Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	1	35

INDEX OF PLANS

SHEET No.	DESCRIPTION
1	TITLE AND LOCATION MAP
2	UTILITY PLAN
3-29	ELECTRICAL PLANS
30-35	REVISED STANDARD PLANS

THE STANDARD PLANS LIST APPLICABLE TO THIS CONTRACT IS INCLUDED IN THE NOTICE TO BIDDERS AND SPECIAL PROVISIONS BOOK.

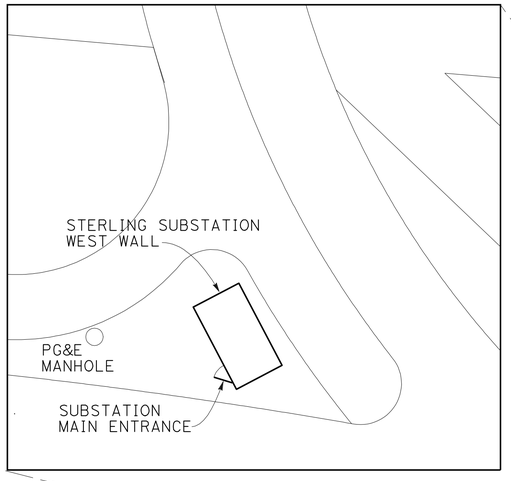
STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ADJACENT TO STATE HIGHWAY

IN THE CITY AND COUNTY OF SAN FRANCISCO AT THE SAN FRANCISCO-OAKLAND BAY BRIDGE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006



BLOWUP DIAGRAM

LOCATION OF CONSTRUCTION STERLING SUBSTATION

NO SCALE

LOCATION MAP

Caltrans

PROJECT MANAGER BEHZAD GOLEMOHAMMADI

DESIGN ENGINEER HOMAYUN KOCHEKALI

Abdol M. Dehghani 9-07-10
PROJECT ENGINEER REGISTERED CIVIL ENGINEER — DATE

April 11, 2011
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Abdol M. Dehghani — No. 48216 — Exp. 6-30-12 — CIVIL — STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

CONTRACT No.	04-040824
PROJECT ID	0400020000

LAST REVISION 09-08-10 — DATE PLOTTED => 12-APR-2011 TIME PLOTTED => 14:27

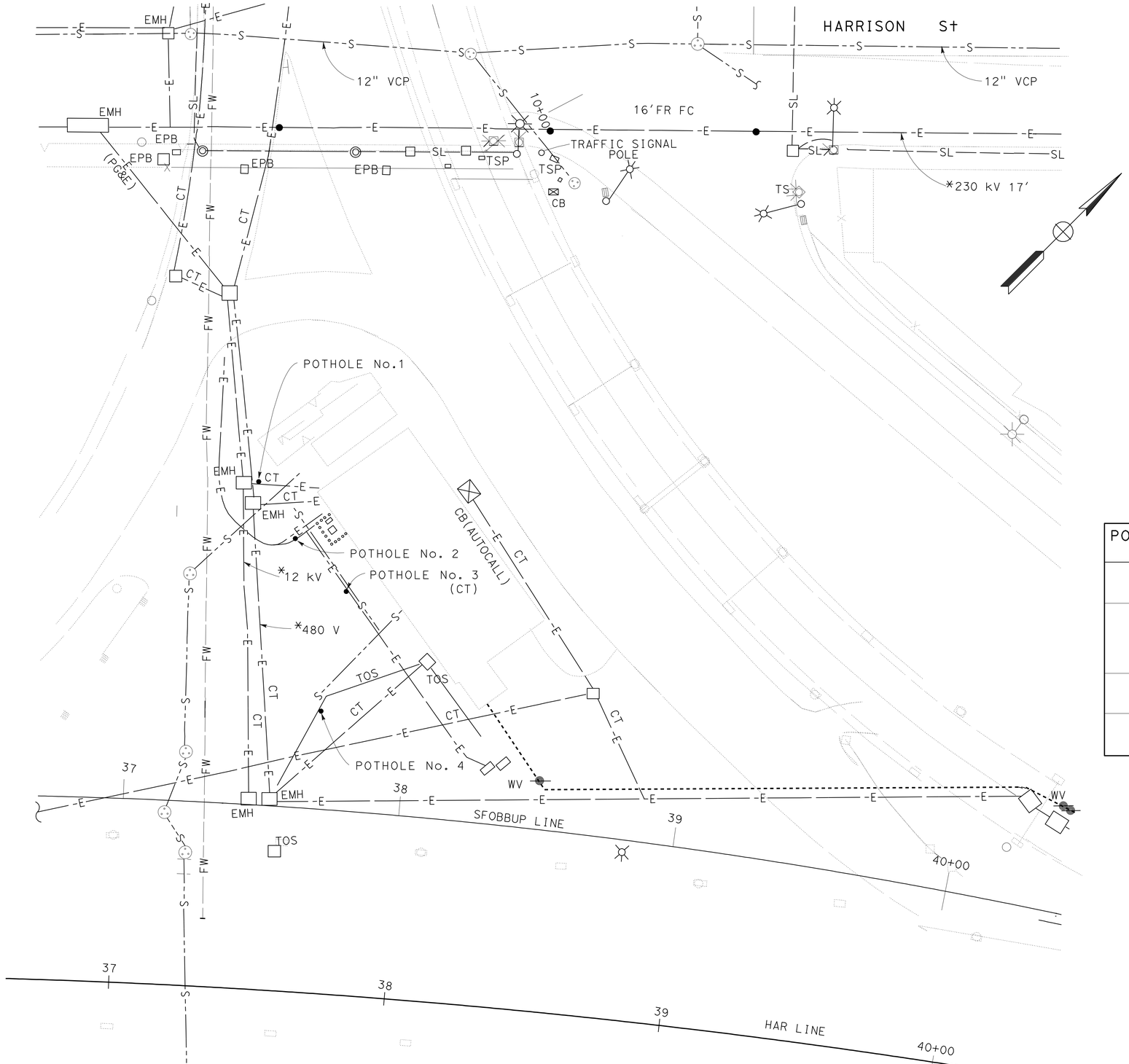
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	2	35

REGISTERED CIVIL ENGINEER 9-07-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Abdol M. Dehghani No. 48216 Exp. 6-30-12 CIVIL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



ABBREVIATIONS:

EMH = ELECTRICAL MANHOLE
EPB = EXISTING POWER BOX (PG&E)
WV = WATER VALVE
CT = CALTRANS (ELECTRICAL)
TOS = TRAFFIC OPERATION SYSTEM
TSP = TRAFFIC SIGNAL POLE
CB = CABLE BOX

POTHOLE No.	EASTING	NORTHING	DEPTH	COMMENTS
1	171983.670	73490.826	36"	HIGH VOLTAGE ELECTRICAL CONCRETE DUCT
2	171996.928	72470.221	38"	HIGH VOLTAGE ELECTRICAL CONCRETE DUCT
			76"	ELECTRICAL CONDUIT
3	172015.383	72451.050	21"	HIGH VOLTAGE ELECTRICAL CONCRETE DUCT
4	172006.245	72407.692	32"	TOS COMMUNICATION CONDUIT

THIS PLAN FOR UTILITY INFORMATION ONLY

UTILITY PLAN

SCALE: 1" = 20'

U-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: GORDON JEONG
CALCULATED-DESIGNED BY: ABDOL DEHGHANI
CHECKED BY: GORDON JEONG
REVISED BY: AD
DATE REVISED: 10/18/10

LAST REVISION 10-26-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 14:50

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	3	35

H. Kochekali 2-10-10
REGISTERED ELECTRICAL ENGINEER DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

DRAWING TITLE	SHEET NUMBER
ELECTRICAL SHEET INDEX AND PROJECT NOTES	E-1
ELECTRICAL SYMBOLS STERLING SUBSTATION	E-2
ELECTRICAL NOTES AND ABBREVIATIONS STERLING SUBSTATION	E-3
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV TO 480 V SINGLE LINE DIAGRAM	E-4
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV TO 480 V UNIT SUBSTATION ELEVATION AND SCHEDULE	E-5
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 480 V LVCC SINGLE-LINE AND ELEVATION	E-6
STERLING SUBSTATION ELECTRICAL LAYOUT DIAGRAM OF ELECTRICAL POWER SYSTEM	E-7
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV PG&E POWER FEEDER CONNECTION TO SWITCHGEAR	E-8
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV CIRCUIT BREAKER ELEMENTARY DIAGRAM	E-9
ELECTRICAL DETAILS (STERLING SUBSTATION ELECTRICAL 480 V CIRCUIT BREAKER ELEMENTARY DIAGRAM	E-10
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV Main (N-1) CIRCUIT BREAKER ELEMENTARY DIAGRAM	E-11
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL 12.47 kV SWITCHGEAR CONNECTION DIAGRAM)	E-12 TO E-14
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL TRANSFORMER AND 480 V SWITCHGEAR CONNECTION DIAGRAM	E-15
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL UP-001 PANELBOARD SCHEDULE	E-16
ELECTRICAL DETAILS STERLING SUBSTATION ELECTRICAL PANELBOARD DP-A SCHEDULE	E-17
STERLING SUBSTATION ELECTRICAL CONDUIT PLAN	E-18
ELECTRICAL DETAILS SCADA REMOTE TERMINAL UNIT SYSTEM PLC#1 ELEMENTARY AND CONNECTION DIAGRAM	E-19 & E-20
STERLING SUBSTATION ELECTRICAL DETAILS NORTH AND SOUTH WALLS ELEVATION VIEWS	E-21

DRAWING TITLE	SHEET NUMBER
DETAILS STERLING SUBSTATION ELECTRICAL LVCC RELAY CABINET ELEMENTARY DIAGRAM	E-22
DETAILS STERLING SUBSTATION ELECTRICAL 480 V TYPICAL LVCC ELEMENTARY DIAGRAM	E-23
DETAILS STERLING SUBSTATION ELECTRICAL LVCC RELAY CABINET ARRANGEMENT AND CONNECTION DIAGRAM	E-24
DETAILS SCADA REMOTE TERMINAL UNIT SYSTEM PLC#1 ELEMENTARY AND CONNECTION DIAGRAM	E-25
DETAILS STERLING SUBSTATION ELECTRICAL LVCC CONNECTION DIAGRAM	E-26
DETAILS CONDUIT AND TRAY SCHEDULE	E-27

PROJECT NOTES:

1. INSTALL ONE ELECTRICAL DUCT BANK 11.5" X 11.5".
2. 4"C, 3-1/C #350 kCMIL, 15 kV EPR INSULATION.
3. INSTALL 4"C, 3-1/C #4/0, 15 kV EPR INSULATION.
4. INSTALL 2 Ft WIDE CABLE TRAY AS SHOWN.
5. REFER TO SHEET E-27 FOR CIRCUIT NUMBER AND CONDUIT SCHEDULE.
6. 12 FT RISER, 4" C, TYPE 2, 3-1/C #350 KCMIL, 15 kV EPR INSULATION.
7. INSTALL NEW LVCC AS SHOWN AND AS REQUIRED.
8. 12 Ft DROP, 4"C, TYPE 2, 3-1/C #4/0, 15 kV EPR INSULATION.

ELECTRICAL SHEET INDEX
(STERLING SUBSTATION)

E-1

REVISED BY	HK
DATE REVISED	10/18/10
HOMAYUN KOCHEKALI	
GURSHARNJEET CHEEMA	
CALCULATED-DESIGNED BY	
CHECKED BY	
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION | DATE PLOTTED => 13-APR-2011
10-20-10 | TIME PLOTTED => 07:33

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	4	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

SYMBOLS

(SEE RSP-ES-1A, RSP-ES-1B AND RSP-ES-1C
FOR ADDITIONAL CALTRANS STANDARD SYMBOLS)

LAYOUT PLAN

- (A) EQUIPMENT OR MATERIAL DESIGNATION
  A=SEQUENTIAL DESCRIPTION
- (1) SHEET NOTES, APPLICABLE ONLY TO THE DRAWING
  1=SEQUENTIAL NUMBER
- [1] PROJECT NOTES, APPLICABLE ONLY TO THE ELECTRICAL SHEETS 1=SEQUENTIAL NUMBER
- (4) CONDUIT SYMBOL SHOWING THE NUMBER 4
  SEE CONDUIT AND TRAY SCHEDULE ON E-27
- (J) JUNCTION BOX, CONDUIT FITTING
- ELECTRICAL EQUIPMENT
  OR INDICATED ON PLAN DRAWINGS
- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- CONDUIT OR CABLE RUN, EXPOSED
- CONDUIT RUN CONCEALED IN WALL, CONCRETE BARRIER, SLAB OR ROUTED UNDERGROUND DUCT BANK
- FLEXIBLE CONDUIT
- CT — CABLE TRAY
- CABLE TRAY
- CABLES OR CONDUIT DOWN TO EQUIPMENT
  (SEE PLAN FOR CONDUIT NUMBER)
- GROUND BARE COPPER WIRE, STRANDED
- CABLE TO CABLE EXOTHERMIC TYPE GROUND CONNECTIONS
- CABLE GROUND CONNECTION TO EQUIPMENT, COMPRESSION TYPE
- CABLE WITH PIGTAIL GROUND CONNECTIONS
  (SEE PLAN FOR LENGTH)
- EXISTING ELECTRICAL VAULT
- SPD — SURGE PROTECTION DEVICE

SINGLE LINE DIAGRAM

- 200/5 MRCT 3 — MM — MPR
  MICROPROCESSOR PROTECTIVE RELAY
  MM = METERING MODULE
  MRCT = MULTI RATIO CURRENT TRANSFORMER
  200/5 = CURRENT AMPERE/RATIO
  3 = QUANTITY
- 1200 A / 500 MVA — N.C.(or N.O.) — 52 — 52-11N
  VACUUM CIRCUIT BREAKER, (DRAWOUT TYPE)
  1200 A = RATING
  500 MVA = NOMINAL INTERRUPTING CLASS
  52-1N = ASSIGNED BREAKER NUMBER
  N.C. = NORMALLY CLOSED
  N.O. = NORMALLY OPEN
- 600-800 A / 42000 — 52S-1 E.O. — 800/5 3 — L,S,G
  AIR CIRCUIT BREAKER (DRAWOUT TYPE)
  600-800 A = RATING
  42000 = INTERRUPTING CURRENT
  E.O. = ELECTRICALLY OPERATED
  52S-1 = ASSIGNED BREAKER NUMBER
  800/5 = CURRENT TRANSFORMER SETTING
  3 = QUANTITY
  SOLID STATE TRIP DEVICE
  L = LONG TIME DELAY
  S = SHORT TIME PICK UP/DELAY
  G = GROUND FAULT PICK UP/DELAY
- 1000 kVA 12.47 kV 480 V
  TRANSFORMER, DISTRIBUTION, DRY TYPE
  12.47 kV = DELTA PRIMARY
  480 V = WYE SECONDARY
  1000 = kVA = SIZE
- MCP 2
  COMBINATION MOTOR STARTER, DRAWOUT TYPE
  MCP = MOTOR CIRCUIT PROTECTOR
  2 = STARTER NEMA SIZE
- 30 A
  SAFETY SWITCH,
  30 A = FRAME SIZE
- (3)
  ROTATING MOTOR
  3 = kW RATING
- 50 AT / 150 AF
  MOLDED CASE CIRCUIT BREAKER,
  50 AT = TRIP RATING
  150 AF = FRAME SIZE
- PACKAGE EQUIPMENT OR PANELBOARD
- 12.47 kV-120 V
  POTENTIAL TRANSFORMER
  CONNECTED OPEN DELTA
- 800/5 3
  CURRENT TRANSFORMER
  800/5 = CURRENT AMPERE/RATIO
  3 = QUANTITY
- STRESS RELIEF CABLE CONNECTION
- or
  FUSE
- 1005-1 CIRCUIT NUMBER
  3-350 KCMIL +1/0 G = THREE SINGLE 350 KCMIL AND ONE 1/0 AWG GROUND
- CKT #1005-1
  3-350 kcmil +1/0 G

ELEMENTARY/CONNECTION DIAGRAMS

- Bk W — SIGNAL CABLE WITH SHIELD
- (M) or
  RELAY, MECHANICAL
  M = MOTOR
  C = CONTACTOR
  42 = RUNNING CIRCUIT BREAKER
  X OR Y = AUXILIARY
  R = INDUSTRIAL
  TD = TIME DELAY
  PEC = PHOTOELECTRIC CONTROL
- ON/OFF SWITCH
- DC BATTERIES
- AC/DC INVERTER
  (BATTERY CHARGER/RECTIFIER)
- END RESISTOR AND CAPACITOR
- 6 7
  COMMUNICATION CABLE
  NOISE SUPPRESSOR
  TERMINAL BLOCK
- ----- INDICATES FIELD WIRING
- ☒ INDICATES LOCAL MOUNTED PANEL
- ⧄ TERMINAL BLOCK IN THE 12.47 kV SWGR

DEVICE NUMBER DEFINITIONS

27	UNDER VOLTAGE RELAY
42	RUNNING CIRCUIT BREAKER
43/R	MANUAL TRANSFER / REMOTE
43/L	MANUAL TRANSFER / LOCAL
49	THERMAL RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
51/51N	PHASE AND GROUND FAULT TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
86	LOCK-OUT RELAY
67	Directional Phase Overcurrent
67N	Directional Earth Fault

ELECTRICAL SYMBOLS
(STERLING SUBSTATION)

E-2

REVISED BY	DATE REVISED
HK	10/18/10

CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-10-10 | DATE PLOTTED => 13-APR-2011 | TIME PLOTTED => 07:34

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	5	35

H. Kochekali 2-10-10
REGISTERED ELECTRICAL ENGINEER DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

GENERAL NOTES

1. CONDUIT ROUTING IS DIAGRAMMATIC. PULL BOX LOCATIONS SHALL BE LOCATED AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL PROVIDE ADDITIONAL PULL BOXES AS REQUIRED. EXACT LOCATIONS OF EQUIPMENT AND DEVICES MAY BE ADJUSTED DEPENDING ON FIELD CONDITIONS OR BY THE ENGINEER.
2. MINIMUM SIZE OF CONDUITS SHALL BE 1". CONDUITS SHALL BE GALVANIZED RIGID STEEL.
3. CONDUIT 90° ELBOWS FOR 3" CONDUITS AND LARGER SHALL HAVE A 24" MINIMUM BENDING RADIUS.
4. ALL CONDUITS, INCLUDING SPARES, SHALL BE PROVIDED WITH PULL WIRES PRIOR TO CABLE INSTALLATIONS.
5. ALL EQUIPMENT AND DEVICES SHALL BE PROVIDED WITH NAMEPLATE TAGS PER DRAWINGS.
6. ALL 480 V FEEDERS AND BRANCH CIRCUITS SHALL BE PROVIDED WITH GROUND WIRE.
7. THE CONTRACTOR SHALL LABEL ALL CONDUCTORS AND CABLES PER WIRING DIAGRAMS.
8. ALL ELECTRICAL SHEETS ARE ACCURATE FOR ELECTRICAL WORK ONLY.
9. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SHOWN.
10. DURING REMOVAL OF EXISTING SWITCHGEAR AND LOW VOLTAGE CONTROL CENTER, LVCC, THE CONTRACTOR SHALL SAVE ALL THE WIRING AND CONDUITS FEEDING EXISTING LOAD FROM LVCC AND SWITCHGEARS FOR FUTURE USE.

ABBREVIATIONS:

ADJ	ADJUST
AF	AMPERE FRAME RATING
AH	AMPERE HOUR
AT	AMPERE TRIP RATING
AUX	AUXILIARY
BKR	BREAKER
CC	CONTROLLER CABINET
CON	CONTROL
Cont'd	CONTINUED
CPT	CONTROL POWER TRANSFORMER
CS	CONTROL SWITCH
CUB	CUBICLE
CU	COPPER
DC	DIRECT CURRENT
DISC, Disc	DISCONNECT
DP-A	DISTRIBUTION PANEL A= EQUIPMENT DESIGNATION
DPDT	DOUBLE POLE DOUBLE THROW
EF	EXHAUST FAN
EH	ELECTRIC HEATER
E.W.	EACH WAY
FLA	FULL LOAD AMPERE
RGS	RIGID GALVANIZED STEEL
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HV	HIGH VOLTAGE
Hz	HERTZ
IND, Ind	INDICATION
JB	JUNCTION BOX
kAIC	KILOAMPERES INTERRUPTING CAPACITY
kCMIL	KILO CIRCULAR MIL
kV	KILOVOLT
kW	KILOWATT
kVA	KILOVOLT AMPERE
LP	LIGHTING PANEL
L/R	LOCAL/REMOTE
LTS, Lts	LIGHTS
LVCC	LOW VOLTAGE CONTROL CENTER
MLO	MAIN LOG ONLY
MPR	MICROPROCESSOR PROTECTIVE RELAY
MVA	MEGA VOLT AMPERE
OTH	OTHER
PH	PHASE
Pnl	PANEL
Pp	PUMP
PT'S	POWER TRANSFER SELECTOR SW.
PTSS	POTENTIAL TRANSFORMER
PWR	POWER
RMS	ROOT MEAN SQUARE
PLC	PROGRAMMABLE LOGIC CONTROLLER
RTU	REMOTE TERMINAL UNIT
SCADA, Scada	SUPERVISORY CONTROL AND DATA ACQUISITION
SFOBB	SAN FRANCISCO OAKLAND BAY BRIDGE
SG	SYSTEM GROUND
Shld, SHLD	SHIELD
SPD	SURGE PROTECTION DEVICE
STR	STARTER
SWGR, Swgr	SWITCHGEAR
SW	SWITCH
SZ	SIZE
TEL	TELEPHONE
TB	TERMINAL BOX
Term	TERMINAL
TOC	TRUCK OPERATED CELL
TSH	TEMPERATURE SWITCH, THERMOSTAT
Tr	TRIAD
UP	UTILITY PANEL
UV	UNDERVOLTAGE
VCB	VACUUM CIRCUIT BREAKER
VM	VOLTMETER
VS	VOLTMETER SWITCH
WP	WEATHERPROOF

ELECTRICAL NOTES AND ABBREVIATIONS
(STERLING SUBSTATION)

E-3

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 12:45
02-10-10

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	6	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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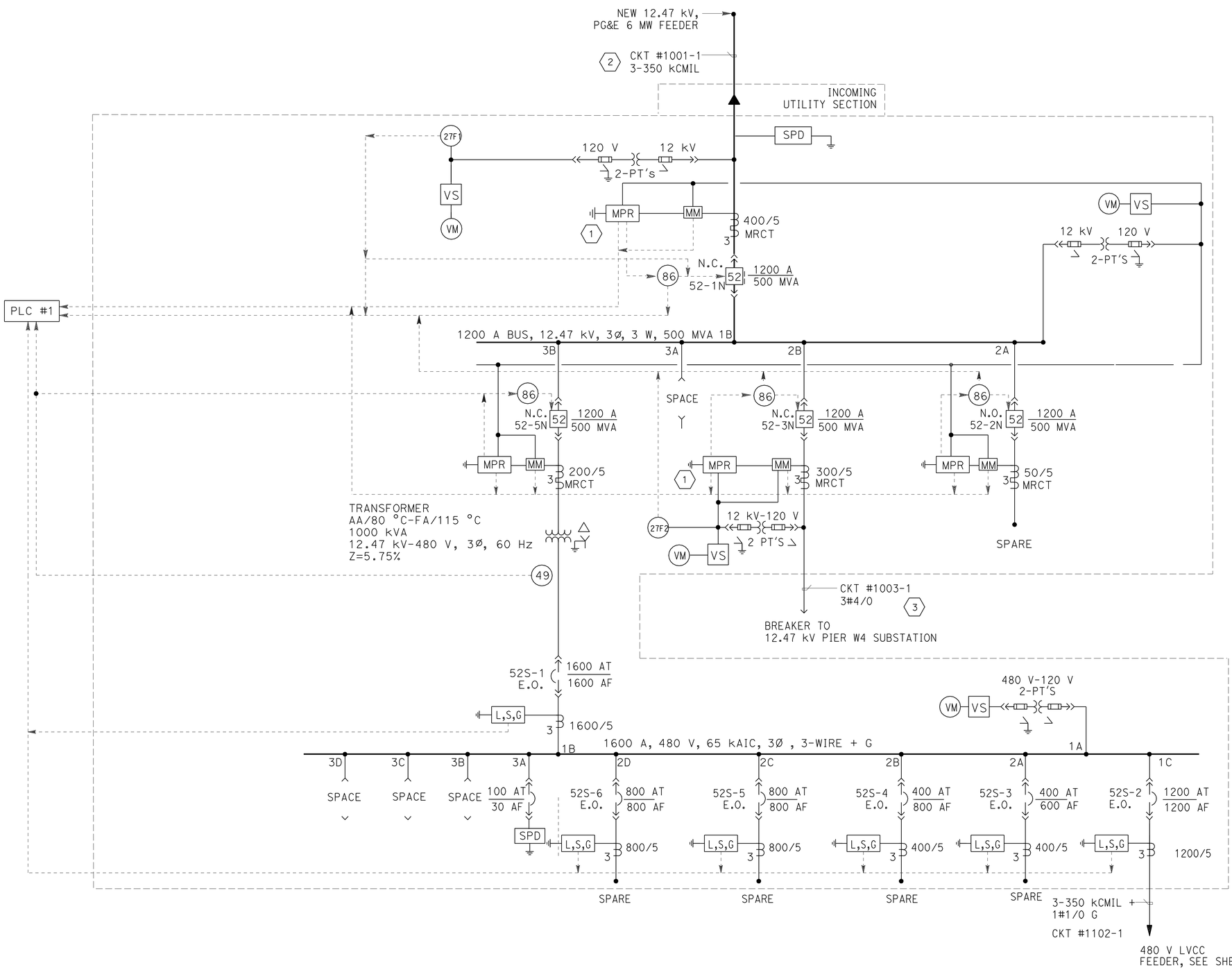

SHEET NOTES:

1. REQUIRES DIRECTIONAL OVER CURRENT PROTECTION. SEE SHEET E-11
2. THE CONTRACTOR SHALL PULL CONDUCTORS AND COIL 10 Ft. LONG INSIDE INCOMING VAULT, SEE SHEET E-7 NOTE 1. PG&E WILL TERMINATE CONDUCTORS.
3. CABLE SHALL BE INSTALLED FROM SWITCH GEAR TO EXISTING VAULT AND SPLICED TO EXISTING CABLE. SEE SHEET E-7 FOR EXISTING VAULT.

NOTES:

1. REFERENCES:
   - FOR UNIT SUBSTATION ELEVATION AND DIMENSIONS, SEE SHEET E-5.
   - FOR 480 V LVCC SINGLE LINE DIAGRAM, SEE SHEET E-6.

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL
12.47 kV TO 480 V SINGLE LINE DIAGRAM

NO SCALE

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

E-4

REVISED BY	DATE REVISED
HK	10/18/10

HOMAYUN KOCHEKALI
GURSHARNJEET CHEEMA
CALCULATED-DESIGNED BY
CHECKED BY
FUNCTIONAL SUPERVISOR
BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION | DATE PLOTTED => 13-APR-2011
02-10-10 | TIME PLOTTED => 07:34

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	7	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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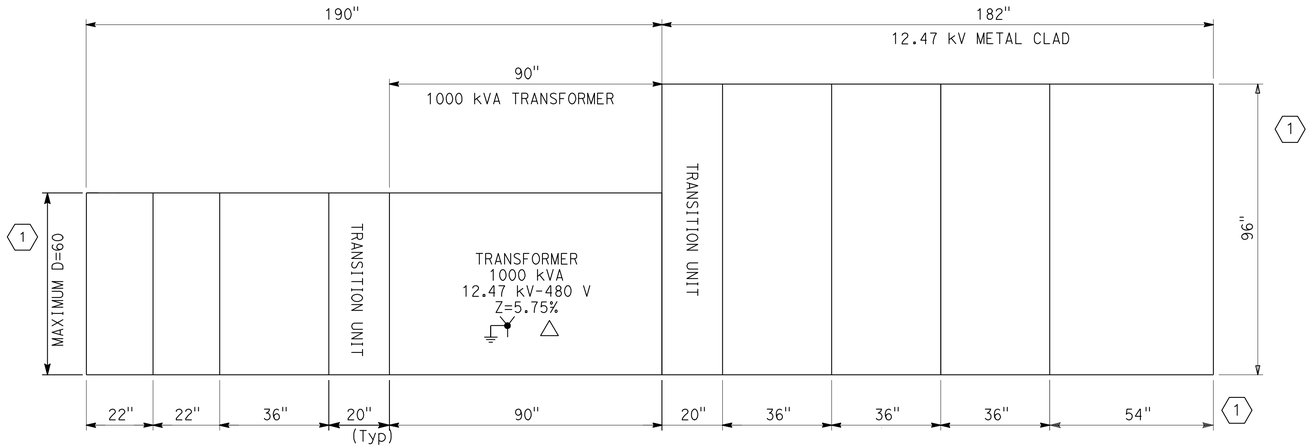
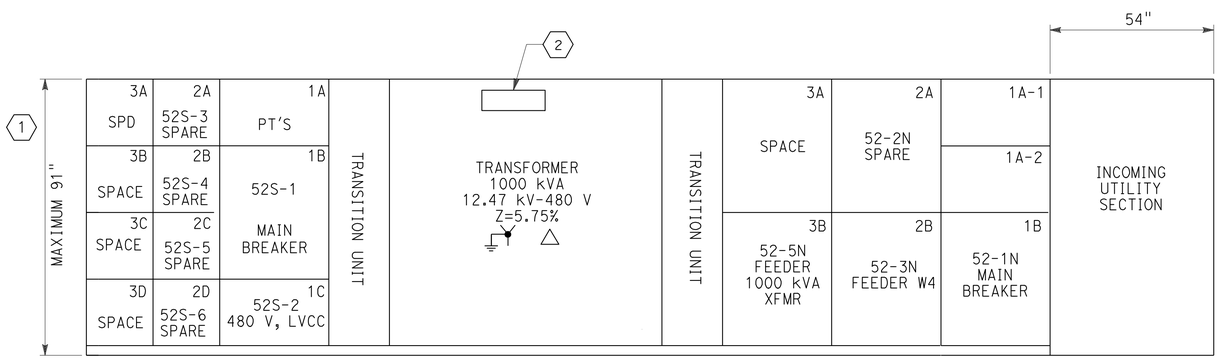


PLAN



FRONT ELEVATION

12.47 kV - 480 V UNIT SUBSTATION ESTIMATED EQUIPMENT DIMENSIONS

NOTE: NAMEPLATES SHALL BE MOUNTED TO THE CONTROL PANEL WITH 4-40 STAINLESS STEEL MACHINE SCREWS. THE CONTROL PANEL SHALL BE DRILLED AND TAPPED. (NO SELF-TAPPING SCREWS)

NAMEPLATE DETAIL

NO SCALE

BREAKER No.	SECTION CUBICLE	NAMEPLATE DESCRIPTION (SEE DETAIL)
		12.47 kV SWITCHGEAR
	1A-1	PT'S
	1A-2	PT'S
52-1N	1B	MAIN BREAKER
52-2N	2A	SPARE
52-3N	2B	FEEDER TO W4 PIER SUBSTATION
	3A	SPACE
52-5N	3B	FEEDER TO 1000 kVA TRANSFORMER

		480 V SWITCHGEAR
	1A	PT'S
52S-1	1B	MAIN BREAKER
52S-2	1C	480 V, 1200 A, 3P, LVCC
52S-3	2A	SPARE
52S-4	2B	SPARE
52S-5	2C	SPARE
52S-6	2D	SPARE
	3A	SURGE PROTECTION DEVICE
	3B	SPACE
	3C	SPACE
	3D	SPACE

SHEET NOTES:

(1) EQUIPMENT DIMENSIONS ARE APPROXIMATE.

(2) NAMEPLATE (SEE NAMEPLATE DETAIL)
FIRST LINE: "STERLING 12.47 kV-480 V UNIT SUBSTATION"

NOTE:

1. FOR 12.47 kV TO 480 V SINGLE LINE DIAGRAM, SEE SHEET E-4.

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

STERLING SUBSTATION
MEDIUM VOLTAGE-SUBSTATION TRANSFORMER AND LOW VOLTAGE SWITCHGEAR

NO SCALE

E-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ELECTRICAL
FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-10-10 DATE PLOTTED => 13-APR-2011 TIME PLOTTED => 07:34

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	8	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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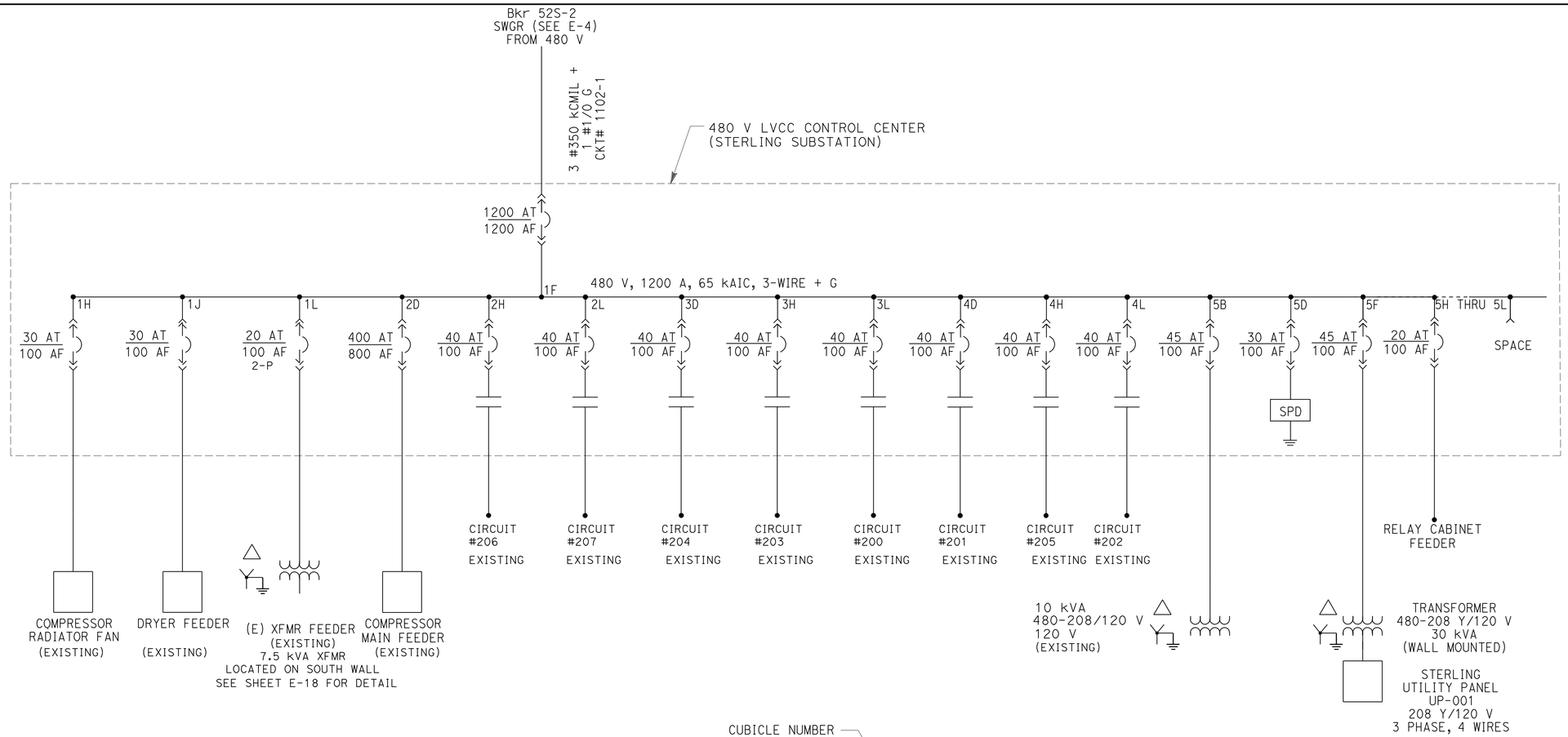
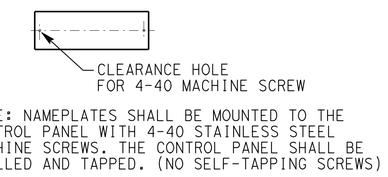
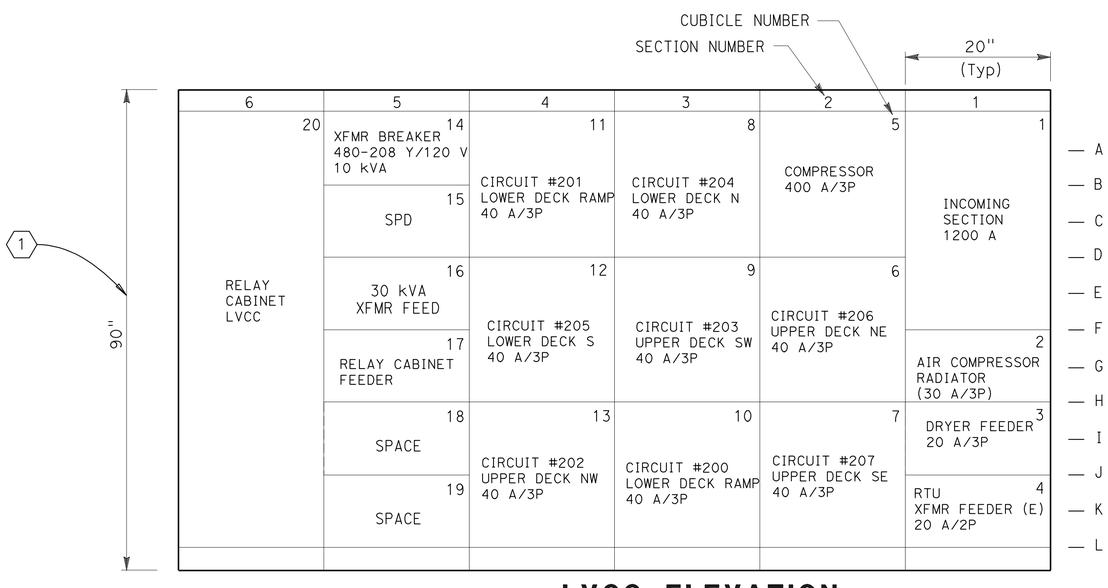




NOTE: NAMEPLATES SHALL BE MOUNTED TO THE CONTROL PANEL WITH 4-40 STAINLESS STEEL MACHINE SCREWS. THE CONTROL PANEL SHALL BE DRILLED AND TAPPED. (NO SELF-TAPPING SCREWS)

NAMEPLATE DETAIL



LVCC ELEVATION

LVCC SCHEDULE

CUBICLE No.	VERTICAL SECTION	NAMEPLATE DESCRIPTION (SEE DETAIL)	CKT BKR AF	CKT BKR AT
1	1	INCOMING SECTION	1200	1200
2	1	COMPRESSOR RADIATOR FAN	100	30
3	1	DRYER FEEDER	100	20
4	1	TRANSFORMER FEEDER 50 A/ 2P	100	50
5	2	COMPRESSOR	800	400
6	2	CIRCUIT #206	100	40
7	2	CIRCUIT #207	100	40
8	3	CIRCUIT #204	100	40
9	3	CIRCUIT #203	100	40
10	3	CIRCUIT #200	100	40
11	4	CIRCUIT #201	100	40
12	4	CIRCUIT #205	100	40
13	4	CIRCUIT #202	100	40
14	5	XFMR BREAKER	100	45
15	5	SURGE PROTECTION DEVICE	100	30
16	5	30 kVA XFMR	100	45
17	5	RELAY CABINET LVCC	100	20
18	5	SPACE		
19	5	SPACE		
20	5	RELAY CABINET LVCC		

SHEET NOTE:

(1) EQUIPMENT DIMENSION IS APPROXIMATE

STERLING SUBSTATION ELECTRICAL

480 V LOW VOLTAGE CONTROL CENTER

NO SCALE

E-6

REVISED BY	DATE REVISED
HK	10/18/10

HOMAYUN KOCHEKALI — GURSHARNJEET CHEEMA — CALCULATED-DESIGNED BY — CHECKED BY

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — ELECTRICAL — Caltrans

LAST REVISION — DATE PLOTTED => 13-APR-2011 — TIME PLOTTED => 07:34 — 02-10-10

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	9	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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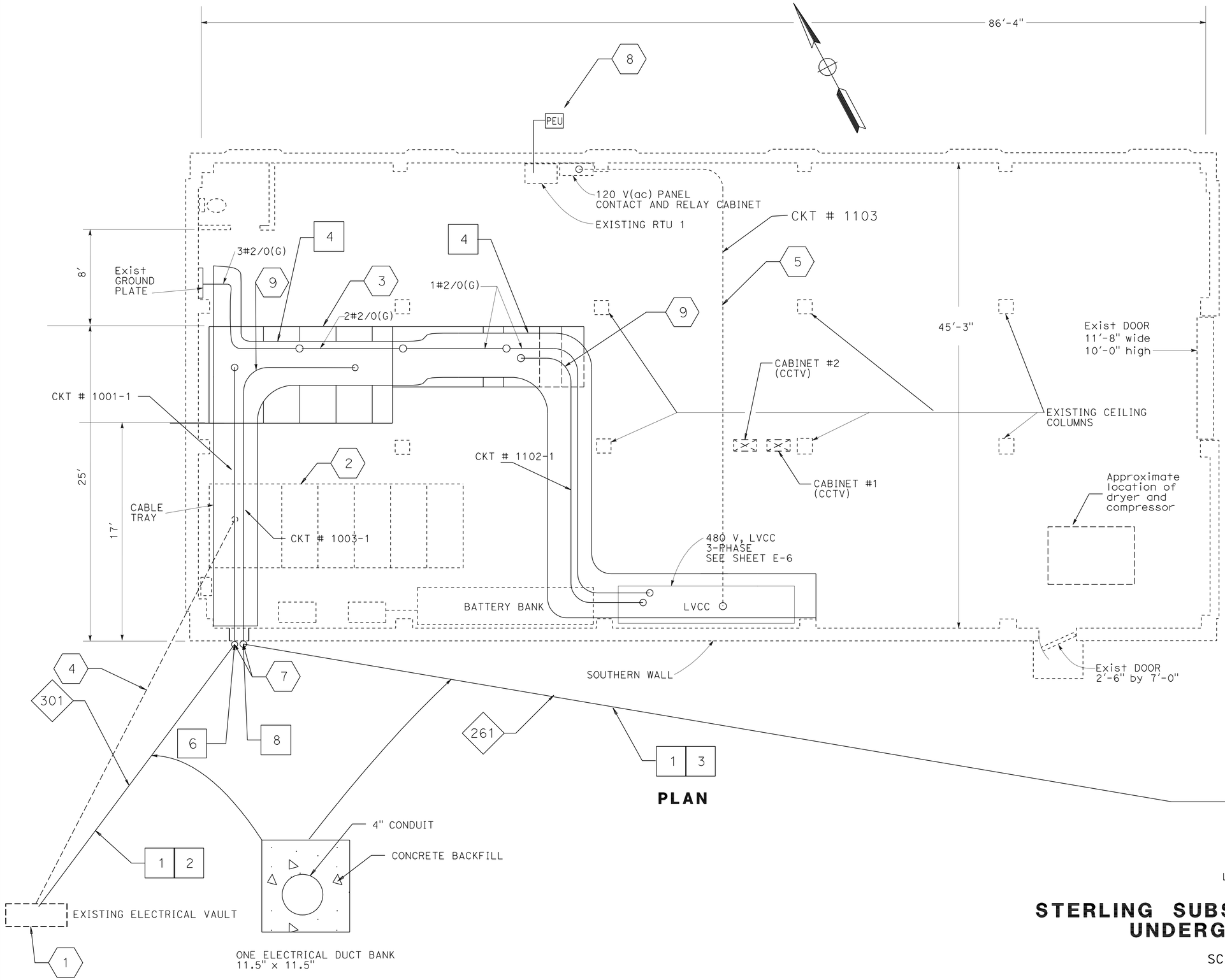

NOTES:

1. INTERCEPT AND SPLICE THE EXISTING PG&E POWER SOURCE FROM THE EXISTING VAULT.
2. REMOVE UNIT SUBSTATION.
3. INSTALL A NEW MV SWITCHGEAR SEE SHEET E-5 FOR DETAIL, & E-4 FOR SINGLE LINE DIAGRAM.
4. EXISTING PG&E INCOMING 15 kV (SEE SHEET NOTE 1).
5. USE EXISTING 1"C, TO CONNECT TO EXISTING (LOCATED ON SOUTH WALL).
6. USE EXISTING CONDUIT TO EXISTING (LOCATED ON SOUTH WALL).
7. SEE SHEET E-8, SECTION BB.
8. PEU IS LOCATED OUTDOOR, MOUNTED ON THE ROOF AT THE NORTHERN EDGE.
9. A MINIMUM BENDING RADIUS OF 3 FEET MUST BE APPLIED TO 15 kV CABLE AS WELL AS 4/0 CONDUCTORS AT ALL TIMES.

STERLING SUBSTATION ELECTRICAL UNDERGROUND WORK

SCALE: 1" = 4'

E-7

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ELECTRICAL
Caltrans

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-10-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 12:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	10	35

H. Kochekali 2-10-10
REGISTERED ELECTRICAL ENGINEER DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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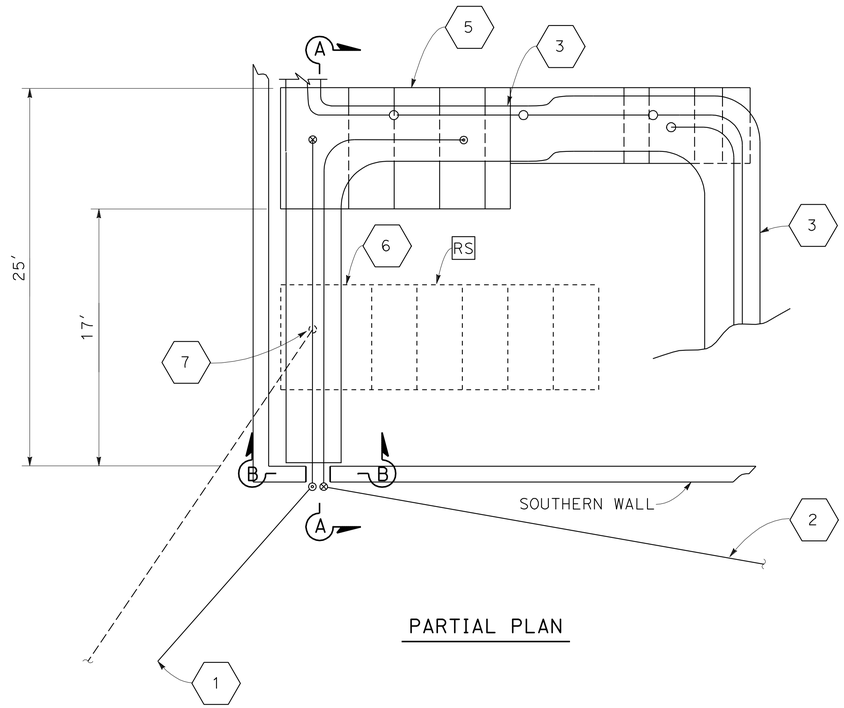
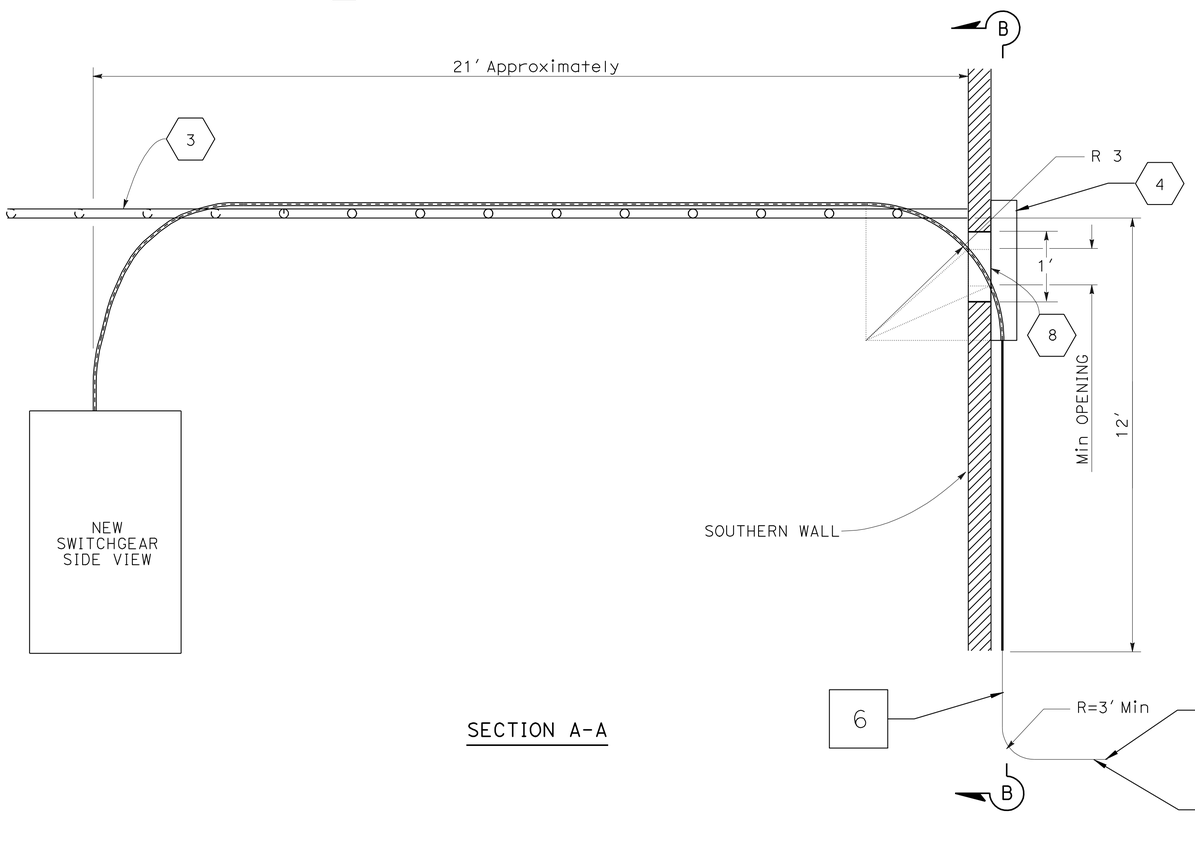
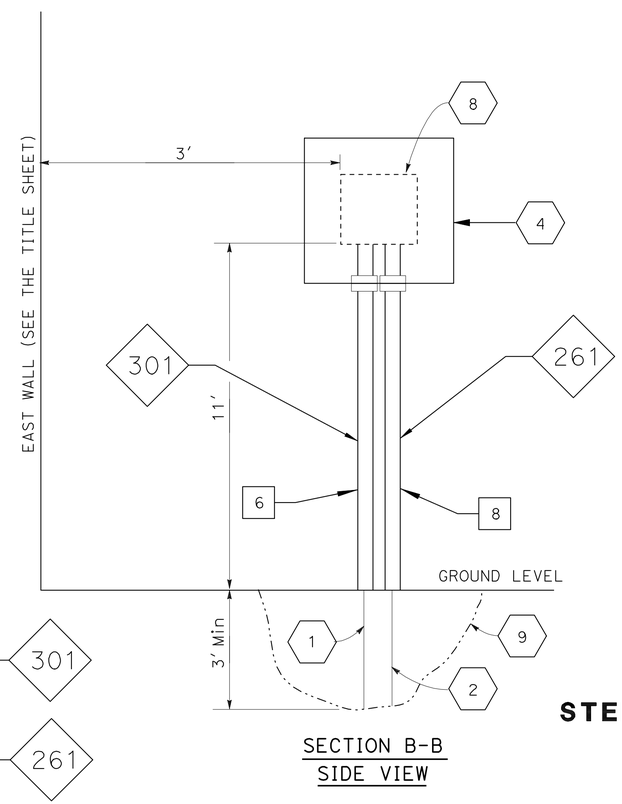


PARTIAL PLAN



SECTION A-A



SECTION B-B
SIDE VIEW

LEGEND:

1. INCOMING 4"C, 15 kV CABLE FROM THE MANHOLE TO SWITCHGEAR.
2. 4"C, 15 kV CIRCUIT FROM SWITCHGEAR TO W4 SUBSTATION.
3. CABLE TRAY 2 Ft WIDE.
4. NEMA 4X JUNCTION BOX. 20" x 20" x 8"
5. NEWLY INSTALLED SWITCHGEAR, SEE SHEET E-7 FOR DETAIL.
6. RC EXISTING UNIT SUBSTATION.
7. EXISTING PG&E INCOMING CIRCUIT FROM THE GROUND TO THE EXISTING SWITCHGEAR.
8. MAKE A HOLE SUFFICIENTLY LARGE THROUGH THE SOUTHERN WALL TO FACILITATE THE PASSAGE OF 15 kV CABLES (MINIMUM OF 3 Ft BENDING RADIUS) SEE SECTION B-B.
9. MAKE A TRENCH WITH A MINIMUM OF 3 Ft DEPTH TO ACCOMMODATE 3 Ft BENDING RADIUS OF THE INCOMING AND OUTGOING 15 kV CABLES THROUGH THE DUCT BANK. SEE SHEET E-7 FOR THE CROSS-SECTION OF THE DUCT BANKS.

STERLING SUBSTATION ELECTRICAL BUILDING WORK-CABLE TRAYS AND CONDUITS

NO SCALE

E-8

REVISED BY	DATE REVISED
HK	10/18/10

CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 10-20-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 12:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	11	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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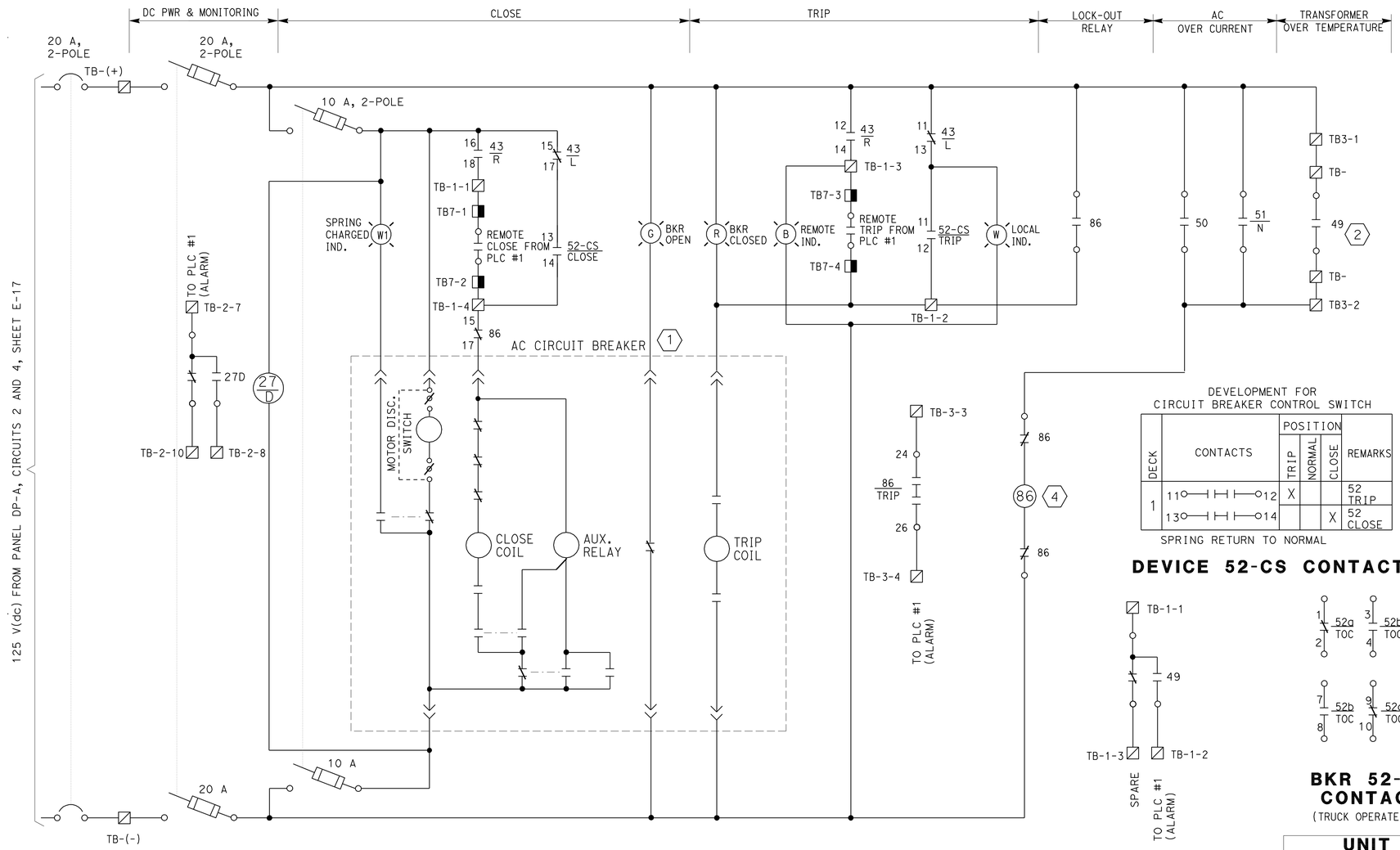


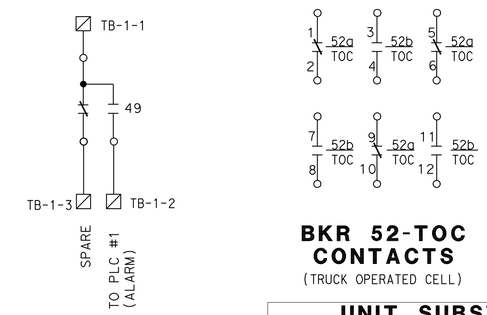
3 12.47 kV CIRCUIT BREAKER ELEMENTARY DIAGRAM

DEVELOPMENT FOR CIRCUIT BREAKER CONTROL SWITCH

DECK	CONTACTS	POSITION TRIP	POSITION NORMAL	POSITION CLOSE	REMARKS
1	11—12	X			52 TRIP
	13—14			X	52 CLOSE

SPRING RETURN TO NORMAL

DEVICE 52-CS CONTACTS



BKR 52-TOC CONTACTS

(TRUCK OPERATED CELL)

2 TRANSFORMER DEVICE 49

SHEET NOTES:

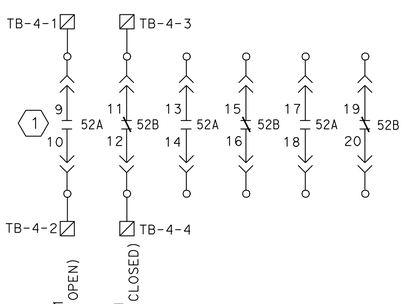
1. THE 12.47 kV CIRCUIT BREAKER CONTACTS ARE SHOWN WITH THE BREAKER IN OPEN POSITION.
2. DEVICE 49 TRANSFORMER OVER-TEMPERATURE WIRING IS REQUIRED FOR 12.47 kV CIRCUIT BREAKER 52-5N ONLY, SEE SHEET E-13.
3. ELEMENTARY DIAGRAM IS SHOWN FOR BREAKER 52-5N. TYPICAL FOR BREAKERS 52-2N EXCEPT TERMINAL NUMBERS FROM PLC #1 AND No. DEVICE 49.
4. DEVICE 86 LOOK-OUT RELAY CONTACTS AND WIRING ARE SHOWN IN RESET POSITION.

NOTE:

1. REFERENCES:
   - FOR UNIT SUBSTATION CONNECTION DIAGRAMS, SEE SHEETS E-11 AND E-12.
   - FOR SINGLE LINE DIAGRAM, SEE SHEET E-4.

UNIT SUBSTATION SCADA INPUTS/OUTPUTS (TO PLC #1)

EQUIPMENT	DEVICE No.	DESCRIPTION	DIGITAL INPUT	DIGITAL OUTPUT	LOW LEVEL Com
12.47 kV BREAKERS 52-5N	52A	BREAKER OPEN	1		
	52B	BREAKER CLOSED	1		
	52A	BREAKER OPEN		1	
	52B	BREAKER CLOSED		1	
	86	LOCK OUT RELAY	1		
	43 L/R	LOCAL/REMOTE	2		
	50/51N	OVERCURRENT	1		
	MM	3-PHASE CURRENTS			1
		POWER FACTOR			1
		KILOWATT			1
		KILOVARS			1
TRANSFORMER	49	OVER-TEMPERATURE	1		
	27D	DC UNDERVOLTAGE	1		



BKR 52 CONTACTS

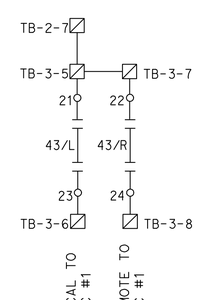
DEVELOPMENT FOR LOCKOUT RELAY (MANUALLY RESET)

DECK	CONTACTS	POS. TRIP	POS. RESET	REMARKS
1	11—13		X	SPARE
	12—18	X		52 TRIP
	15—17		X	52 CLOSE
	14—16	X		SPARE
2	21—23		X	SPARE
	22—28	X		SPARE
	25—27		X	SPARE
	24—26	X		To PLC #1

DEVICE 86 CONTACTS

DEVELOPMENT FOR LOCAL - REMOTE CONTROL SWITCH

DECK	CONTACTS	POS. LOCAL	POS. REMOTE	
1	11—13	X		52 TRIP
	12—14		X	52 TRIP
	15—17	X		52 CLOSE
	16—18		X	52 CLOSE
2	21—23	X		TO PLC #1
	22—24		X	To PLC #1
	25—27	X		SPARE
	26—28		X	SPARE



DEVICE 43 L/R CONTACTS

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL
12.47 kV CIRCUIT BREAKER ELEMENTARY DIAGRAM

NO SCALE

E-9

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ELECTRICAL
Caltrans

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-10-10 | DATE PLOTTED => 13-APR-2011 | TIME PLOTTED => 07:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	12	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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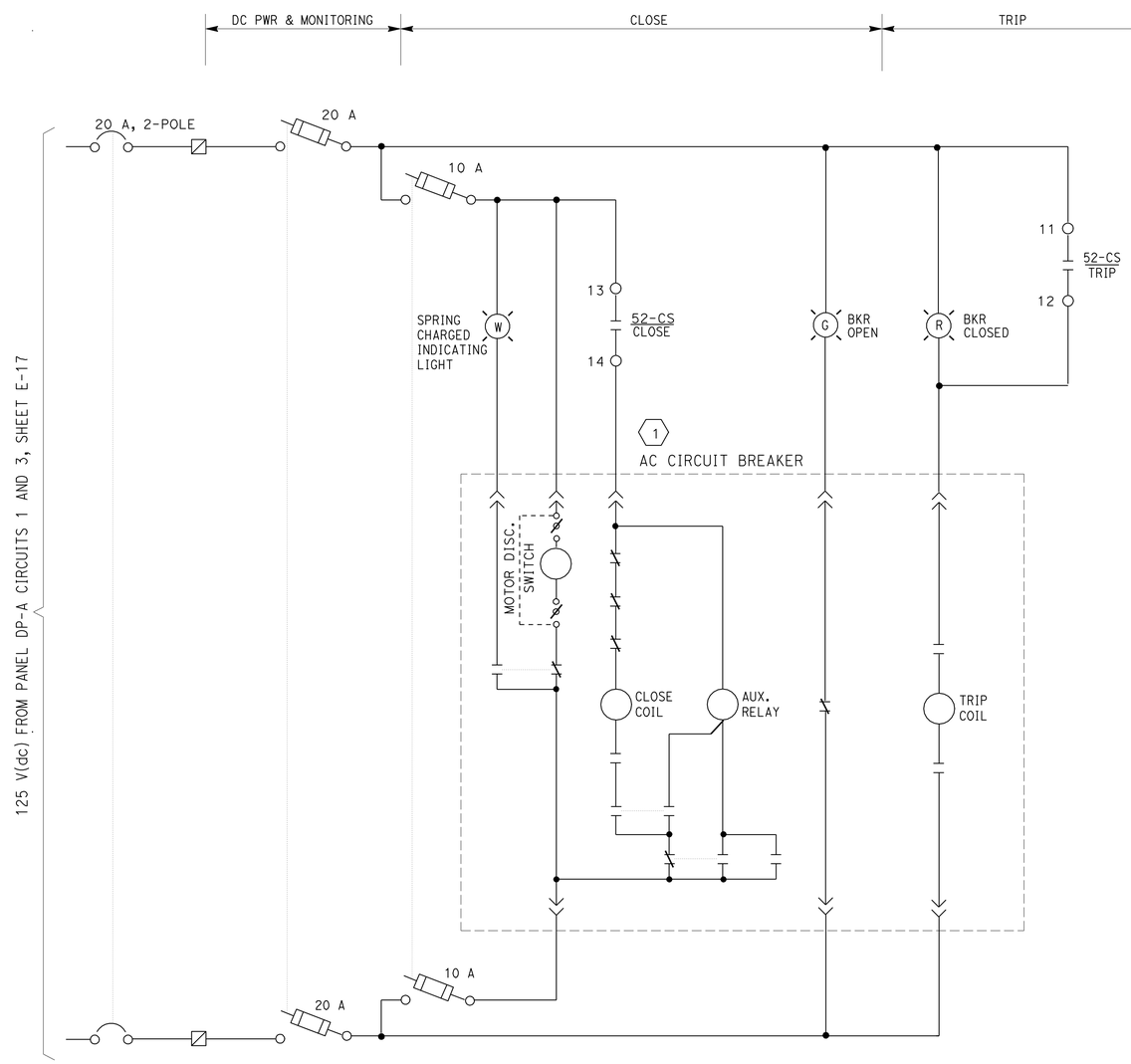
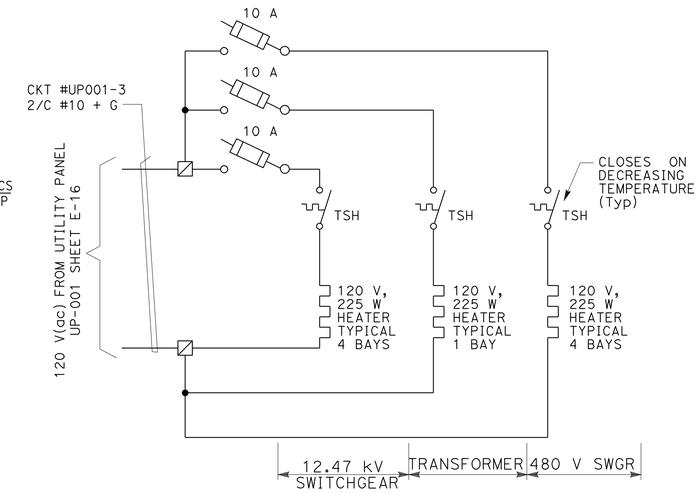
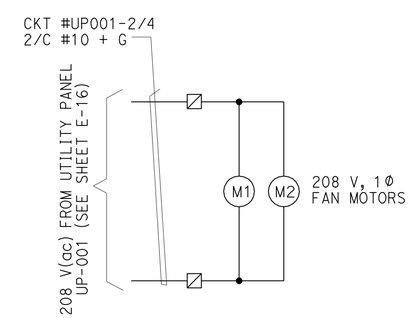


2 480 V CIRCUIT BREAKER ELEMENTARY DIAGRAM



UNIT SUBSTATION CUBICLE SPACE HEATER



TRANSFORMER COOLING FANS

SHEET NOTES:

1. CIRCUIT BREAKER CONTACTS ARE SHOWN WITH THE BREAKER IN OPEN POSITION.
2. ELEMENTARY DIAGRAM SHOWN FOR BREAKER 52S-1. TYPICAL FOR BREAKERS 52S-2 THROUGH 52S-6.

NOTE:

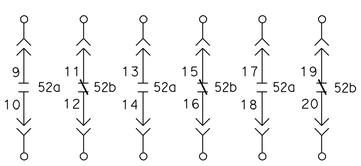
1. REFERENCES:
   - FOR UNIT SUBSTATION CONNECTION DIAGRAMS, SEE SHEETS E-15.
   - FOR SINGLE LINE DIAGRAM, SEE SHEET E-4.
   - FOR UP-001 PANEL SCHEDULE, SEE SHEET E-16.

DEVELOPMENT FOR CIRCUIT BREAKER CONTROL SWITCH

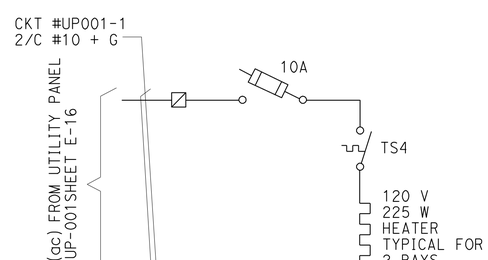
DECK	CONTACTS	POSITION TRIP	POSITION NORMAL	POSITION CLOSE	REMARKS
1	11 — 12	X			52 TRIP
	13 — 14			X	52 CLOSE

SPRING RETURN TO NORMAL

DEVICE 52-CS CONTACTS



1 BREAKER 52 CONTACTS



480 V LVCC SPACE HEATER

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1TO E-3

ELECTRICAL DETAILS
STERLING SUBSTATION ELECTRICAL
480 V CIRCUIT BREAKER ELEMENTARY DIAGRAM

NO SCALE

E-10

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION DATE PLOTTED => 13-APR-2011
10-20-10 TIME PLOTTED => 07:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	13	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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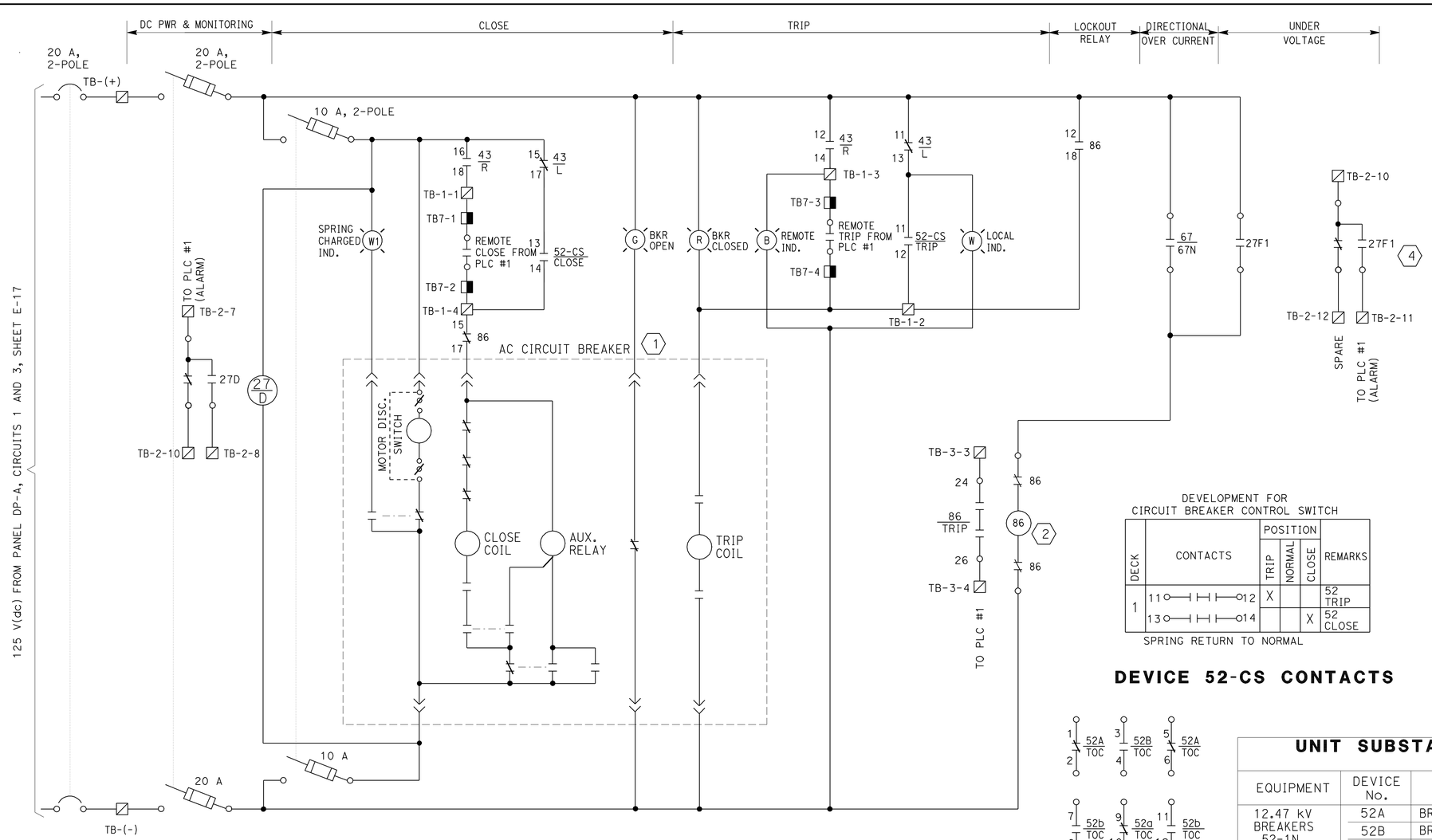


3 CIRCUIT BREAKER 52-1N, 52-3N ELEMENTARY DIAGRAM

DEVELOPMENT FOR CIRCUIT BREAKER CONTROL SWITCH

DECK	CONTACTS	POSITION TRIP	POSITION NORMAL	POSITION CLOSE	REMARKS
1	11 — 12	X			52 TRIP
	13 — 14			X	52 CLOSE

SPRING RETURN TO NORMAL

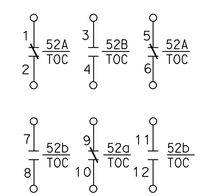
DEVICE 52-CS CONTACTS

SHEET NOTES:

1. 12.47 kV CIRCUIT BREAKER CONTACTS ARE SHOWN WITH THE BREAKER IN OPEN POSITION.
2. DEVICE 86 LOCK-OUT RELAY CONTACTS AND WIRING ARE SHOWN IN RESET POSITION.
3. ELEMENTARY DIAGRAM IS SHOWN FOR BREAKER 52-1N. TYPICAL FOR BREAKER 52-3N EXCEPT TERMINAL NUMBERS FROM PLC #1.
4. UNDER VOLTAGE RELAYS 27F1 AND 27F2 FOR BREAKERS 52-1N AND 52-3N WILL HAVE ALARM INPUTS TO PLC #1.

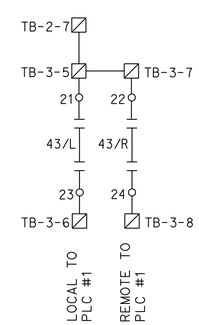
NOTE:

1. REFERENCES:
   - FOR UNIT SUBSTATION CONNECTION DIAGRAMS, SEE SHEETS E-12 AND E-13.
   - FOR SINGLE LINE DIAGRAM, SEE SHEET E-4.



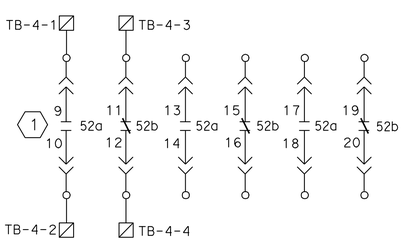
BKR 52-TOC CONTACTS

(TRUCK OPERATED CELL)



UNIT SUBSTATION SCADA INPUTS/OUTPUTS (TO PLC #1)

EQUIPMENT	DEVICE No.	DESCRIPTION	DIGITAL INPUT	DIGITAL OUTPUT	LOW LEVEL Com
12.47 kV BREAKERS 52-1N 52-3N	52A	BREAKER OPEN	1		
	52B	BREAKER CLOSED	1		
	52A	BREAKER OPEN		1	
	52B	BREAKER CLOSED		1	
	86	LOCK-OUT RELAY	1		
	43 L/R	LOCAL/REMOTE	2		
	(SSPP) 50/51N	OVERCURRENT	1		
	MM	3-PHASE CURRENTS			1
		POWER FACTOR			1
		KILOWATT			1
		KILOVARS			1
	27D	DC UNDERVOLTAGE	1		
52-1N	27F1	FEEDER UNDERVOLTAGE	1		
52-3N	27F2	FEEDER UNDERVOLTAGE	1		



BKR 52 CONTACTS

DEVELOPMENT FOR LOCKOUT RELAY (MANUALLY RESET)

DECK	CONTACTS	POS. TRIP	POS. RESET	REMARKS
1	11 — 13		X	SPARE
	12 — 18	X		52 TRIP
	15 — 17		X	52 CLOSE
	14 — 16	X		SPARE
2	21 — 23		X	SPARE
	22 — 28	X		SPARE
	25 — 27		X	SPARE
	24 — 26	X		To PLC #1

DEVICE 86 CONTACTS

DEVELOPMENT FOR LOCAL - REMOTE CONTROL SWITCH

DECK	CONTACTS	POS. LOCAL	POS. REMOTE	
1	11 — 13	X		52 TRIP
	12 — 14		X	52 TRIP
	15 — 17	X		52 CLOSE
	16 — 18		X	52 CLOSE
2	21 — 23	X		TO PLC #1
	22 — 24		X	To PLC #1
	25 — 27	X		SPARE
	26 — 28		X	SPARE

DEVICE 43 L/R CONTACTS

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL
12.47 kV CIRCUIT BREAKER ELEMENTARY DIAGRAM

NO SCALE

E-11

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	ELECTRICAL	Caltrans	
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI	CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI
CHECKED BY	GURSHARNJEET CHEEMA	REVISED BY	HK
DATE REVISED	10/18/10		

LAST REVISION DATE PLOTTED => 13-APR-2011
02-16-10 TIME PLOTTED => 07:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	14	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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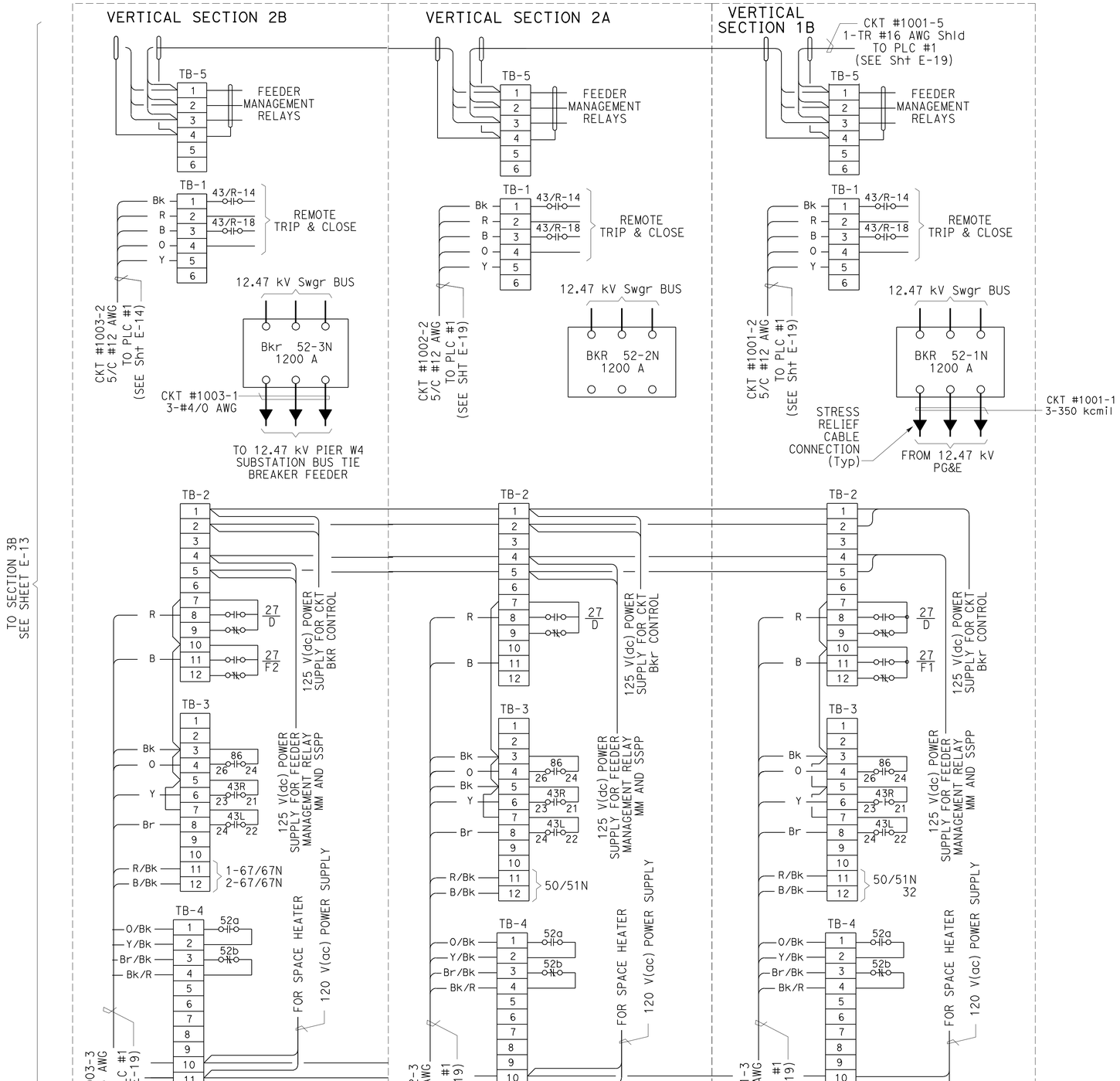

12.47 kV SWITCHGEAR CIRCUIT BREAKERS

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

NOTE:

1. REFERENCES:
   - FOR 12.47 kV/480 V SYSTEM SINGLE LINE DIAGRAM, SEE SHEET E-4.
   - FOR 12.47 kV/480 V UNIT SUBSTATION GENERAL ARRANGEMENT, SEE SHEET E-5.
   - FOR PLC # 1 CONNECTION DIAGRAM, SEE SHEET E-19.

ELECTRICAL DETAILS
STERLING SUBSTATION
12.47 kV SWITCHGEAR CONNECTION DIAGRAM
NO SCALE

E-12

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-16-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 07:36

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	15	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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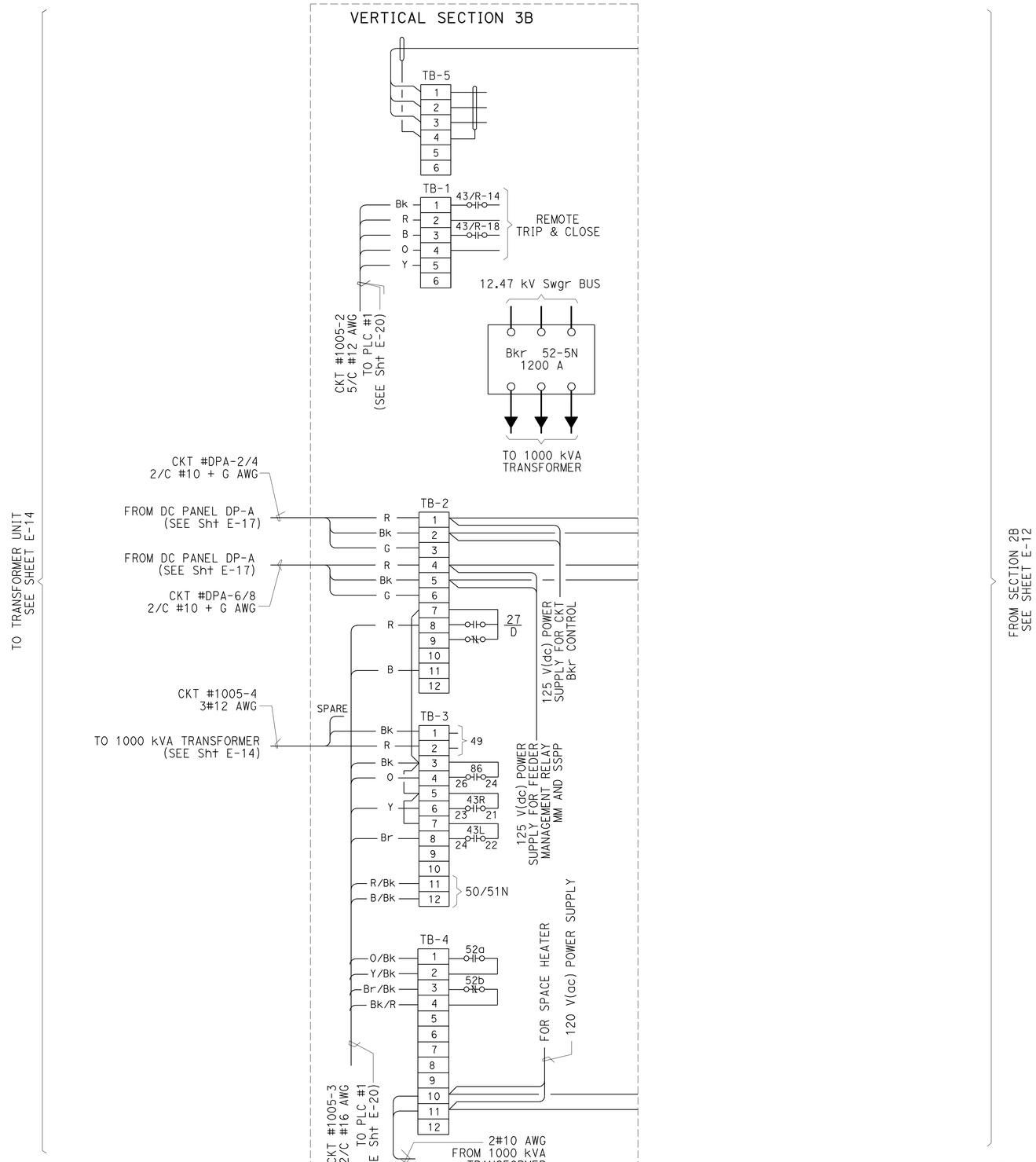

12.47 kV SWITCHGEAR CIRCUIT BREAKERS

NOTE:

1. REFERENCES:
   - FOR 12.47 kV/480 V SYSTEM SINGLE LINE DIAGRAM, SEE SHEET E-4.
   - FOR 12.47 kV/480 V UNIT SUBSTATION GENERAL ARRANGEMENT, SEE SHEET E-5.
   - FOR PLC #1 CONNECTION DIAGRAM, SEE SHEET E-20.

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

ELECTRICAL DETAILS
STERLING SUBSTATION
12.47 kV SWITCHGEAR CONNECTION DIAGRAM

NO SCALE

E-13

CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI	REVISED BY	HK
CHECKED BY	GURSHARNJEET CHEEMA	DATE REVISED	10/18/10
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-16-10 | DATE PLOTTED => 13-APR-2011 | TIME PLOTTED => 07:37

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	16	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

PLANS APPROVAL DATE 4-11-11

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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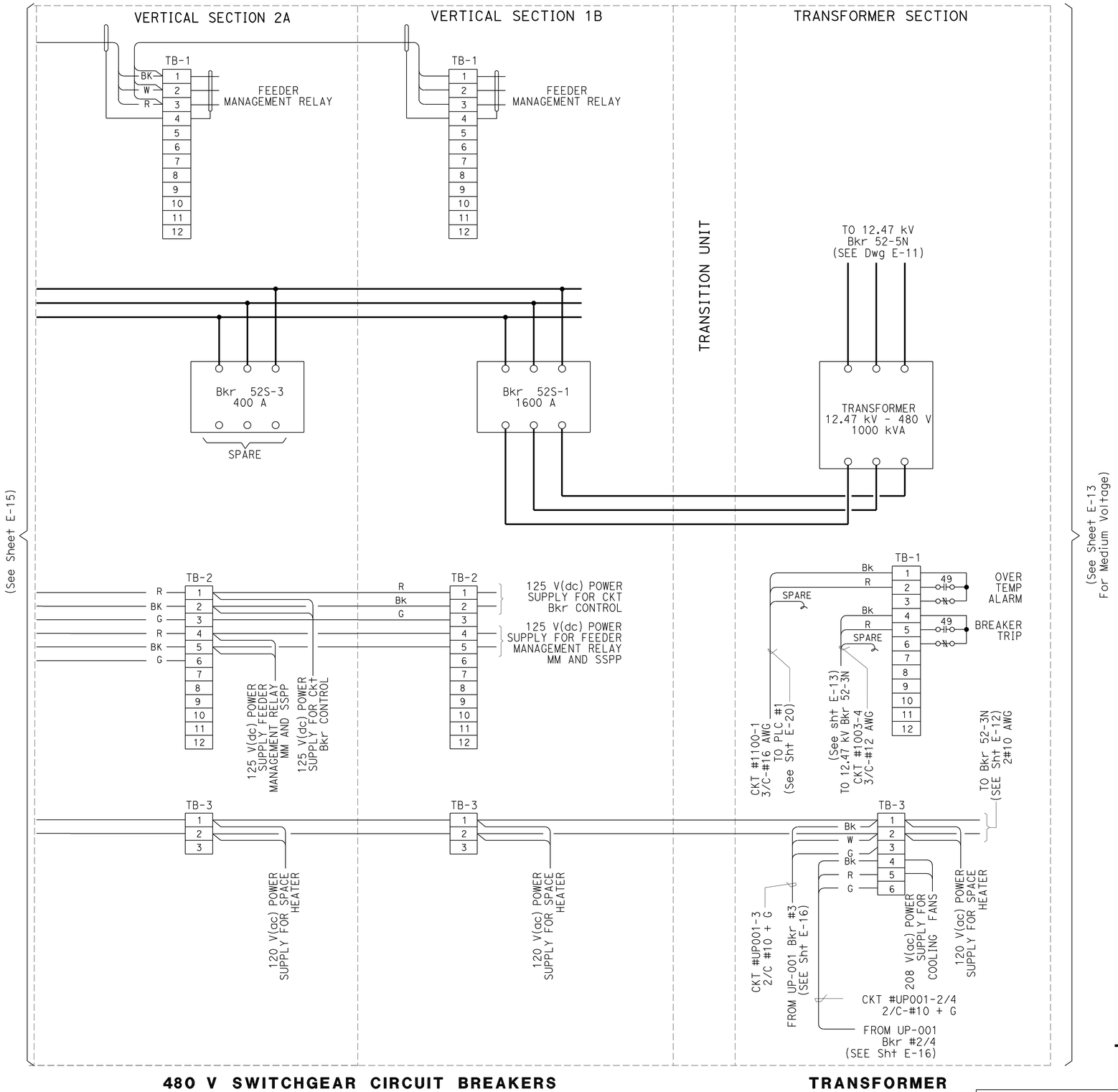

NOTE:

1. REFERENCES:
   - FOR 12.47 kV/480 V SYSTEM SINGLE LINE DIAGRAM, SEE SHEET E-4.
   - FOR 12.47 kV/480 V UNIT SUBSTATION GENERAL ARRANGEMENT, SEE SHEET E-5.
   - FOR RTU CONNECTION DIAGRAM, SEE SHEET E-12 & E-13.

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL TRANSFORMER AND 480 V SWITCHGEAR CONNECTION DIAGRAM

NO SCALE

E-14

CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI	REVISED BY	HK
CHECKED BY	GURSHARNJEET CHEEMA	DATE REVISED	10/18/10
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

ELECTRICAL

LAST REVISION 02-16-10 | DATE PLOTTED => 12-APR-2011 | TIME PLOTTED => 15:16

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	17	35

H. Kochekali 2-10-10
REGISTERED ELECTRICAL ENGINEER DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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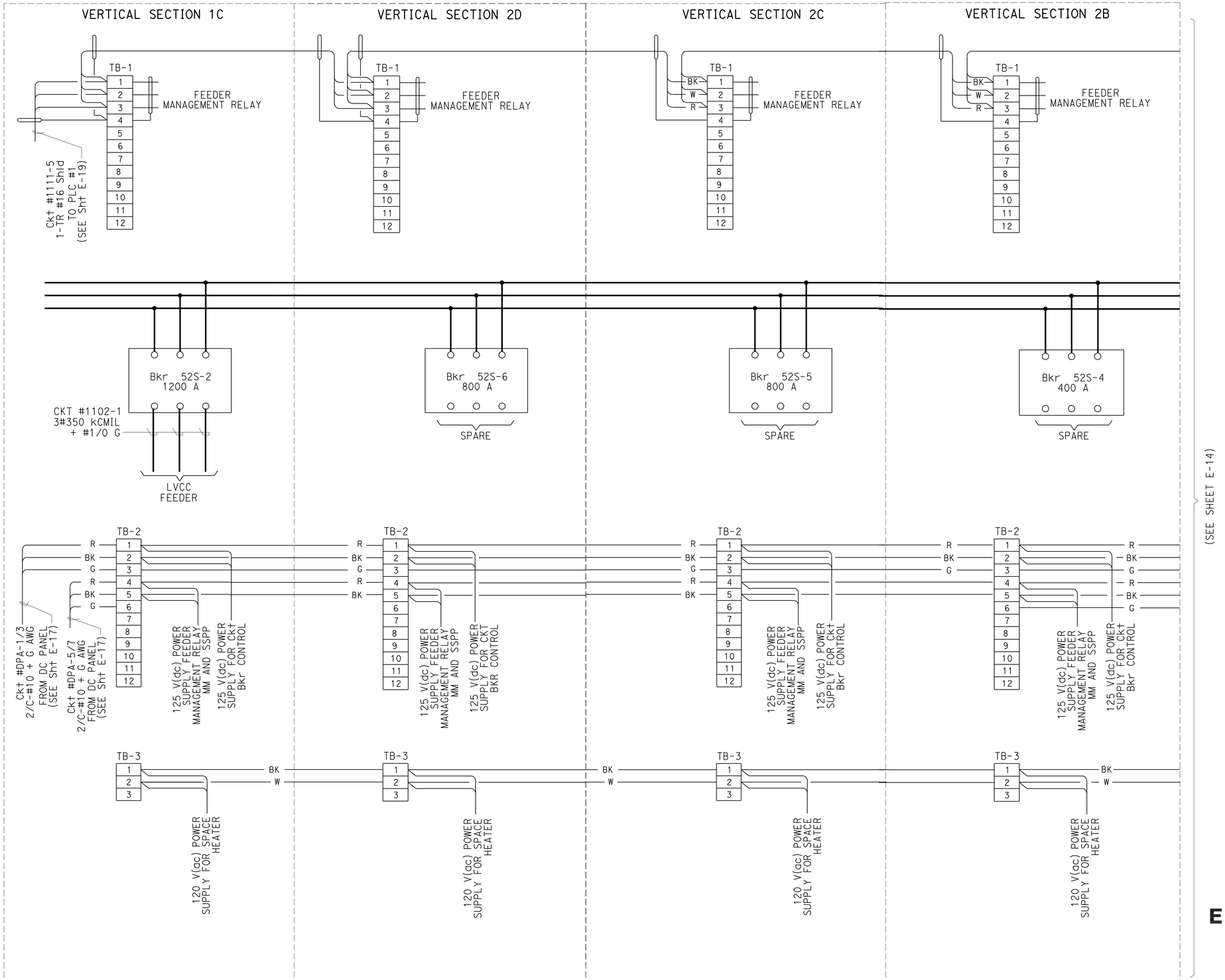


NOTE:

1. REFERENCES:
   - FOR 12.47 kV/480 V SYSTEM SINGLE LINE DIAGRAM, SEE SHEET E-4.
   - FOR 12.47 kV/480 V UNIT SUBSTATION GENERAL ARRANGEMENT, SEE SHEET E-5.

FOR NOTES, ABBREVIATIONS AND LEGEND, SEE SHEETS E-1 TO E-3

ELECTRICAL DETAILS
(STERLING SUBSTATION ELECTRICAL 480 V SWITCHGEAR CONNECTION DIAGRAM)

NO SCALE

E-15

REVISED BY	HK
DATE REVISED	10/18/10
CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI
CHECKED BY	GURSHARNJEET CHEEMA
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION | DATE PLOTTED => 12-APR-2011
10-20-10 | TIME PLOTTED => 15:16

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	18	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

UTILITY PANEL UP-001 LOCATION: NORTH WALL, SEE SHEET E-21, NOTE 5

LOAD DESCRIPTION	LTG	REC	OTH.	CB		CB	LTG	REC	OTH.	LOAD DESCRIPTION
480 V LVCC SPACE HEATERS			450	20/1	1 A 2	20/2			600	TRANSFORMER COOLING FANS
UNIT SUBSTATION SPACE HEATERS			2475	20/1	3 B 4				600	
BATTERY CHARGER			250	50/1	5 C 6	20/1			150	CC CAMERA 1
RELAY CABINET FEEDER			1000	20/1	7 A 8	20/1			150	CC CAMERA 2
SPARE				20/1	9 B 10	20/1				SPARE
SPARE				20/1	11 C 12	20/1				SPARE
SPARE				20/1	13 A 14	20/1				SPARE
SPARE				20/1	15 B 16	20/2				SPARE
SPARE				20/1	17 C 18					SPARE
SPARE				20/1	19 A 20	20/1				SPARE
SPARE				20/1	21 B 22	20/1				SPARE
SPARE				20/1	23 C 24	30/1				
TOTAL VA	-	-	3175				-	-	1500	TOTAL VA

LOAD SUMMARY IN VA (INCLUDES .90 PF) (VA)

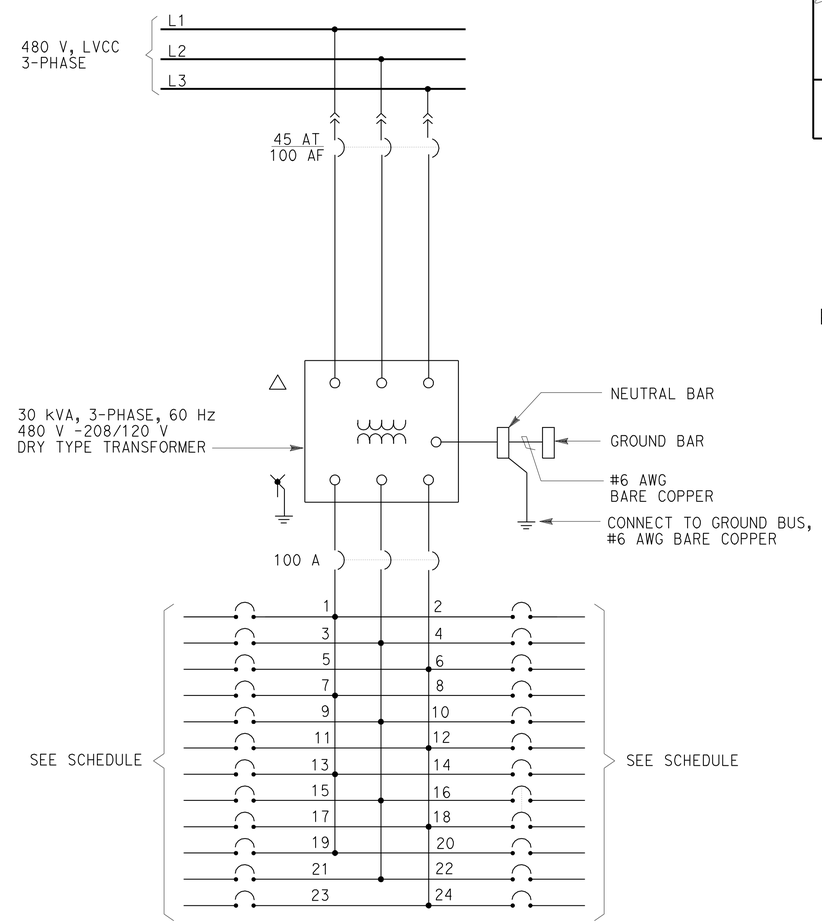
Gen USE (1st 10 kVA AT 100% PLUS 50% OF REMAINDER): 4,675 VA

TOTAL kVA: 5.7
TOTAL A: 16 A at 208 V, 3 ø

BALANCE (kVA)

PHASE A 2.2
PHASE B 3.07
PHASE C 0.4

VOLTAGE: 208 Y/120 V
PHASE/WIRES: 3ø,4 WIRES
BUS RATING: 125 A
MAIN: 100 A
MOUNTING:
kAIC: 10



UTILITY PANEL UP-001

NOTES:

1. THE CONTRACTOR SHALL PROVIDE NAMEPLATES AND CIRCUIT SCHEDULES AS SHOWN.
2. REFERENCES:
   - FOR LVCC SINGLE LINE DIAGRAM, SEE SHEET E-6.
3. UTILITY PANEL UP-001 & 30 kVA TRANSFORMER LOCATED IN 480 LVCC.

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL UP-001 PANELBOARD SCHEDULE

NO SCALE

E-16

REVISED BY	DATE REVISED
HK	10/18/10

HOMAYUN KOCHEKALI
GURSHARNJEET CHEEMA
CALCULATED-DESIGNED BY
CHECKED BY
FUNCTIONAL SUPERVISOR
BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-16-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 15:17

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	19	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

PLANS APPROVAL DATE 4-11-11

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

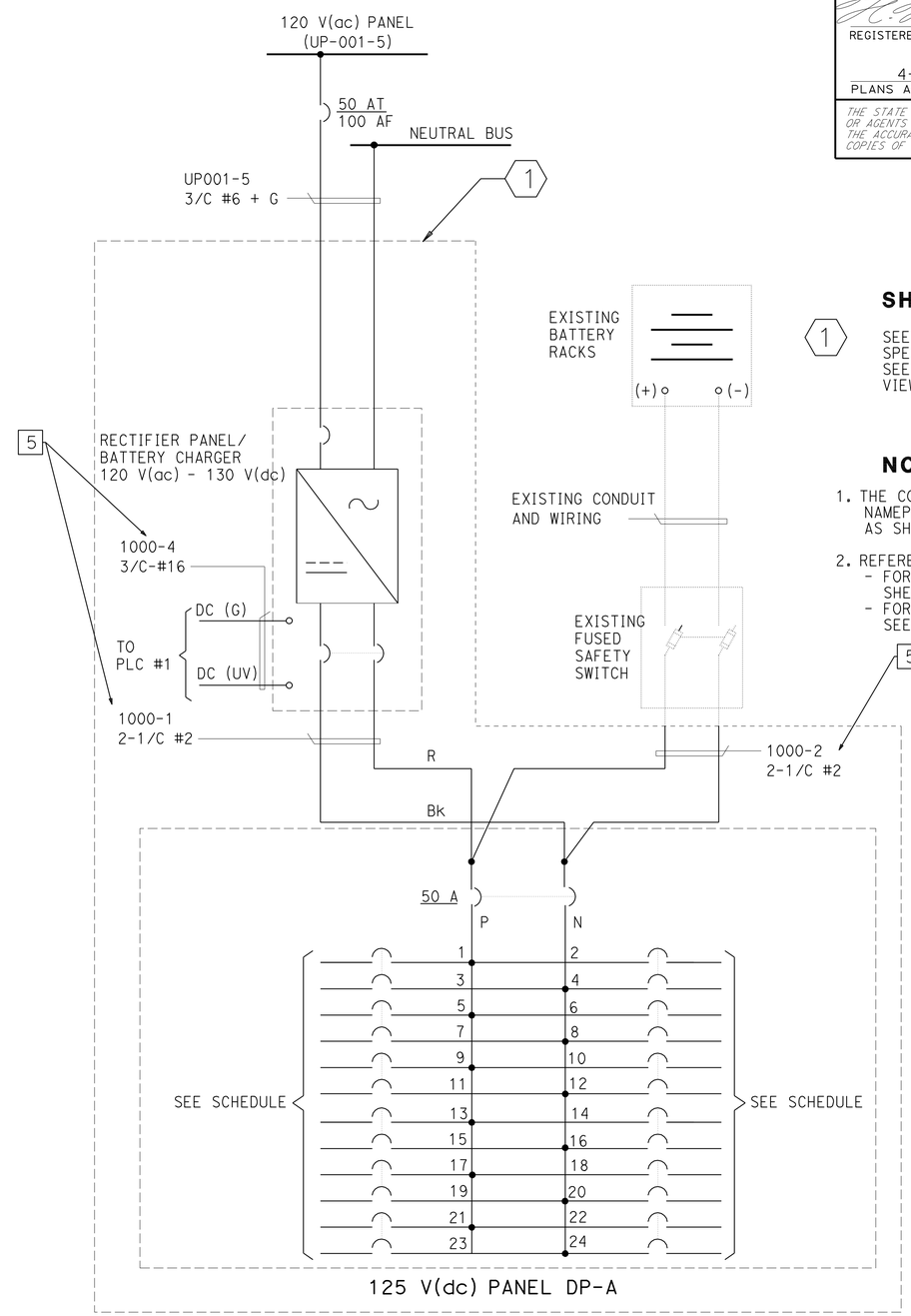
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

125 V(dc) PANEL DP-A

LOCATION: STERLING SUBSTATION

LOAD DESCRIPTION	TOTAL (WATTS) (+)	TOTAL (WATTS) (-)	CB		CB	TOTAL (WATTS) (+)	TOTAL (WATTS) (-)	
480 V Swgr BREAKERS (Swgr SECTION 1C) SEE E-5, E-15 - FOR BREAKER CONTROL	1000		20	1 P 2	20	1000		12.47 kV SWGR BREAKERS (SWGR SECTION 4B) SEE E-5, E-13 - FOR BREAKER CONTROL
	1000		2	3 N 4	2	1000		
480 V SWGR RELAYS (SWGR SECTION 1C) SEE E-5, E-15 - FOR MANAGEMENT RELAYS	15		20	5 P 6	20	15		12.47 kV SWGR RELAYS (SWGR SECTION 4B) SEE E-5, E-13 - FOR MANAGEMENT RELAYS
	15		2	7 N 8	2	15		
SPARE			20	9 P 10	20			SPARE
			2	11 N 12	2			
SPARE			20	13 P 14	20			SPARE
			2	15 N 16	2			
SPARE			20	17 P 18	20			SPARE
			2	19 N 20	2			
SPARE			20	21 P 22	20			SPARE
			2	23 N 24	2			
TOTAL WATTS	2030					2030		TOTAL WATTS

VOLTAGE: 125 V(dc)
PHASE/WIRES: 2-wire
BUS RATING: 100 A
MAIN: 50 A
MOUNTING: Surface
kAIC: 10 (DC Rated)



SHEET NOTE:

1 SEE ELECTRICAL SPECIAL PROVISIONS FOR SPECIFICATIONS AND REQUIREMENTS. SEE SHEET E-21, SECTION B-B FOR ELEVATION VIEW.

NOTES:

1. THE CONTRACTOR SHALL PROVIDE NAMEPLATES AND CIRCUIT SCHEDULES AS SHOWN.
2. REFERENCES:
   - FOR PANEL UP-001 SCHEDULE, SEE SHEET E-16.
   - FOR CONNECTION DIAGRAM TO PLC #1, SEE SHEETS E-19 AND E-20.

ELECTRICAL DETAILS

STERLING SUBSTATION ELECTRICAL PANEL DP-A SCHEDULE

NO SCALE

E-17

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-16-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 15:17

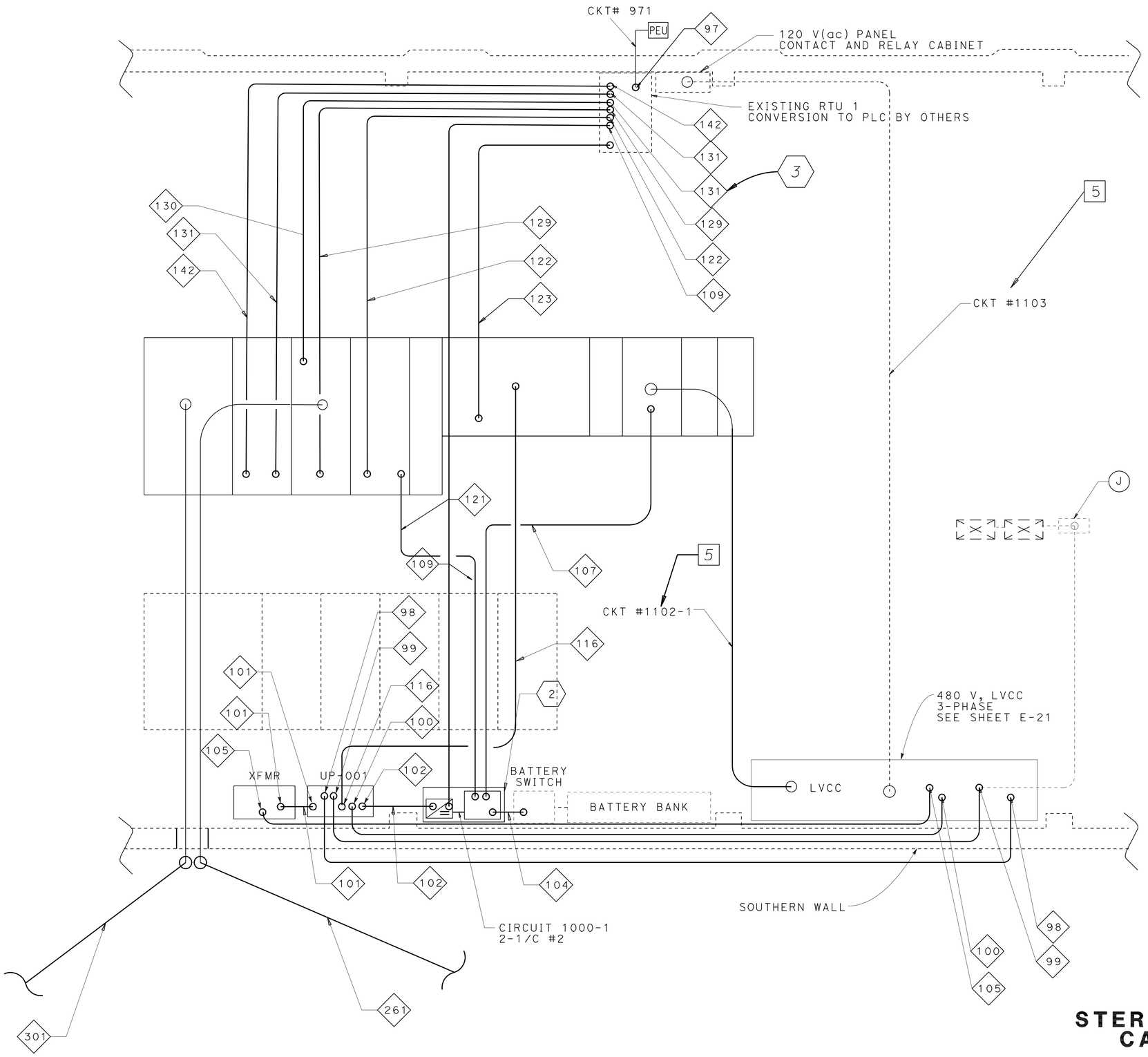
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	20	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



1. CIRCUITS # 1102-1, #1001-1, #1003-1 LAY ON CABLE TRAYS NOT SHOWN HERE FOR CLARITY. CABLE TRAYS ARE SHOWN ON SHEET E-7.
2. INSTALL A WALL MOUNTED CABINET TO HOUSE BOTH DP-A PANEL AND THE INVERTER SEE SHEET E-17 FOR DETAILS.
3. SEE SHEET E-27 FOR CONDUIT SCHEDULE AND CONDUCTORS

STERLING SUBSTATION ELECTRICAL CABLE TRAYS AND CONDUITS

NO SCALE

E-18

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI

CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA

REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-17-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 12:36

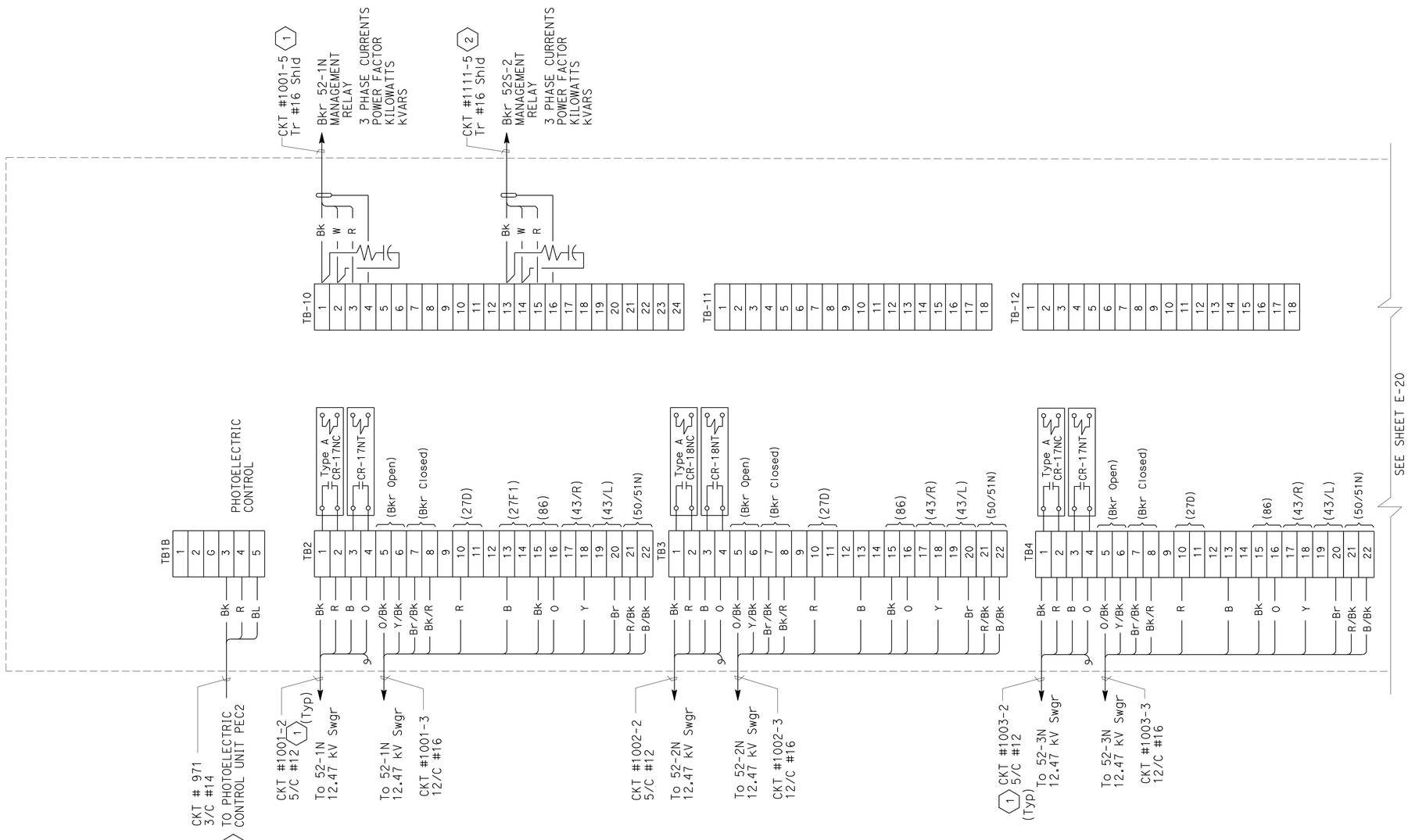
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	21	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



SHEET NOTES:

1. FOR CONNECTION DIAGRAM TO 12.47 kV SWITCHGEAR, SEE SHEET E-12 & E-13.
2. FOR CONNECTION DIAGRAM TO 480 V SWITCHGEAR, SEE SHEET E-14.
3. FOR LIGHTING CONTROL, SEE E-25

NOTES:

1. ALL SPARE CONDUCTORS SHALL BE COILED AND TAPED AT CONDUCTOR ENDS UNLESS TERMINATED.
2. TERMINATE CABLE SHIELDS TO ISOLATED GROUND BUS (LOW LEVEL SIGNAL).
3. REFERENCES:
   - FOR CIRCUIT AND CONDUIT/CABLE TRAY SCHEDULES, SEE SHEETS STARTING AT E-27.
   - FOR UP-001 PANEL SCHEDULE, SEE SHEET E-16.

ELECTRICAL DETAILS

SCADA REMOTE TERMINAL UNIT SYSTEM
PLC #1 ELEMENTARY AND CONNECTION DIAGRAM

NO SCALE

E-19

CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI	REVISED BY	HK
CHECKED BY	GURSHARNJEET CHEEMA	DATE REVISED	10/18/10
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-17-10 | DATE PLOTTED => 12-APR-2011 | TIME PLOTTED => 14:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	22	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

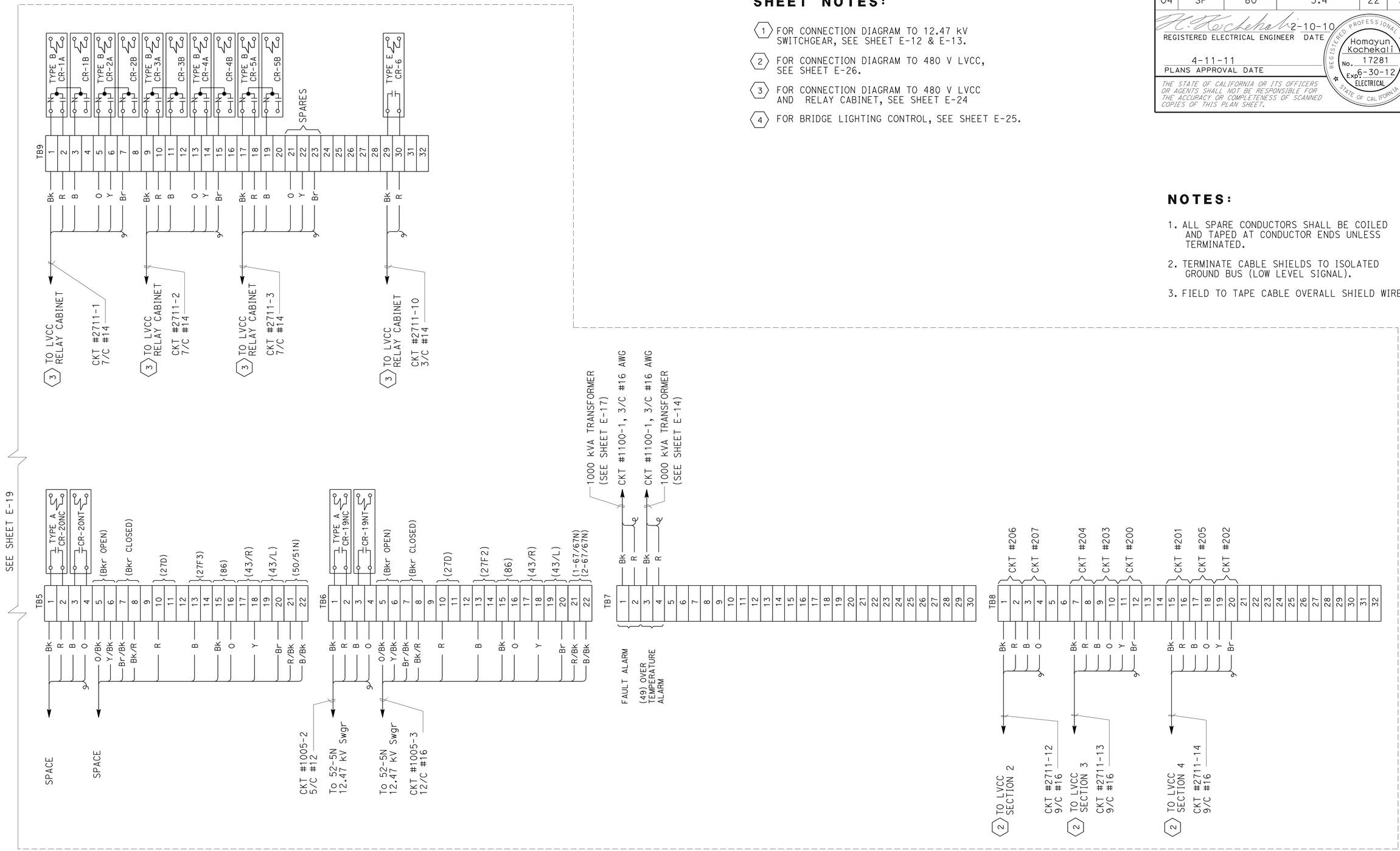
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

SHEET NOTES:

1. FOR CONNECTION DIAGRAM TO 12.47 kV SWITCHGEAR, SEE SHEET E-12 & E-13.
2. FOR CONNECTION DIAGRAM TO 480 V LVCC, SEE SHEET E-26.
3. FOR CONNECTION DIAGRAM TO 480 V LVCC AND RELAY CABINET, SEE SHEET E-24
4. FOR BRIDGE LIGHTING CONTROL, SEE SHEET E-25.

NOTES:

1. ALL SPARE CONDUCTORS SHALL BE COILED AND TAPED AT CONDUCTOR ENDS UNLESS TERMINATED.
2. TERMINATE CABLE SHIELDS TO ISOLATED GROUND BUS (LOW LEVEL SIGNAL).
3. FIELD TO TAPE CABLE OVERALL SHIELD WIRE.



ELECTRICAL DETAILS
SCADA REMOTE TERMINAL UNIT SYSTEM
PLC #1 ELEMENTARY AND CONNECTION DIAGRAM

NO SCALE

E-20

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION: 10-20-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 14:35

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	23	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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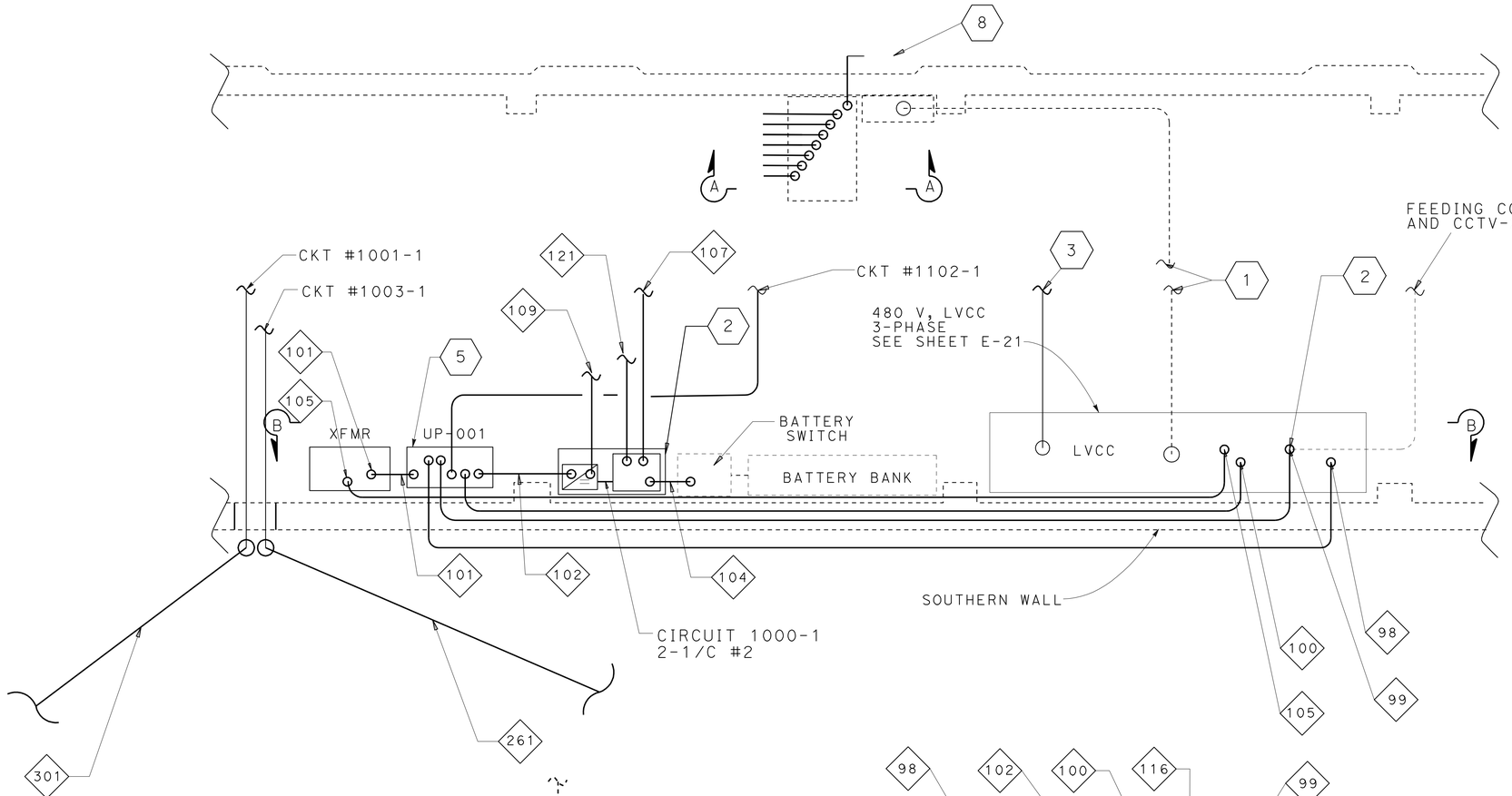
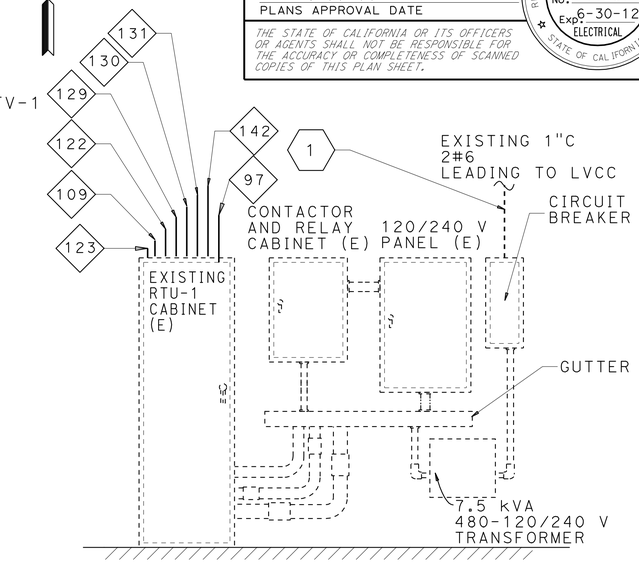
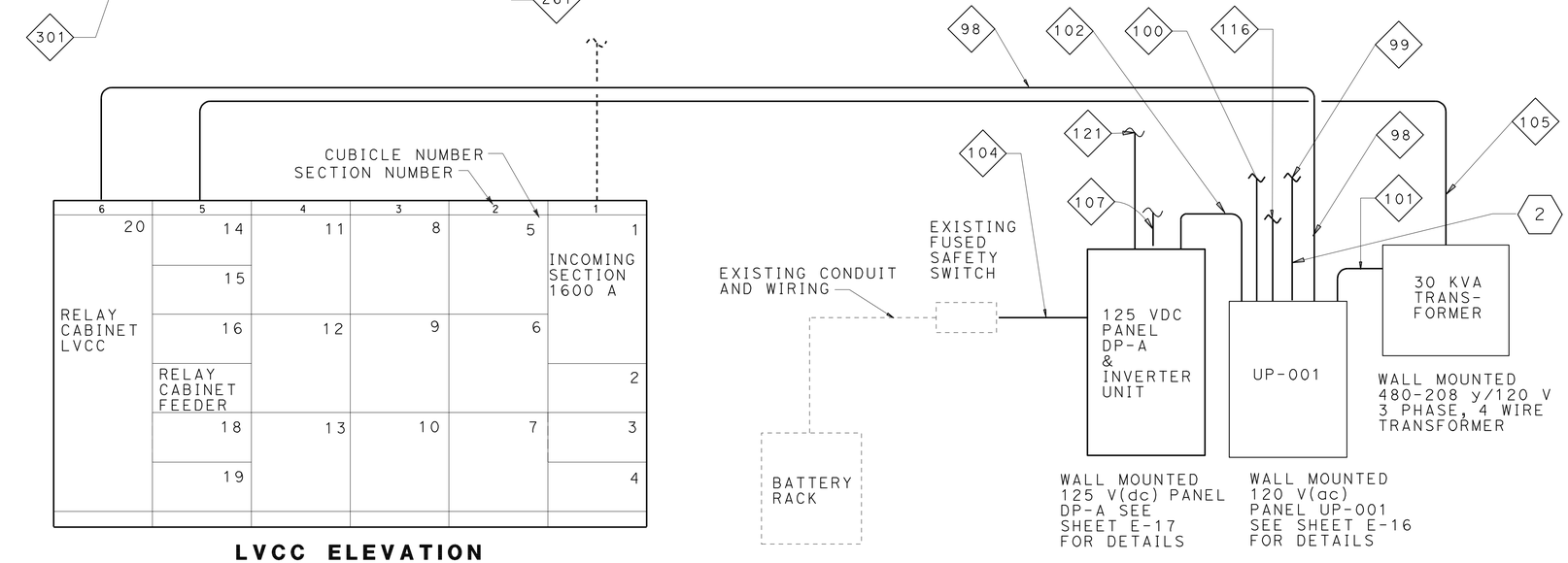




SECTION A-A
VIEWING NORTH WALL



LVCC ELEVATION

SECTION B-B
VIEWING SOUTH WALL

NOTES: (THIS SHEET ONLY)

1. THE CONTRACTOR SHALL USE EXISTING CONDUIT AND WIRING FROM NEW LVCC, SECTION 1,CELL 4, TO PROVIDE POWER TO EXISTING 7.5 kVA 480-120/240 V TRANSFORMER. SEE SECTION A-A
2. THE CONTRACTOR SHALL INTERCEPT EXISTING CONDUIT AND WIRING FEEDING THE TWO CCTVS FROM EXISTING LVCC, SECTION 7,CELL 23, THEN SPLICE A NEW CIRCUIT AND RUN A NEW CONDUIT #99 FROM THE NEW THE NEW DP-001, AT C6 AND A8 (SEE E-16) TO PROVIDE POWER TO EXISTING CCTV 1 AND 2 RESPECTIVELY. SEE SHEET E-18.
3. CKT #1102 LAYING OVER A CABLE TRAY, SEE SHEETS E-7 AND E-28.
4. PEC IS LOCATED OUTDOOR, MOUNTED ON THE ROOF AT THE NORTHERN EDGE.
5. SEE DETAILS OF UP-001 ON SHEET E-16.

STERLING SUBSTATION ELECTRICAL SCADA PLC #1

NO SCALE

E-21

REVISED BY	DATE REVISED
HK	10/18/10

HOMAYUN KOCHEKALI
GURSHARNJEET CHEEMA
CALCULATED-DESIGNED BY
CHECKED BY
FUNCTIONAL SUPERVISOR
BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 10-20-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 13:12

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	24	35

H. Kochekali 2-10-10
REGISTERED ELECTRICAL ENGINEER DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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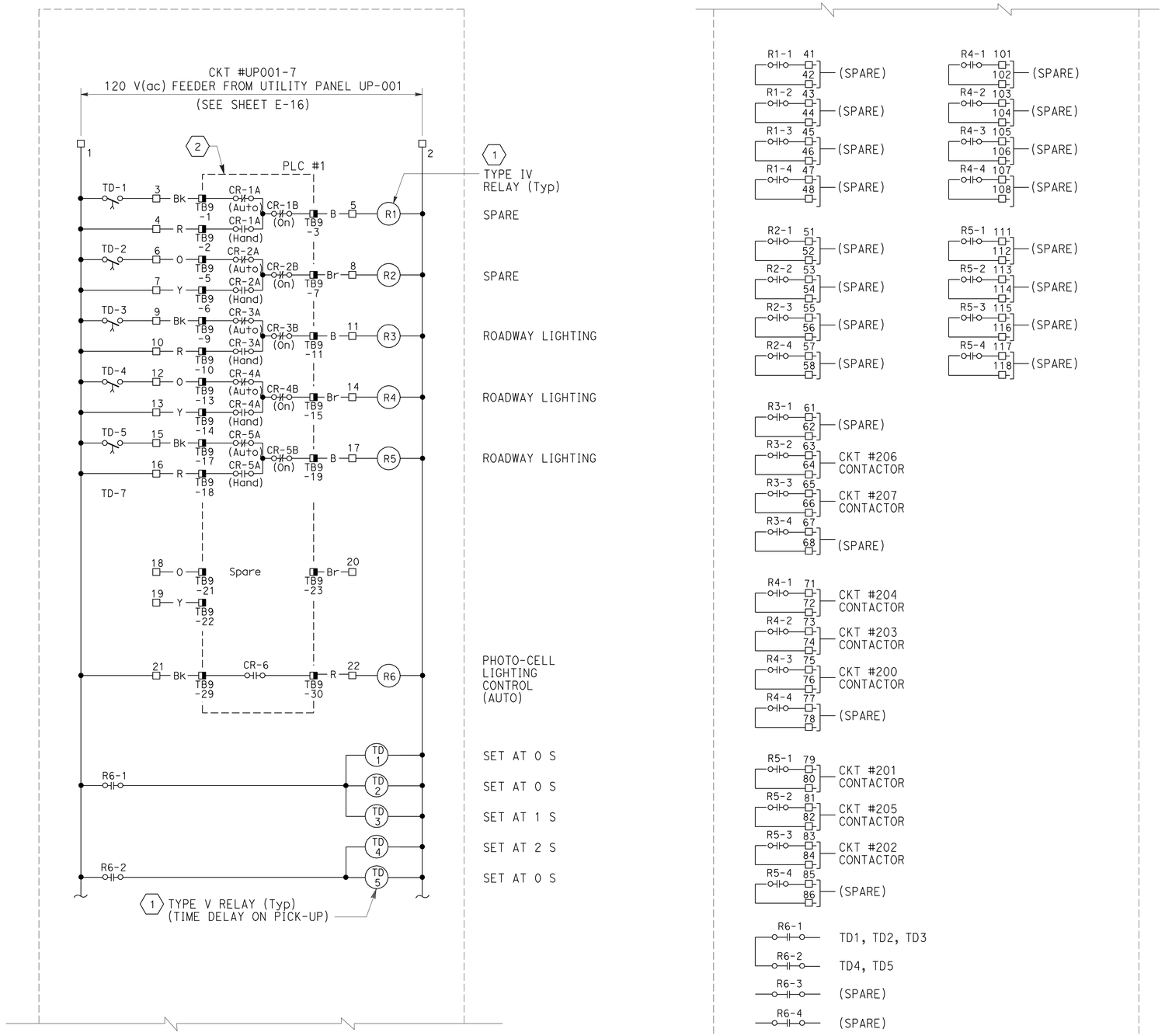

SHEET NOTES:

(1) FOR MATERIAL LIST AND CIRCUIT NUMBERS, SEE SHEET E-25.

(2) FOR SCADA PLC #1 CONNECTION DIAGRAM, SEE SHEET E-26.

NOTE:

1. REFERENCES:
   - FOR 480 V TYPICAL ELEMENTARY DIAGRAM, SEE SHEET E-23.
   - FOR LVCC SINGLE LINE DIAGRAM, AND LVCC ELEVATION AND SCHEDULE, SEE SHEET E-6.
   - FOR LVCC RELAY CABINET ARRANGEMENT AND CONNECTION DIAGRAM, SEE SHEET E-24 AND E-26.

LVCC RELAY CABINET

DETAILS
STERLING SUBSTATION ELECTRICAL
LVCC RELAY CABINET ELEMENTARY DIAGRAM

NO SCALE

E-22

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION DATE PLOTTED => 12-APR-2011
02-17-10 TIME PLOTTED => 14:36

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	25	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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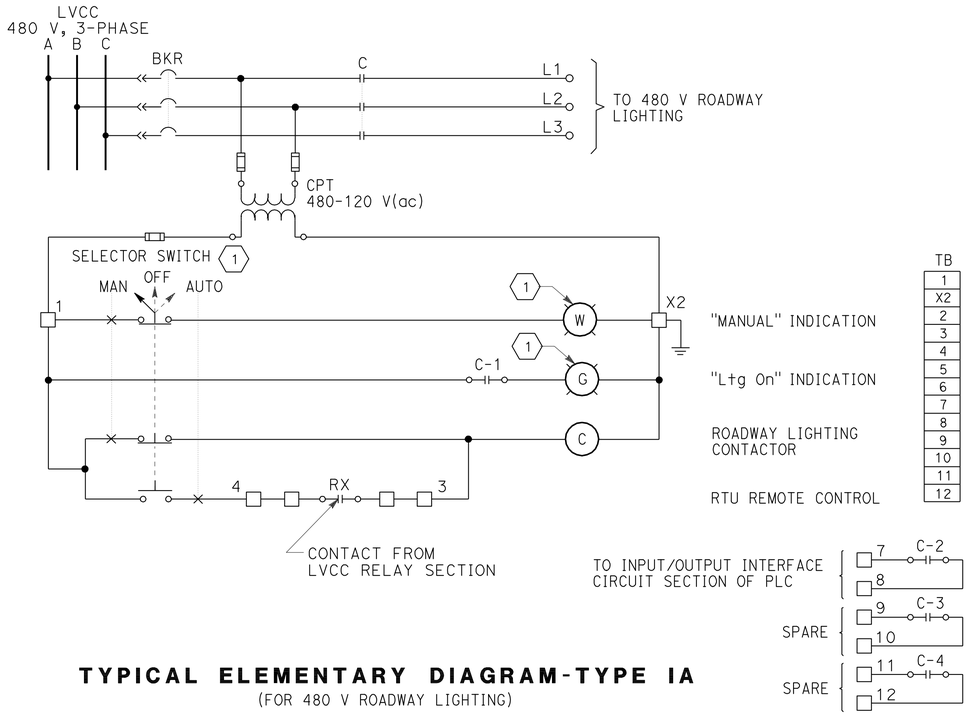

TYPICAL ELEMENTARY DIAGRAM-TYPE IA
(FOR 480 V ROADWAY LIGHTING)

SHEET NOTE:

(1) SELECTOR SWITCH AND INDICATION LIGHTS SHALL BE LOCATED ON THE FACE OF THE LVCC CUBICLE DOOR PANEL.

NOTE:

1. REFERENCES:
   - FOR PLC TERMINATIONS, SEE SCADA SYSTEM CONNECTION DIAGRAMS, SHEETS E-19, E-20.
   - FOR 480 V LVCC ELEVATIONS AND SCHEDULES, SEE SHEETS E-6.
   - FOR LVCC RELAY CABINET CONNECTION DIAGRAMS, SEE SHEETS E-24.

DETAILS
STERLING SUBSTATION ELECTRICAL
480 V TYPICAL LVCC ELEMENTARY DIAGRAM

NO SCALE

E-23

HK	10/18/10
REVISED BY	DATE REVISED
HOMAYUN KOCHEKALI	GURSHARNJEET CHEEMA
CALCULATED-DESIGNED BY	CHECKED BY
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-17-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 14:44

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	26	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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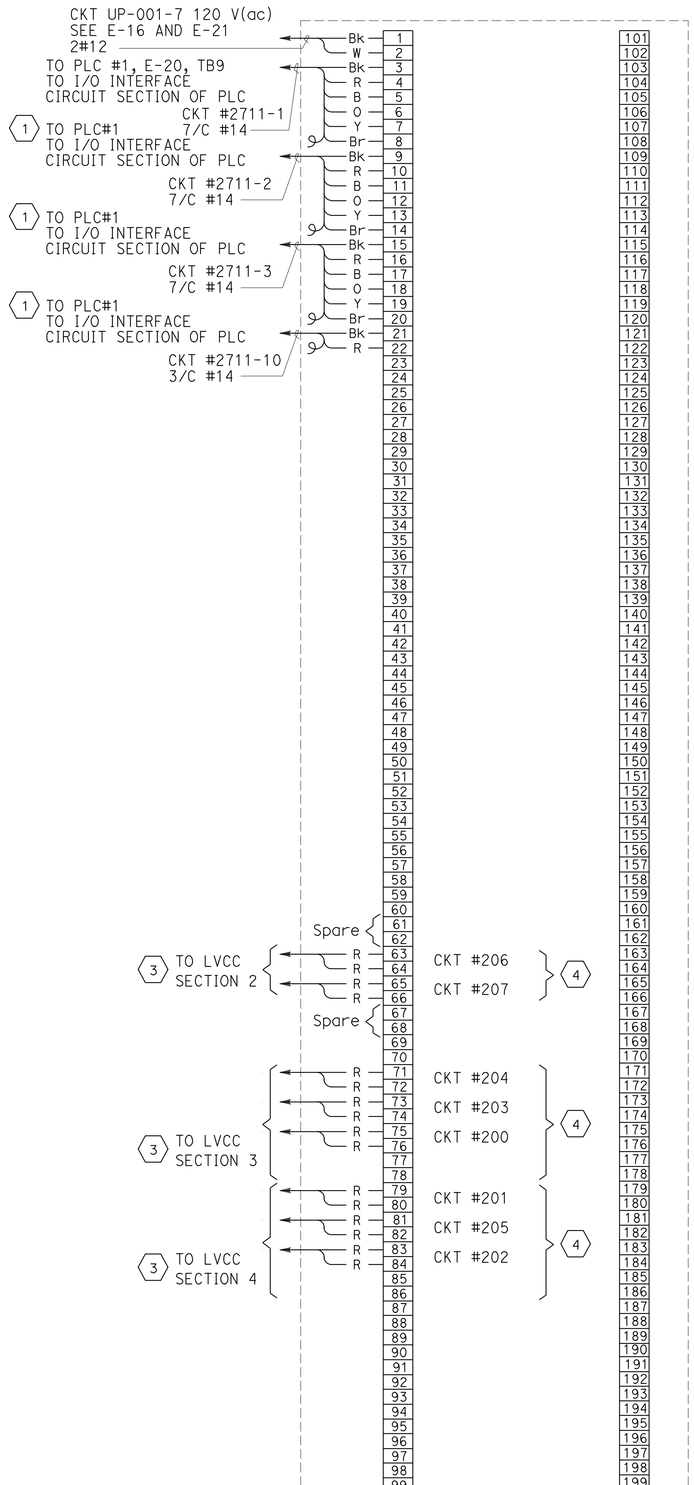
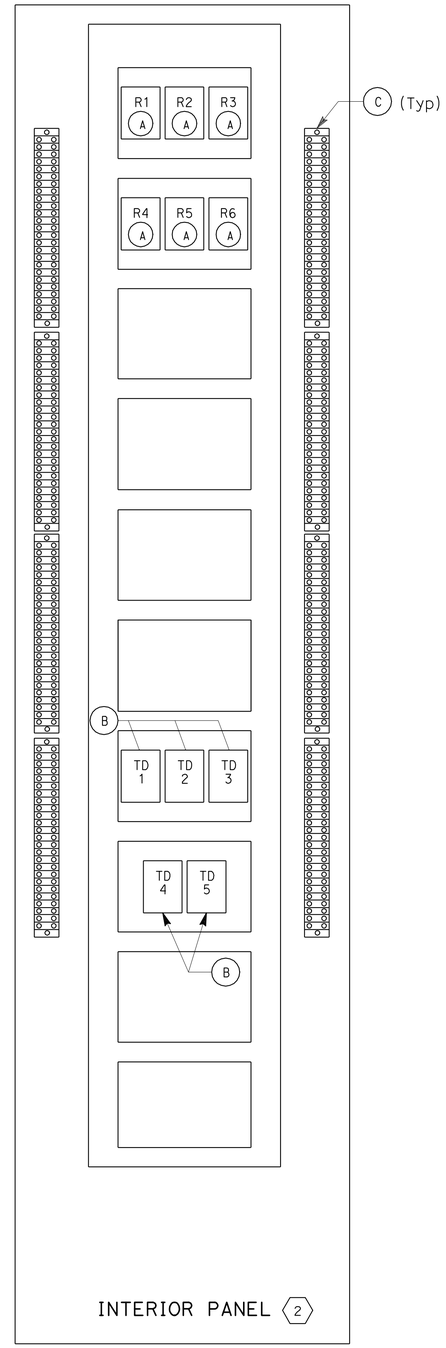


LVCC RELAY CABINET TERMINALS CONNECTION DIAGRAM



LVCC RELAY CABINET ARRANGEMENT

SHEET NOTES:

1. FOR CONNECTION DIAGRAM TO PLC #1, SEE SHEET E-20, TB-9.
2. INTERIOR PANEL IS MOUNTED INSIDE LVCC RELAY CABINET AS PART OF THE 480 V LVCC LINE UP.
3. FOR CONTINUATION, SEE SHEET E-20, TB8.
4. FOR RELAY CABINET ELEMENTARY, SEE SHEETS E-24 AND E-26.

NOTES:

1. EACH SPARE CONDUCTORS SHALL BE COILED AND TAPED AT CONDUCTOR ENDS UNLESS TERMINATED.
2. REFERENCES:
   - FOR TYPICAL 480 V ELEMENTARY DIAGRAM, SEE SHEETS E-23.
   - FOR LVCC-B ELEVATION AND SCHEDULES, SEE SHEET E-6.
   - FOR CONDUIT/CABLE TRAY SCHEDULES, SEE SHEETS STARTING AT E-28.
   - FOR LVCC CONNECTION DIAGRAM, SEE SHEET E-26.

MATERIAL LIST

ITEM	DESCRIPTION	QUANTITY
A	RELAY, GENERAL PURPOSE, 120 V(ac) COIL, (2.0 VOLT-AMPERES) 4PDT, CONTACT RATING: 10 A (TYPE IV RELAY)	6
B	RELAY, TIMING (ON DELAY), 120 V(ac) COIL, Adj RANGE: 0.5-30 S 2PDT, 10 A CONTACTS (TYPE V RELAY)	5
C	TERMINAL BLOCKS, RATED 600 V, 20 A BARRIER TYPE WITH SCREW TERMINALS	200 POINTS

DETAILS
STERLING SUBSTATION ELECTRICAL
LVCC RELAY CABINET ARRANGEMENT AND CONNECTION DIAGRAM

NO SCALE

E-24

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans® ELECTRICAL

FUNCTIONAL SUPERVISOR: BEHZAD GOLEMOHAMMADI
CALCULATED-DESIGNED BY: HOMAYUN KOCHEKALI
CHECKED BY: GURSHARNJEET CHEEMA
REVISED BY: HK
DATE REVISED: 10/18/10

LAST REVISION 02-17-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 14:44

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	27	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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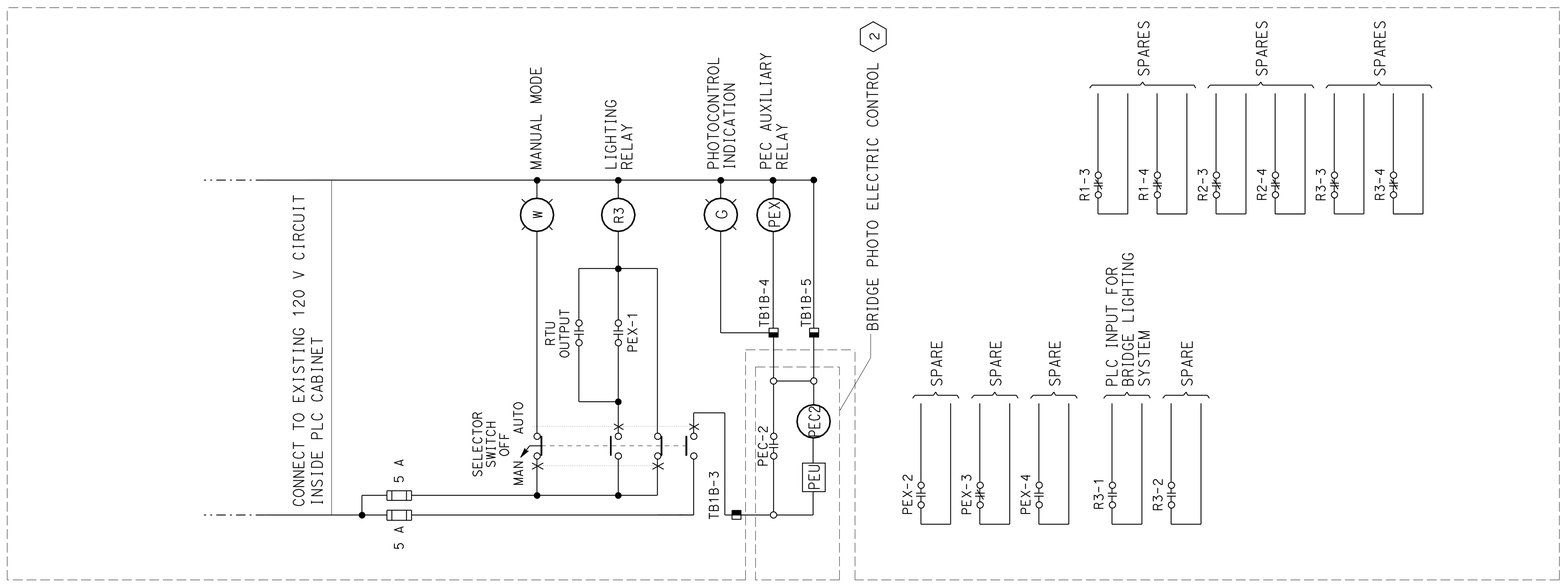

ELEMENTARY DIAGRAM - PLC#1

NOTES:

1. ALL SPARE CONDUCTORS SHALL BE COILED AND TAPED AT CONDUCTOR ENDS UNLESS TERMINATED.
2. TERMINATE CABLE SHIELDS TO LOW LEVEL GROUND BUS.

DETAILS
SCADA REMOTE TERMINAL UNIT SYSTEM
PLC#1 ELEMENTARY AND CONNECTION DIAGRAM

NO SCALE

E-25

CALCULATED-DESIGNED BY	HOMAYUN KOCHEKALI	REVISED BY	HK
CHECKED BY	GURSHARNJEET CHEEMA	DATE REVISED	10/18/10
FUNCTIONAL SUPERVISOR	BEHZAD GOLEMOHAMMADI		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-17-10 | DATE PLOTTED => 13-APR-2011 TIME PLOTTED => 07:50

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	28	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

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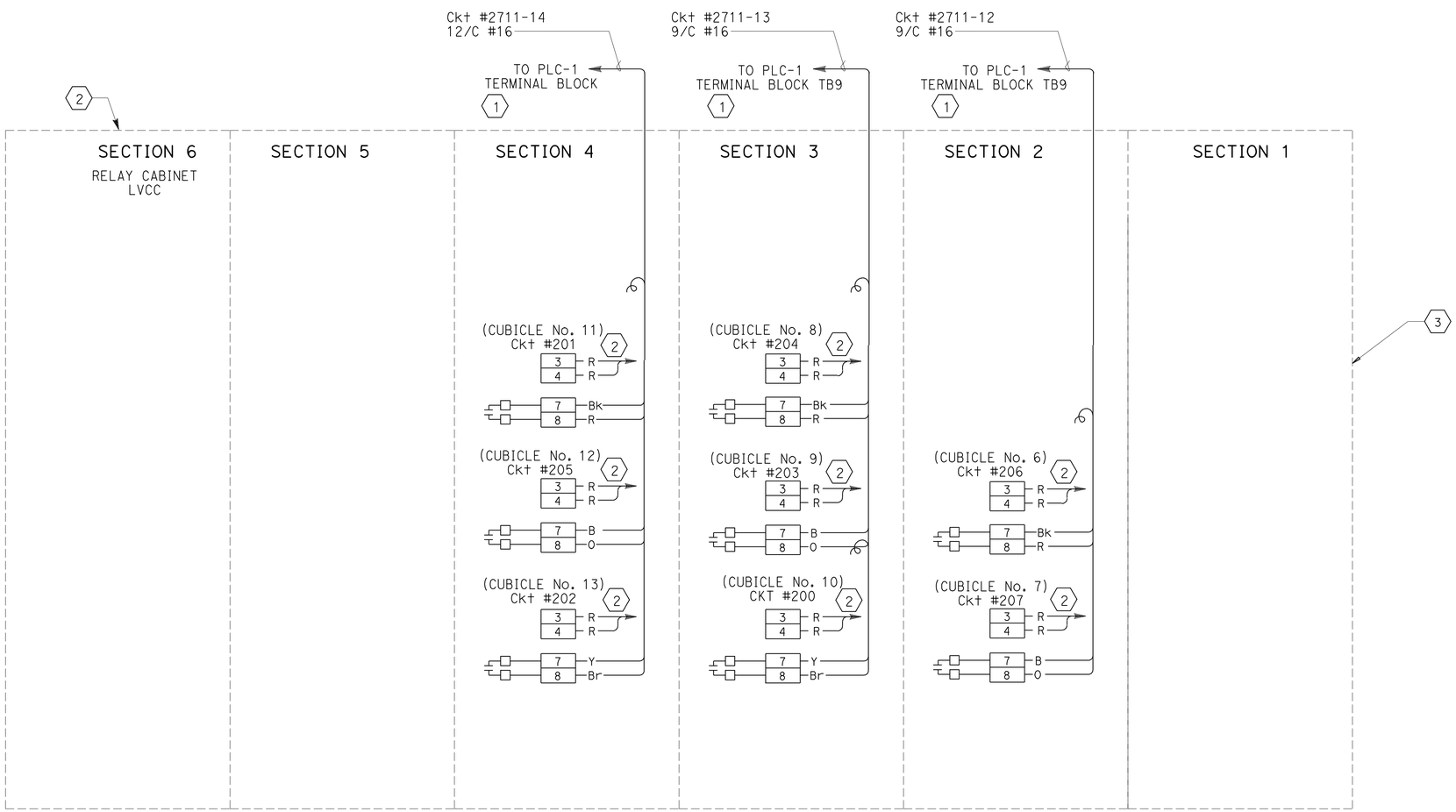

LVCC TO PLC-1 CONNECTION DIAGRAM

SHEET NOTES:

1. FOR CONNECTION TO PLC#1, SEE SHEET E-20, TB8 AND TB9.
2. FOR CONNECTION DIAGRAM OF LVCC RELAY CABINET, SEE SHEET E-24.
3. FOR LVCC ELEVATION AND SCHEDULES, SEE SHEET E-6.

NOTES:

1. EACH SPARE CONDUCTOR SHALL BE COILED AND TAPED AT CONDUCTOR ENDS UNLESS TERMINATED.
2. REFERENCES:
   - FOR LVCC SINGLE LINE DIAGRAM, SEE SHEET E-6.
   - FOR CONDUIT/CABLE TRAY SCHEDULE, SEE SHEETS STARTING AT E-28.
   - FOR LVCC RELAY CABINET ELEMENTARY DIAGRAM, SEE SHEET E-22.

DETAILS
STERLING SUBSTATION ELECTRICAL
LVCC CONNECTION DIAGRAM
NO SCALE

E-26

HOMAYUN KOCHEKALI	HK
REVISED BY	10/18/10
DATE REVISED	
GURSHARNJEET CHEEMA	
CALCULATED-DESIGNED BY	
CHECKED BY	
FUNCTIONAL SUPERVISOR	
BEHZAD GOLEMOHAMMADI	

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL

LAST REVISION 02-17-10
DATE PLOTTED => 12-APR-2011
TIME PLOTTED => 15:07

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	5.4	29	35

REGISTERED ELECTRICAL ENGINEER 2-10-10 DATE

4-11-11
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Homayun Kochekali No. 17281 Exp. 6-30-12 ELECTRICAL STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

CONDUIT AND TRAY SCHEDULE

CONDUIT No.	REFERENCE	SIZE	TOTAL FILL in²	ALLOWABLE FILL in²	CABLE AREA in²	CABLE #	CONDUCTOR	COMMENTS
97	E-18	1	0.1	0.29	0.1	971	1-3/c #14, 600 V	FROM PHOTOCELL MOUNTED ON THE ROOF TO PLC, TB 1B, SEE E-18
98	E-18	1	0.1	0.29	0.1	UP001-7	1-2/c #12, 600 V	120 V FEEDER TO RELAY CABINET LVCC
99	E-18	1	0.1	0.29	0.1	UP001-6/8	2-2/c, + gnd #12, 600V	FEEDING CCTV1-2
100	E-18	1	0.1	0.29	0.1	UP001-1	1-3/c + gnd #12, 600 V	FEEDING 480 V LVCC SPACE HEATER
101	E-18, E-16	1.5	0.43	1.1	0.43	xxxx	3-1/c #1 + gnd #6, 600 V	SUPPLYING POWER TO UP001 (A/C DISTRIBUTION PANEL) FROM 30 kVA TRANSFORMER
102	E-18,E-17	1.5	0.43	1.1	0.43	UP001-5	1-3/c + gnd #6, 600 V	SUPPLYING POWER TO DC PANEL DP-A
CABINET	E-18, E7				0.32	1000-1	1-2/c #2, 600 V, RHH/RHW INSULATION	CONNECTING THE DP-A TO INVERTER LOCATED INSIDE CABINET, SEE SHEET E-17
104	E-18, E-17	1.5	0.32	0.64	0.32	1000-2	1-2/c #2, 600 V, RHH/RHW INSULATION	DP-A TO EXISTING BATTERY SWITCH
105	E-18, E-16	1.5				1000-3	1-3/c #6, 600 V	3-PHASE TRANSFORMER
107	E-18	1.5				DPA-1/3	1-2/c #10, 600V	480 V SWITCHGEAR BREAKERS SECTION 1C-FOR BREAKER CONTROL
						DPA-5/7	1-2/c #10, 600V	480 V SWITCHGEAR RELAYS AND SSSP MANAGEMENT
109	E-16	1	0.1	0.29	0.1	1000-4	1-3/c #16, 600 V	CONNECTING DC OUTPUT FROM THE INVERTER TO PLC#1
116	E-18	1.5	0.4	0.64	0.2	UP001-2/4	1-2/c + gnd #10, 600 V	FEEDING TRANSFORMER COOLING FANS
					0.2	UP001-3	1-2/c + gnd #10, 600 V	FEEDING UNIT SUBSTATION HEATER
121	E-18	1.5	0.34	0.64	0.17	DPA-2/4	1-2/c #10, 600V	15 kV SWITCHGEAR BREAKERS SECTION 4B-FOR BREAKER CONTROL
					0.17	DPA-6/8	1-2/c #10, 600V	15 kV SWITCHGEAR RELAYS AND SSSP MANAGEMENT
122	E-18	1.5	0.51	0.64	0.22	1005-2	1-5c #12, 600 V	CONNECTING BREAKER 5N-SECTION 4B TO PLC, SEE E-13 AND E-20 TB-6
					0.29	1005-3	1-12/c #16, 600 V	
123	E-18	0.75	0.1	0.29	0.1	1100-1	1-3/c #16, 600 V	CONNECTION 1000 kVA TRANSFORMER, SEE E-14, TO PLC, SEE E-20, TB-7
129	E-18	1.5	0.51	0.64	0.22	1003-2	1-5/c #12, 600 V	CONNECTING BREAKER 3N-SECTION 3B, SEE E-12, TO PLC, SEE E-20, TB-4
					0.29	1003-3	1-12/c #16, 600 V	
130	E-18	1.5	0.51	0.64	0.22	1002-2	1-5/c #12, 600 V	CONNECTING BREAKER 2N-SECTION2B, SEE E-12, TO PLC, SEE E-19, TB-3
					0.29	1002-3	1-12/c #16, 600 V	
131	E-18	1.5	0.51	0.64	0.22	1001-2	1-5c #12, 600 V	CONNECTING BREAKER 1N-SECTION 1B, SEE E-12, TO PLC, SEE E-19, TB-2
					0.29	1001-3	1-12/c #16, 600 V	
142		1	0.1	0.29	0.1	1001-5	3-1/c #16 WITH OVERALL SHIELD, 600 V, PVC JACKET	CONNECTING BREAKER 1N-SECTION 1B, SEE E-12, TO PLC, SEE E-19, TB-10
261	E-18, E-7	4	4	5.1	4	1003-1	3-1/c #4/0, 15 kV, EPR INSULATION	FEEDER FROM BREAKER 3N TO PIER W4 SUBSTATION
301	E-18, E-7	4	5.64	8.08	5.64	1001-1	3-1/c #350 KCMIL, 15 kV, EPR INSULATION	PG&E MAIN FEEDER FROM INCOMING VAULT
CABLE TRAY	E-18, E-7					1102-1	3 + 1 gnd, 350 kcmil, #1/0, 600 V, RHH/RHW	LAYING OVER CABLE TRAY, FEEDER TO LVCC
"EXISTING CONDUIT"	E-18, E-7					1103	3-1/c #12, 600 V, RHH/RHW	"INSTALL CIRCUIT 1103 IN THE EXISTING CONDUIT RUNNING FROM NEW LVCC, SECTION 1, CELL 4 TO PROVIDE POWER TO EXISTING 7.5 kVA, 480-120/240 V TRANSFORMER. SEE E-21, SECTION AA.

REVISED BY HK
DATE REVISED 10/18/10
HOMAYUN KOCHEKALI
GURSHARNJEET CHEEMA
CALCULATED-DESIGNED BY
CHECKED BY
FUNCTIONAL SUPERVISOR BEHZAD GOLEMOHAMMADI
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
ELECTRICAL
LAST REVISION 02-17-10
DATE PLOTTED => 13-APR-2011
TIME PLOTTED => 13:12
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UNIT 0700
PROJECT NUMBER & PHASE 04000200001

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	30	35

Randell D. Hiatt
REGISTERED CIVIL ENGINEER

June 6, 2008
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Randell D. Hiatt
No. C50200
Exp. 6-30-09
CIVIL
STATE OF CALIFORNIA

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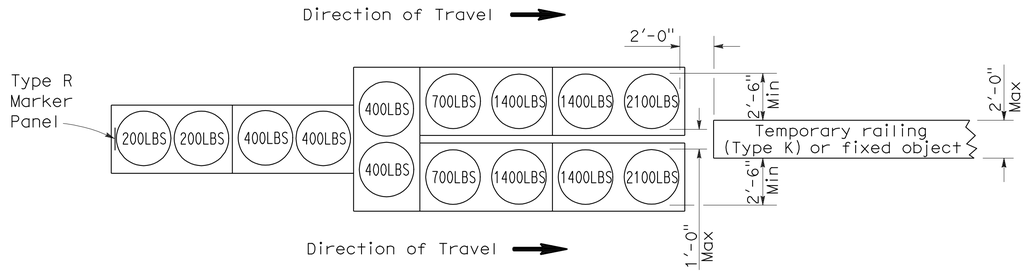
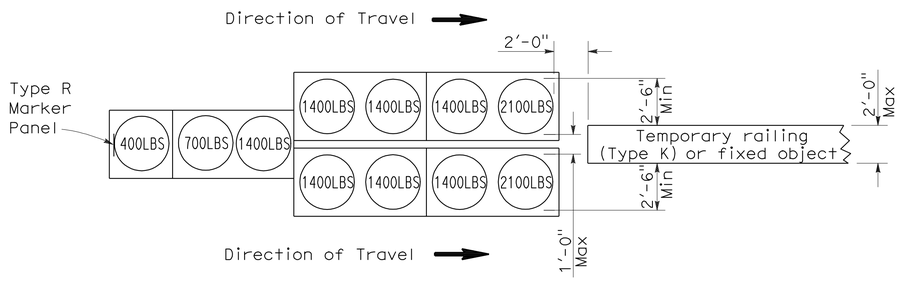
To accompany plans dated 4-11-11



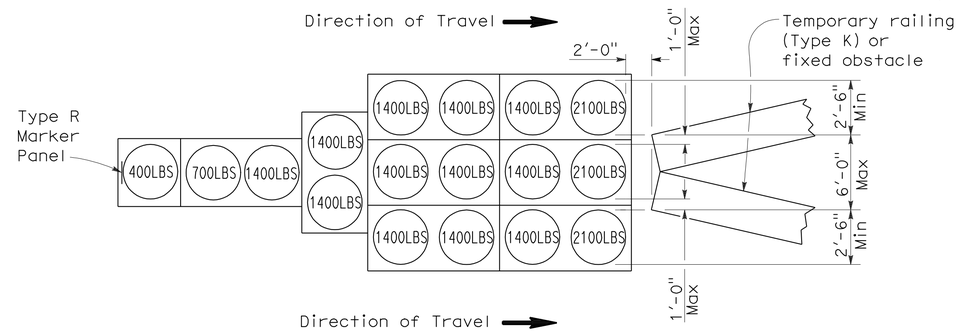
ARRAY 'TU14'

Approach speed 45 mph or more



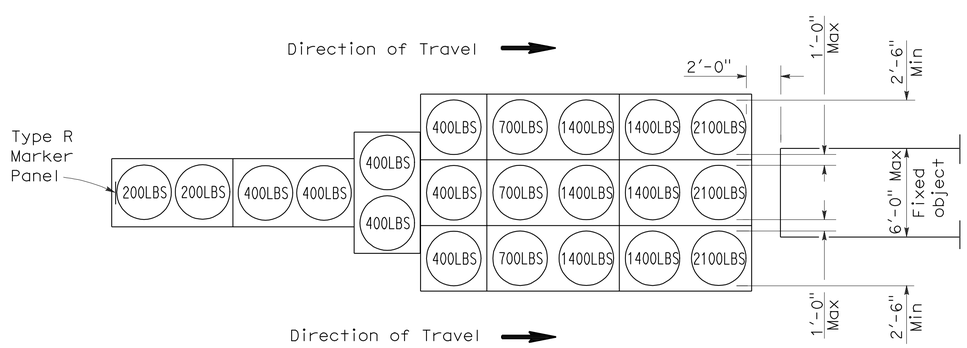
ARRAY 'TU11'

Approach speed less than 45 mph



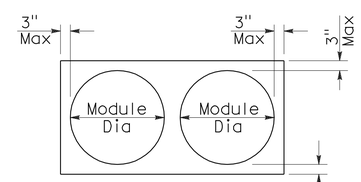
ARRAY 'TU17'

Approach speed less than 45 mph

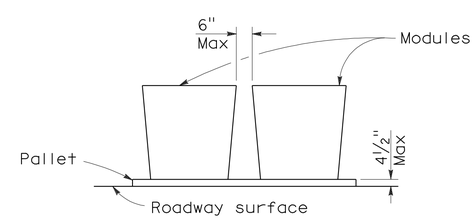


ARRAY 'TU21'

Approach speed 45 mph or more



PLAN



ELEVATION

CRASH CUSHION PALLET DETAIL

See Note 7

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. Temporary crash cushion arrays shall not encroach on the traveled way.
4. Place the top of Type R marker panel 1" below the module lid.
5. Refer to Standard Plan A73B for marker details.
6. Approach speeds indicated conform to NCHRP 350 Report criteria.
7. Use of pallets is optional.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION, SAND FILLED (UNIDIRECTIONAL)

NO SCALE

RSP T1A DATED JUNE 6, 2008 SUPERSEDES STANDARD PLAN T1A
DATED MAY 1, 2006 - PAGE 211 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP T1A

2006 REVISED STANDARD PLAN RSP T1A

5-15-08

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	31	35

Randell D. Hiatt
REGISTERED CIVIL ENGINEER

June 6, 2008
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Randell D. Hiatt
No. C50200
Exp. 6-30-09
CIVIL
STATE OF CALIFORNIA

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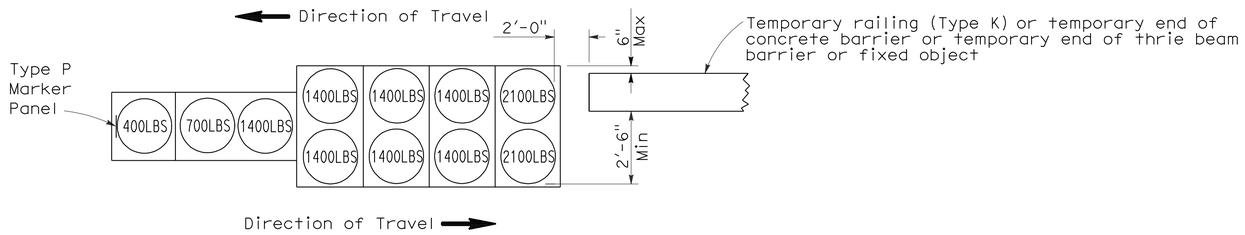
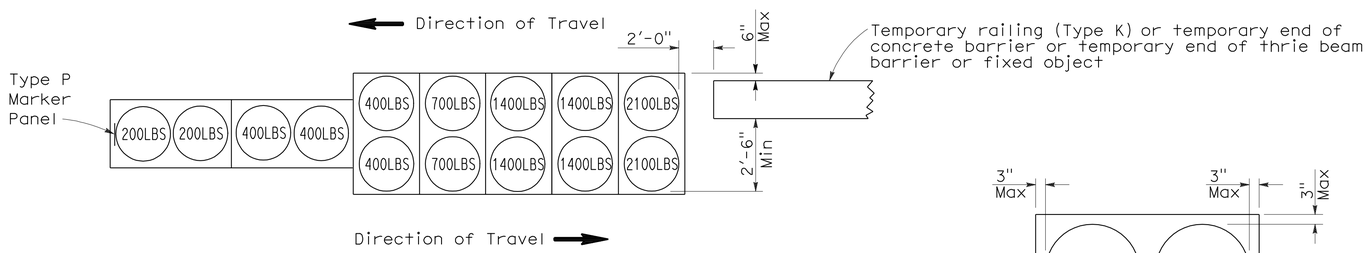
To accompany plans dated 4-11-11



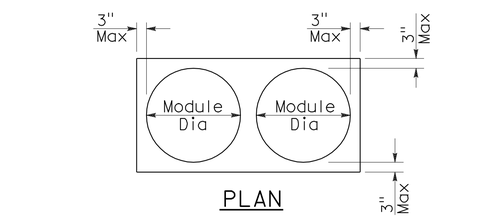
ARRAY 'TB11'

Approach speed less than 45 mph

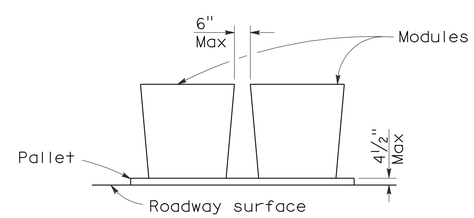


ARRAY 'TB14'

Approach speed 45 mph or more



PLAN



ELEVATION

CRASH CUSHION PALLET DETAIL

See Note 7

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. Temporary crash cushion arrays shall not encroach on the traveled way.
4. Place the Type P marker panel so that the bottom of the panel rests upon the pallet.
5. Refer to Standard Plan A73B for marker details.
6. Approach speeds indicated conform to NCHRP 350 Report criteria.
7. Use of pallets is optional.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION, SAND FILLED (BIDIRECTIONAL)

NO SCALE

RSP T1B DATED JUNE 6, 2008 SUPERSEDES STANDARD PLAN T1B
DATED MAY 1, 2006 - PAGE 212 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP T1B

2006 REVISED STANDARD PLAN RSP T1B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	32	35

Randell D. Hiatt
REGISTERED CIVIL ENGINEER

June 6, 2008
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Randell D. Hiatt
No. C50200
Exp. 6-30-09
CIVIL
STATE OF CALIFORNIA

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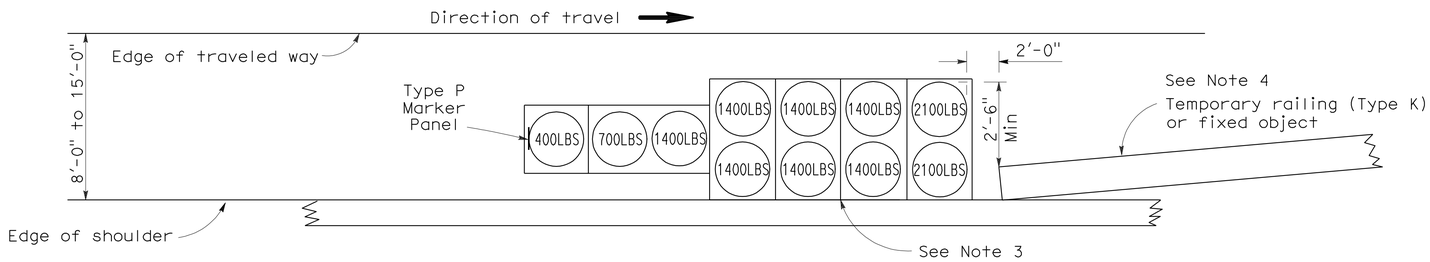
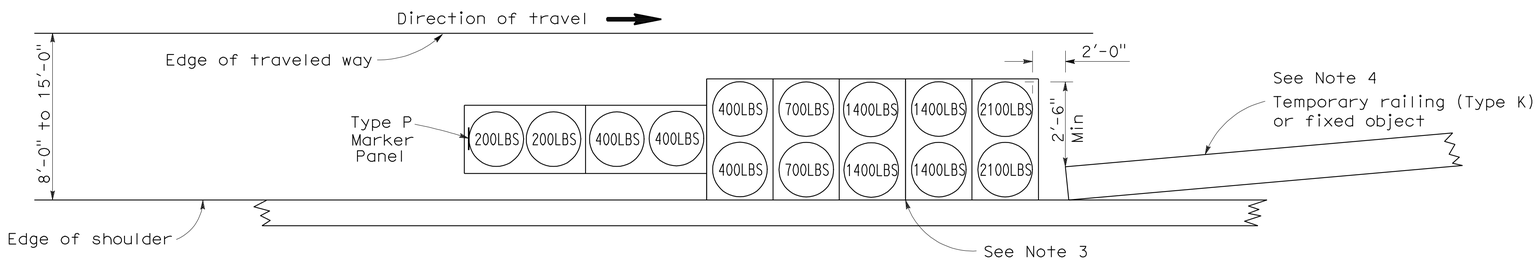
To accompany plans dated 4-11-11



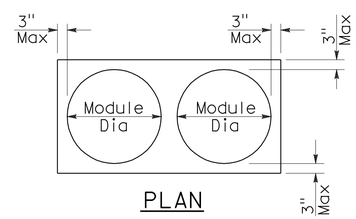
ARRAY 'TS11'

Approach speed less than 45 mph
See Note 9

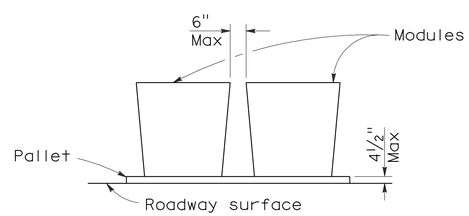


ARRAY 'TS14'

Approach speed 45 mph or more
See Note 9



PLAN



ELEVATION

CRASH CUSHION PALLET DETAIL

See Note 11

NOTES:

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. The temporary crash cushion arrays shown on this plan shall be used only in locations where there will be traffic on one side of the temporary crash cushion array.
4. If the fixed object or approach end of the temporary railing is less than 15'-0" from the edge of traveled way, a temporary crash cushion is required in a construction or work zone.
5. Temporary crash cushion arrays shall not encroach on the traveled way.
6. Arrays for median shoulders shall conform to details shown on this plan for outside shoulders.
7. Place the Type P marker panel so that the bottom of the panel rests upon the pallet and faces traffic.
8. Refer to Standard Plan A73B for marker details.
9. For shoulder widths less than 8'-0", appropriate approved crash cushion protection, other than sand filled modules, shall be provided at fixed objects and at approach ends of temporary railing. The specific type of crash cushion shall be as shown on the project plans or as specified in the Special Provisions, or if not shown on the project plans or specified in the Special Provisions, shall be as approved by the Engineer.
10. Approach speeds indicated conform to NCHRP 350 Report criteria.
11. Use of pallets is optional.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY CRASH CUSHION, SAND FILLED (SHOULDER INSTALLATIONS)

NO SCALE

RSP T2 DATED JUNE 6, 2008 SUPERSEDES STANDARD PLAN T2
DATED MAY 1, 2006 - PAGE 213 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP T2

2006 REVISED STANDARD PLAN RSP T2

5-15-08

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	33	35

REGISTERED ELECTRICAL ENGINEER

October 5, 2007
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Jeffery G. McRae No. E14512 Exp. 6-30-08 ELECTRICAL STATE OF CALIFORNIA

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To accompany plans dated 4-11-11

ELECTROLIERS

STANDARD TYPES
15, 15D
15 STRUCTURE
21, 21D STRUCTURE
30
31
32
35
36-20A

High mast light pole

Double Arm lighting standard

Existing electrolier

Electrolier foundation (Future installation)

NOTES:

1. Luminaires shall be 310 W HPS when installed on Type 21, 21D, 30, 31, 32, 35 and 36-20A Standards, unless otherwise specified. Luminaires shall be 200 W HPS when installed on other type standards or poles, unless otherwise specified.
2. Luminaires shall be the cutoff type, ANSI Type Ⅲ medium cutoff lighting distribution, unless otherwise specified.
3. Variations noted adjacent to symbol on project plans.

Electrolier (see project notes or project plans)

Luminaire on wood pole

STANDARD NOTES:

- AB — Abandon. If applied to conduit, remove conductors.
- BC — Install pull box in existing conduit run.
- BP — Pedestrian barricade, type as indicated on plan.
- CB — Install conduit into existing pull box.
- CC — Connect new and existing conduit. Remove existing conductors and install conductors as indicated.
- CF — Conduit to remain for future use. Remove conductors. Install pull wire or rope.
- DH — Detector handhole.
- FA — Foundation to be abandoned.
- IS — Install sign on signal mast arm.
- NS — No slip base on standard.
- PEC — Photoelectric control.
- PEU — Photoelectric unit.
- RC — Equipment or material to be removed and become the property of the Contractor.
- RE — Remove electrolier, fuses and ballast. Tape ends of conductors.
- RL — Relocate equipment.
- RR — Remove and reuse equipment.
- RS — Remove and salvage equipment.
- SC — Splice new to existing conductors.
- SD — Service disconnect.
- SF — Standard to remain for future use. Remove luminaire, pole conductors, fuses and ballast.
- TSP — Telephone service point.

ABBREVIATIONS AND EQUIPMENT DESIGNATIONS

PROPOSED	EXISTING	
BBS	bbs	Battery backup system
BC	bc	Bolt circle
C	C	Conduit
CCTV	cctv	Closed circuit television
CKT	ckt	Circuit
CMS	cms	Changeable message sign
DLC	dlc	Loop detector lead-in cable
EMS	ems	Extinguishable message sign
EVC	evc	Emergency vehicle cable
EVD	evd	Emergency vehicle detector
FB	fb	Flashing beacon
FBCA	fbca	Flashing beacon control assembly
FBS	fbs	Flashing beacon with slip base
FO	fo	Fiber optic
G	G	Ground (Equipment Grounding Conductor)
GFCI	GFCI	Ground fault circuit interrupt
HAR	har	Highway advisory radio
HEX	hex	Hexagonal
HPS	hps	High pressure sodium
IISNS	iisns	Internally illuminated street name sign
ISL	isl	Induction sign lighting
LED	led	Light emitting diode
LMA	lma	Luminaire mast arm
LPS	lps	Low pressure sodium
LTG	ltg	Lighting
LUM	lum	Luminaire
MAT	mat	Mast arm mounting vehicle signal faces, top attachment
MAS	mas	Mast arm mounting vehicle signal faces, side attachment
MAS-4A	mas-4A	Mast arm mounting vehicle signal faces, side attachment - 4 signal section
MAS-4B	mas-4B	
MAS-4C	mas-4C	
MAS-5A	mas-5A	Mast arm mounting vehicle signal faces, side attachment - 5 signal section
MAS-5B	mas-5B	
MC	mc	Mercury contactor
M/M	m/m	Multiple to multiple transformer
MT	mt	Conduit with pull wire or rope only
MTG	mtg	Mounting
	mv	Mercury vapor lighting fixture
N	N	Neutral (Grounded Conductor)
NC	NC	Normally closed
NO	NO	Normally open
PB	pb	Pull box
PEC	pec	Photoelectric control (Type Ⅰ, Ⅱ, Ⅲ, Ⅳ or Ⅴ as shown)
PED	ped	Pedestrian
PEU	peu	Photoelectric unit
PPB	ppb	Pedestrian push button
RL		Relocated equipment
RM	rm	Ramp metering
SB	sb	Slip base
SIC	sic	Signal interconnect cable
SIG	sig	Signal
SMA	sma	Signal mast arm
SNS	sns	Street name sign
SP	sp	Service point
TDC	tdc	Telephone demarcation cabinet
TMS	tms	Traffic monitoring station
TOS	tos	Traffic Operations System
VEH	veh	Vehicle
XFMR	xfmr	Transformer
COMM	comm	Communication
RWIS	rwis	Roadway weather information system

SOFFIT AND WALL MOUNTED LUMINAIRES

Pendant, 70 W HPS unless otherwise specified.

Flush, 70 W HPS unless otherwise specified.

Wall surface, 70 W HPS unless otherwise specified.

Existing soffit or wall luminaire to remain unmodified.

Existing soffit or wall luminaire to be modified as specified.

NOTE:

Arrow indicates "street side" of luminaire.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS (SYMBOLS AND ABBREVIATIONS)

NO SCALE

RSP ES-1A DATED OCTOBER 5, 2007 SUPERSEDES STANDARD PLAN ES-1A DATED MAY 1, 2006 - PAGE 400 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP ES-1A

2006 REVISED STANDARD PLAN RSP ES-1A

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	34	35

REGISTERED ELECTRICAL ENGINEER

October 5, 2007
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Jeffery G. McRae No. E14512 Exp. 6-30-08 ELECTRICAL STATE OF CALIFORNIA

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To accompany plans dated 4-11-11

CONDUIT

PROPOSED	EXISTING	
		Lighting Conduit, unless otherwise indicated or noted
		Traffic signal conduit
C	c	Communication conduit
T	t	Telephone conduit
F	f	Fire alarm conduit
FO	fo	Fiber optic conduit
		Conduit termination (RSP ES-9A C)
R	r	Conduit riser in/on structure or service pole

SERVICE EQUIPMENT

PROPOSED	EXISTING	
OH	oh	Overhead lines
U	U	Wood pole "U" indicates utility owned
		Pole guy with anchor
		Utility transformer - ground mounted
III		Service equipment enclosure type
		Service equipment enclosure door indicates front of enclosure
T	t	Telephone demarcation cabinet

POLE-MOUNTED SERVICE DESIGNATION

Type of installation

TYPE H SERVICE - 28'-10" ← Pole height above grade

ILLUMINATED OVERHEAD SIGN

PROPOSED	EXISTING	
		Overhead sign - Single post
		Overhead sign - Two post
		Overhead sign - Mounted on structure
		Overhead sign with electrolier

SIGNAL EQUIPMENT

PROPOSED	EXISTING	
		Pedestrian signal face
		Pedestrian push button post
		Pedestrian barricade
		Vehicle signal face (with backplate, 3-Section: red, yellow and green)
		Vehicle signal face with angle visors
PV	PV	Modifications of basic symbols: "L" indicates all non-arrow sections louvered "LG" indicates louvered green section only "PV" indicates 12" programmed visibility sections "8" indicates all 8" sections (only when specified)
		Type 15TS and Vehicle signal face
		Vehicle signal face with red, yellow and green left arrow sections
		Vehicle signal face with red and yellow sections and up green arrow
		Vehicle signal face (5 Section) with red, yellow and green sections and yellow and green right arrows
		Type 1 Standard and attached vehicle signal faces
		Standard with signal mast arm only and attached vehicle signal faces and internally illuminated street name sign
		Type 33 Standard, Left-turn vehicle signal face and sign
		Standard with luminaire and signal mast arms and attached vehicle signal faces
		Cantilever flashing beacon Type 9 Frame, with a sign unless otherwise specified or indicated
		Type 15-FBS Standard with two vehicle signal face sections with lens, backplate and visor with a sign
R	Y	Flashing beacon. One vehicle signal face section with lens, backplate and visor. "R" indicates red indication, "Y" indicates yellow indication
		Controller assembly. Door indicates front of cabinet

SIGNAL EQUIPMENT Cont

PROPOSED	EXISTING	
		Guard post
		Type 1 Standard with "Meter On" sign
		Emergency Vehicle detector

NOTES:

1. All signal sections shall be 12" unless shown otherwise.
2. Signal heads shall be provided with backplates unless shown otherwise.
3. Signal indication shall be LED.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS (SYMBOLS AND ABBREVIATIONS)

NO SCALE

RSP ES-1B DATED OCTOBER 5, 2007 SUPERCEDES STANDARD PLAN ES-1B DATED MAY 1, 2006 - PAGE 401 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP ES-1B

2006 REVISED STANDARD PLAN RSP ES-1B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
04	SF	80	5.4	35	35

REGISTERED ELECTRICAL ENGINEER

October 5, 2007
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Jeffery G. McRae
No. E14512
Exp. 6-30-08
ELECTRICAL
STATE OF CALIFORNIA

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To accompany plans dated 4-11-11

2006 REVISED STANDARD PLAN RSP ES-1C

EQUIPMENT IDENTIFICATION

ILLUMINATED SIGN IDENTIFICATION NUMBER:

Sign No. 12345 — Sign number - Place on post or structure

10 ISL SCI 1.0

- 1.0 — Transformer rating (kVA)
- SCI — Lighting control type
- ISL — Number and type of fixtures

Do NOT place on standard or structure

ELECTROLIER OR EQUIPMENT IDENTIFICATION NUMBER:

12345 - 15'-0"

- 15'-0" — Mast arm length, if shown. Do not place on standard or structure.
- 12345 — Equipment number - Place on standard or structure. Existing equipment numbers are shown in parenthesis

CONDUIT AND CONDUCTOR IDENTIFICATION:

1½"C, 2#10, 15#14, 2 DLC

- 2#10, 15#14, 2 DLC — Number and size of conductors and cables
- 1½"C — Size of conduit in inches

Ø1, Ø2, Ø2P, etc.	Traffic phase identification for signal faces, detectors and phase diagrams
1 2 3	Project note numbers
A B C	Equipment description, installation or item numbers
1 2 3	Conduit run numbers

SIGNAL AND LIGHTING STANDARD (TYPICAL DESIGNATION):

19A - 3 - 100

- 100 — Wind velocity = 100 mph
- 3 — Case 3 arm loading
- 19A — Standard type
- Standard Plan sheet number
- Detail number or letter

MISCELLANEOUS EQUIPMENT

PROPOSED	EXISTING	
CMS	cms	Changeable message sign
		Closed circuit television camera
		Highway advisory radio pole and antenna
EMS	ems	Extinguishable message sign
M V	m v	Detection device M = Microwave sensor V = Video image sensor

WIRING DIAGRAM LEGEND

P	Pole
CB	Circuit breaker
A	Ampere
V	Volt
M	Metered
UM	Unmetered
NB	Neutral bus
GB	Ground bus
G	Equipment grounding conductor
N	Grounded conductor (Neutral)

- External conductor
- Conductor or bus
- Tie point
- Contactor coil
- Contactor, Contact NO
- Terminal blocks
- Contactor, Contact NC
- Enclosure bond
- Grounding electrode
- Circuit breaker
- Receptacle

PULL BOXES

PROPOSED	EXISTING	
		Pull box-No. 5 unless otherwise indicated or noted.
3	9A(21)	Pull box-Additional designations or descriptions

3 = No. 3½ pull box
5 = No. 5 pull box
6 = No. 6 pull box
7 = No. 7 (Ceiling pull box)
8 = No. 8 (Pendant soffit pull box)
9 = No. 9 pull box
9A = No. 9A pull box

(C) = Communications pull box
(E) = Pull box with extension
(S) = Sprinkler control pull box
(21) = Anchor bolts and conduit for future installation of Type 21 Standard
(T) = Traffic pull box

VEHICLE DETECTORS

5 J 9 U

- U = Upper
- L = Lower
- Slot number in input file
- Input file (I or J)
- Phase

PROPOSED	EXISTING	
		Type A detector loop. Outline of sawcut shown.
		Type B detector loop. Outline of sawcut shown.
		Type C detector loop. Outline of sawcut shown.
		Type D detector loop. Outline of sawcut shown.
		Type E detector loop. Outline of sawcut shown.
		Type Q detector loop. Outline of sawcut shown.
		Magnetic detector
DH	dh	Detector handhole
		Microwave or video detection zone

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SYSTEMS (SYMBOLS AND ABBREVIATIONS)

NO SCALE

RSP ES-1C DATED OCTOBER 5, 2007 SUPERCEDES STANDARD PLAN ES-1C DATED MAY 1, 2006 - PAGE 402 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP ES-1C