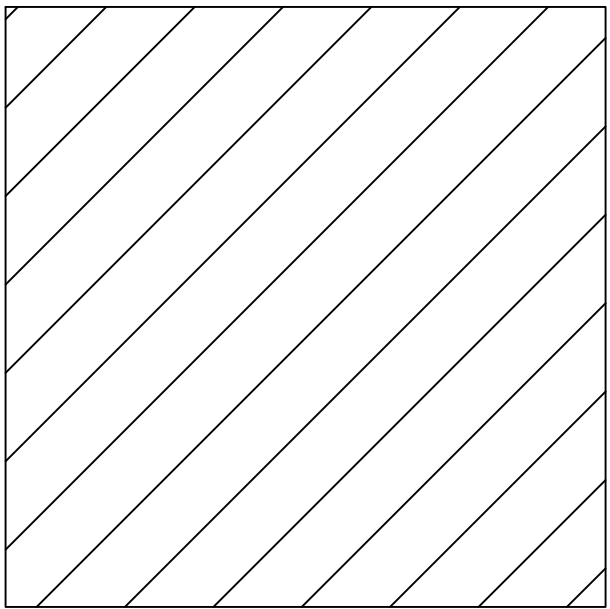
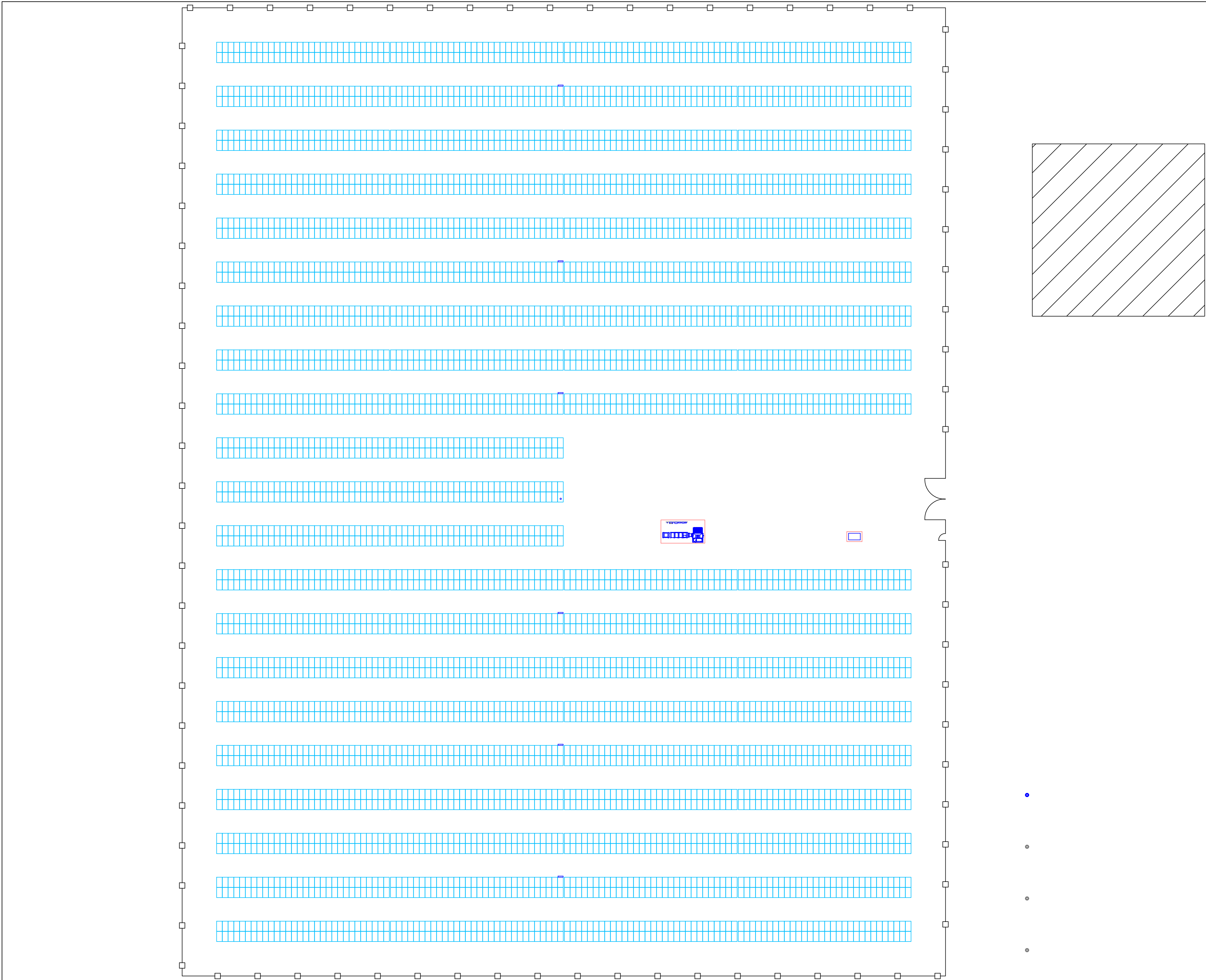


SUNDA REFERENCE DESIGN

1,050KWAC, 1,500VDC

SITE MAP



SYSTEM SUMMARY

AC SYSTEM SIZE: 1,050.0 KW AC
DC SYSTEM SIZE: 1,474.2 KW DC
STRING SIZE: 30
STRING COUNT: 156
INVERTER: (1) POWER ELECTRONICS
HEC-USFS1050CU15
DC VOLTAGE: 1,500V
AC VOLTAGE: 565V, 3φ
IC VOLTAGE: 12,470V, 3φ
ARRAY AZIMUTH: 180°
ARRAY TILT: 25°

SHEET LIST

- ELECTRICAL
PV0.1 COVER SHEET
PV0.2 GENERAL NOTES AND SYMBOLS
PV1.0 SINGLE LINE DIAGRAM
PV1.1 PV SCHEDULES
PV1.2 PV LABELS
PV2.0 SITE PLAN - ARRAY LAYOUT
PV2.1 SITE PLAN - FENCE LAYOUT
PV2.2 SITE PLAN - MEDIUM VOLTAGE ROUTING
PV2.3 SITE PLAN - COMBINER LAYOUT
PV2.4 SITE PLAN - DC FEEDER ROUTING
PV2.5 SITE PLAN - AC AND COMMUNICATION FEEDER ROUTING
PV2.6 SITE PLAN - ARRAY GROUNDING
PV3.0 PARTIAL PLAN - STRINGING LAYOUT NORTH
PV3.1 PARTIAL PLAN - STRINGING LAYOUT SOUTH
PV4.0 PARTIAL PLAN - EQUIPMENT PAD DIMENSIONS
PV4.1 PARTIAL PLAN - EQUIPMENT PAD AC AND COMMUNICATION FEEDER ROUTING
PV4.2 PARTIAL PLAN - EQUIPMENT PAD GROUNDING
PV5.0 FENCE GROUNDING DETAIL

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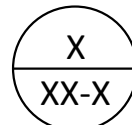
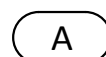
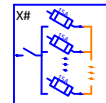
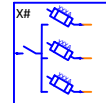
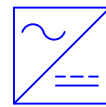
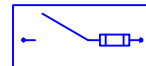
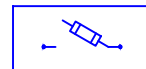
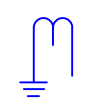


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REV	DATE	DESCRIPTION

TITLE:	COVER SHEET
PROJECT:	NRECA SUNDA REFERENCE DESIGN 1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV0.1

ABBREVIATIONS		GENERAL NOTES	SYMBOLS	
A	AMPS	1. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL OSHA REGULATIONS AND SAFETY PRECAUTIONS ON SITE. THE ENGINEER IS NOT RESPONSIBLE FOR SPECIFIC WORKING HAZARDS. 2. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR READING AND UNDERSTANDING ALL EQUIPMENT MANUALS AND DRAWINGS PRIOR TO INSTALLING AND ENERGIZING EQUIPMENT. 3. ALL SYSTEM COMPONENTS SHALL BE LISTED BY A THIRD PARTY TESTING AGENCY (UL, NRTL, ETL, ETC.). ALL EQUIPMENT SHALL HAVE A MINIMUM RATING OF NEMA 3R UNLESS LOCATED INDOORS. 4. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A CERTIFIED ELECTRICIAN AND APPRENTICES UNDER THE SUPERVISION OF A LICENSED ELECTRICAL CONTRACTOR. 5. PV STRINGS SHALL BE CONNECTED AND LABELED AS DETAILED IN THE DRAWING SET. 6. THE SYSTEM SHALL BE INSTALLED PER NEC 2014 AND SHALL ADHERE TO ALL LOCAL CODES AND STANDARDS. 7. THE PV SYSTEM SHALL BE GROUNDED AND BONDED PER NEC ARTICLE 690 SECTION V AND ARTICLE 250. ANY DEVIATIONS FROM THE DRAWINGS SET WILL NEED TO BE APPROVED BY THE ENGINEER. 8. SYSTEM SIGNAGE SHALL BE INSTALLED AND LABELED PER NEC ARTICLE 690 SECTION VI. 9. WORKING CLEARANCES AROUND ALL EQUIPMENT SHALL CONFORM TO NEC 110.26. 10. ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH CHAPTER 3 OF THE NEC. 11. CONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO THE ENGINEER PRIOR TO MAKING ANY CHANGES. APPROVED CHANGES SHALL REQUIRE A DRAWING REVISION TO MAINTAIN VERSION CONTROL. 12. ACTUAL LOCATION OF OVERHEAD AND UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND DOCUMENTED PRIOR TO THE EXECUTION OF ANY WORK. THE ENGINEER OF RECORD SHALL BE NOTIFIED OF ANY DISCREPANCIES TO EXISTING CONDITIONS. 13. ALL CONDUCTORS AND EQUIPMENT SHALL BE CONSIDERED "ENERGIZED" UNLESS CHECKED, AND CHECKED AGAIN. LOCKOUT - TAGOUT PROCEDURES SHALL BE EMPLOYED BEFORE ANY WORK IS DONE ON ELECTRICAL EQUIPMENT. 14. THE CONTRACTOR SHALL MAKE AN EFFORT TO CAUSE AS LITTLE DISTURBANCE AS POSSIBLE AND PROTECT THE NATURAL ENVIRONMENT AND RESOURCES OF THE FACILITY DURING THE COURSE OF THE WORK. ALL DISTURBED AREAS SHALL BE RETURNED TO THEIR PRE-CONSTRUCTION STATE OR BETTER. AREAS WHICH ARE SEEDED OR SODDED WITH ESTABLISHED GRASS SHALL BE SEEDED AS SOON AS POSSIBLE AFTER COMPLETION OF THE WORK IN THAT AREA. 15. THE CONDUIT LAYOUT DEPICTED IN THE DRAWING SET IS FOR DIAGRAMMATIC PURPOSES ONLY UNLESS OTHERWISE NOTED. CONTRACTOR SHALL ROUTE CONDUIT TO BEST SUIT SITE CONDITIONS AND PROVIDE ACCURATE AS-BUILTS. 16. CONNECTORS, TERMINATIONS AND EQUIPMENT HARDWARE SHALL BE TORQUED PER DEVICE LISTING OR INSTALLATION DOCUMENTATION. 17. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS ON THE DRAWINGS INCLUDING EXISTING STRUCTURES. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES IN THE DRAWINGS AND/OR EXISTING SITE CONDITIONS. 18. DC VOLTAGE IS ALWAYS PRESENT FROM THE ARRAY DURING DAYLIGHT HOURS. THERE IS A POTENTIAL FOR VOLTAGE TO BE PRESENT AT THE TERMINALS OF THE DC DISCONNECT, COMBINER BOX AND AT THE DC TERMINALS ON THE INVERTER. ALL PERSONNEL SHOULD BE NOTIFIED OF THIS POTENTIAL HAZARD AND SHOULD TAKE PRECAUTIONS TO PREVENT ACCIDENTAL SHOCK OR INJURY. 19. ALL EQUIPMENT SHALL BE MOUNTED PER MANUFACTURER'S SPECIFICATIONS. 20. THE CONTRACTOR SHALL SUPPLY EQUIPMENT/MATERIAL SUBMITTALS PRIOR TO ORDERING. APPROVAL BY POWERSECURE SOLAR FOR ALL EQUIPMENT IS MANDATORY.		DETAIL TAG
AC	ALTERNATING CURRENT			EQUIPMENT TAG
AL	ALUMINUM			FEEDER TAG
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS			KEYED NOTE TAG
C	CELSIUS			REVISION TAG
CT	CURRENT TRANSFORMER			MODULE
CU	COPPER			COMBINER
DB	DRY BULB			CONTACTOR RECOMBINER
DC	DIRECT CURRENT			INVERTER
DIA	DIAMETER			METER
DISC	DISCONNECT			FUSE
DWG	DRAWING			CIRCUIT BREAKER
EGC	EQUIPMENT GROUNDING CONDUCTOR			THREE-WINDING TRANSFORMER
EMT	ELECTRICAL METALLIC TUBING			TWO-WINDING TRANSFORMER
ETL	ELECTRICAL TESTING LABS			FUSED DISCONNECT
GALV	GALVANIZED			SWITCH
GEC	GROUNDING ELECTRODE CONDUCTOR			FUSED SWITCH
GFI	GROUND FAULT INTERRUPTER			CURRENT TRANSFORMER
GND	GROUND			POTENTIAL TRANSFORMER
IMC	INTERMEDIATE METALLIC CONDUIT			
IMP	MAXIMUM POWER CURRENT			
INV	INVERTER			
ISC	SHORT CIRCUIT CURRENT			
KW	KILOWATT			
KV	KILOVOLT			
KA	KILOVOLT AMPS			
KVM	KEYBOARD, VIDEO, MOUSE			
LFMC	LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT			
LFNC	LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT			
MAX	MAXIMUM			
MCB	MAIN CIRCUIT BREAKER			
MIN	MINIMUM			
MLO	MAIN LUG ONLY			
MPP	MAXIMUM POWER POINT			
MV	MEDIUM VOLTAGE			
NEC	NATIONAL ELECTRIC CODE			
NEG	NEGATIVE			
NEU	NEUTRAL			
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION			
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION			
NRTL	NATIONALLY RECOGNIZED TESTING LABORATORY			
OCPD	OVER CURRENT PROTECTION DEVICE			
PC	PERSONAL COMPUTER			
PCC	POINT OF COMMON COUPLING			
PLC	PROGRAMMABLE LOGIC CONTROLLER			
POS	POSITIVE			
PT	POTENTIAL TRANSFORMER			
PV	PHOTOVOLTAIC			
PVC	POLYVINYL CHLORIDE			
RMC	RIGID METALLIC CONDUIT			
RTU	REMOTE TERMINAL UNIT			
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION			
SCH	SCHEDULE			
STC	STANDARD TEST CONDITIONS			
TEMP	TEMPERATURE			
TYP	TYPICAL			
UL	UNDERWRITERS LABORATORIES			
UPS	UNINTERRUPTIBLE POWER SUPPLY			
V	VOLT/VOLTS			
VAC	VOLTS AC			
VDC	VOLTS DC			
VMP	MAXIMUM POWER VOLTAGE			
VOC	OPEN CIRCUIT VOLTAGE			
XFMR	TRANSFORMER			

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REV	DESCRIPTION		DATE			
GENERAL NOTES AND SYMBOLS			TITLE:	PROJECT:		
			DATE:	04.06.2017		
			SHEET:	PV0.2		

NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

2 OF 18

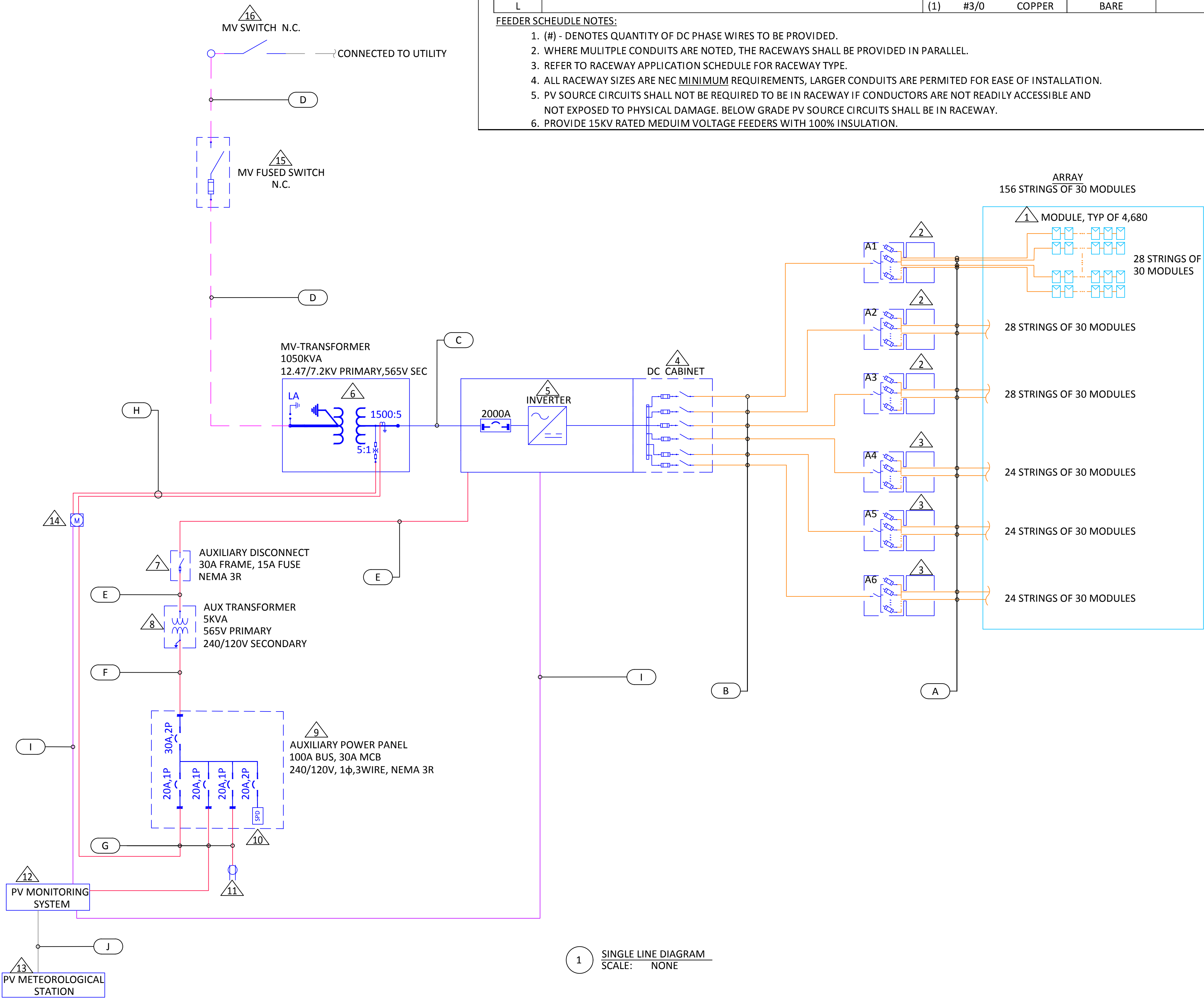
LINE TYPE LEGEND:	
DC FEEDERS	
AC FEEDERS	
MEDIUM VOLTAGE FEEDER	
EQUIPMENT	
MODULES	
PROVIDED BY MANUFACTURE/ OTHERS	
COMMUNICATIONS	

SYSTEM SUMMARY	
AC SYSTEM SIZE:	1,050.0 KW AC
DC SYSTEM SIZE:	1,474.2 KW DC
STRING SIZE:	30
STRING COUNT:	156
INVERTER:	(1) POWER ELECTRONICS HEC-USFS1050CU15
DC VOLTAGE:	1,500V
AC VOLTAGE:	565V, 3φ
IC VOLTAGE:	12,470V, 3φ
ARRAY AZIMUTH:	180°
ARRAY TILT:	25°

GENERAL NOTES:	
1.	PROVIDE LABELS TO EACH INCOMING CIRCUIT IN THE INVERTER.
2.	PROVIDE IRREVERSIBLE BONDS AT ALL GROUNDING ELECTRODE CONDUCTORS.

EQUIPMENT SCHEDULE **EQUIPMENT IS NOTED BY #				
TAG	DESCRIPTION	QUANTITY	MANUFACTURER	NOTES
1	SOLAR PV MODULE	4,680	REC	315 WATT MODULE REFER TO MODULE SCHEDULE FOR SPECIFICATION. MODULES SHALL BE LABELED PER NEC 690 VI
2	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 28 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
3	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 24 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
4	DC CABINET	1	POWERELECTRONICS	FSDK DC CABINET 6 INPUT WITH (3) 400A FUSES AND (3) 350A FUSE, NEGATIVELY GROUNDED, 1500VDC, NEMA 3R ENCLOSURE. PART NUMBER: FSDK L6N1E
5	INVERTER	1	POWERELECTRONICS	1050 KVA, 3 PHASE 565 VOLT (REFER TO INVERTER RATING SCHEDULE FOR SPECIFICATION). PART NUMBER:HEC-US FS1050CU15NR5NA1
6	MEDIUM VOLTAGE TRANSFORMER	1	POWERELECTRONICS	1050 KVA, THREE PHASE, 12.47/7.2 KV YGRND PRIMARY, 565V Y SECONDARY. LIQUID COOLED, BAYONET FUSES ON PRIMARY SIDE.
7	DISCONNECT FOR AUXILIARY POWER PANEL	1	SQUARE-D	30 AMP 2 POLE FUSED DISCONNECT WITH (2) 15 AMP FUSES, NEMA 3R. PROVIDE STICKER LABEL TO BE VISIBLE WHEN FUSE IS REMOVED TO READ "MAX 15A".
8	5 KVA DISTRIBUTION TRANSFORMER	1	DONGAN	SINGLE PHASE GENERAL PURPOSE DRY TYPE TRANSFORMER, PRIMARY VOLTS 565 VAC, SECONDARY VOLTS 240/120 VAC, NEMA 3R ENCAPSULATED ENCLOSURE
9	AUXILIARY POWER PANEL	1	SQUARE-D	AUXILARY PANEL BOARD, 100 AMP BUS WITH 30 AMP MAIN CIRCUIT BREAKER. REFER TO PANEL SCHEDULE FOR ADDITIONAL SPECIFICATIONS.
10	SURGE PROTECTION DEVICE	1	SQUARE-D	NEMA 4X RATING, INTEGRATED OVER CURRENT PROTECTION, MOUNTED DIRECTLY TO ENCLOSURE OF EQUIPMENT, MANUFACTURER PROVIDED INSTALLATION MANUAL SHALL BE FOLLOWED <u>EXACTLY</u>
11	RECEPTACLE	1	PASS & SEYMOUR	120V, 20 AMP, WEATHER PROOF GFI DUPLEX RECEPTACLE.
12	PV MONITORING SYSTEM	1	DRAKER	CENTRAL DATA ACQUISITION UNIT, NEMA 3R ENCLOSURE, LOCAL DATA STORAGE, INTEGRAL ETHERNET COMMUNICATIONS , WEB BASED DISPLAY AND LOCAL KEYPAD DISPLAY, PROVIDE 120V 1φ POWER SUPPLY
13	PV METEOROLOGICAL STATION	1	DRAKER	STATION INCLUDES: PLANE OF ARRAY PYRANOMETER, GLOBAL HORIZONTAL IRRADIANCE PYRANOMETER, BACK OF MODULE TEMPERATURE SENSOR, AMBIENT TEMPERATURE, AND WIND SENSORS
14	PRODUCTION METER	1	SHARK 100	REVENUE GRADE METER IN NEMA 3R ENCLOSURE
15	MEDIUM VOLTAGE SWITCH	1	S&C	15KV PAD MOUNTED SWITCH WITH INTEGRATED 65A STANDARD SPEED FUSES.
16	COORDINATED POLE MOUNTED SWITCH	1	ABB	SWITCH TO MEET THE REQUIREMENT OF THE UTILITY
17	GROUND ROD	5	HARGER OR EQUAL	3/4" DIAMETER, 10'-0" LONG COPPER CLAD GROUND ROD

EQUIPMENT SCHEDULE NOTES:	
1.	SPECIFIED MANUFACTURE OR EQUIVALENT SHALL BE PROVIDED.



FEEDER SCHEDULE **FEEDER IS NOTED BY A									
TAG	PHASE				NEUTRAL		GROUND		INSULATION
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER		(1)	#10	COPPER
B	(2) SET OF	(2)	250 KCMIL	ALUMINUM			(1)	#1	ALUMINUM
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS								
D	(1) SET OF	(3)	#1/0	ALUMINUM					MV TR-XLPE WITH CONCENTRIC NEUTRAL
E	(1) SET OF	(2)	#12	COPPER			(1)	#12	COPPER
F	(1) SET OF	(2)	#10	COPPER	(1)	#10	COPPER	(1)	#10
G	(1) SET OF	(1)	#12	COPPER	(1)	#12	COPPER	(1)	#12
H	(1) SET OF	(6)	#12	COPPER					THWN-2
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT								
J	PROVIDED BY DRAKER								
K							(1)	#6	COPPER
L							(1)	#3/0	COPPER

FEEDER SCHEDULE NOTES:

- (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED.
- WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL.
- REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE.
- ALL RACEWAY SIZES ARE NEC MINIMUM REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION.
- PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY.
- PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.

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REV	DATE	DESCRIPTION

TITLE:
PROJECT:
DATE:
SHEET:

SINGLE LINE DIAGRAM
NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC
04.06.2017
PV1.0

3 OF 18

EQUIPMENT SCHEDULE				
**EQUIPMENT IS NOTED BY 				
TAG	DESCRIPTION	QUANTITY	MANUFACTURER	NOTES
1	SOLAR PV MODULE	4,680	REC	315 WATT MODULE REFER TO MODULE SCHEDULE FOR SPECIFICATION. MODULES SHALL BE LABELED PER NEC 690 VI
2	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 28 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
3	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 24 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
4	DC CABINET	1	POWERELECTRONICS	FSDK DC CABINET 6 INPUT WITH (3) 400A FUSES AND (3) 350A FUSE, NEGATIVELY GROUNDED, 1500VDC, NEMA 3R ENCLOSURE. PART NUMBER: FSDK L6N1E
5	INVERTER	1	POWERELECTRONICS	1050 KVA, 3 PHASE 565 VOLT (REFER TO INVERTER RATING SCHEDULE FOR SPECIFICATION). PART NUMBER:HEC-US FS1050CU15NR5NA1
6	MEDIUM VOLTAGE TRANSFORMER	1	POWERELECTRONICS	1050 KVA, THREE PHASE, 12.47/7.2 KV YGRND PRIMARY, 565V Y SECONDARY. LIQUID COOLED, BAYONET FUSES ON PRIMARY SIDE.
7	DISCONNECT FOR AUXILIARY POWER PANEL	1	SQUARE-D	30 AMP 2 POLE FUSED DISCONNECT WITH (2) 15 AMP FUSES, NEMA 3R. PROVIDE STICKER LABEL TO BE VISIBLE WHEN FUSE IS REMOVED TO READ "MAX 15A".
8	5 KVA DISTRIBUTION TRANSFORMER	1	DONGAN	SINGLE PHASE GENERAL PURPOSE DRY TYPE TRANSFORMER, PRIMARY VOLTS 565 VAC, SECONDARY VOLTS 240/120 VAC, NEMA 3R ENCAPSULATED ENCLOSURE
9	AUXILIARY POWER PANEL	1	SQUARE-D	AUXILARY PANEL BOARD, 100 AMP BUS WITH 30 AMP MAIN CIRCUIT BREAKER. REFER TO PANEL SCHEDULE FOR ADDITIONAL SPECIFICATIONS.
10	SURGE PROTECTION DEVICE	1	SQUARE-D	NEMA 4X RATING, INTEGRATED OVER CURRENT PROTECTION, MOUNTED DIRECTLY TO ENCLOSURE OF EQUIPMENT, MANUFACTURER PROVIDED INSTALLATION MANUAL SHALL BE FOLLOWED <u>EXACTLY</u>
11	RECEPTACLE	1	PASS & SEYMOUR	120V, 20 AMP, WEATHER PROOF GFI DUPLEX RECEPTACLE.
12	PV MONITORING SYSTEM	1	DRAKER	CENTRAL DATA ACQUISITION UNIT, NEMA 3R ENCLOSURE, LOCAL DATA STORAGE, INTEGRAL ETHERNET COMMUNICATIONS , WEB BASED DISPLAY AND LOCAL KEYPAD DISPLAY, PROVIDE 120V 1φ POWER SUPPLY
13	PV METEOROLOGICAL STATION	1	DRAKER	STATION INCLUDES: PLANE OF ARRAY PYRANOMETER, GLOBAL HORIZONTAL IRRADIANCE PYRANOMETER, BACK OF MODULE TEMPERATURE SENSOR, AMBIENT TEMPERATURE, AND WIND SENSORS
14	PRODUCTION METER	1	SHARK 100	REVENUE GRADE METER IN NEMA 3R ENCLOSURE
15	MEDIUM VOLTAGE SWITCH	1	S&C	15KV PAD MOUNTED SWITCH WITH INTEGRATED 65A STANDARD SPEED FUSES.
16	COORDINATED POLE MOUNTED SWITCH	1	ABB	SWITCH TO MEET THE REQUIREMENT OF THE UTILITY
17	GROUND ROD	5	HARGER OR EQUAL	3/4" DIAMETER, 10'-0" LONG COPPER CLAD GROUND ROD

EQUIPMENT SCHEDULE NOTES:
1. SPECIFIED MANUFACTURE OR EQUIVALENT SHALL BE PROVIDED.

FEEDER SCHEDULE									
**FEEDER IS NOTED BY 									
TAG	PHASE				NEUTRAL	GROUND			INSULATION
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER		(1)	#10	COPPER
B	(2) SET OF	(2)	250 KCMIL	ALUMINUM		(1)	#1	ALUMINUM	PV
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS								
D NOTE6	(1) SET OF	(3)	#1/0	ALUMINUM				MV TR-XLPE WITH CONCENTRIC NEUTRAL	4"
E	(1) SET OF	(2)	#12	COPPER		(1)	#12	COPPER	THWN-2
F	(1) SET OF	(2)	#10	COPPER	(1)	#10	COPPER	THWN-2	3/4"
G	(1) SET OF	(1)	#12	COPPER	(1)	#12	COPPER	THWN-2	3/4"
H	(1) SET OF	(6)	#12	COPPER				THWN-2	3/4"
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT								
J	PROVIDED BY DRAKER								
K						(1)	#6	COPPER	BARE
L						(1)	#3/0	COPPER	BARE
FEEDER SCHEUDLE NOTES: 1. (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED. 2. WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL. 3. REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE. 4. ALL RACEWAY SIZES ARE NEC <u>MINIMUM</u> REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION. 5. PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY. 6. PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.									

AUXILIARY POWER PANEL																				
TYPE: SERVICE SUP 240/120V, 1ϕ, 3 WIRE BUS: 100 AMP MAIN: 30 AMP MAIN CIRCUIT BREAKER FEEDER: REFER TO SINGLE LINE DIAGRAM AIC RATING: 10,000										NOTES: 1. PROVIDE COPPER BUSSING 2. MAIN CIRCUIT BREAKER CAT #QOB230 3. BRANCH CIRCUIT BREAKERS: (3) CAT #QOB120 4. SURGE PROTECTION DEVICE: SQUARE-D SDSA1175 SPD SHALL BE THE FIRST DEVICE TO DETECT A SURGE COMING FROM THE MAIN. CONFIGURATION SHOWN FOR BOTTOM ENTRY PANEL. 5. NEMA 3R ENCLOSURE										
VA								Ø	Ø										VA	
A	B		COND	GND	NEU	PH							PH	NEU	GND	COND		A	B	
		SPACE	-	-	-	-	20/1	1	A	A	2	20/1					RECEPTACLE	180		
		SPACE	-	-	-	-	20/1	3	B	B	4	20/1					PRODUCTION METER		25	
		SPACE	-	-	-	-	20/1	5	A	A	6	20/1					PV MONITORING	150		
		SPACE	-	-	-	-	20/1	7	B	B	8	20/1	-	-	-	-	SPACE			
		SPACE	-	-	-	-	20/1	9	A	A	10	20/1	-	-	-	-	SPACE			
		SPACE	-	-	-	-	20/1	11	B	B	12	20/1	-	-	-	-	SPACE			
		MAIN CIRCUIT BREAKER	REFER TO SLD				20/2	13	A	A	14	20/2	REFER TO SLD				SURGE PROTECTION			
							15	B	B	16	DEVICE									
		SPACE	-	-	-	-		17	A	A	18		-	-	-	-	SPACE			
0		0																	330	25
TOTAL CONNECTED LOAD (VA)																			330	25
TOTAL CONNECTED LOAD (A)																			2.8	0.2

MINIMUM CONDUIT REQUIRED PER APPLICATION	
APPLICATION	CONDUIT TYPE
ROOF MOUNTED (EXPOSED)	RMC
BUILDING INTERIOR (EXPOSED TO PHYSICAL DAMAGE)	RMC
BUILDING INTERIOR (PROTECTED FROM PHYSICAL DAMAGE)	EMT
BUILDING EXTERIOR (EXPOSED TO PHYSICAL DAMAGE)	RMC
BUILDING EXTERIOR (PROTECTED FROM PHYSICAL DAMAGE)	RMC
BELOW GRADE (IN DIRECT CONTACT WITH EARTH)	PVC SCHED 40
TRANSITION FROM BELOW GRADE TO ABOVE GRADE (EXPOSED TO PHYSICAL DAMAGE)	RMC
TRANSITION FROM BELOW GRADE TO ABOVE GRADE (PROTECTED FROM PHYSICAL DAMAGE)	PVC SCHED 80

INVERTER SPECIFICATIONS	
INVERTER DESIGNATION	
INVERTER MANUFACTURER	POWER_ELECTRONICS
INVERTER MODEL	HEC-FS1050CH15
INVERTER QUANTITY	1
MAXIMUM DC VOLTAGE	1,500 V
AC POWER OUTPUT	1,050.0 KW
MODULE QUANTITY PER INVERTER	4680
DC POWER INPUT	1,474.2 KW
DC/AC RATIO	140.40%
OUTPUT VOLTAGE	565V, 3φ
MAXIMUM OUTPUT CURRENT	1,285 A
MIN OCPD REQUIRED	2,000 A
MIN Vmp	800 V
MAX Vmp	1,250 V
START UP VOLTAGE	1,100 V
ENCLOSURE	NEMA 3R
MPPT QUANTITY	1
GROUNDING CONFIGURATION	NEGATIVE GROUND

MODULE SPECIFICATIONS	
MODULE MANUFACTURER	REC
MODULE MODEL	REC315PE72
MODULE QUANTITY	4680
MAX POWER (P _{MAX})	315 W
MAX POWER-POINT CURRENT (I _{MP})	8.40 A
MAX POWER-POINT VOLTAGE (V _{MP})	37.50 V
OPEN CIRCUIT VOLTAGE (V _{OC})	45.80 V
SHORT CIRCUIT CURRENT (I _{SC})	8.93 A
MAX SERIES FUSE	25 A
MAXIMUM DC VOLTAGE	1,500 V
V _{OC} TEMP COEFF (%/°C)	-0.27
I _{SC} TEMP COEFF (%/°C)	0.013
P _{MP} TEMP COEFF (%/°C)	-0.4

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TITLE:
DATE:
SHEET:

PV SCHEDULES

NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

REV

DATE

DESCRIPTION

PV1.1

4 OF 18

PHOTOVOLTAIC DC COMBINER BOX

XX

28 STRINGS

RATED MPP CURRENT	235.20 A
RATED MPP VOLTAGE	1,125.0 V
MAX SYSTEM VOLTAGE	1,492.34 V
MAX CIRCUIT CURRENT	312.55 A

WARNING

INTERNAL WIRING MAY BE ENERGIZED AT ANY TIME.

WARNING: ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION.

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WHITE LETTERING ON RED BACKGROUND
TYPICAL OF 3: A1-A3

PHOTOVOLTAIC DC COMBINER BOX

XX

24 STRINGS

RATED MPP CURRENT	201.60 A
RATED MPP VOLTAGE	1,125.0 V
MAX SYSTEM VOLTAGE	1,492.34 V
MAX CIRCUIT CURRENT	267.90 A

WARNING

INTERNAL WIRING MAY BE ENERGIZED AT ANY TIME.

WARNING: ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION.

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WHITE LETTERING ON RED BACKGROUND
TYPICAL OF 3: A4-A6

INVERTER DC INPUT

XX

28 STRINGS

RATED MPP CURRENT	235.20 A
RATED MPP VOLTAGE	1,125.0 V
MAX SYSTEM VOLTAGE	1,492.34 V
MAX CIRCUIT CURRENT	312.55 A

WARNING

INTERNAL WIRING MAY BE ENERGIZED AT ANY TIME.

WARNING: ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION.

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WHITE LETTERING ON RED BACKGROUND
TYPICAL OF 3: DC RECOMBINER A1-A3

INVERTER DC INPUT

XX

24 STRINGS

RATED MPP CURRENT	201.60 A
RATED MPP VOLTAGE	1,125.0 V
MAX SYSTEM VOLTAGE	1,492.34 V
MAX CIRCUIT CURRENT	267.90 A

WARNING

INTERNAL WIRING MAY BE ENERGIZED AT ANY TIME.

WARNING: ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION.

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WHITE LETTERING ON RED BACKGROUND
TYPICAL OF 3: DC RECOMBINER A4-A6

INVERTER AC OUTPUT AND
DISCONNECT

AC OUTPUT CURRENT	1,285 A
NOMINAL AC VOLTAGE	565 V

WARNING: ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION.

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WARNING

THIS EQUIPMENT IS FED BY MULTIPLE SOURCES
(UTILITY AND PHOTOVOLTAIC)

WHITE LETTERING ON RED BACKGROUND
TYPICAL OF 1.

PHOTOVOLTAIC POWER
SOURCE

WHITE LETTERING ON RED REFLECTIVE BACKGROUND. TEXT SHALL BE A MINIMUM OF 3/8". THIS LABEL IS REQUIRED ON EXPOSED RACEWAY, CABLE TRAY, ENCLOSURES AND CONDUIT BODIES CONTAINING PHOTOVOLTAIC CIRCUITS. SPACING AND LOCATION OF LABEL AS SPECIFIED PER NEC 690.31(G)(3) & (4).

WARNING: ELECTRIC SHOCK HAZARD

IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

WHITE LETTERING ON RED BACKGROUND.
PROVIDE LABEL ON PV METER, BREAKER...
690.5(C)

1500VDC WIRE

POSITIVE BLACK
NEGATIVE WHITE
GROUND GREEN OR BARE

WHITE LETTERING ON BLACK BACKGROUND
PROVIDE WARNING SIGNAGE AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT, AND ANY OTHER DEVICE WHERE ENERGIZE THAT CONTAINS 1500VDC WIRE.

565VAC WIRE

A PHASE BROWN
B PHASE ORANGE
C PHASE YELLOW
GROUND GREEN OR BARE

WHITE LETTERING ON BLACK BACKGROUND
PROVIDE WARNING SIGNAGE AT EACH JUNCTION BOX OR ANY OTHER DEVICE WHERE ENERGIZE THAT CONTAINS 360VAC WIRE.

120/240VAC WIRE

L1 BLACK
L2 RED
NEUTRAL WHITE OR GRAY
GROUND GREEN OR BARE

WHITE LETTERING ON BLACK BACKGROUND
PROVIDE WARNING SIGNAGE AT EACH JUNCTION BOX OR ANY OTHER DEVICE WHERE ENERGIZE THAT CONTAINS 120/240VAC WIRE.

12,470VAC WIRE

A PHASE BROWN
B PHASE ORANGE
C PHASE YELLOW
NEUTRAL WHITE OR GRAY
GROUND GREEN OR BARE

WHITE LETTERING ON BLACK BACKGROUND
PROVIDE WARNING SIGNAGE AT EACH JUNCTION BOX OR ANY OTHER DEVICE WHERE ENERGIZE THAT CONTAINS 12470VAC WIRE.

TRANSFORMER

WHITE LETTERING ON BLACK BACKGROUND. TYPICAL OF 1

MV FUSED SWITCH

WHITE LETTERING ON BLACK BACKGROUND. TYPICAL OF 1

PV PRODUCTION
MONITORING SYSTEM

WHITE LETTERING ON BLACK BACKGROUND.TYPICAL OF 1

PV PRODUCTION
METEOROLOGICAL STATION

WHITE LETTERING ON BLACK BACKGROUND. TYPICAL OF 1

PV PRODUCTION
METER

WHITE LETTERING ON BLACK BACKGROUND.TYPICAL OF 1

DC CABINET

WHITE LETTERING ON BLACK BACKGROUND. TYPICAL OF 1

INVERTER

WHITE LETTERING ON BLACK BACKGROUND. TYPICAL OF 1

5.0KVA AUXILIARY
POWER TRANSFORMER
565:240/120V, 1φ

WHITE LETTERING ON BLACK BACKGROUND

AUXILIARY POWER PANEL
240/120V, 1φ
100A BUS, 30A MCB

WHITE LETTERING ON BLACK BACKGROUND

AUXILIARY POWER DISCONNECT

WHITE LETTERING ON BLACK BACKGROUND.

PV SERVICE

VOLTAGE:	XXX V
AVAILABLE FAULT CURRENT	XXX A
CALCULATED:	XX/XX/XXXX
OCPD AIC RATING	XXX,XXX A

WHITE LETTERING ON RED BACKGROUND

 WARNING

ARC FLASH AND SHOCK HAZARD

APPROPRIATE PPE REQUIRED

XXX cal/cm2	Incident Energy at
XXX in	Working Distance
XXX in	Arc Flash Boundary
XXX kV AC	System Voltage
XXX	Glove Class
X ft X in	Limited Approach Boundary
X ft X in	Restricted Approach Boundary
XXX	Equipment Label

Arc Flash Study Performed on XX/XX/XXXX

WARNING TEXT SHALL BE BLACK LETTERING ON ORANGE BACKGROUND. OTHER TEXT SHALL BE BLACK LETTERING ON WHITE BACKGROUND. TYPICAL OF XX. PROVIDE LABEL ON XX.

 DANGER

ARC FLASH AND SHOCK HAZARD

NO SAFE PPE EXISTS

XXX cal/cm2	Incident Energy at
XXX in	Working Distance
XXX in	Arc Flash Boundary
XXX kV AC	System Voltage
XXX	Glove Class
X ft X in	Limited Approach Boundary
X ft X in	Restricted Approach Boundary
XXX	Equipment Label

Arc Flash Study Performed on XX/XX/XXXX

DANGER TEXT SHALL BE BLACK LETTERING ON RED BACKGROUND. OTHER TEXT SHALL BE BLACK LETTERING ON WHITE BACKGROUND. TYPICAL OF XX. PROVIDE LABEL ON XX.

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REV	DATE	DESCRIPTION

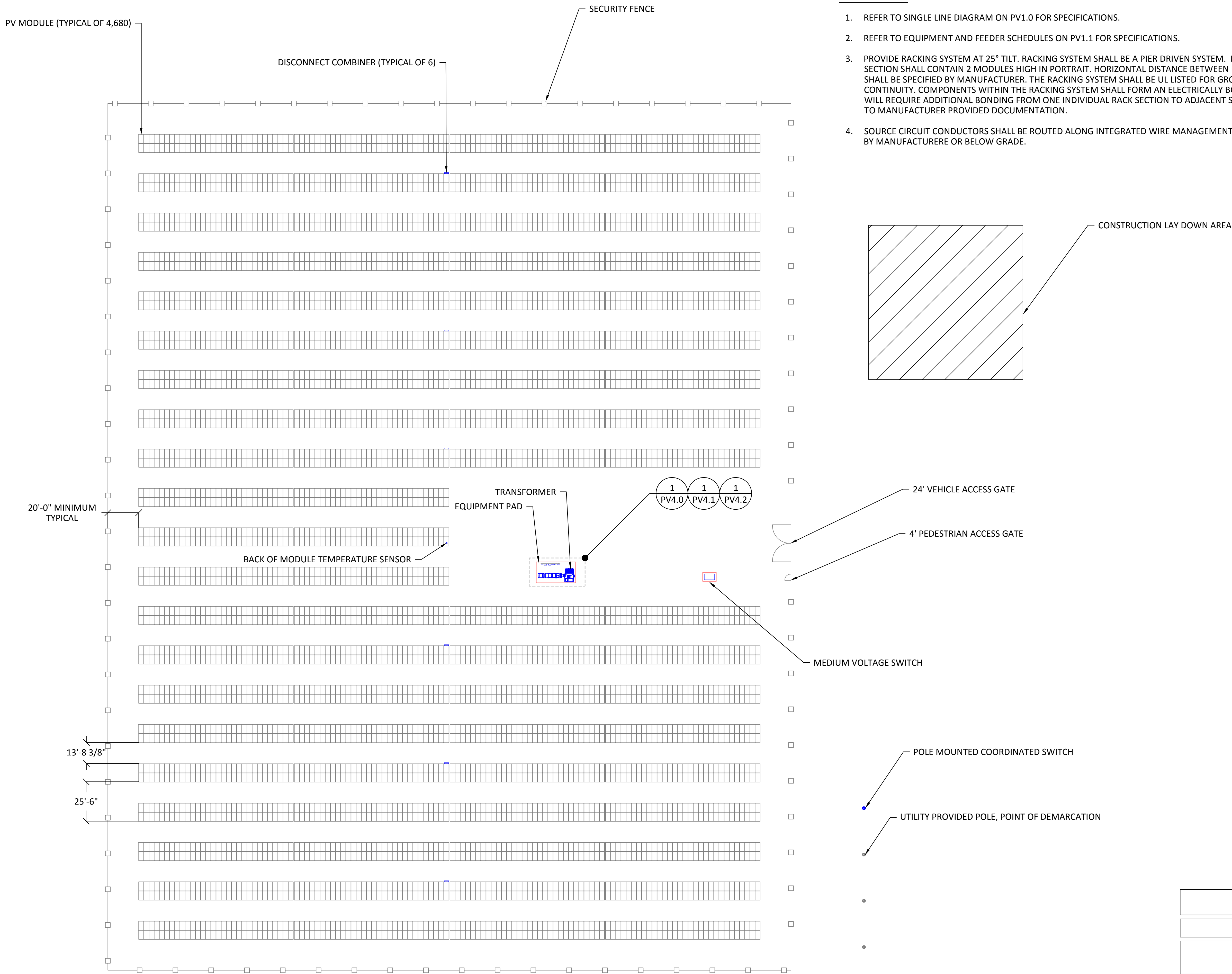
TITLE:
PROJECT:

PV LABELS
NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE:
SHEET:

04.06.2017
PV1.2

6 OF 18



- GENERAL NOTES:
1. REFER TO SINGLE LINE DIAGRAM ON PV1.0 FOR SPECIFICATIONS.
 2. REFER TO EQUIPMENT AND FEEDER SCHEDULES ON PV1.1 FOR SPECIFICATIONS.
 3. PROVIDE RACKING SYSTEM AT 25° TILT. RACKING SYSTEM SHALL BE A PIER DRIVEN SYSTEM. EACH RACKING SECTION SHALL CONTAIN 2 MODULES HIGH IN PORTRAIT. HORIZONTAL DISTANCE BETWEEN RACK SECTION SHALL BE SPECIFIED BY MANUFACTURER. THE RACKING SYSTEM SHALL BE UL LISTED FOR GROUNDING CONTINUITY. COMPONENTS WITHIN THE RACKING SYSTEM SHALL FORM AN ELECTRICALLY BONDED UNIT AND WILL REQUIRE ADDITIONAL BONDING FROM ONE INDIVIDUAL RACK SECTION TO ADJACENT SECTIONS. REFER TO MANUFACTURER PROVIDED DOCUMENTATION.
 4. SOURCE CIRCUIT CONDUCTORS SHALL BE ROUTED ALONG INTEGRATED WIRE MANAGEMENT TRAY PROVIDED BY MANUFACTURERE OR BELOW GRADE.

1 SITE PLAN - ARRAY LAYOUT
SCALE: 1/32"=1'-0"



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REV	DATE	DESCRIPTION

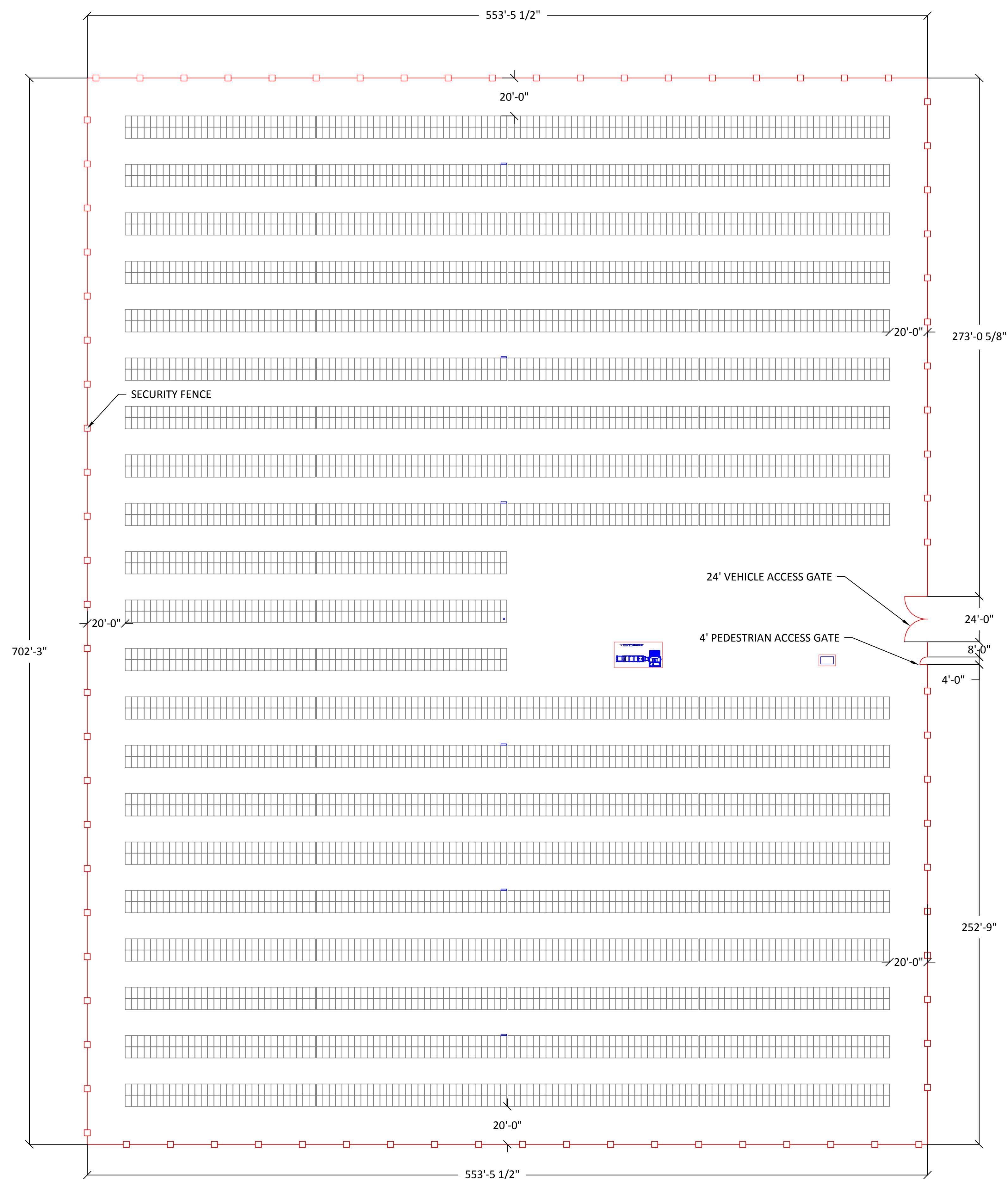
TITLE: SITE PLAN - ARRAY LAYOUT

PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017

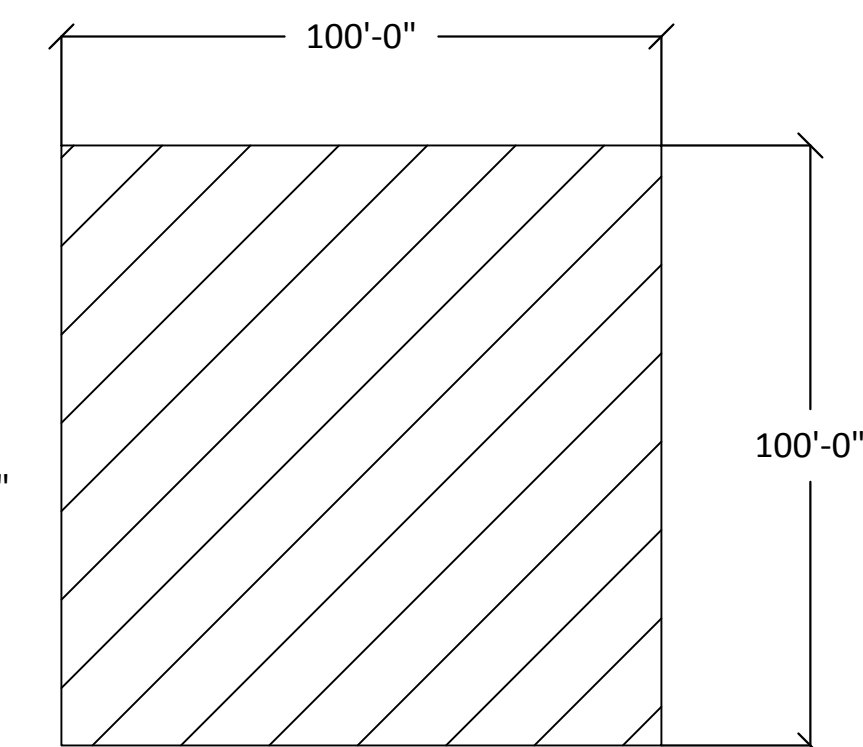
SHEET: PV2.0

6 OF 18



GENERAL NOTES:

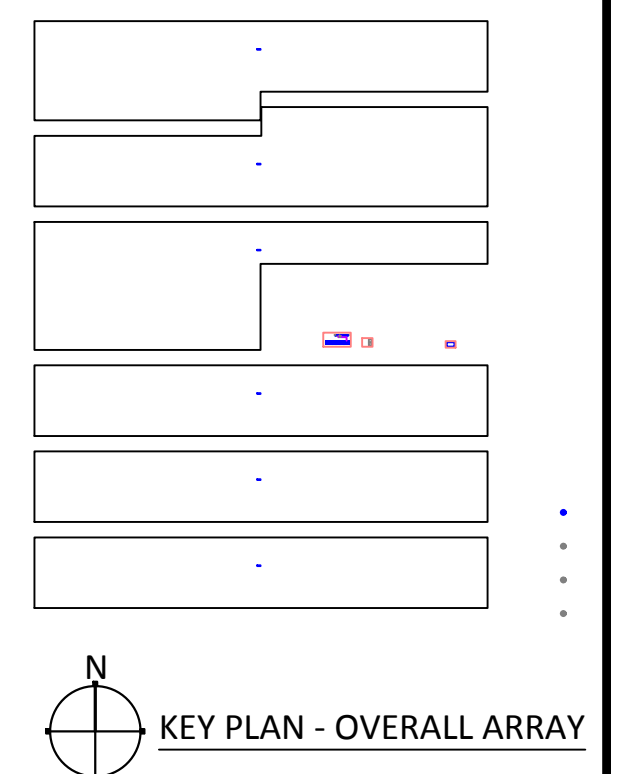
1. TOTAL FENCE LENGTH IS APPROXIMATELY 2,520 FEET.
2. FENCE SHALL BE 6'-0" TALL TOPPED WITH 3 STRING BARBED WIRE NO LESS THAN 12" IN HEIGHT. OVERALL HEIGHT OF 7'-0" MINIMUM PER NEC110.31.
3. ONE PERMANENT VEHICLE ENTRANCE GATE, 24' MINIMUM IN WIDTH, LOCATED AS SHOWN.
4. ONE PERMANENT PEDESTRIAN ENTRANCE GATE, 4' MINIMUM IN WIDTH, LOCATED AS SHOWN.
5. REFER TO FENCE GROUNDING DETAIL ON PV5.0.



24' VEHICLE ACCESS GATE

4' PEDESTRIAN ACCESS GATE

1 SITE PLAN - FENCE LAYOUT
SCALE: 1/32"=1'-0"

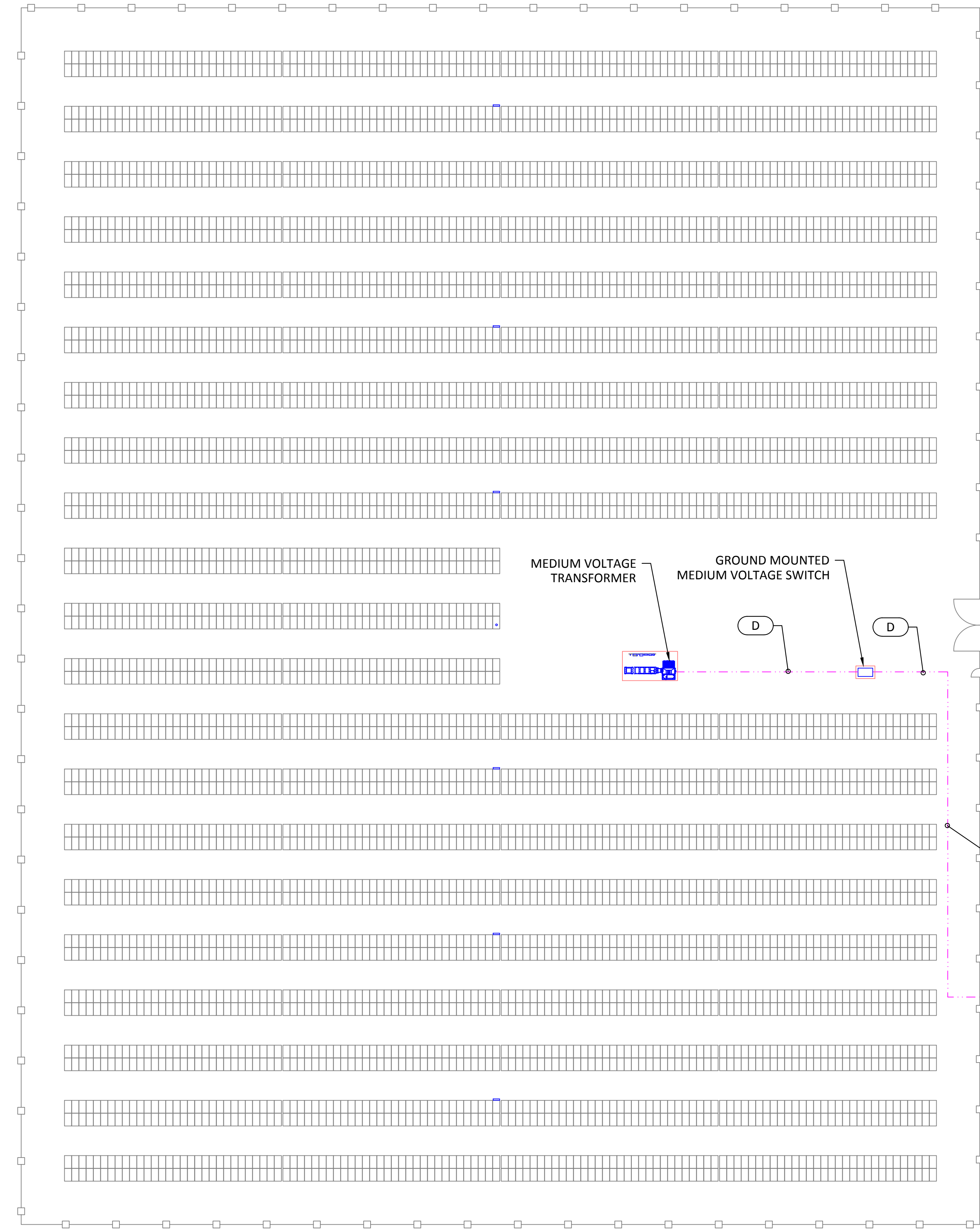


GENERAL NOTES:

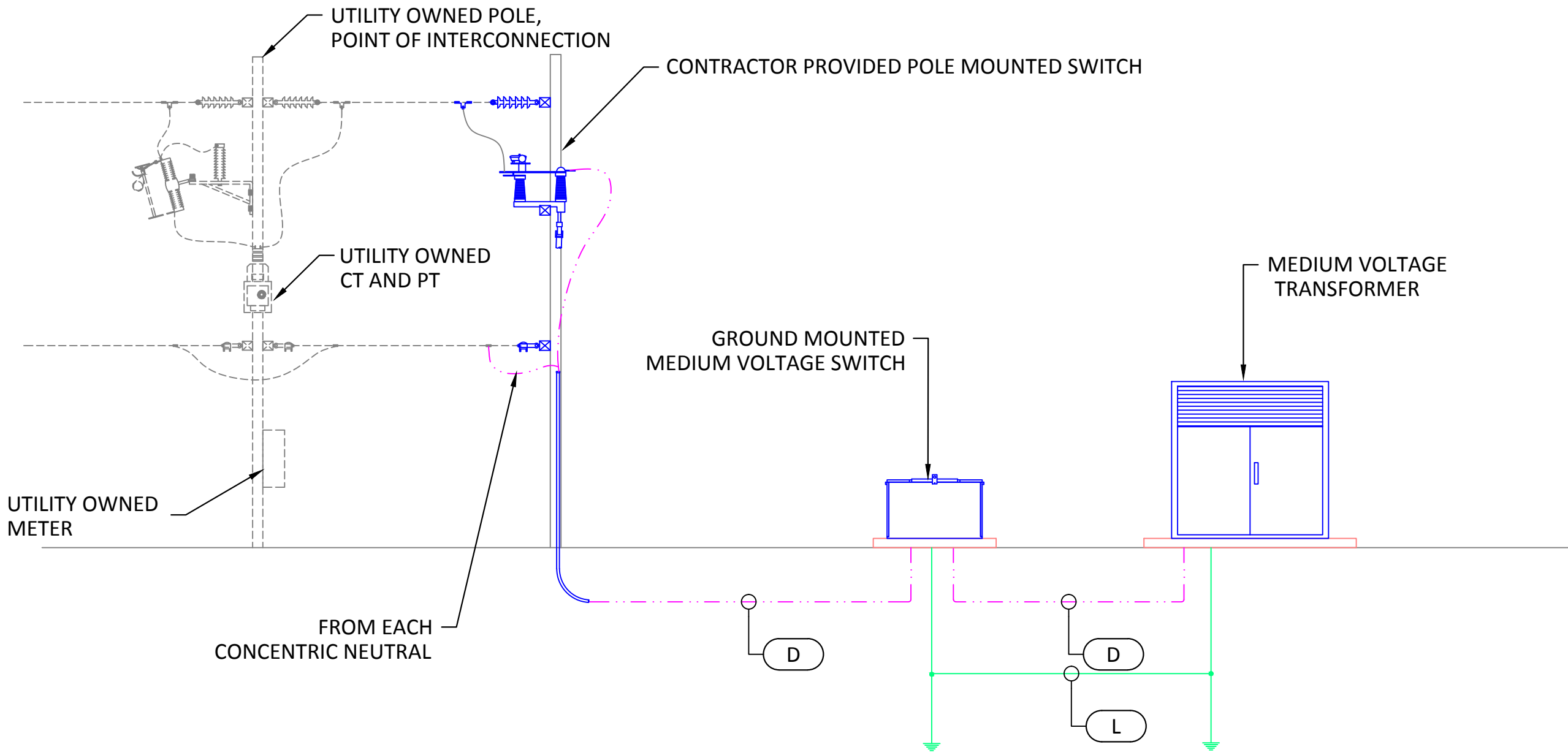
1. REFER TO SINGLE LINE DIAGRAM ON PV1.0 FOR SPECIFICATIONS.
2. REFER TO EQUIPMENT AND FEEDER SCHEDULES ON PV1.1 FOR SPECIFICATIONS.

LINE TYPE LEGEND:

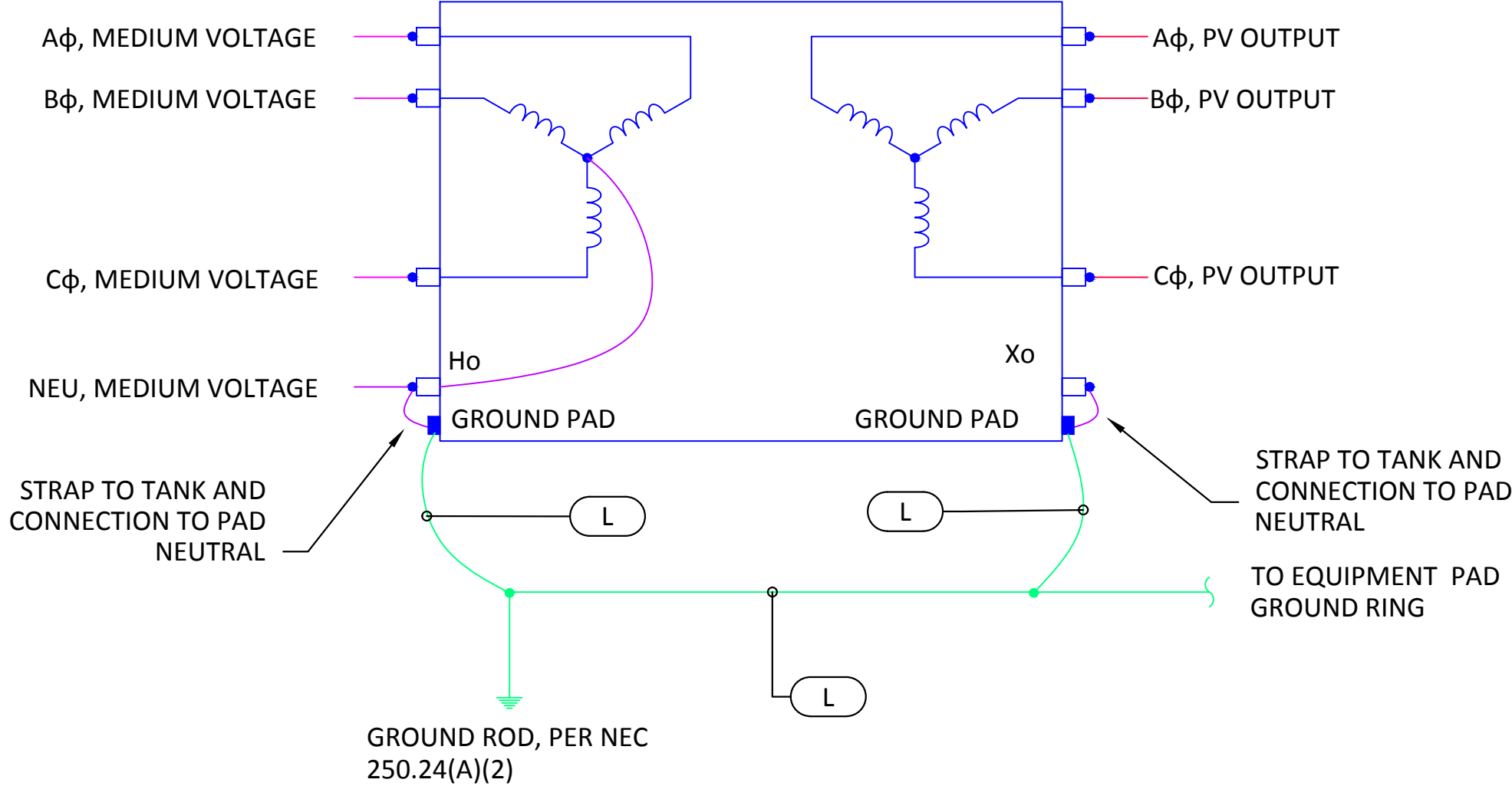
- MV FEEDERS
- FEEDERS/EQUIPMENT PROVIDED BY OTHERS
- UTILITY NEUTRAL
- NEW EQUIPMENT
- GROUNDING CONDUCTOR



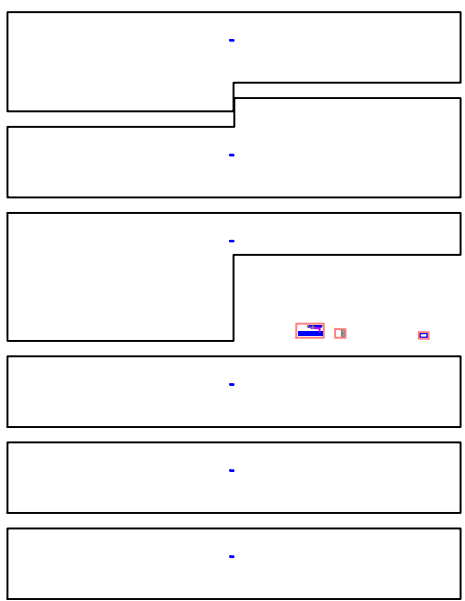
1 SITE PLAN - MEDIUM VOLTAGE ROUTING
SCALE: 1/32"=1'-0"



2 MEDIUM VOLTAGE INTERCONNECTION DETAIL
SCALE: NTS



3 MEDIUM VOLTAGE TRANSFORMER DETAIL
SCALE: NTS



KEY PLAN - OVERALL ARRAY

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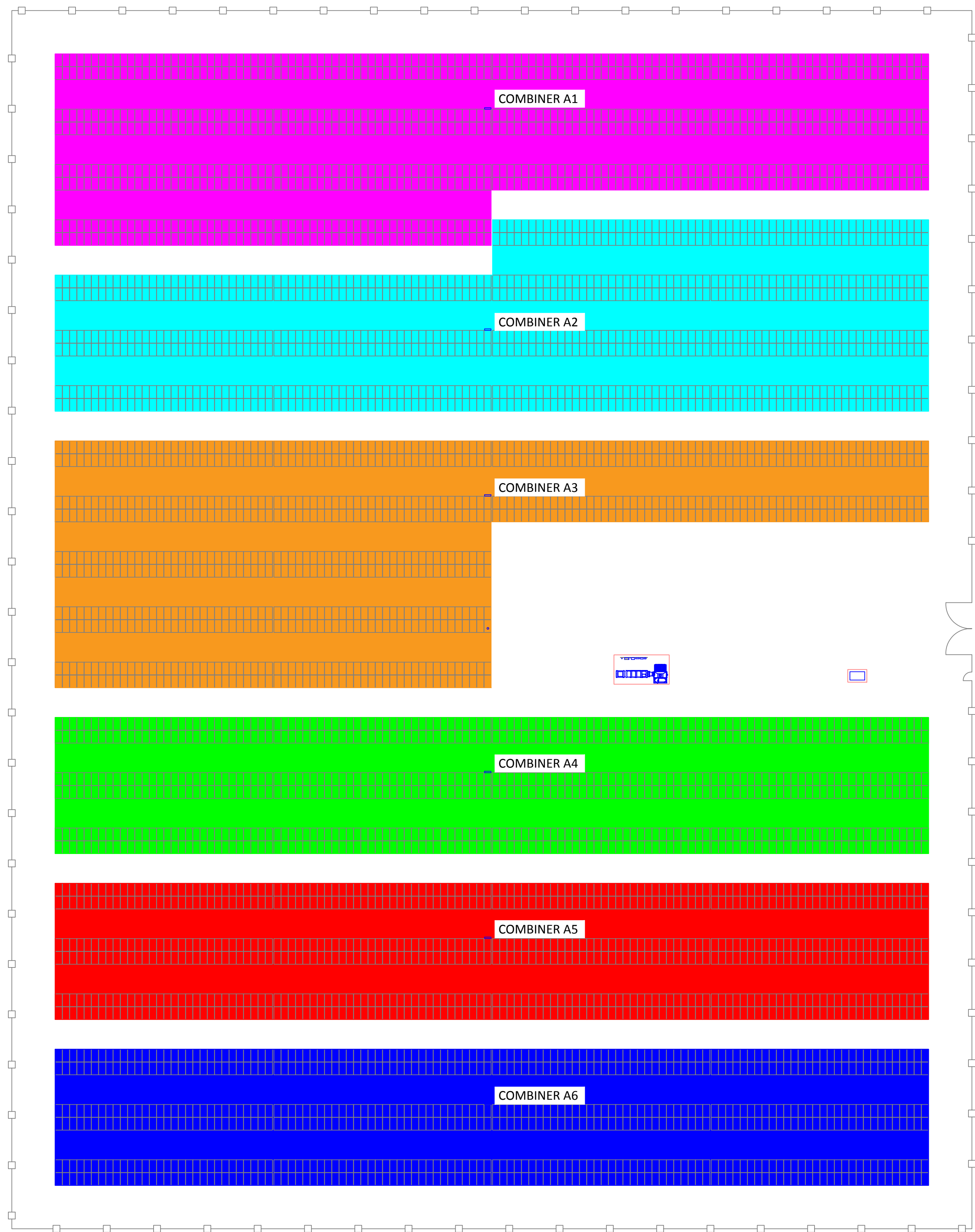
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REV	DATE	DESCRIPTION

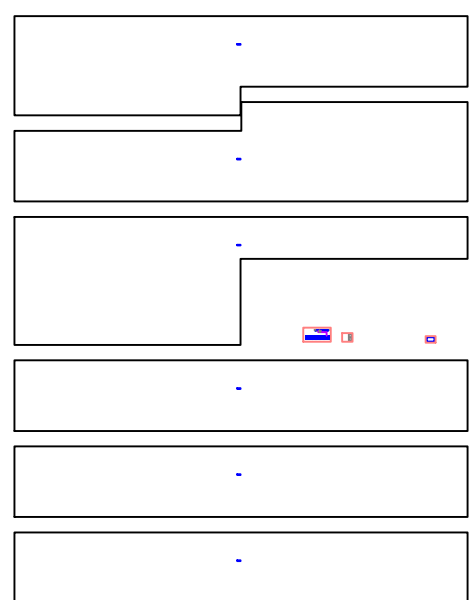
TITLE: SITE PLAN - MEDIUM VOLTAGE ROUTING
PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV2.2



GENERAL NOTES:
1. REFER TO EQUIPMENT SCHEDULE ON PV1.1 AND SINGLE LINE DIAGRAM ON PV1.0 FOR SPECIFICATIONS.

1 SITE PLAN - COMBINER LAYOUT
SCALE: 1/32"=1'-0"



KEY PLAN - OVERALL ARRAY

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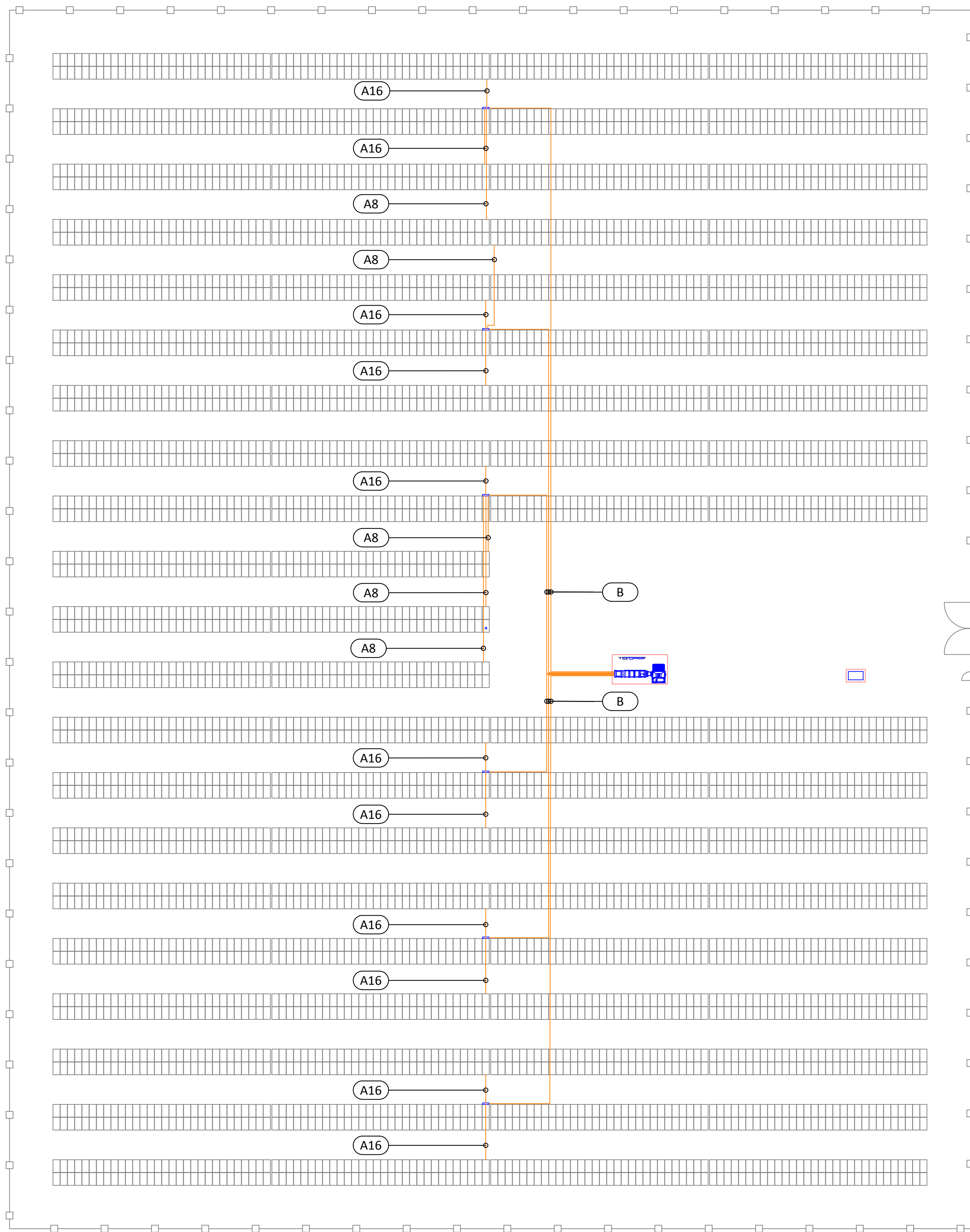
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REV	DATE	DESCRIPTION

TITLE:
PROJECT:
DATE:
SHEET:

SITE PLAN - COMBINER LAYOUT
NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC
04.06.2017
PV2.3

9 OF 18



1 SITE PLAN - DC FEEDER ROUTING
SCALE: 1/32"=1'-0"

FEEDER SCHEDULE											
**FEEDER IS NOTED BY											
A											
TAG	PHASE				NEUTRAL		GROUND		INSULATION	RACEWAY SIZE	
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER		(1)	#10	COPPER	PV	2"
B	(2) SET OF	(2)	250 KCMIL		ALUMINUM		(1)	#1	ALUMINUM	PV	2-1/2"
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS										
D	#NOTE6	(1) SET OF	(3)	#1/0	ALUMINUM				MV TR-XLPE WITH CONCENTRIC NEUTRAL	4"	
E	(1) SET OF	(2)	#12	COPPER		(1)	#12	COPPER		THWN-2	3/4"
F	(1) SET OF	(2)	#10	COPPER		(1)	#10	COPPER		THWN-2	3/4"
G	(1) SET OF	(1)	#12	COPPER		(1)	#12	COPPER		THWN-2	3/4"
H	(1) SET OF	(6)	#12	COPPER						THWN-2	3/4"
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT										3/4"
J	PROVIDED BY DRAKER										3/4"
K							(1)	#6	COPPER	BARE	
L							(1)	#3/0	COPPER	BARE	

FEEDER SCHEDULE NOTES:

1. (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED.

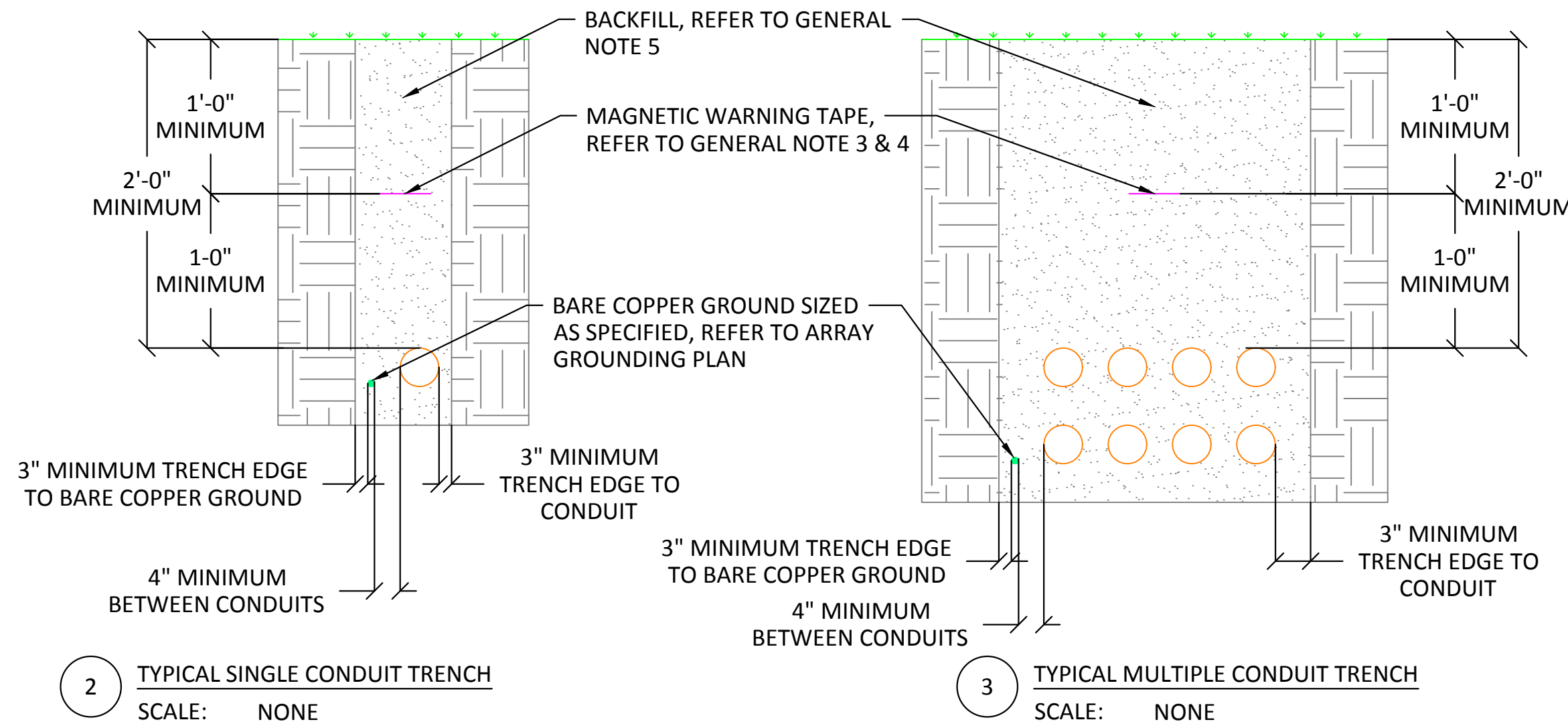
2. WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL.

3. REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE.

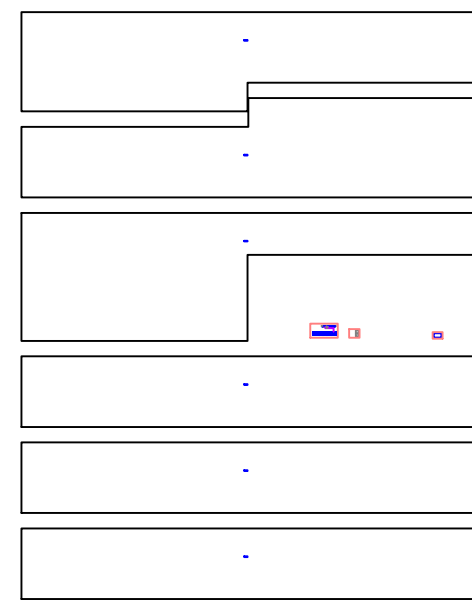
4. ALL RACEWAY SIZES ARE NEC MINIMUM REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION.

5. PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY.

6. PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.



- GENERAL NOTES:
- REFER TO EQUIPMENT SCHEDULE AND SINGLE LINE DIAGRAM FOR SPECIFICATIONS.
 - ALL UNDERGROUND RACEWAY SHALL BE SCHEDULE 40 PVC. TRANSITIONS BELOW TO ABOVE GRADE SHALL BE PER CONDUIT STUB UP DETAIL.
 - FOR TRENCHES 24" WIDE AND LESS, ONLY ONE RUN OF MAGNETIC ELECTRICAL WARNING TAPE SHALL BE REQUIRED PER DETAIL 3.
 - FOR TRENCHES WIDER THAN 24" ONE PIECE OF TAPE SHALL BE LOCATED AT EACH SIDE OF THE TRENCH WITH ADDITIONAL RUNS PROVIDED AS NECESSARY. THE MAXIMUM DISTANCE BETWEEN TAPE RUNS SHALL BE 24" ON CENTER.
 - TRENCH BOTTOMS: EXCAVATE TRENCHES 3" DEEPER THAN BOTTOM OF PIPE ELEVATION TO ALLOW FOR BEDDING COURSE. HAND EXCAVATE FOR BELL OF PIPE. EXCAVATE TRENCHES 3" DEEPER THAN ELEVATION REQUIRED IN ROCK OR OTHER UNYIELDING BEARING MATERIAL TO ALLOW BEDDING COURSE.
 - ALL BACKFILL SHOULD BE FREE OF MATERIALS THAT MAY DAMAGE THE CONDUIT OR CABLE SYSTEM. BACKFILL WITHIN 150 MM (6 IN) OF THE CONDUIT OR CABLE SHOULD BE FREE OF SOLID MATERIAL GREATER THAN 100 MM (2 IN) IN MAXIMUM DIMENSION OR WITH SHARP EDGES LIKELY TO DAMAGE IT. THE BALANCE OF BACKFILL SHOULD BE FREE OF SOLID MATERIAL GREATER THAN 200 MM (8 IN) IN DIAMETER. BACKFILL MATERIAL SHOULD BE ADEQUATELY COMPACTED.
 - REFER TO ARRAY GROUNDING DETAIL FOR BARE COPPER GROUND TRENCH ROUTING.
 - FEEDER ROUTING SHOWN DIAGRAMMATICALLY, COORDINATION WITH SITE CONDITIONS REQUIRED.



N
KEY PLAN - OVERALL ARRAY

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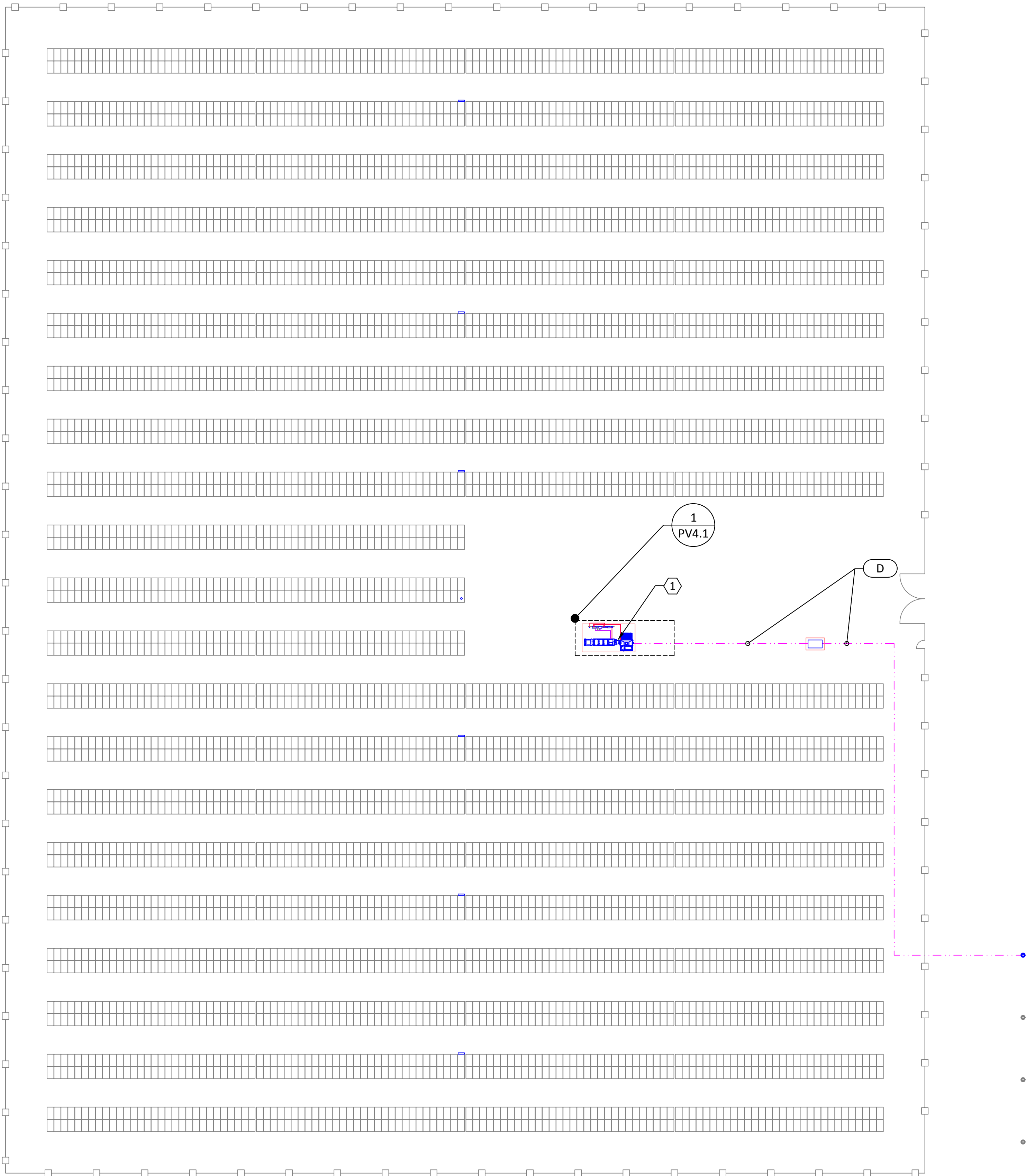
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TITLE: SITE PLAN - DC FEEDER ROUTING

PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV2.4

10 OF 18



1 SITE PLAN - AC AND COMMUNICATION FEEDER ROUTING
SCALE: 1/32"=1'-0"

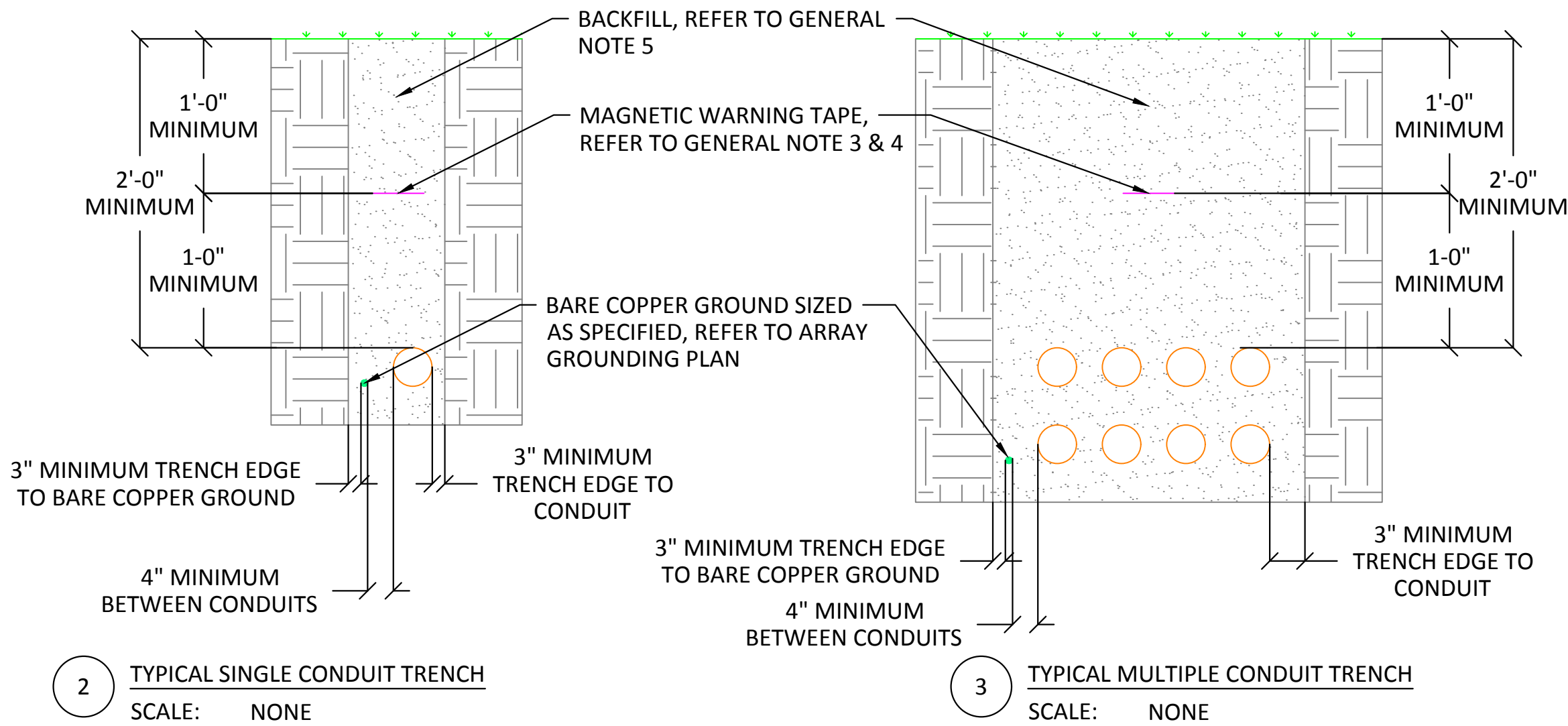
KEYED NOTES: ⓧ

1. DIRECT BUS CONNECTION BETWEEN INVERTER AND MEDIUM VOLTAGE TRANSFORMER.

FEEDER SCHEDULE									
**FEEDER IS NOTED BY ⓐ									
TAG	PHASE				NEUTRAL		GROUND		INSULATION
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER		(1) #10	COPPER	PV
B	(2) SET OF	(2)	250 KCMIL	ALUMINUM			(1) #1	ALUMINUM	PV
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS								
DNOTE6	(1) SET OF	(3)	#1/0	ALUMINUM					MV TR-XLPE WITH CONCENTRIC NEUTRAL
E	(1) SET OF	(2)	#12	COPPER			(1) #12	COPPER	THWN-2
F	(1) SET OF	(2)	#10	COPPER	(1) #10	COPPER	(1) #10	COPPER	THWN-2
G	(1) SET OF	(1)	#12	COPPER	(1) #12	COPPER	(1) #12	COPPER	THWN-2
H	(1) SET OF	(6)	#12	COPPER					THWN-2
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT								
J	PROVIDED BY DRAKER								
K							(1) #6	COPPER	BARE
L							(1) #3/0	COPPER	BARE

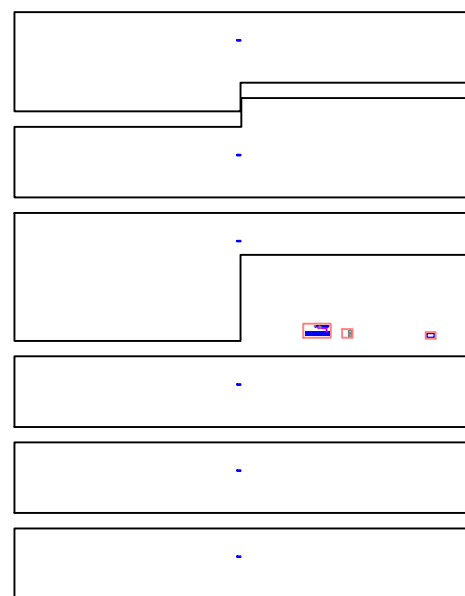
FEEDER SCHEDULE NOTES:

- (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED.
- WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL.
- REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE.
- ALL RACEWAY SIZES ARE NEC MINIMUM REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION.
- PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY.
- PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.



GENERAL NOTES:

- REFER TO EQUIPMENT SCHEDULE AND SINGLE LINE DIAGRAM FOR SPECIFICATIONS.
- ALL UNDERGROUND RACEWAY SHALL BE SCHEDULE 40 PVC. TRANSITIONS BELOW TO ABOVE GRADE SHALL BE PER CONDUIT STUB UP DETAIL.
- FOR TRENCHES 24" WIDE AND LESS, ONLY ONE RUN OF MAGNETIC ELECTRICAL WARNING TAPE SHALL BE REQUIRED PER DETAIL 3.
- FOR TRENCHES WIDER THAN 24" ONE PIECE OF TAPE SHALL BE LOCATED AT EACH SIDE OF THE TRENCH WITH ADDITIONAL RUNS PROVIDED AS NECESSARY. THE MAXIMUM DISTANCE BETWEEN TAPE RUNS SHALL BE 24" ON CENTER.
- TRENCH BOTTOMS: EXCAVATE TRENCHES 3" DEEPER THAN BOTTOM OF PIPE ELEVATION TO ALLOW FOR BEDDING COURSE. HAND EXCAVATE FOR BELL OF PIPE. EXCAVATE TRENCHES 3" DEEPER THAN ELEVATION REQUIRED IN ROCK OR OTHER UNYIELDING BEARING MATERIAL TO ALLOW BEDDING COURSE.
- ALL BACKFILL SHOULD BE FREE OF MATERIALS THAT MAY DAMAGE THE CONDUIT OR CABLE SYSTEM. BACKFILL WITHIN 150 MM (6 IN) OF THE CONDUIT OR CABLE SHOULD BE FREE OF SOLID MATERIAL GREATER THAN 100 MM (2 IN) IN MAXIMUM DIMENSION OR WITH SHARP EDGES LIKELY TO DAMAGE IT. THE BALANCE OF BACKFILL SHOULD BE FREE OF SOLID MATERIAL GREATER THAN 200 MM (8 IN) IN DIAMETER. BACKFILL MATERIAL SHOULD BE ADEQUATELY COMPACTED.
- REFER TO ARRAY GROUNDING DETAIL FOR BARE COPPER GROUND TRENCH ROUTING.
- FEEDER ROUTING SHOWN DIAGRAMMATICALLY, COORDINATION WITH SITE CONDITIONS REQUIRED.



N
KEY PLAN - OVERALL ARRAY

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REV	DATE	DESCRIPTION

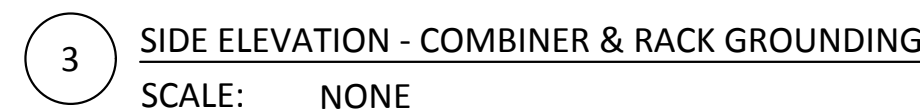
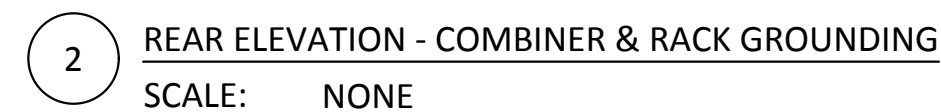
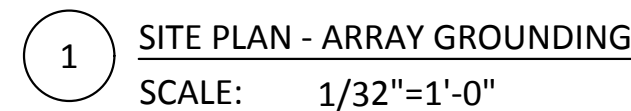
TITLE: SITE PLAN - AC AND COMMUNICATION FEEDER ROUTING

PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017

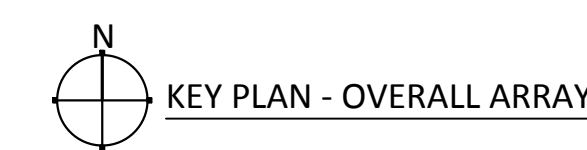
SHEET: PV2.5

11 OF 18

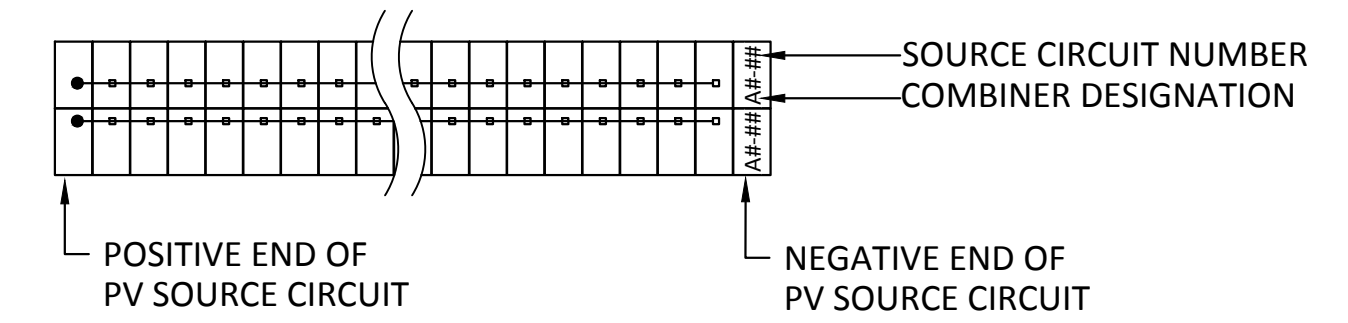


1. THE RACKING SYSTEM SHALL BE UL LISTED FOR GROUNDING CONTINUITY. COMPONENTS WITHIN THE RACKING SYSTEM SHALL FORM AN ELECTRICALLY BONDED UNIT AND REQUIRE ADDITIONAL BONDING FROM ONE INDIVIDUAL RACK SECTION TO ADJACENT SECTIONS.
2. REFER TO SINGLE LINE DIAGRAM AND SCHEDULES FOR SPECIFICATIONS.
3. ARRAY EQUIPMENT GROUND CONDUCTOR SHALL BE RUN IN TRENCH WITH COMBINER DC CONDUITS WHERE POSSIBLE.
4. GROUND FEEDER ROUTING SHOWN DIAGRAMMATICALLY, COORDINATION WITH SITE CONDITIONS REQUIRED.
5. PROVIDE AT LEAST 6'-1/2" OF WORKING CLEARANCE FOR INVERTERS AS PER NEC 110.26(A)(3) OR TO THE HEIGHT OF THE EQUIPMENT, WHICHEVER IS GREATER.

1. PROVIDE GROUND BRAID BETWEEN RACKING SECTIONS PER MANUFACTURER INSTRUCTIONS.
2. PROVIDE #10 COPPER (FEEDER A) EQUIPMENT GROUND CONDUCTOR (EGC) FROM THE COMBINER BOX GROUND BAR TO RACK ON ADJOINING ROW. EGC SHALL BE RUN WITH ASSOCIATED COMBINER BOX STRING FEEDERS.
3. PROVIDE #10 COPPER (FEEDER A) EQUIPMENT GROUND CONDUCTOR (EGC) FROM THE COMBINER BOX GROUND BAR TO RACK ON ADJOINING ROW ASSOCIATED WITH THE COMBINER BOX. EGC SHALL BE RUN WITH ASSOCIATED COMBINER BOX STRING FEEDERS.
4. PROVIDE #1 ALUMINIUM (FEEDER B) EQUIPMENT GROUND CONDUCTOR (EGC) FROM COMBINER BOX GROUND BAR TO ASSOCIATED INVERTER GROUND BAR. EGC SHALL BE RUN IN CONDUIT WITH ASSOCIATED PV DC INPUT CONDUCTORS.
5. PROVIDE #6 BARE COPPER (FEEDER K) JUMPER FROM THE COMBINER BOX GROUND BAR TO THE COMBINER BOX MOUNTING STRUCTURE.
6. PROVIDE #3/0 BARE COPPER (FEEDER L) ARRAY SUPPLEMENTAL GROUNDING ELECTRODE THE LENGTH OF ARRAY.
7. PROVIDE #6 BARE COPPER (FEEDER K) BONDING JUMPER VIA IRREVERSIBLE CRIMP FROM ARRAY SUPPLEMENTAL GROUNDING CONDUCTOR IN TRENCH TO POST OF RACKING. IRREVERSIBLE CRIMP SHALL BE UL LISTED FOR GROUNDING AND BONDING. ENSURE ALL CONNECTIONS ARE TORQUED TO MANUFACTURER'S SPECIFICATIONS.
8. PROVIDE #6 BARE COPPER (FEEDER K) BONDING JUMPER VIA IRREVERSIBLE CRIMP FROM ARRAY SUPPLEMENTAL GROUNDING CONDUCTOR IN TRENCH TO THE COMBINER BOX MOUNTING STRUCTURE. IRREVERSIBLE CRIMP SHALL BE UL LISTED FOR GROUNDING AND BONDING.
9. BOND ARRAY GROUNDING ELECTRODE VIA IRREVERSIBLE CRIMP.



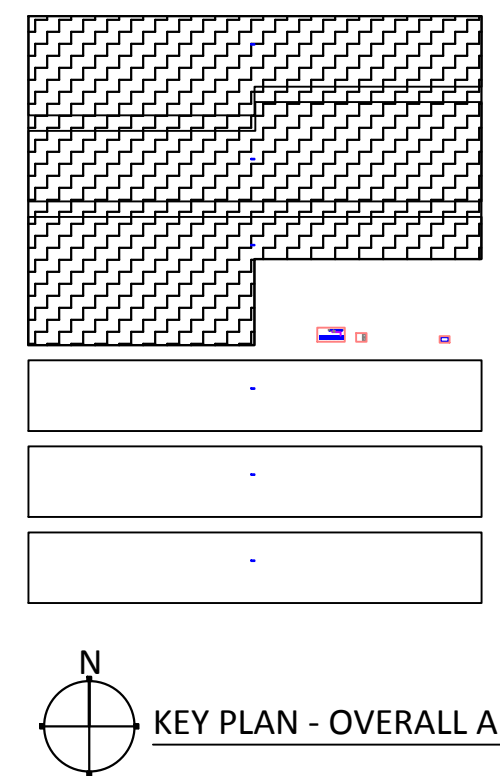
1. EACH STRING SHALL BE LABELED AS DESIGNATED WITH SHRINK TUBE.
2. LABELS SHALL BE LOCATED AT CONNECTOR ON BOTH POSITIVE AND NEGATIVE SIDES, AND AT THE CONNECTOR BOX.



2 TYPICAL TWO STRING DETAIL
SCALE: NONE



1 PARTIAL PLAN - STRING LAYOUT NORTH
SCALE: 1/16"=1'-0"



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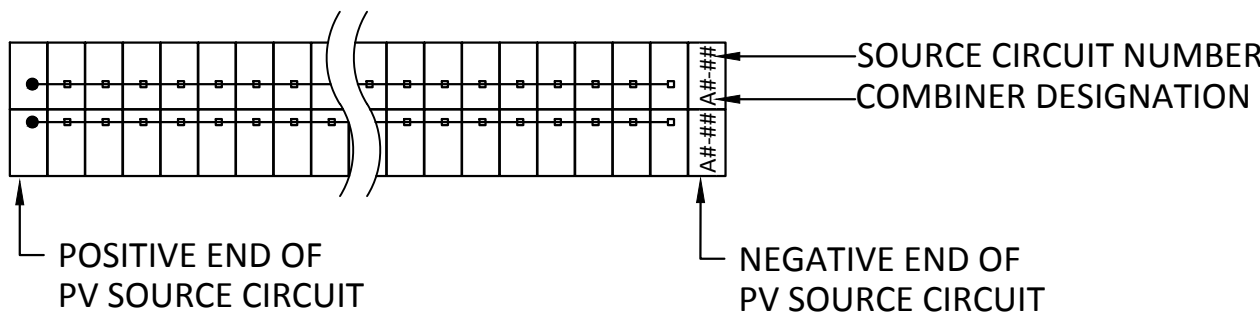


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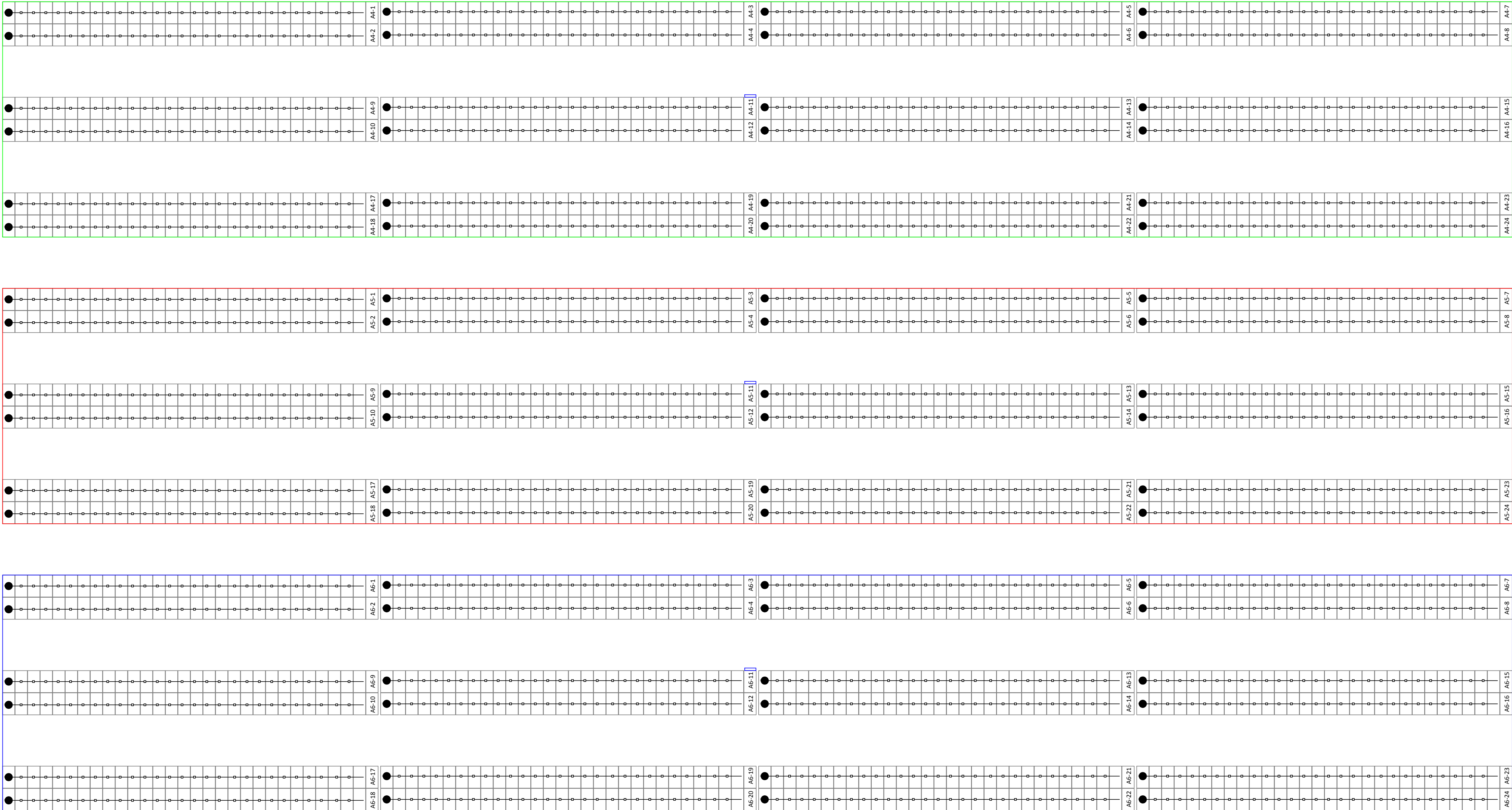
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TITLE:		PARTIAL PLAN - STRING LAYOUT NORTH
PROJECT:		NRECA SUNDA REFERENCE DESIGN 1,050KWAC, 1,500VDC
DATE:	04.06.2017	
SHEET:	PV3.0	

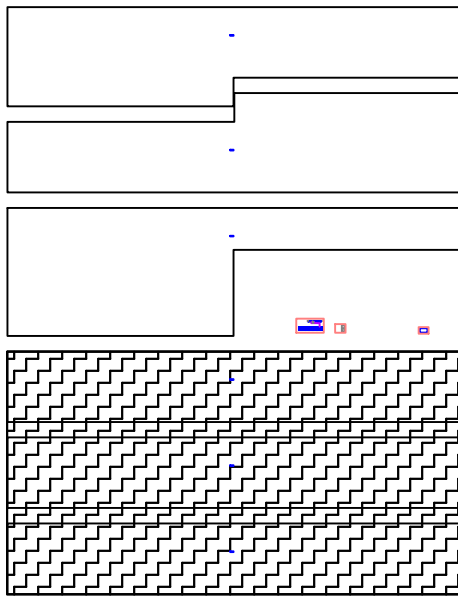
- GENERAL NOTES:
- 1. EACH STRING SHALL BE LABELED AS DESIGNATED WITH SHRINK TUBE.
 - 2. LABELS SHALL BE LOCATED AT CONNECTOR ON BOTH POSITIVE AND NEGATIVE SIDES, AND AT THE CONNECTOR BOX.



2 TYPICAL TWO STRING DETAIL
SCALE: NONE



1 PARTIAL PLAN - STRING LAYOUT SOUTH
SCALE: 1/16"=1'-0"



N
KEY PLAN - OVERALL ARRAY

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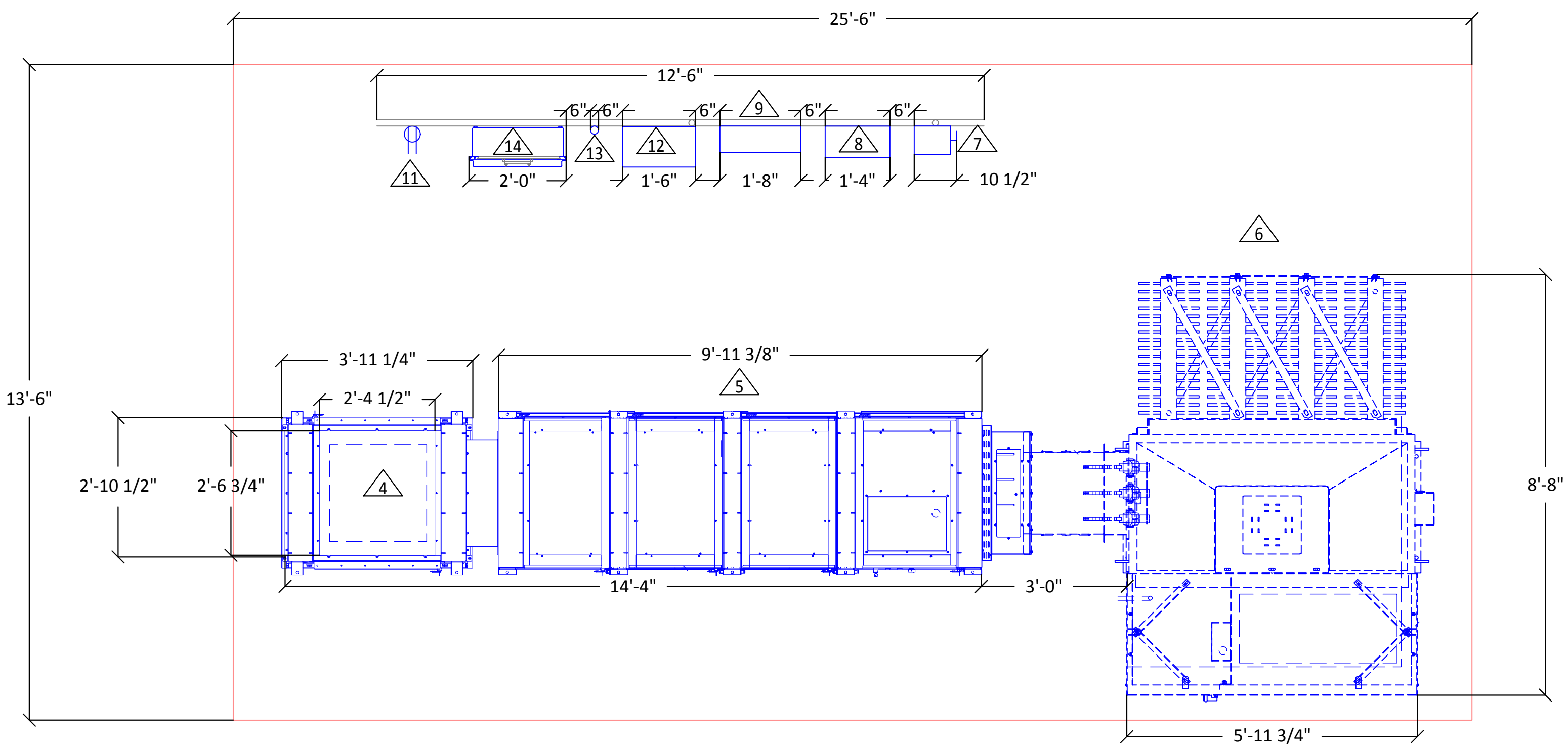
TITLE:
PARTIAL PLAN - STRING LAYOUT SOUTH

PROJECT:
NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE:
04.06.2017

SHEET:
PV3.1

14 OF 18



1 PARTIAL PLAN - EQUIPMENT PAD DIMENSIONS
SCALE: 1/2"=1'-0"

EQUIPMENT SCHEDULE				
**EQUIPMENT IS NOTED BY  #				
TAG	DESCRIPTION	QUANTITY	MANUFACTURER	NOTES
1	SOLAR PV MODULE	4,680	REC	315 WATT MODULE REFER TO MODULE SCHEDULE FOR SPECIFICATION. MODULES SHALL BE LABELED PER NEC 690 VI
2	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 28 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
3	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 24 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
4	DC CABINET	1	POWERELECTRONICS	FSDK DC CABINET 6 INPUT WITH (3) 400A FUSES AND (3) 350A FUSE, NEGETIVELY GROUNDED, 1500VDC, NEMA 3R ENCLOSURE. PART NUMBER: FSDK L6N1E
5	INVERTER	1	POWERELECTRONICS	1050 KVA, 3 PHASE 565 VOLT (REFER TO INVERTER RATING SCHEDULE FOR SPECIFICATION). PART NUMBER:HEC-US FS1050CU15NR5NA1
6	MEDIUM VOLTAGE TRANSFORMER	1	POWERELECTRONICS	1050 KVA, THREE PHASE, 12.47/7.2 KV YGRND PRIMARY, 565V Y SECONDARY. LIQUID COOLED, BAYONET FUSES ON PRIMARY SIDE.
7	DISCONNECT FOR AUXILIARY POWER PANEL	1	SQUARE-D	30 AMP 2 POLE FUSED DISCONNECT WITH (2) 15 AMP FUSES, NEMA 3R. PROVIDE STICKER LABEL TO BE VISIBLE WHEN FUSE IS REMOVED TO READ "MAX 15A".
8	5 KVA DISTRIBUTION TRANSFORMER	1	DONGAN	SINGLE PHASE GENERAL PURPOSE DRY TYPE TRANSFORMER, PRIMARY VOLTS 565 VAC, SECONDARY VOLTS 240/120 VAC, NEMA 3R ENCAPSULATED ENCLOSURE
9	AUXILIARY POWER PANEL	1	SQUARE-D	AUXILIARY PANEL BOARD, 100 AMP BUS WITH 30 AMP MAIN CIRCUIT BREAKER. REFER TO PANEL SCHEDULE FOR ADDITIONAL SPECIFICATIONS.
10	SURGE PROTECTION DEVICE	1	SQUARE-D	NEMA 4X RATING, INTEGRATED OVER CURRENT PROTECTION, MOUNTED DIRECTLY TO ENCLOSURE OF EQUIPMENT, MANUFACTURER PROVIDED INSTALLATION MANUAL SHALL BE FOLLOWED <u>EXACTLY</u>
11	RECEPTACLE	1	PASS & SEYMOUR	120V, 20 AMP, WEATHER PROOF GFI DUPLEX RECEPTACLE.
12	PV MONITORING SYSTEM	1	DRAKER	CENTRAL DATA ACQUISITION UNIT, NEMA 3R ENCLOSURE, LOCAL DATA STORAGE, INTEGRAL ETHERNET COMMUNICATIONS , WEB BASED DISPLAY AND LOCAL KEYPAD DISPLAY, PROVIDE 120V 1 ϕ POWER SUPPLY
13	PV METEOROLOGICAL STATION	1	DRAKER	STATION INCLUDES: PLANE OF ARRAY PYRANOMETER, GLOBAL HORIZONTAL IRRADIANCE PYRANOMETER, BACK OF MODULE TEMPERATURE SENSOR, AMBIENT TEMPERATURE, AND WIND SENSORS
14	PRODUCTION METER	1	SHARK 100	REVENUE GRADE METER IN NEMA 3R ENCLOSURE
15	MEDIUM VOLTAGE SWITCH	1	S&C	15KV PAD MOUNTED SWITCH WITH INTEGRATED 65A STANDARD SPEED FUSES.
16	COORDINATED POLE MOUNTED SWITCH	1	ABB	SWITCH TO MEET THE REQUIREMENT OF THE UTILITY
17	GROUND ROD	5	HARGER OR EQUAL	3/4" DIAMETER, 10'-0" LONG COPPER CLAD GROUND ROD

EQUIPMENT SCHEDULE NOTES:

1. SPECIFIED MANUFACTURE OR EQUIVALENT SHALL BE PROVIDED.

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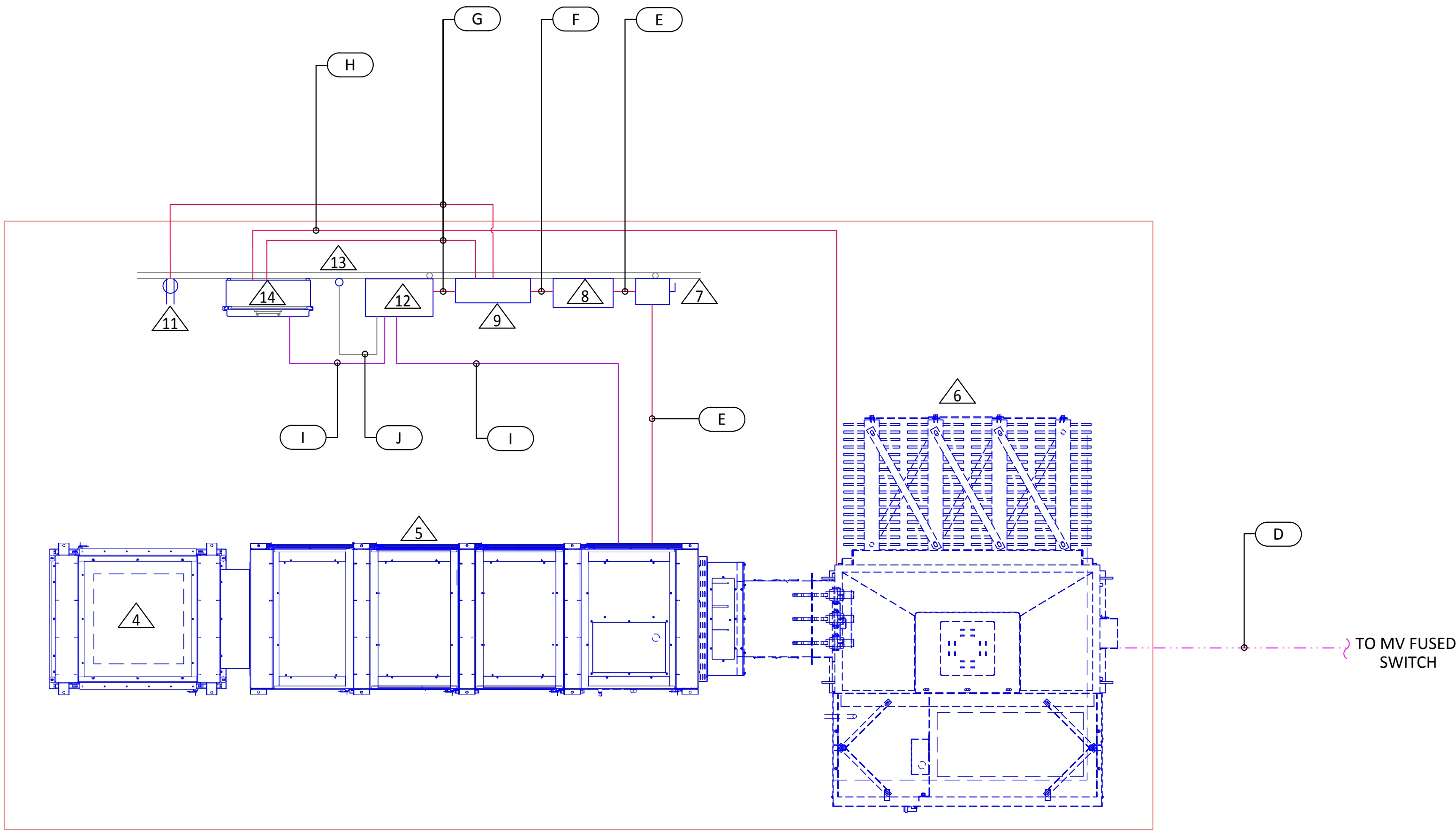
REV	DATE	DESCRIPTION

TITLE: PARTIAL PLAN-EQUIPMENT PAD DIMENSIONS
PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV4.0

FEEDER SCHEDULE **FEEDER IS NOTED BY (A)									
TAG	PHASE			NEUTRAL		GROUND		INSULATION	RACEWAY SIZE
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER	(1)	#10	COPPER	PV
B	(2) SET OF	(2)	250 KCMIL	ALUMINUM		(1)	#1	ALUMINUM	PV
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS								
D ^{NOTE#6}	(1) SET OF	(3)	#1/0	ALUMINUM				MV TR-XLPE WITH CONCENTRIC NEUTRAL	4"
E	(1) SET OF	(2)	#12	COPPER		(1)	#12	COPPER	THWN-2
F	(1) SET OF	(2)	#10	COPPER	(1) #10	COPPER	(1) #10	COPPER	THWN-2
G	(1) SET OF	(1)	#12	COPPER	(1) #12	COPPER	(1) #12	COPPER	THWN-2
H	(1) SET OF	(6)	#12	COPPER				THWN-2	3/4"
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT								3/4"
J	PROVIDED BY DRAKER								3/4"
K						(1)	#6	COPPER	BARE
L						(1)	#3/0	COPPER	BARE

- FEEDER SCHEUDLE NOTES:
- (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED.
 - WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL.
 - REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE.
 - ALL RACEWAY SIZES ARE NEC MINIMUM REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION.
 - PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY.
 - PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.



1 PARTIAL PLAN - EQUIPMENT PAD AC AND COMMUNICATION FEEDER ROUTING
SCALE: 1/2"=1'-0"

LINE TYPE LEGEND:	
CONCRETE PAD	_____
EQUIPMENT	_____
PROVIDED BY MANUFACTURER/ OTHERS	_____
AC FEEDERS	_____
COMMUNICATIONS	_____
MEDIUM VOLTAGE FEEDERS	_____

EQUIPMENT SCHEDULE **EQUIPMENT IS NOTED BY (#)				
TAG	DESCRIPTION	QUANTITY	MANUFACTURER	NOTES
1	SOLAR PV MODULE	4,680	REC	315 WATT MODULE REFER TO MODULE SCHEDULE FOR SPECIFICATION. MODULES SHALL BE LABELED PER NEC 690 VI
2	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 28 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
3	DISCONNECT COMBINER	3	SOLARBOS	28 STRING DISCONNECTING COMBINER TO CONTAIN 24 STRINGS, RATED AT 400A WITH 15A FUSES, 1500VDC, RATED FOR CONTINUOUS DUTY, WITH DISCONNECT HANDLE MOUNTED ON DOOR EXTERIOR, NEMA 3R ENCLOSURE.
4	DC CABINET	1	POWERELECTRONICS	FSDK DC CABINET 6 INPUT WITH (3) 400A FUSES AND (3) 350A FUSE, NEGATIVELY GROUNDED, 1500VDC, NEMA 3R ENCLOSURE. PART NUMBER: FSDK L6N1E
5	INVERTER	1	POWERELECTRONICS	1050 KVA, 3 PHASE 565 VOLT (REFER TO INVERTER RATING SCHEDULE FOR SPECIFICATION). PART NUMBER:HEC-US FS1050CU15NR5NA1
6	MEDIUM VOLTAGE TRANSFORMER	1	POWERELECTRONICS	1050 KVA, THREE PHASE, 12.47/7.2 KV YGRND PRIMARY, 565V Y SECONDARY. LIQUID COOLED, BAYONET FUSES ON PRIMARY SIDE.
7	DISCONNECT FOR AUXILIARY POWER PANEL	1	SQUARE-D	30 AMP 2 POLE FUSED DISCONNECT WITH (2) 15 AMP FUSES, NEMA 3R. PROVIDE STICKER LABEL TO BE VISIBLE WHEN FUSE IS REMOVED TO READ "MAX 15A".
8	5 KVA DISTRIBUTION TRANSFORMER	1	DONGAN	SINGLE PHASE GENERAL PURPOSE DRY TYPE TRANSFORMER, PRIMARY VOLTS 565 VAC, SECONDARY VOLTS 240/120 VAC, NEMA 3R ENCAPSULATED ENCLOSURE
9	AUXILIARY POWER PANEL	1	SQUARE-D	AUXILIARY PANEL BOARD, 100 AMP BUS WITH 30 AMP MAIN CIRCUIT BREAKER. REFER TO PANEL SCHEDULE FOR ADDITIONAL SPECIFICATIONS.
10	SURGE PROTECTION DEVICE	1	SQUARE-D	NEMA 4X RATING, INTEGRATED OVER CURRENT PROTECTION, MOUNTED DIRECTLY TO ENCLOSURE OF EQUIPMENT, MANUFACTURER PROVIDED INSTALLATION MANUAL SHALL BE FOLLOWED <u>EXACTLY</u>
11	RECEPTACLE	1	PASS & SEYMOUR	120V, 20 AMP, WEATHER PROOF GFI DUPLEX RECEPTACLE.
12	PV MONITORING SYSTEM	1	DRAKER	CENTRAL DATA ACQUISITION UNIT, NEMA 3R ENCLOSURE, LOCAL DATA STORAGE, INTEGRAL ETHERNET COMMUNICATIONS , WEB BASED DISPLAY AND LOCAL KEYPAD DISPLAY, PROVIDE 120V 1φ POWER SUPPLY
13	PV METEOROLOGICAL STATION	1	DRAKER	STATION INCLUDES: PLANE OF ARRAY PYRANOMETER, GLOBAL HORIZONTAL IRRADIANCE PYRANOMETER, BACK OF MODULE TEMPERATURE SENSOR, AMBIENT TEMPERATURE, AND WIND SENSORS
14	PRODUCTION METER	1	SHARK 100	REVENUE GRADE METER IN NEMA 3R ENCLOSURE
15	MEDIUM VOLTAGE SWITCH	1	S&C	15KV PAD MOUNTED SWITCH WITH INTEGRATED 65A STANDARD SPEED FUSES.
16	COORDINATED POLE MOUNTED SWITCH	1	ABB	SWITCH TO MEET THE REQUIREMENT OF THE UTILITY
17	GROUND ROD	5	HARGER OR EQUAL	3/4" DIAMETER, 10'-0" LONG COPPER CLAD GROUND ROD

- EQUIPMENT SCHEDULE NOTES:
- SPECIFIED MANUFACTURE OR EQUIVALENT SHALL BE PROVIDED.

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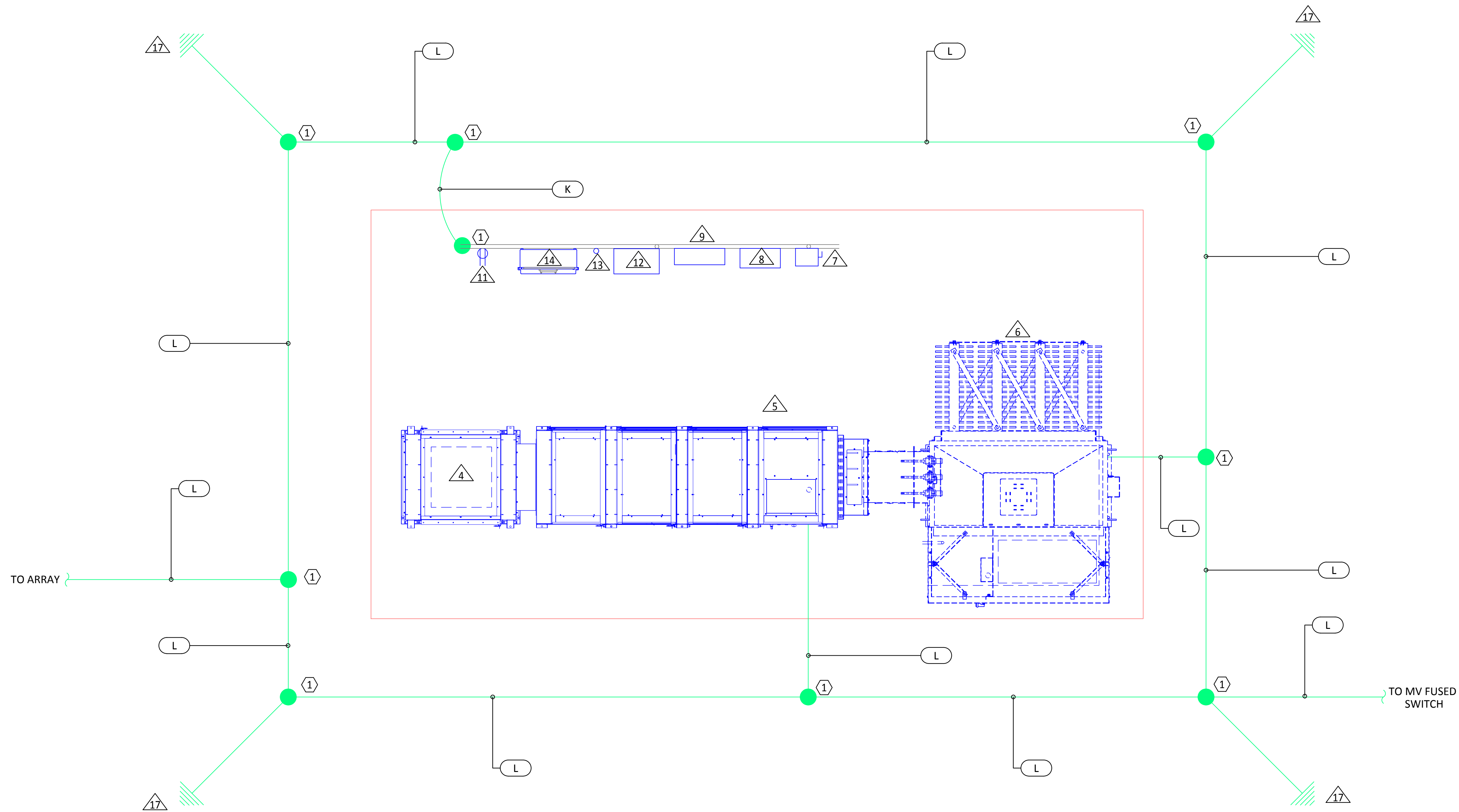
TITLE:	PARTIAL PLAN-EQUIPMENT PAD AC AND COMMUNICATION FEEDER ROUTING
PROJECT:	NRECA SUNDA REFERENCE DESIGN 1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV4.1

LINE TYPE LEGEND:	
CONCRETE PAD	
EQUIPMENT	
PROVIDED BY MANUFACTURER/ OTHERS	
GROUND FEEDERS	

- GENERAL NOTES:
- REFER TO EQUIPMENT SCHEDULE ON PV4.0 FOR SPECIFICATIONS.

- KEYED NOTES: ⓧ
- PROVIDE IRREVERSIBLE BOND TO GROUND RING.



1 PARTIAL PLAN - EQUIPMENT PAD GROUNDING
SCALE: 1/2"=1'-0"

FEEDER SCHEDULE												
**FEEDER IS NOTED BY												
A												
TAG	PHASE				NEUTRAL		GROUND		INSULATION	RACEWAY SIZE		
A	(1) SET OF	#NOTE1	(2) - (16)	#10	COPPER		(1)	#10	COPPER	PV	2"	
B	(2) SET OF	(2)	250 KCMIL	ALUMINUM			(1)	#1	ALUMINUM	PV	2-1/2"	
C	DIRECT BUS CONNECTION BY POWER ELECTRONICS											
D ^{NOTE#6}	(1) SET OF	(3)	#1/0	ALUMINUM					MV TR-XLPE WITH CONCENTRIC NEUTRAL		4"	
E	(1) SET OF	(2)	#12	COPPER			(1)	#12	COPPER	THWN-2	3/4"	
F	(1) SET OF	(2)	#10	COPPER	(1)	#10	COPPER	(1)	#10	COPPER	THWN-2	3/4"
G	(1) SET OF	(1)	#12	COPPER	(1)	#12	COPPER	(1)	#12	COPPER	THWN-2	3/4"
H	(1) SET OF	(6)	#12	COPPER						THWN-2	3/4"	
I	CAT5E OR CAT6 ETHERNET CABLE: BELDEN 7937A OR EQUIVALENT											3/4"
J	PROVIDED BY DRAKER											3/4"
K							(1)	#6	COPPER	BARE		
L							(1)	#3/0	COPPER	BARE		

FEEDER SCHEDULE NOTES:

1. (#) - DENOTES QUANTITY OF DC PHASE WIRES TO BE PROVIDED.

2. WHERE MULTIPLE CONDUITS ARE NOTED, THE RACEWAYS SHALL BE PROVIDED IN PARALLEL.

3. REFER TO RACEWAY APPLICATION SCHEDULE FOR RACEWAY TYPE.

4. ALL RACEWAY SIZES ARE NEC MINIMUM REQUIREMENTS, LARGER CONDUITS ARE PERMITTED FOR EASE OF INSTALLATION.

5. PV SOURCE CIRCUITS SHALL NOT BE REQUIRED TO BE IN RACEWAY IF CONDUCTORS ARE NOT READILY ACCESSIBLE AND NOT EXPOSED TO PHYSICAL DAMAGE. BELOW GRADE PV SOURCE CIRCUITS SHALL BE IN RACEWAY.

6. PROVIDE 15KV RATED MEDIUM VOLTAGE FEEDERS WITH 100% INSULATION.

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TITLE: PARTIAL PLAN-EQUIPMENT PAD GROUNDING

PROJECT: NRECA
SUNDA REFERENCE DESIGN
1,050KWAC, 1,500VDC

DATE: 04.06.2017

SHEET: PV4.2

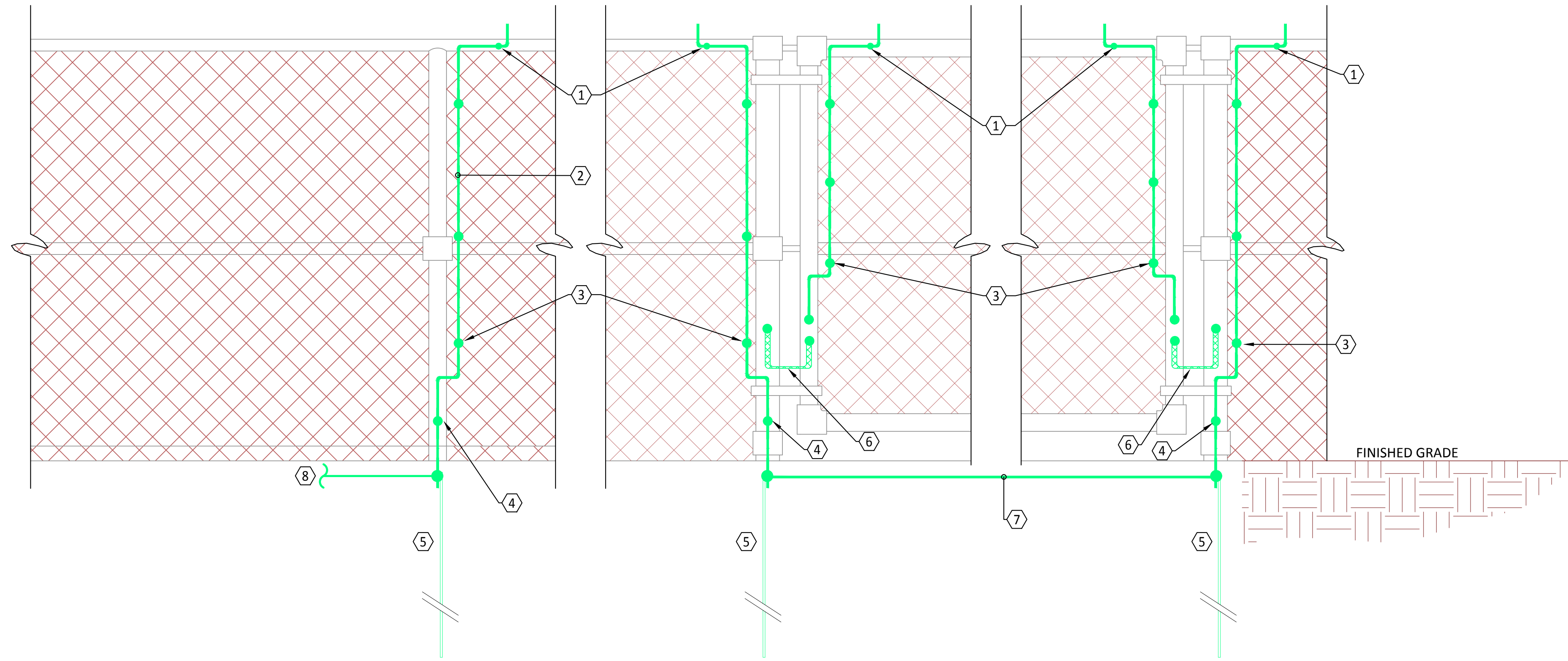
17 OF 18

GENERAL NOTES:

1. ALL FENCE GROUNDING POINTS SHALL BE LOCATED WITHIN FENCE PERIMETER.
2. GROUND CORNER POSTS AND ADDITIONAL POSTS AT 500' INTERVAL.
3. GROUND ALL GATE POSTS.

KEYED NOTES:

1. PROVIDE EXOTHERMIC WELD TO TOP RAIL.
2. #6 BARE COPPER WIRE, TYPICAL UNLESS NOTED OTHERWISE.
3. PROVIDE SPLIT BOLT TO CONNECT WIRE TO FENCE FABRIC.
4. PROVIDE EXOTHERMIC WELD TO FENCE POST.
5. 3/4" X 10' COPPER CLAD GROUND ROD BONDED TO BARE COPPER.
6. FLEXIBLE GROUND BRAID SECURED TO GATE.
7. GATES SHALL BE BONDED TOGETHER.
8. TO ARRAY SUPPLEMENTAL GROUNDING ELECTRODE.



1 FENCE GROUNDING DETAIL
SCALE: NTS

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TITLE:	FENCE GROUNDING DETAIL
PROJECT:	NRECA SUNDA REFERENCE DESIGN 1,050KWAC, 1,500VDC

DATE: 04.06.2017
SHEET: PV5.0