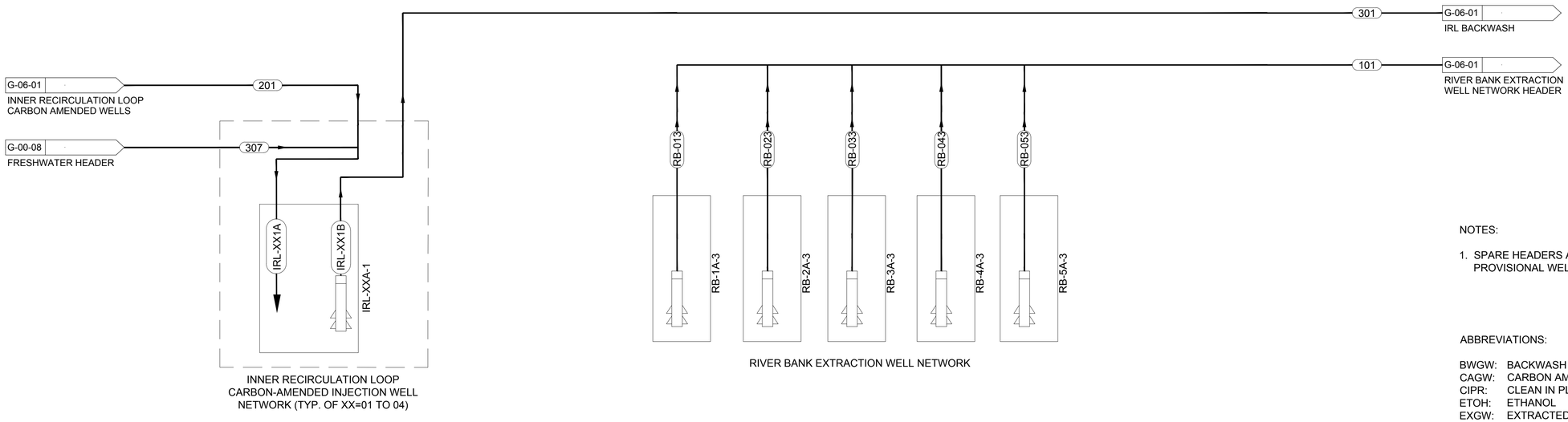
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SHEET NO. of SHEETS

I-04-15 REV 2

N1808

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NOTES:

1. SPARE HEADERS AND FUTURE PROVISIONAL WELLS ARE NOT SHOWN.

ABBREVIATIONS:

BWGW:	BACKWASH GROUNDWATER
CAGW:	CARBON AMENDED GROUNDWATER
CIPR:	CLEAN IN PLACE REAGENT
ETOH:	ETHANOL
EXGW:	EXTRACTED GROUNDWATER
FW:	FRESH WATER
GPD:	GALLONS PER DAY
GPM:	GALLONS PER MINUTE
IRL:	INNER RECIRCULATION LOOP
IRZ:	IN-SITU REACTIVE ZONE
lbs/day	POUNDS PER DAY
mg/L:	MILLIGRAMS PER LITER
NTH:	NATIONAL TRAIL HIGHWAY
TOC:	TOTAL ORGANIC CARBON
TW:	TREATED WATER
WMR:	WELL MAINTENANCE REAGENT
µg/L:	MICROGRAMS PER LITER

Design Basis and Mass Balance[a,f]

Stream ID:	101	201	307	301	IRL-011A	IRL-021A	IRL-031A	IRL-041A	RB-013	RB-023	RB-033	RB-043	RB-053	IRL-XX1B
Stream Description:	EXGW	CAGW	FW	BWGW	CAGW/FW	CAGW/FW	CAGW/FW	CAGW/FW	EXGW	EXGW	EXGW	EXGW	EXGW	BWGW[i]
Nominal Design Parameters														
Flow Rate (GPM):	**150**	**150**	**300**	**≤400**	75	75	100	200	25	0	50	50	25	j
Carbon Substrate[b,c] (GPD):	**---**	**10**	**---**	---	5.2	5.2	6.9	14	---	---	---	---	---	---
TOC[b,c] (mg/L):	**---**	**20**	**---**	---	20	20	20	20	---	---	---	---	---	---
Chromium[d] (µg/L):	**10**	**---**	**---**	---	---	---	---	---	10	10	10	10	10	---
Chromium[d] (lbs/day):	**1.8E-02**	**---**	**---**	---	---	---	---	---	3.0E-03	0.0E+00	6.0E-03	6.0E-03	3.0E-03	---
Maximum Design Parameters														
Flow Rate (GPM):	**500[e]**	**750[g]**		**≤400**	200	200	200	200	170	170	170	170	170	j
Carbon Substrate[b,c] (GPD):	**---**	**104**		---	35	35	35	35	---	---	---	---	---	---
TOC[b,c] (mg/L):	**---**	**50**		---	50	50	50	50	---	---	---	---	---	---
Chromium[d] (µg/L):	**10**	**---**	**---**	---	---	---	---	---	10	10	10	10	10	---
Chromium[d] (lbs/day):	**6.0E-02**	**---**	**---**	---	---	---	---	---	2.0E-02	2.0E-02	2.0E-02	2.0E-02	2.0E-02	---

Typ. For XX = 01 to 04

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Total maximum River Bank extracted groundwater flow limited to 500 gpm.
f - Nominal design parameters assume River Bank extracted groundwater to be amended with carbon and re-injected at IRL-1 and IRL-2, if chromium concentrations in the river bank extraction wells exceed the cleanup goal then IRL-3 and IRL-4 will receive freshwater. However, IRL injection wells will be constructed preferably to inject either/both freshwater and/or river bank extraction well water.
g - Total maximum IRL injection well flow limited to 750 gpm.
h - Maximum design parameters assume chromium concentrations and general flow distribution similar to minimal design parameters.
i - Single pump operation, in succession.
j - Backwash flow rate equals twice the nominal injection flow rate and twice the maximum injection flow rate.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN		KLD	BJW	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		KLD	BJW	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

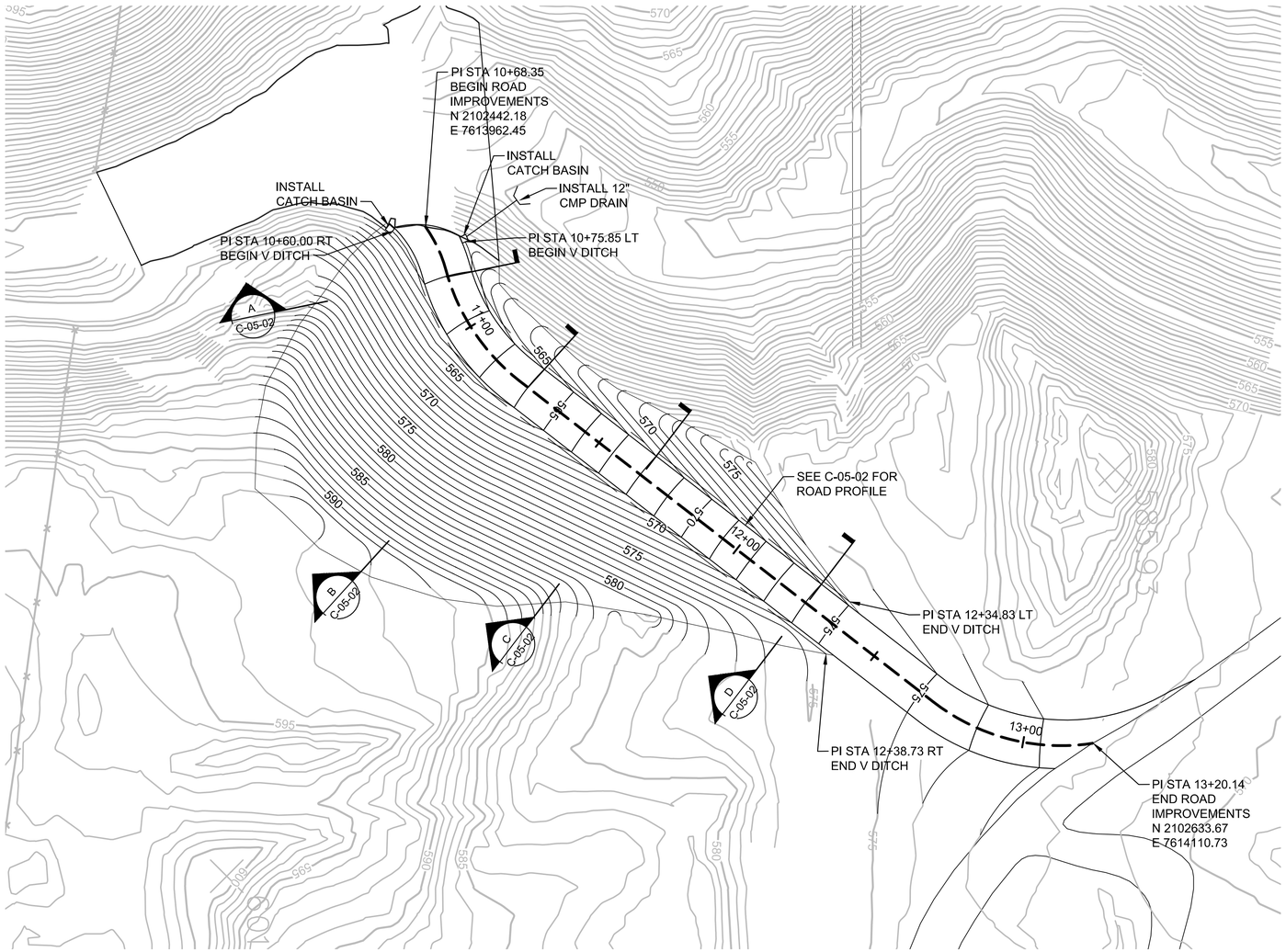
INNER RECIRCULATION LOOP PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-05-01	REV 2

N1808

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NOTE:

1. REFER TO STATIONING ON C-07-25 WHICH IS IDENTICAL TO PIPELINE H STATIONING.

LEGEND

———— = EDGE OF ROAD

—— – —— = FLOW LINE

0 20 40 60

HORZ: SCALE: 1"=20'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		WTH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

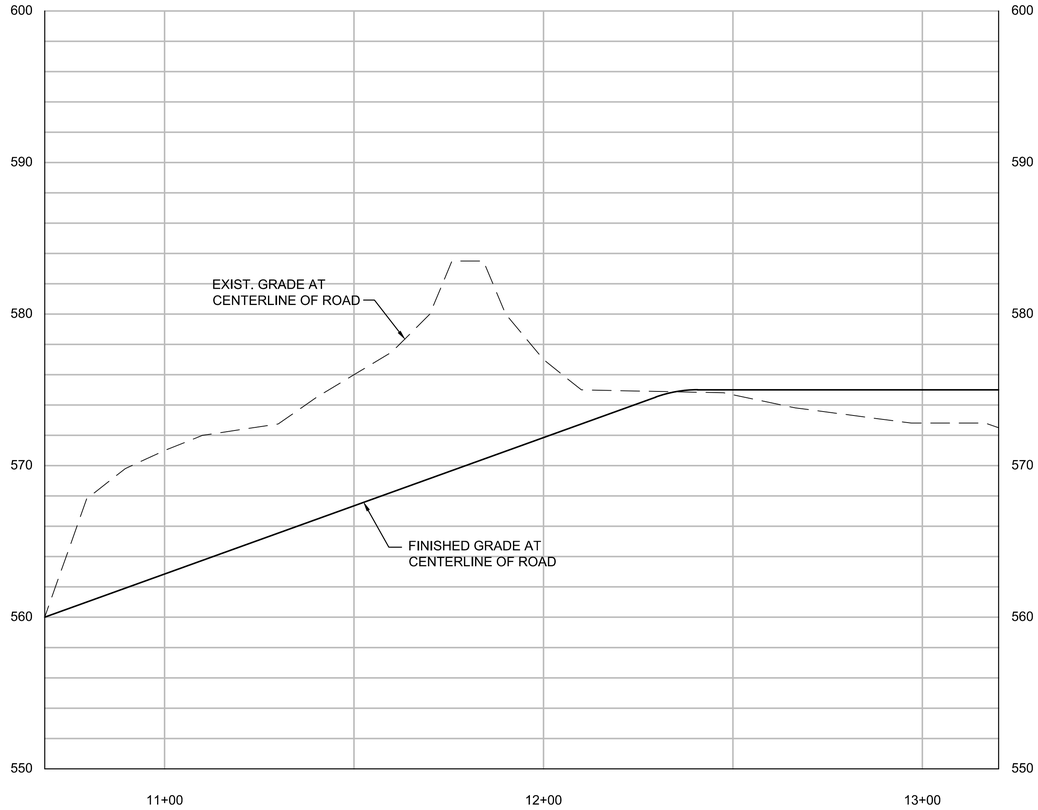
IRL-4 ACCESS ROAD SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

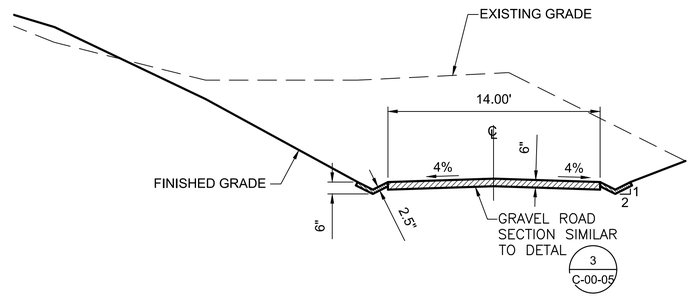
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-01	REV 2

N1808

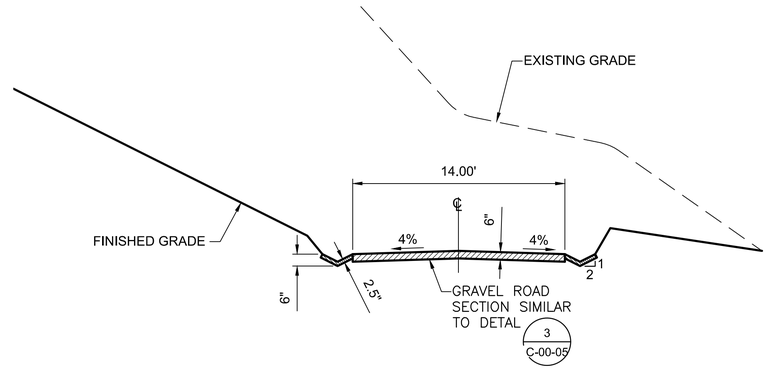
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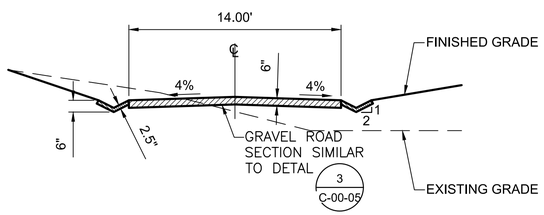
IRL-4 ACCESS ROAD

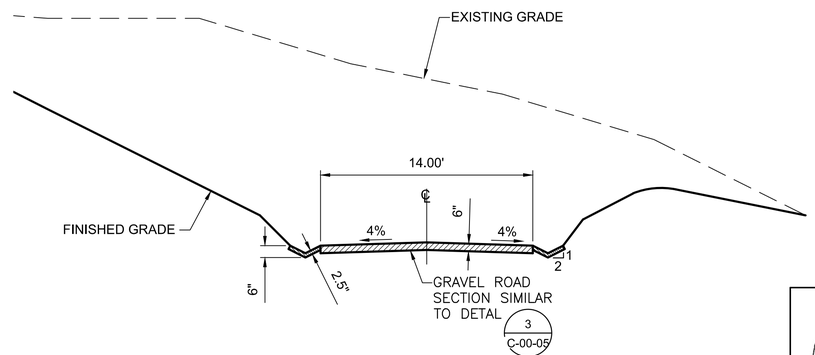


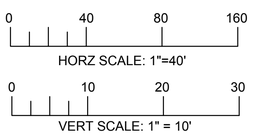
A C-05-01 — SECTION @ STA 10+86.19
1" = 5'-0"



A C-05-01 — SECTION @ STA 11+24.15
1" = 5'-0"







A C-05-01 — SECTION @ STA 12+25.45
1" = 5'-0"

A C-05-01 — SECTION @ STA 11+65.00
1" = 5'-0"

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BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

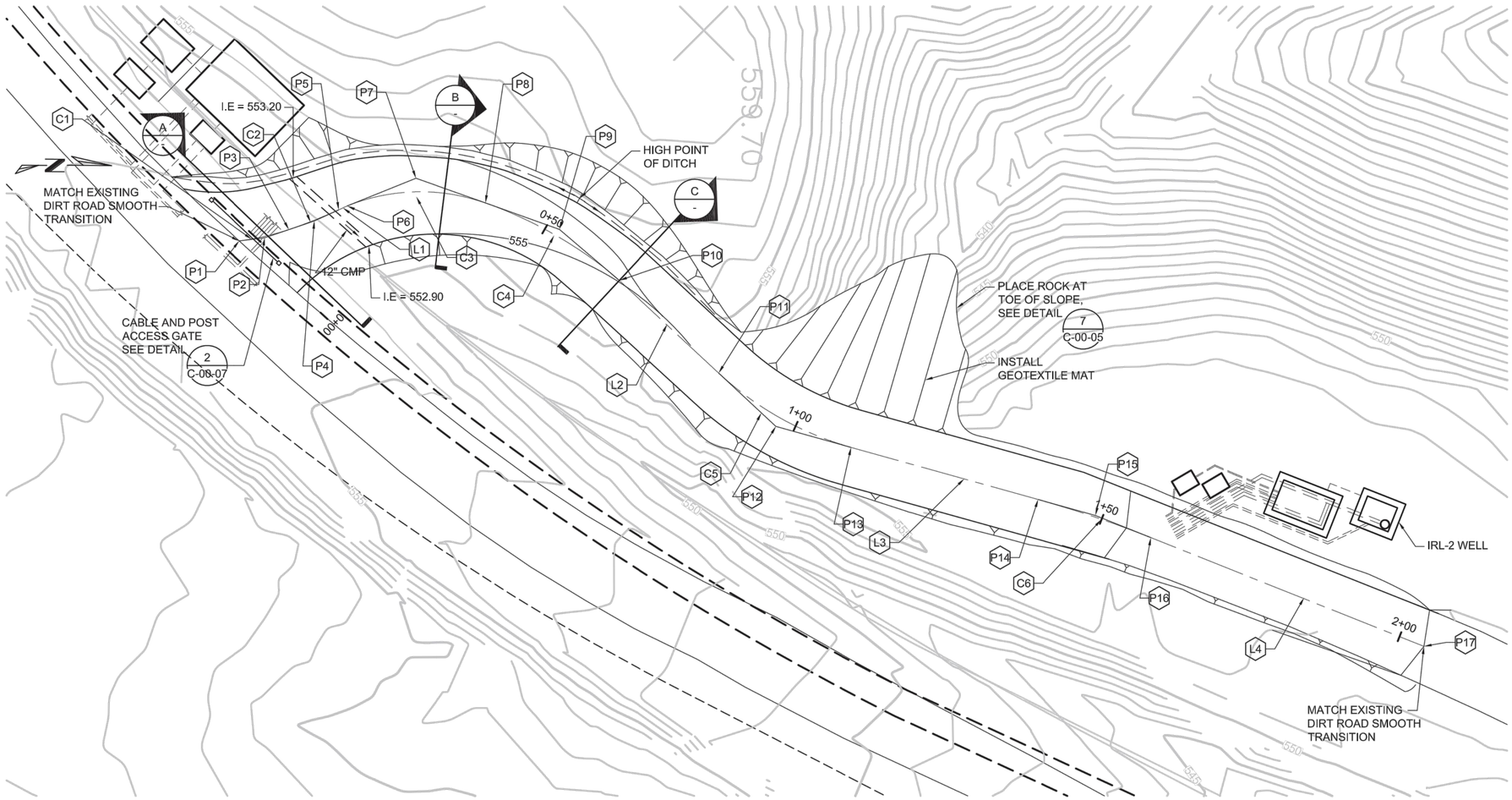
IRL-4 ACCESS ROAD - SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-02	REV 2

N1608

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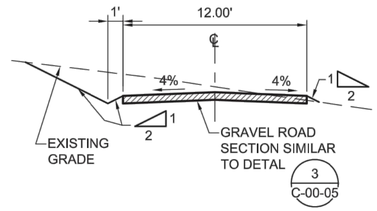
IRL-2 ACCESS ROAD - SITE PLAN

1" = 10'

Point Table				
Point	Description	Sta	Northing	Easting
P1	BC	0+00.00	2102879.51	7614089.03
P2	PI	0+04.00	2102883.48	7614088.54
P3	EC,BC	0+07.94	2102887.26	7614087.26
P4	PI	0+12.12	2102891.22	7614085.92
P5	EC	0+16.30	2102895.03	7614084.18
P6	BC	0+17.77	2102896.37	7614083.57
P7	PI	0+29.31	2102907.08	7614079.26
P8	EC,BC	0+39.84	2102917.96	7614083.11
P9	PI	0+52.12	2102929.52	7614087.23
P10	EC	0+64.13	2102938.87	7614095.20
P11	BC	0+89.18	2102954.40	7614109.65
P12	PI	1+01.38	2102963.32	7614117.97
P13	EC	1+13.12	2102975.08	7614121.24
P14	BC	1+43.39	2103004.23	7614129.36
P15	PI	1+52.72	2103013.22	7614131.87
P16	EC	1+62.04	2103021.88	7614135.31
P17	PI	2+07.91	2103064.51	7614152.28

Line Table				
Line	Beg Point	End Point	Distance	Bearing
L1	P5	P6	1.47	N 24° 28' 34" W
L2	P10	P11	25.05	N 42° 56' 13" E
L3	P13	P14	30.27	N 15° 33' 56" E
L4	P16	P17	45.87	N 21° 42' 23" E

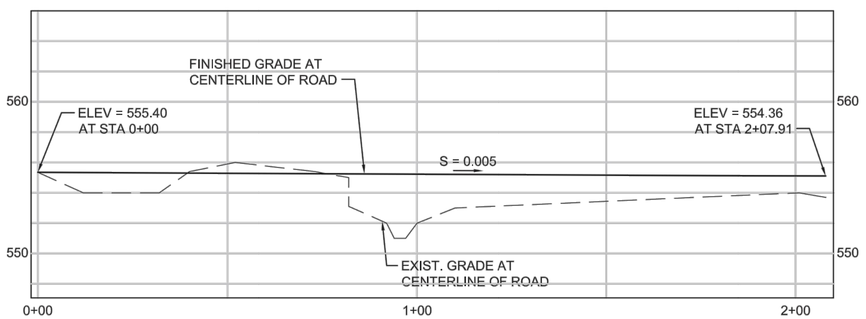
Curve Table						
Curve	Beg Point	End Point	Distance	Ä	Radius	Tangent
C1	P1	P3	7.94	15° 10' 20"	30.00	4.00
C2	P3	P5	8.36	05° 53' 58"	81.21	4.18
C3	P6	P8	22.07	41° 25' 18"	30.53	11.54
C4	P8	P10	24.29	20° 49' 20"	66.83	12.28
C5	P11	P13	23.94	27° 25' 44"	50.00	12.20
C6	P14	P16	18.65	06° 08' 10"	174.00	9.33



C SECTION @ STA 0+64.13

1" = 5'-0"

C-05-06

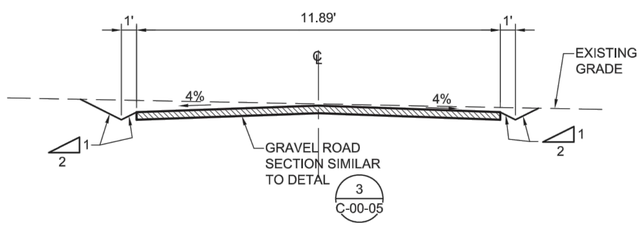


IRL-2 ACCESS ROAD PROFILE

0 20 40 60 — HORZ SCALE: 1"=20'

0 5 10 15 — VERT SCALE: 1" = 5'

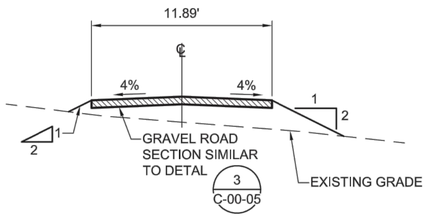
CUT QUANTITY = 25.78 CY
FILL QUANTITY = 121.03 CY
NOTE - CONTRACTOR SHALL VERIFY QUANTITIES



A SECTION @ STA 0+2.00

1" = 5'-0"

C-05-06



B SECTION @ STA 0+24.00

1" = 5'-0"

C-05-06

0 10 20 30 — SCALE: 1" = 20'

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUEBEL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	
	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRL-2 ACCESS ROAD PLAN AND SECTION

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

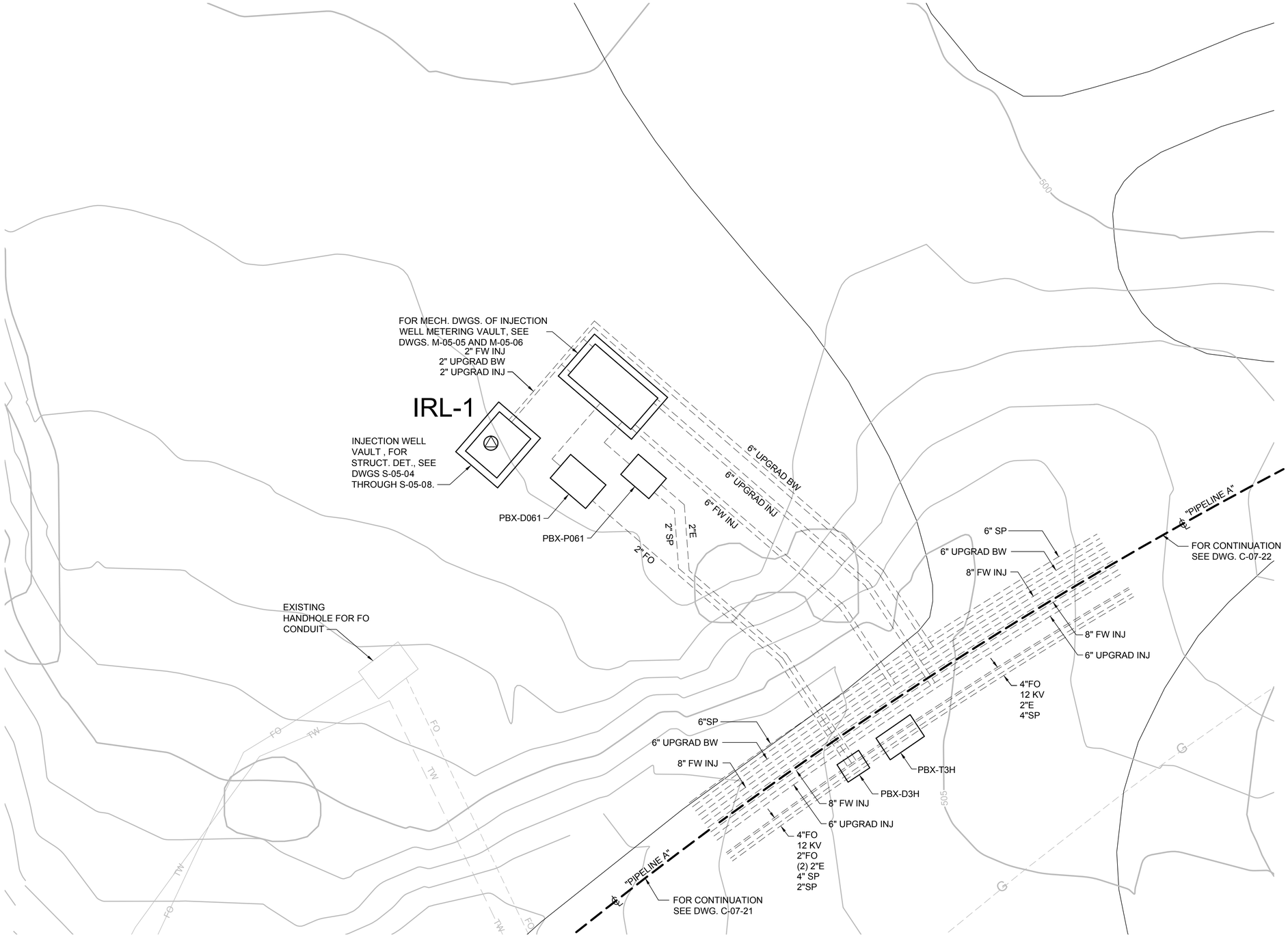
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-03	REV 2

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N1808

NOTES:

1. FOR IRL-1 INJECTION WELL METERING AND WELL VAULT STRUCTURAL DETAILS, SEE DWGS. S-05-04 THROUGH S-05-08.
2. FOR INJECTION WELL METERING AND WELL VAULT MECHANICAL DETAILS, SEE DWGS. M-05-05 AND M-05-06.



IRL-1 WELL, METER AND VALVE VAULT SITE PLAN

1" = 5'

SCALE: 1"=5'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		WTH	PT	VMB	VMB
1	9/8/14	PRE-FINAL (90%) DESIGN		PH	PT	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

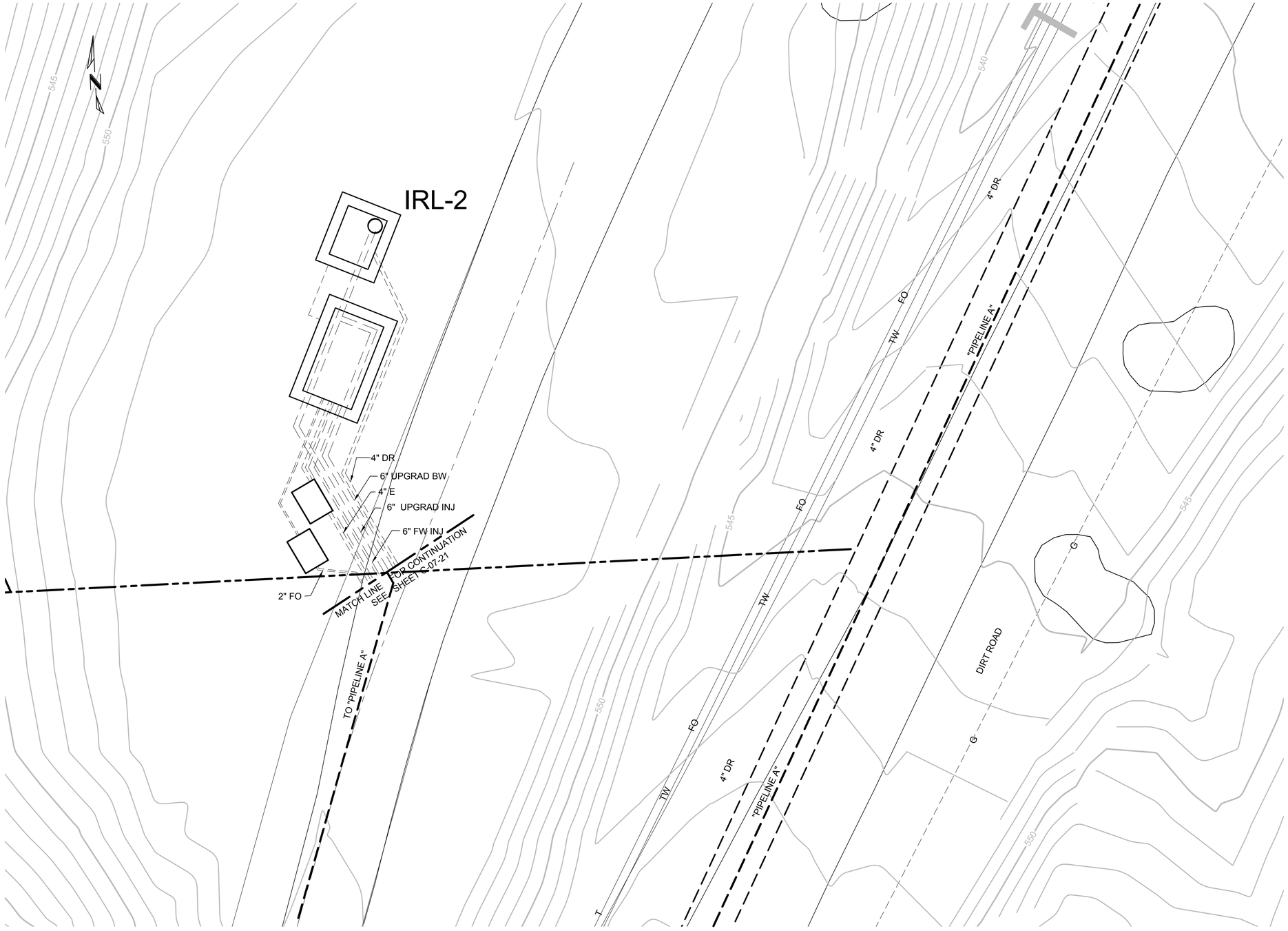
INNER RECIRCULATION LOOP
INJECTION WELL IRL-1
SITE PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-04	REV 3

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N1808



NOTES:

1. FOR INJECTION WELL METERING AND WELL VAULT STRUCTURAL DETAILS, SEE DWGS. S-05-01 THROUGH S-05-05.
2. FOR INJECTION WELL METERING AND WELL VAULT MECHANICAL DETAILS, SEE DWGS. M-05-05 AND M-05-06.

IRL-2 WELL, METER AND VALVE VAULT SITE PLAN

1" = 5'

SCALE: 1"=5'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL IRL-2 SITE PLAN

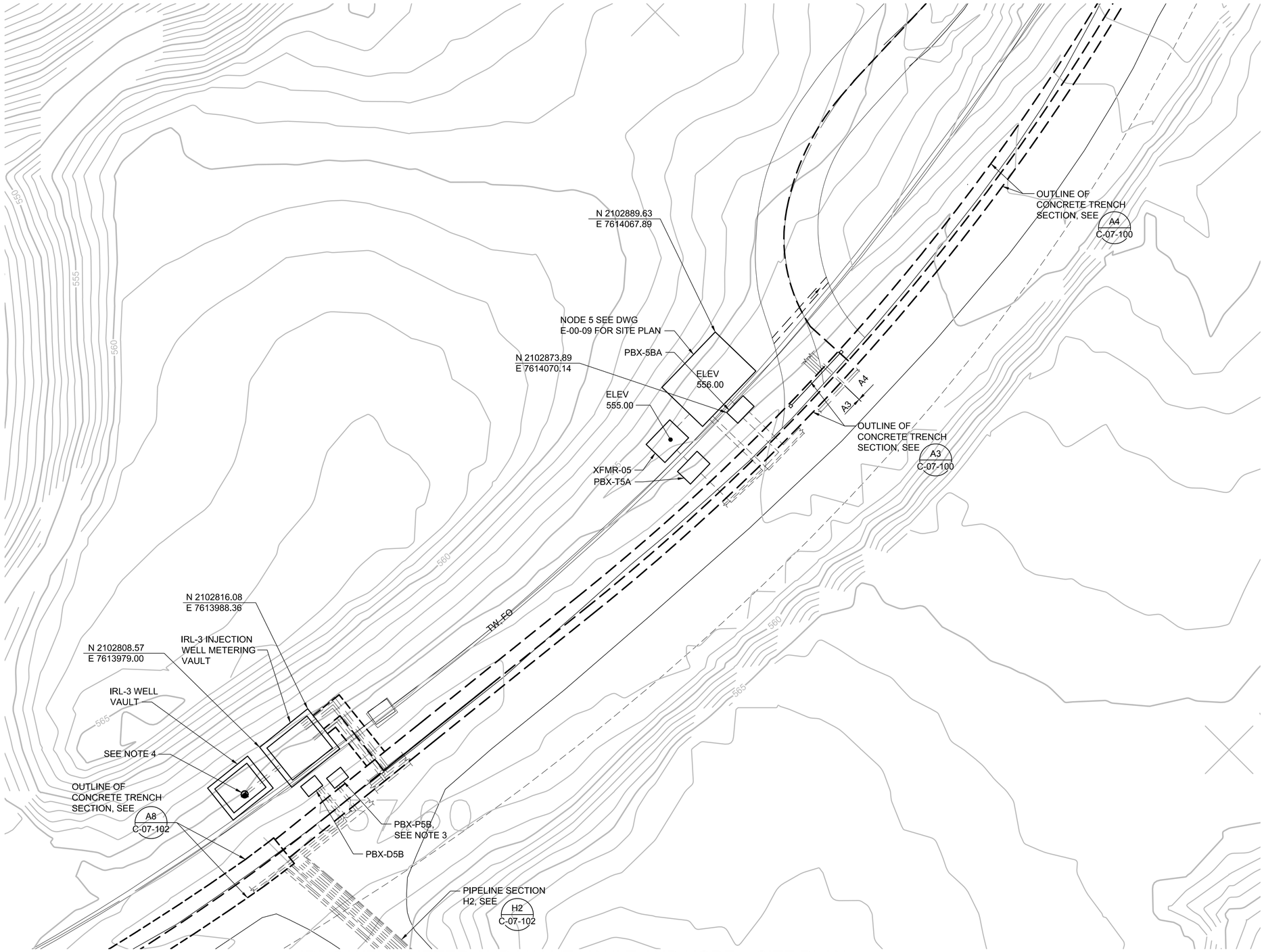
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-05-05	REV 2

N1808

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NOTES:

1. FOR IRL-3 WELL METERING AND WELL VAULT STRUCTURAL DETAILS, SEE DWGS. S-05-01 THROUGH S-05-05.
2. FOR WELL METERING AND WELL VAULT MECHANICAL DETAILS, SEE DWGS. M-05-05 AND M-05-06.
3. SEE E-00-09 FOR ELECTRICAL SITE PLAN AT IRL-3.
4. FOR COORDINATES OF IRL-3 WELL, SEE DWG. C-00-03.

IRL-3 WELL, METER AND VALVE VAULT AND NODE 5 SITE PLAN

1" = 10'

N

0 10 20 30

SCALE: 1"=10'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

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BENJAMIN J. WUBEL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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0	4/5/13	INTERMEDIATE (60%) DESIGN		PC	PT	VMB	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL IRL-3 AND NODE 5 SITE PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

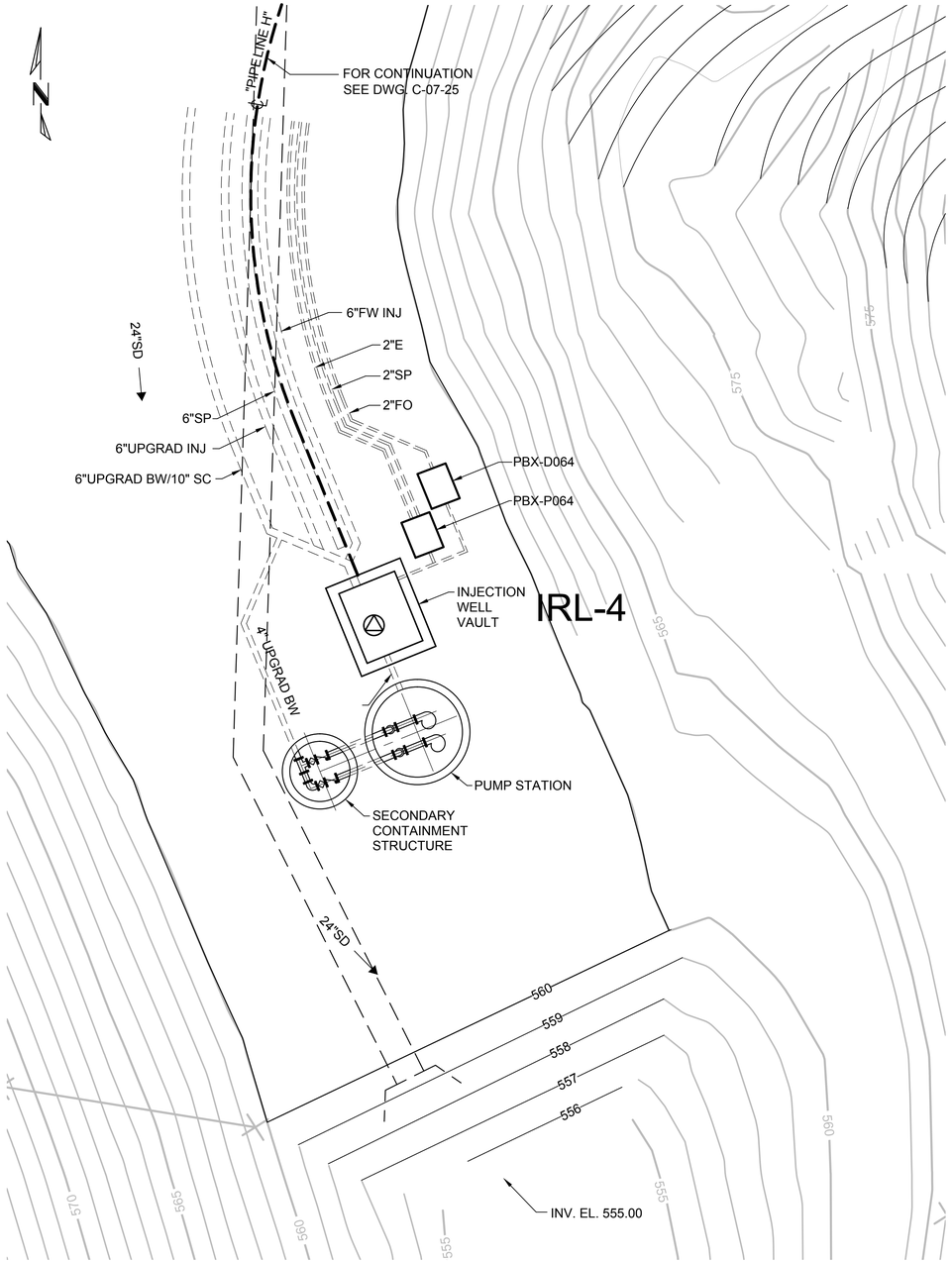
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-05-06	REV 3

N1808

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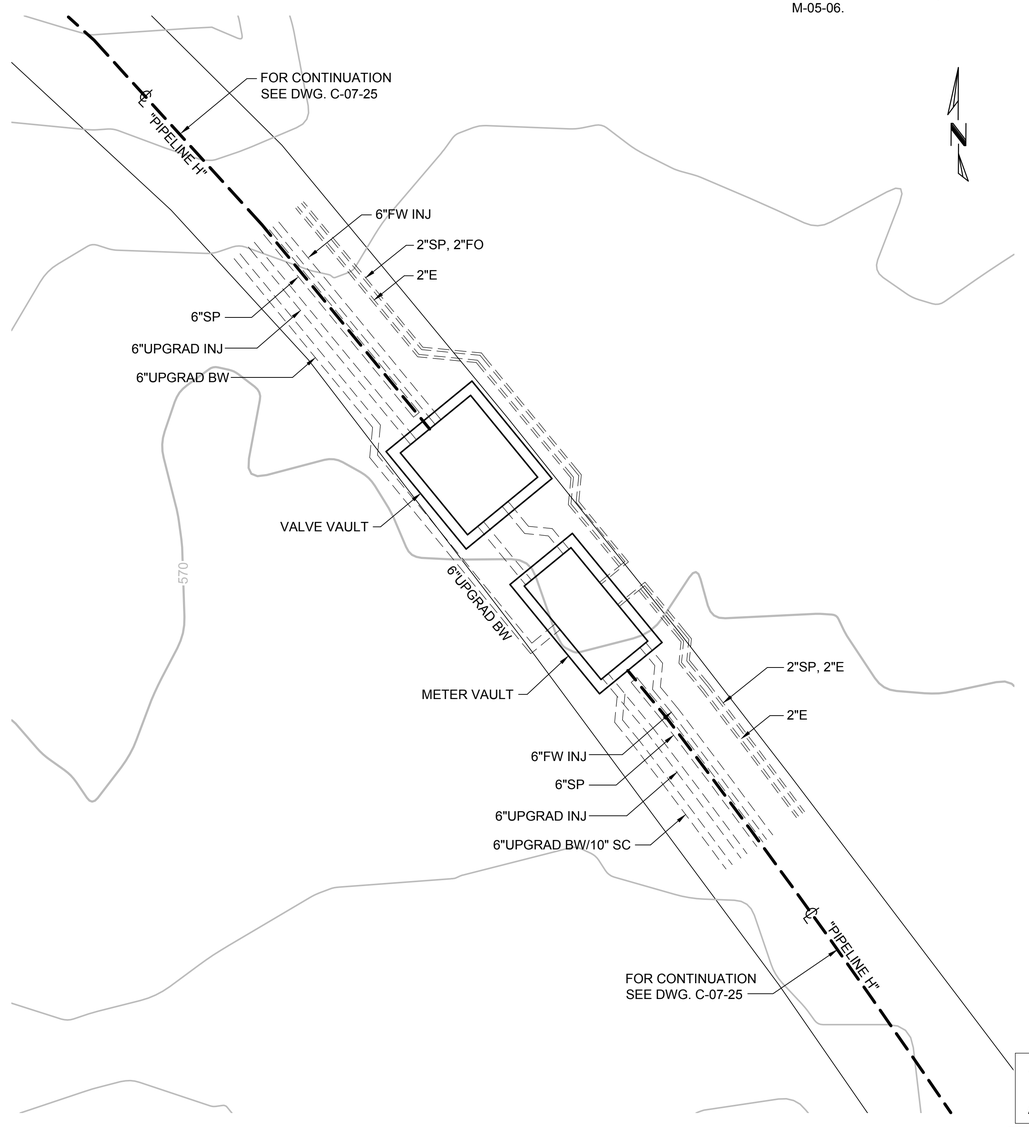
NOTES:

1. FOR INJECTION WELL METERING AND WELL VAULT STRUCTURAL DETAILS, SEE DWGS. S-05-04 THROUGH S-05-08.
2. FOR INJECTION WELL METERING AND WELL VAULT MECHANICAL DETAILS, SEE DWGS. M-05-05 AND M-05-06.



IRL-4 WELL VAULT SITE PLAN

1" = 5'



IRL-4 METER AND VALVE VAULT SITE PLAN

1" = 5'

0 5 10 15

SCALE: 1"=5'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

N1808

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN	WTH	PT	VMB	VMB	
1	9/8/14	PRE-FINAL (90%) DESIGN	PH	PT	VMB	VMB	
0	4/5/13	INTERMEDIATE (60%) DESIGN	PC	PT	VMB	VMB	

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL IRL-4 SITE PLAN

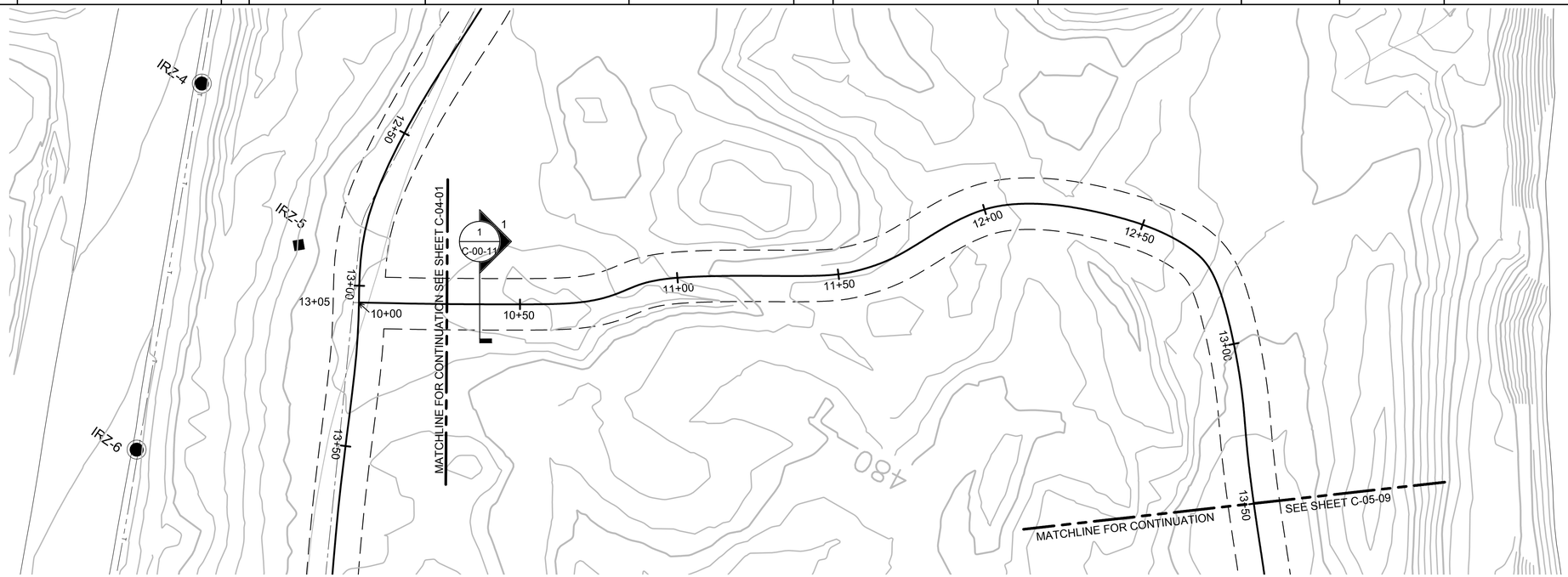
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS

C-05-07 | REV 3

11/02/2015, 13:26, G:\Graphics\ARITOPOCK-01\Submittal_100%\DWGs\C-Civil\C-05-07.DWG, Tab: C-05-07



ACCESS ROAD - PLAN

(SCALE: 1" = 20')

NOTES:

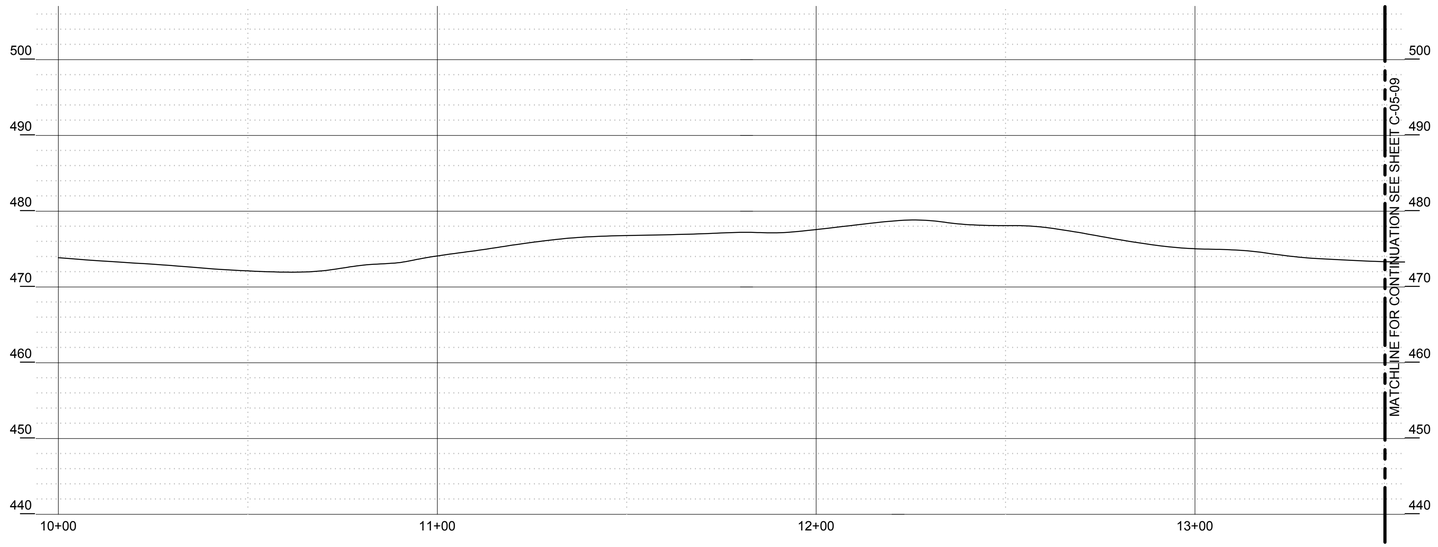
1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

0 20 40 60

HORIZ: SCALE: 1"=20'

0 10 20 30

VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "G" STA 10+00 TO STA 13+50

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

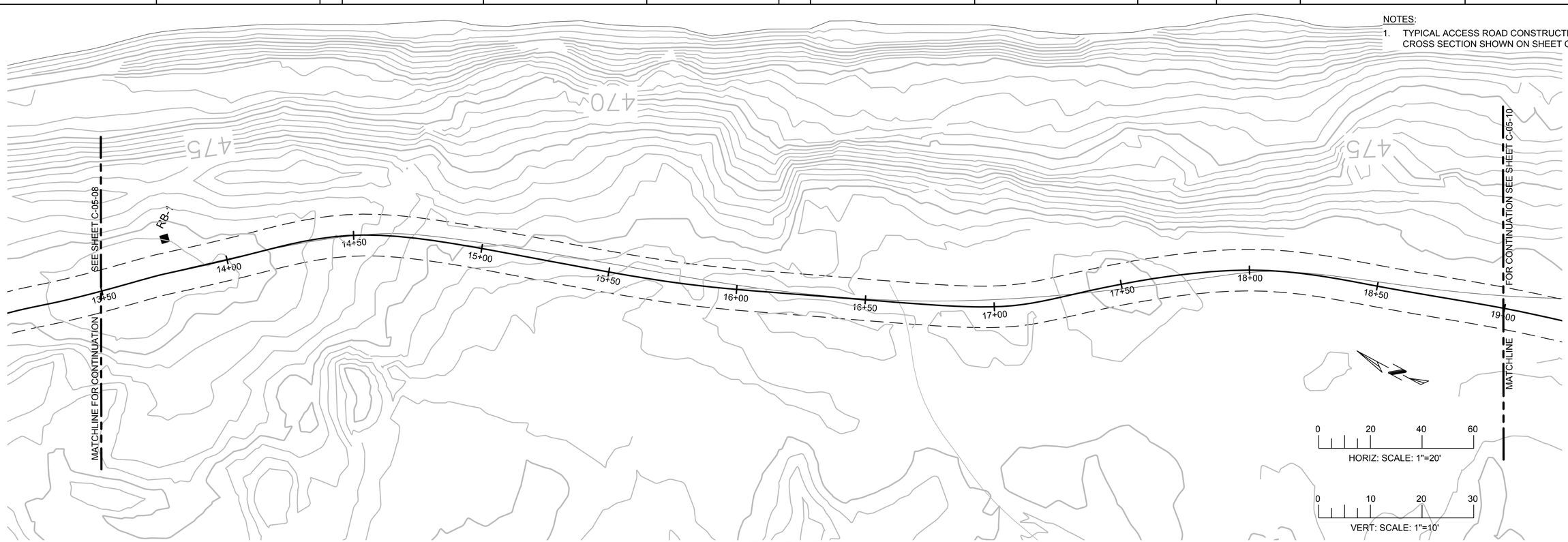
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-08	REV 2

N1608

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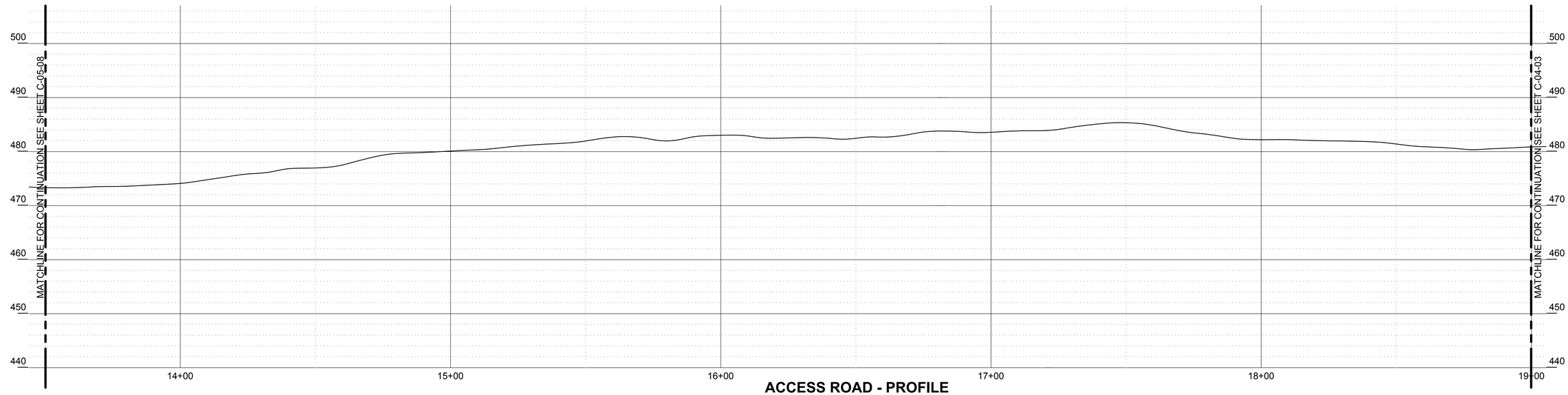
NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PLAN

(SCALE: 1" = 20')



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUEST
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "G" STA 13+50 TO STA 19+00

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-09	REV 2

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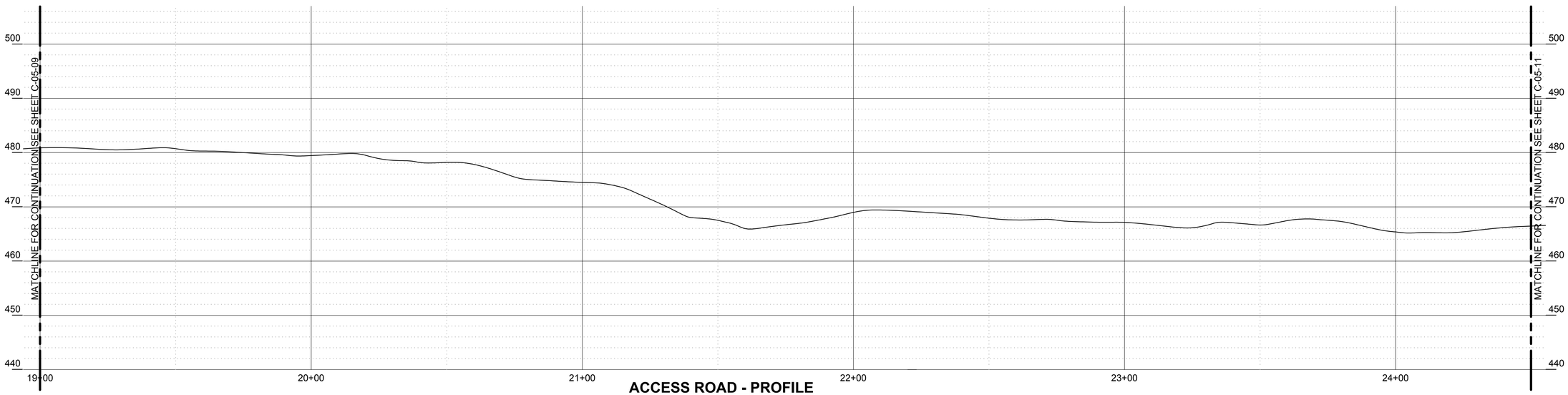
NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PLAN

(SCALE: 1" = 20')



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "G" STA 19+00 TO STA 24+50

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

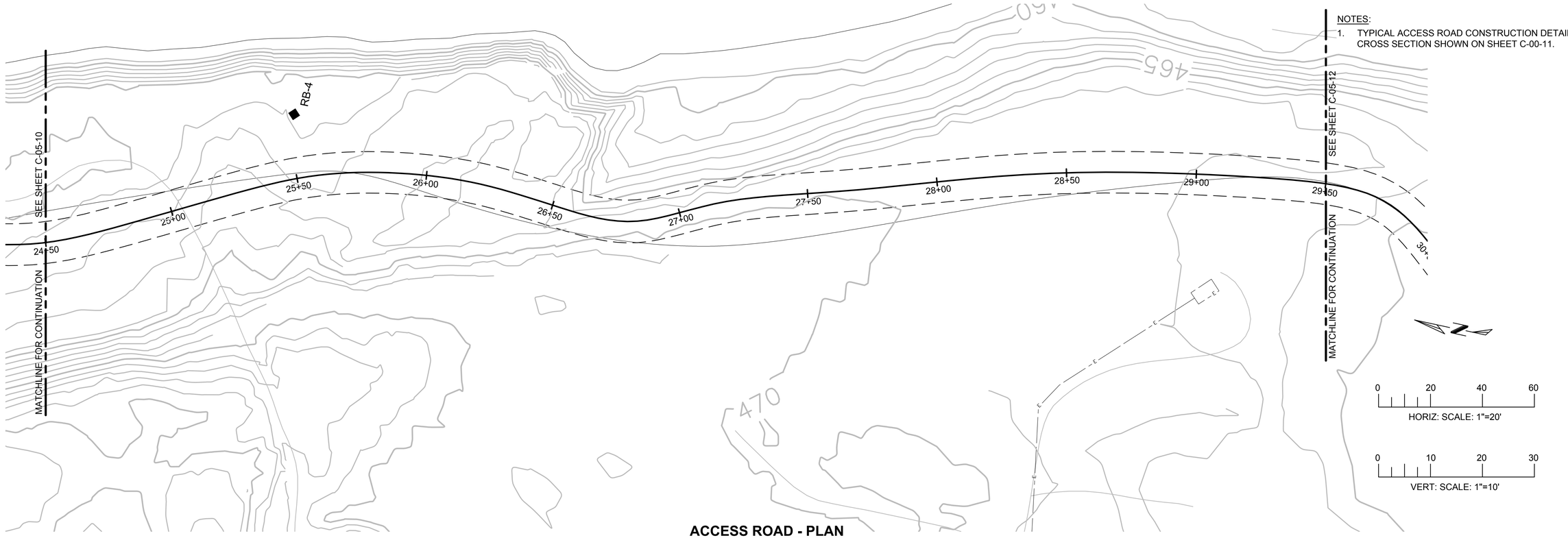
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
C-05-10	REV 2

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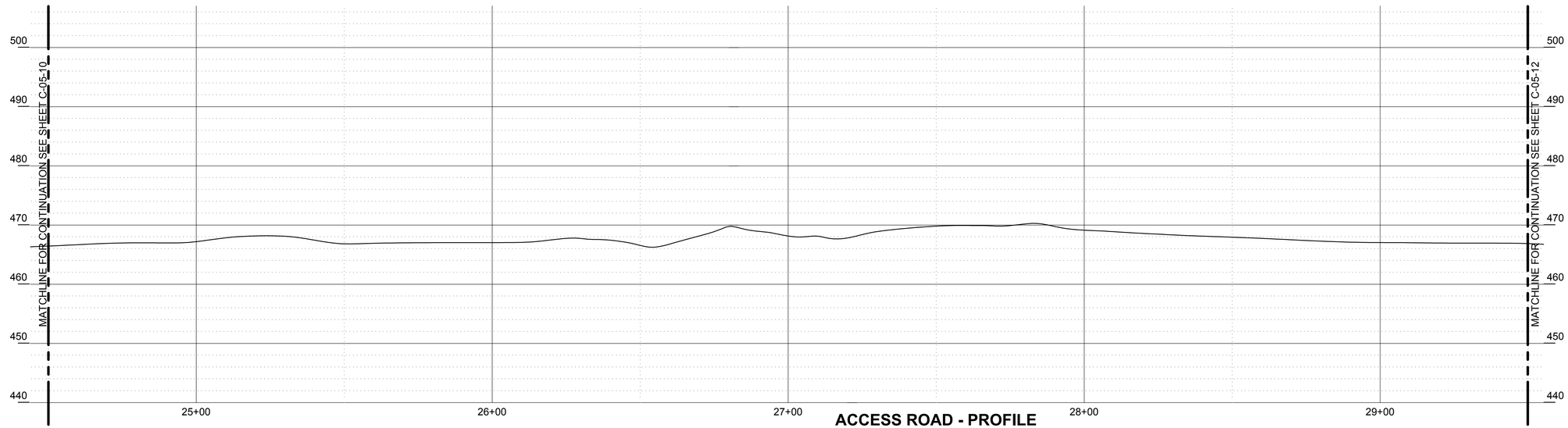
NOTES:

1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.



ACCESS ROAD - PLAN

(SCALE: 1" = 20')



ACCESS ROAD - PROFILE

(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- PLAN AND PROFILE - PIPELINE "G" STA 24+50 TO STA 29+50

GAS TRANSMISSION & DISTRIBUTION

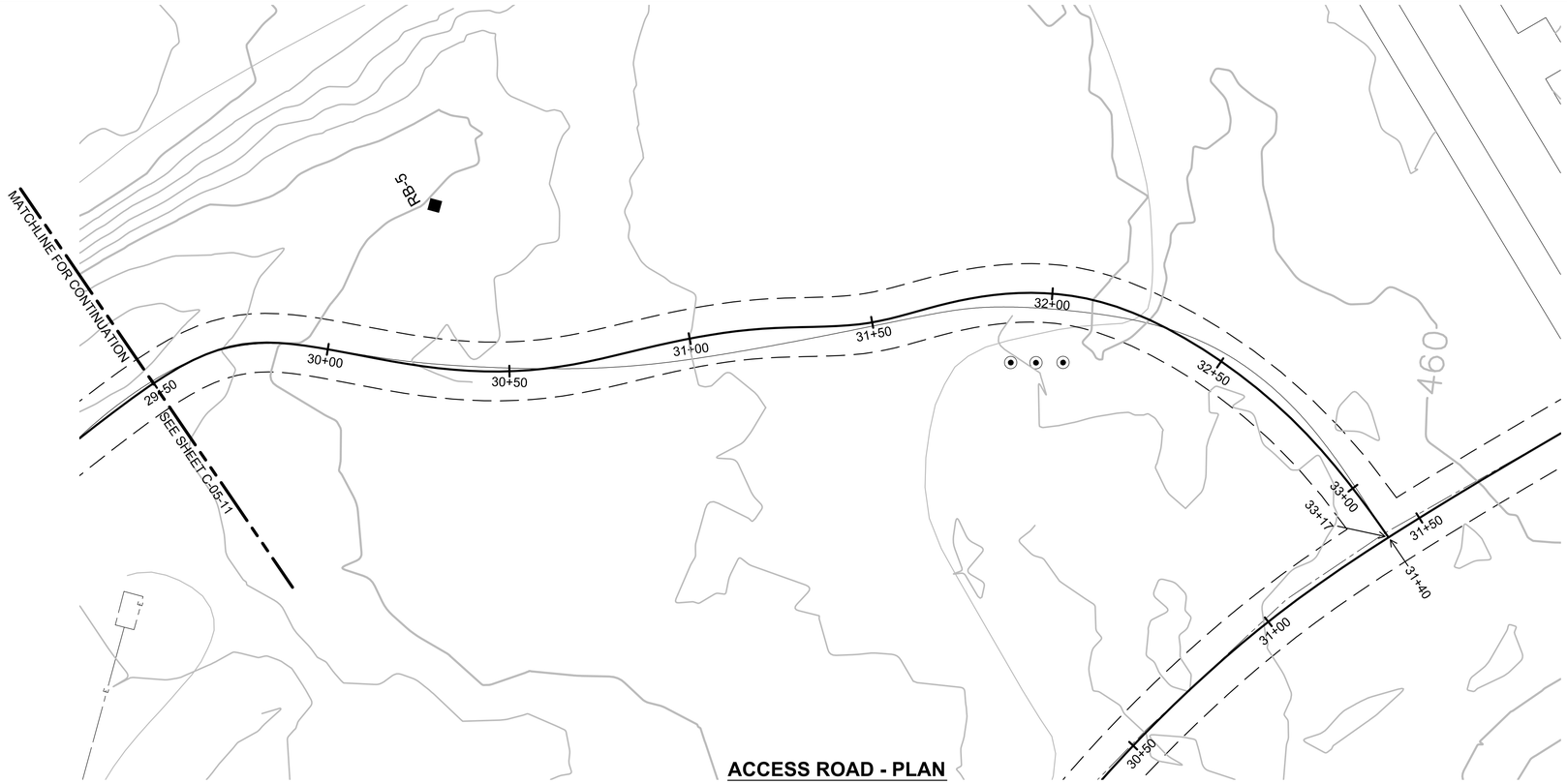
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-11	REV 2

N1808

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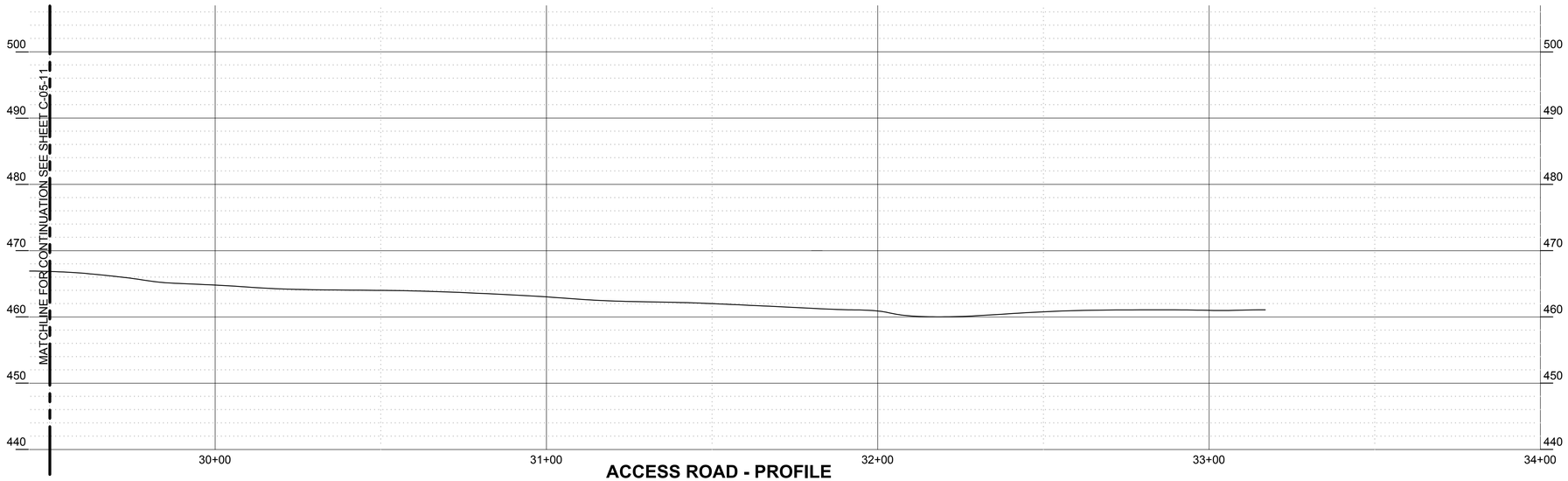
ACCESS ROAD - PLAN
(SCALE: 1" = 20')

NOTES:
1. TYPICAL ACCESS ROAD CONSTRUCTION DETAIL CROSS SECTION SHOWN ON SHEET C-00-11.

N

0 20 40 60
HORIZ: SCALE: 1"=20'

0 10 20 30
VERT: SCALE: 1"=10'



ACCESS ROAD - PROFILE
(SCALE: 1" = 20' H; 1" = 10' V)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

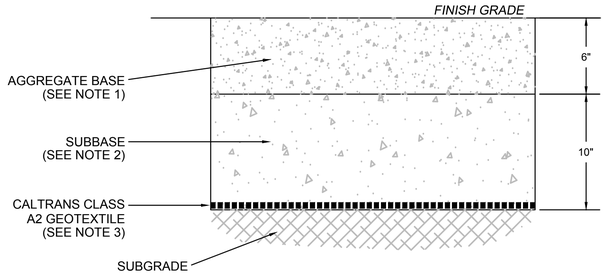
APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
ACCESS ROAD- PLAN AND PROFILE - PIPELINE "G" STA 29+50 TO STA 33+17
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-05-12	REV 2

N1608

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NOTES:
1. AGGREGATE BASE MATERIAL SHOULD MEET CALTRANS SPECIFICATION FOR CLASS 2 AGGREGATE BASE.
2. SUBBASE MATERIAL SHOULD MEET CALTRANS SPECIFICATION FOR CLASS 2 AGGREGATE BASE OR CLASS 1 OR 2 AGGREGATE SUBBASE.
3. IF ONLY CLASS 2 AGGREGATE BASE IS USED IN THE ROAD SECTION, THE GEOTEXTILE MAY BE OMITTED.

1 SECTION
NOT TO SCALE

C-05-08 THRU' C-05-12

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

ACCESS ROAD- TYPICAL ROAD SECTION

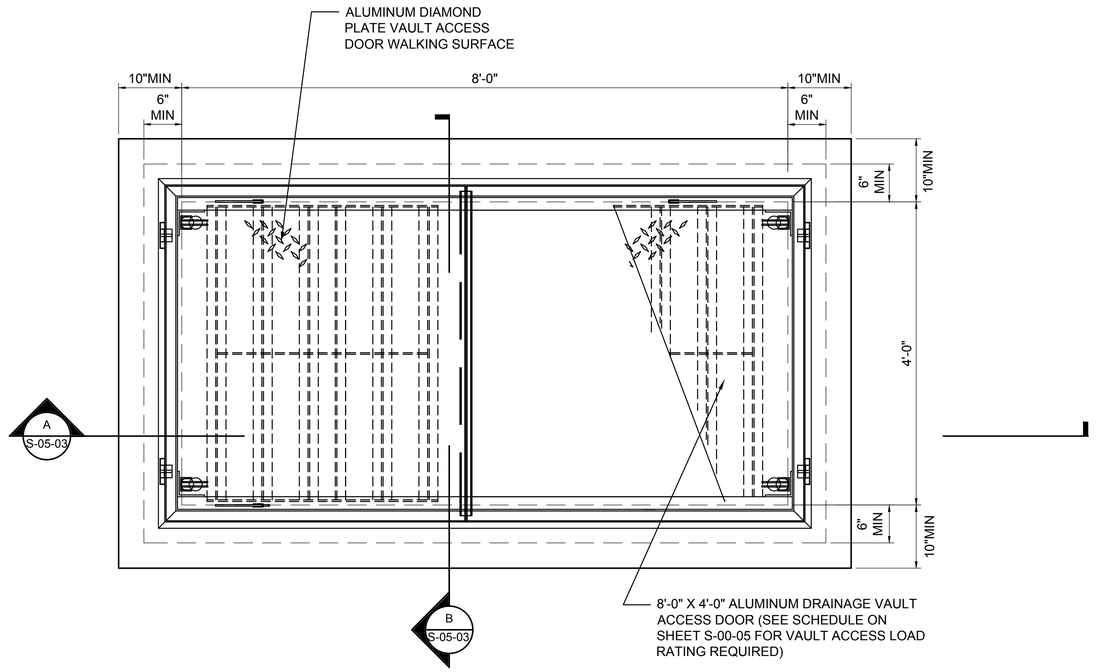
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY

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C-05-13		REV 2

N1808

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WELL METER VAULT

INNER RECIRCULATION LOOP EXTRACTION WELL METER VAULT TYPE 1 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOMBARDO
No. C81650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	GWE	MSL	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP EXTRACTION WELL METER VAULT-TYPE 1 - TOP PLAN

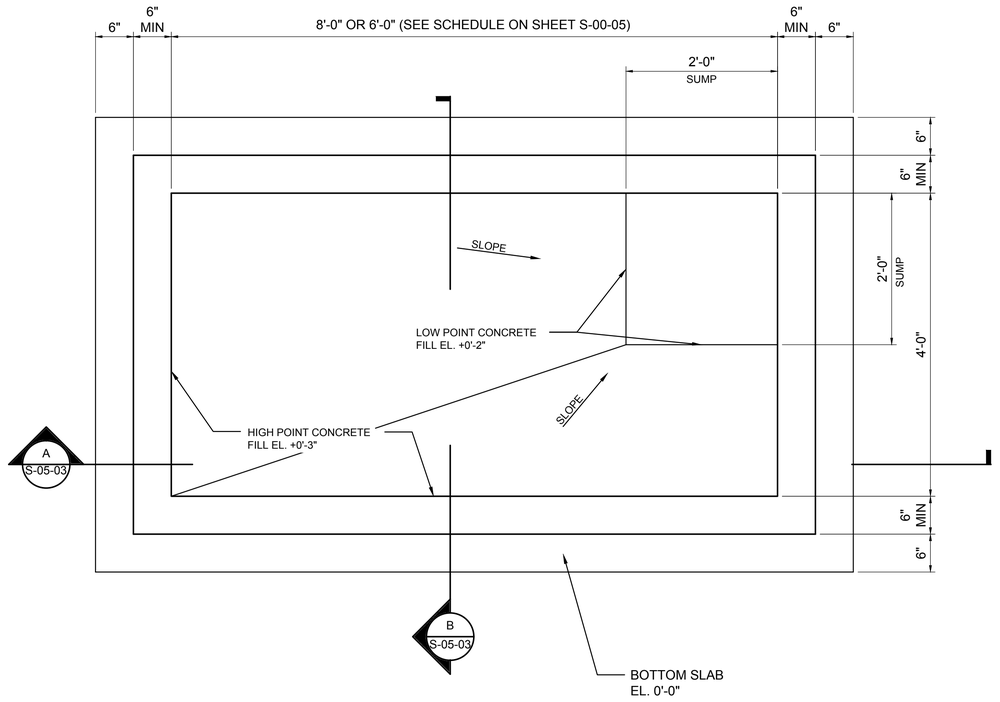
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-05-01	REV 2

N1B08

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WELL METER VAULT

INNER RECIRCULATION LOOP EXTRACTION WELL METER VAULT TYPE 1 - FOUNDATION PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
No. C 65000
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	MSL	JPB	RAO	
1	9/8/14	PRE-FINAL (90%) DESIGN	GWE	MSL	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	GWE	MSL	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP EXTRACTION WELL METER VAULT-TYPE 1 - FOUNDATION PLAN

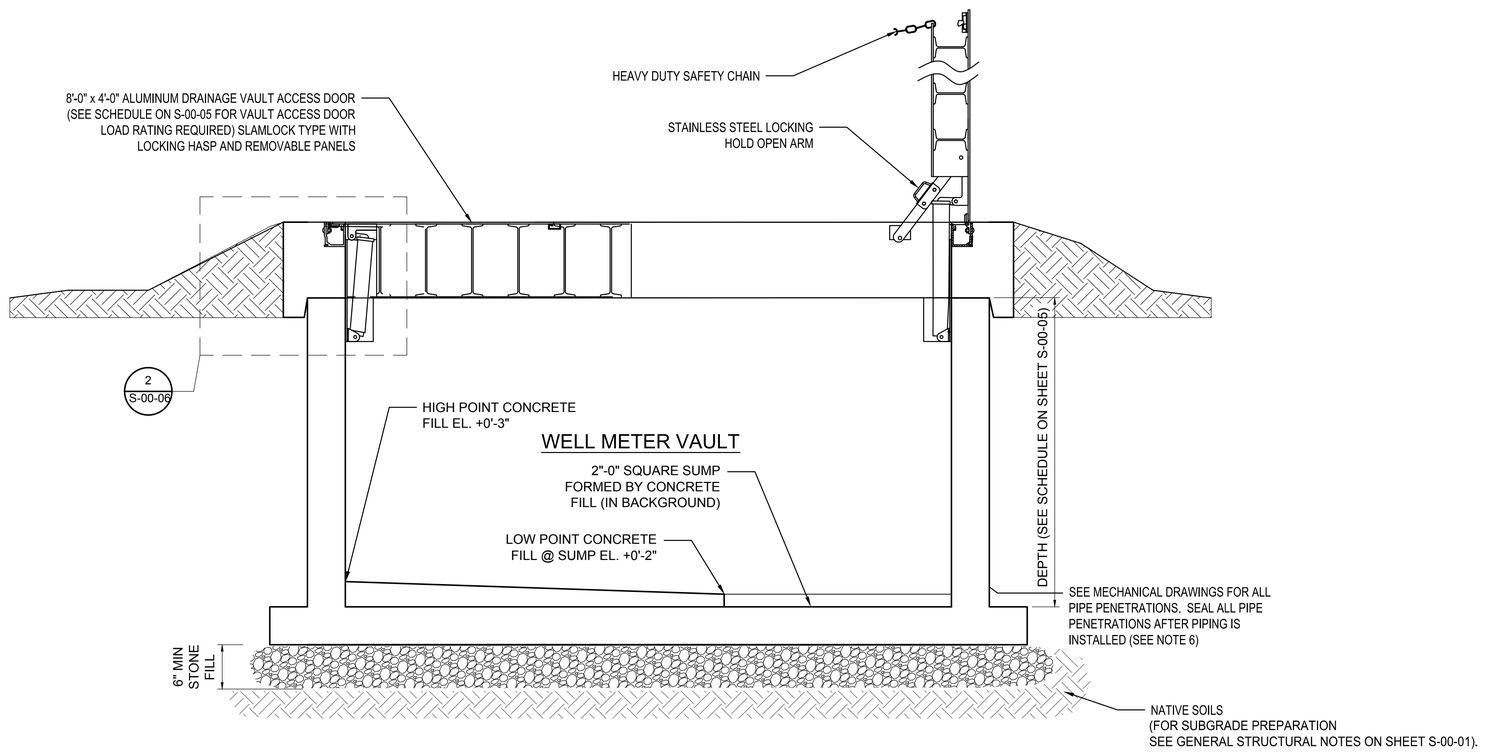
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-05-02	REV 2

N1B08

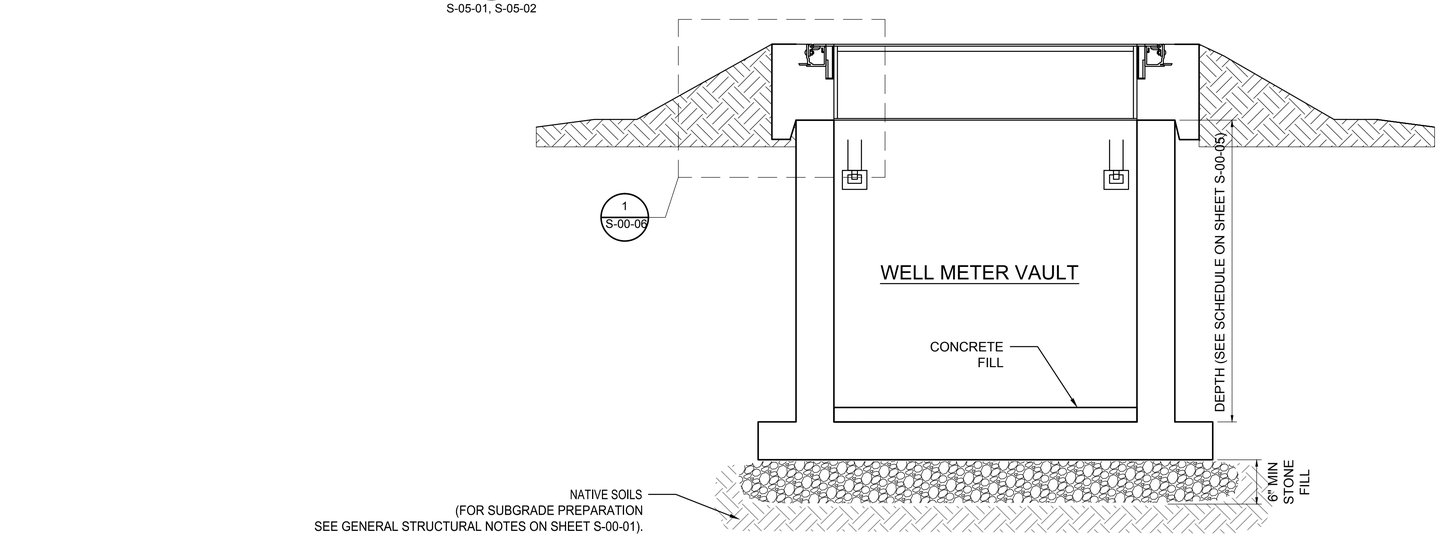
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A INNER RECIRCULATION LOOP EXTRACTION WELL METER TYPE 1 - SECTION

1" = 1'-0"

S-05-01, S-05-02



B INNER RECIRCULATION LOOP EXTRACTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-05-01, S-05-02

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY C 61650 EXP 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

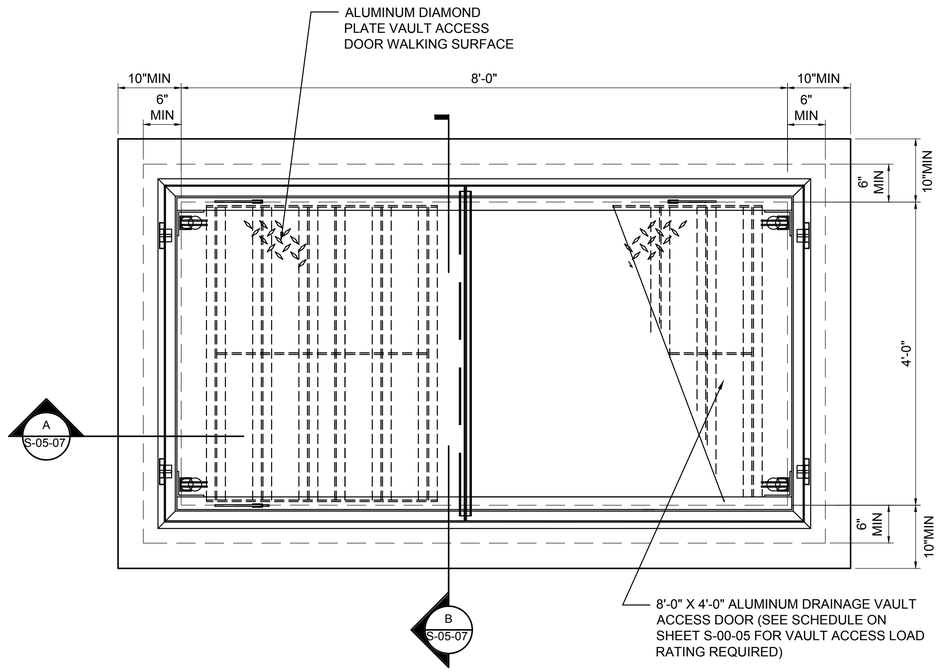
APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP EXTRACTION WELL VAULTS - SECTIONS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

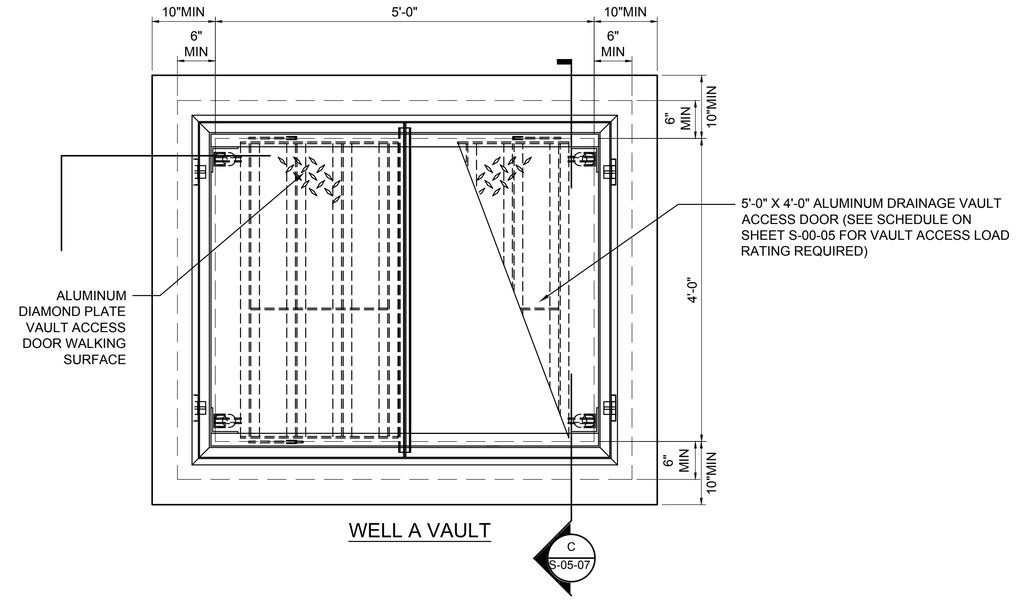
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SHEET NO. of	SHEETS
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WELL METER VAULT



WELL A VAULT

INNER RECIRCULATION LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
2. CONCRETE SHALL BE 5,000 P.S.I. COMPRESSIVE STRENGTH @ 28 DAYS. REINFORCING STEEL SHALL BE ASTM A-615.
3. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OR BASE SLAB OF THE CONCRETE VAULTS WITH ANCHOR BOLTS, UNISTRUT, OR CONCRETE PIPE SUPPORTS. CONTRACTOR SHALL INSTALL SUPPORTS WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT PER SPECIFICATION 40 05 15.
4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOMBARDO No. C81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MD	KJ	VMB	VMB
0	4/5/13	INTERMEDIATE (60%) DESIGN		MD	KJ	VMB	VMB

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS - TYPE 1 TOP PLAN

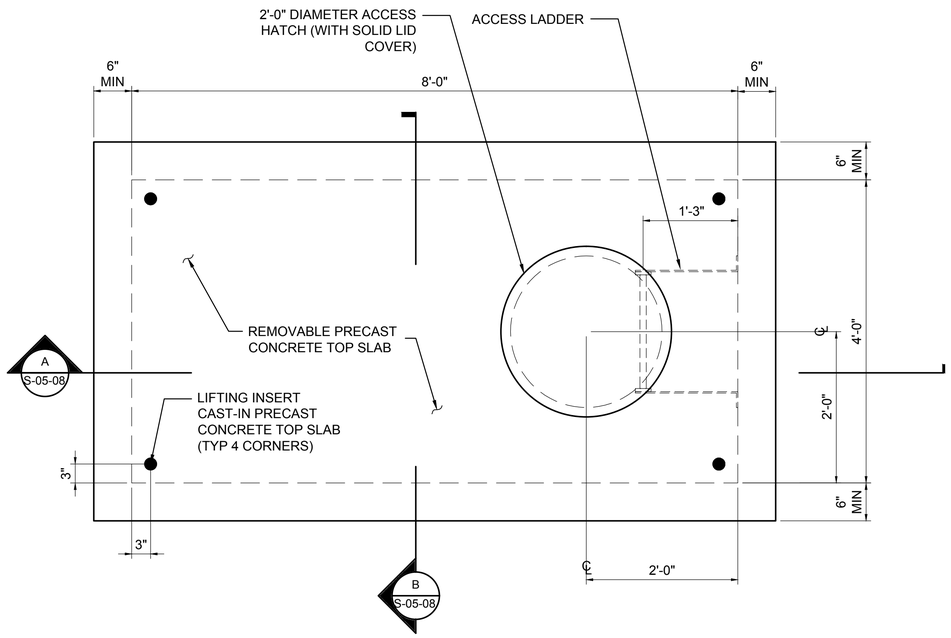
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

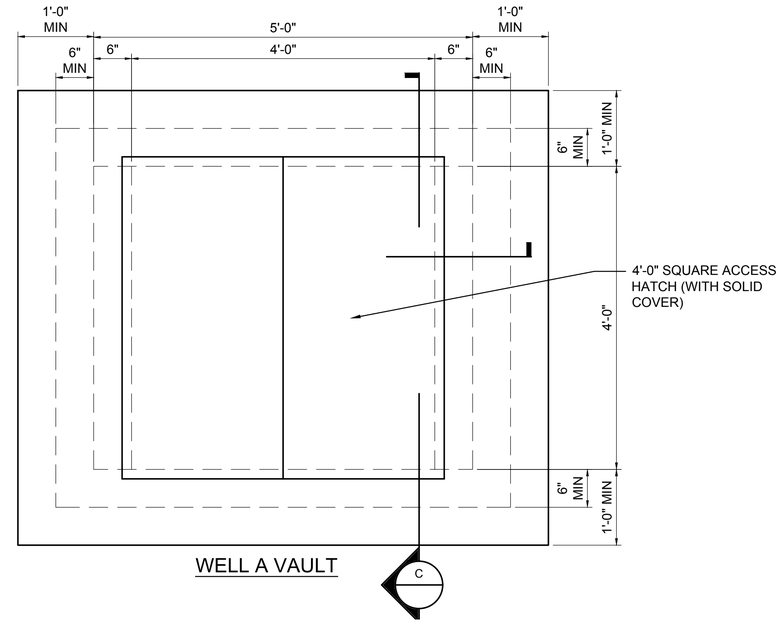
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-05-04	REV 2

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WELL METER VAULT



WELL A VAULT

INNER RECIRCULATION LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - TOP PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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4. CONTRACTOR RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES LOCATED WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.
7. ACCESS HATCH, SOLID LID, AND FRAME TO BE HIGHWAY RATED (HS20-44) AND MANUFACTURED BY NEENAH FOUNDRY OR EAST JORDAN IRON WORKS.
8. PROVIDE 90° HOOK AT ENDS OF TOP AND BOTTOM RESTEEL IN WELL METER VAULT TOP SLAB WITHIN 1'-6" OF LIFTING INSERTS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

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REVISIONS

APPROVED BY: RAO

SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 2 - TOP PLAN

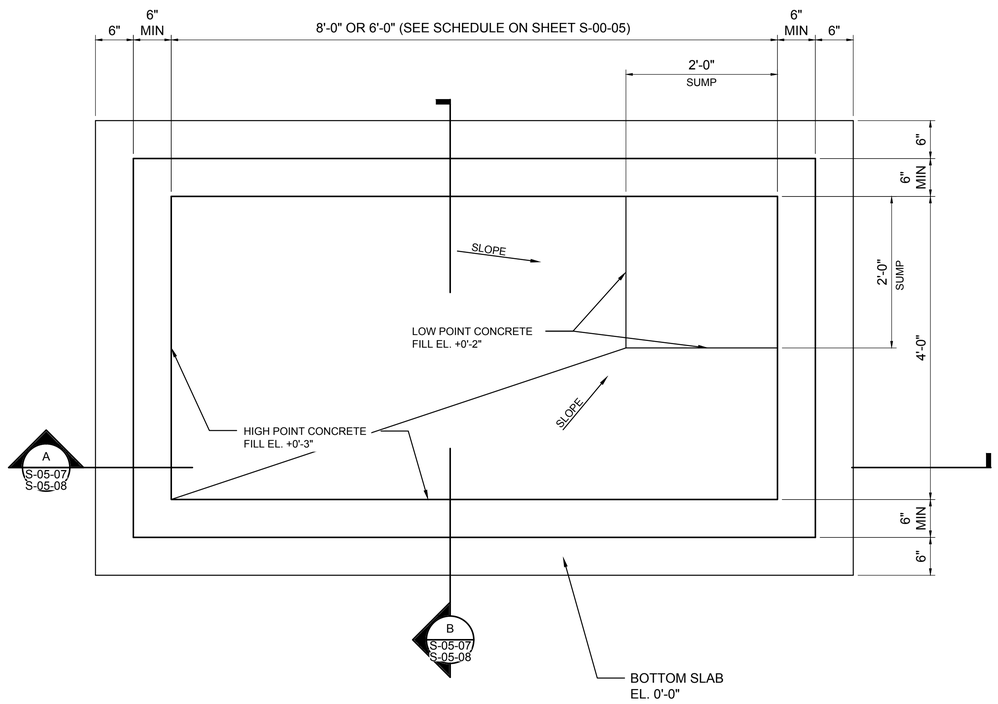
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

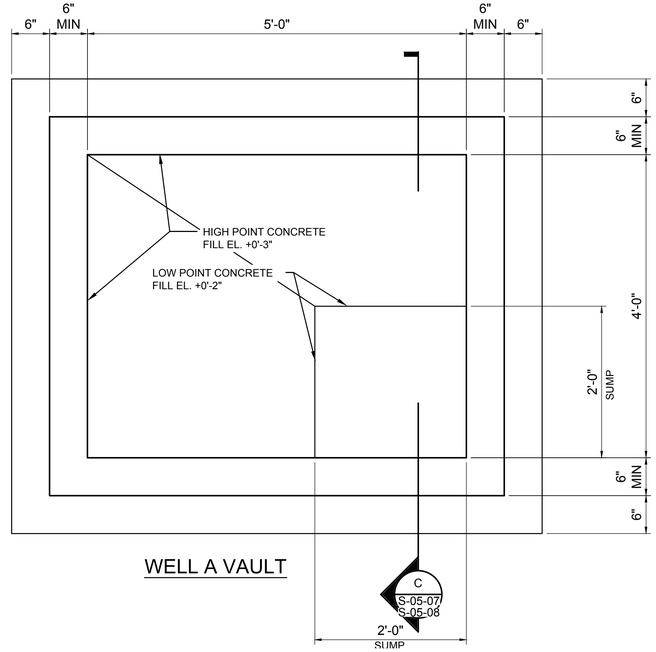
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BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. S-05-05 of SHEETS
REV 2

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WELL METER VAULT



WELL A VAULT

INNER RECIRCULATION LOOP INJECTION WELL METER VAULT AND WELL VAULTS TYPES 1 AND 2 - FOUNDATION PLAN

1"=1'-0"

NOTES:

1. PRECAST CONCRETE VAULT COMPONENTS (I.E. TOP SLAB, WALLS, AND BASE SLAB) SHALL BE DESIGNED BY PRECAST MANUFACTURER WITH LOADING IN ACCORDANCE WITH AASHTO HS20-44 AND PER SPECIFICATION SECTION 03 40 00.
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5. ALL PIPE PENETRATIONS SHALL BE LINK SEALED IN ACCORDANCE WITH SPECIFICATIONS.
6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.

0 1' 2' 3'

SCALE: 1"=1'-0"

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOMBARDO
No. C 81650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION VAULTS-
TYPES 1 AND 2 - FOUNDATION PLAN

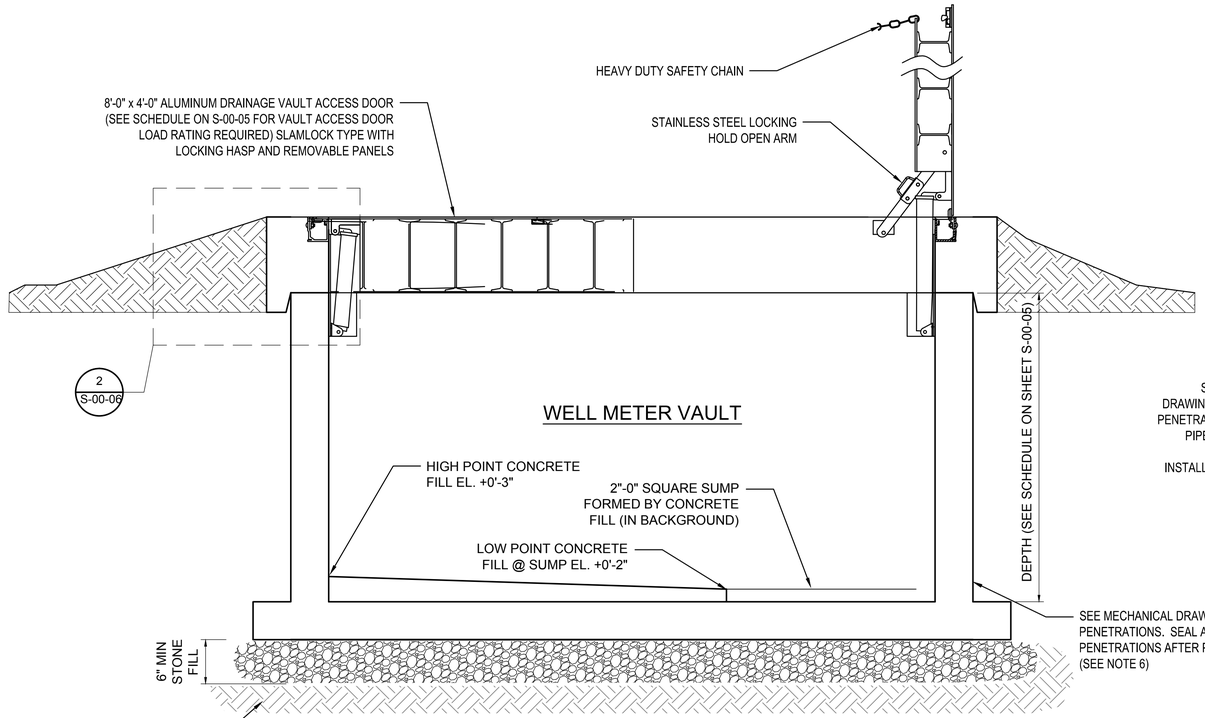
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SUPSDS	
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SHEET NO.	of SHEETS
S-05-06	REV 2

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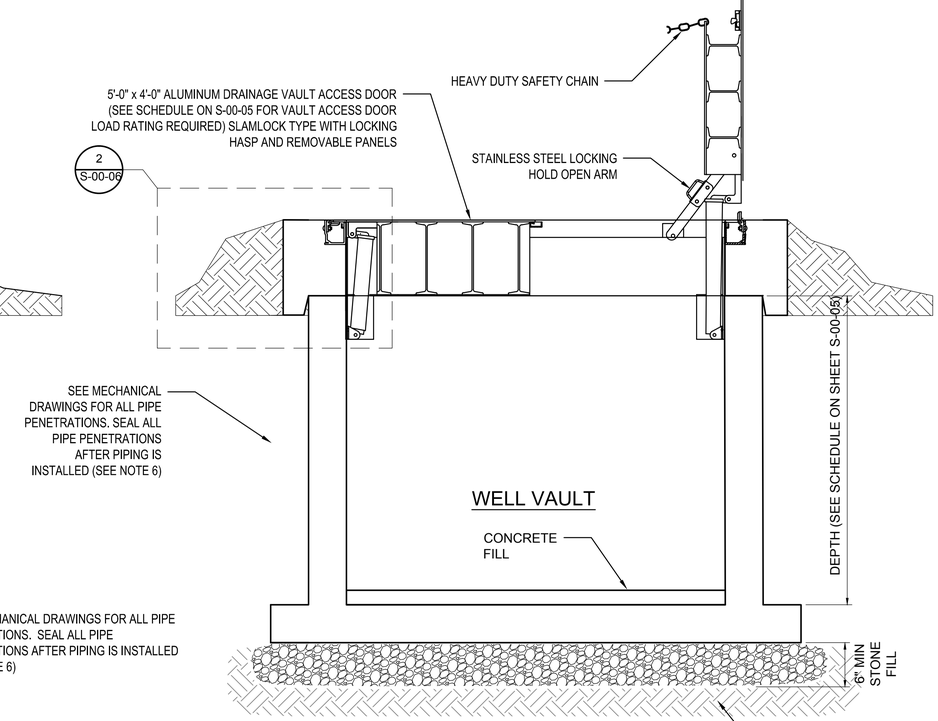
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A INNER RECIRCULATION LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

S-05-04, S-05-06

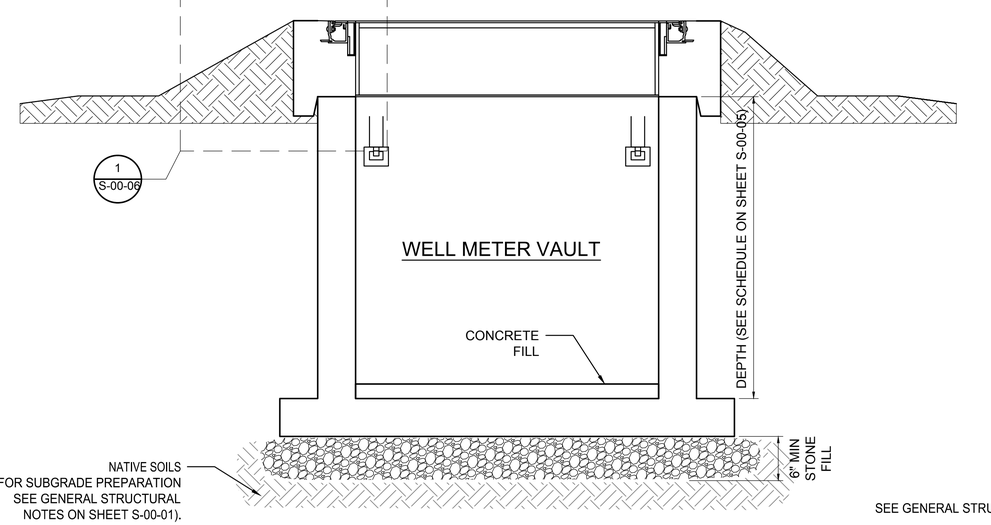


0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

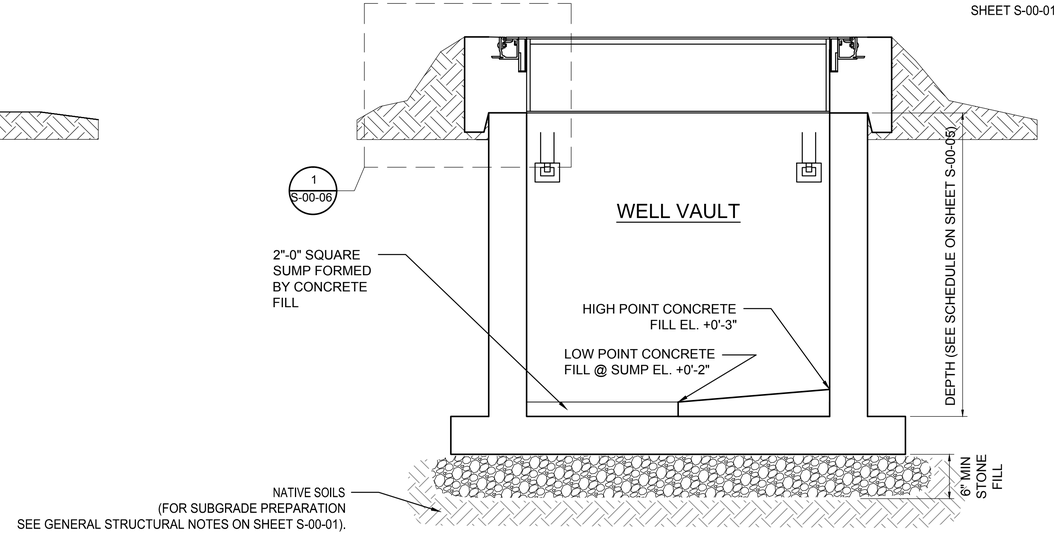
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6. SEE MECHANICAL DRAWINGS FOR ALL PIPE PENETRATIONS.



B INNER RECIRCULATION LOOP INJECTION WELL METER VAULT TYPE 1 - SECTION

1" = 1'-0"

S-05-04, S-05-06



C INNER RECIRCULATION LOOP INJECTION WELL VAULT TYPE 1 - SECTION

1" = 1'-0"

S-05-04, S-05-06

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOMBARDI 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS - SECTIONS - SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

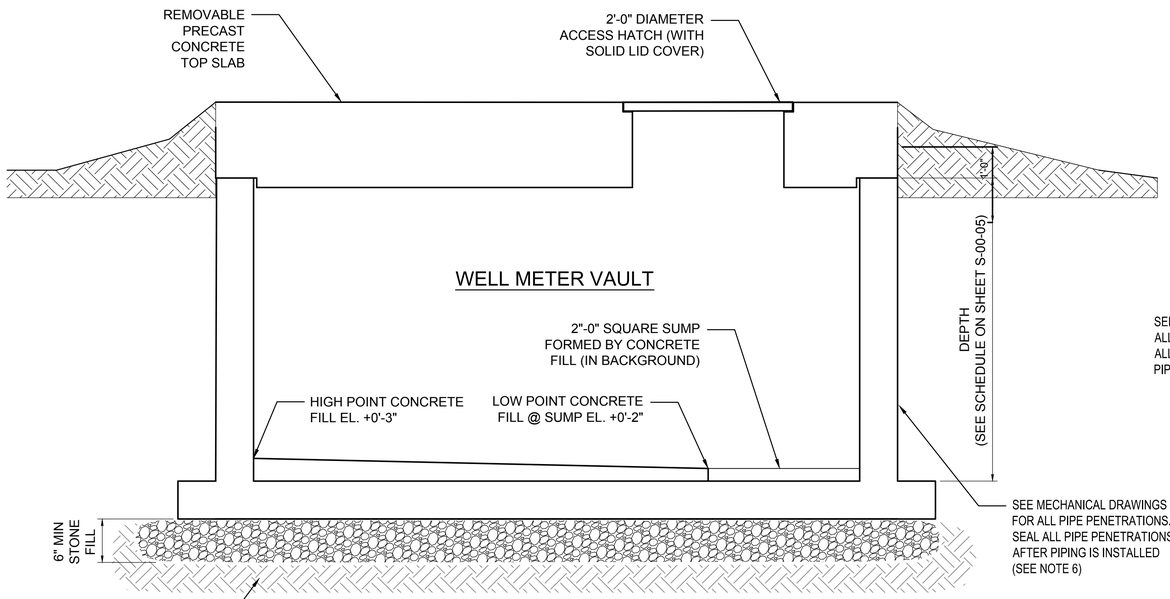
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-05-07	REV 2

N1808

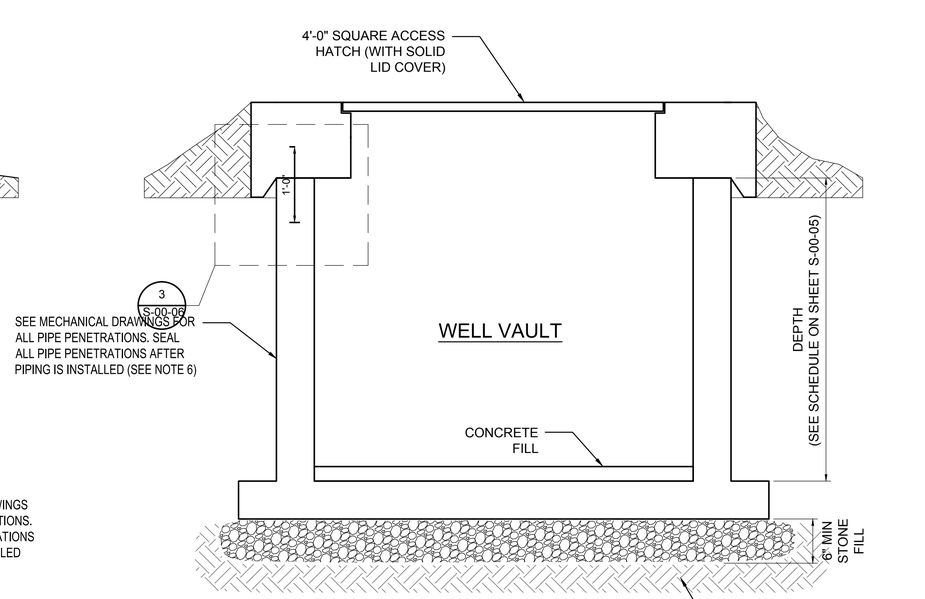
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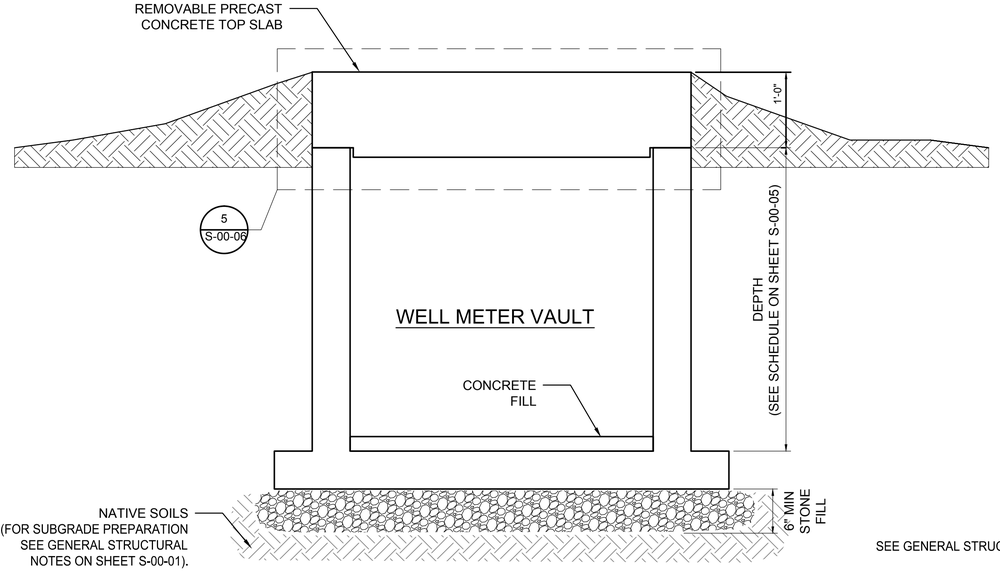


A — INNER RECIRCULATION LOOP INJECTION WELL METER VAULT AND WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-05-05, S-05-06

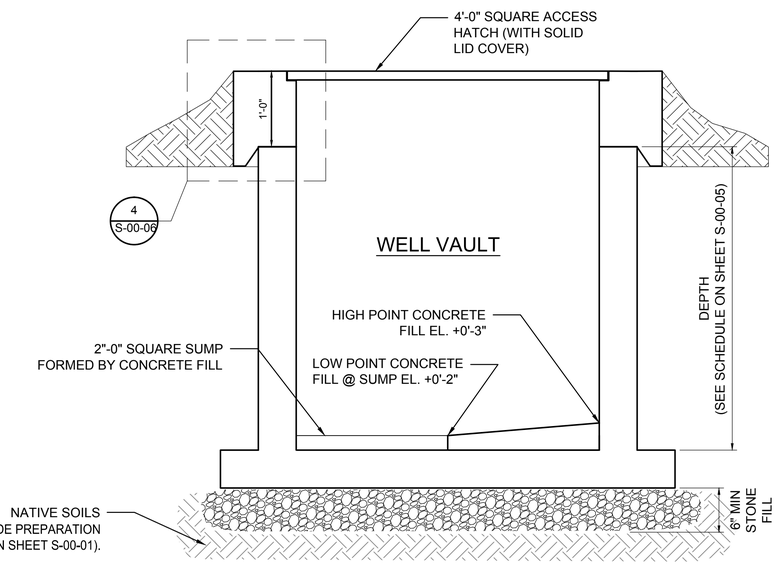




B — INNER RECIRCULATION LOOP INJECTION WELL METER VAULT TYPE 2 - SECTION

1" = 1'-0"

S-05-05, S-05-06



C — INNER RECIRCULATION LOOP INJECTION WELL VAULT TYPE 2 - SECTION

1" = 1'-0"

S-05-05, S-05-06

0 1' 2' 3'

SCALE: 1"=1'-0"

NOTES:

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REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWERY C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
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REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS- SECTIONS - SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

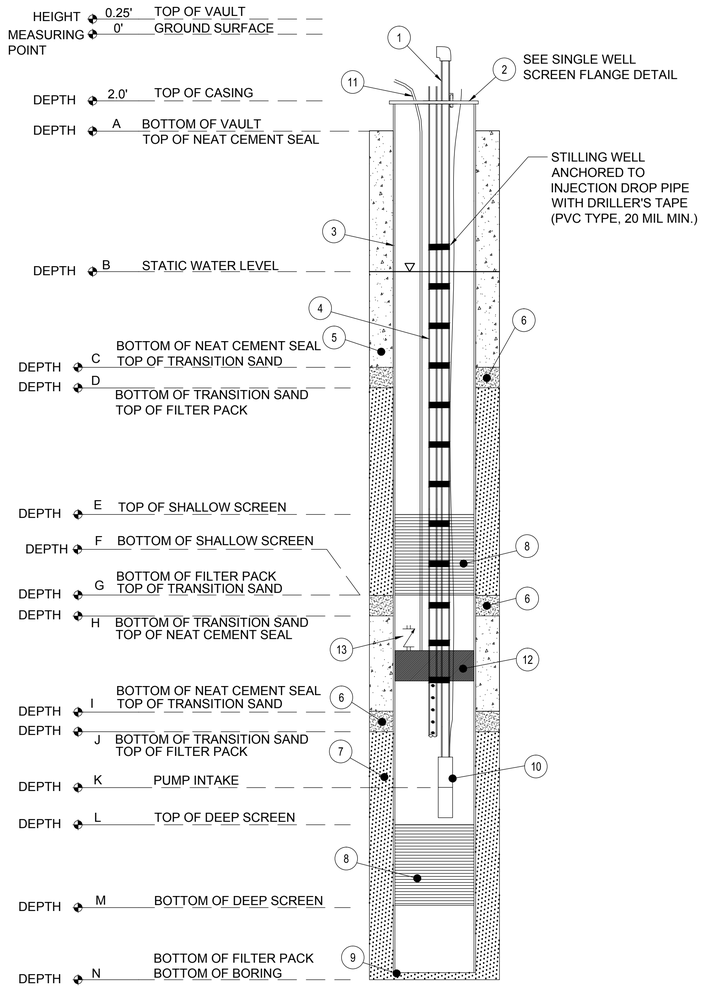
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-05-08	REV 2

ETIC ENGINEERING

ARCADIS

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A RIVERBANK DUAL SCREEN E□TRACTION WELL DETAIL
NTS

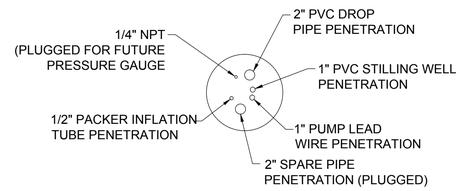
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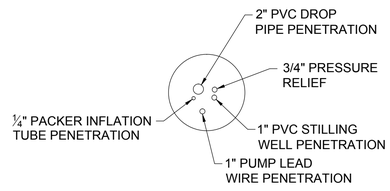
NOTES:
1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER E□AGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.

SCHEDULE

ITEM	DESCRIPTION
1	2" PVC DROP PIPE
2	CUSTOM TAPERED WELL FLANGE
3	WELL CASING (SEE NOTE 3)
4	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
5	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
6	ANNULAR SPACE, TRANSITION SAND (SIZE TBD)
7	ANNULAR SPACE, FILTER PACK (SIZE TBD)
8	WELL SCREEN (316L SS, WIRE-WRAP)
9	SUMP
10	GROUNDWATER E□TRACTION PUMP
11	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
12	PNEUMATIC WELL PACKER
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE



B DUAL SCREEN WELL FLANGE DETAIL
NTS



C E□TRACTION WELL PACKER DETAIL
NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WURL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		BEH	JPB	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		BEH	JPB	JPB	JEF	

REVISIONS

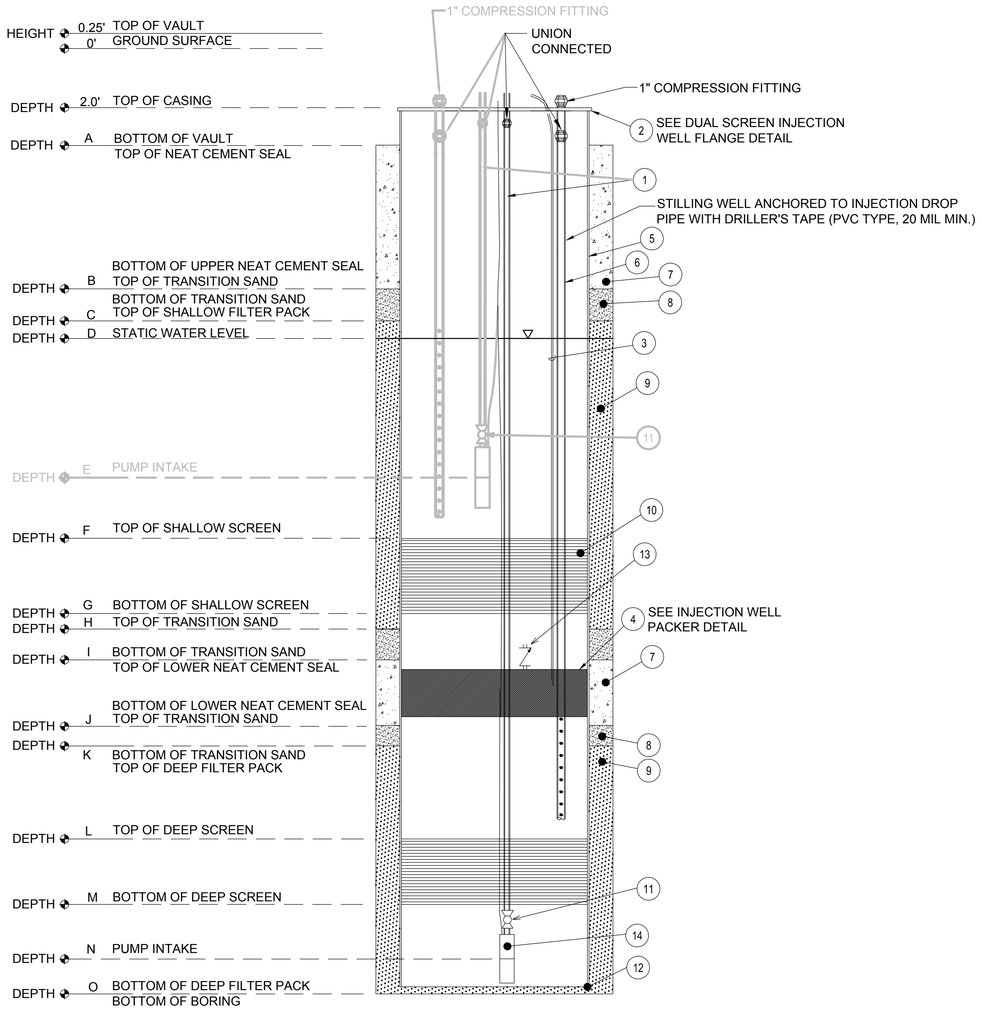
APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP E□TRACTION WELL CONSTRUCTION DETAILS
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-05-01	REV 2

N1808

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A IRL DUAL SCREEN INJECTION WELL WITH BACKWASH PUMP DETAIL

NTS

LEGEND:

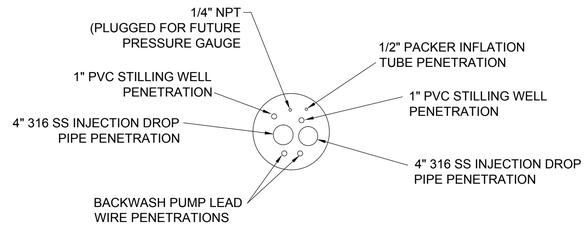
(1) REFERENCE ITEM NUMBER IN SCHEDULE.

NOTES:

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2. WELL DIAMETER E□AGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.
6. GRAYED-OUT ITEMS REPRESENT CONTINGENT E□UIPMENT AND MAY BE CONSTRUCTED IN THE FUTURE.

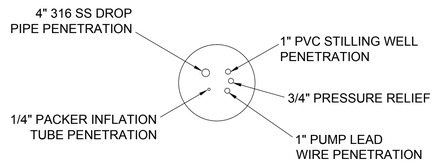
SCHEDULE

ITEM	DESCRIPTION
1	4" 316 SS DROP PIPE
2	CUSTOM TAPPED WELL FLANGE
3	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
4	PNEUMATIC WELL PACKER
5	WELL CASING (SEE NOTE 3)
6	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
7	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
8	ANNULAR SPACE, TRANSITION SAND (SIZE TBD)
9	ANNULAR SPACE, FILTER PACK (TYPE TBD)
10	WELL SCREEN (316L SS, WIRE-WRAP)
11	ASR VALVE
12	SUMP
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE
14	BACKWASH PUMP



B IRL DUAL SCREEN WELL FLANGE DETAIL

NTS



C INJECTION WELL PACKER DETAIL

NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUEST C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		BEH	JPB	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		BEH	JPB	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP TYPE 1 INJECTION WELL CONSTRUCTION DETAILS

GAS TRANSMISSION & DISTRIBUTION

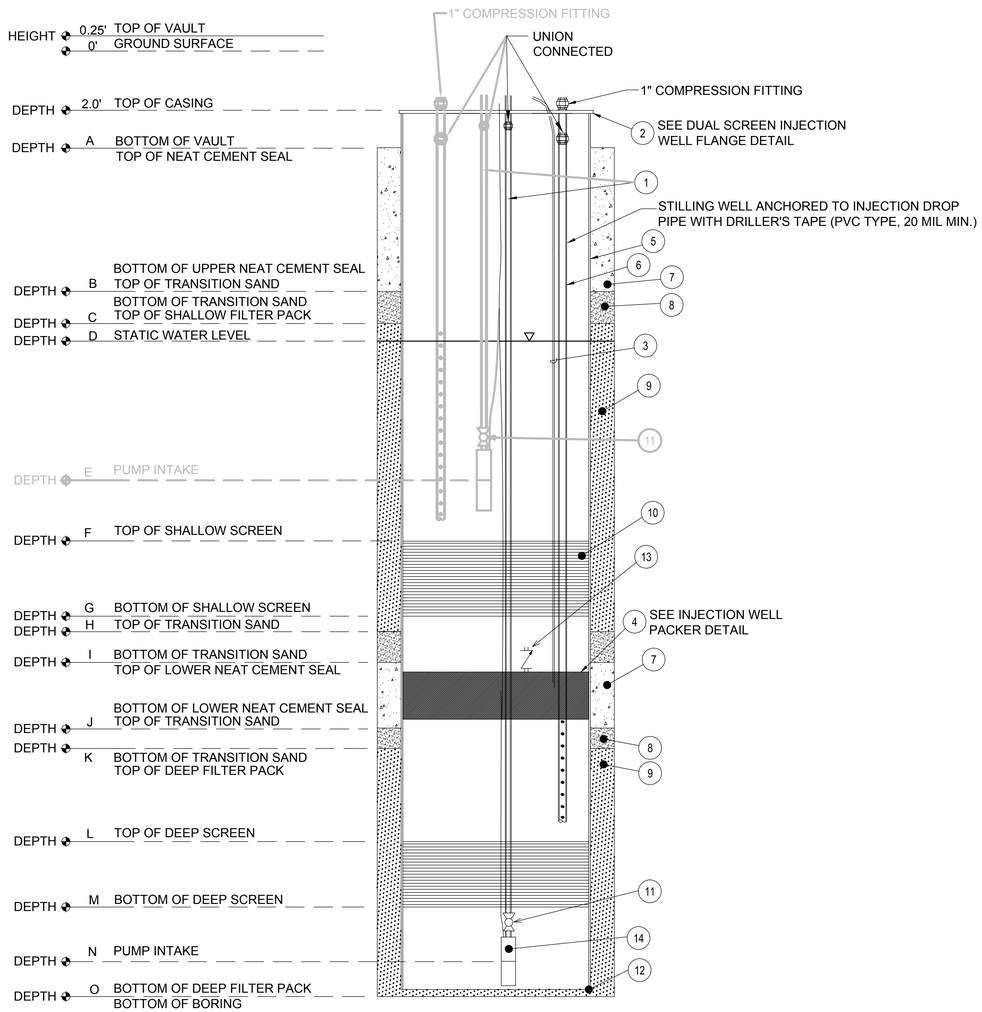
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-05-02	REV 2

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A IRL DUAL SCREEN INJECTION WELL WITH BACKWASH PUMP DETAIL

NTS

LEGEND:

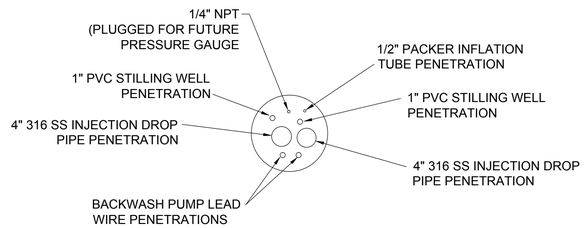
(1) REFERENCE ITEM NUMBER IN SCHEDULE.

NOTES:

1. ALL DEPTH INTERVALS ARE IN FEET BELOW GROUND SURFACE. SEE WELL CONSTRUCTION SCHEDULE SHEET M-00-06 FOR REPRESENTATIVE DEPTHS.
2. WELL DIAMETER E□AGGERATED TO SHOW DETAIL.
3. WELL CASING 150' OR SHALLOWER SHALL BE SCH80 PVC. WELL CASINGS DEEPER THAN 150' SHALL BE 316L SS.
4. ALL WELL SEALS ARE 100% NEAT CEMENT WITH UP TO 6% BENTONITE.
5. ALL ABOVE-GRADE PIPING AND INSTRUMENTATION INSTALLED IN ACCORDANCE WITH THE P□ID AND THE WELLHEAD MECHANICAL LAYOUT.
6. GRAYED-OUT ITEMS REPRESENT CONTINGENT E□UIPMENT AND MAY BE CONSTRUCTED IN THE FUTURE.

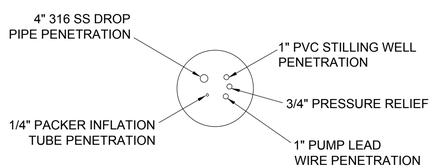
SCHEDULE

ITEM	DESCRIPTION
1	4" 316 SS DROP PIPE
2	CUSTOM TAPPED WELL FLANGE
3	1/4" DIAMETER HOSE FROM PACKER TO FILL ASSEMBLY
4	PNEUMATIC WELL PACKER
5	WELL CASING (SEE NOTE 3)
6	1" PVC TUBING (STILLING WELL WITH PRESSURE TRANSDUCER)
7	ANNULAR SPACE, NEAT CEMENT GROUT (SEE NOTE 4)
8	ANNULAR SPACE, TRANSITION SAND (SIZE TBD)
9	ANNULAR SPACE, FILTER PACK (TYPE TBD)
10	WELL SCREEN (316L SS, WIRE-WRAP)
11	ASR VALVE
12	SUMP
13	3/4" PACKER PRESSURE RELIEF SAFETY VALVE
14	BACKWASH PUMP



B IRL DUAL SCREEN WELL FLANGE DETAIL

NTS



C INJECTION WELL PACKER DETAIL

NTS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESTL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	BEH	JPB	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	BEH	JPB	JPB	JEF	

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP TYPE 2 INJECTION WELL CONSTRUCTION DETAILS

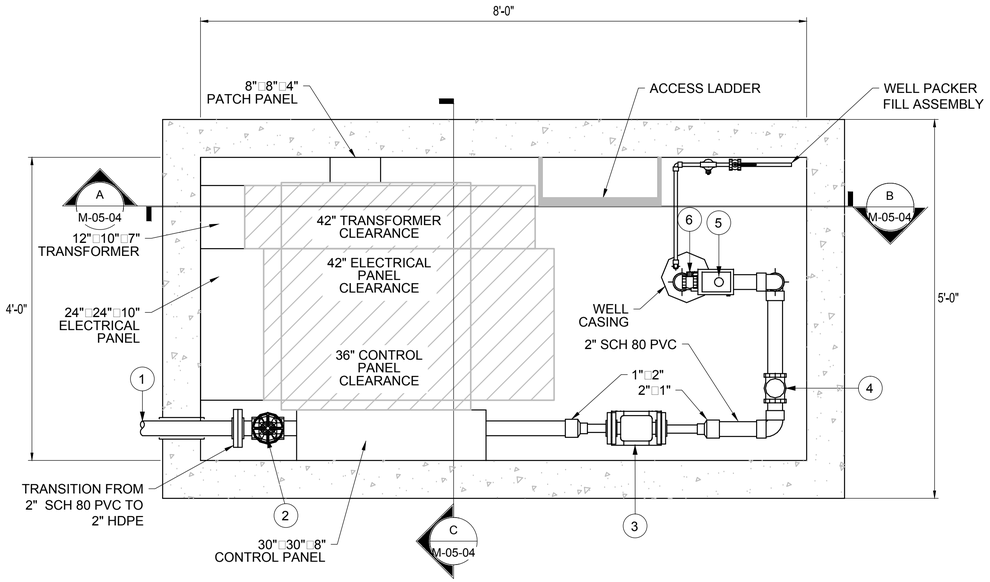
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-05-03	REV 2

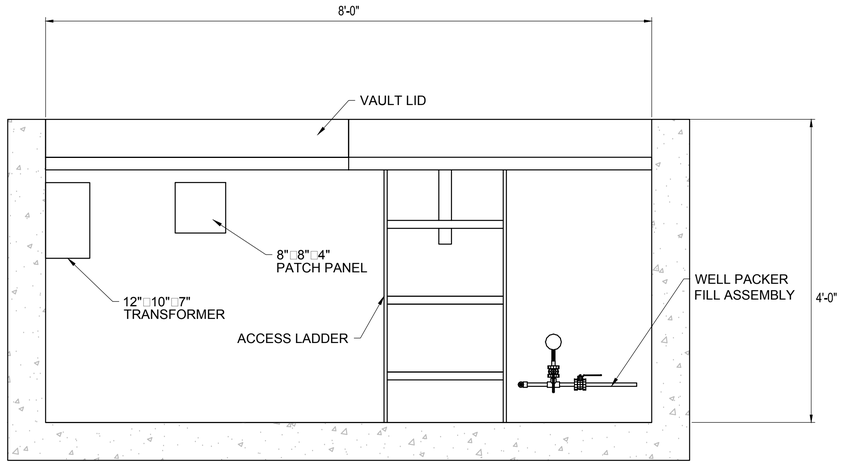
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E□TRACTION WELL VAULT PLAN VIEW

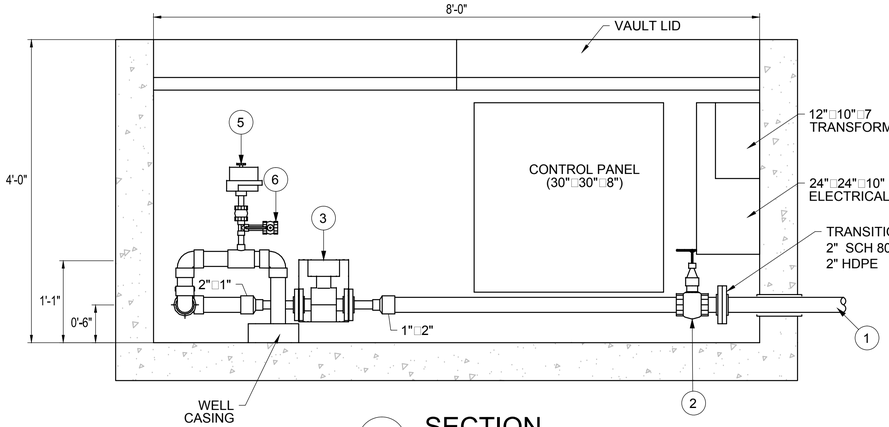
1" = 1'-0"



A SECTION

1"=1'-0"

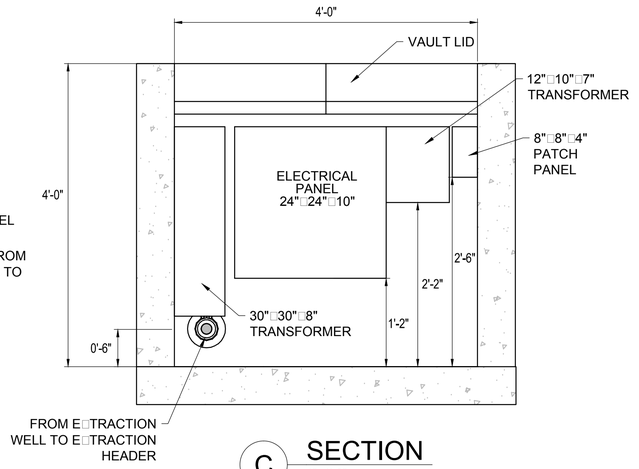
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B SECTION

1"=1'-0"

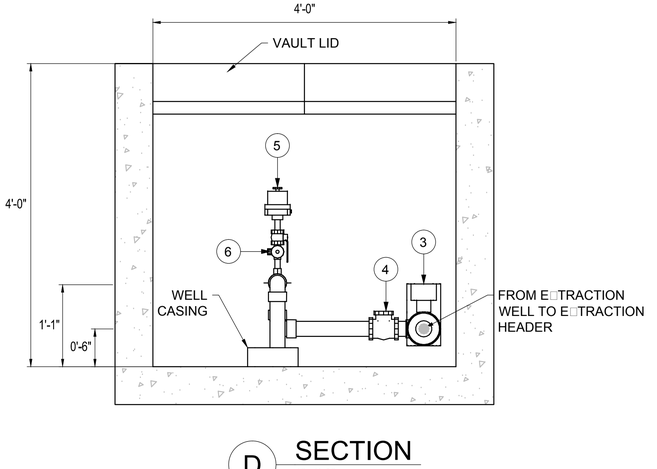
M-05-04



C SECTION

1"=1'-0"

M-05-04



D SECTION

1"=1'-0"

M-05-04

E□TRACTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	TAG ID
1	2"	HDPE	E□TRACTED GROUNDWATER	8	E□TRACTION WELL CONVEYANCE LINE	
2	2"	PVC	E□TRACTED GROUNDWATER	8	GLOBE VALVE	V-□0501D
3	1"	TEFLON	E□TRACTED GROUNDWATER	8	MAGNETIC FLOW METER	FE-□0570A
4	2"	PVC	E□TRACTED GROUNDWATER	8	CHECK VALVE	V-□0501C
5	1/2"	TBD	E□TRACTED GROUNDWATER	8	PRESSURE TRANSMITTER	PIT-□0560A
6	1/4"	TBD	E□TRACTED GROUNDWATER	8	SAMPLE PORT	V-□0522B

LEGEND:

(1) REFERENCE ITEM □E□TRACTION WELL VAULT SCHEDULE.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P□IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE RE□UIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P□IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P□IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPRO□IMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WURL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

RIVERBANK E□TRACTION WELL VAULTS MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

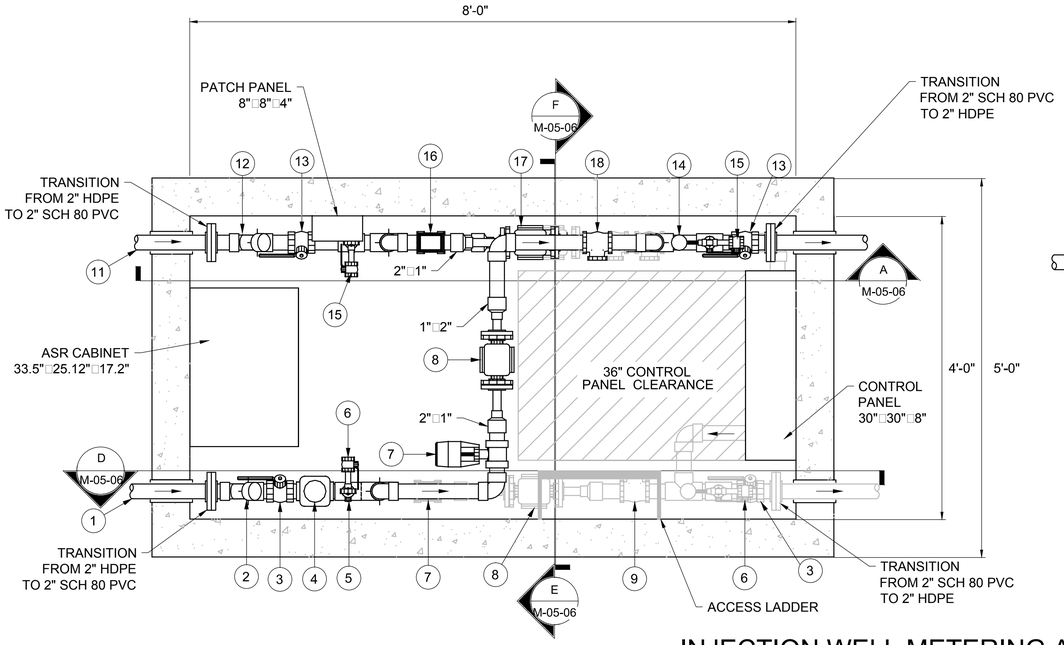
SAN FRANCISCO, CALIFORNIA

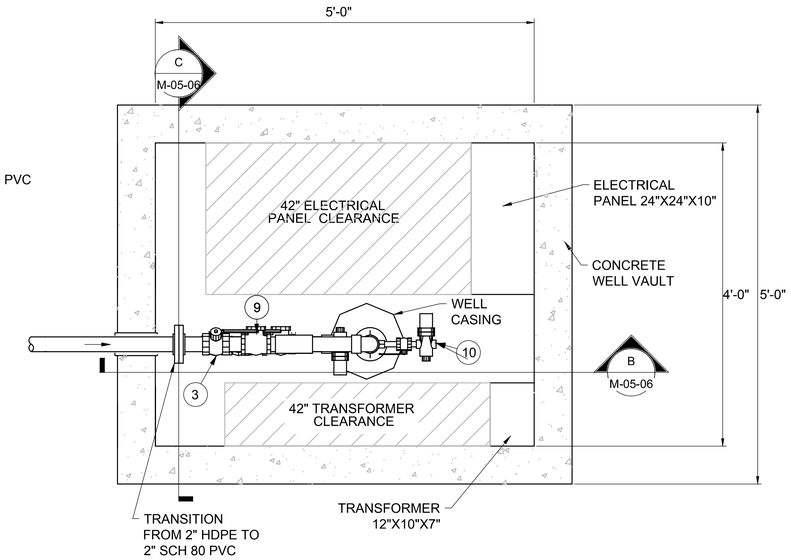
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SHEET NO. M-05-04 of SHEETS | REV 2

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INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"

LEGEND:

(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE BELOW.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.
12. GREYED OUT ITEMS REPRESENT CONTINGENT EQUIPMENT AND MAY BE CONSTRUCTED IN THE FUTURE.

INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	CARBON AMENDED GROUNDWATER	2	CARBON AMENDED CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	2	WYE STRAINER	V-*0519
3	2"	PVC	CARBON AMENDED GROUNDWATER	2	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0502A
4	2"	PVC	CARBON AMENDED GROUNDWATER	2	BACK PRESSURE REGULATOR	V-*0518
5	1/2"	TBD	CARBON AMENDED GROUNDWATER	2	PRESSURE GAUGE ASSEMBLY	PI-*0561B
6	1/4"	PVC	CARBON AMENDED GROUNDWATER	2	SAMPLE PORT	V-*0521A
7	2	TBD	CARBON AMENDED GROUNDWATER	2	ACTUATED BALL VALVE	FV-*0506
8	1	TEFLON	CARBON AMENDED GROUNDWATER	2	MAGNETIC FLOW METER	FE-*0571A
9	2"	TBD	CARBON AMENDED GROUNDWATER	2	CHECK VALVE	V-*0512
10	2"	PVC	CARBON AMENDED GROUNDWATER	2	AIR/VAC RELEASE ASSEMBLY	
11	2"	HDPE	FRESH WATER	1	FRESH WATER CONVEYANCE LINE	
12	2"	PVC	FRESH WATER	1	WYE STRAINER	
13	2"	PVC	FRESH WATER	1	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0502B
14	1/2"	TBD	FRESH WATER	1	PRESSURE GAUGE ASSEMBLY	PI-*0561A
15	1/4"	PVC	FRESH WATER	1	SAMPLE PORT	V-*0521C
16	1"	TEFLON	FRESH WATER	1	ACTUATED BALL VALVE	FV-*0508
17	2"	TBD	FRESH WATER	1	MAGNETIC FLOW METER	FE-*0571C
18	2"	PVC	FRESH WATER	1	CHECK VALVE	V-*0608A
19	2"	PVC	BACKWASH WATER	3	BALL VALVE	V-*0523
20	2"	PVC	BACKWASH WATER	3	ACTUATED BUTTERFLY VALVE	FV-*0509

0 1 2 3

SCALE: 1"=1'

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
Exp 6/30/15
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 1 MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

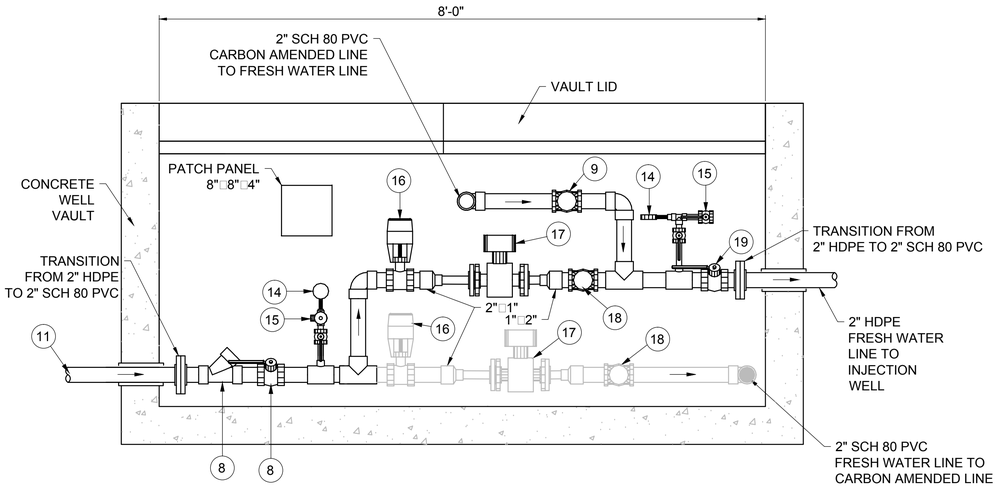
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SHEET NO.	of SHEETS
M-05-05	REV 2

N1808

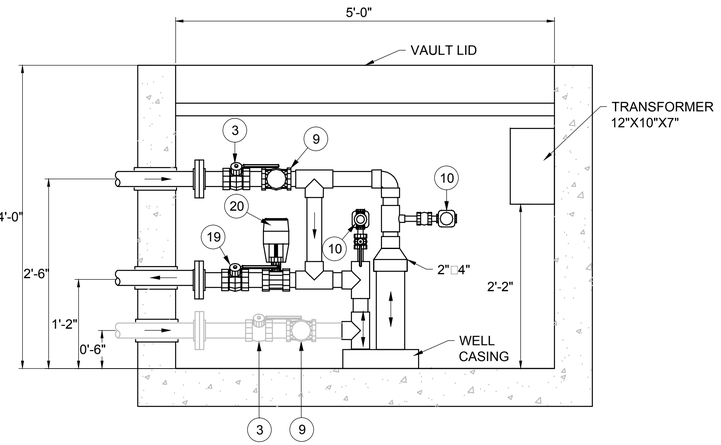
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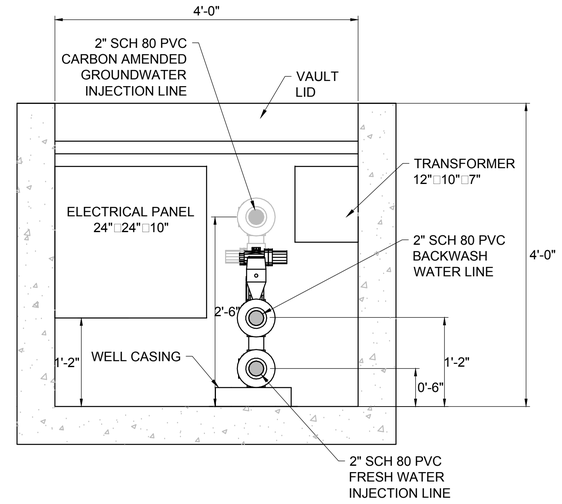
(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE ON SHEET M-05-05.



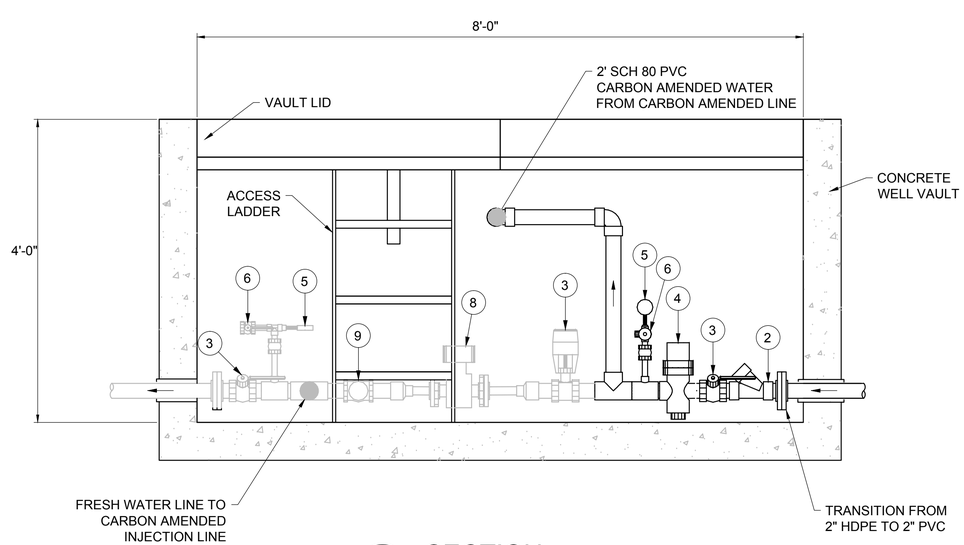
A SECTION
1"=1'-0"
M-05-05



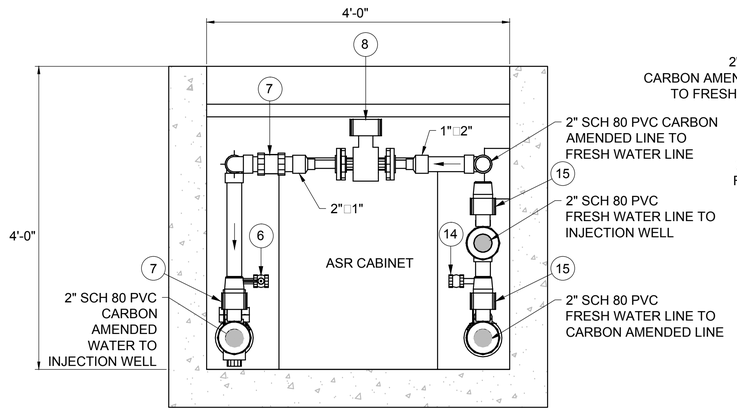
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M-05-05



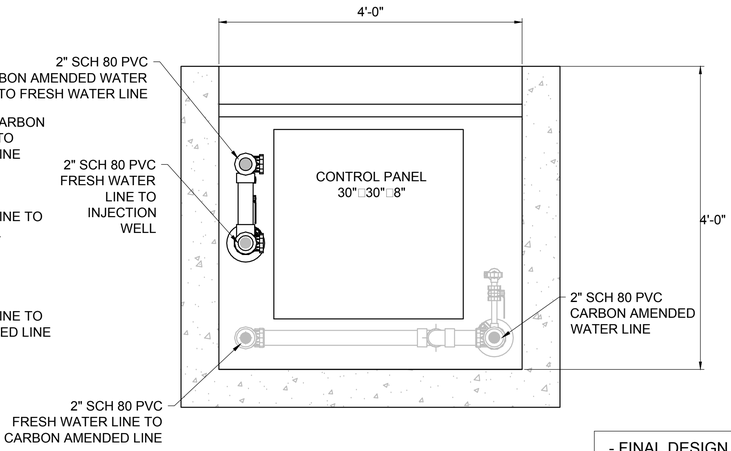
C SECTION
1"=1'-0"
M-05-05



D SECTION
1"=1'-0"
M-05-05



E SECTION
1"=1'-0"
M-05-05



F SECTION
1"=1'-0"
M-05-05

0 1 2 3
SCALE: 1"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESTE C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

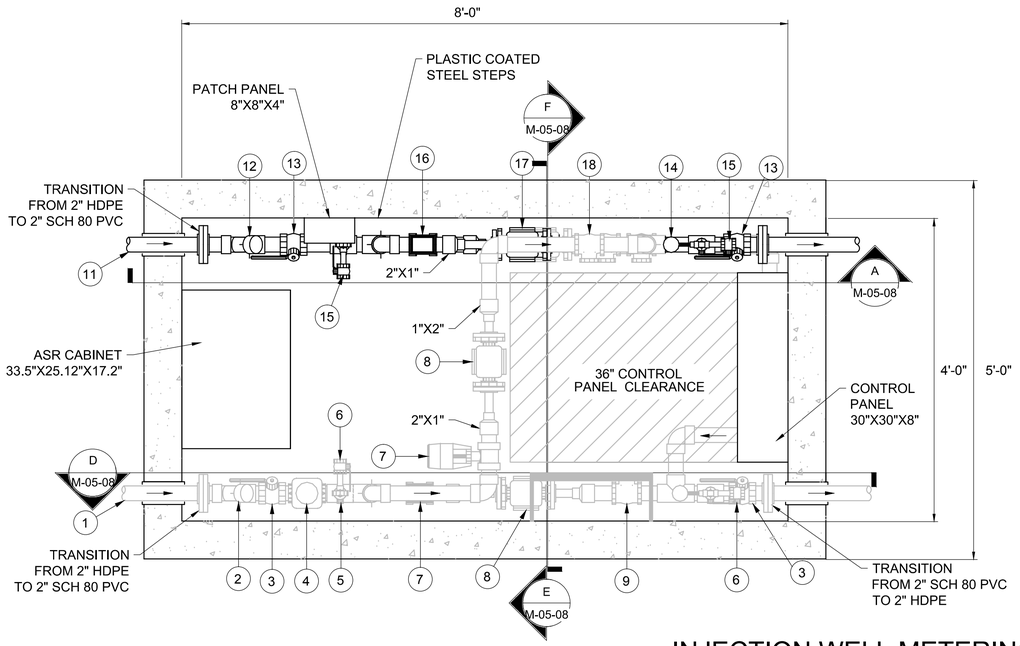
INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 1 MECHANICAL DETAILS

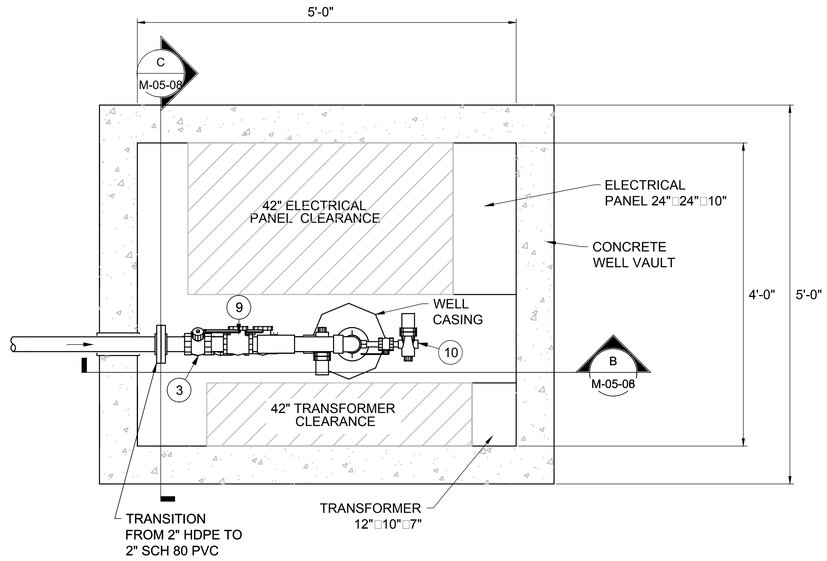
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-05-06	REV 2

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N1808





INJECTION WELL METERING AND WELL VAULT PLAN VIEW

1" = 1'-0"

INJECTION WELL VAULT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	2"	HDPE	CARBON AMENDED GROUNDWATER	2	CARBON AMENDED CONVEYANCE LINE	
2	2"	PVC	CARBON AMENDED GROUNDWATER	2	WYE STRAINER	V-*0519
3	2"	PVC	CARBON AMENDED GROUNDWATER	2	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0502A
4	2"	PVC	CARBON AMENDED GROUNDWATER	2	BACK PRESSURE REGULATOR	V-*0518
5	1/2"	TBD	CARBON AMENDED GROUNDWATER	2	PRESSURE GAUGE ASSEMBLY	PI-*0561B
6	1/4"	PVC	CARBON AMENDED GROUNDWATER	2	SAMPLE PORT	V-*0521A
7	2	TBD	CARBON AMENDED GROUNDWATER	2	ACTUATED BALL VALVE	FV-*0506
8	1	TEFLON	CARBON AMENDED GROUNDWATER	2	MAGNETIC FLOW METER	FE-*0571A
9	2"	TBD	CARBON AMENDED GROUNDWATER	2	CHECK VALVE	V-*0512
10	2"	PVC	CARBON AMENDED GROUNDWATER	2	AIR/VAC RELEASE ASSEMBLY	
11	2"	HDPE	FRESH WATER	1	FRESH WATER CONVEYANCE LINE	
12	2"	PVC	FRESH WATER	1	WYE STRAINER	
13	2"	PVC	FRESH WATER	1	ISOLATION BALL VALVE EQUIPPED WITH STEM EXTENSION TO ALLOW FOR OPERATION FROM OUTSIDE OF VAULT	V-*0502B
14	1/2"	TBD	FRESH WATER	1	PRESSURE GAUGE ASSEMBLY	PI-*0561A
15	1/4"	PVC	FRESH WATER	1	SAMPLE PORT	V-*0521C
16	1"	TEFLON	FRESH WATER	1	ACTUATED BALL VALVE	FV-*0508
17	2"	TBD	FRESH WATER	1	MAGNETIC FLOW METER	FE-*0571C
18	2"	PVC	FRESH WATER	1	CHECK VALVE	V-*0608A
19	2"	PVC	BACKWASH WATER	3	BALL VALVE	V-*0523
20	2"	PVC	BACKWASH WATER	3	ACTUATED BUTTERFLY VALVE	FV-*0509

LEGEND:

(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE BELOW.

NOTES:

1. ALL PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P&IDs.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. CROSS SECTIONS SHOW ONLY THOSE COMPONENTS NECESSARY TO INDICATE ELEVATIONS AND SPACE REQUIREMENTS FOR PIPING AND MAJOR COMPONENTS. INSTALL PIPING AND INSTRUMENTATION PER THE P&IDs.
5. ALL INSTRUMENTATION SHALL BE INSTALLED SUCH THAT IT MAY BE READ WITHOUT ENTERING THE WELL VAULT.
6. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE WITHOUT ENTERING THE WELL VAULT AND OPERABLE THROUGH ENTIRE STROKE.
7. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS OF THE CONCRETE WELL VAULT WITH ANCHOR BOLTS AND UNI-STRUT. SUPPORTS SHALL BE INSTALLED WHEREVER NECESSARY TO PROPERLY SUPPORT PIPING AND CONDUIT.
8. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P&IDs.
9. PIPING KNOCKOUTS AND ROUTING OF PIPING SHOWN AS PROPOSED AND APPROXIMATE. ACTUAL ROUTING TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
10. ALL FLANGES SHALL BE CLASS 150 RATE FACE FLANGES UNLESS OTHERWISE SPECIFIED.
11. ALL TRANSITION FITTINGS FOR HDPE PIPING SHALL BE FLANGED WITH BACKING RINGS.
12. GREYED OUT ITEMS REPRESENT CONTINGENT EQUIPMENT AND MAY BE CONSTRUCTED IN THE FUTURE.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

0 1 2 3

SCALE: 1"=1'

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 2 MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

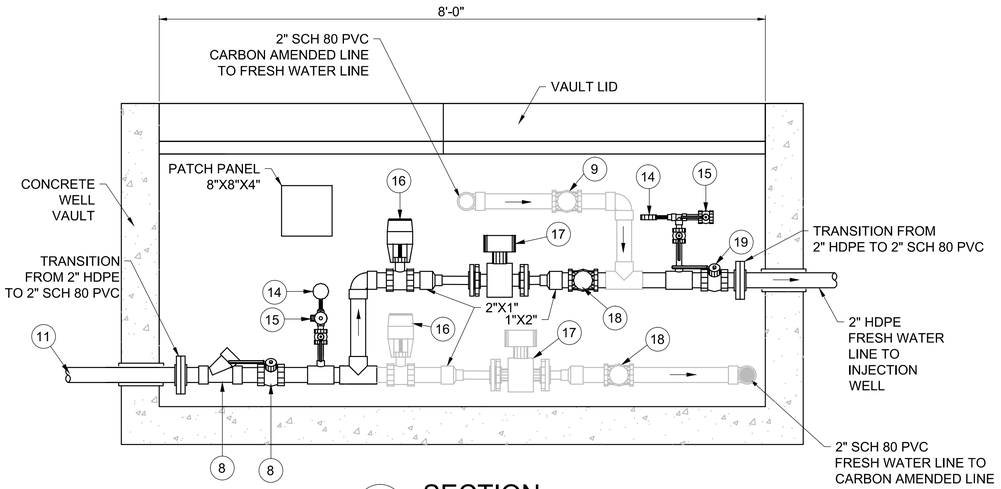
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. M-05-07	of SHEETS
REV	2

N1808

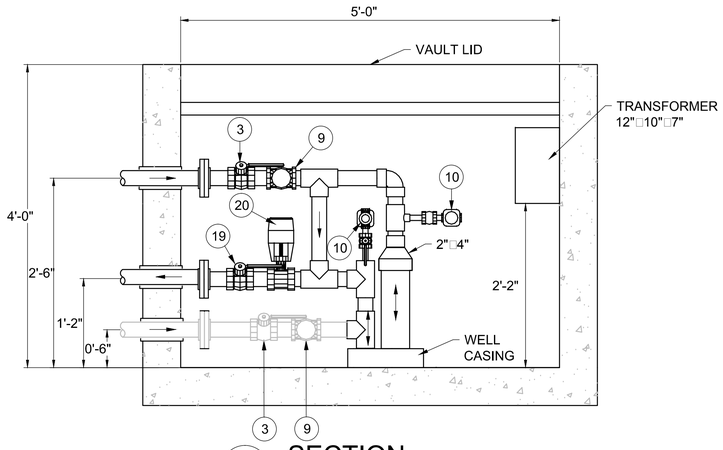
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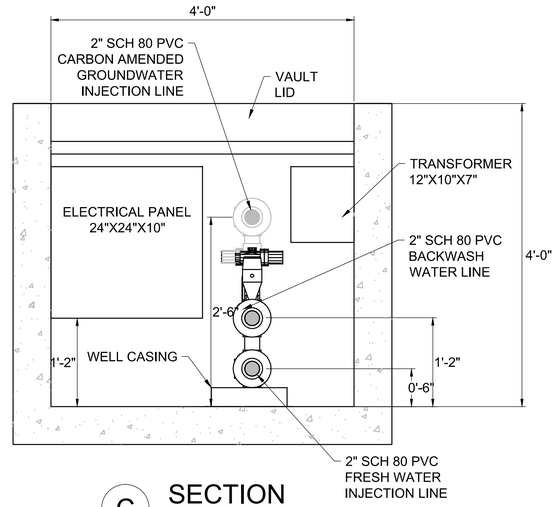
(1) REFERENCE ITEM □ INJECTION WELL VAULT SCHEDULE ON SHEET M-05-07.



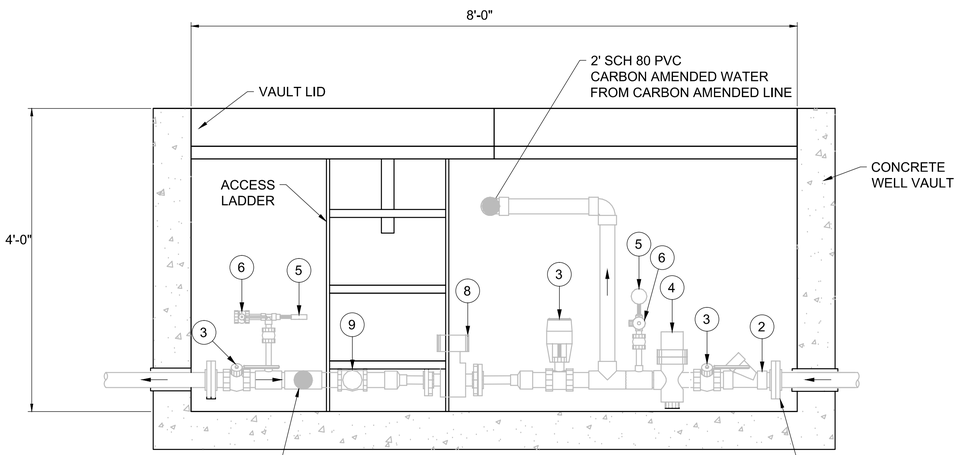
A SECTION
1"=1'-0"
M-05-07



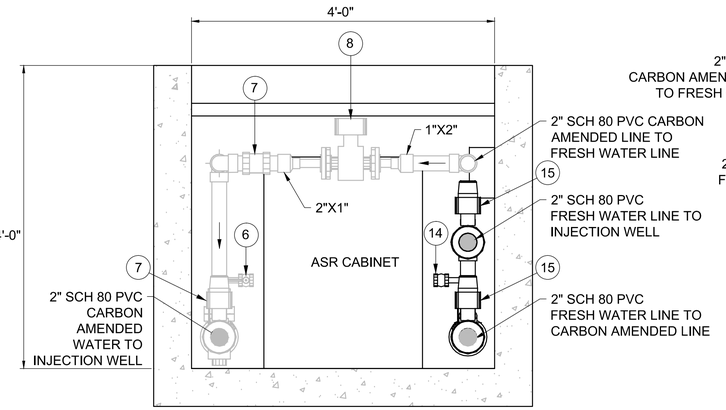
B SECTION
1"=1'-0"
M-05-07



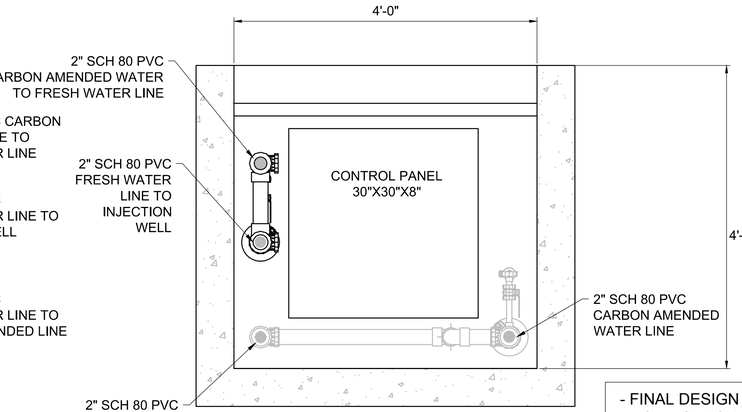
C SECTION
1"=1'-0"
M-05-07



D SECTION
1"=1'-0"
M-05-07



E SECTION
1"=1'-0"
M-05-07



F SECTION
1"=1'-0"
M-05-07

0 1 2 3

SCALE: 1"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP INJECTION WELL VAULTS TYPE 2 MECHANICAL DETAILS

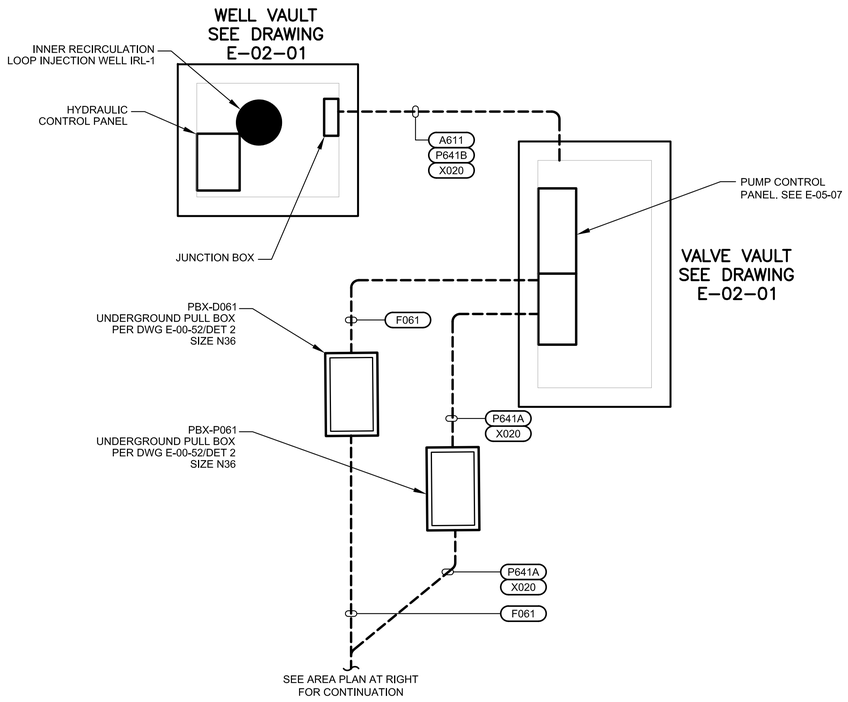
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-05-08	REV 2

N1808

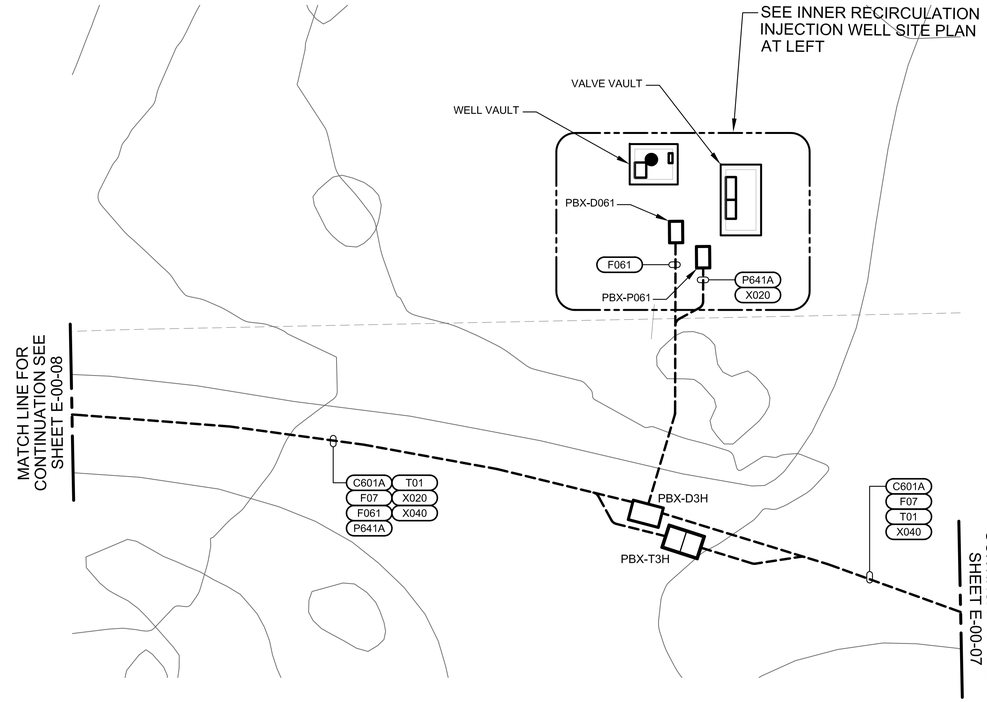
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INNER RECIRCULATION LOOP INJECTION WELL IRL-1 ELECTRICAL SITE PLAN

0 2.66 5.33 8.0

SCALE: 3/8"=1'



INNER RECIRCULATION LOOP INJECTION WELL IRL-1 AREA PLAN (1)

0 10 20 30

SCALE: 1"=10'

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-05-04.

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOCHI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY: RAO

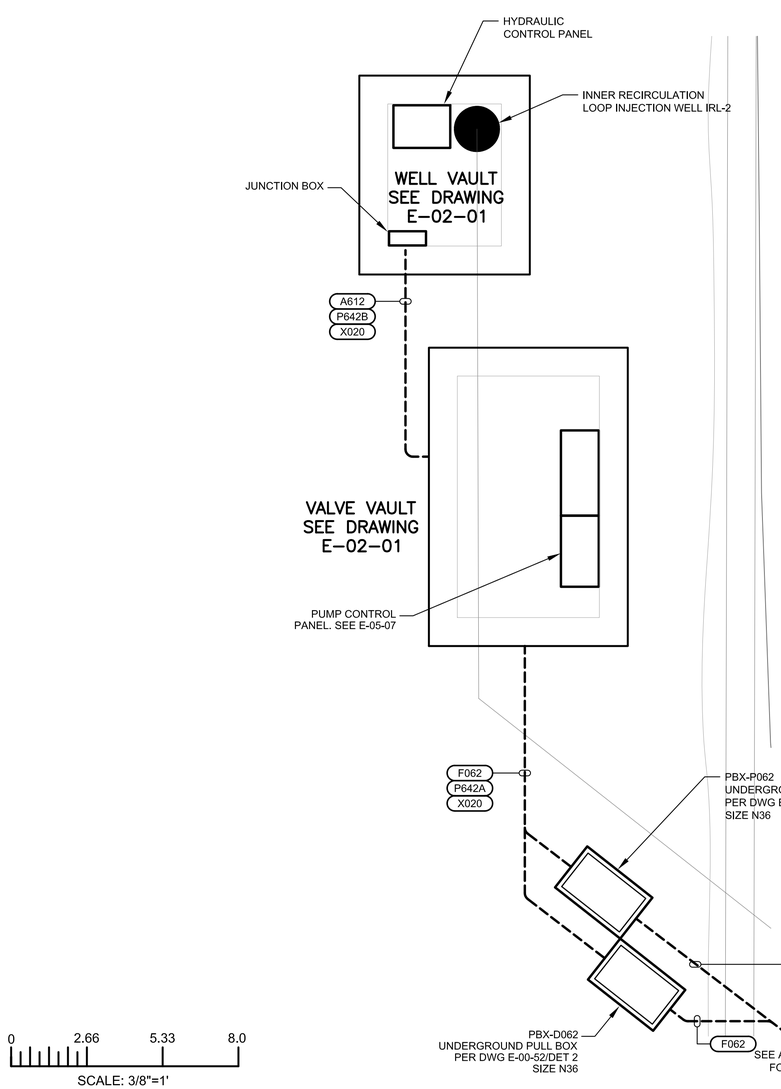
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP
INJECTION WELL IRL-1
SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

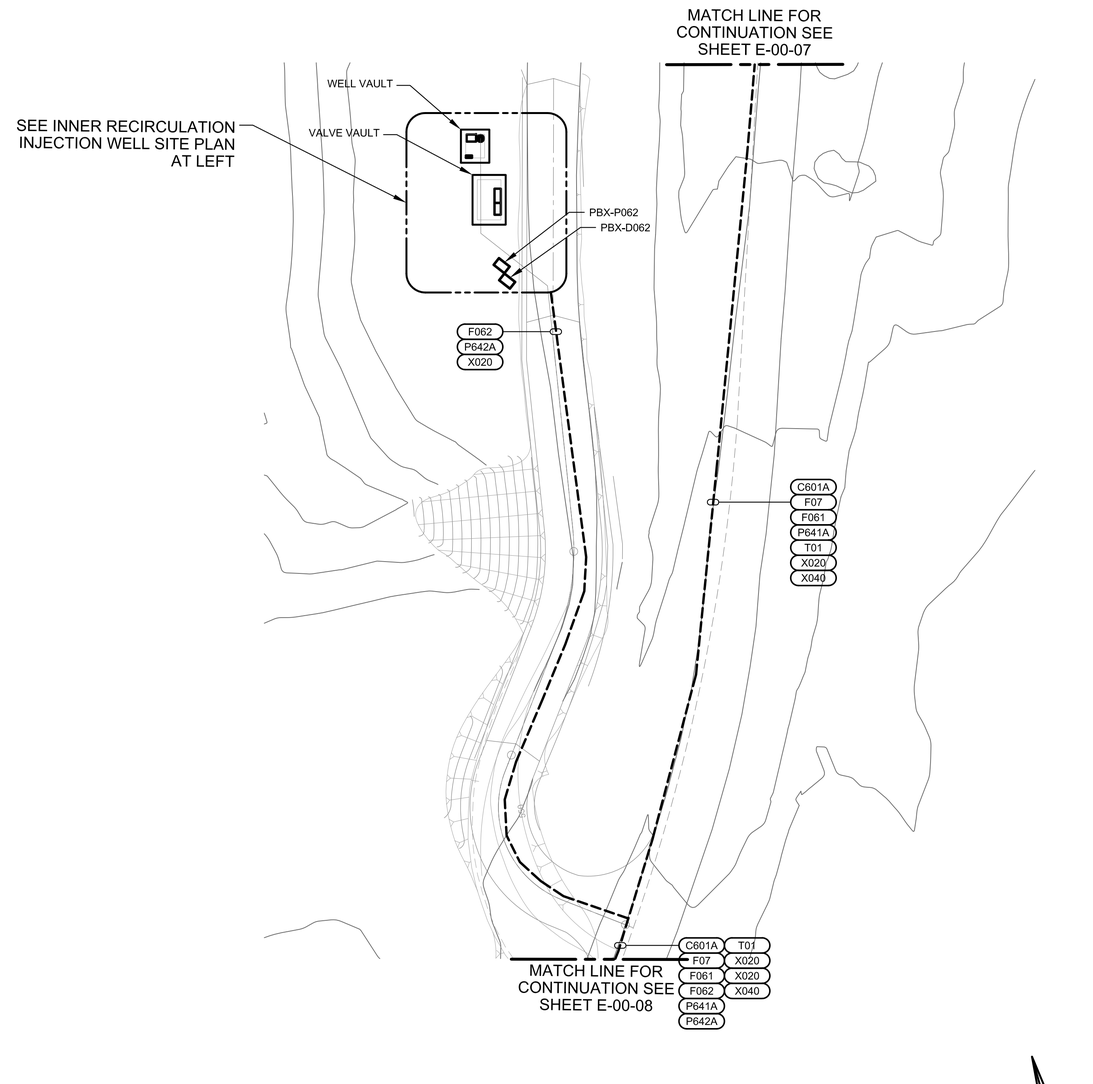
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-01	REV 2

FILENAME: E-05-01.dwg
PLOT DATE: Oct 29, 2015
PLOT TIME: 3:54:59pm

N1808



INNER RECIRCULATION LOOP INJECTION WELL IRL-2 ELECTRICAL SITE PLAN



INNER RECIRCULATION LOOP INJECTION WELL IRL-2 AREA PLAN (1)

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-05-03 & C-05-05.

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDOTI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

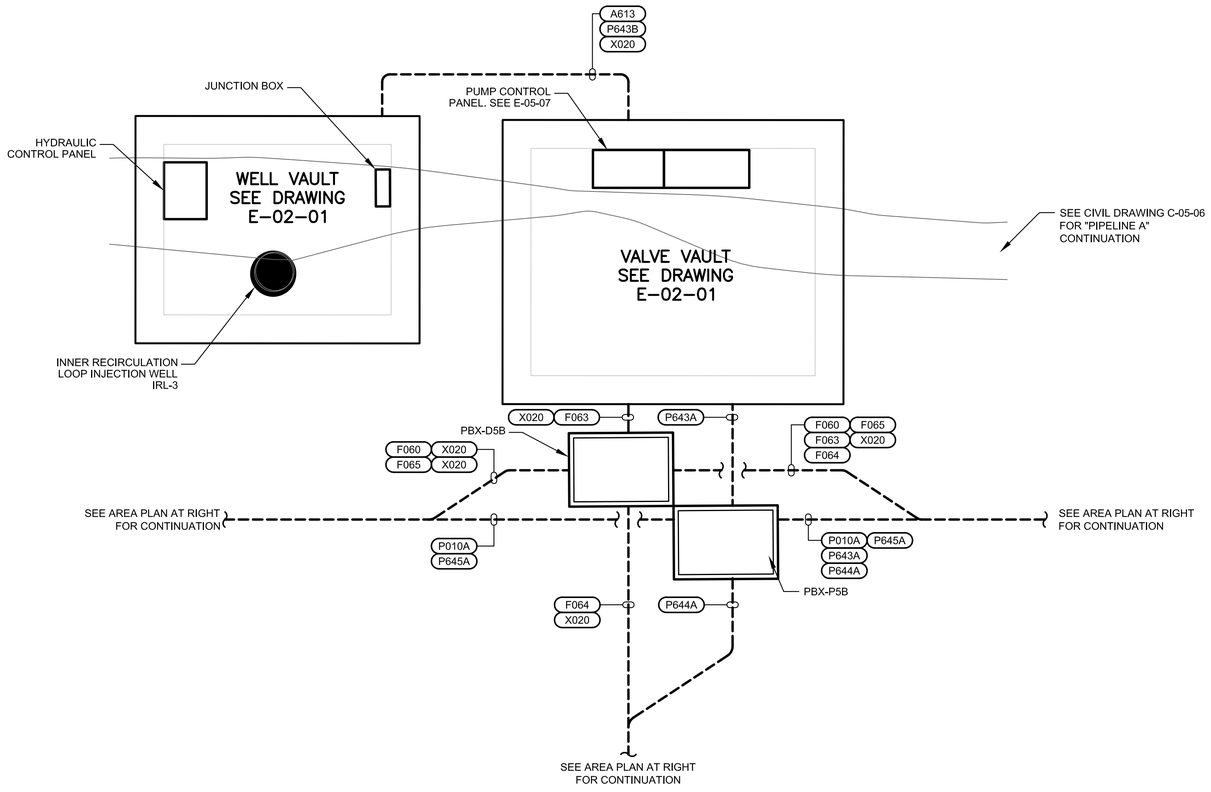
APPROVED BY	
RAO	

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP INJECTION WELL IRL-2 SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-02	REV 2

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:55:06pm
FILENAME: E-05-01.dwg
N1808



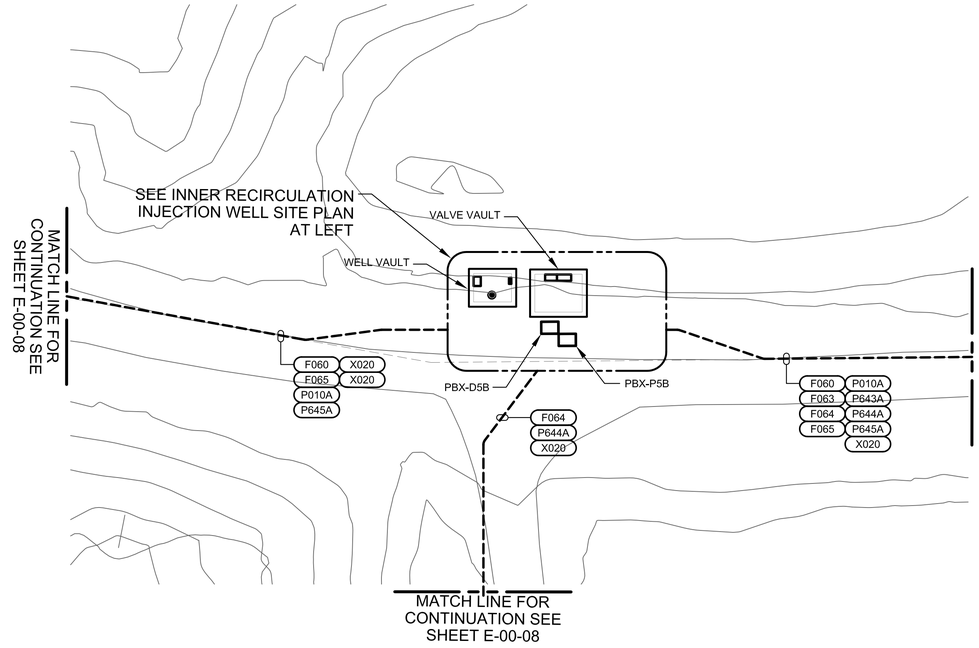
INNER RECIRCULATION LOOP INJECTION WELL IRL-3 ELECTRICAL SITE PLAN

0 2.66 5.33 8.0

SCALE: 3/8"=1'

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.



INNER RECIRCULATION LOOP INJECTION WELL IRL-3 ELECTRICAL AREA PLAN (1)

0 16 32 48

SCALE: 1"=16'

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-05-06.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
2	12/30/14	SUPPLEMENTAL PRE-FINAL (90%) DESIGN		MBY			TPF
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

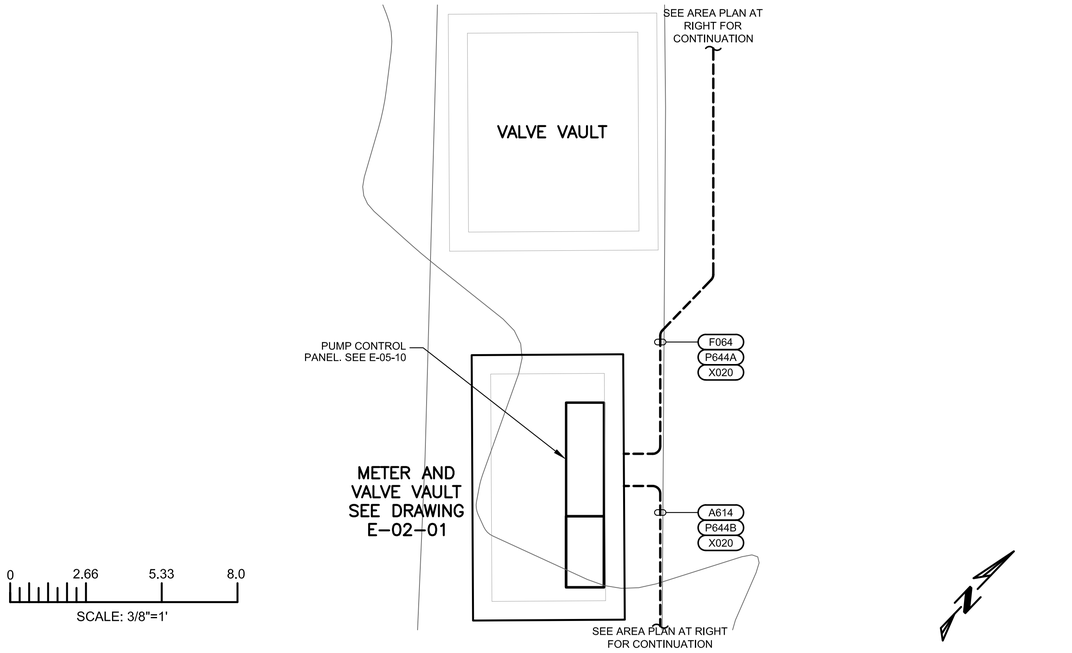
REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

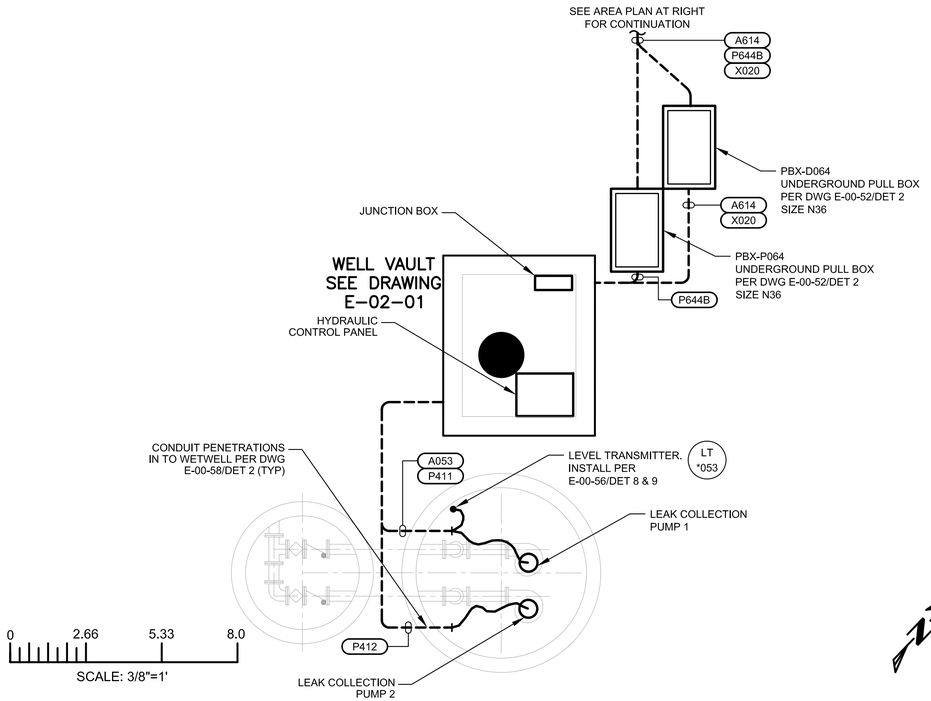
TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP INJECTION WELL IRL-3 SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-03	REV 2

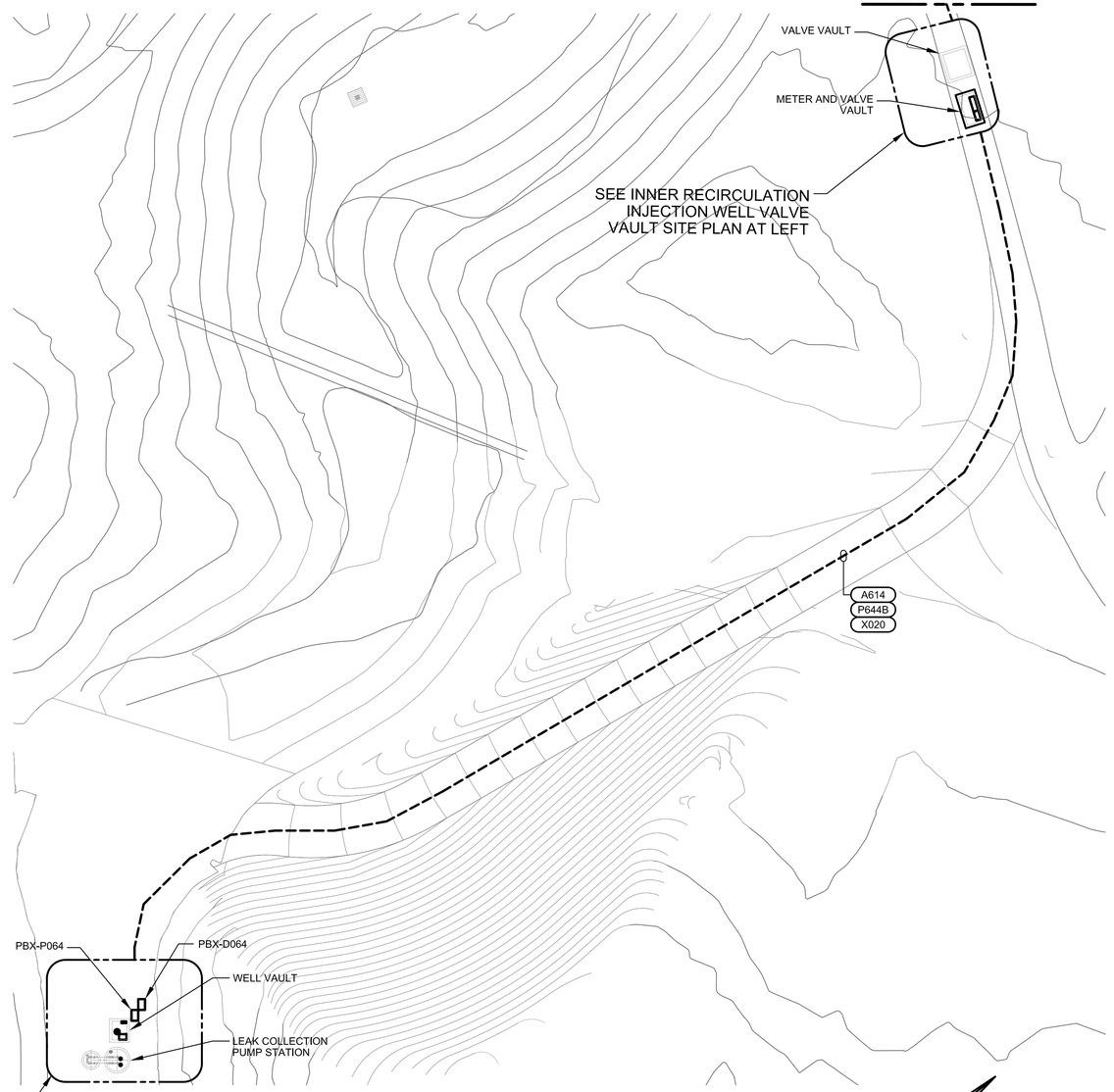
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:55:12pm
FILENAME: E-05-01.dwg
N1808



INNER RECIRCULATION LOOP INJECTION WELL IRL-4 VALVE VAULT ELECTRICAL PARTIAL SITE PLAN



INNER RECIRCULATION LOOP INJECTION WELL IRL-4 WELL VAULT ELECTRICAL PARTIAL SITE PLAN



INNER RECIRCULATION LOOP INJECTION WELL IRL-4 AREA PLAN (1)(2)

ELECTRICAL PLAN NOTES:

1. SEE ELECTRICAL PLAN NOTES ON DRAWING E-00-02.

DRAWING REFERENCED NOTES:

(1) CONDUIT ROUTE AND PULLBOX LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE CONDUIT ROUTE AND PULLBOX LOCATIONS WITH CIVIL PIPELINE ROUTING. SEE DRAWINGS C-05-01 & C-05-07.

(2) SEE CIVIL DRAWING C-05-07 FOR "PIPELINE H" PIPING ALIGNMENT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

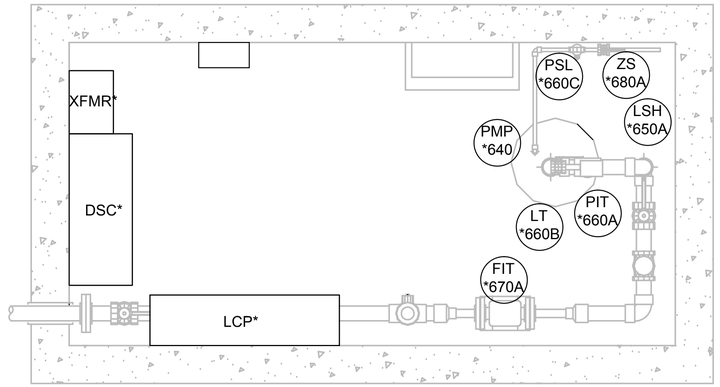
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP INJECTION WELL IRL-4 SITE PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-04	REV 2

PLOT DATE: Oct 29, 2015 PLOT TIME: 3:55:19pm
FILENAME: E-05-01.dwg

N1808



WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1'-0"

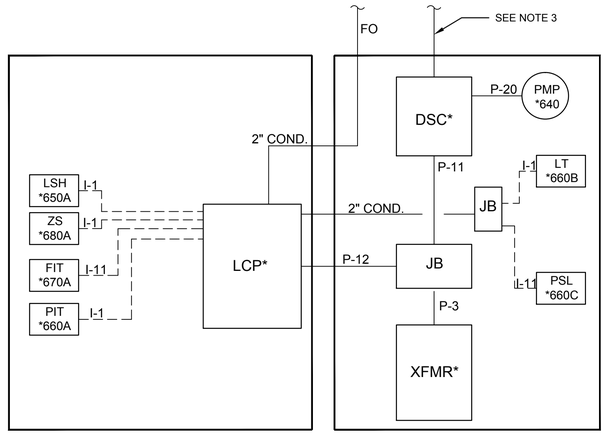
NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
_ _ _ _	MULTICONDUCTOR SHIELDED CABLE

NODE / WELL VAULT
TYPE / WELL ID
DSC-xx-IRZxx-x



WELL VAULT RISER DIAGRAM

NOT TO SCALE

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A P-1B	REFER TO SINGLE LINE DIAGRAM.		
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIDOTI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		LUK	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

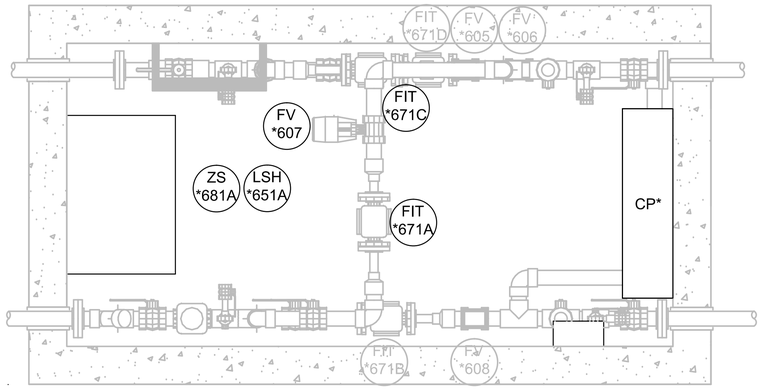
INNER RECIRCULATION LOOP INJECTION
DUAL SCREEN INJECTION WELL
ELECTRICAL PLAN

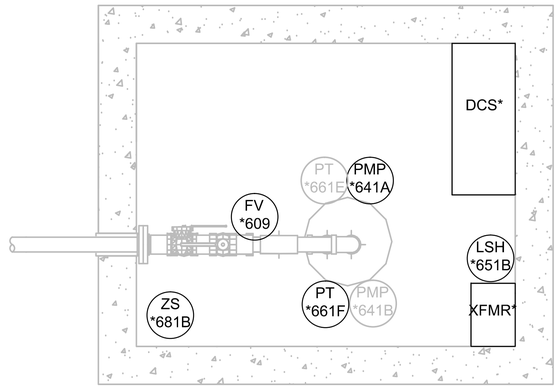
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. E-05-05 of SHEETS | REV 2

N1808





NOTES:

1. CONDUIT ROUTING WITHIN VAULTS TO BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER.
2. "*" IS A PLACEHOLDER FOR THE LOCATION ID. SEE DESCRIPTION BELOW FOR FULL LOCATION ID NUMBER.
3. D
4. REFER TO CONDUIT AND CABLE SCHEDULES AND SINGLE LINE DIAGRAMS ON SHEETS E-00-12 THROUGH E-00-20 FOR VAULT MAIN POWER FEED CONDUIT AND WIRE SIZES.

LEGEND

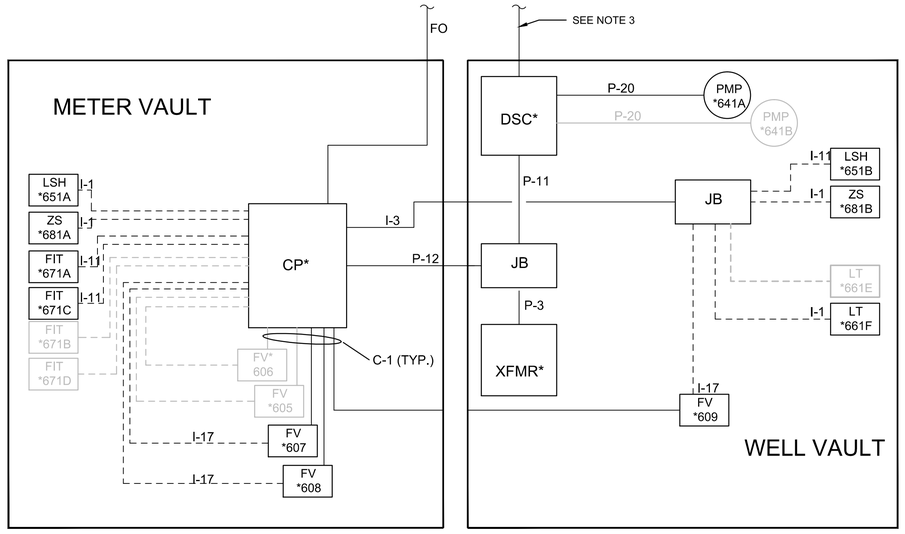
CP	CONTROL PANEL
DSC	DISCONNECT
JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
- - - - - - -	MULTICONDUCTOR SHIELDED CABLE

NODE TYPE / WELL ID / WELL VAULT

DSC-xx-IRZxx-x

METER AND WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1'-0"



METER AND WELL VAULT RISER DIAGRAM

NOT TO SCALE

WELLS RISER DIAGRAM CONDUCTOR SCHEDULE

SYMBOL	WIRE TYPE, SIZE, AND QTY.	CONDUCTOR OR CABLE TYPE	CONDUIT SIZE (INCHES)
P-1A	REFER TO SINGLE LINE DIAGRAM.		
P-1B			
P-11	(2)#12 BLK, (2)#12 GRN,(7)#14YEL, (1)#14WHT	XHHW	1
P-12	(1)#12RED, (1)#12WHT, (1)#12GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
I-17	(1) #18, 7 CONDUCTOR SHIELDED CABLE	BELDEN 5305FE	3/4"
C-1	SOW CABLE (1)#16BLK, (1)#16WHT, (1)#16GRN	XHHW	3/4"
NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ARCADIS

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0	4/5/13	INTERMEDIATE (60%) DESIGN		LUK	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO / SUPV / DSGN / DWN / CHKD / OK / DATE / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP DUAL SCREEN INJECTION WELL TYPE 1 ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

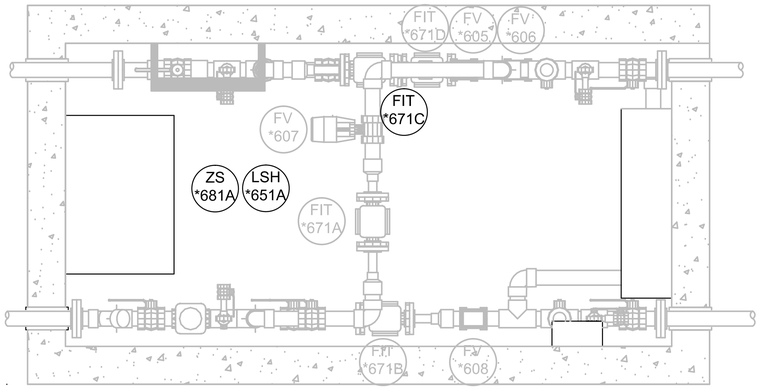
MICROFILM

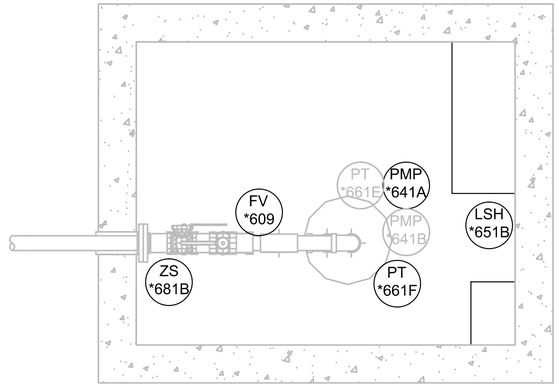
BILL OF MATL / DWG LIST / SUPSDS / SUPSD BY

SHEET NO. E-05-06 of SHEETS

REV 2

N1808





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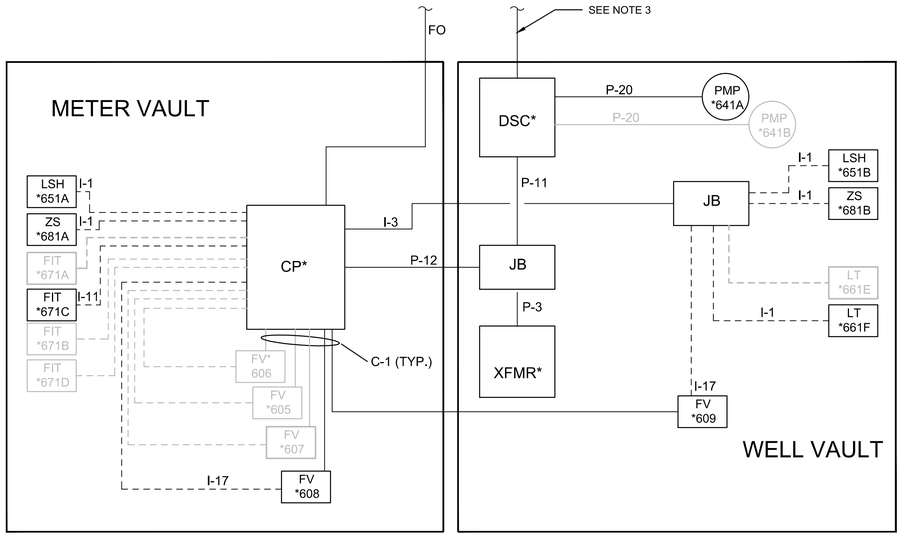
LEGEND

CP	CONTROL PANEL
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JB	JUNCTION BOX
P	POWER
I	INSTRUMENTATION
C	CABLE (POWER)
FO	FIBER OPTIC
XFMR	TRANSFORMER
----------	MULTICONDUCTOR SHIELDED CABLE

NODE — WELL VAULT
TYPE — WELL ID
DSC-xx-IRZxx-x

METER AND WELL VAULT ELECTRICAL AND INSTRUMENTATION PLAN

1" = 1"-0"



METER AND WELL VAULT RISER DIAGRAM

NOT TO SCALE

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P-2	(5) #12 BLK, (3) #12 GRN, (14)#14YEL, (2)#14WHT	XHHW	2
P-20	(3) #12 BLK, (1) #12 GRN	XHHW	3/4"
P-3	(2)#12BLK, (2)#12GRN,(1)#12RED, (1)#12WHT	XHHW	1
P-4	(3) #12 BLK, (1) #12 GRN, (7)#14YEL, (1)#14WHT	XHHW	1
P-5	(1)#12RED, (1)#12WHT, (1)#12GRN, (4)14YEL, (2)#14WHT	XHHW	1
FO	MULTI-MODE FIBER OPTIC		2
I-1	(1) #16, 2 CONDUCTOR SHIELDED CABLE	BELDEN 9952	3/4"
I-11	(1) #16, 4 CONDUCTOR SHIELDED CABLE	BELDEN 9954	3/4"
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NOTE:	THIS SCHEDULE APPLIES TO ALL VAULT RISER DIAGRAMS. SOME OF THE SYMBOLS MAY NOT BE USED ON THIS DRAWING.		

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REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

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REVISIONS

APPROVED BY: RAO

SO / SUPV / DSGN / DWN / CHKD / OK / DATE / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP DUAL SCREEN INJECTION WELL TYPE 2 ELECTRICAL PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

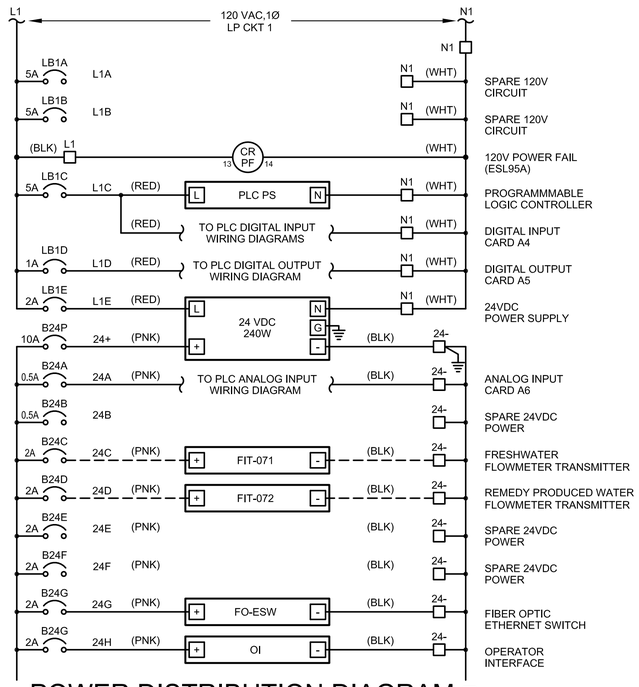
MICROFILM

BILL OF MATL / DWG LIST / SUPSDS / SUPSD BY

SHEET NO. E-05-07 of SHEETS

REV 2

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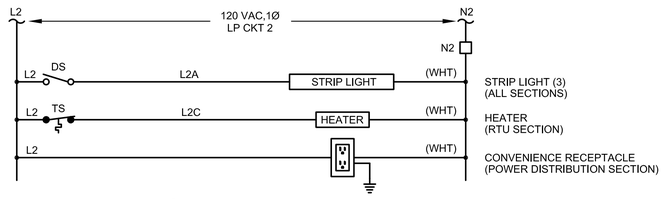
POWER DISTRIBUTION DIAGRAM (1)

SCHEMATIC REFERENCED NOTES:

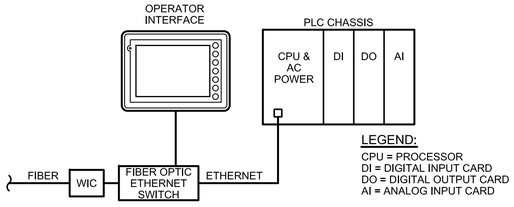
(1) DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.

GENERAL NOTES:

1. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.

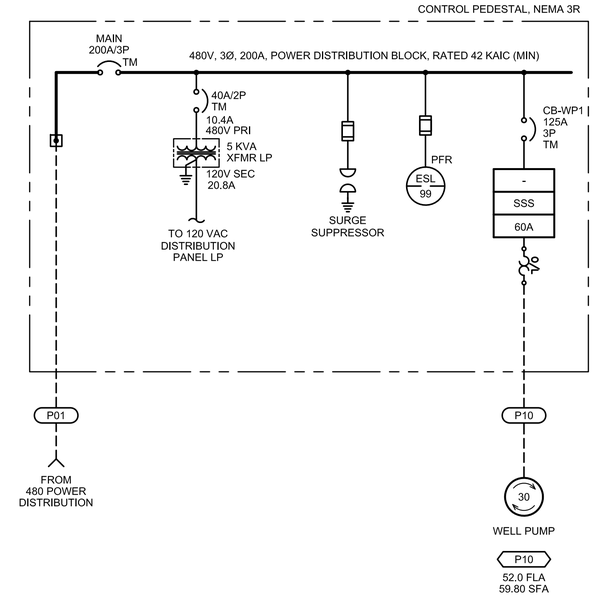


PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM

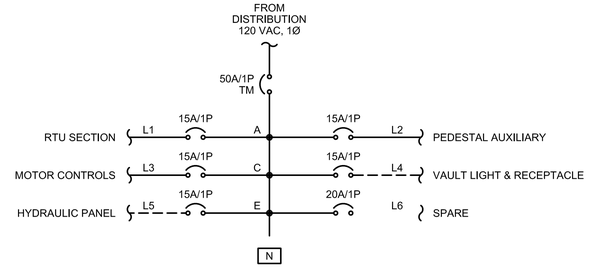


PLC BLOCK DIAGRAM

IRL -1,2,3 - LOAD CALCULATIONS						
LOAD DESCRIPTION				LOAD	QTY	TOTAL
30 HP	INJECTION WELL			40.00 A	1	33255.4 VA
5	KVA PANELBOARD TRANSFORMER			10.42 A	1	5000.0 VA
			TOTAL LOAD =	46.01 A		38255.4 VA
LOAD CORRECTION FACTORS						
	LARGEST MOTOR LOAD x 25%:					
30	HP => 0.25 x	33255.4 VA	=	10.00 A		8313.8 VA
	80% BREAKER DERATING =	TOTAL x 0.25	=	14.00 A		11642.3 VA
	FOR CONTINUOUS LOADS NEC 210-20					
			UTILITY SERVICE SIZE (MIN) =	70.02 A		58211.5 VA
			480 V, 3 PHASE, 4 WIRE			
			UTILITY SERVICE SIZE REQUIRED =	200 AMP		



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOCHI
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
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0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY		
RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

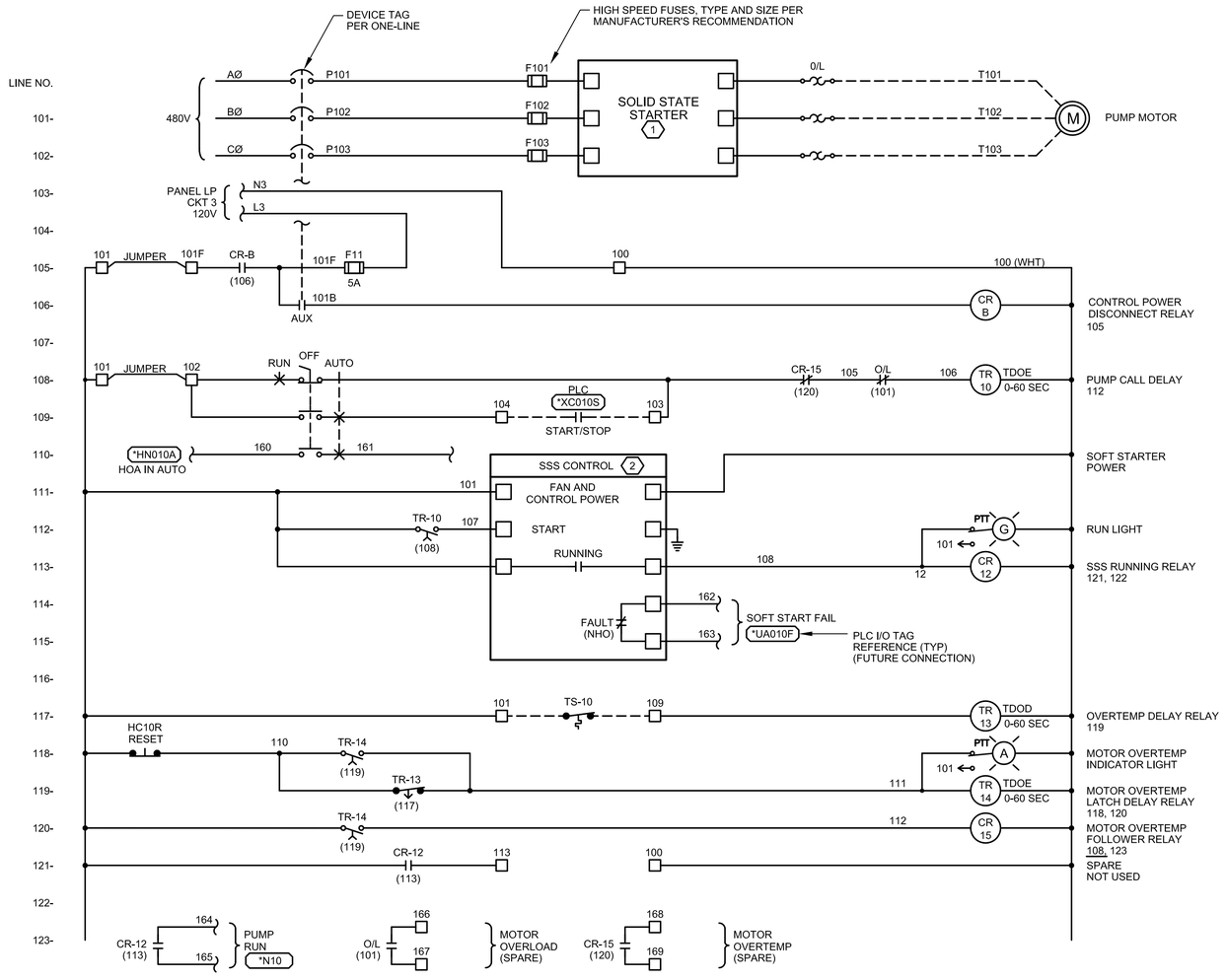
ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP
IRL-1,2,3 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

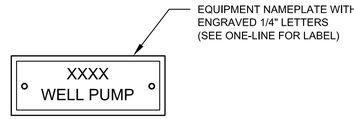
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DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-08	REV 1

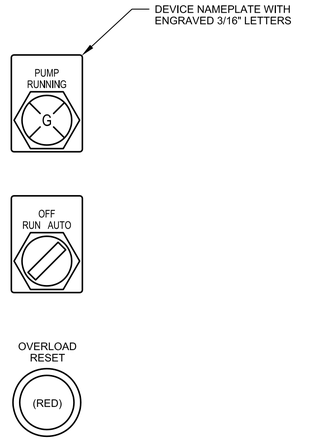
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PLOT DATE: Oct 29, 2015
PLOT TIME: 3:55:32pm

N1808



WELL PUMP ELEMENTARY DIAGRAM





DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:

VOLTAGE	CURRENT	MOTOR PARAMETERS
PHASE REVERSAL	OVERLOAD	OVERLOAD CLASS
	UNBALANCE	FULL LOAD CURRENT

2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

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REVISIONS

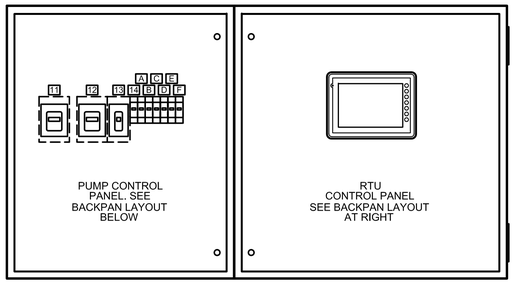
APPROVED BY: RAO

SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK	JMS
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP IRL-1,2,3 PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

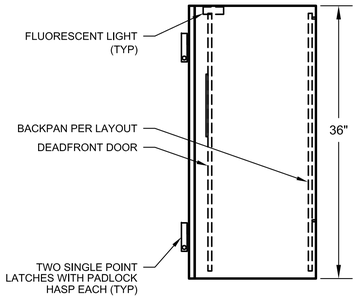
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-09	REV 1

FILENAME: E-05-09.DWG
PLOT DATE: Oct 29, 2015 PLOT TIME: 3:55:39pm
N1808



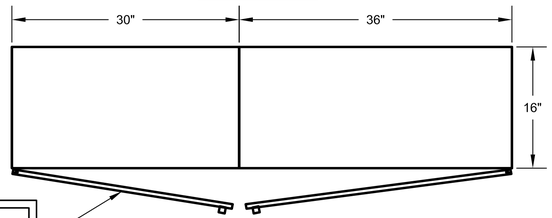
DEADFRONT DOOR ELEVATION

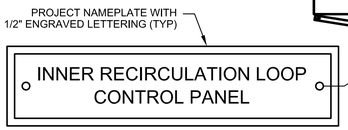
(SHOWN WITH OUTER DOOR REMOVED)



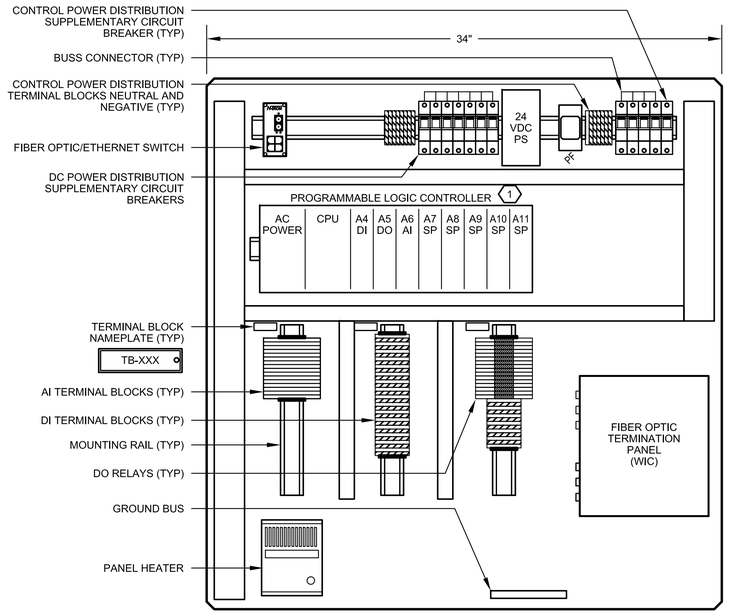
SIDE ELEVATION

ELEVATION



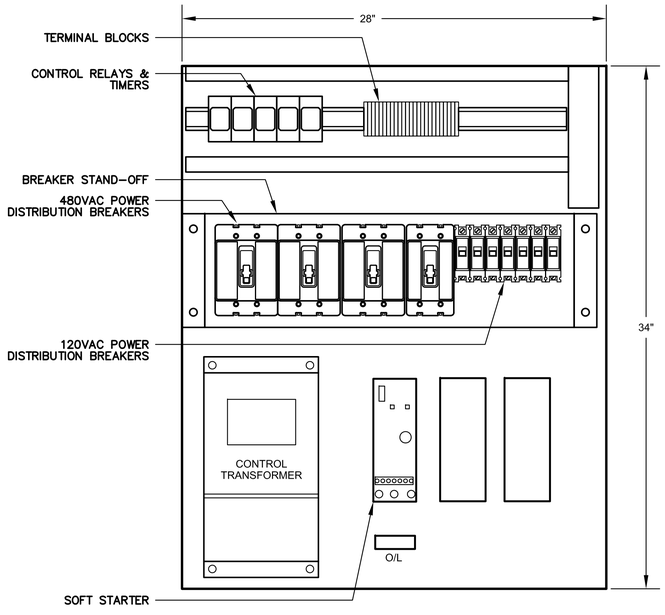


BASE PLAN



PLC PANEL BACKPAN LAYOUT

1 WIRE I/O TO TERMINAL BLOCK PER EXAMPLE I/O WIRING DIAGRAMS.



PUMP CONTROL PANEL BACKPAN LAYOUT

NAMEPLATE SCHEDULE

KEY	ENGRAVING LINE 1	ENGRAVING LINE 2	LETTER HEIGHT
11	MAIN	DISCONNECT	3/16"
12	PUMP	DISCONNECT	3/16"
13	TRANSFORMER	DISCONNECT	3/16"
14	PANEL LP	DISCONNECT	3/16"
A	RTU	DISCONNECT	3/16"
B	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
C	PEDESTAL AUXILIARY	POWER DISTRIBUTION	3/16"
D	MOTOR CONTROL		3/16"
E	SPARE BREAKER		3/16"
F	SPARE BREAKER		3/16"

PANEL FABRICATION METHODS

1. NEMA 4, SS, FOR INDOOR OR OUTDOOR WALLMOUNT INSTALLATION.
2. ALL SEAMS CONTINUOUS WELDED.
3. OUTER DOORS TO BE PADLOCKABLE WITH HEAVY DUTY SINGLE POINT LATCHES.
4. DOOR HINGES AND PINS SHALL BE 316 STAINLESS STEEL.
5. NO SCREWS, RIVETS, OR BOLTS SHALL PROTRUDE EXTERNALLY.
6. INTERNAL SCREWS, BOLTS, AND NUTS SHALL BE MACHINE THREAD.
7. PLASTIC SCREW MOUNTED NAMEPLATES SHALL BE PROVIDED FOR ALL DEVICES ON DEADFRONT SCREWS SHALL BE STAINLESS STEEL.
8. FABRICATION AND WIRING SHALL CONFORM TO U.L. AND NEMA STANDARDS.
9. ALL WIRING SHALL BE PERMANENTLY LABELLED WITH WIRE MARKERS ON BOTH ENDS.
10. WIRING DIAGRAMS SHALL BE PLACED IN A PLASTIC DRAWING HOLDER PERMANENTLY ATTACHED TO THE INSIDE OF THE FRONT DOOR.
11. AS - BUILT WIRING DIAGRAMS SHALL BE SHIPPED WITH EQUIPMENT.

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REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOSTROM 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

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REVISIONS

APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP IRL-4 PLC CONTROL PANEL ELEVATION & BACKPAN LAYOUT
GAS TRANSMISSION & DISTRIBUTION

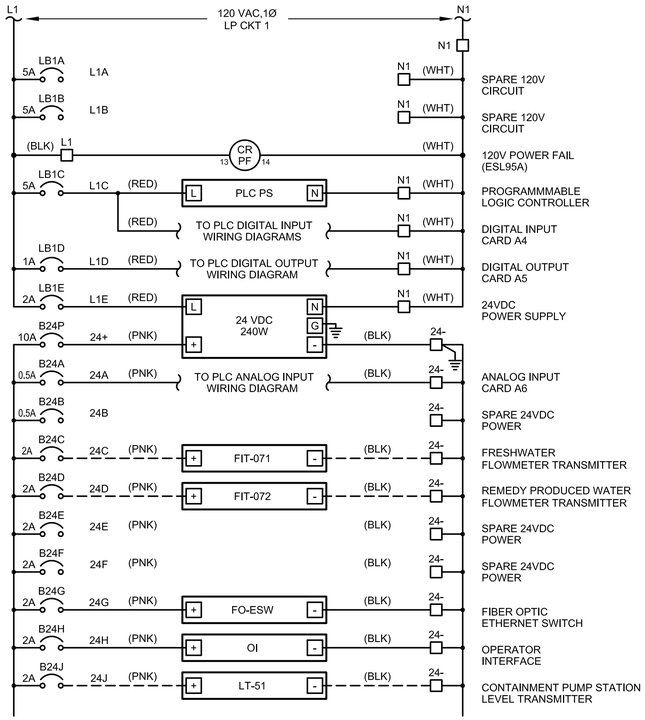
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-10	REV 1

PLOT DATE: Nov 04, 2015 PLOT TIME: 3:39:59pm

FILENAME: E-05-10.DWG

N1808



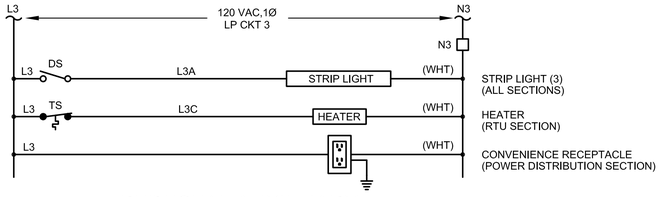
POWER DISTRIBUTION DIAGRAM (1)

SCHEMATIC REFERENCED NOTES:

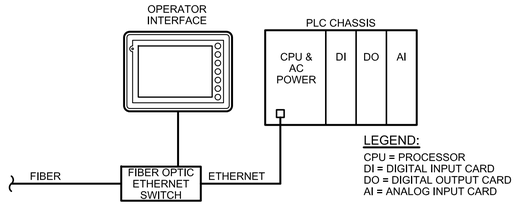
(1) DISTRIBUTION DIAGRAM REPRESENTATIVE OF MAJOR COMPONENTS ONLY. ADDITIONAL FUSES, CIRCUITS AND COMPONENT CONNECTIONS MAY BE REQUIRED FOR A FUNCTIONAL SYSTEM.

GENERAL NOTES:

1. REMAINING WIRES AND TERMINALS SHALL BE NUMBERED BY MANUFACTURER DURING SUBMITTAL.



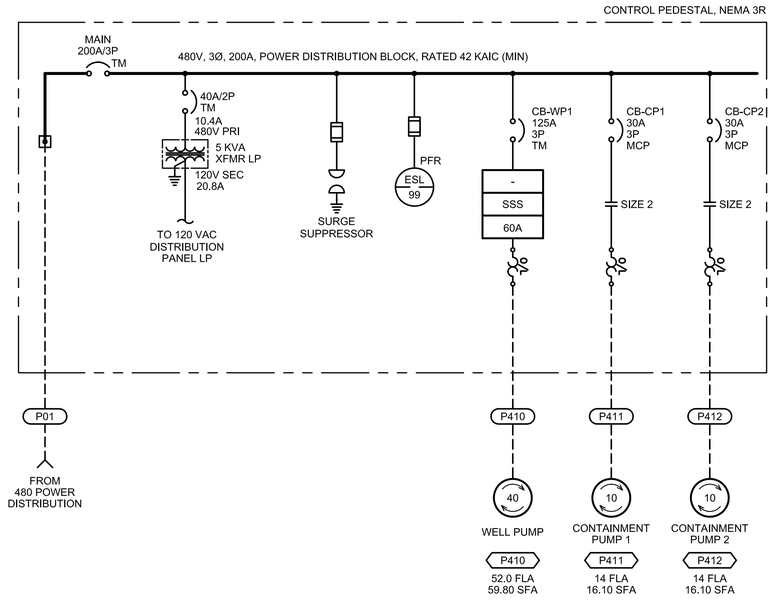
PEDESTAL AUXILLIARY POWER DISTRIBUTION DIAGRAM



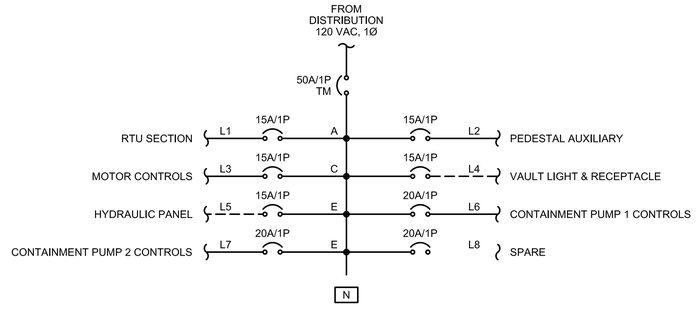
PLC BLOCK DIAGRAM

IRL-4 - LOAD CALCULATIONS

LOAD DESCRIPTION			LOAD		QTY	TOTAL	
40 HP	INJECTION WELL		52.00	A	1	43232.0	VA
10 HP	CONTAINMENT PUMPS		14.00	A	2	23278.8	VA
5	KVA PANELBOARD TRANSFORMER		10.42	A	1	5000.0	VA
		TOTAL LOAD =	86.01	A		71510.8	VA
LOAD CORRECTION FACTORS							
	LARGEST MOTOR LOAD x 25%:						
40	HP => 0.25 x 43232.0 VA	=	13.00	A		10808.0	VA
	80% BREAKER DERATING =	TOTAL x 0.25 =	24.75	A		20579.7	VA
	FOR CONTINUOUS LOADS NEC 210-20						
		UTILITY SERVICE SIZE (MIN) =	123.77	A		102898.4	VA
		480 V, 3 PHASE, 4 WIRE					
		UTILITY SERVICE SIZE REQUIRED =	200	AMP			



ONE-LINE DIAGRAM



PANEL LP

120/240 VAC DISTRIBUTION DIAGRAM
NEUTRALS NOT SHOWN

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOOTIS 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

REVISIONS																	
NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY	NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
								2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
								1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
								0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

APPROVED BY		
RAO	SO	
	SUPV	JMS
	DSGN	MBY
	DWN	MBY
	CHKD	TPF
	OK	JMS
	DATE	
	SCALES	N/A

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

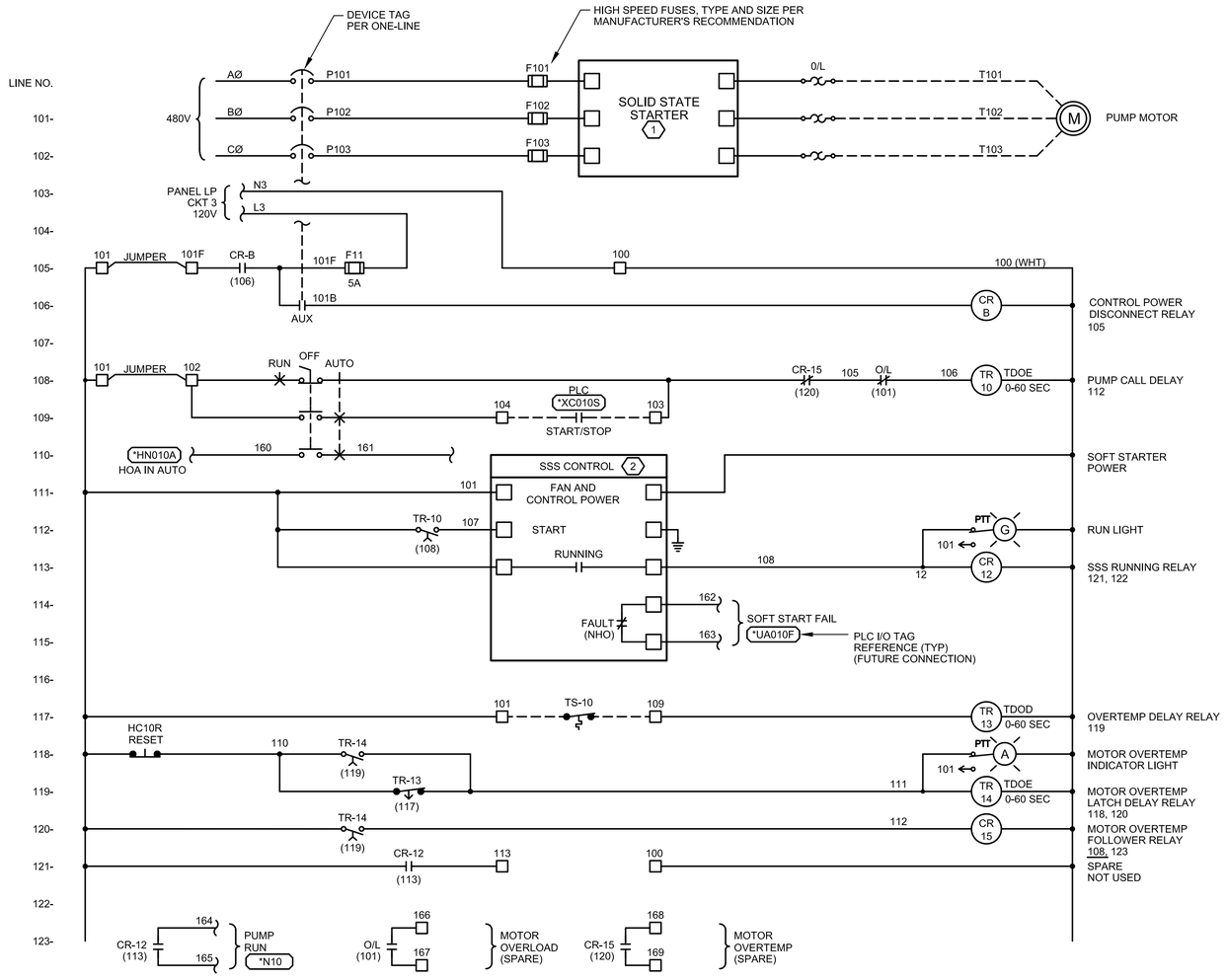
ARCADIS

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP
IRL-4 CONTROL PANEL POWER DISTRIBUTION & PLC DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	E-05-11 / REV 1

PLOT DATE: Nov 04, 2015 PLOT TIME: 3:40:40pm
FILENAME: E-05-11.DWG

N1808



WELL PUMP ELEMENTARY DIAGRAM

EQUIPMENT NAMEPLATE WITH ENGRAVED 1/4" LETTERS (SEE ONE-LINE FOR LABEL)

IRL-4
WELL PUMP

DEVICE NAMEPLATE WITH ENGRAVED 3/16" LETTERS

PUMP RUNNING
G

OFF
RUN AUTO

OVERLOAD RESET
(RED)

DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SOLID STATE STARTER SHALL PROVIDE THE FOLLOWING MOTOR PROTECTION PARAMETERS:

VOLTAGE	CURRENT	MOTOR PARAMETERS
PHASE REVERSAL	OVERLOAD	OVERLOAD CLASS
	UNBALANCE	FULL LOAD CURRENT

2. 120 VAC CONTROL INTERFACE, NO EXCEPTIONS.

GENERAL NOTES:

1. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDDLE 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

MICROFILM

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY		TPF	
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY		TPF	

REVISIONS

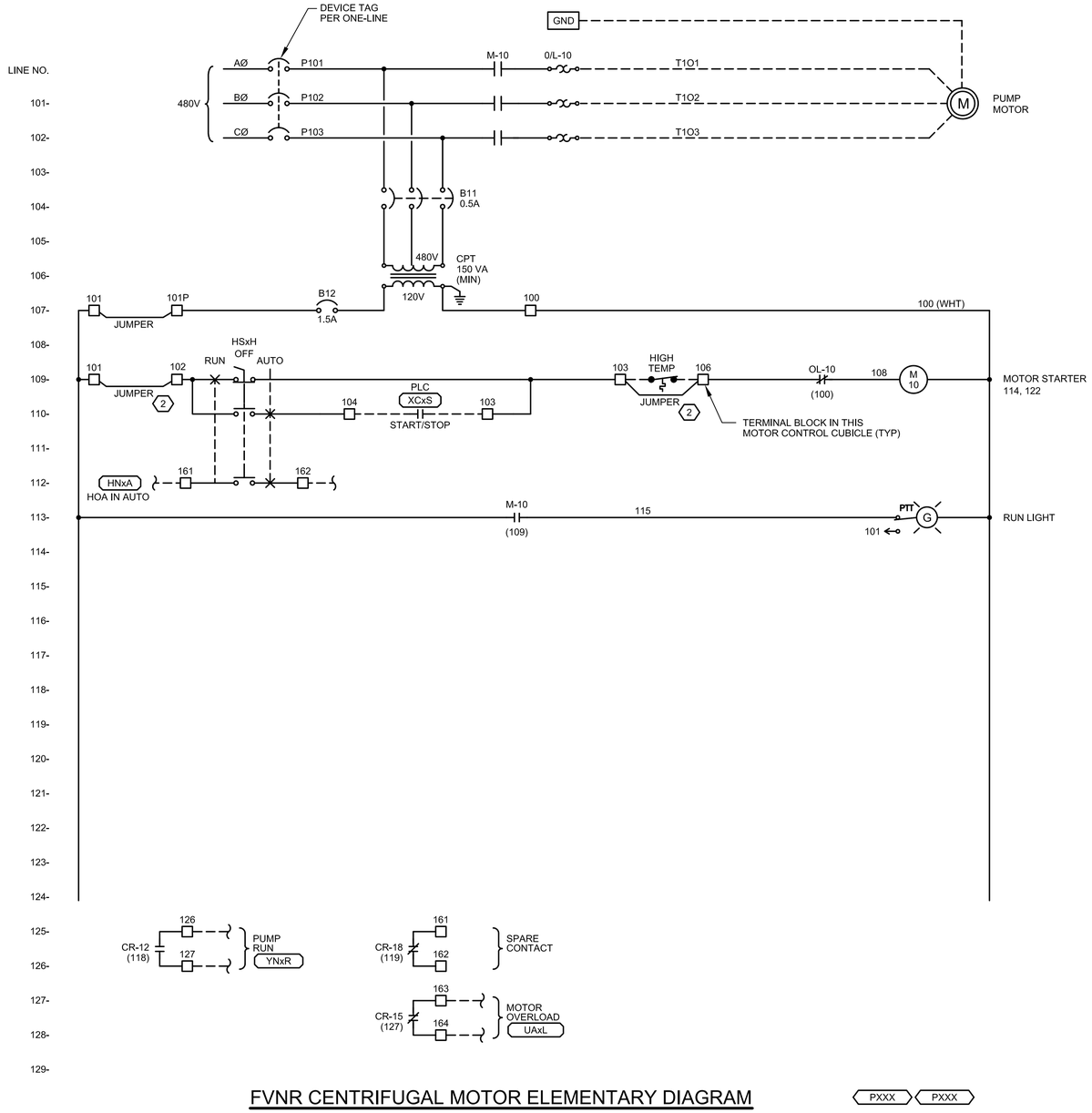
APPROVED BY	
RAO	SO
	SUPV JMS
	DSGN MBY
	DWN MBY
	CHKD TPF
	OK JMS
	DATE
	SCALES N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP
IRL-4 SSS PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-12	REV 1

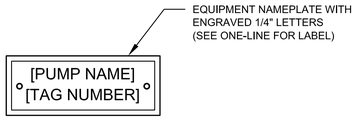
PLOT TIME: 3:55:57pm
PLOT DATE: Oct 29, 2015
FILENAME: E-05-12.DWG

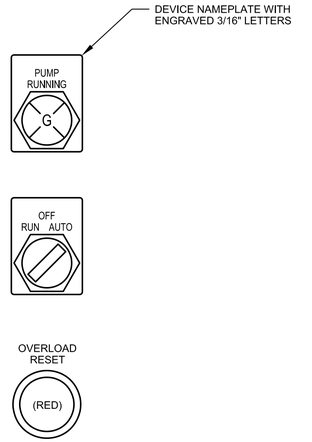
N1808



FVNR CENTRIFUGAL MOTOR ELEMENTARY DIAGRAM

PXXX PXXX





DOOR LAYOUT (PARTIAL)

NOTES REFERENCED IN DRAWING:

1. SET TIME DELAY ON DROP TO 0.5 SECONDS.
2. REMOVE JUMPER FOR DEVICE WHEN CONNECTED.

GENERAL NOTES:

1. SIMILAR DIAGRAM FOR PUMPS LISTED AND PER P&IDS.
2. TERMINAL BLOCKS AND WIRES SHALL BE LABELED SAME EXCEPTION: WIRES TO PLC SHALL BE NUMBERED PER CONTROL PANEL TERMINAL BLOCK NUMBER.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIOCHI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

FRISCH ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
13405 FOLSOM BLVD, UNIT 600
FOLSOM, CA 95630
PH 916 353 1025
WWW.FRISCHENGINEERING.COM

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		MBY	TPF	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		MBY			TPF
0	4/5/13	INTERMEDIATE (60%) DESIGN		MBY			TPF

REVISIONS

APPROVED BY	
RAO	

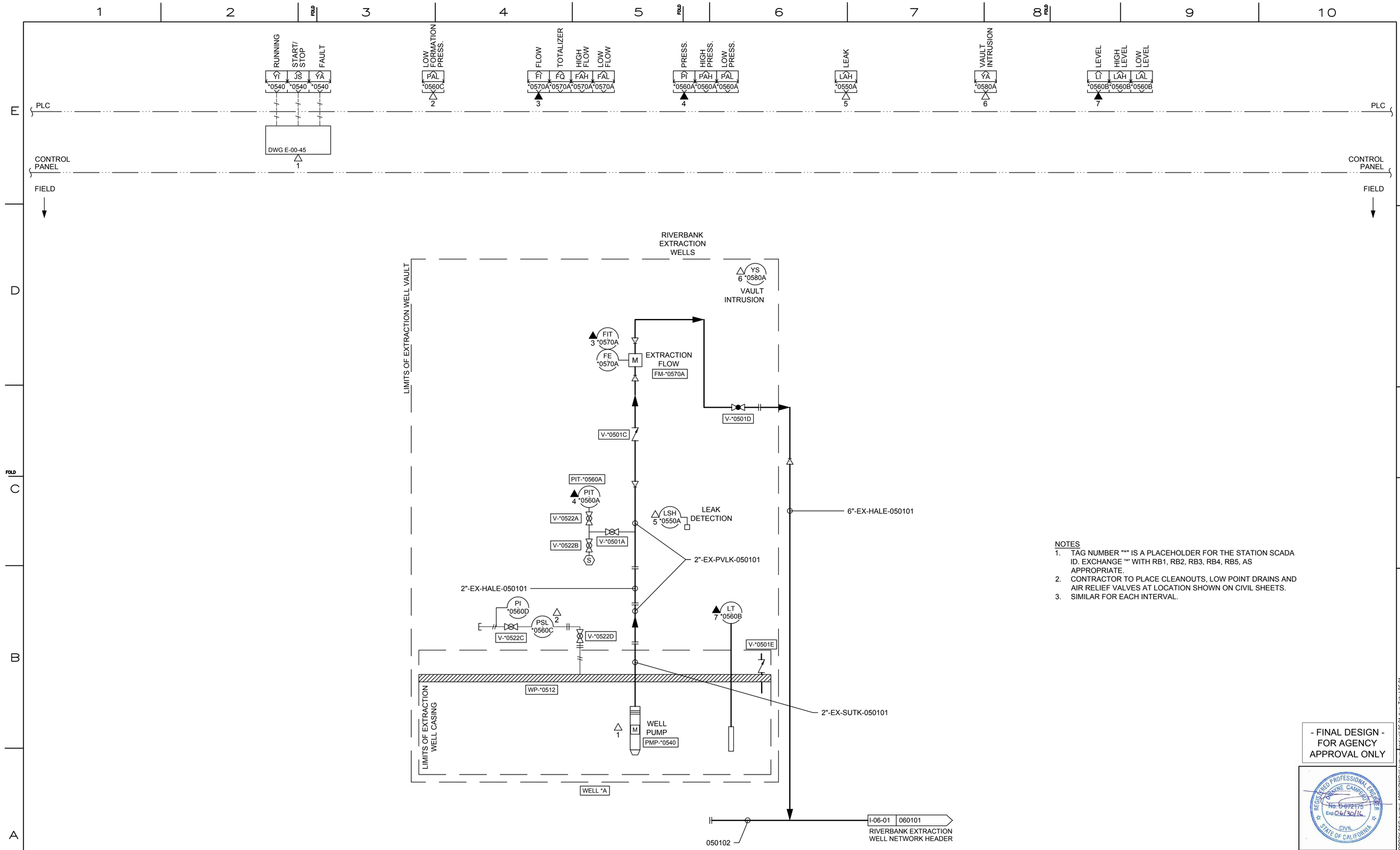
SO	
SUPV	JMS
DSGN	MBY
DWN	MBY
CHKD	TPF
OK JMS	
DATE	
SCALES	N/A

TOPOCK GROUNDWATER REMEDIATION PROJECT
INNER RECIRCULATION LOOP IRL-4 FVNR PUMP ELEMENTARY DIAGRAM
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-05-13	REV 1

PLOT TIME: 3:56:02pm
PLOT DATE: Oct 29, 2015
FILENAME: E-05-13.DWG

N1808



NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE "*" WITH RB1, RB2, RB3, RB4, RB5, AS APPROPRIATE.
2. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
3. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. C-072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING
ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

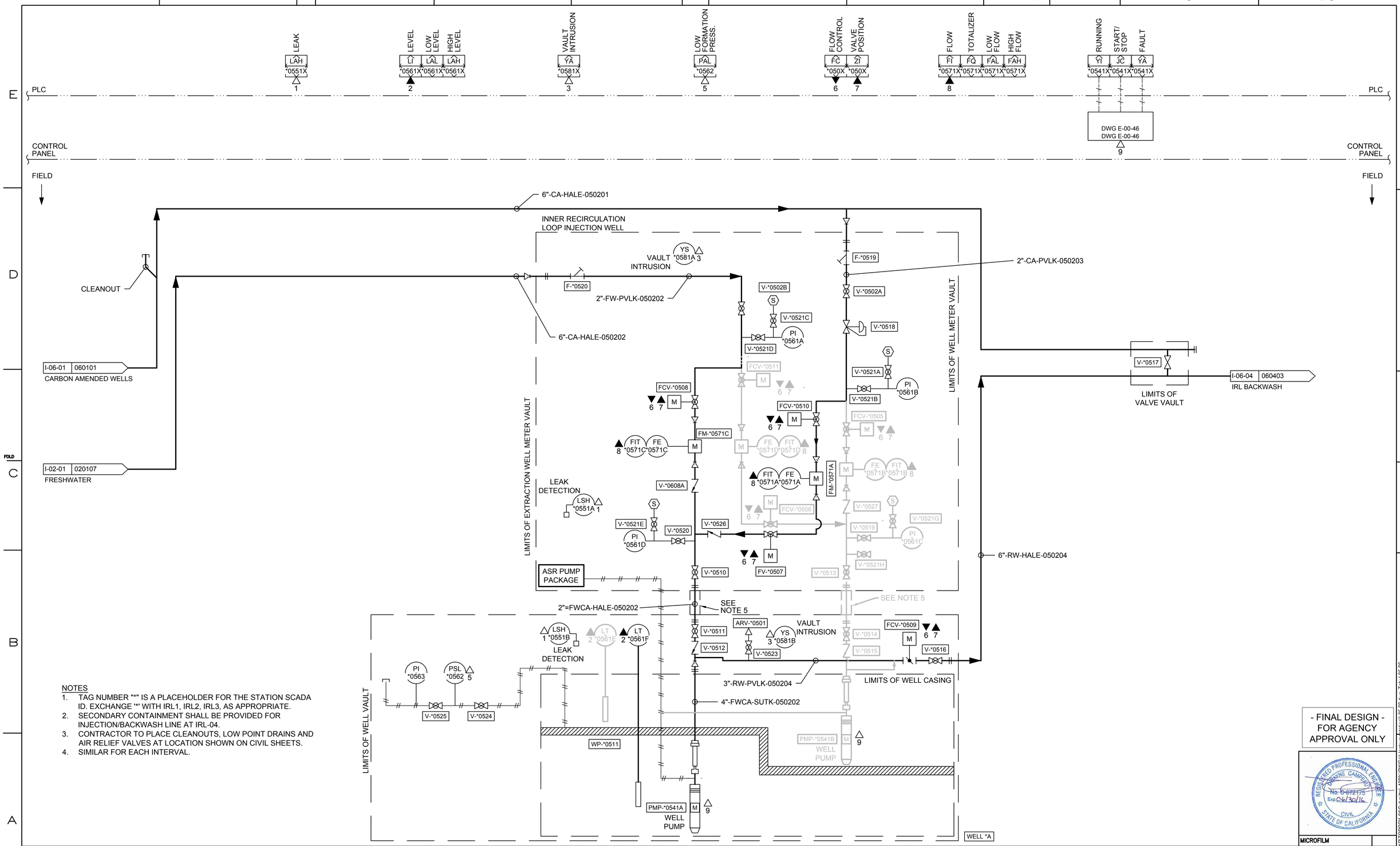
INNER RECIRCULATION LOOP EXTRACTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-05-01	REV 2

11/03/2015, 17:20, G:\Graphics\ARTOPOCK-01\Submittal_100%\DWG\I-Instrumentation\I-05-01.dwg, I-tab: I-05-01

N1808



NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRL1, IRL2, IRL3, AS APPROPRIATE.
2. SECONDARY CONTAINMENT SHALL BE PROVIDED FOR INJECTION/BACKWASH LINE AT IRL-04.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — DWAYNE CAMPBELL — No. C 67275 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	
	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

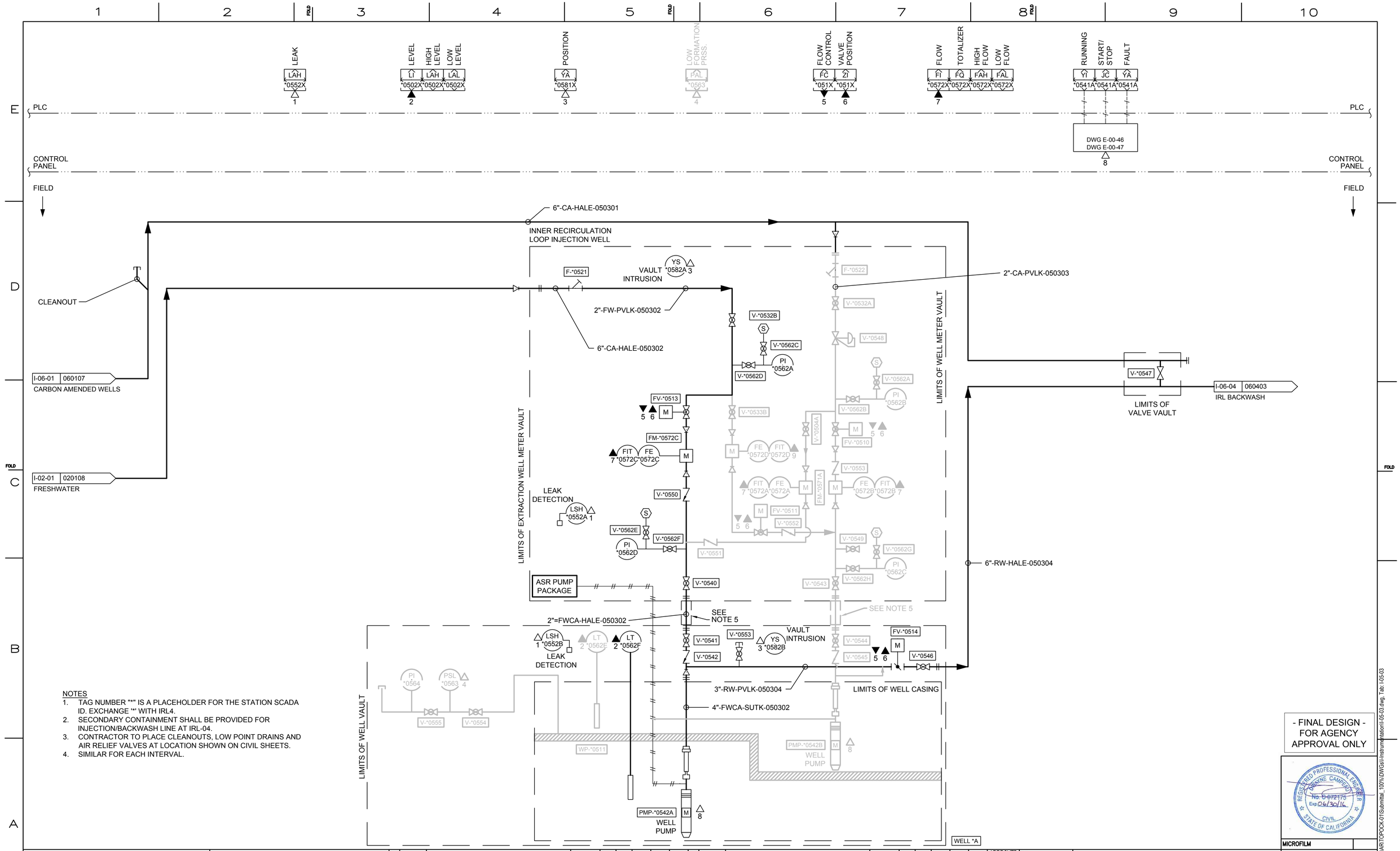
INNER RECIRCULATION LOOP TYPE 1 INJECTION WELLS P&ID

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-05-02	REV 2

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N1608



NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRL4.
2. SECONDARY CONTAINMENT SHALL BE PROVIDED FOR INJECTION/BACKWASH LINE AT IRL-04.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — DIANNE CAMPBELL — No. C 072176 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO / SUPV / DSGN / DWN / CHKD / OK / DATE / SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

INNER RECIRCULATION LOOP TYPE 2 INJECTION WELLS P&ID

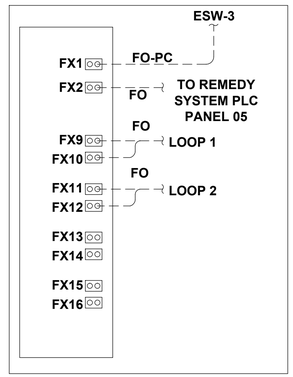
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

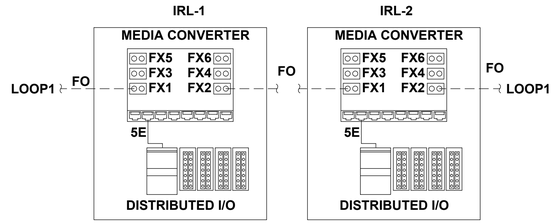
MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

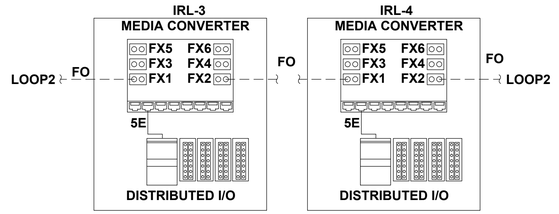
SHEET NO. I-05-03 of SHEETS | REV 2

N1808

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LEGEND

FO	**MM FIBER OPTIC CABLE**
FO-PC	**FIBER OPTIC PATCH CABLE**
5E	**CAT 5e ETHERNET PATCH CABLE**
FOD	**FIBER OPTIC DROP**
PLC	**PROGRAMMABLE LOGIC CONTROLLER**
I/O	**INPUT/OUTPUT**

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DIANNE CAMPAGNA
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT

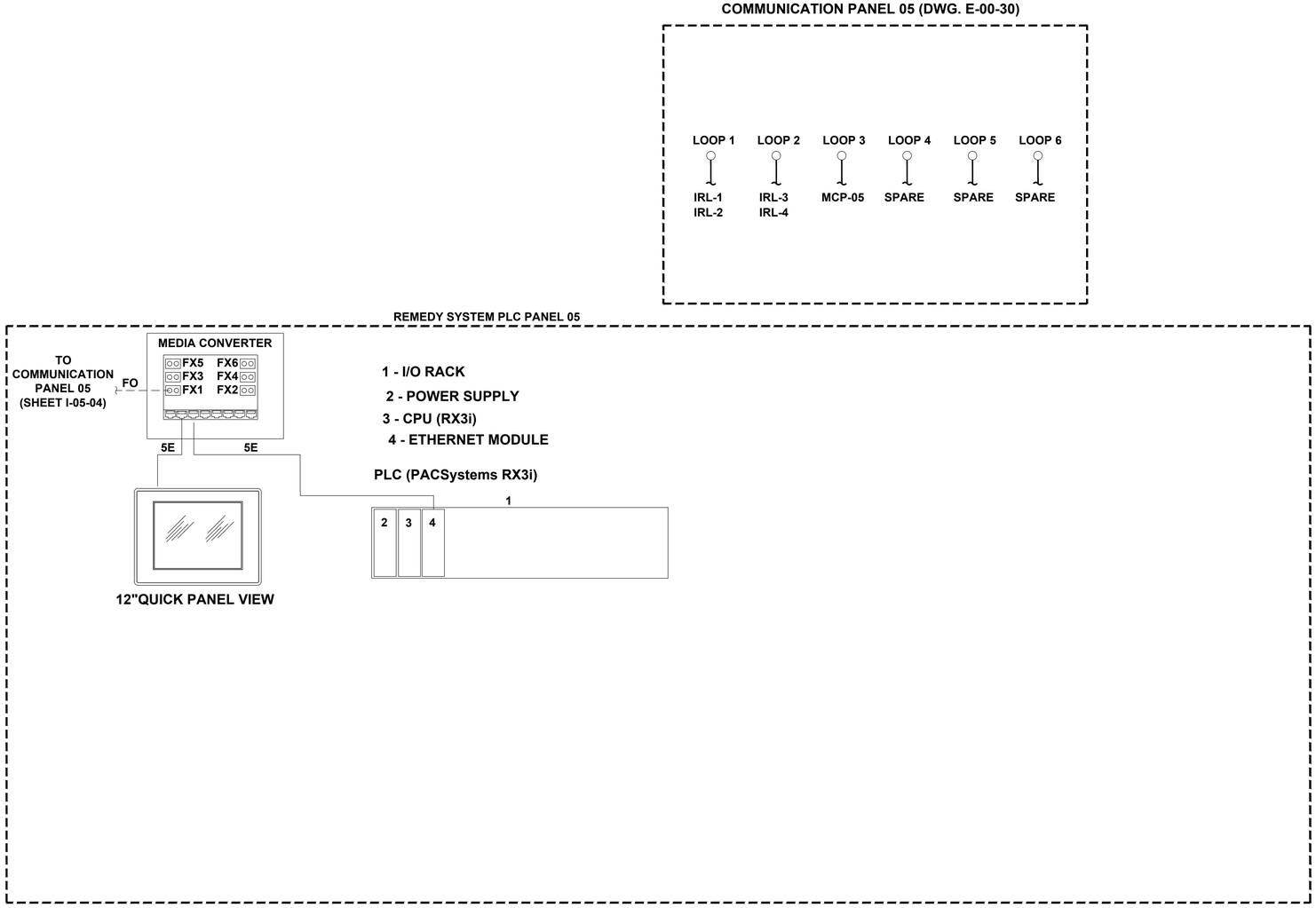
NODE 05 FIBER OPTIC NETWORK

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-05-04	REV 2

N1808

11/03/2015, 17:21, G:\Graphics\AR\TOPOCX-01\Submittal_100%\DWGs\I-Instrumentation\I-05-04.dwg, Tab: I-05-04



LEGEND

AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
DC-DI	DC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
PLC	PROGRAMMABLE LOGIC CONTROLLER
FOD	FIBER OPTIC DROP
I/O	INPUT/OUTPUT
MCP	MAIN CONTROL PANEL
FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DAWNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
		REVISIONS					

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	DAC	RAO	
1	0908/14	PRE-FINAL (90%) DESIGN	MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	MS	MWM	JPB	JEF	
		REVISIONS					

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 05 PLC PANEL INSTRUMENTATION CONNECTION SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

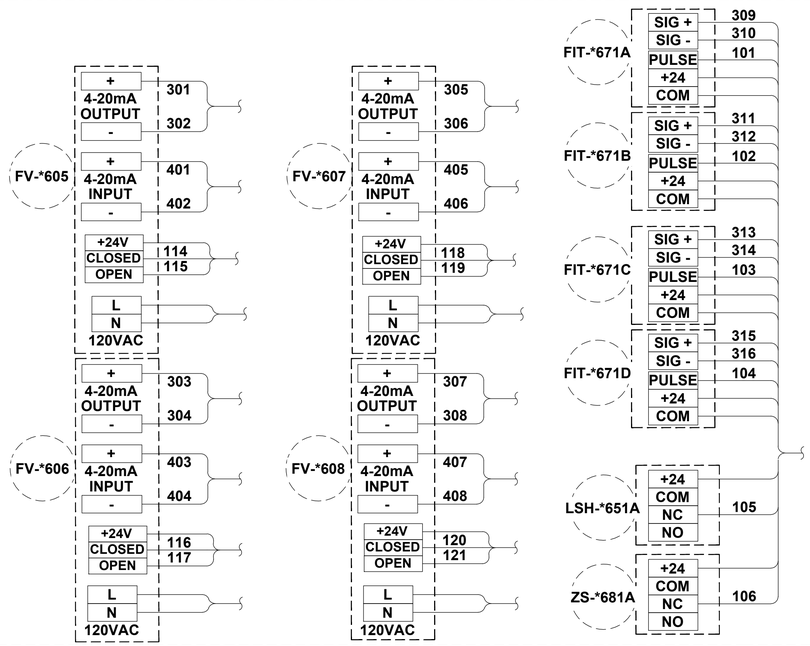
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
I-05-05	REV 2

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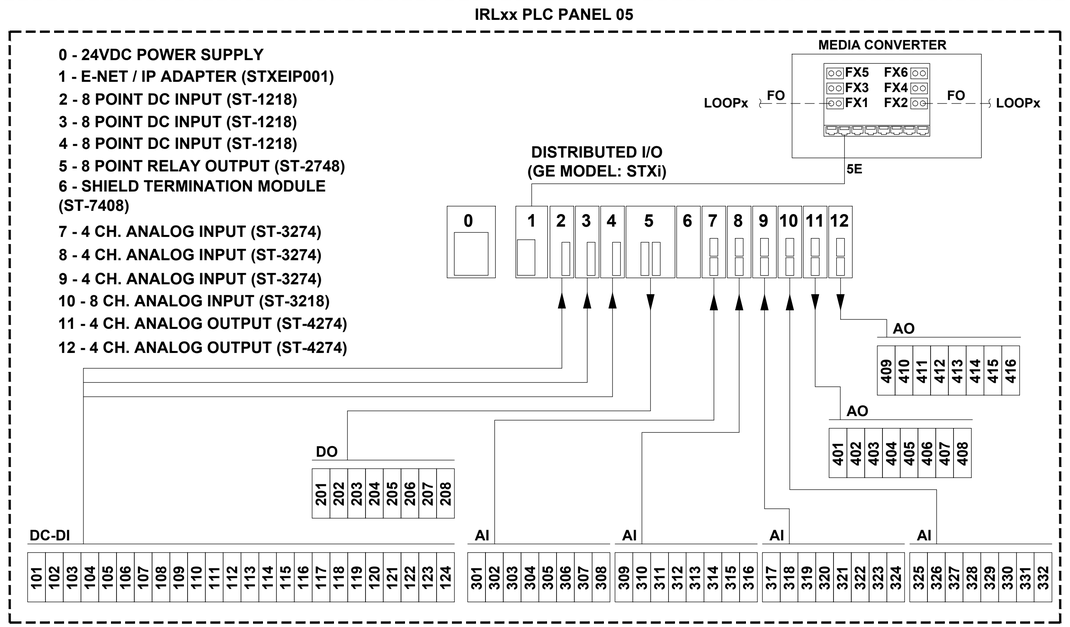
N1808

(TYP. IRL-1, IRL-2, IRL-3, IRL-4)

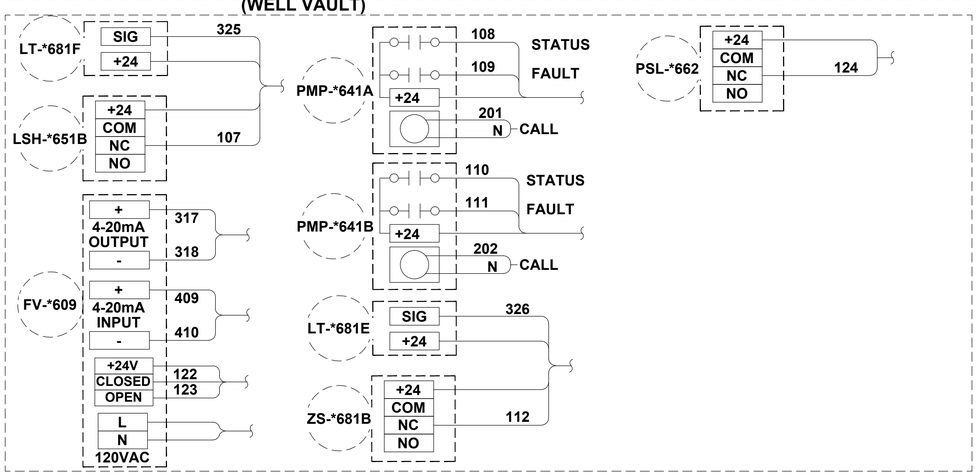
(METER VAULT)



IRLxx PLC PANEL 05



(WELL VAULT)



LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
E5	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:
1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC).
2. NOT ALL INSTRUMENTS ARE TO BE INSTALLED IN EACH IRL WELL. SEE I-05-02 AND I-05-03 FOR DETAILS.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOHNNIE CAMPBELL — No. C072176 Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 05 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 2

GAS TRANSMISSION & DISTRIBUTION

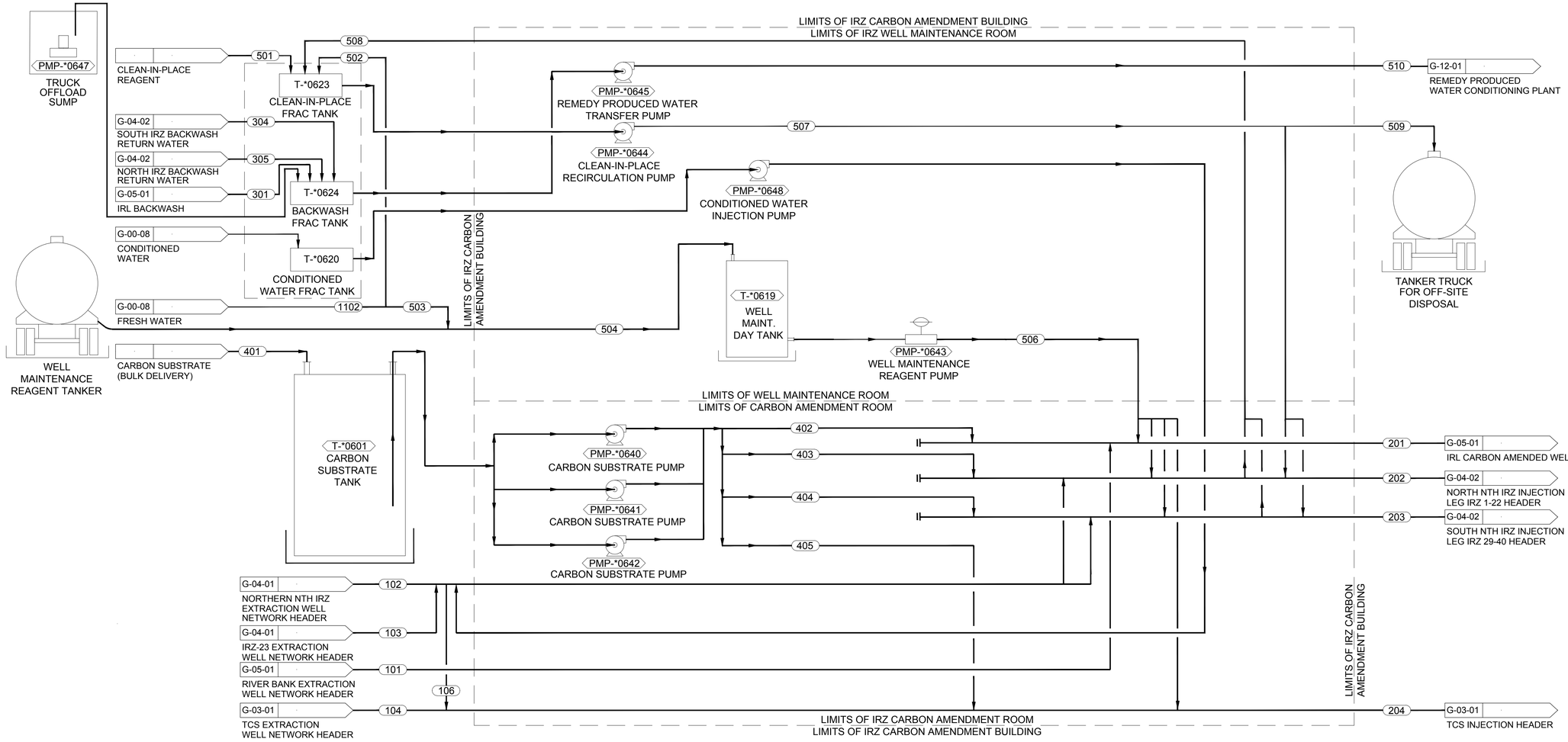
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-05-06	REV 2

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N1808



NOTES:

1. SPARE HEADERS AND FUTURE PROVISIONAL WELLS ARE NOT SHOWN.

ABBREVIATIONS:

BWGW:	BACKWASH GROUNDWATER
CAGW:	CARBON AMENDED GROUNDWATER
CIPR:	CLEAN IN PLACE REAGENT
ETOH:	ETHANOL
EXGW:	EXTRACTED GROUNDWATER
FW:	FRESH WATER
GPD:	GALLONS PER DAY
GPM:	GALLONS PER MINUTE
IRL:	INNER RECIRCULATION LOOP
IRZ:	IN-SITU REACTIVE ZONE
lbs/day	POUNDS PER DAY
mg/L:	MILLIGRAMS PER LITER
NTH:	NATIONAL TRAIL HIGHWAY
TOC:	TOTAL ORGANIC CARBON
TW:	TREATED WATER
WMR:	WELL MAINTENANCE REAGENT
µg/L:	MICROGRAMS PER LITER

Design Basis and Mass Balance[a,g]

Stream ID:	101	102	103	105	106	201	202	203	204	209	301	304[i]	305[i]	401	402	403	404	405	1102	501	502	503	504	505	506	507	508	509	510	511
Stream Description:	EXGW	EXGW	EXGW	EXGW	EXGW	CAGW/FW	CAGW	CAGW	CAGW	FW	BWGW	BWGW	BWGW	ETOH	ETOH	ETOH	ETOH	ETOH	FW	CIPR	FW	FW	FW	FW	WMR	WMR	WMR	WMR/BWGW	WMR/BWGW	MWPW
Nominal Design Parameters																														
Flow Rate (GPM):	150	200	100	TBD	TBD	150	300		24	TBD	≤400	17	20	---	---	---	---	---	8.3	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Carbon Substrate[b,c] (GPD):	---	---	---	---	---	10	104		8.3	---	---	---	---	---	10	104	TBD	100	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	---	---	---	---	---	20	100		100	---	---	---	---	---	20	100	TBD	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (µg/L):	10	26.3	2300	---	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	1.8E-02	6.3E-02	2.8E+00	---	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum Design Parameters																														
Flow Rate (GPM):	500[e]	400[f]		TBD	TBD	750[h]	400[f]		75	---	≤400	35	40	---	---	---	---	---	38	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Carbon Substrate[b,c] (GPD):	---	---	---	---	---	104	694		130	---	---	---	---	j	104	694	TBD	130	---	---	---	---	---	---	---	---	---	---	---	---	---
TOC[b,c] (mg/L):	---	---	---	---	---	50	500		500	---	---	---	---	---	50	500	TBD	500	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (µg/L):	10	26	2,300	---	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium[d] (lbs/day):	6.0E-02	3.7		---	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

a - Values represent target/estimated design parameters for initial operation; system operation may be modified to optimize system performance.
b - Denatured ethanol assumed; instantaneous dosage concentration will not exceed 1-percent by volume.
c - Average flow rate/concentration over time; carbon substrate dosing will be periodic and duration/frequency will vary.
d - Estimated initial concentration.
e - Total maximum River Bank extracted groundwater flow limited to 500 gpm.
f - Total maximum NTH IRZ extracted/injected groundwater flow limited to 400 gpm.
g - Reference: G-03-01, G-04-01, G-04-02.
h - Total maximum carbon-amended injection well flow limited to 750 gpm; may include freshwater (see G-05-01).
i - Total backwash return water volume per week from NTH IRZ injection will network is approximately 18,000 gallons.
j - Maximum delivered volume = 7,000 gallons.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WIEBE C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		AJW	JPB	BW	RAO
2	8/5/15	90% RTC RESOLUTION		AJW	MSL	JPB	JEF
1	9/8/14	PRE-FINAL (90%) DESIGN		KLD	BJW	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		KLD	BJW	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

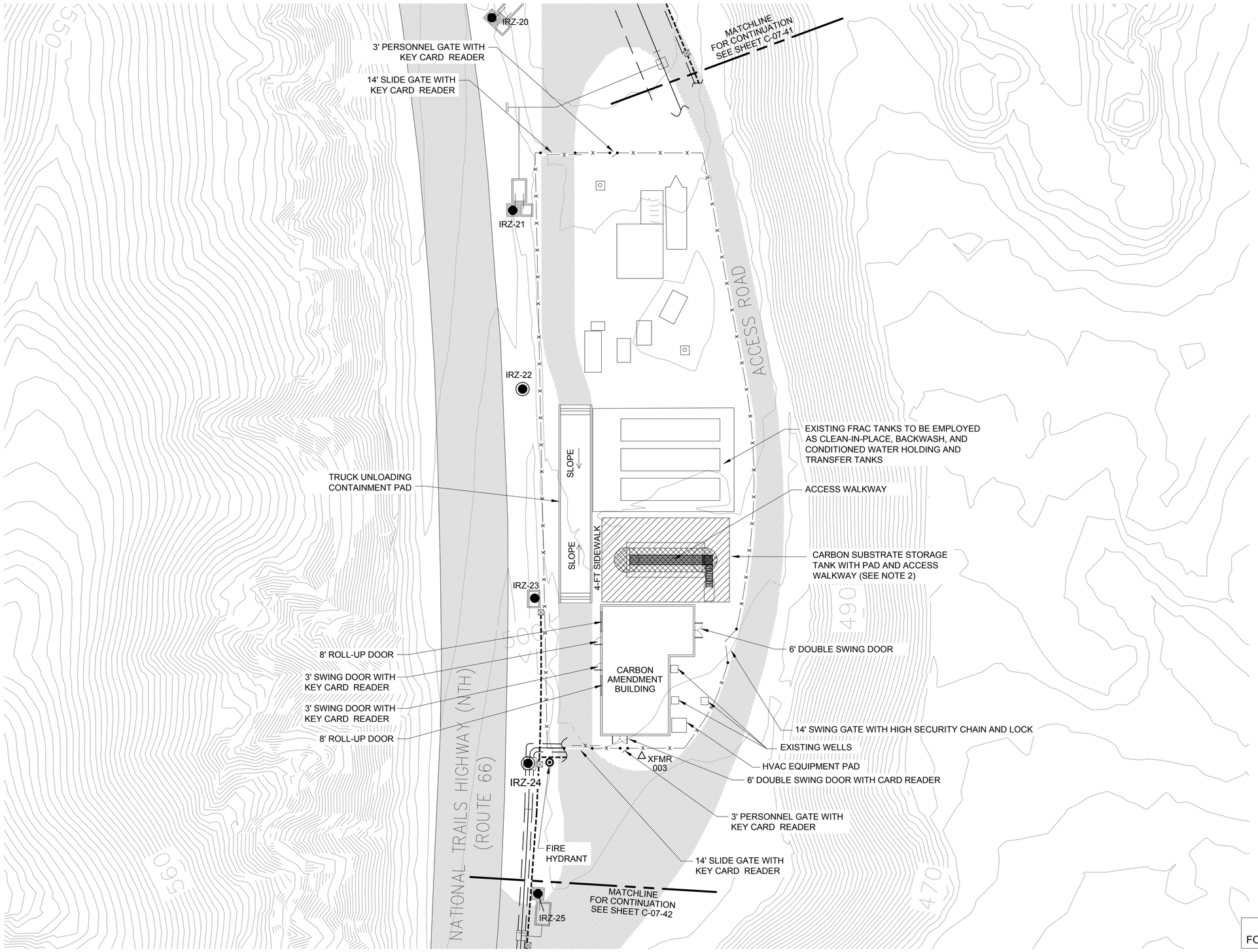
MW-20 BENCH PROCESS FLOW DIAGRAM

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
G-06-01	REV 3

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NOTES:

1. CARBON AMENDMENT AND WELL MAINTENANCE BUILDING FOUNDATIONS INCLUDE A 6" CONCRETE CURB TO PROVIDE SECONDARY CONTAINMENT FOR PROCESSES WITHIN BUILDINGS.
2. CARBON SUBSTRATE STORAGE TANK VENDOR SHALL PROVIDE ACCESS PLATFORM.

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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WURL
C 67811
Exp 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

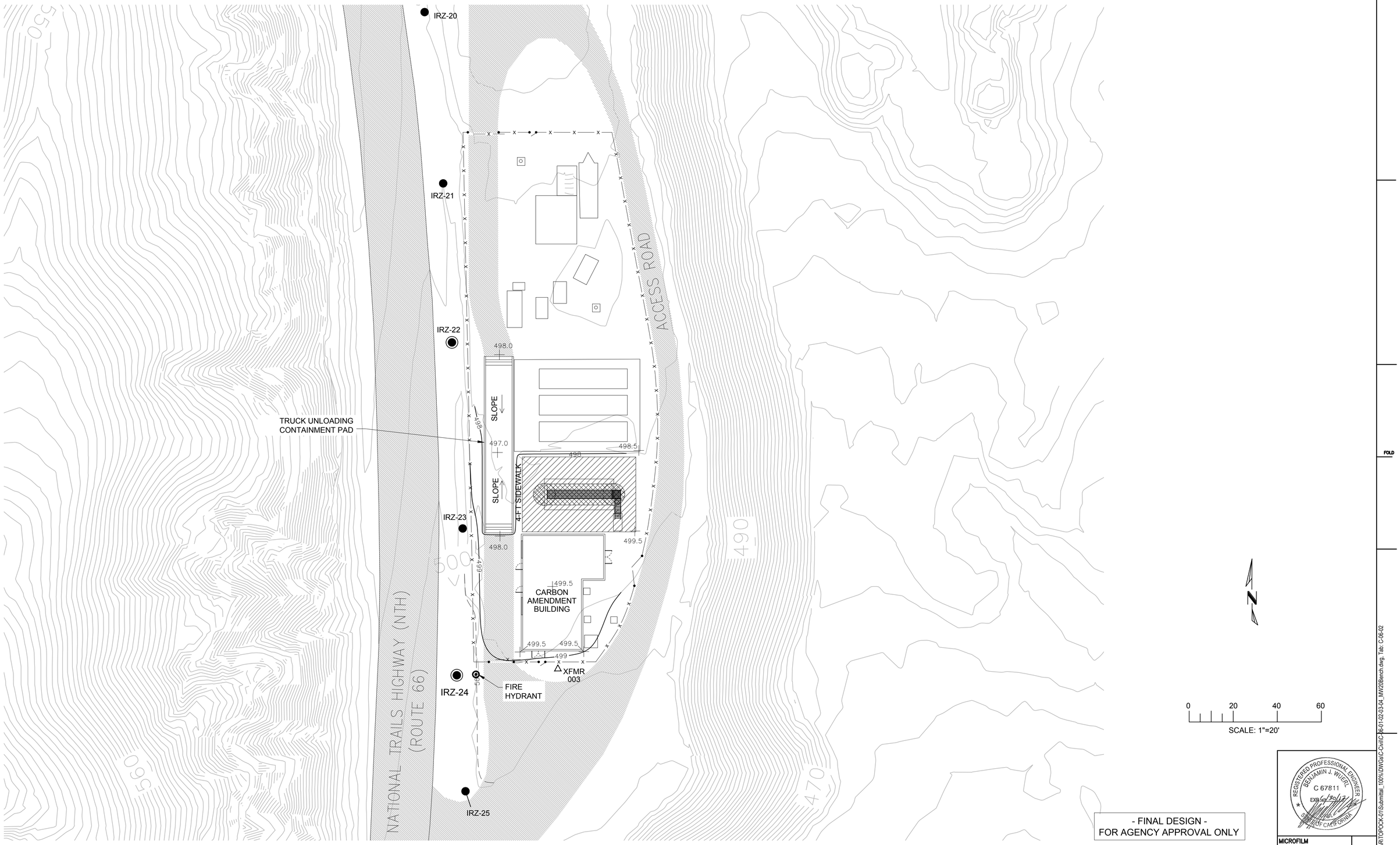
MW-20 BENCH AREA PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-06-01	REV 3

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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WURL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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1	9/8/14	PRE-FINAL (90%) DESIGN	AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

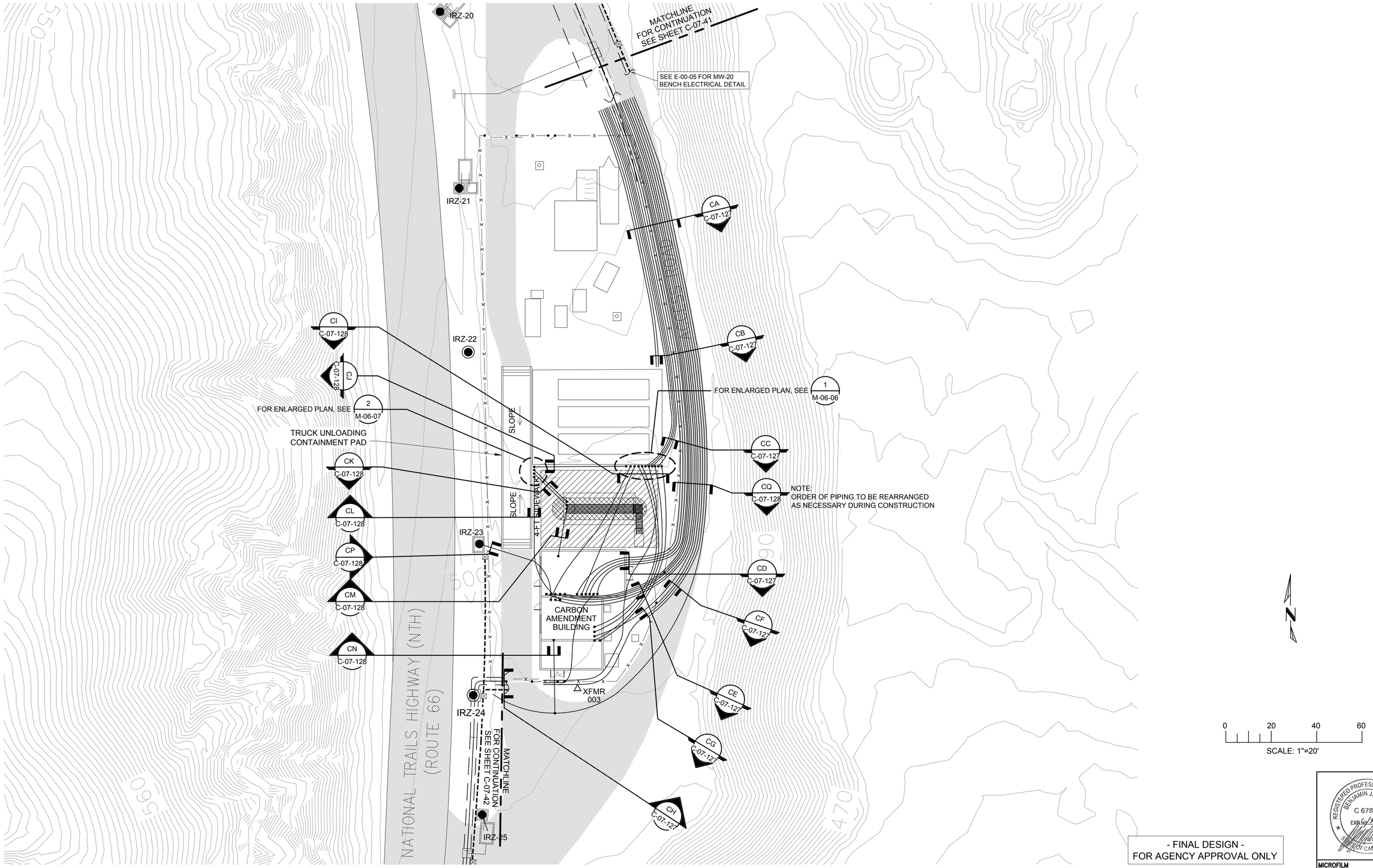
MW-20 BENCH GRADING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SUPSDS	
SUPSD BY	
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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN	AJW	WLM	BW	RAO	
2	8/5/15	90% RTC RESOLUTION	AJW	KLD	WLM	BJW	
1	9/8/14	PRE-FINAL (90%) DESIGN	AJW	BAS	JPB	JEF	
0	4/5/13	INTERMEDIATE (60%) DESIGN	AJW	KLD	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

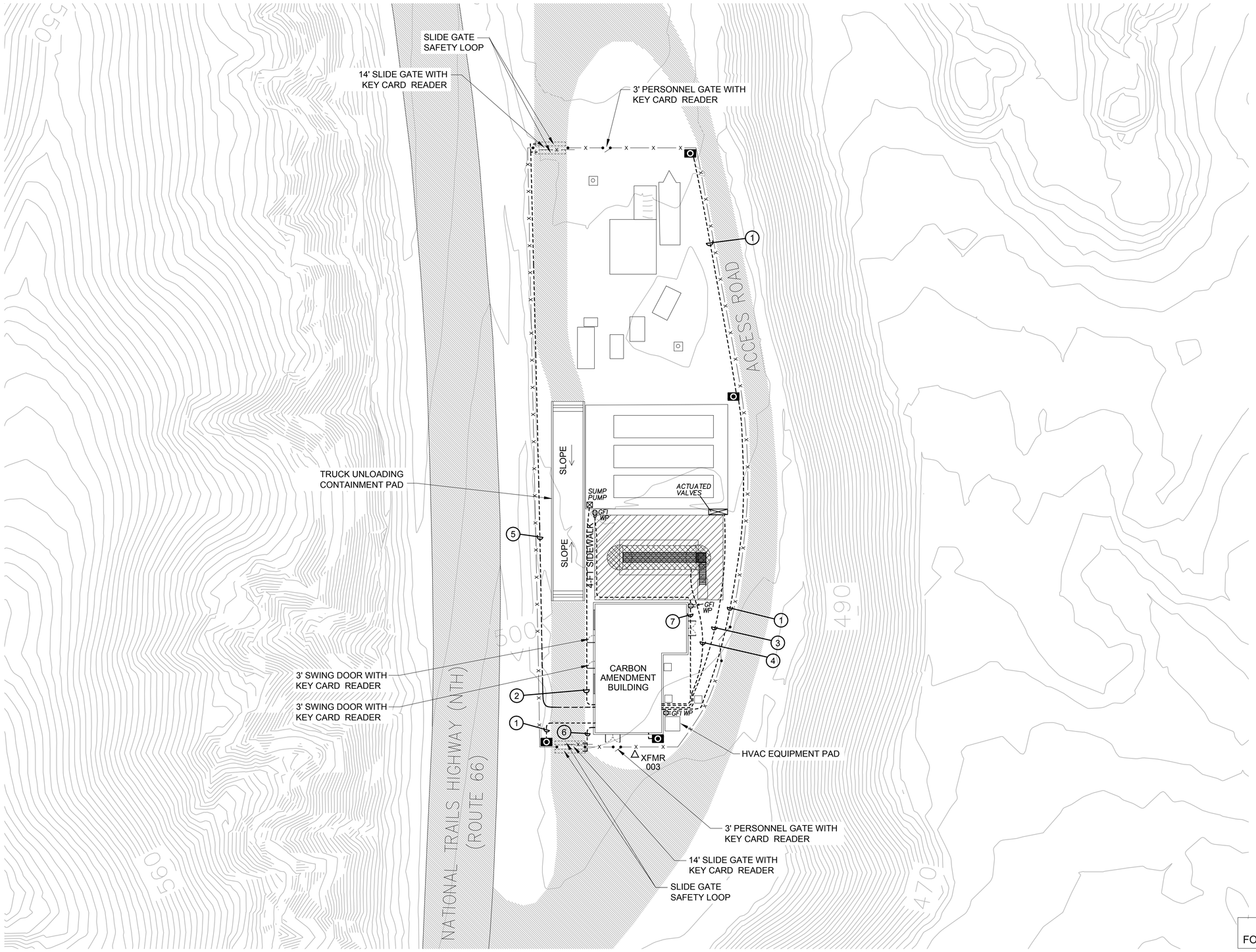
MW-20 BENCH YARD PIPING PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
C-06-03	REV 3

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NOTES:

1. ELECTRICAL HAZARD CLASSIFICATIONS:
   - A. CLASS I, DIV I WITHIN A 5-FT RADIUS OF THE CARBON STORAGE TANK VENTS.
   - B. CLASS I, DIV II WITHIN A 10-FT RADIUS OF THE CARBON STORAGE TANK VENTS (FROM VENT ELEVATION TO GROUND).
   - C. CLASS I, DIV II FROM GROUND SURFACE TO 18-INCHES ABOVE GRADE WITHIN A 10-FT RADIUS OF THE TANK FOOTPRINT.
   - D. CLASS I, DIV II WITHIN THE CARBON AMENDMENT BUILDING WHERE DOSING LINES CONTAIN >10% ETHANOL, FIRE RATED WALLS MAY BE USED TO MINIMIZE THE FOOTPRINT OF THE CLASSIFIED AREA.
   - E. CLASS I, DIV II WITHIN A 10-FT RADIUS OF THE VENTS OF THE EQUIVALENT HAZ CLASS LOCATIONS WITHIN THE BUILDING.
2. SECURITY FEATURES BY OTHERS. CONDUIT INSTALLATION TO FEATURES BY CONTRACTOR.

LEGEND:

- Φ_{WP}^{GFI} OUTDOOR ELECTRICAL RECEPTACLE
- CAMERA

CONDUIT NOTES:

1. 1" EMPTY CONDUIT W/ PULL LINE FOR CAMERAS.
2. (3) #10, (1) #10G, 1" CONDUIT FOR TRUCK UNLOADING CONTAINMENT PAD (LOCAL DISCONNECT).
3. 2" CONDUIT TO CONTAINMENT MANIFOLD ACTUATED VALVES.
4. 2" CONDUIT TO CARBON SUBSTRATE TANK LEVEL TEMPERATURE TRANSMITTERS AND LEVEL SWITCH.
5. 1" EMPTY CONDUIT W/ PULL LINE TO NORTH END SLIDE GATE AND CARD READERS.
6. 1" EMPTY CONDUIT W/ PULL LINE TO SOUTH END SLIDE GATE AND CARD READERS.
7. (2) #10, (1) #10G, 1" CONDUIT FOR OUTDOOR RECEPTACLES, RUN TO LP-3 INSIDE CARBON AMENDMENT BUILDING.

N

0 20 40 60

SCALE: 1"=20'

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERZ
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

- FINAL DESIGN -
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ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
3	11/18/15	FINAL DESIGN		AJW	WLM	BW	RAO
2	8/5/15	90% RTC RESOLUTION		AJW	KLD	WLM	BJW
1	9/8/14	PRE-FINAL (90%) DESIGN		AJW	BAS	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		AJW	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

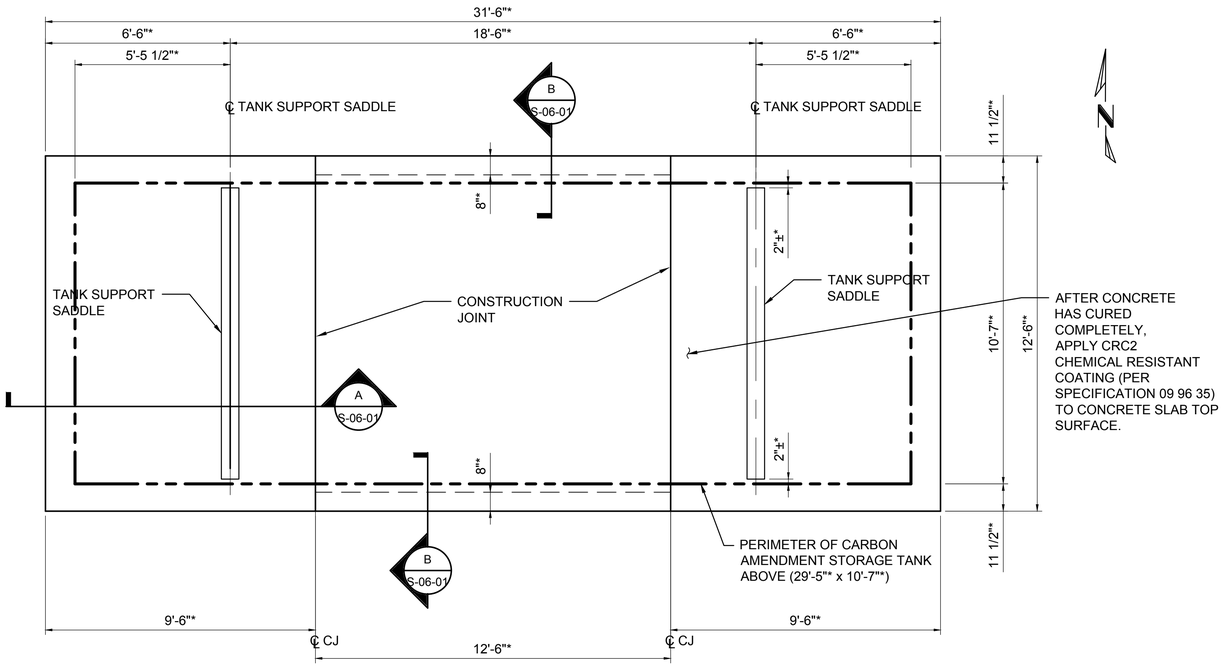
SECURITY AND ELECTRICAL OUTLET

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. C-06-04 of SHEETS	REV 3

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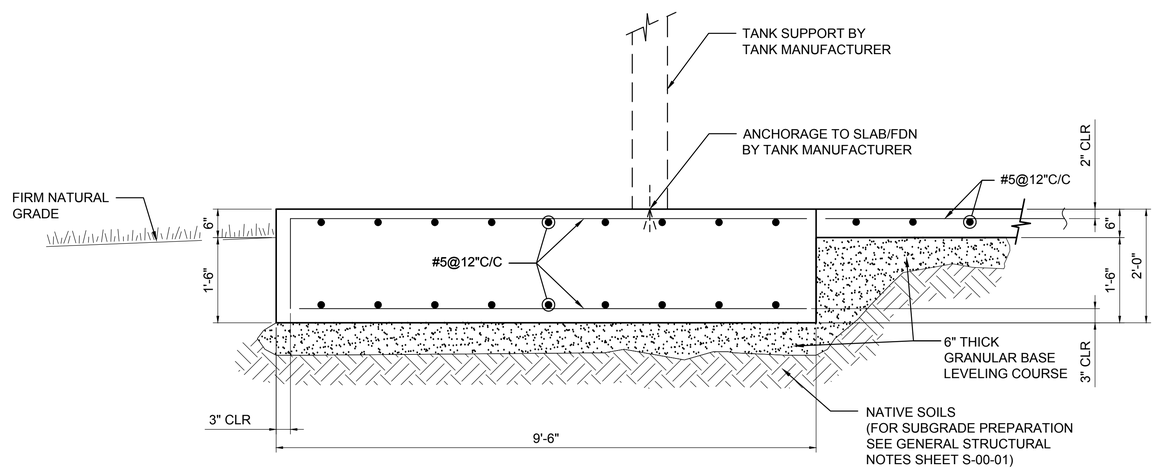
* TO BE VERIFIED BY CONTRACTOR PER APPROVED MANUFACTURER'S STORAGE TANK SHOP DRAWINGS

FOUNDATION NOTES:

1. CARBON AMENDMENT TANK SUPPORTS/SADDLES, ATTACHMENT OF CARBON AMENDMENT TANK TO SUPPORTS/SADDLES, AND ANCHORAGE OF CARBON AMENDMENT TANK OR SUPPORTS/SADDLES TO THE CONCRETE SLAB/FOUNDATION ARE TO BE DESIGNED AND PROVIDED BY THE TANK MANUFACTURER.
2. FOUNDATION DESIGN IS BASED UPON 1500 psf ALLOWABLE BEARING PRESSURE, IN CONFORMANCE WITH CBC TABLE 18-1-C FOR CLASSIFICATION(S) SW, SP, SM, SC. GM, AND/OR GC. A LICENSED GEOTECHNICAL ENGINEER SHALL INSPECT THE EXCAVATIONS AND CONFIRM THAT 1500 psf BEARING IS ALLOWED FOR THE FOUNDATIONS DELINEATED HEREIN, AS WELL AS 0.40 FRICTION FOR THE CARBON AMENDMENT TANK FOUNDATION.
3. GROSS WEIGHT OF CARBON AMENDMENT STORAGE TANK (INCLUDING CONTENTS (FUEL) AND SUPPORT SADDLES) SHALL NOT EXCEED 181,000 lbs. THIS PARAMETER SHALL BE POSTED IN PLAIN SIGHT WITH PERMANENT LETTERING.

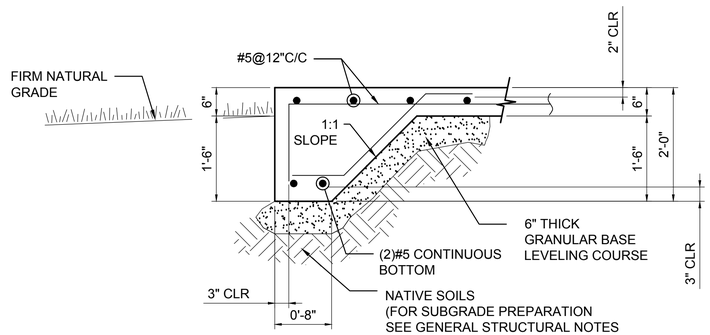
IRZ CARBON SUBSTRATE STORAGE TANK: FOUNDATION PLAN

3/8" = 1'-0"



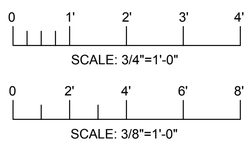
A SECTION

3/4" = 1'-0"



B SECTION

3/4" = 1'-0"



- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWE C 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	MSL	JPB	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		GWE	MSL	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		GWE	MSL	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON SUBSTRATE STORAGE TANK FOUNDATION

GAS TRANSMISSION & DISTRIBUTION

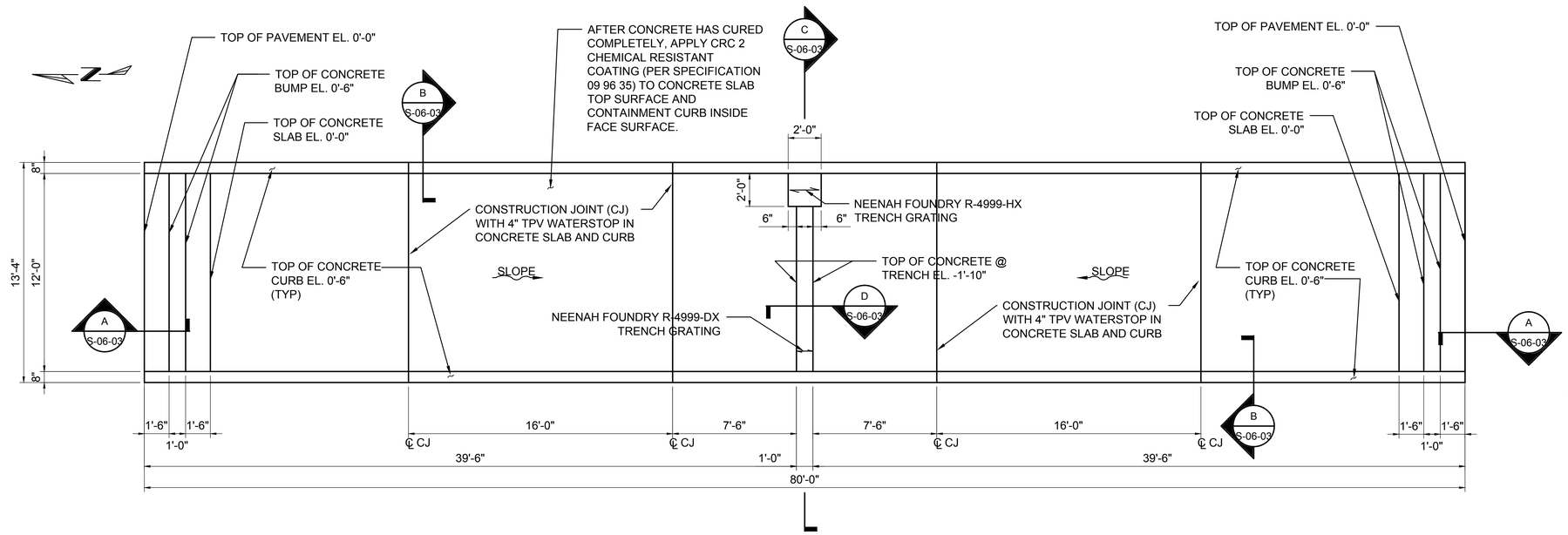
PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-01	REV 2

N1808

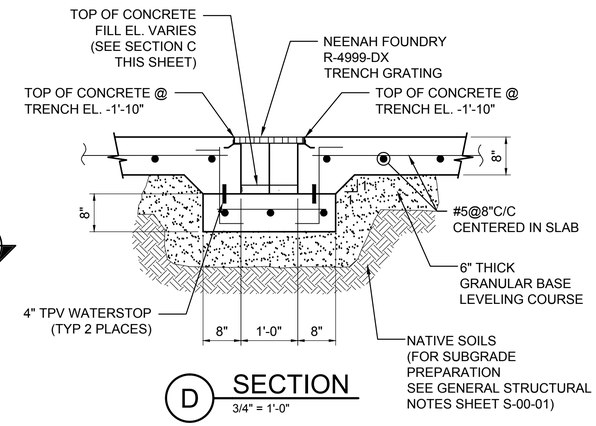
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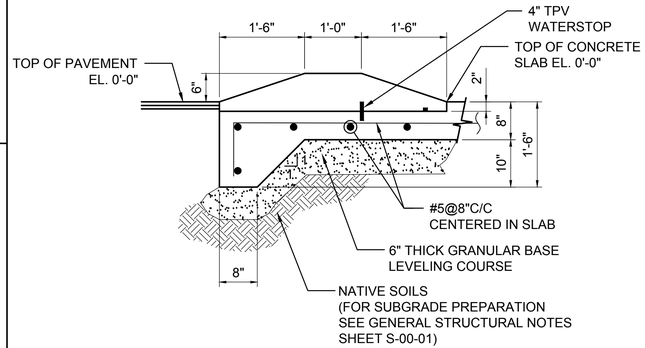
* TO BE VERIFIED BY CONTRACTOR FOR APPROVED MANUFACTURER'S STORAGE TANK SHOP DRAWINGS

IRZ UNLOADING PAD

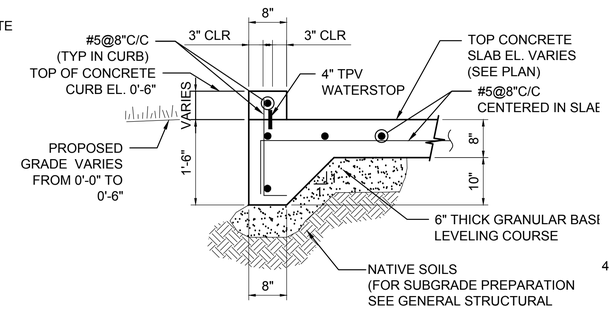
1/4" = 1'-0"



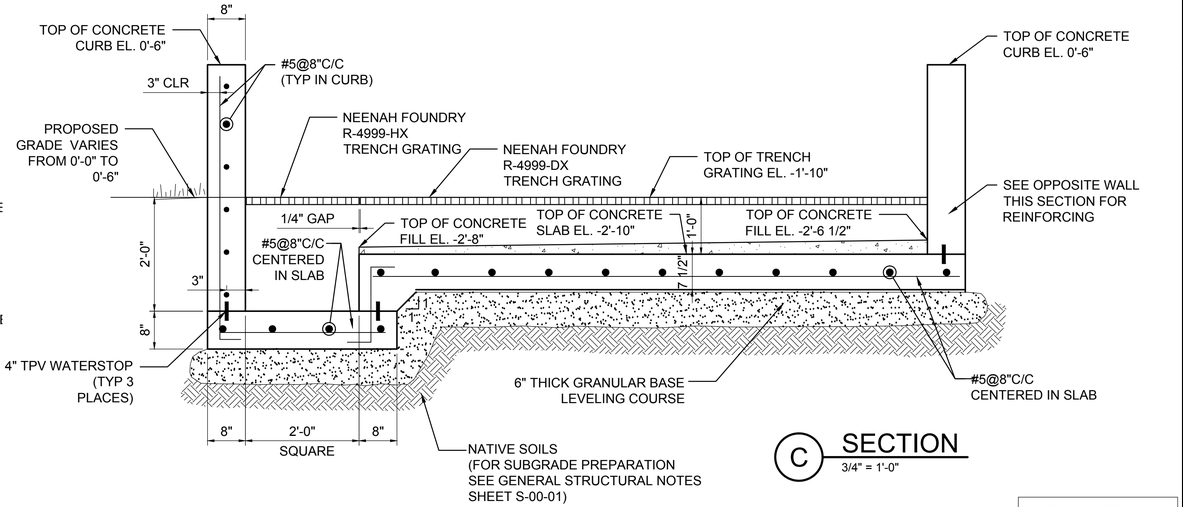
D SECTION
3/4" = 1'-0"



A SECTION
3/4" = 1'-0"



B SECTION
3/4" = 1'-0"



C SECTION
3/4" = 1'-0"

0 1' 2' 3' 4'
SCALE: 3/4"=1'-0"

0 2' 4' 6' 8'
SCALE: 3/8"=1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER STEPHEN S. LOWS 81650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

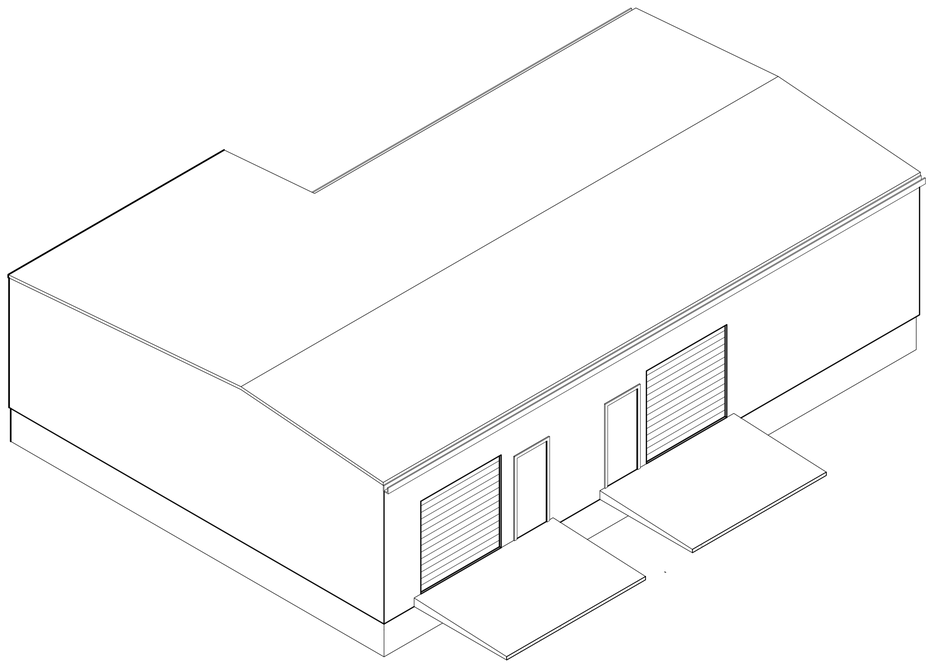
MW-20 BENCH UNLOADING PAD

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

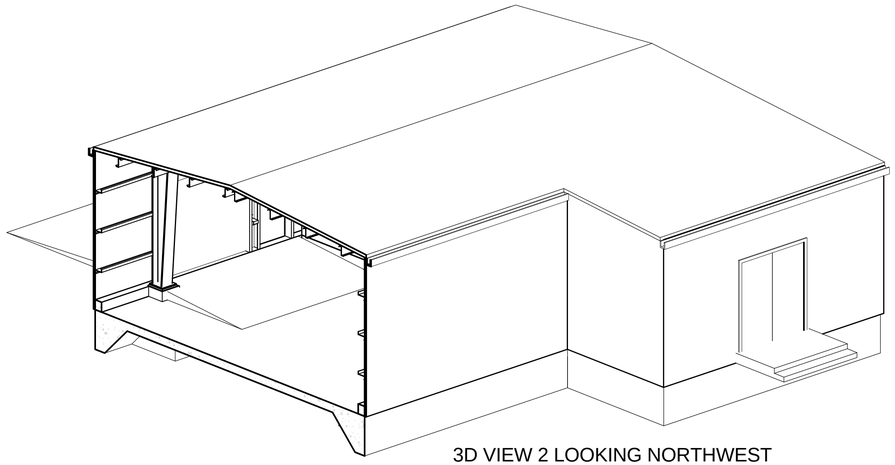
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
S-06-03	REV 2

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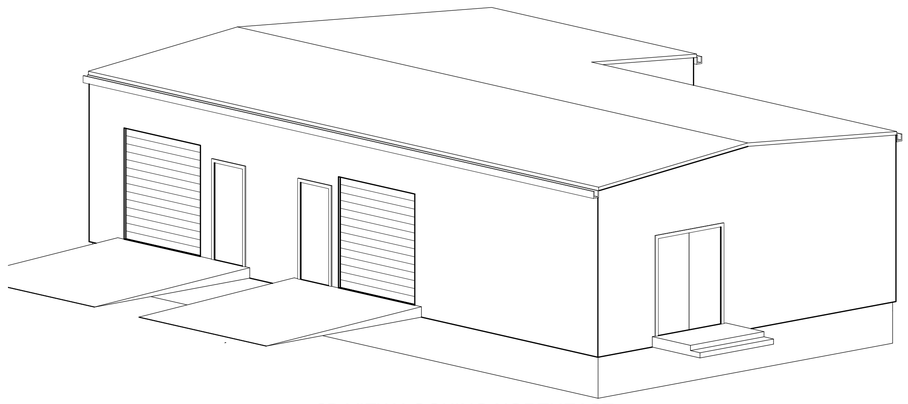
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3D VIEW LOOKING SOUTHEAST



3D VIEW 2 LOOKING NORTHWEST



3D VIEW LOOKING NORTHEAST

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWRY No. 21650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	CMW	MSL	JPB	RAO	
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL	GWE	JR	MSL	LT	

REVISIONS

APPROVED BY	
RAO	
SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

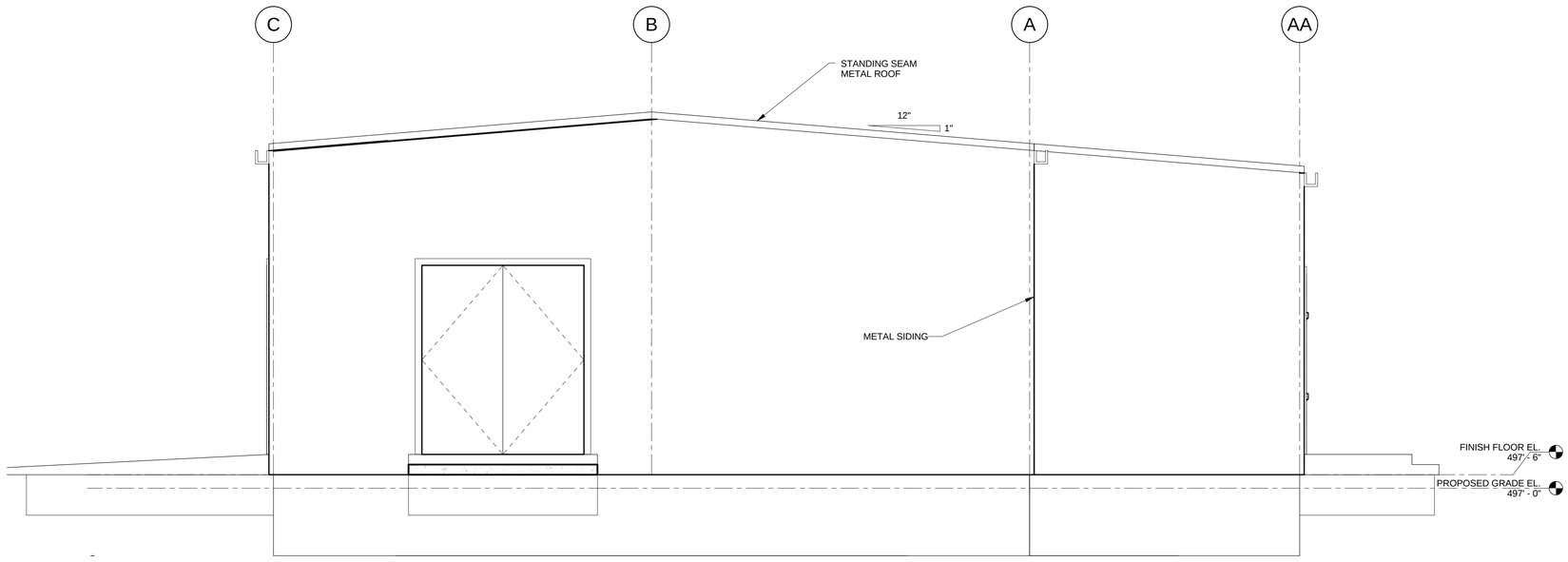
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING AXONOMETRIC VIEWS

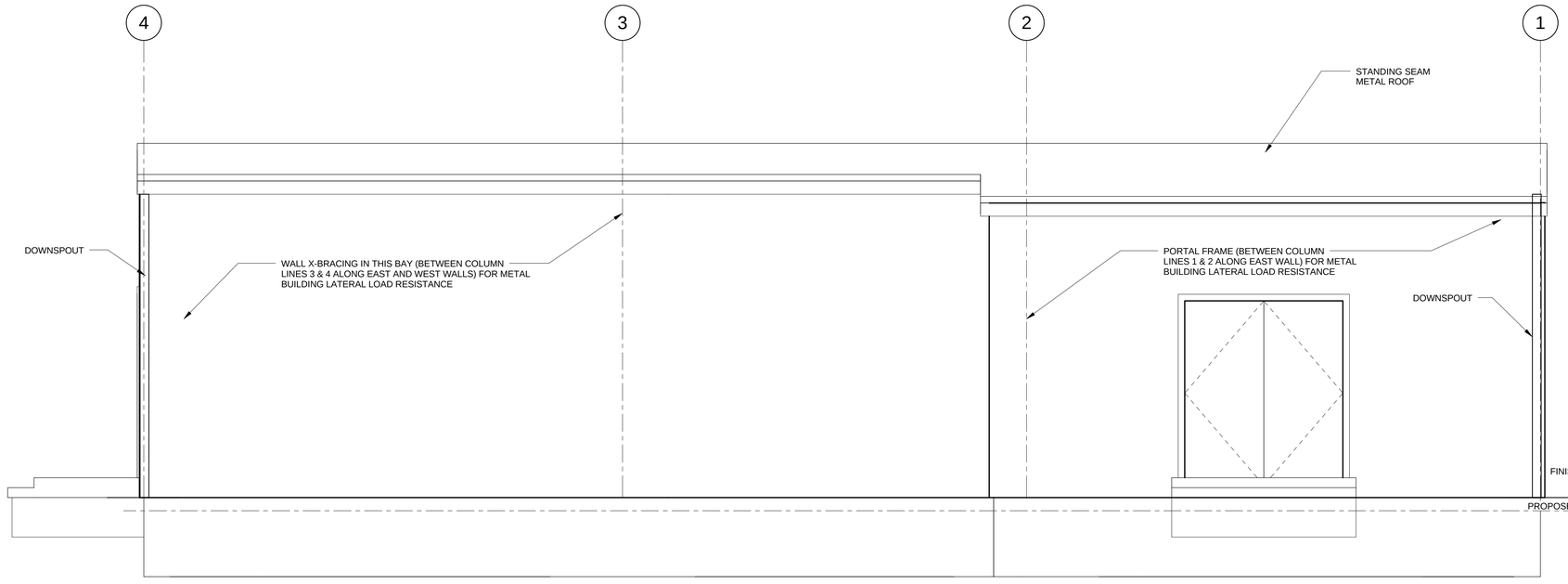
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-05	REV 1

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SOUTH ELEVATION
3/8" = 1'-0"



EAST ELEVATION
3/8" = 1'-0"

BUILDING CODE NOTES:

1. CODE ITEMS

DESIGN CODES	2013 CALIFORNIA BUILDING CODE,
	2012 INTERNATIONAL BUILDING CODE
	2010 ASCE-7
BUILDING OCCUPANCY CLASSIFICATION	GROUP F-2
TYPE OF CONSTRUCTION	II-B
BUILDING AREA	1300 SF
BUILDING HEIGHT	1 STORY
FIRE SUPPRESSION SYSTEM	NONE

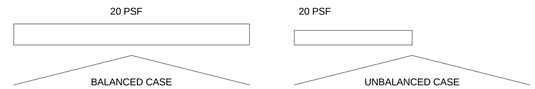
2. ALL FOUNDATIONS AND SLABS SHALL BEAR ON A 6 INCH MINIMUM THICKNESS OF GRANULAR BASE LEVELING COURSE MATERIAL. FOUNDATION DESIGN IS BASED ON 2,000 PSF ALLOWABLE BEARING PRESSURE IN CONFORMANCE WITH CBC TABLE 1806.2 FOR CLASSIFICATION(S) SW, SP, SM, SC, GM, AND/OR GC. A LICENSED GEOTECHNICAL ENGINEER SHALL INSPECT THE EXCAVATIONS AND CONFIRM THAT 2,000 PSF BEARING IS ALLOWED FOR THE FOUNDATIONS.

3. LIVE LOADING:
GRADE SLAB - 3 TON FORKLIFT (RATED CAPACITY) AND HS-20 TRAFFIC LOADS (NOT ACTING SIMULTANEOUSLY)
ROOF - 20 PSF

4. METAL BUILDING DESIGN CRITERIA:
THE METAL BUILDING MANUFACTURER SHALL DESIGN THE BUILDING FOR THE FOLLOWING LOADS, BASED ON THE 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10:

ROOF LOADING:
ROOF COLLATERAL LOAD - 5 PSF.
MAX ROOF DEAD LOAD - 11.5 PSF (NOT INCLUDING ROOF COLLATERAL LOADS)
MIN ROOF DEAD LOAD - 4 PSF

ROOF LIVE LOADING



METAL BUILDING LOAD COORDINATION - METAL BUILDING MANUFACTURER MUST COORDINATE EQUIPMENT LOADS WITH EQUIPMENT MANUFACTURER AND ROOF SUPPORTED PIPE SUPPORTS (LOADS AND LOCATIONS) WITH CONTRACTOR

WIND LOADING:
BASIC WIND SPEED (3 SECOND GUST) V=110 MPH - ULTIMATE, OR MINIMUM NET WIND PRESSURE, Pnet = 20 PSF WHICHEVER IS GREATER
WIND IMPORTANCE FACTOR - Iw = 1.0
RISK CATEGORY II.
WIND EXPOSURE C.
ENCLOSURE - PARTIALLY ENCLOSED.
INTERNAL PRESSURE COEFFICIENT - ±0.55.
ALL COMPONENTS AND CLADDING SHALL BE DESIGNED FOR THE CONDITIONS OF INTERNAL AND EXTERNAL PRESSURES.

SEISMIC CRITERIA:
SEISMIC IMPORTANCE FACTOR - Ie=1.0.
RISK CATEGORY II.
DESIGN CATEGORY - C
SITE CLASS - D
MAPPED SPECTRAL RESPONSE ACCELERATIONS - Ss=0.230, S1=0.120.
SPECTRAL RESPONSE COEFFICIENTS - Sds=0.245, Sd1=0.188.
SEISMIC FORCE RESISTING SYSTEM:
NORTH-SOUTH DIRECTION: ORDINARY STEEL CONCENTRICALLY BRACED FRAMES
Cs=7.5%, R=3.25, BASE SHEAR: V=4.55 KIPS (TO BE VERIFIED BY METAL BUILDING MANUFACTURER DESIGN)
EAST-WEST DIRECTION: ORDINARY STEEL MOMENT FRAMES
Cs=7%, R=3.5, BASE SHEAR: V=4.25 KIPS (TO BE VERIFIED BY METAL BUILDING MANUFACTURER DESIGN)
ANALYSIS PROCEDURE - EQUIVALENT LATERAL FORCE.

FOUNDATIONS:
THE BUILDING FOUNDATIONS HAVE BEEN DESIGNED FOR THE FOLLOWING MAXIMUM SERVICE LOAD REACTIONS. THE METAL BUILDING MANUFACTURER SHAL PROPORTION THE BUILDING SUCH THAT THE ACTUAL REACTIONS DO NOT EXCEED THOSE LISTED. IF THE FINAL REACTIONS EXCEED THOSE LISTED, THE CONTRACTOR SHALL BEAR THE COST OF RE-DESIGNING THE FOUNDATIONS TO THE SATISFACTION OF THE ENGINEER, AT NO ADDITIONAL COST TO THE OWNER.

8.3 KIPS DOWNWARD
2.3 KIPS EAST-WEST SHEAR
2.1 KIPS NORTH-SOUTH SHEAR
5.1 KIPS NET UPLIFT

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
C 71650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	CMW	MSL	JPB	RAO	
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL	GWE	JR	MSL	LT	

REVISIONS

APPROVED BY
RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

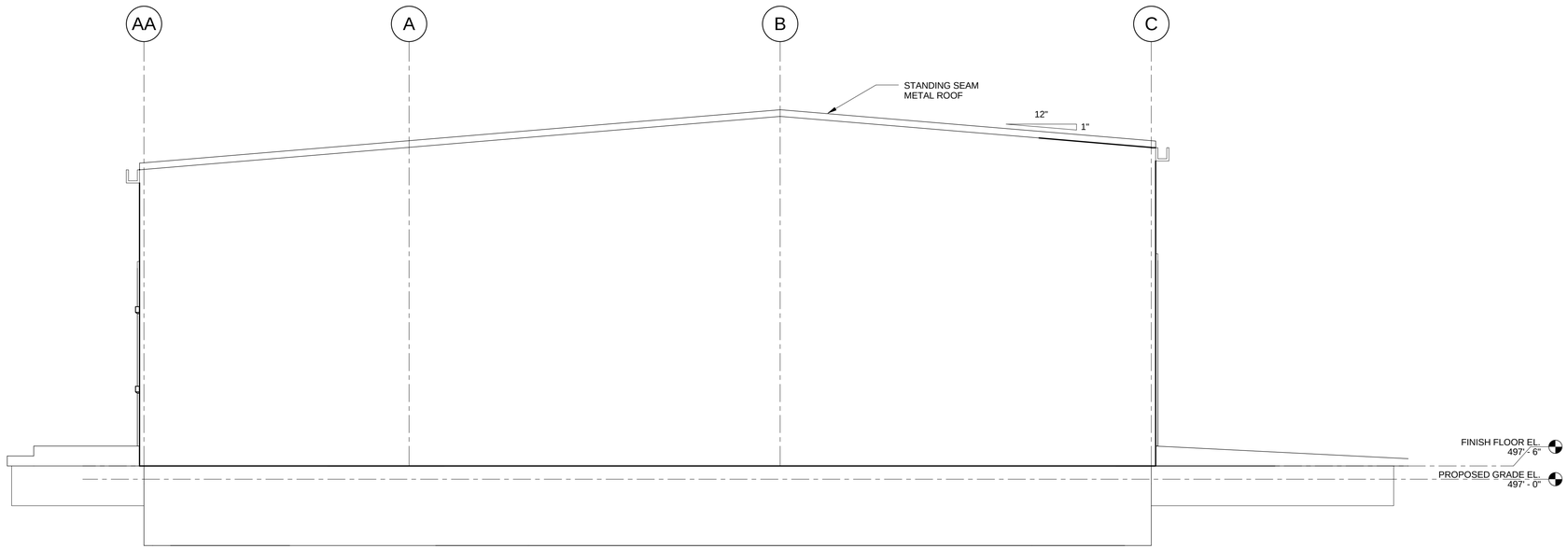
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELEVATIONS (1 OF 2)

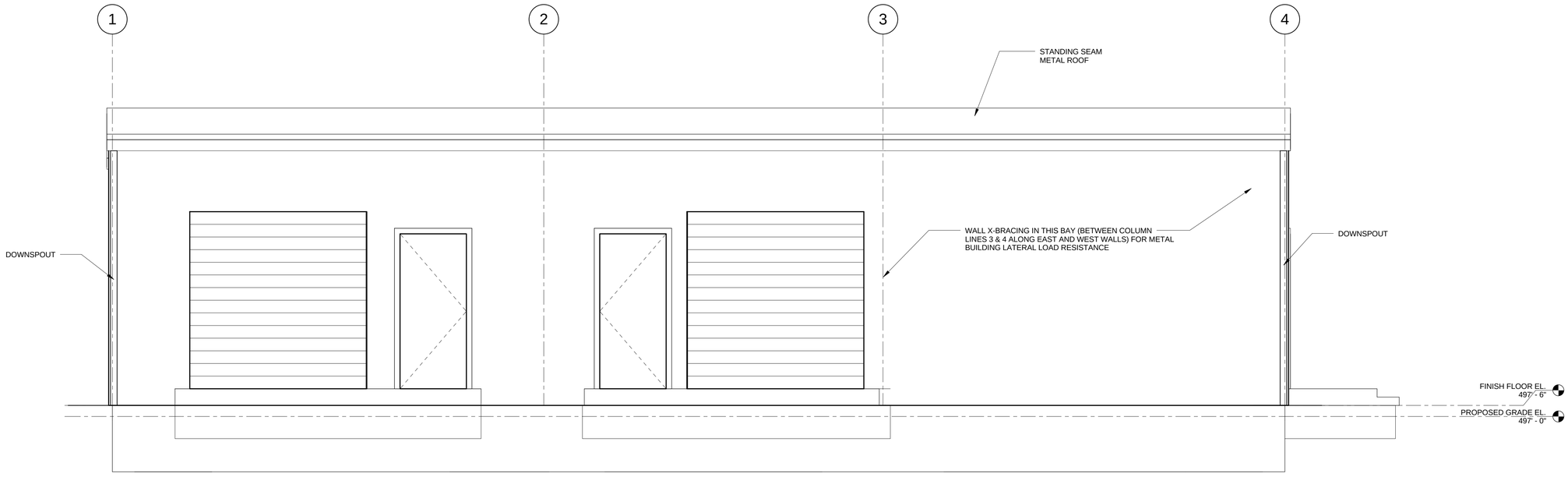
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
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NORTH ELEVATION
3/8" = 1'-0"



WEST ELEVATION
3/8" = 1'-0"

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWRY
61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY
RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

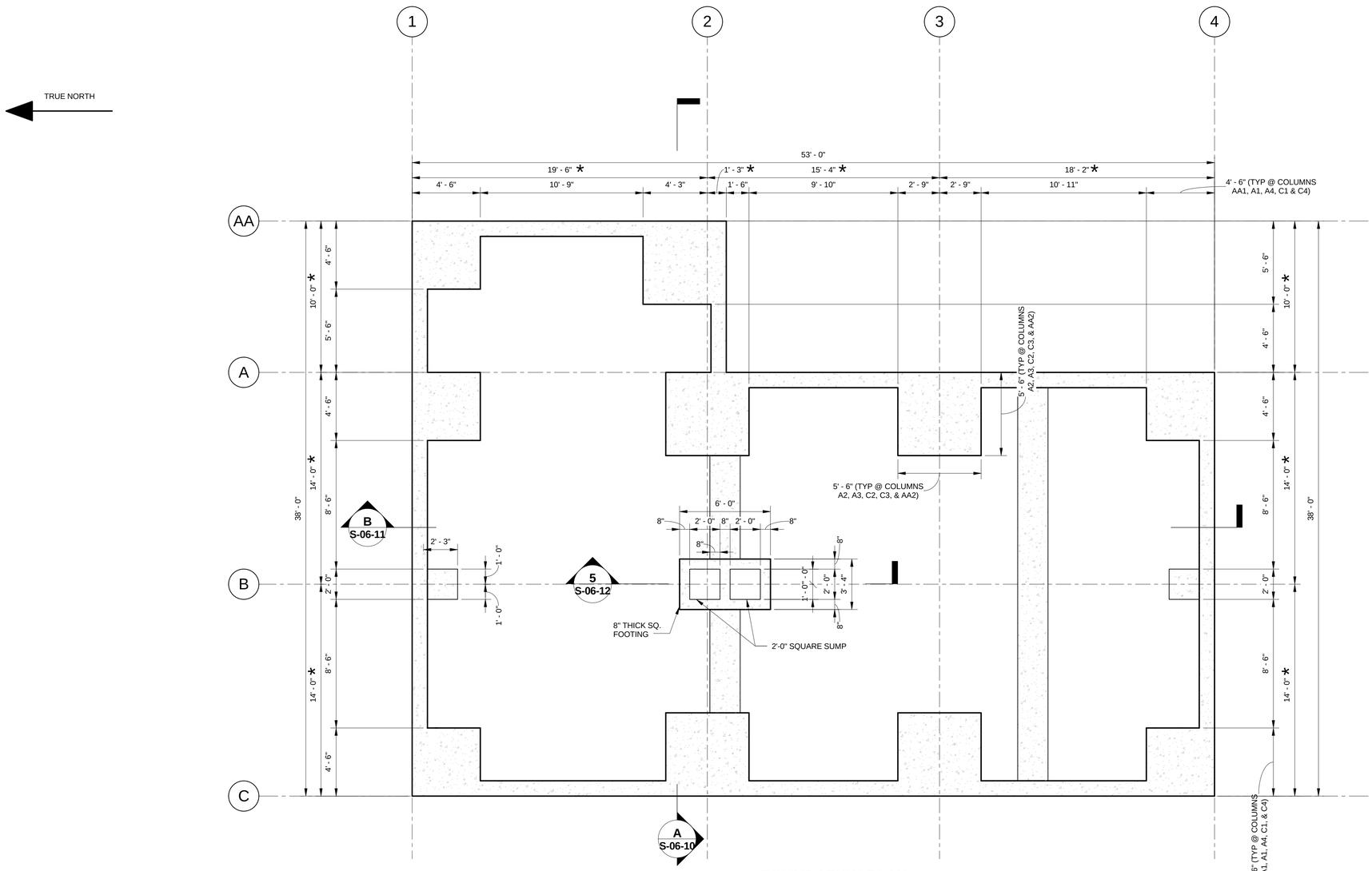
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELEVATIONS (2 OF 2)

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
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FOUNDATION PLAN
1/4" = 1'-0"

NOTE:

1. P.E. SIGNED & SEALED BUILDING SHOP DRAWINGS AND DETAILED DESIGN CALCULATIONS ARE TO BE COMPLETED, SUBMITTED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO PLACEMENT OF FOUNDATION CONCRETE.

* COLUMN AND FOUNDATION LOCATIONS TO BE VERIFIED PER APPROVED PRE-ENGINEERED BUILDING COLUMN LOCATIONS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOWE
C 61650
EXP. 1-30-17
CIVIL
STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		CMW	MSL	JPB	RAO
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY
RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

TOPOCK GROUNDWATER REMEDIATION PROJECT

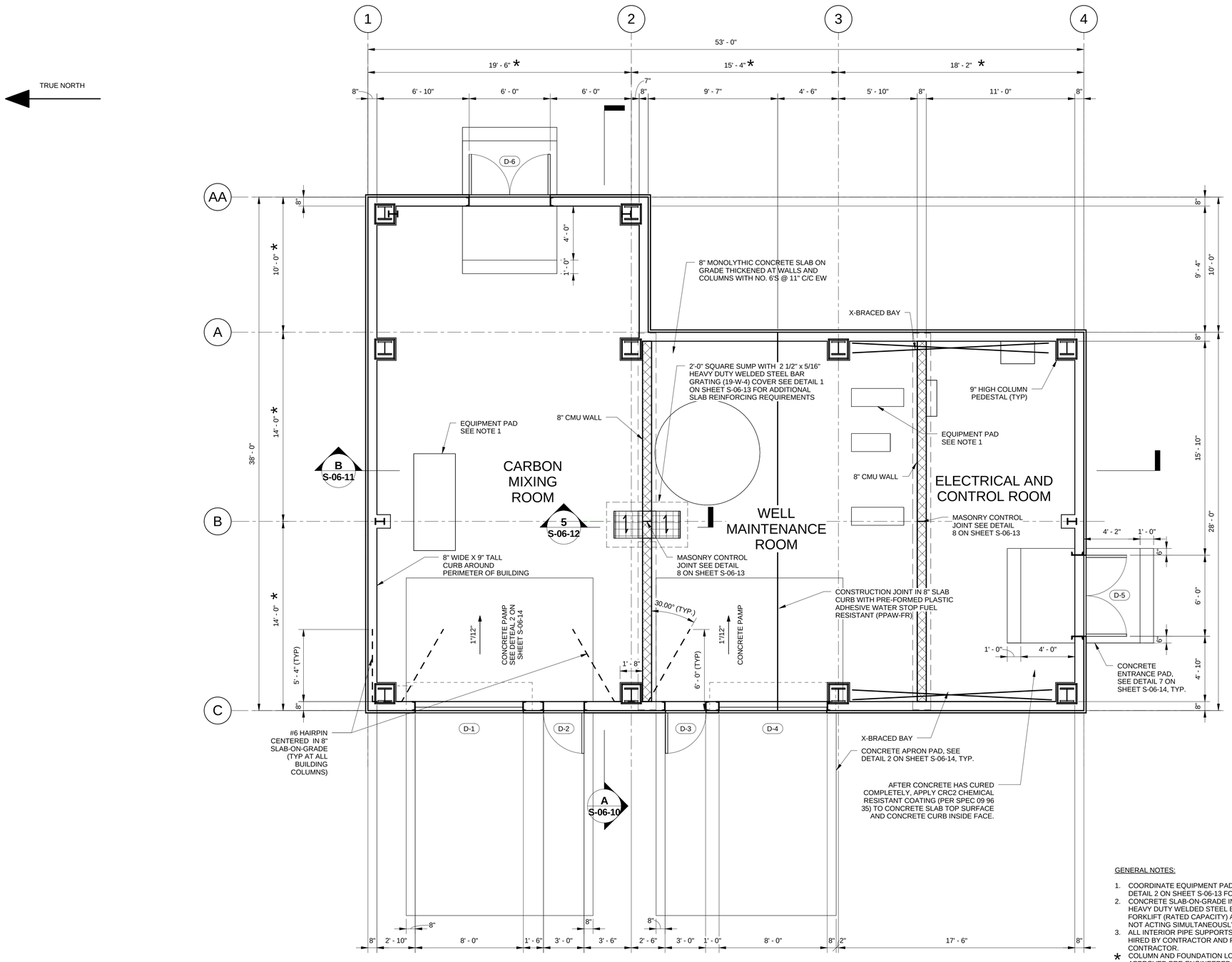
MW-20 BENCH CARBON AMENDMENT BUILDING FOUNDATION PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
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DWG LIST	
SUPSDS	
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S-06-08	REV 1

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TRUE NORTH



FINISH FLOOR PLAN
1/4" = 1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

GENERAL NOTES:

1. COORDINATE EQUIPMENT PADS WITH MECHANICAL DRAWINGS. SEE DETAIL 2 ON SHEET S-06-13 FOR CONSTRUCTION REQUIREMENTS.
2. CONCRETE SLAB-ON-GRADE IN BUILDING, CONCRETE RAMPS, AND HEAVY DUTY WELDED STEEL BAR GRATING IS DESIGNED FOR 3 TON FORKLIFT (RATED CAPACITY) AND HS-20 TRAFFIC LOADS (LOADS NOT ACTING SIMULTANEOUSLY).
3. ALL INTERIOR PIPE SUPPORTS TO BE DESIGNED BY CALIFORNIA P.E. HIRED BY CONTRACTOR AND PIPE SUPPORTS TO BE PORVIDED BY CONTRACTOR.

* COLUMN AND FOUNDATION LOCATIONS TO BE VERIFIED PER APPROVED PRE-ENGINEERED BUILDING COLUMN LOCATIONS.

REGISTERED PROFESSIONAL ENGINEER STEPHEN S. LOW No. C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		CMW	MSL	JPB	RAO
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

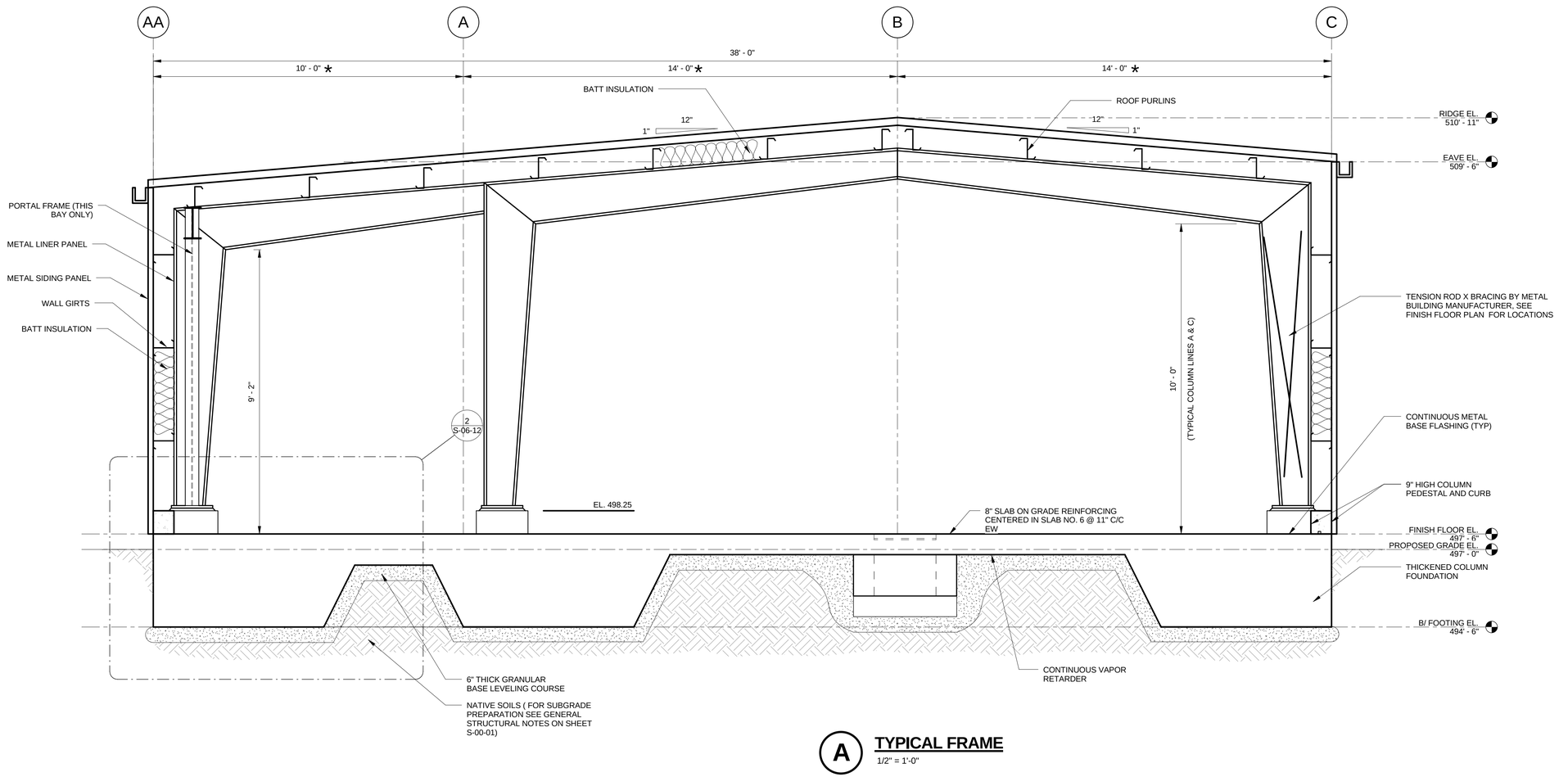
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING FINISH FLOOR PLAN

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-09	REV 1

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A **TYPICAL FRAME**
1/2" = 1'-0"

NOTE:

* COLUMN AND FOUNDATION LOCATIONS TO BE VERIFIED PER APPROVED PRE-ENGINEERED BUILDING COLUMN LOCATIONS

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER MATTHEW S. LOWES No. C61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY
RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

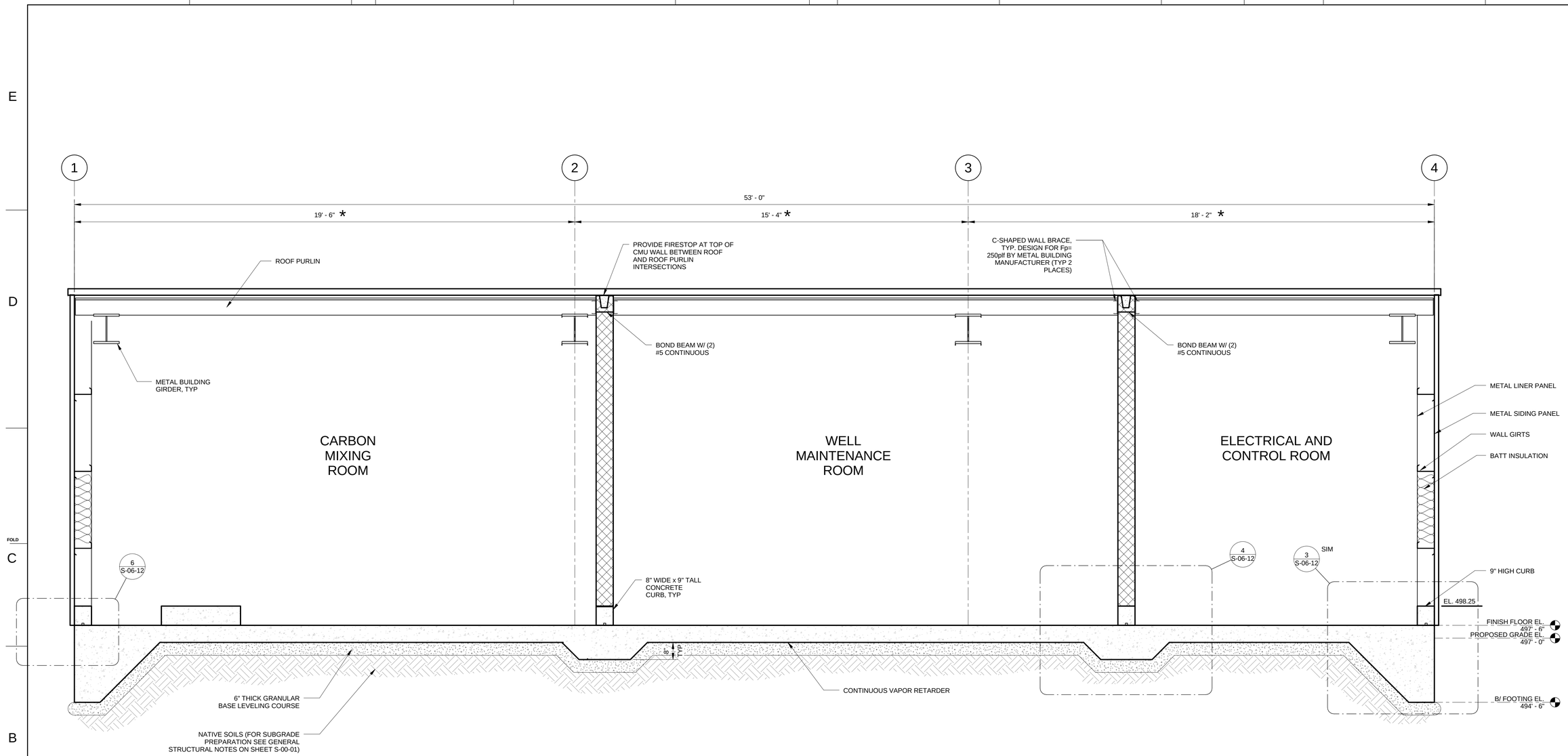
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING SECTION-TYPICAL FRAME

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
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S-06-10	REV 1

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B BUILDING SECTION

1/2" = 1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

NOTE:

* COLUMN AND FOUNDATION LOCATIONS TO BE VERIFIED PER APPROVED PRE-ENGINEERED BUILDING COLUMN LOCATIONS

REGISTERED PROFESSIONAL ENGINEER — MATTHEW S. LOWE — 61650 — EXP. 9-30-17 — CIVIL — STATE OF CALIFORNIA

ARCADIS

No.	Date	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		CMW	MSL	JPB	RAO
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY
RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

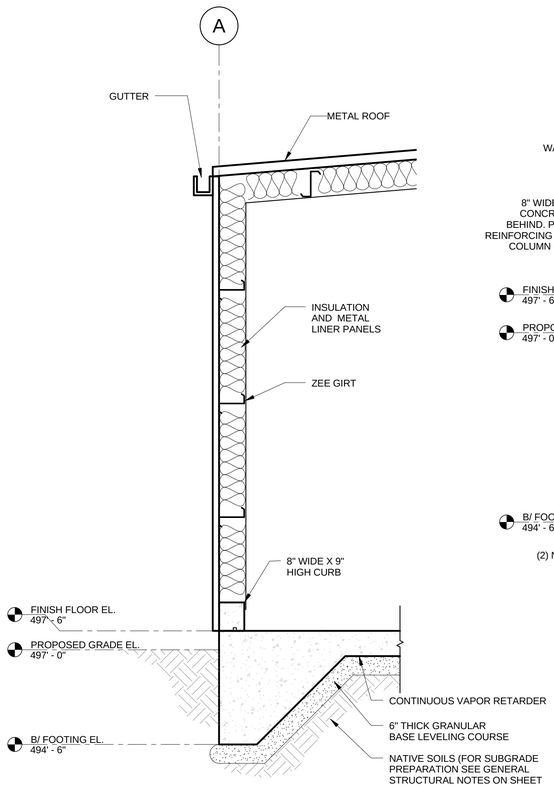
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING SECTION

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

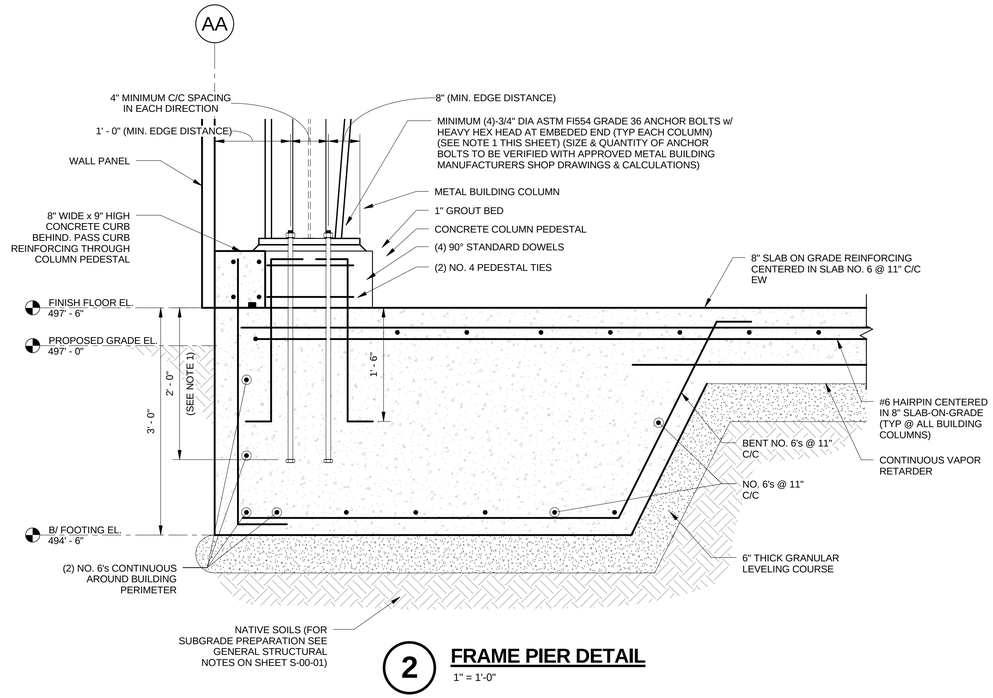
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-11	REV 1

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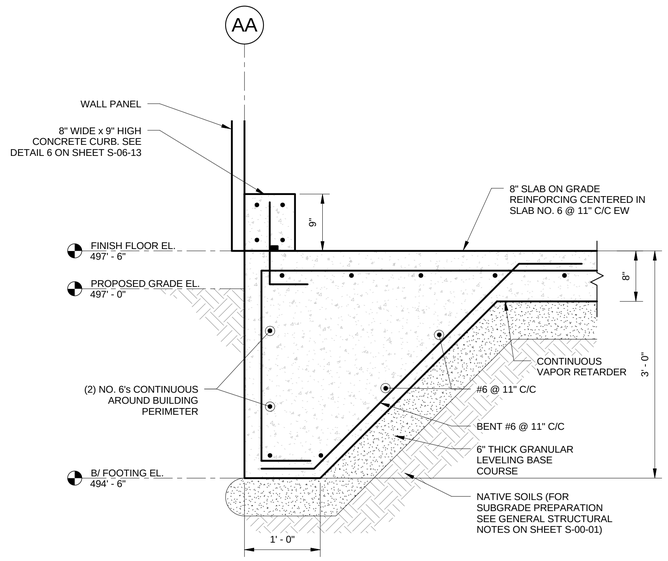
1 TYPICAL SIDEWALL SECTION

1/2" = 1'-0"



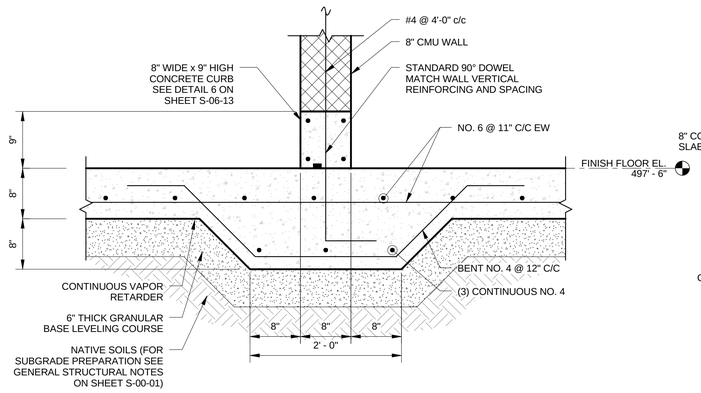
2 FRAME PIER DETAIL

1" = 1'-0"



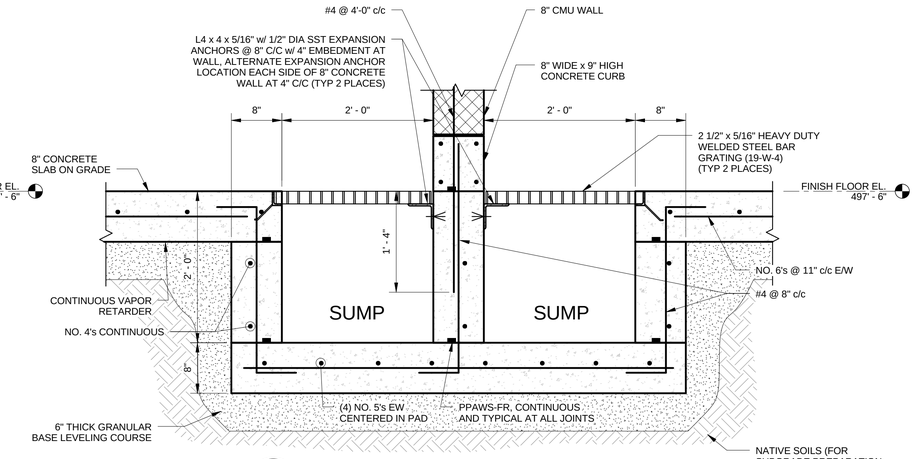
3 TYPICAL WALL FOOTER

1" = 1'-0"



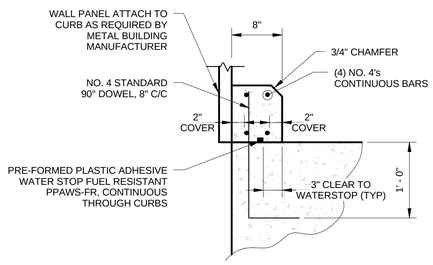
4 TYPICAL INTERIOR WALL FOOTER

1" = 1'-0"



5 SUMP DETAIL

1" = 1'-0"



NOTES:

1. EXTEND COLUMN ANCHOR BOLTS A MINIMUM OF 9" INTO FOUNDATION WITH HEAVY HEX NUT TACK-WELDED AT EMBEDED END.
2. PROVIDE STANDARD 90° DOWELS AT CORNERS FOR REINFORCEMENT IDENTIFIED AS CONTINUOUS. SEE DETAIL 7 ON SHEET S-06-13.

6 CONCRETE CURB DETAIL

1" = 1'-0"

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — MATTHEW S. LOWE — No. C61650 — EXP. 9-30-17 — CIVIL — STATE OF CALIFORNIA

ARCADIS

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2	11/18/15	FINAL DESIGN		CMW	MSL	JPB	RAO
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE or AS SHOWN

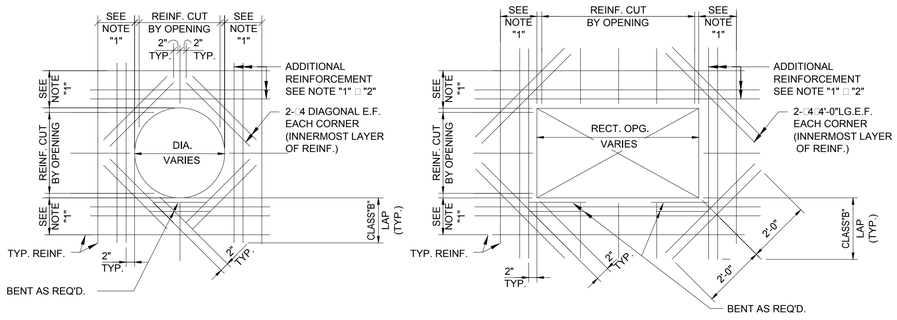
TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING SECTIONS & DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-12	REV 1

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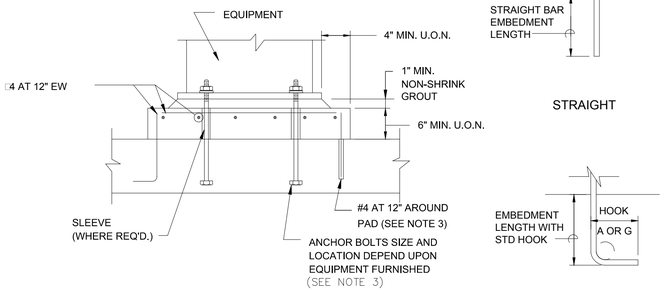


CIRCULAR RECTANGULAR

1 TYPICAL REINFORCING AROUND OPENING IN WALL AND SLAB

SCALE: NO SCALE

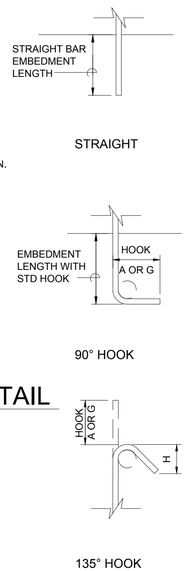
NOTES:
1. PROVIDE ADDITIONAL REINFORCEMENT AT ALL OPNGS. EQUAL IN AREA TO TYPICAL REINFORCEMENT CUT BY OPENING IN EACH DIRECTION. ADDITIONAL REINFORCEMENT TO MATCH SIZE OF TYPICAL REINFORCEMENT (MIN. 2 BARS E.F.) AND PLACED BETWEEN TYPICAL REINFORCEMENT ON EACH SIDE OF OPENING
2. PROVIDE MATCHING DWLS. WHERE REQ'D. TO PROVIDE CLASS "B" LAP WITH ADDITIONAL. REINF.



2 TYPICAL EQUIPMENT SUPPORT PAD DETAIL

SCALE: NO SCALE

NOTES:
1. PROVIDE TYP. 6" MIN. CONCRETE SUPPORT PAD FOR ALL EQUIPMENT UON.
2. COORDINATE LOCATION AND SIZE OF PADS WITH OTHER DWGS AND MFGRS CERTIFED DWGS.
3. FOR EXIST. SLABS, DRILL HOLE DIA. & DEPTH IN EXISTING SLAB PER MANUFACTURER'S REQ'MTS FOR ADHESIVE ANSHORAGE SYSTEM.



BAR SIZE	MIN LAP LENGTHS FOR BEAMS AND COLUMNS & CLASS B		MIN LAP LENGTHS FOR SLABS AND WALLS & CLASS B		MIN EMBEDMENT LENGTHS FOR BEAMS AND COLUMNS &		MIN EMBEDMENT LENGTHS FOR SLABS AND WALLS &		WITH STD HOOKS	MIN STD. HOOKS 90°		MIN STD. HOOKS 135°	
	TOP***	OTHERS	TOP***	OTHERS	TOP***	OTHERS	TOP***	OTHERS		A OR G		A OR G	H
#3	25	19	16	16	19	15	12	12	5	6	4	2.5	
#4	33	25	20	16	25	19	15	12	7	8	4.5	3	
#5	41	31	25	19	31	24	19	15	9	10	5.5	3.75	
#6	49	37	29	23	37	29	23	18	10	12	8	4.5	
#7	71	54	43	33	54	42	33	25	12	14	9	5.25	
#8	81	62	49	37	62	48	37	29	14	16	10.5	6	
#9	91	70	60	46	70	54	46	36	15	19	-	-	
#10	102	79	74	57	79	61	57	44	17	22	-	-	
#11	114	87	89	69	87	67	68	53	19	24	-	-	

NOTES:

REINFORCEMENT LAP SPLICE, EMBEDMENT LENGTH AND STANDARD HOOKS TABLE IS BASED ON A MINIMUM CONCRETE COMPRESSIVE STRENGTH OF 4000 PSI AND 60000 PSI REINFORCEMENT (WITH NO EPOXY COATING).

ALL LAP SPLICES SHALL BE CLASS B SPLICES.

& THE MINIMUM LAP LENGTH FOR BEAMS, COLUMNS, AND STRAIGHT EMBEDMENTS ARE BASED ON A 3 BAR DIAMETER MINIMUM CENTER TO CENTER BAR SPACING AND A 2 INCH BAR COVER. IF THE SPLICE AND/OR EMBEDMENT DOES NOT CONFORM TO THESE REQUIREMENTS, THEN CONTRACTOR SHALL APPLY APPROPRIATE FACTORS IN COMPLIANCE WITH ACI 318 WITH APPROVAL BY ENGINEER.

&& THE MINIMUM LAP LENGTH FOR SLABS, WALLS, AND STRAIGHT EMBEDMENTS ARE BASED ON A 6 INCH BAR SPACING AND A 2 INCH BAR COVER. IF THE LAP CONDITION DOES NOTE CONFORM TO THESE REQUIREMENTS, THEN USE BEAM LAP LENGTHS & OR COMPLY WITH LAP REQUIREMENTS OF ACI 318 WITH APPROVAL BY ENGINEER.

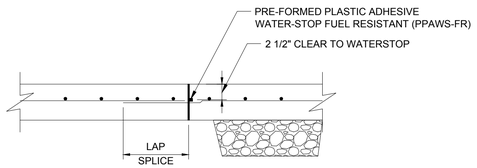
&&& TOP BARS ARE DEFINED AS ALL HORIZONTAL BARS, EXCLUDING WALL BARS, WITH 12" OR MORE FRESH CONCRETE BENEATH.

WHERE SPLICES ARE REQUIRED BETWEEN BARS OF DIFFERENT SIZES, THE LAP LENGTH SHALL BE NO LESS THAN THE EMBEDMENT LENGTH OF THE LARGER BAR OR THE LAP LENGTH OF THE SMALLER BAR, WHICHEVER IS GREATER.

IN CIRCULAR TANKS DESIGNED FOR RING TENSION, THE LOCATION OF SPLICES SHOULD BE STAGGERED. ADJACENT HOOP REINFORCING SPLICES SHOULD BE STAGGERED HORIZONTALLY (CENTER OF LAP TO CENTER OF LAP) BY NOT LESS THAN ONE LAP LENGTH NOR 3 FEET AND SHOULD NOT COINCIDE IN VERTICAL ARRAYS MORE FREQUENTLY THAN EVERY THIRD BAR.

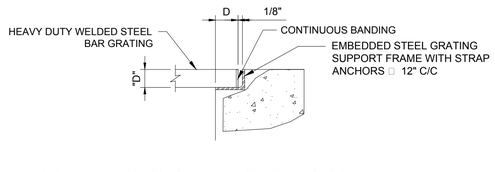
3 LAP SPLICE AND EMBEDMENT LENGTH TABLE

SCALE: NO SCALE



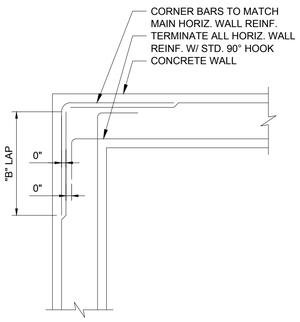
4 CONSTRUCTION JOINT FOR SLAB ON GRADE

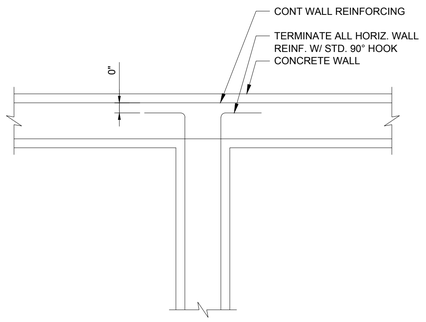
SCALE: NO SCALE



5 TYP GRATING SUPPORT

SCALE: NO SCALE

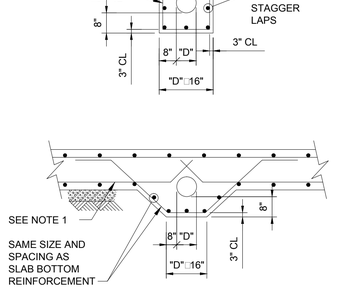




NOTES:
1. SEE PLANS AND SECTIONS FOR WALL INFORMATION.
2. VERTICAL REINFORCEMENT NOT SHOWN FOR CLARITY.
3. FOR ALL STRUCTURES UNLESS NOTED OTHERWISE.

6 TYPICAL CORNER REINFORCEMENT DETAIL

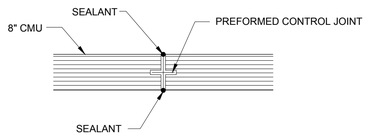
SCALE: NO SCALE



NOTES:
1. BOTTOM REINFORCEMENT TO BE CONTINUOUS WHERE POSSIBLE.
2. FOR PIPE SIZE "D" AND ELEVATION, SEE MECHANICAL DRAWINGS.
3. ALL PIPES LOCATED BENEATH BASE SLABS SHALL BE ENCASED IN CONCRETE UNLESS OTHERWISE NOTED.

7 PIPE ENCASEMENT DETAIL

SCALE: NO SCALE



8 MASONRY CONTROL JOINT DETAIL

SCALE: NO SCALE

- FINAL DESIGN - ISSUED FOR AGENCY APPROVAL

REGISTERED PROFESSIONAL ENGINEER STEPHEN S. LOW 61650 EXP. 9-30-17 CIVIL STATE OF CALIFORNIA

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	CMW	MSL	JPB	RAO	
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL	GWE	JR	MSL	LT	

REVISIONS

ARCADIS

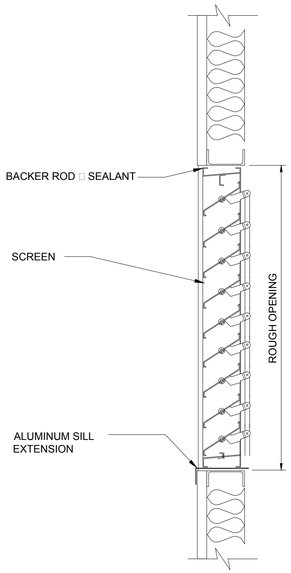
APPROVED BY	SO	
RAO	SUPV	RAO
	DSGN	MSL
	DWN	CMW
	CHKD	MSL
	OK	RAO
	DATE	11/18/15
	SCALES	NONE/AS SHOWN

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING TYPICAL DETAILS (1 OF 2)
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

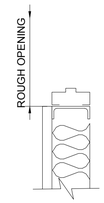
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
S-06-13	REV X

N1808

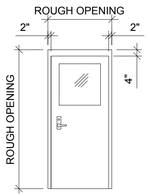
10/29/2015, 11:48, C:\U...\S-06-13.d...T... S-06-13



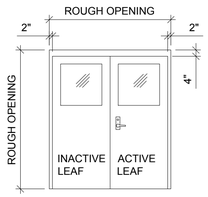
1 LOUVER
SCALE: 1' = 1'-0"



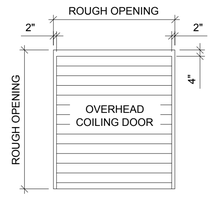
3 DOOR JAMB
SCALE: NO SCALE



4 DOOR TYPE 1
SCALE: NO SCALE



5 DOOR TYPE 2
SCALE: NO SCALE

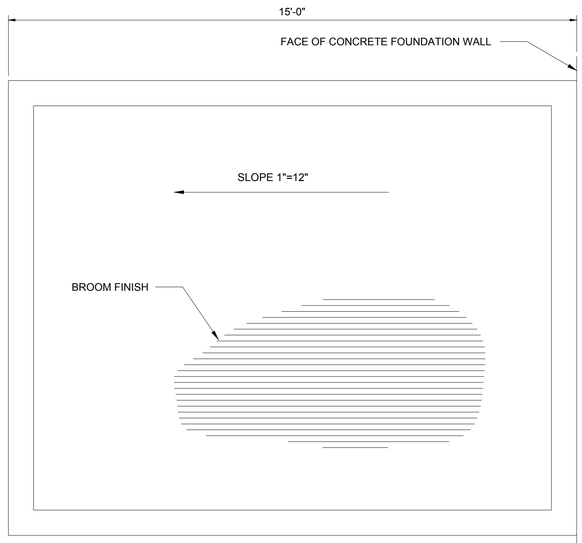


6 DOOR TYPE 3
SCALE: NO SCALE

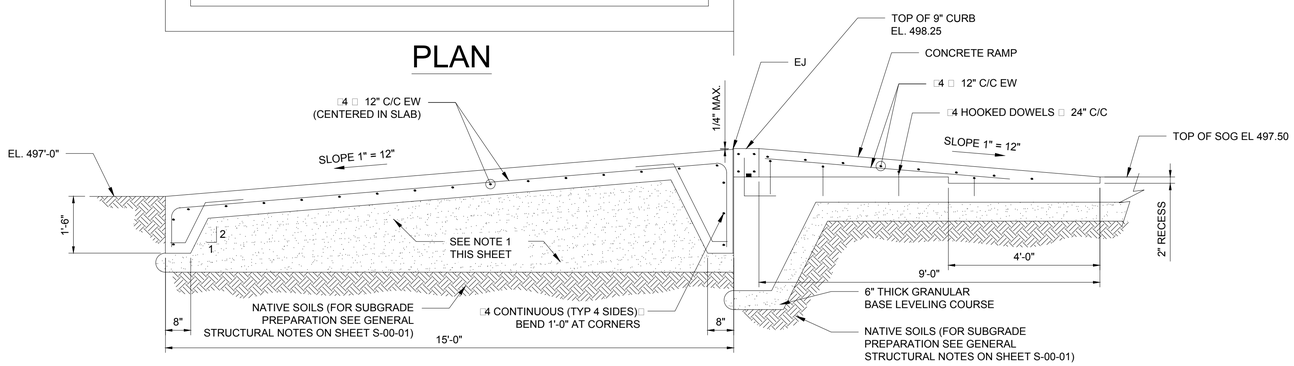
DOOR SCHEDULE

DOOR NUMBER	ROUGH OPENING		DOOR TYPE	FRAME TYPE	DETAILS		U.L. LABEL	HARDWARE SET	REMARKS
	WIDTH	HEIGHT			HEAD	JAMB			
D-2, D-3	3'-0"	7'-2"	1	HM	A	A	-	1	24" X 24" VISION PANEL
D-1, D-4	8'-0"	8'-0"	3	HM	A	A	-	1	OVERHEAD COILING DOOR
D-5, D-6	6'-0"	7'-2"	2	HM	A	A	-	1	24" X 24" VISION PANEL

HM - HOLLOW METAL



PLAN

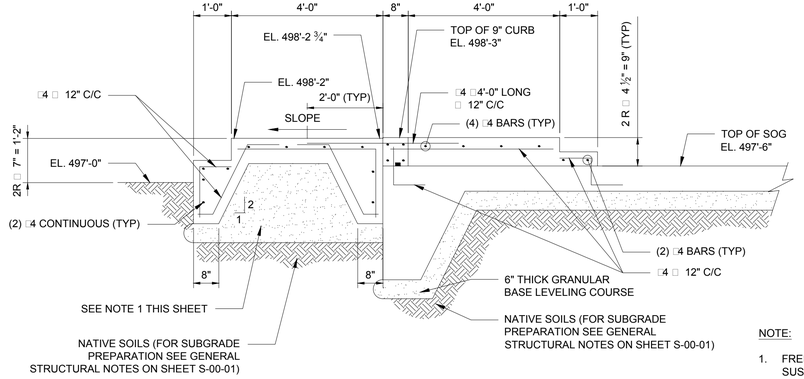


SECTION

NOTE:

1. FREE DRAINING NON-FROST SUSCEPTIBLE GRANULAR MATERIAL

2 CONCRETE APRON PAD DETAIL
SCALE: 1/2" = 1'-0"



NOTE:

1. FREE DRAINING NON-FROST SUSCEPTIBLE GRANULAR MATERIAL

7 CONCRETE ENTRANCE PAD DETAIL
SCALE: 1/2" = 1'-0"

- FINAL DESIGN - ISSUED FOR AGENCY APPROVAL

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. LOVE
No. C 61650
EXP. 9-30-17
CIVIL
STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		CMW	MSL	JPB	RAO
1	09/08/14	INTERMEDIATE (90%) DESIGN SUBMITTAL		GWE	JR	MSL	LT

REVISIONS

APPROVED BY: RAO

SO	
SUPV	RAO
DSGN	MSL
DWN	CMW
CHKD	MSL
OK	RAO
DATE	11/18/15
SCALES	NONE/AS SHOWN

TOPOCK GROUNDWATER REMEDIATION PROJECT

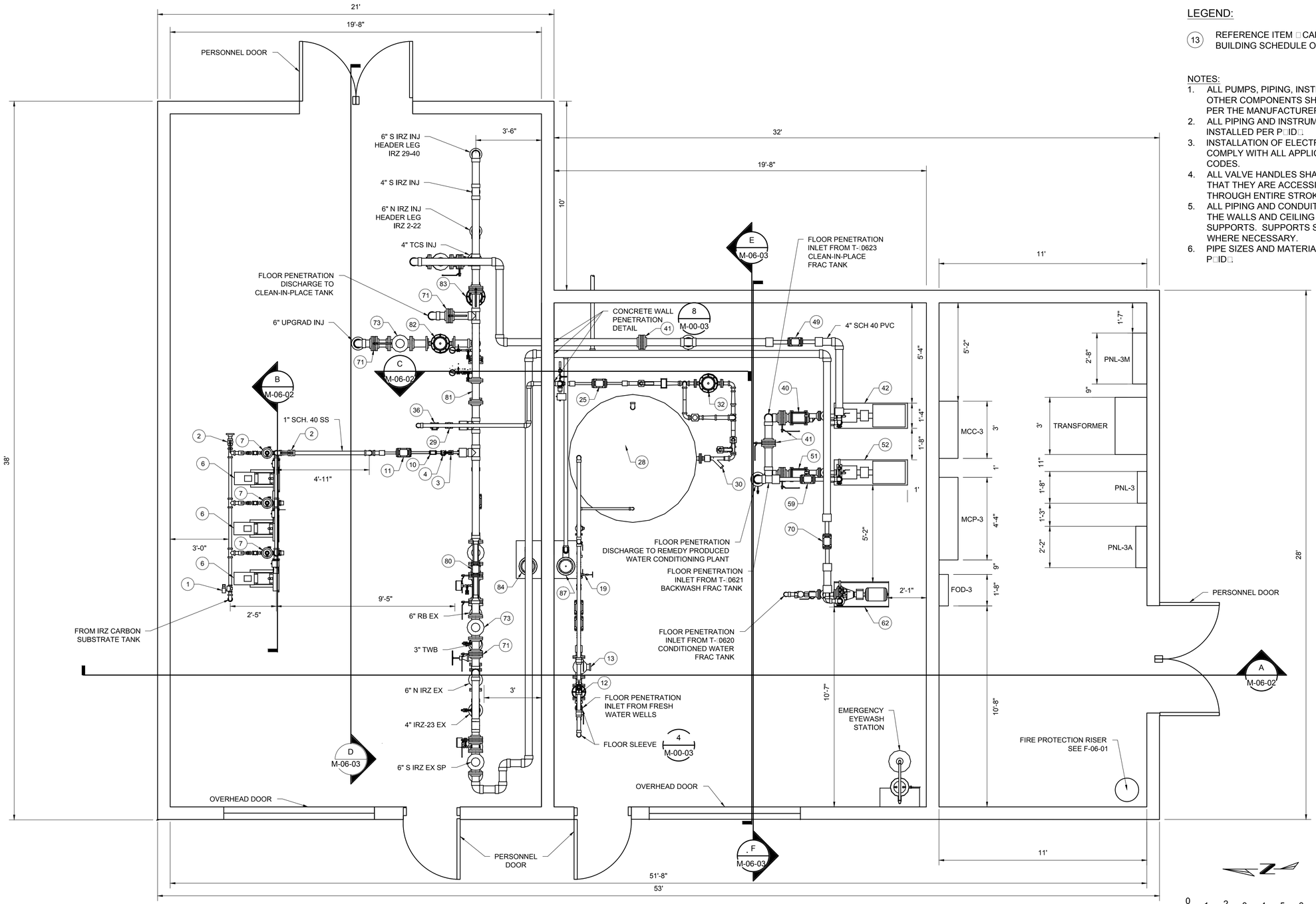
MW-20 BENCH CARBON AMENDMENT BUILDING TYPICAL DETAILS (2 OF 2)

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
S-06-14	REV X

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N1808



LEGEND:

(13) REFERENCE ITEM □CARBON AMENDMENT BUILDING SCHEDULE ON M-06-08

NOTES:

1. ALL PUMPS, PIPING, INSTRUMENTATION, AND OTHER COMPONENTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S GUIDELINES.
2. ALL PIPING AND INSTRUMENTATION SHALL BE INSTALLED PER P□ID□.
3. INSTALLATION OF ELECTRIC COMPONENTS SHALL COMPLY WITH ALL APPLICABLE NEC AND LOCAL CODES.
4. ALL VALVE HANDLES SHALL BE INSTALLED SUCH THAT THEY ARE ACCESSIBLE AND OPERABLE THROUGH ENTIRE STROKE.
5. ALL PIPING AND CONDUIT SHALL BE SECURED TO THE WALLS AND CEILING WITH HANGERS AND SUPPORTS. SUPPORTS SHALL BE INSTALLED WHERE NECESSARY.
6. PIPE SIZES AND MATERIALS ARE SHOWN ON THE P□ID□

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT

3/8" = 1'-0"

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

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUESTL C 67811 EXP 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	LUK	KLD	BW	RAO	
0	8/5/15	90% RTC RESOLUTION	LUK	JPB	KLD	BJW	

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

SAN FRANCISCO, CALIFORNIA

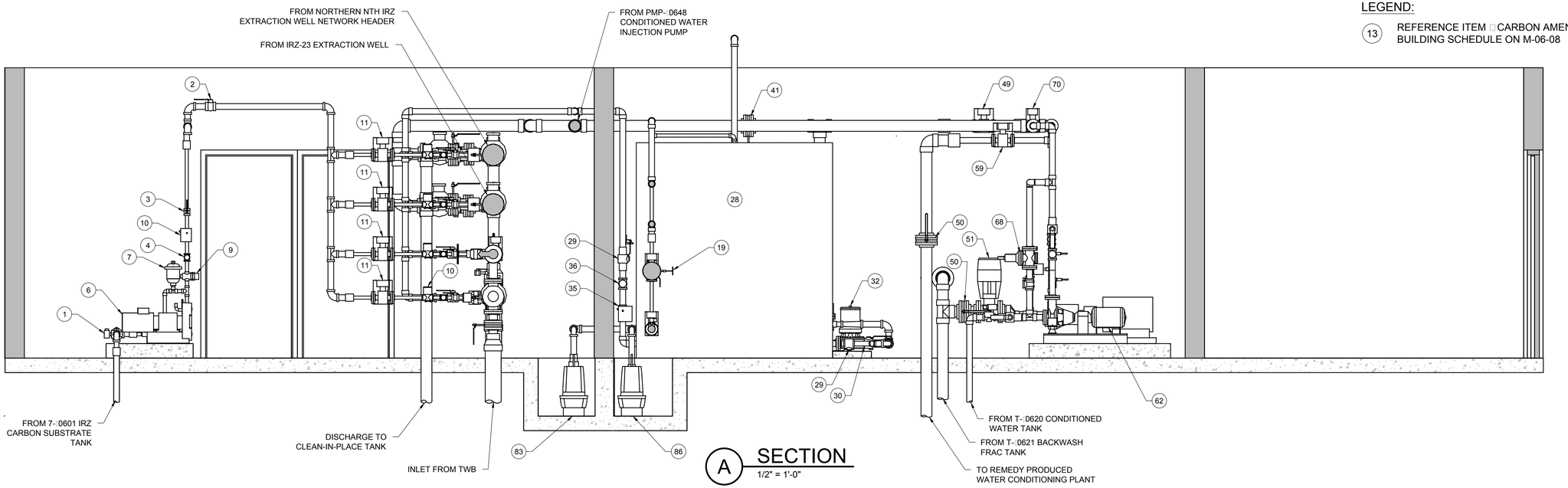
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BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of SHEETS	
M-06-01	REV 1

11/02/2015, 10:27, G: Gr□□□□AR TOPOCK-01 S□□ □□□100% DWG: M-M□□□□□□□M-06-01 02_03_08.d□□, T□□M-06-01

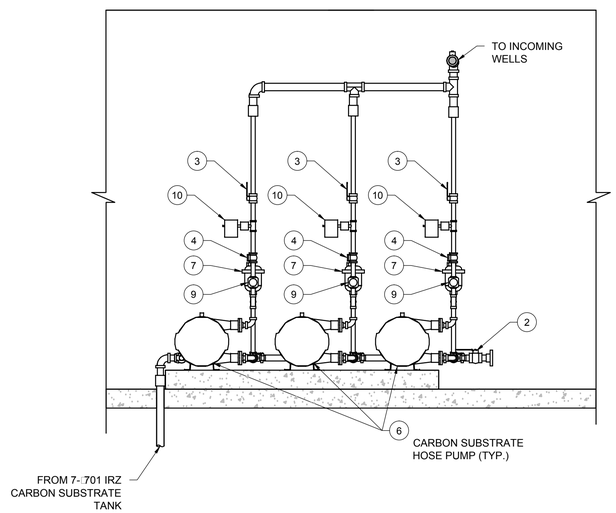
N1808

LEGEND:

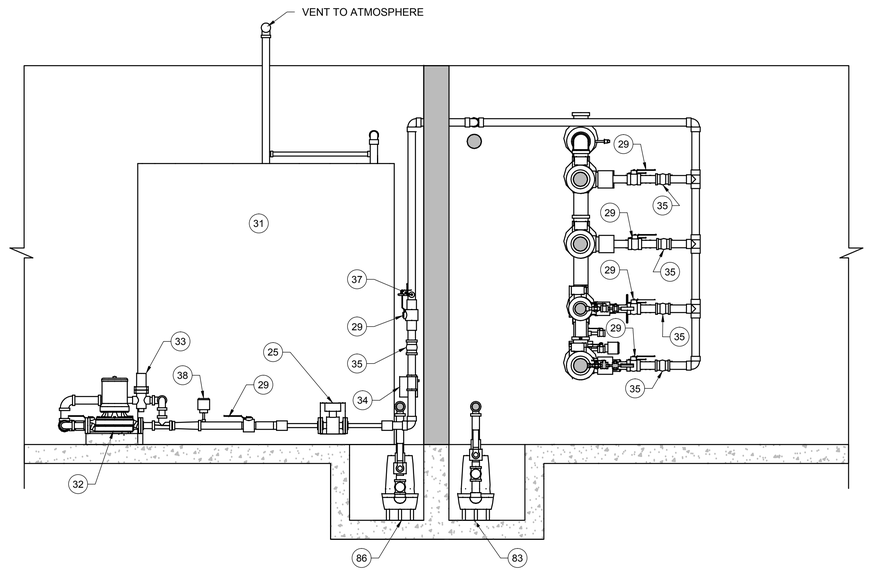
(13) REFERENCE ITEM □ CARBON AMENDMI
BUILDING SCHEDULE ON M-06-08



A SECTION
1/2" = 1'-0"
M-06-01



B SECTION
1/2" = 1'-0"
M-06-01



C SECTION
1/2" = 1'-0"
M-06-01

0 1/2 1
SCALE: 1/2"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
0	8/5/15	90% RTC RESOLUTION		LUK	JPB	KLD	BJW

REVISIONS

APPROVED BY	SO
RAO	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT SECTIONS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

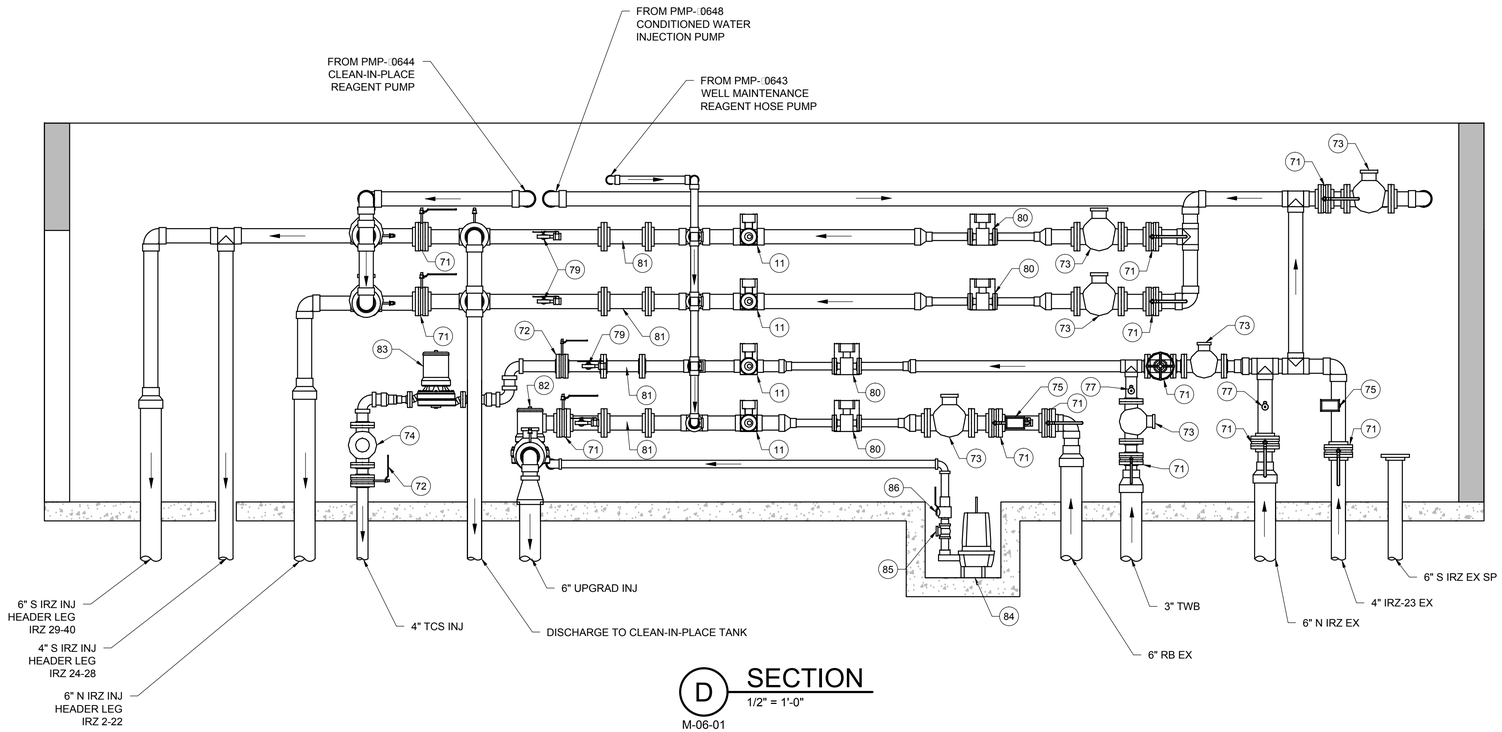
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO. of	SHEETS
M-06-02	REV 1

N1808

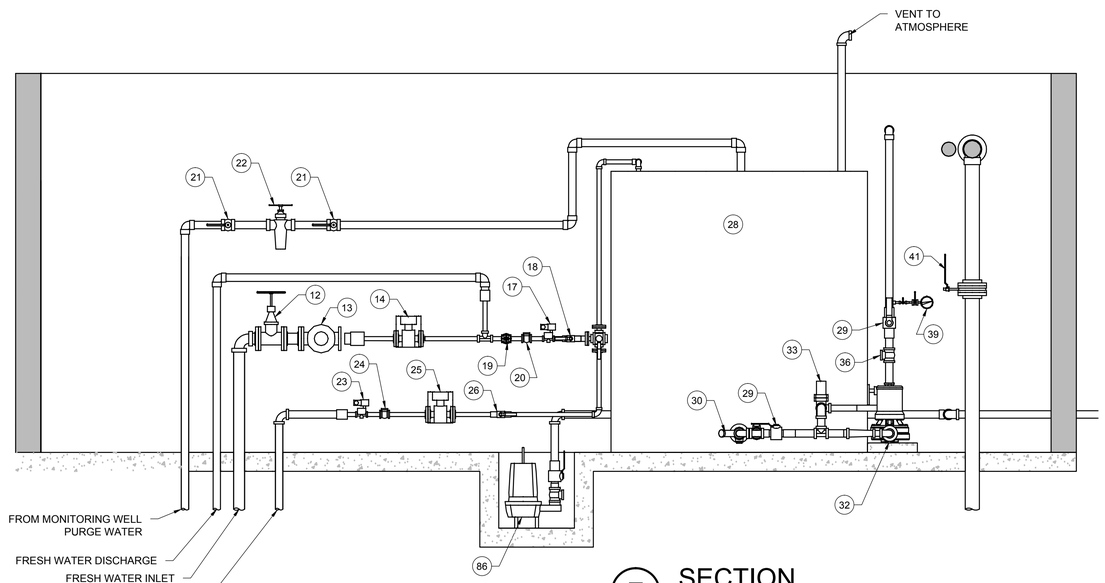
11/02/2015, 10:28, G:\Gr□□□□AR-TOPOCK-01\S□□□□100% DWG\M-M□□□□□□\M-06-01 02 03 08.d□, T□□: M-06-02

LEGEND:

(13) REFERENCE ITEM □ CARBON AMENDMENT BUILDING SCHEDULE ON M-06-08

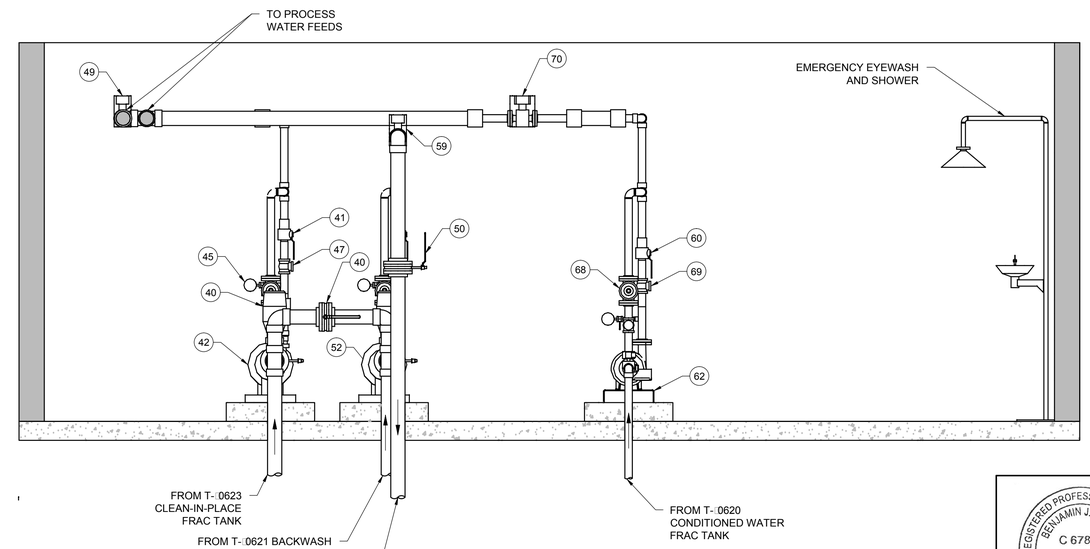


D SECTION
1/2" = 1'-0"
M-06-01



E SECTION
1/2" = 1'-0"
M-06-01

0 1/2 1



F SECTION
1/2" = 1'-0"
M-06-01

- FINAL DESIGN -
FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER BENJAMIN J. WUERL C 67811 Exp 6/30/17 STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN		LUK	KLD	BW	RAO
0	8/5/15	90% RTC RESOLUTION		LUK	JPB	KLD	BJW

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT SECTIONS

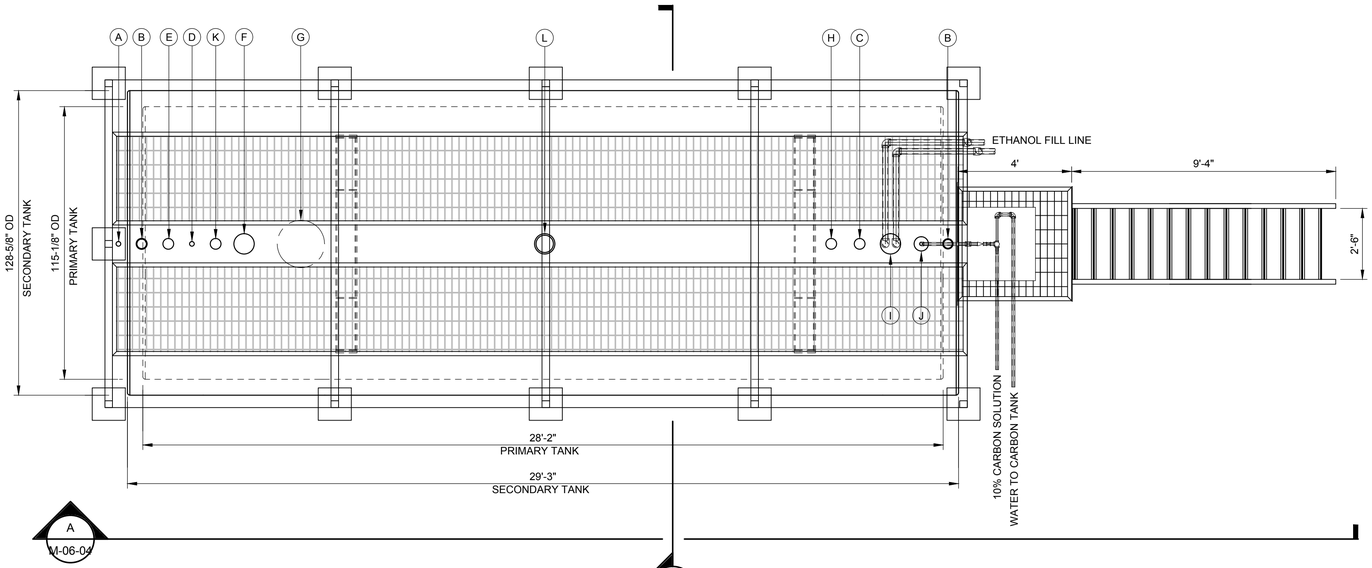
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-03	REV 1

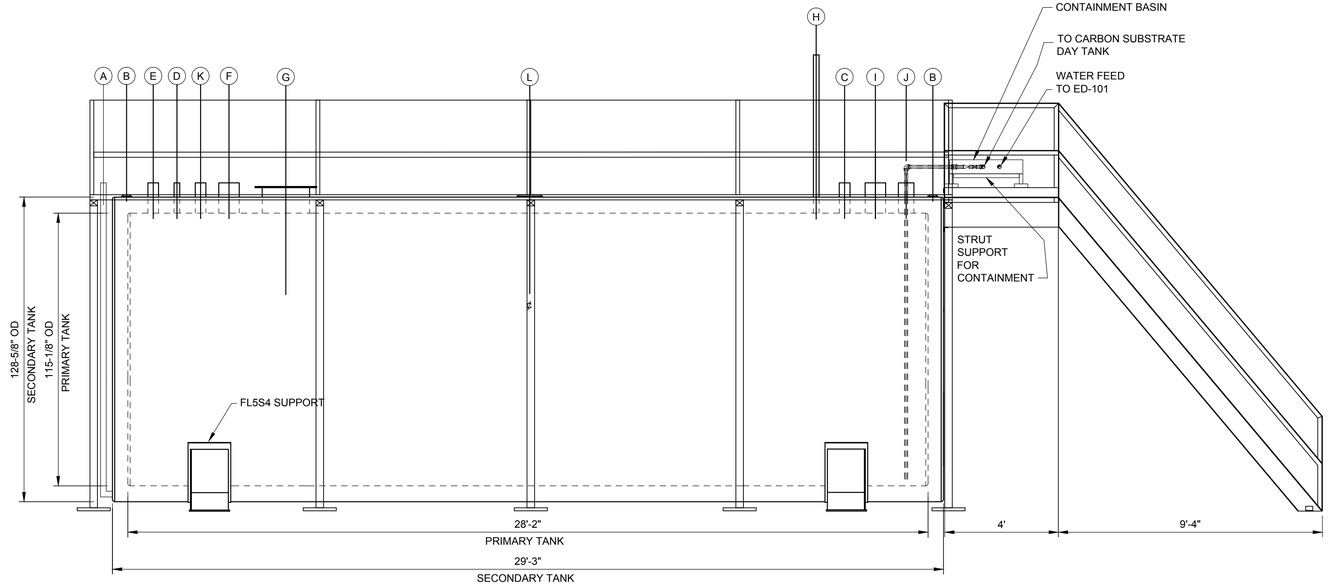
N1808

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TANK PLAN

3/8" = 1'-0"



A TANK SECTION

3/8" = 1'-0"

M-06-04

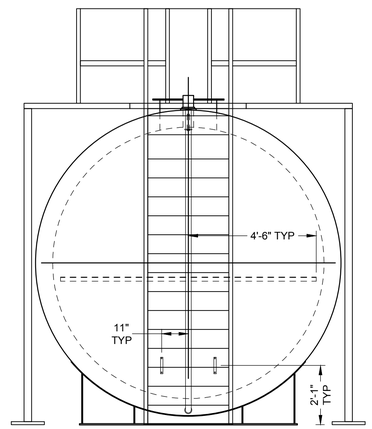
LEGEND

(A) REFERENCE NOZZLE SCHEDULE

NOZZLE SCHEDULE						
NOZZLE	SIZE	RATING	SCH	FLANGE		EXISTING NOZZLE DESCRIPTION
				SLIP-ON	F.F.	
A	2"	150□	80	SLIP-ON	F.F.	INTERSTITIAL MONITOR
B	4"	150□	80	SLIP-ON	F.F.	AGGREGATE FILL
C	4"	150□	80	SLIP-ON	F.F.	SPARE
D	2"	150□	80	SLIP-ON	F.F.	TEMPERATURE TRANSMITTER
E	4"	150□	80	SLIP-ON	F.F.	LEVEL TRANSMITTER
F	8"	150□	80	SLIP-ON	F.F.	EMERCENCY VENT
G	20"	150□	80	SLIP-ON		ACCESS PORT
H	2"	150□	80	SLIP-ON	F.F.	PRESSURE/VACUUM (P/V) VENT
I	8"	150□	80	SLIP-ON	F.F.	FILL OPENING
J	6"	150□	80	SLIP-ON	F.F.	SUCTION OPENING
K	4"	150□	80	SLIP-ON	F.F.	SPARE
L	8"	150□	80	SLIP-ON	F.F.	SECONDARY EMERGENCY VENT

NOTES:

1. TANK MUST MEET ALL SEISMIC ZONE IV REQUIREMENTS.
2. FABRICATOR SHALL PROVIDE CONTRACTOR WITH TANK ANCHORING DETAILS TO CONCRETE SLAB.
3. 3" AND SMALLER NOZZLES SHALL PROJECT 4" (MIN) FROM VESSEL SHELL.
4. 4" NOZZLES AND LARGER SHALL PROJECT 6" (MIN) FROM VESSEL SHELL.
5. FABRICATOR SHALL PROVIDE HANDLES ON ACCESS PORTS.
6. FLANGE BOLT HOLES TO STRADDLE PRINCIPAL VESSEL CENTERLINE UNLESS OTHERWISE INDICATED.
7. FABRICATOR TO PROVIDE REINFORCING PLATES FOR NOZZLES AS REQUIRED.
8. FABRICATOR TO PROVIDE LIFTING LUGS OR PROVIDE INSTRUCTIONS FOR SETTING TANK (E.G., STRAPS WITH SPREADER BAR).
9. CONTRACTOR TO PROCURE, OFFLOAD, AND INSTALL.
10. FABRICATOR SHALL PROVIDE PLATFORM AND STAIRS TO ACCESS TOP OF TANK.



B TANK SECTION

3/8" = 1'-0"

M-06-04

CARBON SUBSTRATE STORAGE TANK PLAN AND SECTION VIEWS

3/8" = 1'-0"

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

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUJCIK
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		LUK	JPB	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		LUK	JPB	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

IRZ CARBON SUBSTRATE STORAGE TANK MECHANICAL DETAILS

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

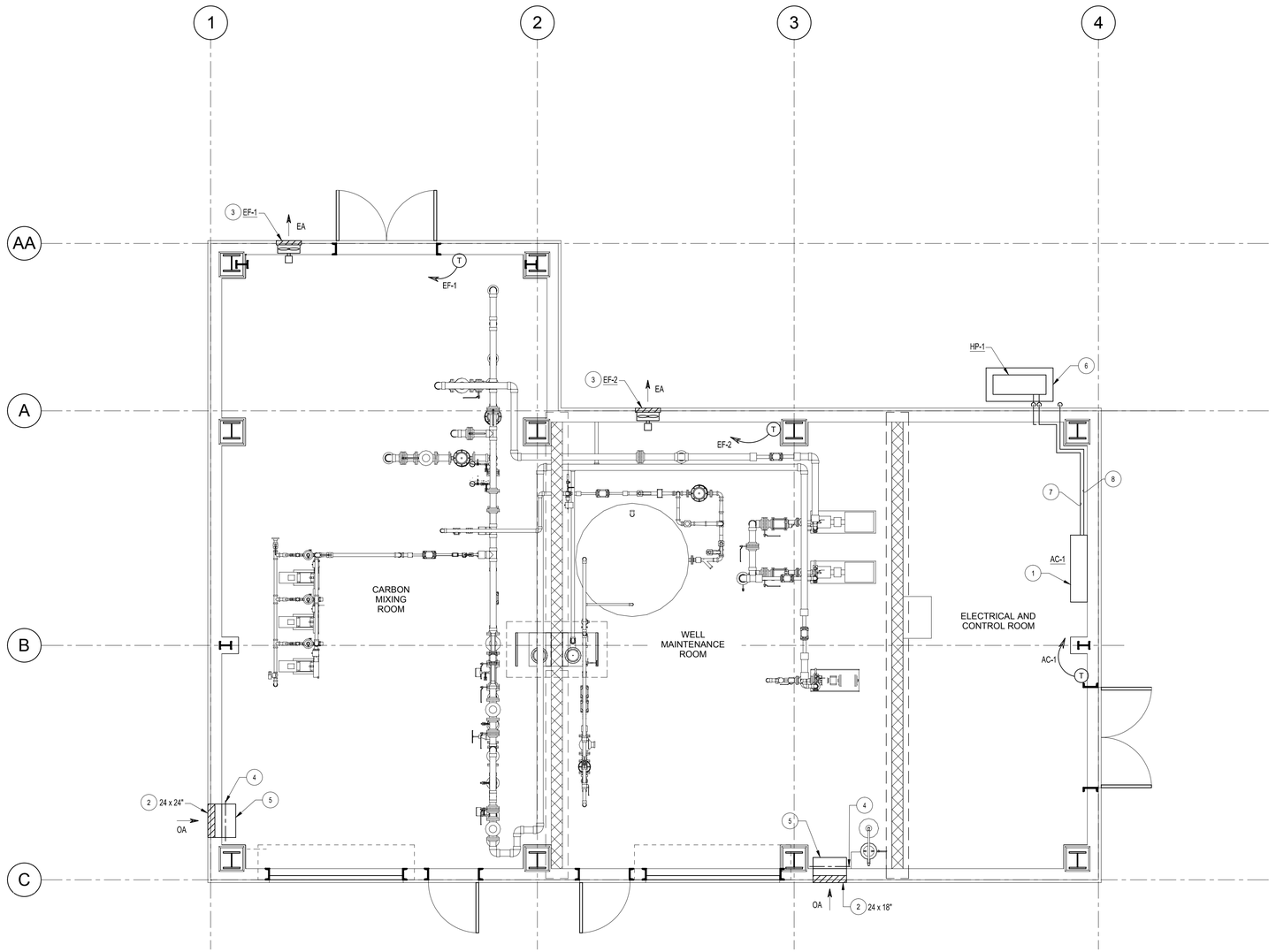
MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-04	REV 2

N1808

11/02/2015, 10:31, G:\Gr\ARTOPOCK-01S\100% DWG\M-M\M-06-04.dwg, T M-06-04

DRAWING NOTES:

1. MOUNT WALL MOUNTED INDOOR AC-1 APPROXIMATELY 6'-0" AFF. COORDINATE FINAL LOCATION WITH ARCHITECT.
2. OUTSIDE AIR LOUVER OF SIZE INDICATED (MIN. 50% FREE AREA) WITH BIRDSCREEN. REFER TO ARCHITECTURAL DIVISION FOR ADDITIONAL INFORMATION. MOUNT HIGH IN WALL NEAR CEILING. COORDINATE FINAL LOCATION WITH ARCHITECT.
3. SIDEWALL PROP FAN MOUNTED HIGH IN WALL NEAR CEILING. COORDINATE FINAL LOCATION WITH ARCHITECT.
4. GRAVITY BACKDRAFT DAMPER.
5. OPEN-ENDED DUCT WITH INSECT SCREEN (MIN. 50% FREE AREA)
6. PROVIDE 4" CONCRETE PAD FOR EQUIPMENT
7. REFRIGERANT LIQUID & GAS PIPING RUN ALONG WALL. SIZE PIPING IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
8. 3/4" CONDENSATE DRAIN RUN ALONG WALL TO DISCHARGE ON GRADE.



SCALE: 1/4" = 1'-0"
AT: 22"□34"

0 4' 8' 16'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
HAROEE P. SINGH
No. M-37414
Exp. 06/30/17
MECHANICAL
STATE OF CALIFORNIA
11/18/2015

CALLISONRTKL
A DESIGN CONSULTANCY OF ARCADIS

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/2015	FINAL DESIGN		JMH	HS	HS	RAO

REVISIONS

APPROVED BY	
RAO	

SO	
SUPV	HS
DSGN	JMH
DWN	JMH
CHKD	HS
OK	
DATE	11/18/2015
SCALES	1/4" = 1'-0"

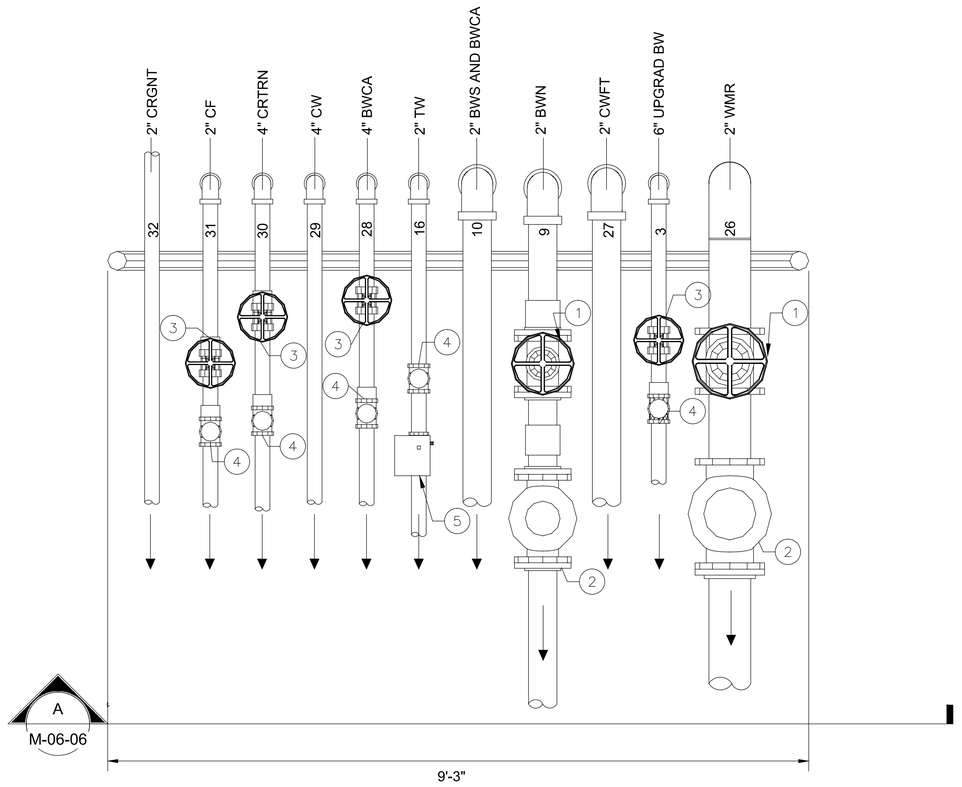
TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING FINISH FLOOR PLAN MECHANICAL FLOOR PLAN
GAS TRANSMISSION □ DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-05	REV 0

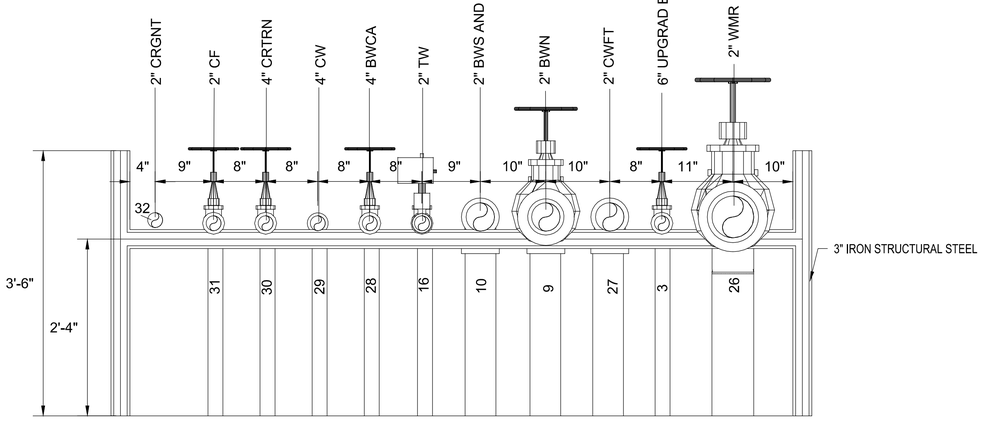
N1808

Project Number

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1 MW-20 BENCH FRAC TANK BASIN PIPE RACK ENLARGED PLAN
1"=1'-0"
C-06-03



A SECTION
1"=1'-0"
M-06-06

LEGEND

(1) REFERENCE ITEM # VALVE SCHEDULE.

NOTES:
1. FOR PIPE ID AND ABBREVIATION SCHEDULE, SEE C-00-X

VALVE SCHEDULE:

VALVE ID	DESCRIPTION
1	6" GATE VALVE
2	6" CHECK VALVE
3	2" GATE VALVE
4	2" CHECK VALVE
5	2" MOTORIZED BUTTERFLY VALVE

SCALE: 1"=1'

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WURL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	KLD	BW	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		BEH	KLD	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		BEH	KLD	JPB	JEF

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH FRAC TANK BASIN PIPE RACK DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-06	REV 2

N1808

11/02/2015, 10:35, G:\GR\...\AR-TOPOCK-01\S\...\100% DWG\M-M\...\M-06-06.dwg, T: M-06-06

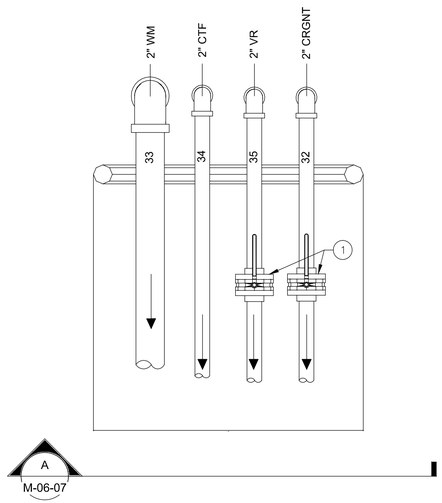
LEGEND

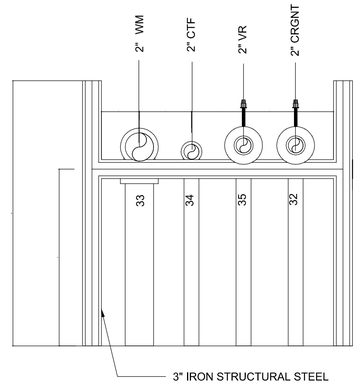
(1) REFERENCE ITEM # VALVE SCHEDULE.

NOTES:
1. FOR PIPE ID AND ABBREVIATION SCHEDULE, SEE C-00-X

VALVE SCHEDULE:

VALVE ID	DESCRIPTION
1	2" BUTTERFLY VALVE
2	2" CHECK VALVE
3	2" BALL VALVE
4	2" GATE VALVE





A SECTION
1'0"=1'-0"
M-06-07

1 MW-20 BENCH UNLOADING PAD PIPE RACK ENLARGED PLAN
1'0"=1'-0"
M-06-03

SCALE: 1"=1'

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	KLD	BW	RAO	
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0	04/15/13	INTERMEDIATE (60%) DESIGN	BEH	KLD	JPB	JEF	

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH UNLOADING PAD PIPE RACK DETAILS

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. M-06-07 of SHEETS | REV 2

N1808

11/02/2015, 10:36, G:\Gr...\AR-TOPOCK-01 S...\100% DWG\M-M...\M-06-07.dgn, T...: M-06-07

EQUIPMENT SCHEDULE

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
1	1-1/2"	SCH. 40 CST	CARBON LINE	36	SOLENOID VALVE	FV-*0611
2	1-1/2"	SCH. 40 CST	CARBON LINE	36	BALL VALVE	V-*0602B
						V-*0603T
3	1"	SCH. 40 CST	CARBON LINE	36	BALL VALVE	V-*0603A
						V-*0603F
						V-*0603G
						V-*0603L
						V-*0603M
						V-*0603S
						V-*0603V
						V-*0603X
						V-*0603Z
						V-*0604K
4	1"	SCH. 40 CST	CARBON LINE	36	CHECK VALVE	V-*0603B
						V-*0603E
						V-*0603H
						V-*0603K
						V-*0603N
						V-*0603R
						V-*0603U
						V-*0603W
						V-*0603Y
						V-*0604J
5	1"	SCH. 40 CST	CARBON LINE	36	DRAIN VALVE	V-*0603C
						V-*0603I
						V-*0603P
6	1"	SCH. 40 CST	CARBON LINE	36	CARBON SUBSTRATE HOSE PUMP	PMP-*0640
						PMP-*0641
						PMP-*0642
7	1"	SCH. 40 CST	CARBON LINE	36	AIR/VAC RELIEF	V-*0603D
						V-*0603J
						V-*0603Q
8	1/2"	SCH. 40 CST	CARBON LINE	36	BALL VALVE (PRESSURE SWITCH)	V-*0604G
						V-*0604H
						V-*0604I
9	1/2"	SCH. 40 CST	CARBON LINE	36	PRESSURE SWITCH	PSH-*0665
						PSH-*0666
						PSH-*0667
10	1"	SCH. 40 CST	CARBON LINE	36	MOTORIZED FLOW CONTROL VALVE	FCV-*0612
						FCV-*0613
						FCV-*0614
						FCV-*0615
						FCV-*0616
						FCV-*0617
						FCV-*0618
11	1"		CARBON LINE	36	MAGNETIC FLOWMETER	FM-*0671
						FM-*0675
						FM-*0676
						FM-*0681
12	3"	SCH. 80 PVC	FRESHWATER	1	GATE VALVE	V-*0625A
13	3"	SCH. 80 PVC	FRESHWATER	1	CHECK VALVE	V-*0625B
14	1"		FRESHWATER	1	MAGNETIC FLOWMETER	FM-*0678
15	1"	SCH. 80 PVC	FRESHWATER	1	GATE VALVE	V-*0625C
16	1"	SCH. 80 PVC	FRESHWATER	1	CHECK VALVE	V-*0625D
17	1"	SCH. 80 PVC	FRESHWATER	1	SOLENOID VALVE	FV-*0630
18	1"	SCH. 80 PVC	FRESHWATER	1	BALL VALVE	V-*0625E
19	1"	SCH. 80 PVC	FRESHWATER	1	GATE VALVE	V-*0628A
20	1"	SCH. 80 PVC	FRESHWATER	1	CHECK VALVE	V-*0628B
21	2"	SCH. 80 PVC	MONITORING WELL PURGE WATER		BALL VALVE	V-*0620M
						V-*0620N
22	2"	SCH. 80 PVC	MONITORING WELL PURGE WATER		FILTER	F-*0620
23	1"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	SOLENOID VALVE	FV-*0629
24	1"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	CHECK VALVE	V-*0620C
25	1"		WELL MAINTENANCE REAGENT	33	MAGNETIC FLOWMETER	FM-*0677
						FM-*0679
26	1"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	BALL VALVE	V-*0620D
27	1"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	EDUCTOR	E-*0622
28		POLYETHYLENE	WELL MAINTENANCE REAGENT		IRZ WELL MAINTENANCE REAGENT DAY TANK	T-*0619
29	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	BALL VALVE	V-*0620G
						V-*0620F
						V-*0620H
						V-*0620J
						V-*0620K
						V-*0604B
						V-*0604D
						V-*0604F
						V-*0604M
30	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	WYE STRAINER	F-*0622
31	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	DRAIN VALVE	V-*0620L
32	4"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	WELL MAINTENANCE PUMP	PMP-*0643
33	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	AIR/VAC RELIEF	V-*0629C
34	2"		WELL MAINTENANCE REAGENT	33	PRESSURE SWITCH	PSH-*0668
35	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	MOTORIZED FLOW CONTROL VALVE	FCV-*0631
36	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	CHECK VALVE	V-*0620I
						V-*0604A
						V-*0604C
						V-*0604E
						V-*0604L
37	1/2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	BALL VALVE (PRESSURE TRANSMITTER)	V-*0670G
38	1/4"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	BALL VALVE (SAMPLE PORT)	V-*0670H
39	1/2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT	33	PRESSURE INDICATING TRANSMITTER	PIT-*0661

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
40	4"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		MOTORIZED FLOW CONTROL VALVE	FCV-*0632
41	4"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		BUTTERFLY VALVE	V-*0626F
						V-*0626H
						V-*0626I
						V-*0626J
						V-*0610A
						V-*0610C
						V-*0610E
42	2"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		CLEAN-IN-PLACE REAGENT PUMP	PMP-*0644
43	1/2"		CLEAN-IN-PLACE WATER		PRESSURE SWITCH	PSH-*0669A
44	1/2"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		BALL VALVE (PRESSURE GAUGE ASSEMBLY)	V-*0670B
45	1/2"		CLEAN-IN-PLACE WATER		PRESSURE GAUGE ASSEMBLY	PI-*0660F
46	1/4"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		SAMPLE PORT	V-*0670A
47	4"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		CHECK VALVE	V-*0626G
						V-*0626M
						V-*0610B
						V-*0610D
48	4"	SCH. 80 PVC	CLEAN-IN-PLACE WATER		AIR/VAC RELIEF	V-*0626N
49	2"		CLEAN-IN-PLACE WATER		MAGNETIC FLOWMETER	FM-*0680A
50	4"	SCH. 80 PVC	PRODUCED WATER		BUTTERFLY VALVE	V-*0626D
						V-*0627D
						V-*0627E
51	4"	SCH. 80 PVC	PRODUCED WATER		MOTORIZED FLOW CONTROL VALVE	FCV-*0633
52	2"	SCH. 80 PVC	PRODUCED WATER		PRODUCED WATER TRANSFER PUMP	PMP-*0645
53	1/2"		PRODUCED WATER		PRESSURE SWITCH	PSH-*0669B
54	1/2"		PRODUCED WATER		BALL VALVE (PRESSURE GAUGE ASSEMBLY)	V-*0670C
55	1/2"	SCH. 80 PVC	PRODUCED WATER		PRESSURE GAUGE ASSEMBLY	PI-*0660G
56	1/4"	SCH. 80 PVC	PRODUCED WATER		SAMPLE PORT	V-*0670D
57	4"	SCH. 80 PVC	PRODUCED WATER		AIR/VAC RELIEF	V-*0627J
58	4"	SCH. 80 PVC	PRODUCED WATER		CHECK VALVE	V-*0627C
						V-*0627I
59	2"		PRODUCED WATER		MAGNETIC FLOWMETER	FM-*0680B
60	2"	SCH. 80 PVC	CONDITIONED WATER		BALL VALVE	V-*0627B
						V-*0627H
61	2"	SCH. 80 PVC	CONDITIONED WATER		MOTORIZED FLOW CONTROL VALVE	FCV-*0628S
62	2"	SCH. 80 PVC	CONDITIONED WATER		CONDITIONED WATER INJECTION PUMP	PMP-*0648
63	1/2"	SCH. 80 PVC	CONDITIONED WATER		PRESSURE SWITCH	PSH-*0669C
64	1/2"	SCH. 80 PVC	CONDITIONED WATER		BALL VALVE (PRESSURE GAUGE ASSEMBLY)	V-*0670E
65	1/2"	SCH. 80 PVC	CONDITIONED WATER		PRESSURE GAUGE ASSEMBLY	PI-*0660
66	1/4"	SCH. 80 PVC	CONDITIONED WATER		SAMPLE PORT	V-*0670F
67	4"	SCH. 80 PVC	CONDITIONED WATER		BUTTERFLY VALVE	V-*0610H
68	4"	SCH. 80 PVC	CONDITIONED WATER		AIR/VAC RELIEF	V-*0627L
69	4"	SCH. 80 PVC	CONDITIONED WATER		CHECK VALVE	V-*0626E
						V-*0627K
						V-*0610I
70	2"	SCH. 80 PVC	CONDITIONED WATER		MAGNETIC FLOWMETER	FM-*0680C
71	4"	SCH. 80 PVC	PROCESS WATER		BUTTERFLY VALVE	V-*0608A
						V-*0608B
						V-*0608D
						V-*0609A
						V-*0609B
						V-*0609C
						V-*0609D
						V-*0609H
						V-*0609K
						V-*0609P
						V-*0610F
						V-*610G
						V-*
						V-*
72	3"	SCH. 80 PVC	PROCESS WATER		BUTTERFLY VALVE	V-*0609L
						V-*0610L
73	4"	SCH. 80 PVC	PROCESS WATER		CHECK VALVE	V-*0608C
						V-*0609G
						V-*0609J
						V-*0609O
						V-*
						V-*
74	3"	SCH. 80 PVC	PROCESS WATER		CHECK VALVE	V-*0609M
75	1/2"	SCH. 80 PVC	PROCESS WATER		BALL VALVE (PRESSURE TRANSMITTER)	V-*0608K
						V-*0608L
76	1/2"	SCH. 80 PVC	PROCESS WATER		PRESSURE TRANSMITTER	PIT-*0662
						PIT-*0663
77	1/4"	SCH. 80 PVC	PROCESS WATER		SAMPLE PORT	V-*0608F
						V-*0608H
						V-*0608J
						V-*0608N
						V-*0608O
						V-*0608P
						V-*0609N
						V-*0610J

ITEM	PIPE SIZE	MATERIAL	PROCESS FLOW	PIPE ID	DESCRIPTION	ID TAG
78	1/2"	SCH. 80 PVC	PROCESS WATER		BALL VALVE (PRESSURE GAUGE ASSEMBLY)	V-*0608E
						V-*0608G
						V-*0608I
						V-*0610K
79	1/2"		PROCESS WATER		PRESSURE GAUGE ASSEMBLY	PI-*0660A
						PI-*0660B
						PI-*0660C
						PI-0660D
80	2"		PROCESS WATER		MAGNETIC FLOWMETER	FM-*0672
						FM-*0673
						FM*-0674
						FM*-0680
81	4"	SCH. 80 PVC	PROCESS WATER		STATIC MIXER	M-*0605
						M-*0606
						M-*0607
						M-*0608
82	2"		PROCESS WATER		INLINE BOOSTER PUMP	PMP-*
83	2"		PROCESS WATER		INLINE BOOSTER PUMP	PMP-*
84	2"	SCH. 80 PVC	SUMP WATER		SUMP PUMP	PMP-*0646
85	2"	SCH. 80 PVC	SUMP WATER		CHECK VALVE	V-*0627F
86	2"	SCH. 80 PVC	SUMP WATER		BALL VALVE	V-*0627G
87	2"	SCH. 80 PVC	WELL MAINTENANCE REAGENT		SUMP PUMP	PMP-*0647

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN J. WUERL
C 67811
EXP 6/30/17
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/15	FINAL DESIGN	LUK	KLD	BW	RAO	
0	8/5/15	90% RTC RESOLUTION	LUK	JPB	KLD	BJW	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING MECHANICAL LAYOUT SCHEDULE

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-08	REV 1

11/02/2015, 10:30, G: Gr AR TOPOCK-01 S 100% DWG M-M M-06-01 02 03 08.dt T M-06-08

N180B

FAN SCHEDULE

DESIG	LOCATION	SYSTEM	CFM	SP (IN WG)	MOTOR INFORMATION			OPERATING WEIGHT (LBS)	BASIS OF DESIGN		REMARKS
					HP	RPM	VOLTS/PHASE/HZ		MANUFACTURER	MODEL NUMBER	
EF-1	CARBON MIXING ROOM	EXHAUST	750	0.125	1/12	1550	115V/1ø/60	20	GREENHECK	S1-10-440-D	(1) (2)
EF-2	WELL MAINTENANCE ROOM	EXHAUST	510	0.125	1/20	1650	115V/1ø/60	20	GREENHECK	S1-10-428-P	(1) (2)

(1) PROVIDE GRAVITY BACKDRAFT DAMPER, INSECT SCREEN, PROTECTIVE MOTOR GUARD, AND WEATHER HOOD.
(2) PROVIDE DISCONNECT.

DUCTLESS SPLIT AIR CONDITIONING UNIT SCHEDULE

DESIG.	TYPE	AREA SERVED	AIR FLOW CFM	ESP (IN. W.G.)	COOLING		HTG MBH	ELECTRICAL			WEIGHT (LB)	REFRIG.	DIMEN. HxWxD (IN.)	REMARKS
					TOT. MBH	SENS. MBH		INPUT POWER (KW)	MCA	V-ø-HZ				
AC-1	WALL MTD	ELECTRIC & CONTROL ROOM	475	-	30	19.9	38.0	2.8	0.4	208-1-60	38	R-410A	13x47x9	(1) (2) (3) (4)

(1) BASIS OF DESIGN DAIKIN FTXS30LVJU.
(2) COOLING CAPACITY BASED ON NOMINAL INDOOR CONDITIONS OF 80/67 (°F DB/WB) AND AMBIENT CONDITIONS OF 95/75 (°F DB/WB).
(3) PROVIDE DISCONNECT, WALL MOUNTED THERMOSTAT
(4) HEATING CAPACITY BASED ON NOMINAL INDOOR CONDITIONS OF 70/70 (°F DB/WB) AND AMBIENT CONDITIONS OF 47/43 (°F DB/WB).

HEAT PUMP SCHEDULE

MARK	LOCATION	CAPACITY		REFRIG TYPE	COMPRESSOR		GENERAL			PHYSICAL		ELECTRICAL					REFRIG. PIPING			BASIS OF DESIGN	REMARKS
		COOLING (MBH)	HEATING (MBH)		TYPE	QTY (#)	SERVICE	CLG EER	HTG COP	HxWxD (IN.)	WEIGHT (LB)	INPUT POWER (KW)	MCA	VOLTS (V)	PHASE (ϕ)	HERTZ (Hz)	MAX. EQUIVALENT PIPE LENGTH (FT.)	MAX. VERT. PIPE LENGTH (FT.)	CHARGE (LB/FT)		
HP-1	OUTSIDE ELECTRIC ROOM	30.0	38.0	R-410	INVERTER	1	AC-1	17.9	-	39x37x12	179	3.9	19.5	208	1	60	98	65	6	DAIKIN RXS36LVJU	(1) (2) (3)

(1) COOLING OPERATING RANGE = 23-122°F.
(2) HEATING OPERATING RANGE = -4-60 °F.
(3) COOLING CAPACITY RATED AT 115°F.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
HAROLD F. SIMON
No. M-37414
Exp. 06/30/2017
MECHANICAL
STATE OF CALIFORNIA
11/18/2015

CALLISONRTKL
A DESIGN CONSULTANCY OF ARCADIS

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	11/18/2015	FINAL DESIGN		JMH	HS	HS	RAO

REVISIONS

APPROVED BY: RAO

SO	
SUPV	HS
DSGN	JMH
DWN	JMH
CHKD	HS
OK	
DATE	11/18/2015
SCALES	1/4" = 1'-0"

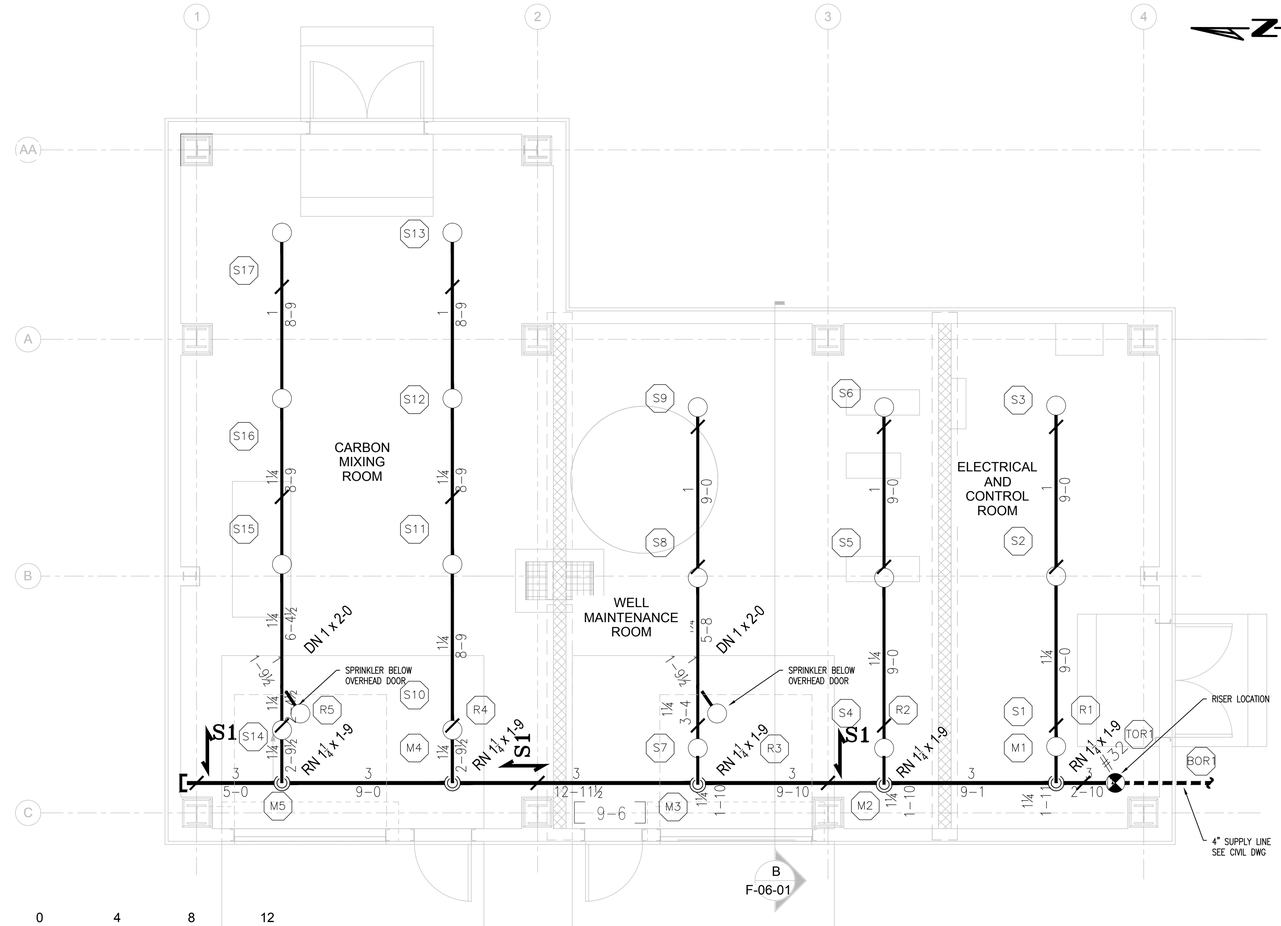
TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT
BUILDING FINISH FLOOR PLAN
MECHANICAL SCHEDULES
GAS TRANSMISSION :: DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
M-06-09	REV 0

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Project Number

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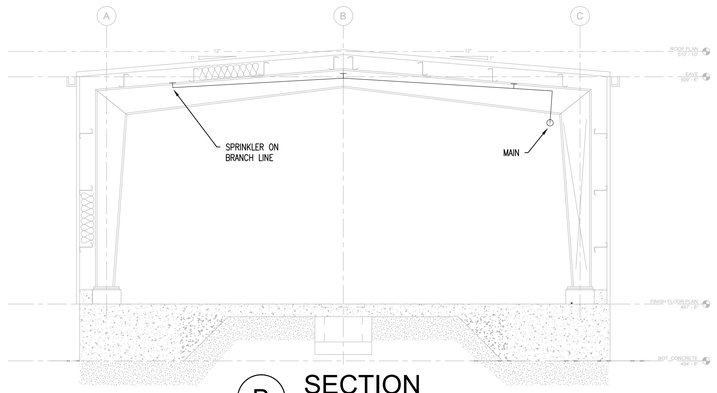


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SCALE: 1/4"=1'-0"

A MW-20 BENCH CARBON AMENDMENT BUILDING

1/4" = 1'-0"



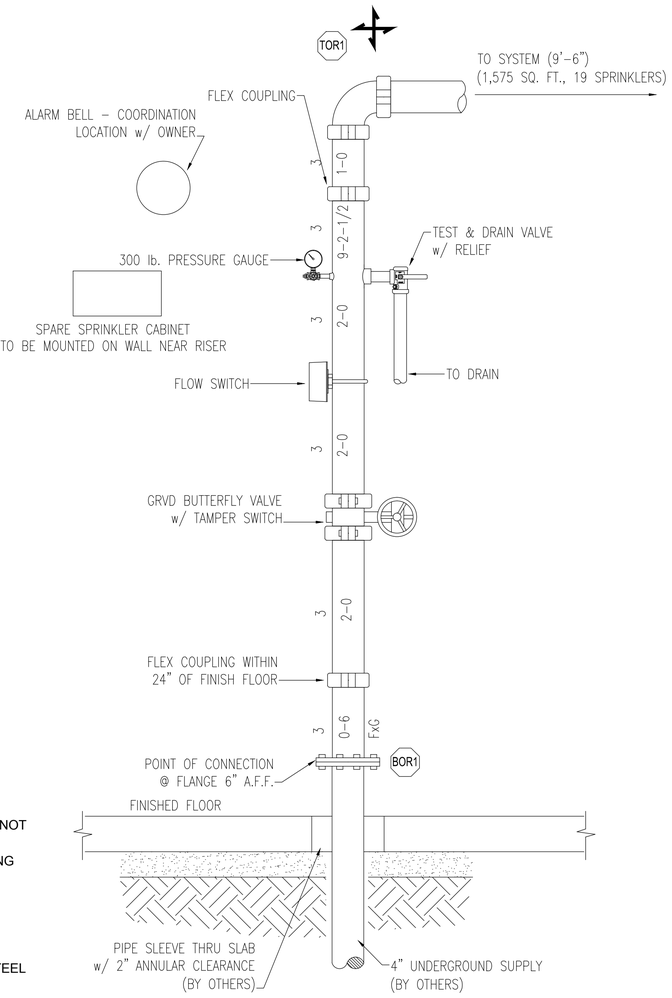
B SECTION

1/4" = 1'-0"

CALCULATION DESIGN INFORMATION	
SYSTEM or AREA No.	ONE
QUICK RESPONSE SPRINKLERS?	YES
SYSTEM TYPE	WET
K-FACTOR	5.6
HAZARD	ORD. GP. 2
DENSITY (GPM/FT²)	.20
AREA PER SPRINKLER (FT²)	124
AREA OF OPERATION (FT²)	1500
AREA OF OPERATION ADJUSTED AS FOLLOWS:	
DRY PIPE INCREASE (30%)	N/A
SLOPE >2:12 INCREASE (30%)	N/A
CEILING HEIGHT:	N/A
% REDUCTION:	N/A
CEILING HEIGHT REDUCTION (FT²)	N/A
ADJ. AREA OF OPERATION (FT²)	1500

WATER SUPPLY	
STATIC (PSI)	N/A
RESIDUAL (PSI)	N/A
FLOW (GPM)	N/A
PUMP (GPM @ PSI)	N/A @ N/A

SYSTEM DEMAND REQUIRED AT: BASE OF RISER	
PSI REQUIRED	40.11
GPM REQUIRED	433.026
PSI AVAILABLE	N/A
GPM AVAILABLE	N/A
SAFETY MARGIN	N/A
HOSE STREAM DEMAND (GPM):	
INSIDE: N/A – OUTSIDE:	250
LOCATION:	WORKSHOP



FIRE SPRINKLER RISER DETAIL

NO SCALE

PIPING PLAN

1. AT OBSTRUCTED CONSTRUCTION SPRINKLER DEFLECTOR SHALL NOT EXCEED 6" BELOW THE BOTTOM OF THE FRAMING. (DEFLECTOR SHALL NOT EXCEED 22" BELOW THE DECK.)
2. MAIN PIPING SHALL HANG AT 9'-6" AFF. LINE PIPING SHALL HANG AT 6" BOTTOM OF FRAMING.
3. MAIN HANGERS SHALL BE (#7) C-CLAMP W/ RETAINER STRAP. LINE HANGERS SHALL BE (#4) SIDE BEAM BRACKET. (SEE DETAILS)
4. MAIN PIPING SHALL BE SCHEDULE 10 STEEL (THINWALL) AND SHALL BE ROLL GROOVED PER NFPA 13. LINE PIPING SHALL BE SCHEDULE 40 STEEL (STANDARD) AND SHALL BE GROOVED OR THREADED PER NFPA.

SPRINKLERS	SYM	CNT	ORIF, K-FACTOR	NPT	MFG.	TEMP	FINISH	RESPONSE-STYLE	S.I.N.	MODEL#	ESCUTCHEON
	○	19	(1/2", K=5.6)	1/2"	VKG	200	BRASS	QR - SSU	VK300	MFAST	N/A

19 = TOTAL SPRINKLERS THIS SHEET

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

LICENSED FIRE PROTECTION CONTRACTOR — CLASSIFICATION C-16 — LICENSE No. 570970 — STATE OF CALIFORNIA

MARQUEE FIRE PROTECTION
710 W. Stadium Lane
Sacramento, CA. 95834-1130
TEL. 916. 641-7997 / 707. 642-7905
FAX. 916. 641-0775
CA. LIC. 570970 C-16

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		TPH	TPH	JJA	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		AJW	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		AJW	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

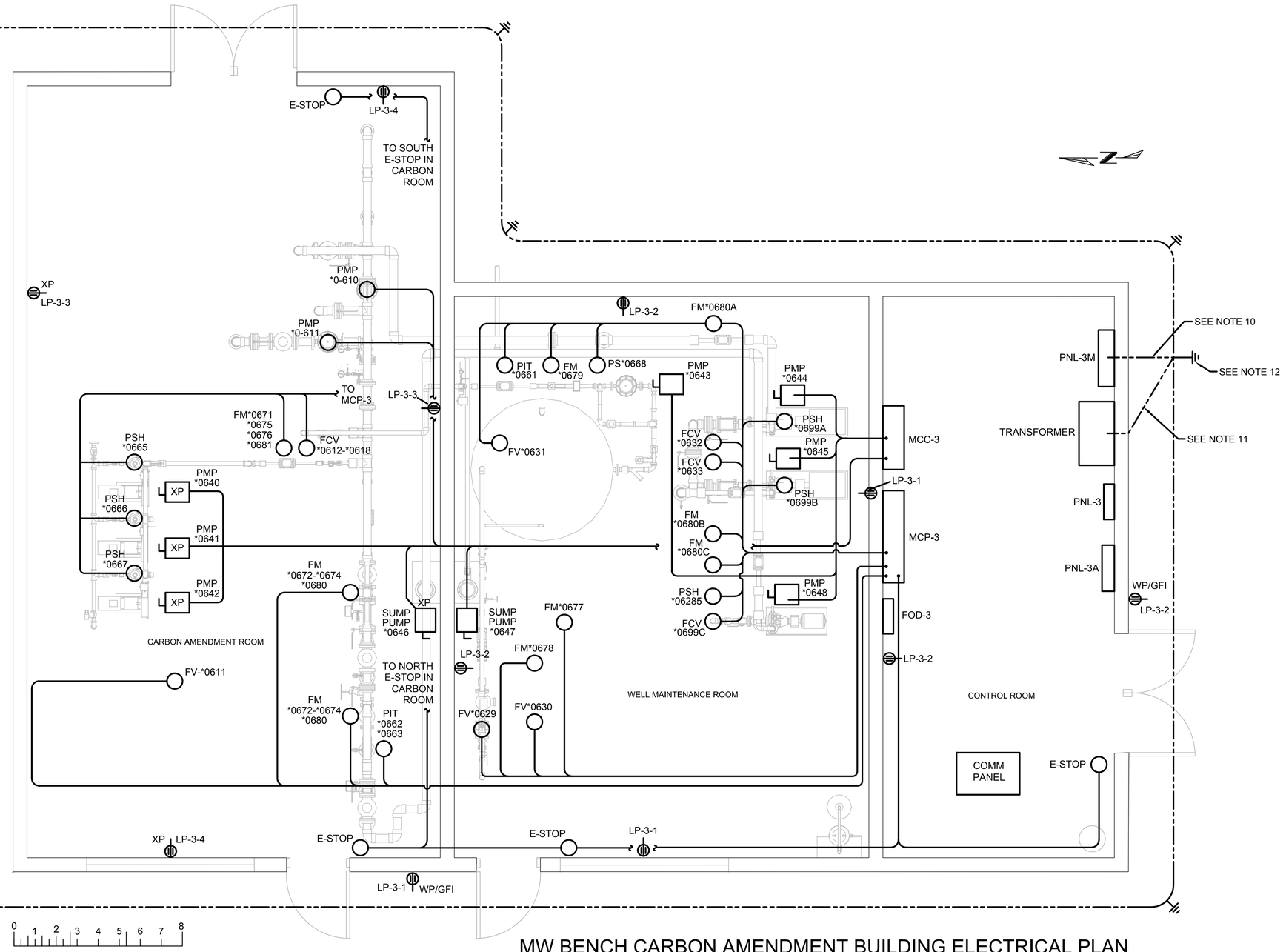
TOPOCK GROUNDWATER REMEDIATION PROJECT
FIRE PROTECTION MW-20 BENCH CARBON AMENDMENT BUILDING
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. F-06-01 of SHEETS | REV 2

N1808

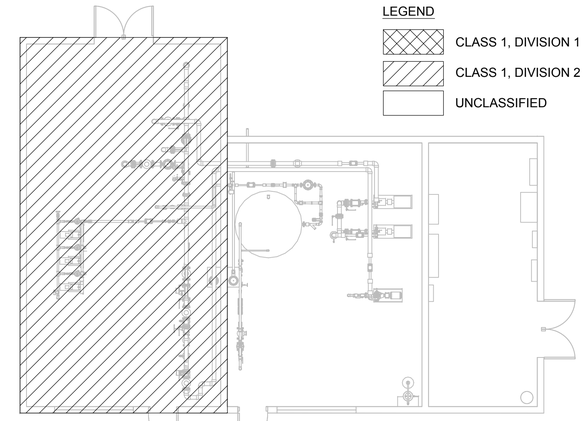
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SCALE: 3/8"=1'-0"

MW BENCH CARBON AMENDMENT BUILDING ELECTRICAL PLAN

3/8" =1'-0"



MW BENCH CARBON AMENDMENT BUILDING HAZARDOUS CLASSIFICATION

NOT TO SCALE

NOTES:

1. REFER TO SHEET E-06-04 FOR CONDUIT AND WIRE SCHEDULE.
2. REFER TO INSTRUMENTATION CONNECTION DRAWINGS FOR CONTROL WIRES NUMBERING AND CONNECTION TO PLC (MCP).
3. ALL INSTRUMENTATION SIGNAL CABLES SHALL BE BELDEN 9952 (2 CONDUCTOR SHIELDED CABLE), BELDEN 9954 (4 CONDUCTOR SHIELDED CABLE), OR BELDEN 5305 FE (7 CONDUCTOR SHIELDED CABLE) AS INDICATED ON THE TABLE.
4. CONDUIT AND FITTING TYPES SHALL COMPLY AND BE APROVED FOR THE AREA CLASSIFICATION THAT ARE INSTALLED IN. SEAL-OFFS SHALL BE INSTALLED AS REQUIRED.
5. CONDUIT SIZES ARE AS INDICATED, JUNCTION BOXES SHALL BE CARBON STEEL, NEMA 4, OR XP WHEN USED IN CLASSIFIED AREAS. JUNCTION BOXES SIZES SHALL BE DETERMINED BY CONTRACTOR TO COMPLY WITH LOCAL. STATE AND NEC.
6. WIRE SIZES AND TYPES ARE PROVIDED IN CONDUCTOR SCHEDULE TABLE.
7. P*0640, P*0641, P*0612, P*0643, P*0644, P*0645, AND P*0648 DISCONNECT SWITCHES SHALL HAVE AUXILIARY CONTACT WIRED TO PLC TO INDICATE SWITCH POSITION.
8. INSTALL DISCONNECT MOUNTING STRUCTURE/ CHANNEL FRAMING. EXACT LOCATION TO BE FIELD DETERMINED TO ALLOW ACCESS TO EQUIPMENT SERVICE AND REMOVAL FROM BUILDING.
9. PROVIDE AND INSTALL #2 / 0 GROUNDING RING.
10. PROVIDE AND INSTALL #1 /0 AWG GROUNDING ELECTRODE CONDUCTOR TO SERVICE ENTRANCE DISCONNECT IN PNL-3M.
11. PROVIDE AND INSTALL #2 GROUNDING ELECTRODE CONDUCTOR TO TRANSFORMER.
12. PROVIDE AND INSTALL #4 GROUNDING ELECTRODE TO FOUNDATION REBAR.
13. ALL CONDUITS WITHIN BUILDING SHALL BE RUN OVERHEAD/ EXPOSED.
14. ALL EQUIPMENT AND INSTRUMENTATION WIRING, AND CABLES SHALL BE CONTINUOUS RUNS FROM PANELS TO DEVICES.
15. 120V 10 CIRCULATING TO BE (2) #12, (1) #12 6., 3/4" C UNLESS OTHERWISE NOTED.
16. USE #10 CONDUCTORS FOR 120V, 20a BRANCH CIRCUITS OVER 100 FEET
17. 120V 10 POWER CIRCUITING WIRED TO PANEL LP-1, UNLESS OTHERWISE NOTED.
18. ALL CONTROL AND POWER CABLES RUNNING FROM JUNCTION BOXES TO INSTRUMENTATION AND DEVICES SHALL BE INSIDE CONDUITS.
19. PUMP DISCONNECTS IN CLOSE PROXIMITY SHALL BE MOUNTED ON EQUIPMENT RACK.
20. ALL HOMERUNS TO PANELBOARDS, CONTROL PANELS, AND INSTRUMENTATION PANELS CAN BE COMBINED IN THEIR RESPECTIVE HOMERUN CONDUITS TO MINIMIZE THE TOTAL NUMBER OF CONDUITS ENTERING THE PANEL, PROVIDED THE CONDUITS ARE PROPERLY SIZED PER NEC. FOR COMBINED CIRCUITS/HOMERUNS, CONDUCTORS MUST BE DERATED IN ACCORDANCE WITH THE MOST RECENT NEC REQUIREMENTS.
21. CONTRACTOR SHALL PROVIDE AND INSTALL APPROPRIATE ELECTRICAL JUNCTION BOXES WHERE DEEMED NECESSARY TO COMPLY WITH THE NATIONAL ELECTRICAL CODE.

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIDOTI 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		BEH	KLD	JPB	JEF
0	4/5/13	INTERMEDIATE (60%) DESIGN		BEH	KLD	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELECTRICAL PLAN

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY

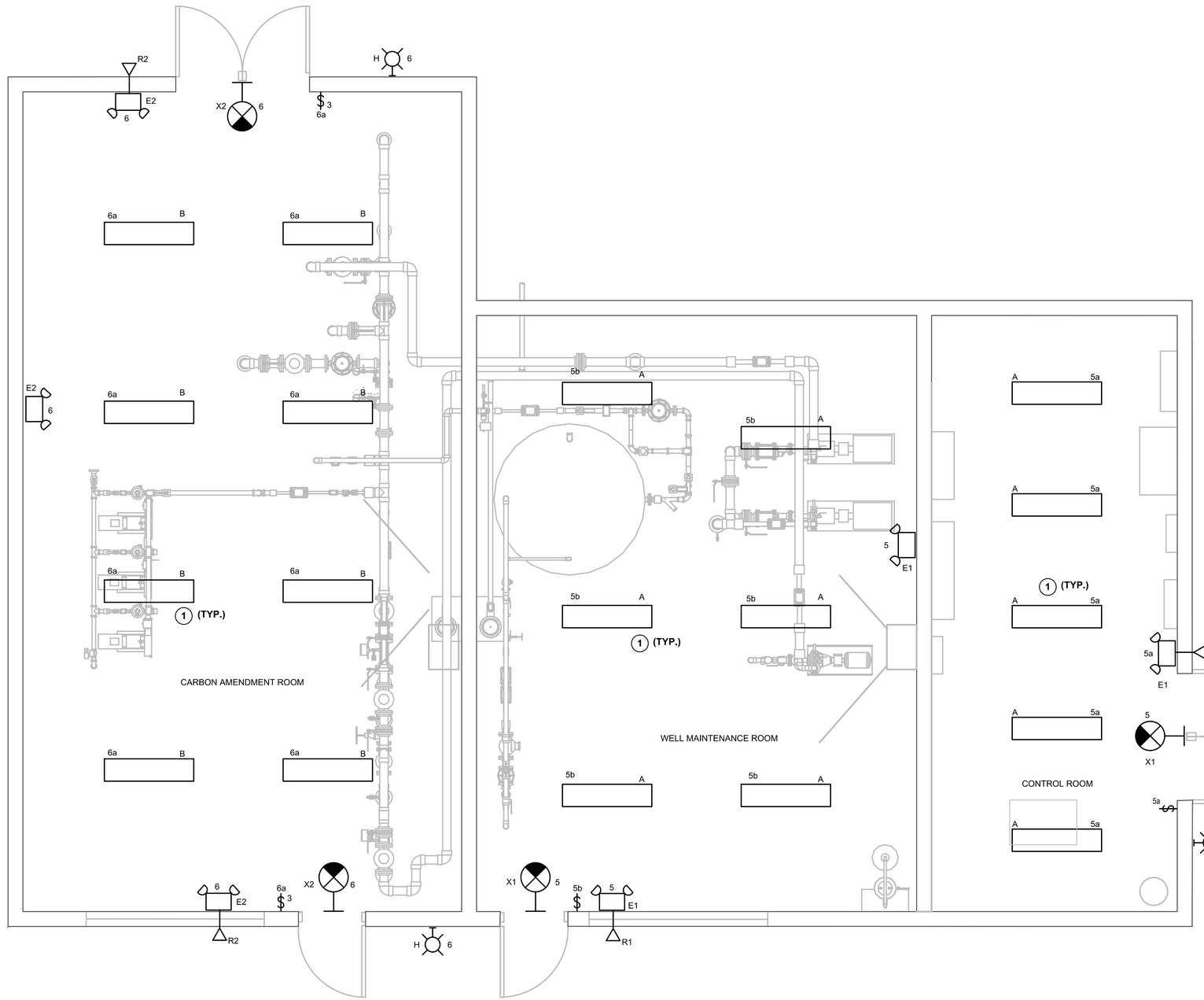
SAN FRANCISCO, CALIFORNIA

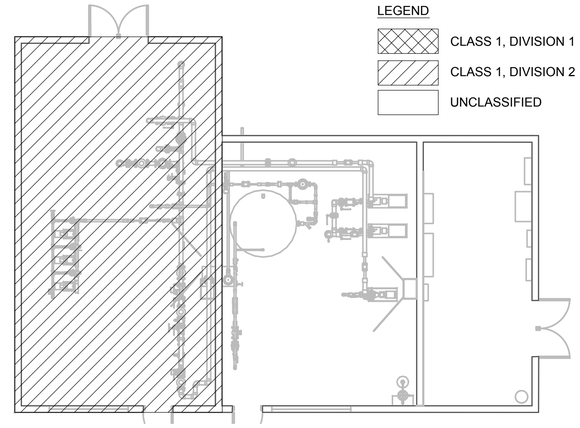
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SHEET NO. E-06-01 of SHEETS | REV 2

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MW BENCH CARBON AMENDMENT
BUILDING HAZARDOUS CLASSIFICATION

NOT TO SCALE

$ 2a — NUMBER INDICATES CIRCUIT, LOWER CASE LETTER INDICATES SWITCH LEG

GENERAL NOTES:

1. 120V, 1Ø CIRCUITING TO BE (2) #12, (1) #12 G., 3/4" C., UNLESS OTHERWISE NOTED.
2. USE #10 CONDUCTORS FOR 120V, 20A BRANCH CIRCUITS OVER 100 FEET.
3. 120V, 1Ø LIGHTING CIRCUITING WIRED TO PANEL LP-3 UNLESS OTHERWISE NOTED.
4. CIRCUIT EXIT AND EMERGENCY LIGHTING AHEAD OF LOCAL SWITCHING.
5. SEE SHEET E-06-04 FOR LUMINAIRE SCHEDULE AND PANEL SCHEDULE.

PLAN NOTES:

(1) MOUNT LUMINAIRE DIRECTLY TO CEILING SURFACE.

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

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
JOHN M. SIOSTA
20532
Exp. 9-30-17
ELECTRICAL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	JMS	RAO
1	9/8/14	PRE-FINAL (90%) DESIGN		BEH	JMS	JPB	JEF
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REVISIONS

APPROVED BY	RAO
SO	
SUPV	
DSGN	
DWN	
CHKD	
OK	
DATE	
SCALES	

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING LIGHTING PLAN
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
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SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
E-06-02	REV 2

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N1808

LUMINAIRE SCHEDULE

		LAMPS QUANTITY	LAMPS TYPE	CONNECTED WATTS			
A		2	F32T8	64	ENCLOSED AND GASKETED FLUORESCENT LUMINAIRE, WITH IMPACT RESISTANT FIBERGLASS REINFORCED POLYESTER HOUSING, AND HIGH IMPACT ACRYLIC DIFFUSER.	LITHONIA CAT NO. DMW232-120-GEB10IS, DAY-BRITE, OR EQUAL.	MOUNT DIRECTLY TO CEILING SURFACE
B		2	F32T8	64	ENCLOSED INDUSTRIAL FLUORESCENT LUMINAIRE, WITH MOLDED COMPOSITE BODY AND TEMPERED GLASS LENS, UL LISTED FOR CLASS 1, DIVISION 2, GROUPS A, B, C, AND D LOCATIONS.	DAY-BRITE CAT NO. HAZ232-120-E10I, LITHONIA, OR EQUAL.	MOUNT DIRECTLY TO CEILING SURFACE
E1		2	25W SBT	20	SELF-CONTAINED EMERGENCY LIGHTING UNIT WITH 120V CHARGER, 12V LEAD-CALCIUM BATTERY, AND CAPABILITY FOR THE ADDITION OF REMOTE HEADS	DUAL-LITE CAT NO. LM112-12V-D-I, EMERGI-LITE, OR EQUAL CAPACITY FOR SRHSW1225 REMOTE HEAD	MOUNT AT 8' ABOVE FINISHED FLOOR, UON
E2		2	12W SBT	20	SELF-CONTAINED EMERGENCY LIGHTING UNIT WITH 120V CHARGER, 12V SEALED LEAD-ACID BATTERY, AND CAPABILITY FOR THE ADDITION OF REMOTE HEADS, UL LISTED FOR CLASS 1, DIVISION 2, GROUPS B, C, AND D LOCATIONS.	DUAL-LITE CAT NO. C1D2-12V72-12W, EMERGI-LITE, OR EQUAL CAPACITY FOR C1D2R-12V12W REMOTE HEAD	MOUNT AT 8' ABOVE FINISHED FLOOR, UON
H		1	50W MH	50M	METAL HALIDE WALL PACK, WITH CUTOFF DISTRIBUTION, CORROSION-RESISTANT, DIE-CAST ALUMINUM HOUSING, AND PHOTOCELL, UL LISTED FOR WET LOCATIONS	LUMINAIRE: LITHONIA CAT NO. TWAC-50M-120-PE-LPI, OR EQUAL	MOUNT AT 8' ABOVE GRADE TO CENTERLINE OF LUMINAIRE, UON
R1		1	25W SBT	20	REMOTE INCANDESCENT OUTDOOR HEAD FOR EMERGENCY LIGHTING UNIT E1 ABOVE.	DUAL-LITE CAT NO. SRHSW1225, EMERGI-LITE, OR EQUAL	EXTERIOR MOUNT AT 8' ABOVE GRADE TO CENTERLINE OF LUMINAIRE, UON
R2		1	12W SBT	20	REMOTE INCANDESCENT OUTDOOR HEAD FOR EMERGENCY LIGHTING UNIT E2 ABOVE. UL LISTED FOR CLASS 1, DIVISION 2, GROUPS B, C, AND D LOCATIONS.	DUAL-LITE CAT NO. C1D2R-12V12W, EMERGI-LITE, OR EQUAL	EXTERIOR MOUNT AT 8' ABOVE GRADE TO CENTERLINE OF LUMINAIRE, UON
X1		6	RED LED	4	RED LED EXIT SIGN, WITH THERMOPLASTIC HOUSING, NICKEL-CADMIUM BATTERY, WITH SELF-TESTING ELECTRONICS	DUAL LITE LXURWE-I, EMERGI-LITE OR EQUAL	WALL OR PENDANT MOUNT FROM CEILING
X2		6	RED LED	3	RED LED EXIT SIGN, WITH DIE CAST ALUMINUM HOUSING AND NICKEL-CADMIUM BATTERY, WITH SELF-TESTING ELECTRONICS, UL LISTED FOR CLASS 1, DIVISION 2, GROUPS A, B, C, AND D LOCATIONS	CROUSE HINDS CCH-UX70RSDHAZ, EMERGI-LITE OR EQUAL	WALL OR PENDANT MOUNT FROM CEILING

MW-20 BENCH CARBON AMENDMENT BUILDING ELECTRICAL SCHEDULES

EQUIPMENT, DEVICES AND INSTRUMENTATION WIRING SCHEDULE

ID	WIRE TYPE, SIZE, AND QUANTITY	CONDUCTOR OR CABLE TYPE
P740	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P741	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P742	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P743	(3)#10 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
SUMP PUMP	(3)#10 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P744	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P745	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
P748	(3)#8 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
FV715	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV715	(1) C7 (CONTROLS)	BELDEN 5305FE
FV716	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV716	(1) C7 (CONTROLS)	BELDEN 5305FE
FV717	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV717	(1) C7 (CONTROLS)	BELDEN 5305FE
FV729	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV729	(1) C7 (CONTROLS)	BELDEN 5305FE
FV730	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV730	(1) C7 (CONTROLS)	BELDEN 5305FE
FV731	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV731	(1) C7 (CONTROLS)	BELDEN 5305FE
FV732	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV732	(1) C7 (CONTROLS)	BELDEN 5305FE
FV733	(1)#16 BLK, (1)#16 WHT, (1)#16 GRN (POWER)	XHHW
FV733	(1) C7 (CONTROLS)	BELDEN 5305FE
FIT771	(1) C4	BELDEN 9954
FIT775	(1) C4	BELDEN 9954
FIT776	(1) C4	BELDEN 9954
FIT777	(1) C4	BELDEN 9954
FIT778	(1) C4	BELDEN 9954
FIT732	(1) C4	BELDEN 9954
PS768	(1) C4	BELDEN 9954
PIT762	(1) C2	BELDEN 9952
PIT763	(1) C2	BELDEN 9952
PIT764	(1) C2	BELDEN 9952
PIT761	(1) C2	BELDEN 9952
SUMP PUMP 746	(3)#10 BLK, (1)#12 GRN, (2)#14 YEL	XHHW
SUMP PUMP 747	(3)#10 BLK, (1)#12 GRN, (2)#14 YEL	XHHW

PANEL: LP-3 **LOCATION:** MW-20 BENCH CARBON AMENDMENT BUILDING **CABINET MOUNTING:** SURFACE
VOLTS: 208Y/120V **PHASE:** 3 **WIRE:** 4 **ENCLOSURE: NEMA TYPE** 1 **RATING:** 10 KAIC
FEED: BOTTOM, 175A MAIN C/B **NEUTRAL:** 100% **NOTE:**

LOAD SERVED	LOAD (KVA) A	LOAD (KVA) B	LOAD (KVA) C	BREAKER AMP	BREAKER POLE	CKT	PH	CKT	BREAKER AMP	BREAKER POLE	LOAD (KVA) A	LOAD (KVA) B	LOAD (KVA) C	LOAD SERVED
RECEPTACLES--MECH, REAGENT ROOM, EXT.	0.8			20	1	1	A	2	20	1	0.6			RECEPTACLES--MECH, REAGENT ROOM, EXT.
RECEPTACLES--CARBON ROOM, EXTERIOR		0.4		20	1	3	B	4	20	1		0.4		RECEPTACLES--CARBON ROOM, EXTERIOR
LIGHTING--CONTROL ROOM, WELL			0.7	20	1	5	C	6	20	1			0.7	LIGHTING--CARBON ROOM, EXTERIOR
REMOTE WELL COMM PANEL 3	0.5			20	1	7	A	8	20	1				SPARE
SPARE				20	1	9	B	10	20	1				SPARE
SPARE				20	1	11	C	12	30	2			2.6	HEAT PUMP
SPARE				20	1	13	A	14			2.6			" "
SPARE				20	1	15	B	16	20	1				SPARE
SPARE				20	1	17	C	18	20	1				SPARE
SPARE				20	1	19	A	20	20	1				SPARE
SPACE						21	B	22						SPACE
SPACE						23	C	24						SPACE
SPACE						25	A	26						SPACE
SPACE						27	B	28						SPACE
SPACE						29	C	30						SPACE
SPACE						31	A	32						SPACE
SPACE						33	B	34						SPACE
SPACE						35	C	36						SPACE
SPACE						37	A	38						SPACE
SPACE						39	B	40						SPACE
SPACE						41	C	42						SPACE
SUB-TOTAL CONNECTED KVA:	1.3										3.2			4.5
		0.4										0.4		0.8
			0.7										3.3	4.0
													TOTAL CONNECTED KVA:	9.3

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER JOHN M. SIGOTY 20532 Exp. 9-30-17 ELECTRICAL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
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REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING ELECTRICAL SCHEDULES

GAS TRANSMISSION & DISTRIBUTION

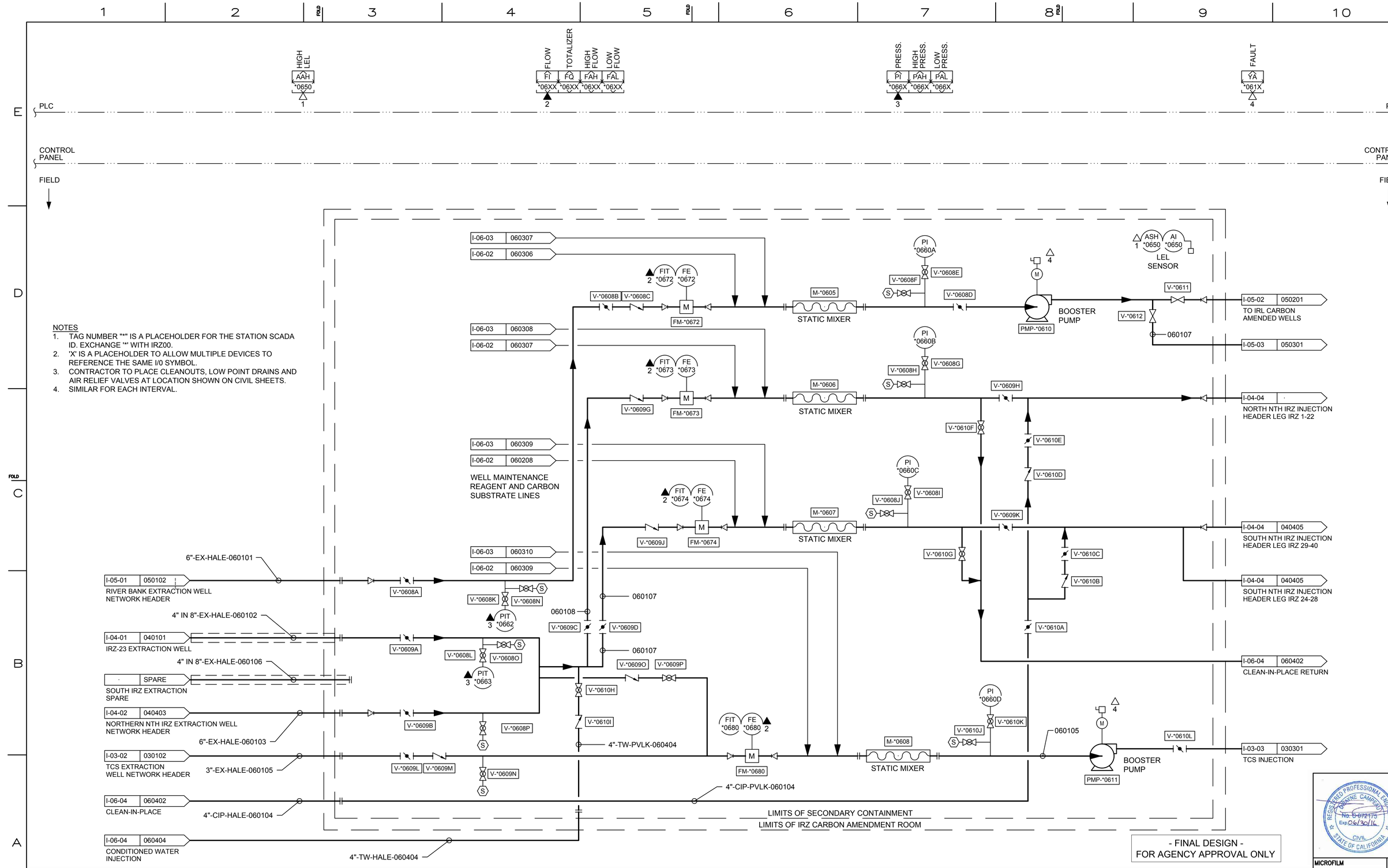
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM | BILL OF MATL | DWG LIST | SUPSDS | SUPSD BY

SHEET NO. E-06-04 of SHEETS | REV 2

N1808

11/13/2015, 15:25, G:\Gr...\AR-TOPOCK-01 S...100% DWG...\E-E...\E-06-04.d..., T...: E-06-04



REGISTERED PROFESSIONAL ENGINEER
CORINNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF	
0	04/04/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING P&ID SHEET 1 OF 4

GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-06-01	REV 2

N1808

11/03/2015, 17:21, G:\Graphics\ARIT\TOPOCK.01\Submittal_100%\DWG\sil-Instrumentation\sil-06-01.dwg, Tab: I-06-01

1 2 FOLD 3 4 5 FOLD 6 7 8 FOLD 9 10

E

PLC

LEAK LA *065X 1

LEVEL LI *0562 2 | HIGH LEVEL LAH *0562 14 | LOW LEVEL LAL *0562

TEMP. TI *0690 3 | HIGH TEMP. TAH *0690 | LOW TEMP. TAL *0690

RUNNING YI *064X | START/STOP JC *064X | FAULT YA *064X | SPEED IND. SI *064X | SPEED COM. SC *064X

E-00-38

TO PMP-*064X 4

CLOSE FC *061X | OPENED ZIO *061X | CLOSED ZIC *061X

5 6 7

HIGH PRESS. PAH *066X 8

FLOW CONTROL ZC *061X | VALVE POSITION ZI *061X

9 10

FLOW FT *06XX 11 | TOTALIZER FQ *06XX | HIGH FLOW FAH *06XX | LOW FLOW FAL *06XX

HS *0611 12

LAH *0657 13 15

CONTROL PANEL

CONTROL PANEL

FIELD

FIELD

D

LAH *0657A 14 15 HORN

LAH *0657B 14 15 BEACON

LEAK DETECTION

LSH *0650 1

LEAK DETECTION

LSH *0651 1

V-*0601D

LT *0652 2 | LE *0652

TT *0690 3 | TE *0690

V-*0601E

LSH *0657 13

2"-CS-CSLF-060201

2"-CS-CSLF-060202

2"-CS-HALE-060201

V-*0601C 1

LSH *0653 1

CARBON SUBSTRATE PIPE LEAK DETECTION

S 12

FV-*0611

1-1/2"-CS-CSLF-060201

2" IN 4"-CS-CSLF-060201

2" IN 4"-CS-HALE-060201

T-*0601

IRZ CARBON SUBSTRATE TANK
15,000 GALLONS

2"-VT-HALE-060202

2"-CS-CSLF-060201

V-*0601B

V-*0601A

V-*0602A

V-*0601F

TRUCK OFFLOAD BAY

DRY BREAK QUICK-CONNECT
WITH LOCKABLE DUST CAP

LEAK DETECTION

LSH *0654 1

V-*0602B

V-*0603A

V-*0603B

V-*0603C

YS *0640 4

V-*0603D

PMP-*0640

CARBON SUBSTRATE HOSE PUMP

PSH *0665 8

V-*0604G

V-*0603E

ZSC *0612

ZSO *0612

M 5 6 7

FCV-*0612 | V-*0603F

1"-CS-CSLF-060203

060202

YS *0641 4

V-*0603J

PMP-*0641

CARBON SUBSTRATE HOSE PUMP

PSH *0666 8

V-*0604H

V-*0603G

V-*0603H

V-*0603I

V-*0603K

ZSC *0613

ZSO *0613

M 5 6 7

FCV-*0613 | V-*0603L

1"-CS-CSLF-060204

YS *0642 4

V-*0603Q

PMP-*0642

CARBON SUBSTRATE HOSE PUMP

PSH *0667 8

V-*0604I

V-*0603M

V-*0603N

V-*0603P

V-*0603R

ZSC *0614

ZSO *0614

M 5 6 7

FCV-*0614 | V-*0603S

1"-CS-CSLF-060205

LIMITS OF SECONDARY CONTAINMENT

LIMITS OF IRZ CARBON AMENDMENT ROOM

060205

V-*0603T

060206

FE *0671 11 | FIT *0671

M

FM-*0671

FCV-*0615

M 9 10

V-*0603U | V-*0603V

I-06-01 | 060101

060207

FE *0675 11 | FIT *0675

M

FM-*0675

FCV-*0616

M 9 10

V-*0603W | V-*0603X

I-06-01 | 060108

060208

FE *0676 11 | FIT *0676

M

FM-*0676

FCV-*0617

M 9 10

V-*0603Y | V-*0603Z

I-06-01 | 060107

060209

FE *0681 11 | FIT *0681

M

FM-*0681

FCV-*0618

M 9 10

V-*0604J | V-*0604K

I-06-01 | 060105

C

B

A

NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ00.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

- FINAL DESIGN -
FOR AGENCY
APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DWAYNE CAMPBELL
No. 60172
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/04/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY: RAO

SO | SUPV | DSGN | DWN | CHKD | OK | DATE | SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING P&ID SHEET 2 OF 4

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM

BILL OF MATL

DWG LIST

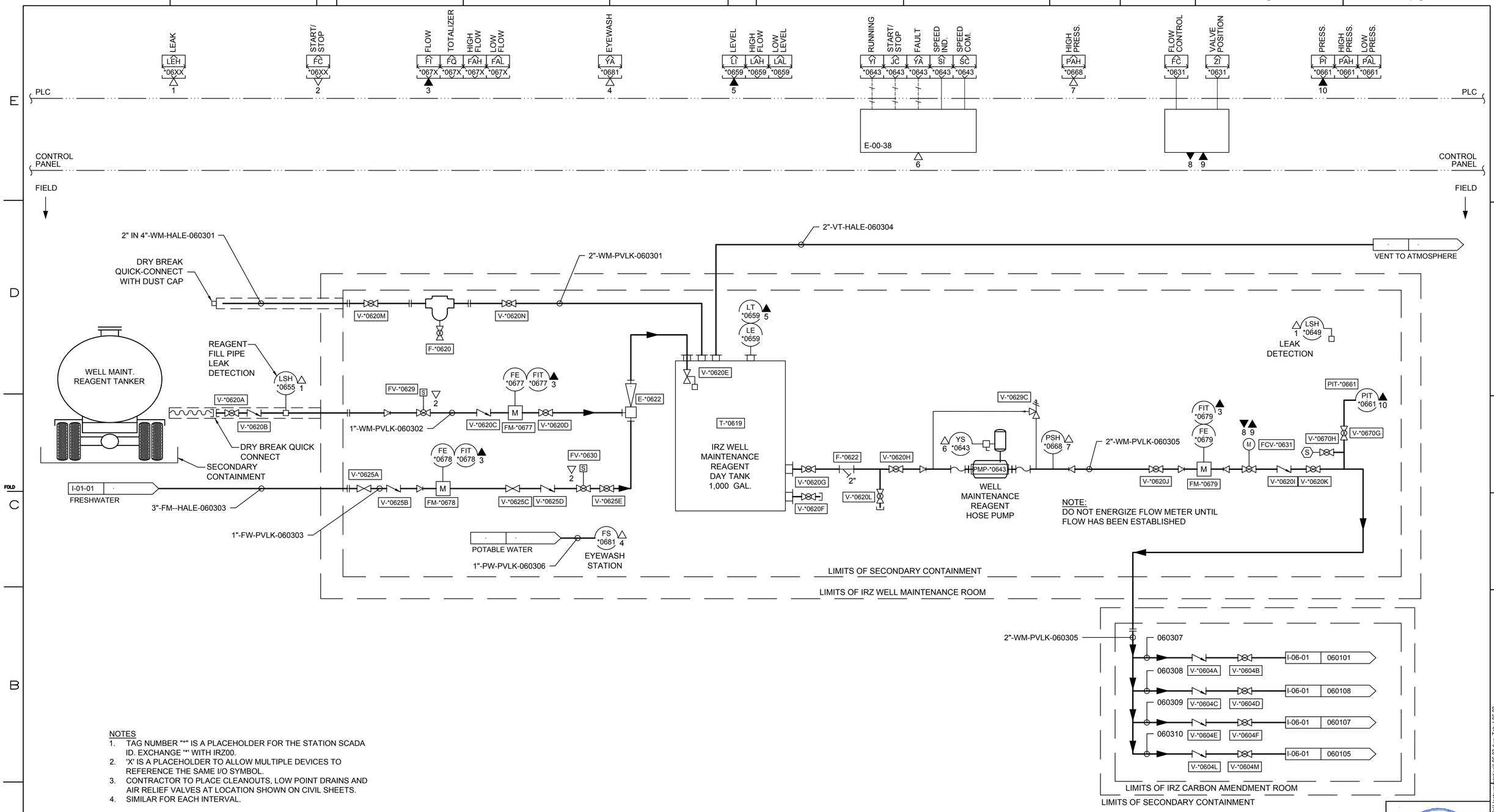
SUPSDS

SUPSD BY

SHEET NO. I-06-02 of SHEETS | REV 2

N1608

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NOTES
1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ00.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/O SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.

REGISTERED PROFESSIONAL ENGINEER DWAYNE CAMPBELL No. C 072175 Exp. 06/30/16 CIVIL STATE OF CALIFORNIA

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/04/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

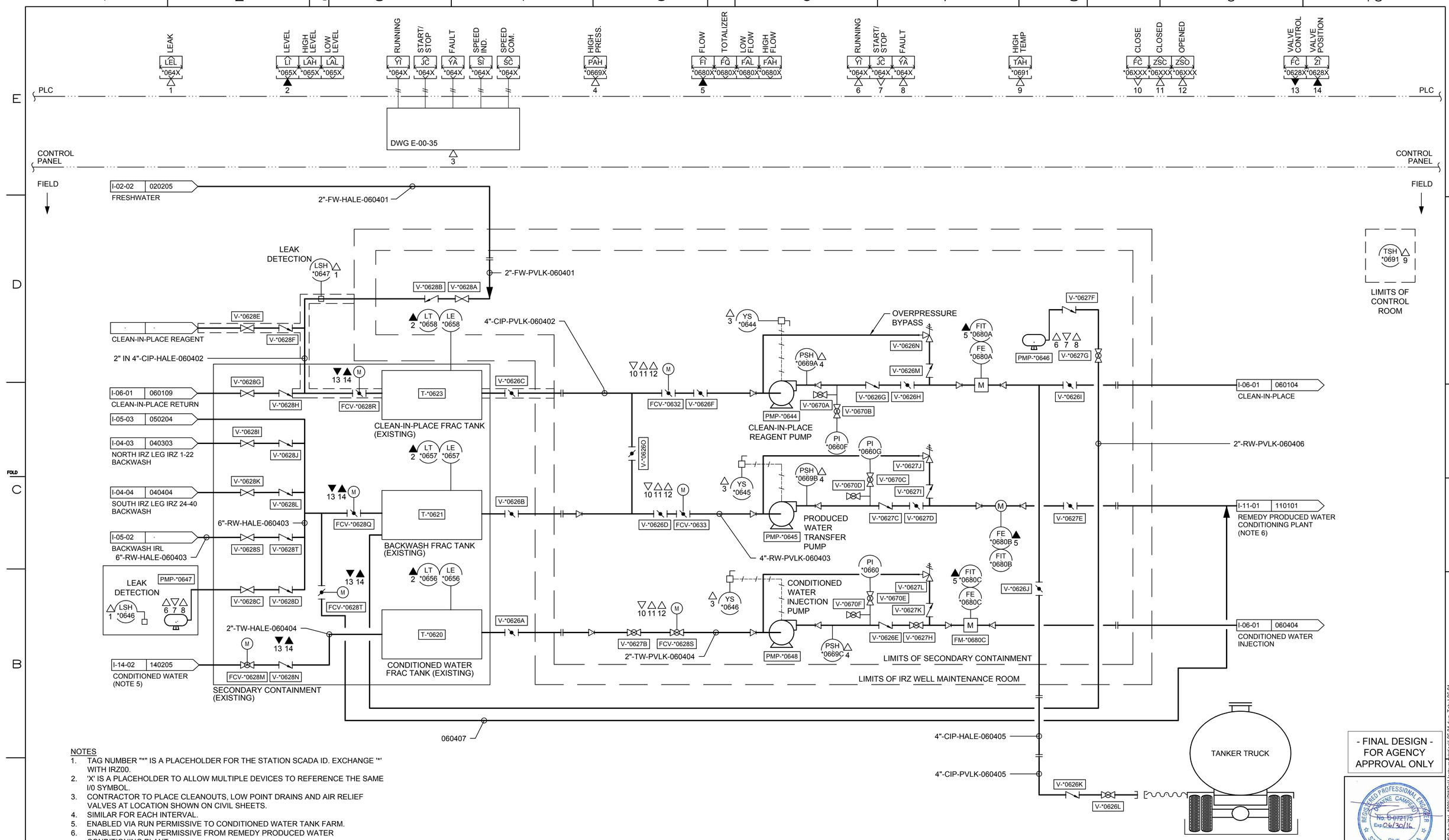
APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
MW-20 BENCH CARBON AMENDMENT BUILDING P&ID SHEET 3 OF 4
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-06-03	REV 2

N1808

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NOTES

1. TAG NUMBER "*" IS A PLACEHOLDER FOR THE STATION SCADA ID. EXCHANGE '*' WITH IRZ00.
2. 'X' IS A PLACEHOLDER TO ALLOW MULTIPLE DEVICES TO REFERENCE THE SAME I/0 SYMBOL.
3. CONTRACTOR TO PLACE CLEANOUTS, LOW POINT DRAINS AND AIR RELIEF VALVES AT LOCATION SHOWN ON CIVIL SHEETS.
4. SIMILAR FOR EACH INTERVAL.
5. ENABLED VIA RUN PERMISSIVE TO CONDITIONED WATER TANK FARM.
6. ENABLED VIA RUN PERMISSIVE FROM REMEDY PRODUCED WATER CONDITIONING PLANT.

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER DONNIE CAMPBELL No. C 67215 Exp 06/30/16 CIVIL STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD	BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF	
0	04/04/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY	
RAO	SO
	SUPV
	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

MW-20 BENCH CARBON AMENDMENT BUILDING P&ID SHEET 4 OF 4

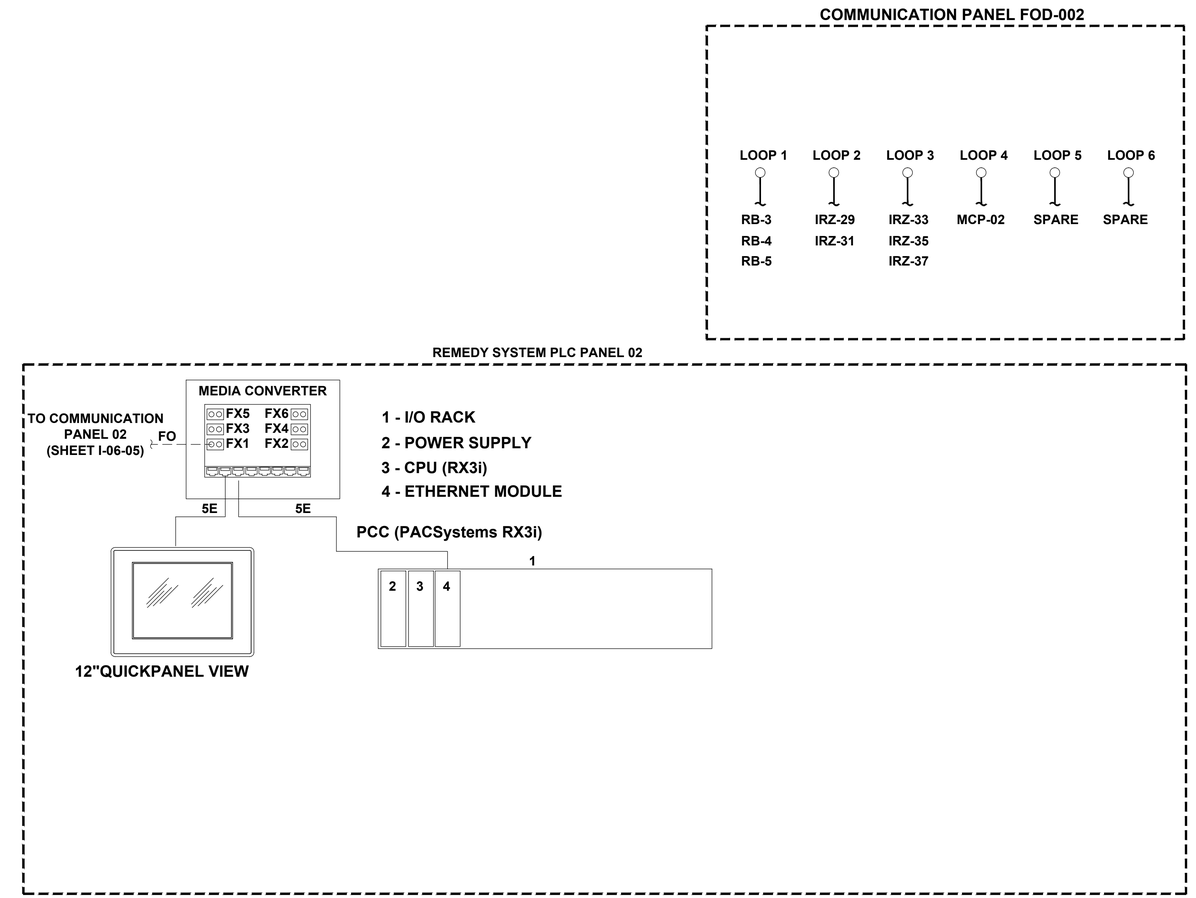
GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-06-04	REV 2

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LEGEND

AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
DC-DI	DC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
PLC	PROGRAMMABLE LOGIC CONTROLLER
FOD	FIBER OPTIC DROP
I/O	INPUT/OUTPUT
MCP	MAIN CONTROL PANEL
FO	MM FIBER OPTIC CABLE
FO-PC	FIBER OPTIC PATCH CABLE
5E	CAT 5e ETHERNET PATCH CABLE

NOTES:

1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER
DIANNE CAMPBELL
No. C 072175
Exp 06/30/16
CIVIL
STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN		AJW	JPB	DAC	RAO
1	09/08/14	PRE-FINAL (90%) DESIGN		MS	MWM	JPB	JEF
0	04/05/13	INTERMEDIATE (60%) DESIGN		MS	MWM	JPB	JEF

REVISIONS

APPROVED BY	SO
	SUPV
RAO	DSGN
	DWN
	CHKD
	OK
	DATE
	SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT

NODE 02 PLC PANELS INSTRUMENTATION CONNECTION SHEET 1 OF 2

GAS TRANSMISSION & DISTRIBUTION

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM	
BILL OF MATL	
DWG LIST	
SUPSDS	
SUPSD BY	
SHEET NO.	of SHEETS
I-06-06	REV 2

N1808

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(TYP. IRZ-29, IRZ-31, IRZ-33)

(METER VAULT)

IRZxx PLC PANEL 02

0 - 24VDC POWER SUPPLY
1 - E-NET / IP ADAPTER (STXEIP001)
2 - 8 POINT DC INPUT (ST-1218)
3 - 8 POINT DC INPUT (ST-1218)
4 - 4 POINT RELAY OUTPUT (ST-2744)
5 - SHIELD TERMINATION MODULE (ST-7408)
6 - 4 CH. ANALOG INPUT (ST-3274)
7 - 4 CH. ANALOG INPUT (ST-3214)
8 - 4 CH. ANALOG OUTPUT (ST-4274)

MEDIA CONVERTER
LOOPx — FO — FX5 FX6 / FX3 FX4 / FX1 FX2 — FO — LOOPx
5E

DISTRIBUTED I/O (GE MODEL: STXi)
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

DC-DI: 101 102 103 104 105 106 107 108
DC-DI: 109 110 111 112 113 114 115 116
DO: 201 202 203 204
AI: 301 302 303 304 305 306 307 308
AI: 309 310 311 312
AO: 401 402 403 404 405 406 407 408

FIT-*0473A — SIG + 301, SIG - 302, PULSE 101, +24, COM
FIT-*0473B — SIG + 303, SIG - 304, PULSE 102, +24, COM
LSH-*0453A — +24, COM, NC, NO — 103
ZS-*0483A — +24, COM, NC, NO — 104
FV-*0408 — + 4-20mA OUTPUT - 305/306; + 4-20mA INPUT - 401/402; +24V CLOSED OPEN 112/113; L N 120VAC
FV-*0409 — + 4-20mA OUTPUT - 307/308; + 4-20mA INPUT - 403/404; +24V CLOSED OPEN 114/115; L N 120VAC

LT-*0463H — SIG, +24 — 309
LT-*0463I — SIG, +24 — 310
LSH-*0453B — +24, COM, NC, NO — 105
PSL-*0463G — +24, COM, NC, NO — 106
YS-*0483B — +24, COM, NC, NO — 107

PMP-*0444 — +24 — 108 STATUS, 109 FAULT, 201 N CALL
PMP-*0445 — +24 — 110 STATUS, 111 FAULT, 202 N CALL

(WELL VAULT)

(TYP. RB-3, RB-4, RB-5)

(WELL VAULT)

RBxx PLC PANEL 02

0 - 24VDC POWER SUPPLY
1 - E-NET / IP ADAPTER (STXEIP001)
2 - 8 POINT DC INPUT (ST-1218)
3 - 8 POINT DC INPUT (ST-1218)
4 - 4 POINT RELAY OUTPUT (ST-2744)
5 - SHIELD TERMINATION MODULE (ST-7408)
6 - 4 CH. ANALOG INPUT (ST-3274)
7 - 4 CH. ANALOG INPUT (ST-3214)

MEDIA CONVERTER
LOOP1 — FO — FX5 FX6 / FX3 FX4 / FX1 FX2 — FO — LOOP1
5E

DISTRIBUTED I/O (GE MODEL: STXi)
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7

DC-DI: 101 102 103 104 105 106 107 108
DC-DI: 109 110 111 112 113 114 115 116
DO: 201 202 203 204
AI: 301 302 303 304 305 306 307 308
AI: 309 310 311 312

FIT-*0570A — SIG + 301, SIG - 302, PULSE 101, +24, COM
LSH-*0550A — +24, COM, NC, NO — 102
ZS-*0580A — +24, COM, NC, NO — 103
LT-*0560B — SIG 310, +24
PSL-*0560C — +24, COM, NC, NO — 105

PMP-*0540 — +24 — 106 STATUS, 107 FAULT, 201 N CALL

(TYP. IRZ-35, IRZ-37 METER VAULT)

IRZxx PLC PANEL 02

0 - 24VDC POWER SUPPLY
1 - E-NET / IP ADAPTER (STXEIP001)
2 - 8 POINT DC INPUT (ST-1218)
3 - 8 POINT DC INPUT (ST-1218)
4 - 4 POINT RELAY OUTPUT (ST-2744)
5 - SHIELD TERMINATION MODULE (ST-7408)
6 - 4 CH. ANALOG INPUT (ST-3274)
7 - 4 CH. ANALOG INPUT (ST-3214)
8 - 4 CH. ANALOG OUTPUT (ST-4274)

MEDIA CONVERTER
LOOP 3 — FO — FX5 FX6 / FX3 FX4 / FX1 FX2 — FO — LOOP 3
5E

DISTRIBUTED I/O (GE MODEL: STXi)
0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

DC-DI: 101 102 103 104 105 106 107 108
DC-DI: 109 110 111 112 113 114 115 116
DO: 201 202 203 204
AI: 301 302 303 304 305 306 307 308
AI: 309 310 311 312
AO: 401 402 403 404 405 406 407 408

FIT-*0472A — SIG + 303, SIG - 304, PULSE 101, +24, COM
LT-*0462E — SIG, +24 — 309
LSH-*0452A — +24, COM, NC, NO — 102
YS-*0482A — +24, COM, NC, NO — 103
FV-*0404 — + 4-20mA OUTPUT - 301/302; + 4-20mA INPUT - 401/402; +24V CLOSED OPEN 106/107; L N 120VAC

PMP-*0443 — +24 — 104 STATUS, 105 FAULT, 201 N CALL

LEGEND

COM	COMMON
CP	CONTROL PANEL
FO	MM FIBER OPTIC CABLE
E5	CAT5e ETHERNET
CH	CHANNEL
SIG	SIGNAL
L	LINE
N	NEUTRAL
PWR	POWER
AC	ALTERNATING CURRENT
DC-DI	24VDC DISCRETE INPUT
DO	DISCRETE OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT

NOTES:
1. ALL MEDIA CONVERTERS ARE MANAGED ETHERNET MEDIA CONVERTER/SWITCH 8 10/100 BASE TX RJ-45 PORT, 6 100BASE FX, SC. (N-TRON MODEL 114FX6-SC OR 714FX6-SC)

- FINAL DESIGN - FOR AGENCY APPROVAL ONLY

REGISTERED PROFESSIONAL ENGINEER — JOANNE CAMPBELL — No. C 072176 — Exp 06/30/16 — CIVIL — STATE OF CALIFORNIA

ETIC ENGINEERING

ARCADIS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
2	11/18/15	FINAL DESIGN	AJW	JPB	DAC	RAO	
1	09/08/14	PRE-FINAL (90%) DESIGN	MS	MWM	JPB	JEF	
0	04/05/13	INTERMEDIATE (60%) DESIGN	MS	MWM	JPB	JEF	

REVISIONS

APPROVED BY: RAO
SO
SUPV
DSGN
DWN
CHKD
OK
DATE
SCALES

TOPOCK GROUNDWATER REMEDIATION PROJECT
NODE 02 PLC PANELS INSTRUMENTATION CONNECTION SHEET 2 OF 2
GAS TRANSMISSION & DISTRIBUTION
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. of SHEETS
I-06-07
REV 2

N1808

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