CIRCUIT AND RACEWAY

GENERAL CIRCUIT CONDUCTOR AND CONDUIT IDENTIFICATION

POWER CIRCUIT CALLOUTS

[P1]	[1/2"FLEX, 2#12,#12G]
[P2]	[3/4"C,2#12,1#12G]
[P3]	[3/4"C,3#12,1#12G]
[P4]	[3/4"C,4#12,1#12G]
[P5]	[3/4"C,5#12,1#12G]
[P6]	[3/4"C,6#12,1#12G]
[P7]	[3/4"C,7#12,1#12G]
[P8]	[3/4"C,8#12,1#12G]
[P9]	[3/4"C,3#12,2#14,1#12G]
[P10]	[3/4"C,3#12,3#14,1#12G]
[P11]	[3/4"C,3#12,4#14,1#12G]
[P12]	[3/4"C,3#12,5#14,1#12G]
[P13]	[3/4"C,3#12,6#14,1#12G]
[P14]	[3/4"C,3#12,7#14,1#12G]
[P15]	[3/4"C,2#10,1#10G]
[P16]	[3/4"C,3#10,1#10G]
[P17]	[3/4"C,3#10,2#14,1#10G]
[P18]	[3/4"C,3#10,3#14,1#10G]
[P19]	[3/4"C,3#10,4#14,1#10G]
[P20]	[3/4"C,3#10,5#14,1#10G]
[P21]	[1"C,2#8,1#10G]
[P22]	[1"C,3#8,1#10G]
[P23]	[1"C,3#8,2#14,1#10G]
[P24]	[1"C,3#8,3#14,1#10G]
[P25]	[1"C,3#8,4#14,1#10G]
[P26]	[1"C,3#8,5#14,1#10G]
[P27]	[1"C,2#6, 1#10G]
[P28]	[1"C,3#6, 1#10G]
[P29]	[1"C,3#6, 2#14,1#10G]
[P30]	[1"C,3#6, 3#14,1#10G]
[P31]	[1"C,3#6, 4#14,1#10G]
[P32]	[1"C,3#6, 5#14,1#10G]
[P33]	[1"C,3#4,1#8G]
[P34]	[1 1/4"C,3#4,3#14,1#8G]
[P35]	[1 1/4"C,3#4,5#14,1#8G]
[P36]	[1 1/4"C,3#3, 1#8G]
[P37]	[1 1/4"C,3#3, 3#14,1#8G]
[P38]	[1 1/4"C,3#2, 1#6G]
[P39]	[1 1/2"C,3#1, 1#6G]
[P40]	[1 1/2"C,3#1, 3#14,1#6G]
[P41]	[1 1/2"C,3#2/0, 1#6G]
[P42]	[2"C,3#3/0, 1#4G]
[P43]	[2"C,3#4/0, 1#4G]
[P44]	[1 1/2"C,3#1/0, 1#6G]
[P45]	[2"C,3#2/0, 1#3G]
[P46]	[3"C,3-350KCMIL, 1#1G]
[P47]	[5"C,3-600KCMIL, 1#3/0G]
[P48]	[1"C,4#6, 1#10G]
[P49]	[2"C,4#3/0, 1#4G]
[P50]	[1 1/2"C,8#10, 1#10G]
[P51]	[1 1/2"C,4#1, 1#6G]
[P52]	[4"C,3-350 KCMIL, 1#1/0G]

POWER CABLE CIRCUIT CALLOUTS

[PC1]	[3/4"C,1 (3C#12,1#12G) TYPE 2]
[PC2]	[3/4"C,1 (3C#10,1#12G) TYPE 2]
[PC3]	[1"C,1 (3C#8,1#10G) TYPE 2]
[PC4]	[1 1/4"C,2 (3C#12,1#12G) TYPE 2]
[PC5]	[1 1/2"C,2 (3C#10,1#12G) TYPE 2]
[PC1A]	[3/4"C,1 (2C#12,1#12G) TYPE 2]
[PC2A]	[3/4"C,1 (2C#10,1#12G) TYPE 2]

EMPTY CONDUIT

[CE-1]	[3/4"C,WITH PULL STRING]
[CE-2]	[1"C,WITH PULL STRING]
[CE-3]	[1 1/4"C,WITH PULL STRING]
[CE-4]	[1 1/2"C,WITH PULL STRING]
[CE-5]	[2"C,WITH PULL STRING]
[CE-6]	[3"C,WITH PULL STRING]
[CE-7]	[4"C,WITH PULL STRING]
[CE-8]	[5"C,WITH PULL STRING]

ANALOG CIRCUIT CALLOUTS

[A1]	[3/4"C,1 TYPE 3]
[A2]	[1"C,2 TYPE 3]
[A3]	[1"C,3 TYPE 3]
[A4]	[1"C,4 TYPE 3]
[A5]	[1 1/4"C,5 TYPE 3]
[A6]	[1 1/4"C,6 TYPE 3]
[A7]	[1 1/2"C,7 TYPE 3]
[A8]	[1 1/2"C,8 TYPE 3]
[A9]	[1 1/2"C,9 TYPE 3]
[A10]	[2"C,10 TYPE 3]
[A11]	[2"C,11 TYPE 3]
[A12]	[2"C,12 TYPE 3]
[A13]	[2"C,13 TYPE 3]
[A14]	[2"C,14 TYPE 3]
[A15]	[3/4"C,1 TYPE 4]
[A16]	[3/4"C,2 TYPE 4]
[A17]	[1"C,3 TYPE 4]
[A18]	[1 1/4"C,4 TYPE 4]
[A19]	[1 1/4"C,5 TYPE 4]
[A20]	[1 1/4"C,6 TYPE 4]
[A21]	[1 1/2"C,7 TYPE 4]
[A22]	[1 1/2"C,8 TYPE 4]
[A23]	[2"C,9 TYPE 4]
[A24]	[3/4"C,1-4 pr. TYPE 5]
[A25]	[1"C,2-4 pr. TYPE 5]
[A30]	[2"C,1 TYPE 6, 12 TR]

CONTROL CIRCUIT CALLOUTS

[C1]	[3/4"C,MSC]
[C2]	[3/4"C,2#14,1#14G]
[C3]	[3/4"C,3#14,1#14G]
[C4]	[3/4"C,4#14,1#14G]
[C5]	[3/4"C,5#14,1#14G]
[C6]	[3/4"C,6#14,1#14G]
[C7]	[3/4"C,7#14,1#14G]
[C8]	[3/4"C,8#14,1#14G]
[C9]	[3/4"C,9#14,1#14G]
[C10]	[3/4"C,10#14,1#14G]
[C11]	[3/4"C,11#14,1#14G]
[C12]	[3/4"C,12#14,1#14G]
[C13]	[3/4"C,13#14,1#14G]
[C14]	[3/4"C,14#14,1#14G]
[C15]	[3/4"C,15#14,1#14G]
[C16]	[3/4"C,16#14,1#14G]
[C17]	[3/4"C,17#14,1#14G]
[C18]	[3/4"C,18#14,1#14G]
[C19]	[3/4"C,19#14,1#14G]
[C20]	[1"C,20#14,1#14G]
[C21]	[1"C,21#14,1#14G]
[C22]	[1"C,22#14,1#14G]
[C23]	[1"C,23#14,1#14G]
[C24]	[1"C,24#14,1#14G]
[C25]	[1"C,25#14,1#14G]

CONTROL CABLE CIRCUIT CALLOUTS

[CC5]	[3/4"C,1-5C TYPE 1]
[CC7]	[3/4"C,1-7C TYPE 1]
[CC9]	[1"C,1-9C TYPE 1]
[CC12]	[1"C,1-12C TYPE 1]
[CC19]	[1 1/2 ", 1-19C TYPE 1]
[CC25]	[1 1/2"C,1-25C TYPE 1]
[CC37]	[2"C,1-37C TYPE 1]
[CCC1]	[1-7C #12 TYP 1]

VFD TO MOTOR CONDUCTORS TYPE 8 CABLE

CKT ID	CONDUCTOR SIZE (AWG)	MINIMUM GROUND WIRE SIZE (AWG)	CONDUCTOR AMPACITY (AMPS)*	MINIMUM CONDUIT (INCH)
[VFD-1]	12	12	24	1
[VFD-2]	10	10	33	1 1/4
[VFD-3]	8	8	43	1 1/2
[VFD-4]	6	6	58	2
[VFD-5]	4	4	79	2
[VFD-6]	2	2	105	3
[VFD-7]	1	3 x 6	121	3
[VFD-8]	1/0	3 x 4	145	3
[VFD-9]	2/0	3 x 4	166	3
[VFD-10]	3/0	3 x 4	189	3
[VFD-11]	4/0	3 x 2	223	3

* BASED ON 75 DEGREES C, NEC TABLE B.310.1

NOTES:

1. FOR CABLE TYPES, SEE SPECIFICATIONS.
2. CONDUIT SIZES ARE BASE ON THE AREA OF THE CONDUCTORS.
3. SIZING OF CONDUCTORS #2AWG AND SMALLER BASED ON AMPACITIES AT 60 DEGREES C, SIZING OF CONDUCTORS #1AWG AND LARGER BASED ON AMPACITIES AT 75 DEGREES C.
4. WHERE CIRCUITS ARE UNDERGROUND, DIRECT BURIED OR CONCRETE ENCASED, MINIMUM CONDUIT SIZE SHALL BE 1".
5. CONTRACTOR RESPONSIBLE FOR DESIGN AND INSTALLATION OF RECEPTACLE CIRCUIT WIRING AND RACEWAYS WHERE CIRCUITING IS NOT SHOWN ON DRAWINGS. WHERE RECEPTACLES ARE SHOWN ON DRAWINGS WITH A NUMBER ADJACENT TO THE SYMBOL, THE NUMBER INDICATES PANELBOARD BRANCH CIRCUIT NUMBER. PANELBOARD SCHEDULES ARE INCLUDED TO ASSIST INSTALLATION AND CIRCUITING. RECORD DRAWINGS SHALL SHOW LOCATIONS AND RACEWAY AND CIRCUIT INFORMATION BETWEEN RECEPTACLES AND PANELBOARDS.
6. CONTRACTOR RESPONSIBLE FOR DESIGN AND INSTALLATION OF LIGHTING CIRCUIT WIRING AND RACEWAYS WHERE CIRCUITING IS NOT SHOWN ON DRAWINGS. WHERE LUMINAIRES ARE SHOWN ON DRAWINGS WITH A NUMBER ADJACENT TO THE SYMBOL THE NUMBER INDICATES LUMINAIRE TYPE. LIGHTING PANELBOARDS SERVING FACILITY OR AREA HAVE DESIGNATED CIRCUIT BREAKERS FOR LIGHTING. PANELBOARD SCHEDULES, LUMINAIRE SCHEDULE, AND LIGHTING CONTROL DIAGRAMS ARE INCLUDED TO ASSIST INSTALLATION AND CIRCUITING. RECORD DRAWINGS SHALL SHOW LOCATIONS AND RACEWAY AND CABLE INFORMATION BETWEEN LUMINAIRES, LIGHTING SWITCHES, CONTROL DEVICES, AND LIGHTING PANELBOARDS.

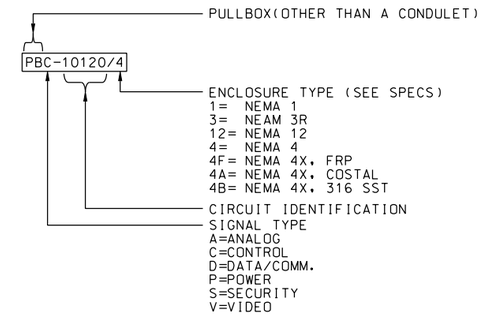
DEVICE TABLE

ONE LINE PROTECTION RELAYING AND ELEMENTARY DIAGRAMS-2

DEVICE FUNCTION NO.	DEVICE DESCRIPTION
21	IMPEDANCE/DISTANCE RELAY
25A	AUTOMATIC SYNCHRONIZER
25C	SYNCH CHECK RELAY
27	UNDERVOLTAGE RELAY
32	REVERSE POWER RELAY
40	GENERATOR LOSS OF EXCITATION RELAY
43CSE	AUTOMATIC POWER TRANSFER AND LOAD CONTROL MODE SEL. SWITCH
43CSX	MODE SEL. SWITCH
46	GENERATOR CURRENT UNBALANCE RELAY
49	THERMAL RELAY
50GS	INSTANTANEOUS OVERCURRENT DEVICE, GROUND SENSOR
50	INSTANTANEOUS OVERCURRENT DEVICE,
51	TIME OVERCURRENT RELAY
51G	TIME OVERCURRENT RELAY, GROUND FAULT
51V	TIME OVERCURRENT, VOLTAGE RESTRAINED
52	POWER CIRCUIT BREAKER
52CSX	POWER CIRCUIT BREAKER CONTROL SWITCH
59	OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
65A	ENGINE GOVERNOR, SPEED CONTROL
65A, MOP	ENGINE GOVERNOR, SPEED CONTROL MOTOR OPERATED POTENTIOMETER
65A, RL	ENGINE GOVERNOR, SPEED CONTROL RAISE/LOWER SWITCH
65B	ENGINE GOVERNOR, LOAD CONTROL
65B, MOP	ENGINE GOVERNOR, LOAD CONTROL MOTOR OPERATED POTENTIOMETER
65B, RL	ENGINE GOVERNOR, % LOAD RAISE/LOWER SWITCH
65E	AUTOMATIC POWER TRANSFER AND LOAD CONTROL, WOODWARD APTL
65F	AUTOMATIC GENERATOR LOADING CONTROL, WOODWARD AGLC
67	DIRECTIONAL TIME OVERCURRENT RELAY
74	ALARM RELAY
81O/U	FREQUENCY RELAY, OVER/UNDER
86	LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY
90	VOLTAGE REGULATOR
90, MOP	ENGINE EXCITATION, POWER OPERATED POTENTIOMETER
90PF	ENGINE EXCITATION, POWER FACTOR CONTROL
90RL	ENGINE EXCITATION, RAISE/ LOWER SWITCH

X = DEVICE NUMBER, WHEN THERE ARE MULTIPLE UNITS

PULLBOX IDENTIFICATION CALLOUT



SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

EASTERN MUNICIPAL WATER DISTRICT
PERRIS II DESALINATION FACILITY
PERRIS, CALIFORNIA

ELECTRICAL LEGEND
SHEET 3

DESIGNED BY: A MATHEWS
DRAWN BY: A GORDEN
CHECKED BY: R DENTON

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

CH2MHILL

SUBMITTED BY:
ART JUNG, P.E.
CHIEF, DESIGN BRANCH

SPEC. NO.: NOT APPLICABLE

CADD FILE NAME: PDFg022d.dgn

L.A. DISTRICT FILE NO. XXX-XXXX

REGISTERED PROFESSIONAL ENGINEER
RANDALL S. DENTON
No. 10438
Exp. 09/30/10
ELECTRICAL
STATE OF CALIFORNIA

DATE: 10/05/09

G-22

SHEET 22 OF 226 SHEETS

NDM-SCO-EMWD USACE PERRIS II/ PDFg022d.dgn PLOT DATE: 2/19/2010 PLOT TIME: 10:53:14 AM