

# CAL POLY ACADEMIC LAB SOLAR PHOTOVOLTAIC SYSTEM

## TEAM

## DESCRIPTION

## LOCATION

## CODES

## SHEET INDEX

**CLIENT**  
CALIFORNIA POLYTECHNIC STATE UNIVERSITY  
1 GRAND AVE., BUILDING 70  
SAN LUIS OBISPO, CA 93407

**CONTRACTOR**  
REC SOLAR  
3450 BROAD ST. SUITE 105  
SAN LUIS OBISPO, CA 93401  
PH: 805-703-4498  
PROJECT MANAGER: KIM STRICKLAND  
DESIGN ENGINEER: JESSICA KENDRICK  
ENGINEERING INTERN: JASON CHAUVIN (CAL POLY)

**ELECTRICAL ENGINEER**  
SONOMA ELECTRICAL ENGINEERING, INC.  
1125 SHADY OAK PLACE,  
SANTA ROSA, CA 95404  
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CONTACT: MARTIN WOBIG, PE

**CIVIL ENGINEER**  
DPSI  
1998 SANTA BARBARA AVE, SUITE 120  
SAN LUIS OBISPO, CA 93401  
PH: 805-250-2891  
CONTACT: DAVID CHANLEY, PE, QSD/P

**STRUCTURAL ENGINEER**  
ENGINEERED POWER SOLUTIONS  
1405 SPRING ST. #204  
PASO ROBLES, CA 93446  
PH: 805-296-3171  
CONTACT: MATT GILLISS, PE

**STRUCTURAL - ROOF SYSTEM**  
PZSE STRUCTURAL ENGINEERS  
1478 STONE POINT DR., SUITE 190,  
ROSEVILLE, CA 95661  
PH: 916-961-3960  
CONTACT: XXXX

**RACKING CONTACT**  
RBI SOLAR  
5513 VINE ST.  
CINCINNATI, OH 45217  
PH: 951-587-1452  
CONTACT: KEVIN WARD

**RACKING CONTACT**  
PANELCLAW, INC.  
1570 OSGOOD ST. STE 2100  
NORTH ANDOVER, MA 01845  
PH: 978-688-4900  
CONTACT: PAUL BITTEROLF

**RACKING CONTACT**  
SNAPNACK  
775 FIERO LANE, STE 200  
SAN LUIS OBISPO, CA 93401  
PH: 805-547-2607  
CONTACT: CODY NORMAN

**LANDSCAPE ARCHITECT**  
XXXXXX  
XXXXXX  
XXXXXX  
PH: XXX-XXX-XXXX  
CONTACT: XXXXXX

THE PROJECT CONSISTS OF THE INSTALLATION AND COMMISSIONING OF A SOLAR PHOTOVOLTAIC SYSTEM

THE SYSTEM WILL INCLUDE SOLAR MODULES AT:  
AZIMUTH: VARIES°  
PITCH: 20° & 5°  
LOCATED ON: GROUND & ROOF  
ROOF TYPE: FIXED TILT & FLUSH MOUNT  
RACKING SYSTEM: RBI, PANELCLAW & SNAPNACK

INTERCONNECTION INFORMATION AT POC:  
VOLTAGE: 208V  
CURRENT: 60A  
CONFIGURATION: 3-PHASE  
LOCATION: EXISTING SWITCHGEAR IN ELECTRICAL ROOM

PV INVERTERS AND EQUIPMENT CABINETS SHALL BE MOUNTED ON THE PV RACKING OUTSIDE AND AT THE ELECTRICAL ROOM.

### SYSTEM SIZE:

DC SYSTEM SIZE (kW):  
ZONE 1A - 6.9  
ZONE 1B - 6.9  
ZONE 2A - 3.45  
ZONE 2B - 3.45  
ZONE 3 - 4.66  
TOTAL - 25.36

AC NAMEPLATE SYSTEM SIZE (kW)  
ZONE 1A - 5.75  
ZONE 1B - 5.75  
TOTAL - 11.5

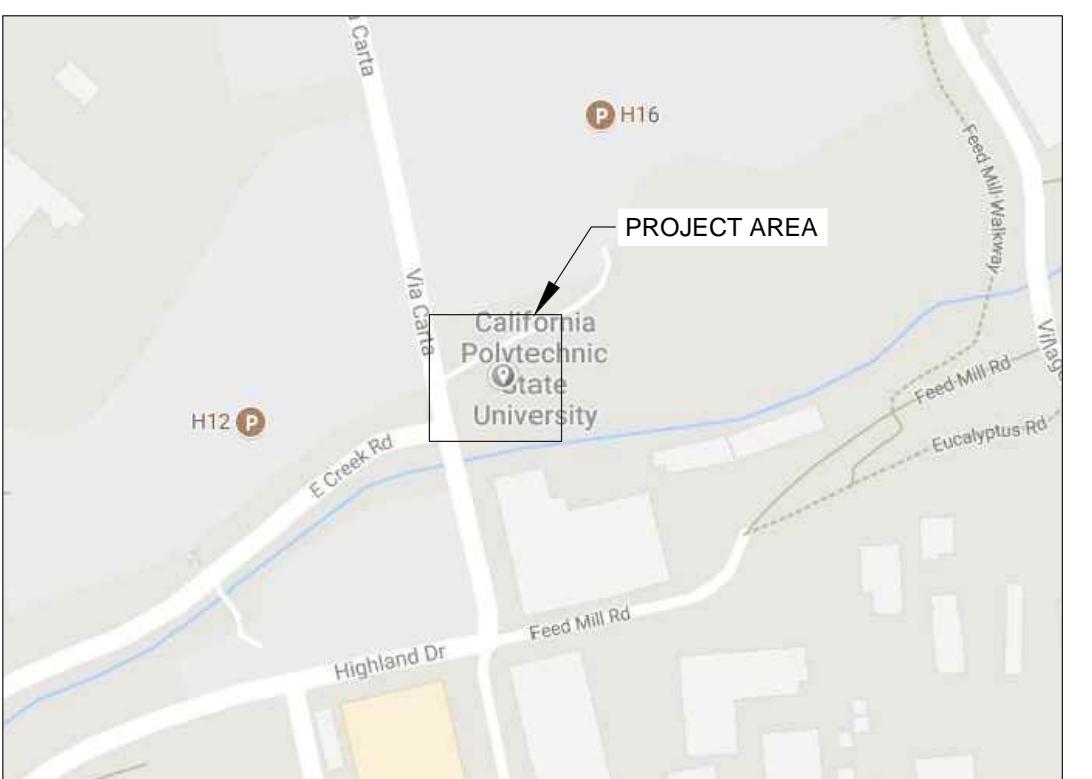
DC:AC RATIO: (6.9/5=1.38)

### SYSTEM SPECIFICATIONS:

MODULES: (62) TRINA SOLAR TSM-DE14A (II) 345Wp  
(8) SUNPOWER SPR-E20-435-COM  
(2) HANWHA HSL60P6-PB-4-245Q  
INVERTER: (2) SMA SUNNY BOY 5.0-US

UTILITY: PG&E (PACIFIC GAS AND ELECTRIC)  
DC VOLTAGE: 600 VDC

PROPERTY  
CALIFORNIA POLYTECHNIC STATE UNIVERSITY  
1 GRAND AVE., BUILDING 70  
SAN LUIS OBISPO, CA 93407  
PROJECT IS LOCATED ADJACENT TO BUILDING 20



ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUCTED IF NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES:

CAL OSHA  
ANSI/EIA-222- LIFE SAFETY CODE NFPA-101  
2015 NFPA 1 FIRE CODE  
CITY/COUNTY ORDINANCES (JURISDICTION)  
2016 CALIFORNIA ELECTRIC SAFETY CODE (CESC)  
2016 CALIFORNIA BUILDING CODE (CBC)  
2016 CALIFORNIA ELECTRICAL CODE (CEC) & SUPPLEMENTAL CODES  
2014 NATIONAL ELECTRIC CODE  
CALIFORNIA ENERGY CODE 2016  
CALIFORNIA FIRE CODE 2016  
CALIFORNIA GREEN BUILDING CODE 2016  
COUNTY BUILDING AD CONSTRUCTION ORDINANCE - TITLE 19  
COUNTY COASTAL ZONE LAND USE ORDINANCE - TITLE 23  
COUNTY FIRE CODE ORDINANCE - TITLE 16  
COUNTY LAND USE ORDINANCE - TITLE 22

## UNDERGROUND UTILITIES

COLOR CODE	
WHITE	PROPOSED EXCAVATION
PINK	TEMP SURVEY MARKINGS
RED	ELECTRIC
YELLOW	GAS-OIL-STEAM
ORANGE	COMMUNICATION CATV
BLUE	WATER
PURPLE	RECLAIMED WATER
GREEN	SEWER



EXISTING UNDERGROUND FACILITIES ARE SHOWN ON THESE PLANS FROM RECORD INFORMATION AND ARE FOR INFORMATION ONLY. OTHER UNDERGROUND FACILITIES NOT SHOWN ON THE PLANS MAY EXIST. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL EXISTING UNDERGROUND FACILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY A ONE-CALL SERVICE CENTER, TOLL FREE AT 811, NO LESS THAN TWO DAYS PRIOR TO ANY EXCAVATION.

SHEET	DESCRIPTION
G101	COVER SHEET
G201	GENERAL NOTES, SYMBOLS & ABBREVIATIONS
G301	PROJECT SITE PLAN
PV101	EQUIPMENT & STRINGING PLAN - ZONE 1A, 1B, 2A, 2B
PV102	EQUIPMENT PLAN - ZONE 3 - DC ROOF MOUNT
PV301	SINGLE LINE DIAGRAM - ZONE 1A & 1B - GRID TIED
PV302	SINGLE LINE DIAGRAM - ZONE 2A & 2B - LAB YARD
PV303	SINGLE LINE DIAGRAM - ZONE 3 - DC ARRAY
PV304	THREE LINE DIAGRAM - SPARE CIRCUITS PER EE DEPT
PV401	POINT OF CONNECTION PLAN - BUILDING 20 ROOM 103
PV402	EQUIPMENT ELEVATION
PV403	RACKING PLAN - ZONE 1B - ROOF MOUNT
PV404	RACKING PLAN - ZONE 3 - ROOF MOUNT
PV501	RACKING DETAIL
PV521	ROOF MOUNT DETAILS
PV531	GROUND MOUNT/TRENCH DETAILS
PV551	GROUNDING & BONDING DETAILS
PV552	GROUNDING & BONDING DETAILS
PV561	EQUIPMENT MOUNTING DETAIL
PV571	CONDUIT DETAILS
PV581	WIRE MANAGEMENT DETAILS
PV591	MONITORING DETAILS
PV601	MODULE SPECIFICATIONS SHEET
PV602	INVERTER SPECIFICATIONS SHEET
PV701	EQUIPMENT SIGNAGE
L101	LANDSCAPING & IRRIGATION - ZONE 1A, 2A & 2B - GROUND MOUNT
L201	LANDSCAPING & IRRIGATION - GROUND MOUNT - ELEVATION
L301	LANDSCAPING DETAILS
L401	TREE REMOVAL PLAN
G-001	RBI SOLAR - COVER SHEET
G-002	RBI SOLAR - GENERAL NOTES/ MODULE SPECIFICATION SHEETS
S-101	COMPONENT LAYOUT
S-301	RACK SECTION & BAY PLAN VIEWS
S-501	DETAILS
S-502	BALLAST BLOCK DETAILS AND SCHEDULE
PC-1	PANELCLAW COVER SHEET
PC-2	ARRAY SITE MAP
PC-3	TYPICAL ARRAY DIMENSIONS
PC-4	RACKING COMPONENTS
PC-5	BALLAST LEGEND
PC-6	BALLAST LAYOUT - 1
C1	CIVIL - TITLE SHEET
C2	CIVIL - GRADING PLAN
S1	STRUCTURAL NOTES
S2	STRUCTURAL NOTES
S3	STRUCTURAL DETAILS

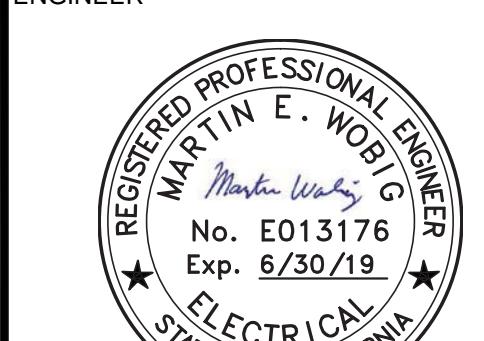
2  
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3  
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ACADEMIC LAB  
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3  
-  
-  
6 10/26/2018 SEISMIC COMMENTS  
5 07/12/2018 FENCE ADDED  
4 06/19/2018 PLAN CHECK COMMENTS  
3 04/20/2018 PERMIT SET  
2 02/02/2018 ELECT, PROGRESS SET  
1 01/05/2018 LANDSCAPE UPDATE  
0 11/08/2017 INITIAL SUBMITTAL  
REV DATE DESCRIPTION

DATE 10/26/2018  
PROJECT NUMBER 30250901  
PROJECT MANAGER KIM STRICKLAND  
PROJECT ENGINEER THOMAS CEMO  
INTERN ENGINEER JASON CHAUVIN  
CHECKED BY JESSICA KENDRICK

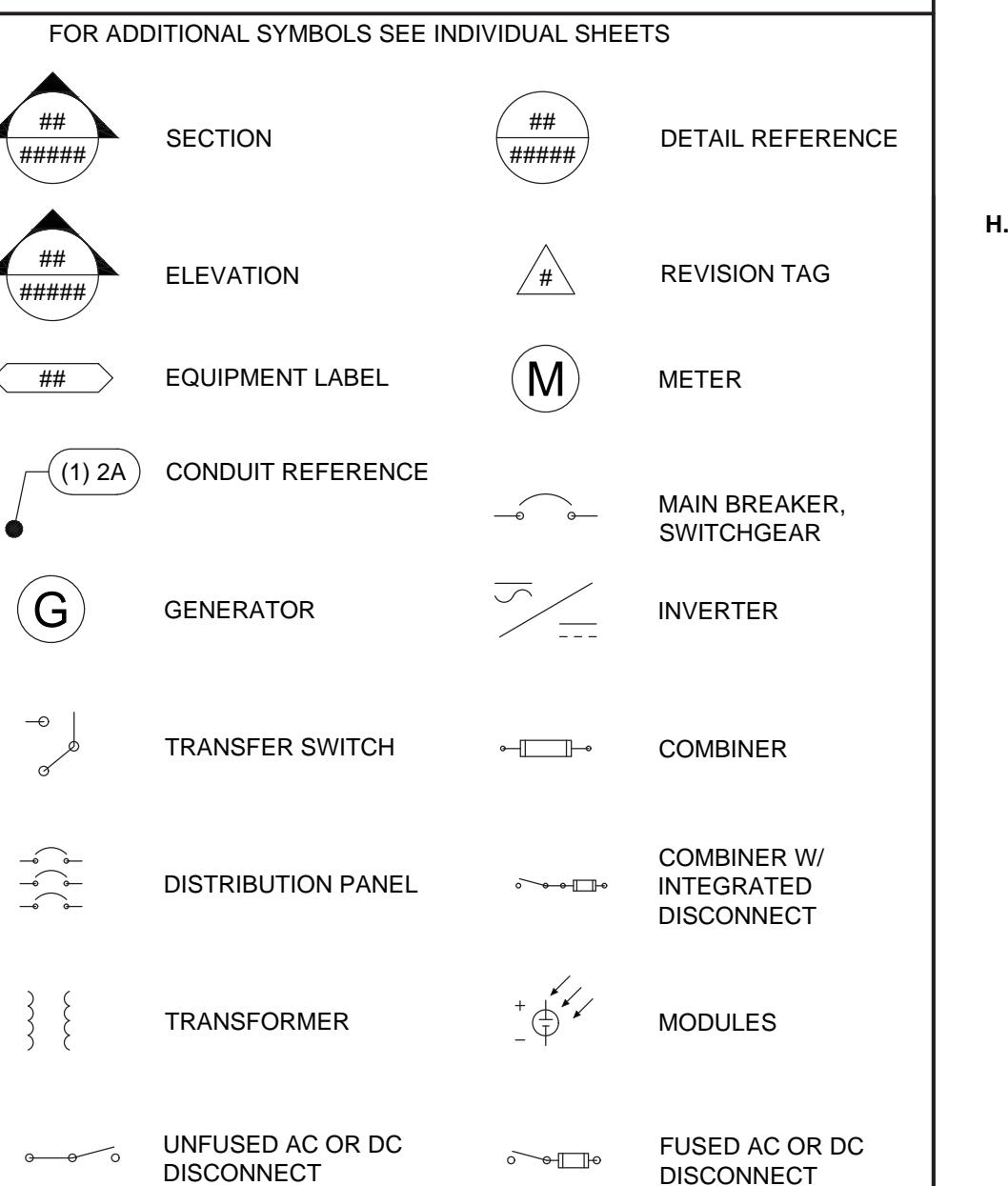
4  
PERMIT  
  
SHEET TITLE COVER SHEET  
SHEET NUMBER G101



## ABBREVIATIONS

A/AMP	AMPERE
AC	ALTERNATING CURRENT
ACB	ARRAY COMBINER BOX
ACD	AC DISCONNECT (FUSED AND NON-FUSED)
AHU	AUTHORITY HAVING JURISDICTION
AIC	AMPERE INTERRUPTING CAPACITY
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BLK	BLOCK
C	CANOPY
CBT	CABLE TRAY
CONT'D	CONTINUED
CT	CURRENT TRANSFORMER
D	DISTANCE
DAS	DATA ACQUISITION SYSTEM
DC	DIRECT CURRENT
DCD	DC DISCONNECT (FUSED AND NON-FUSED)
DEG	DEGREE
DIA	DIAMETER
EF	ELECTRICAL FOREMAN
EGC	EQUIPMENT GROUNDING CONDUCTOR
EMT	ELECTRICAL METALLIC TUBING
EQUIV	EQUIVALENT
(E)	EXISTING
FT.	FOOT
GEC	GROUNDING ELECTRODE CONDUCTOR
GEN	GENERATOR
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
GND	GROUND
HDPE	HIGH DENSITY POLYETHYLENE
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
IFC	IN FOR CONSTRUCTION
IFP	IN FOR PERMIT
IN	INCH
INV	INVERTER
JBX	JUNCTION BOX
KW	KILOWATT
L	LENGTH
L x W x D	LENGTH x WIDTH x DEPTH
MAX	MAXIMUM
MDP	MAIN DISTRIBUTION PANEL
MNB	MAINTENANCE BOX
MF	MECHANICAL FOREMAN
MIN	MINIMUM
MON	MONITORING EQUIPMENT
MOT	MOTOR
MTR	METER
NA	NOT APPLICABLE
NEC	NATIONAL ELECTRICAL CODE
NEG	NEGATIVE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NTS	NOT TO SCALE
OC	ON CENTER
PBX	PULL BOX
PDB	POWER DISTRIBUTION BLOCK
PH	PHASE
PNL	PANELBOARD
POC	POINT OF CONNECTION
POL	POLARITY
POS	POSITIVE
PPA	POWER PURCHASE AGREEMENT
PSI	POUNDS PER SQUARE INCH
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
QA	QUALITY ASSURANCE
QC	QUALITY CONTROL
RD	ROOF DRAIN
RLY	RELAY
RFI	REQUEST FOR INFORMATION
RMC	RIGID METAL CONDUIT
SCB	STRING COMBINER BOX (DISCONNECTING AND NON-DISCONNECTING)
SCH	SCHEDULE
SFB	SPARE FUSE BOX
SLD	SINGLE LINE DIAGRAM
SS	STAINLESS STEEL
SSQP	SITE SPECIFIC QUALITY PLAN
STR	STRING
SWB	SWITCHBOARD (MAIN-SWB FOR MAIN SWITCHBOARD)
SWG	SWITCHGEAR (MAIN-SWG FOR MAIN SWITCHGEAR)
SWPPP	STORMWATER POLLUTION PREVENTION PLAN
TPS	TWISTED PAIR SHIELDED
TSW	TRANSFER SWITCH
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UV	ULTRAVIOLET
V	VOLT
VDC	VOLTAGE DIRECT CURRENT
VOC	OPEN CIRCUIT VOLTAGE
VT	VOLTAGE TAPS
W	WATT
XFM	TRANSFORMER

## SYMBOLS



## A. General

- All work on this project shall be performed in compliance with all local, state, and federal codes and regulations, the AHJ approved drawings, IFC drawings, installation manuals, material specification sheets, as well as REC Solar's Environmental, Health, Safety (EHS), and quality requirements, as applicable to each Contractors scope of work.
- Contractors', and contractors' employees, shall be duly licensed and certified to perform their scope of work required to build and complete this project.
- See diagrams and details for site specific information.
- This proposed photovoltaic system is intended to connect to the existing site or facility electrical system. This connection shall be in compliance with NEC article 705.12 "Point Of Connection" (POC).
- This proposed photovoltaic system is intended to be operated in parallel with the utility service provider. Anti-islanding protection is a requirement of UL 1741 and is intended to prevent the operation of the system when the utility grid is not operational.
- All electrical components and materials shall be listed for their intended use and installed per manufacturer specifications.
- All outdoor equipment shall meet appropriate NEMA standards.
- The contractor shall check and verify all dimensions on the drawings, and layout all areas of the array prior to any installation work in order to verify that no discrepancies, environmental conditions, obstructions or shading exist. If either exist, contractor shall submit a RFI to the engineer and installation work shall not commence until formal direction is received.
- The contractor shall furnish and install all work as indicated on the drawings and specifications.
- The contractor shall be responsible for locating and protecting any existing utilities and equipment encountered in the work area.
- The contractor shall coordinate all operations with equipment and installers.
- The contractor shall have all switches and breakers in the "off" position prior to receiving permission to operate with the exception of when conducting approved and code compliant testing and commissioning.
- Permission to operate the system is not authorized until final inspections and approvals are obtained.
- All mechanical hardware shall be corrosion resistant appropriate for site conditions.
- All connections shall be torqued per manufacturer specifications. Provide permanent torque marks on all structural, mechanical, and electrical terminating hardware with paint pen for inspection.

## B. PROCORE

- REC Solar requires the project/construction management of this project to be run through our PROCORE cloud-based system. Contractors are required to go through a PROCORE usage orientation prior to beginning work.

## C. Pre-Construction Meeting

- No contractor shall begin construction without first attending a pre-construction meeting covering the following topics:
  - Contractor's scope of work
  - Site specific EHS plan review
  - AHJ approved drawings
  - IFC drawings review
  - Site specific quality, testing, and commissioning plan review
  - Use of REC Solar's PROCORE project/construction management system
  - Other project site requirements

## D. Materials & Receiving

- All material to be installed shall be new and free from any corrosion, damage, or deformation.
- All material to be used shall have an approved specifications sheet (cut sheet) available onsite.
- Contractor shall seek approval for material specification sheets and installation guides via REC Solar's PROCORE submittal tool.
- All material received shall be inspected for defects or non-conformances to design and purchasing specifications.
- Electrical equipment (i.e.: central inverters, switchboards/gears, inverter skids, transformers, etc.) that have a greater than 4 week lead time and/or costs greater than \$50k shall require a critical lift plan.

## E. Requests For Information (RFIs)

- AHJ approved IFC plans & IFC (issue for construction) drawings, with approved RFIs, are the only approved drawing set for the construction of this project.
- All desired changes to the IFC drawings shall be submitted through REC Solar's PROCORE RFI tool.
- RFI shall be submitted to the project engineer if ambiguity or contradictions exist between the IFC drawings, manufacturer's design/installation manuals, or approved product specifications sheets.
- RFIs shall be submitted to the project manager for all other clarifications.
- Changes to the IFC drawings shall be updated by the project engineer and if a hard copy print of the IFC drawings is onsite, the invalid sheets/details shall be "X" out with a note to see new sheet/detail in the PROCORE current IFC drawing set.
- Record drawings shall be created for this project throughout construction and all IFC drawing changes shall be reflected in this record drawing set.

## F. Stop Work Authority

- All contractor personnel performing work on this project shall be granted "stop work authority" and should stop work of themselves and co-workers when they feel an unsafe condition is present and posing an environmental, health, and/or safety hazard to workers or the project, and when they feel non-conforming work is being installed or non-conforming material is being used.
- A stop work shall be initiated through REC Solar's PROCORE observation tool and noted in the daily log tool.
- Work shall only be restarted if the hazard or non-conformance has been abated/corrected.

## G. Non-Conformance Reporting

- A non-conformance is when the installation of material is not installed to an expected code/standard/design, or when the material itself has a defect or does not meet purchase specifications.
- All installation or material non-conformances discovered shall be logged in REC Solar's PROCORE observation tool. Final punchlist walk non-conformances will be documented in REC Solar's PROCORE punchlist tool.

## H. Site Labeling

- String** - a collection of solar PV modules wired in series.
- Subarray** - an electrical subset of an 'array' (NEC 690.2; mechanical concept). A portion of the total PV array that is physically co-located and oriented in the same direction. Each module in a subarray should have the same sun intensity and should have the same electrical characteristics. Typically, a subarray is a collection of strings that feed one inverter.
- Array** - a mechanically integrated assembly of PV modules with a support structure and foundation, along with other components, to form a direct-current power-producing unit (NEC 690.2). Typically, a collection of 'subarrays' that feed one or more inverters.
- Zone** - a designated area of a project whose identity is directly linked to a piece of equipment (i.e. inverter, combiner, panelboard, etc.).
- Block** - a collection of project 'zones'. Typically used for large systems in order to bring clarity to a project with a significant amount of 'zones'.
- Area** - a designated project boundary on the site plan that spatially encompasses 'blocks' and/or 'zones'.
- Site** - a collection of all project 'areas' that reside on a specific parcel(s).

## I. Equipment Naming Convention

- The following three letter naming conventions will be used for these equipment:
 

ACB	-Array Combiner Box
ACD	-Ac Disconnect
DAS	-Data Acquisition System
DCD	-DC Disconnect
GEN	-Generator
INV	-Inverter
JBX	-Junction Box
MDP	-Main Distribution Panel
MNB	-Maintenance Box
MTR	-Meter
MOT	-Motor
MON	-Monitoring Equipment
PBX	-Pbx Box
PNL	-Panelboard
RLY	-Relay
SCB	-String Combiner Box
SWB	-Switchboard
SWG	-Switchgear
TSW	-Transfer Switch
UPS	-Uninterruptible Power Supply
XFM	-Transformer

- These conventions will appear on both the single line diagrams and site plans.

- Equipment labeling is to be completed in the following manner:
  - a (equipment three letter callout)(equipment number)
  - a) If a site has two inverters, labels = inv1 and inv2.
  - b) If a site has 20 string combiners, labels = scb1 through scb20.

- String labeling is to be completed in the following manner:
  - a (equipment three letter callout)(equipment number),(string number)
  - a) If the string callout is SCB1.5 for string combiner 1, string 5.

- Definitions:
  - a. Main Distribution Panel - refer to NEC 551.2 'definitions: distribution panel.' a single panel assembly that contains buses and overcurrent protection devices for the control of power circuits. Typically placed in a cabinet against a wall with accessibility only from the front.
  - b. Panelboard - refer to NEC 100.1 'definitions: panelboard.' although the same in definition as a distribution panel, a panelboard is usually a subset of the main distribution panel, with smaller circuits tied to it. Panelboards are then electrically tied back to main distribution panel through larger feeder style conductors.
  - c. Switchgear - refer to NEC 100.1 'definitions: metal-enclosed power switchgear.' an assembly enclosed on all sides with sheet metal that contains primary power circuit switching, interrupting devices, or both, with buses and connections. Interior access provided via doors or removable covers.
  - d. Switchboard - refer to NEC 100.1 'definitions: switchboard.' commonly used interchangeably with "switchgear," switchboards in general often use the same type of breakers that are found in panelboards. Switchboards are also constructed with different UL/ANSI standards than switchgears (typically much smaller than a switchgear; often only 24-36" deep). The ability to withstand fault currents is less than that of switchgear. Switchboards typically have a maximum feeder breaker size of 1200amps.

## J. Campus Standards

Cal Poly campus facility maintenance and renovation standards Division 26 - Electrical shall be referenced and implemented

## GENERAL NOTES

### ENVIRONMENTAL, HEALTH & SAFETY (EHS) NOTES

#### A. General

- All contractors performing work on this project shall meet all local, state, and federal OSHA and EPA requirements, as well as REC Solar specific EHS requirements.
- All contractors who do not abide by governmental regulations or REC Solar EHS requirements are in breach of contract, and hence subjected to a "Notice to Cure".
- Contractors must ensure that a competent person supervisor is assigned and onsite for this project at all times.

- All projects must be built under a Site Specific Safety Plan (SSSP). Each contractor shall submit a site Purpose specific SSSP to REC Solar no later than 2 weeks prior to their construction start for review and approval. The contractor shall not be allowed to begin construction without an approved SSSP. The contractor's SSSP shall include site specific EHS OSHA compliant and best practices language covering the following topics:

#### a. PURPOSE

##### b. SCOPE

##### i. Construction scope of work

##### ii. Scope of EHS Plan

##### c. Management Commitment To EHS Compliance

##### d. Roles & Responsibilities

##### e. Designation Of Affected, Authorized, Competent, And Qualified Persons

##### f. Safety Requirements

##### i. Activity Hazard Assessment (Aha)

##### ii) Job Safety & Quality Analyses (JSQA), Aka: Pre-Task Plans

##### iii) Safety & Staging Map

##### iv) Jobsite Safety Orientations

##### v) Chain Of Command

##### vi) Employee Parking

##### vii) Security, Badging, & Site Access

##### viii) Evacuation

##### ix) Accountability / Discipline

##### x) PPE

##### g. Training Requirements

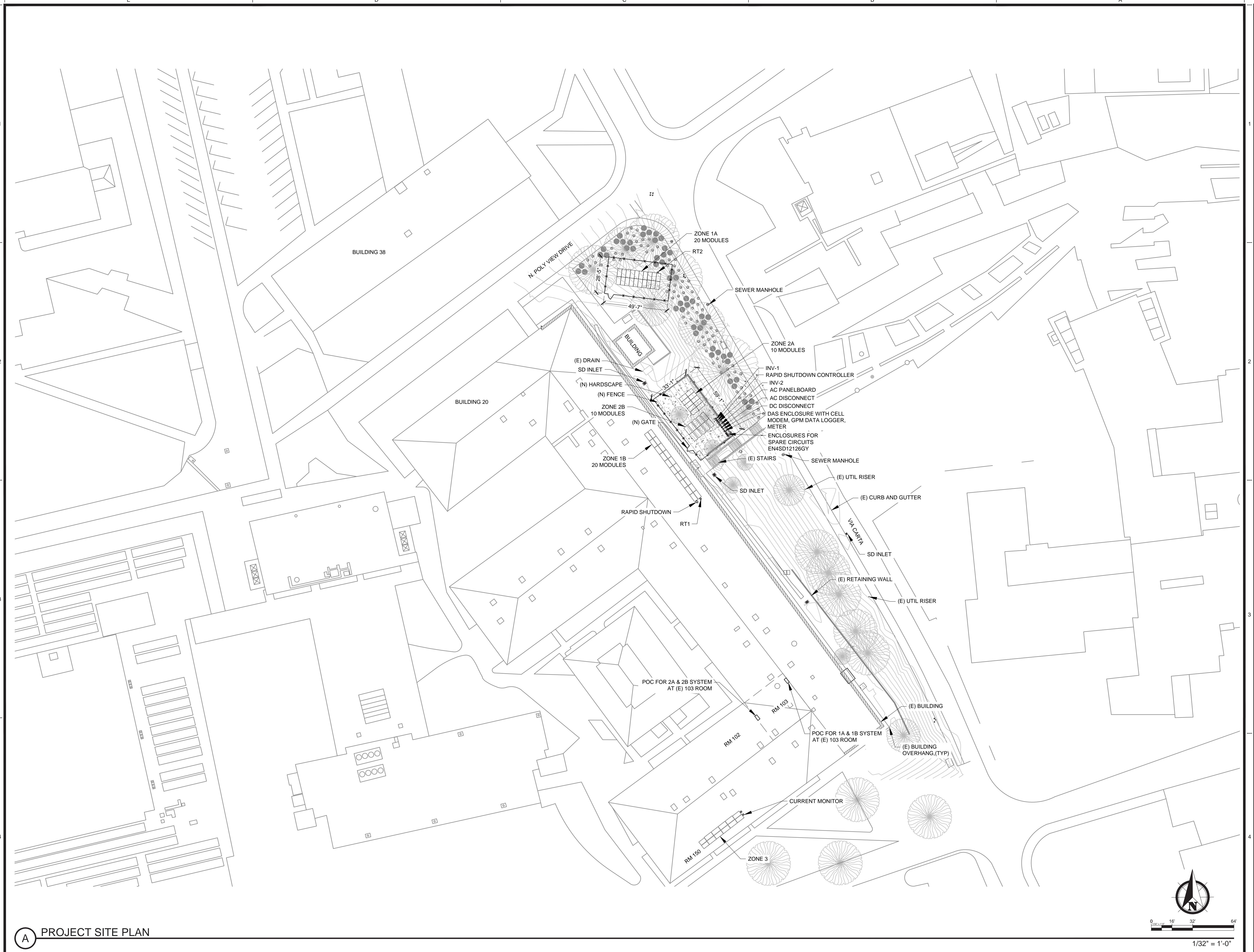
##### h. Inspection/Audit Requirements

##### i. Injury/illness Reporting & Investigating

-		
-		
6	10/26/2018	SEISMIC COMMENTS
5	07/12/2018	FENCE ADDED
4	06/19/2018	PLAN CHECK COMMENTS
3	04/20/2018	PERMIT SET
2	02/02/2018	ELECT. PROGRESS SET
1	01/05/2018	LANDSCAPE UPDATE
0	11/08/2017	INITIAL SUBMITTAL
REV	DATE	DESCRIPTION

DATE	10/26/2018
PROJECT NUMBER	30250901
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PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

<b>PERMIT</b>	
SHEET TITLE	PROJECT SITE PLAN
SHEET NUMBER	G301
1/32" = 1'-0"	





**REC SOLAR**

3450 BROAD ST, SUITE 105  
SAN LUIS OBISPO, CA 93401  
PH (805) 477-3970  
FX (805) 548-8661  
(844) REC SOLAR

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ENGINEER



SONOMA ELECTRICAL ENGINEERING, INC.  
1125 SHADY OAK PLACE  
SANTA ROSA, CA 95404  
707-483-8829

CLIENT

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PROJECT

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2	02/02/2018 ELECT, PROGRESS SET
1	01/05/2018 LANDSCAPE UPDATE
0	11/08/2017 INITIAL SUBMITTAL
REV	DATE
	DESCRIPTION

DATE	10/26/2018
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CHECKED BY	JESSICA KENDRICK

**PERMIT**

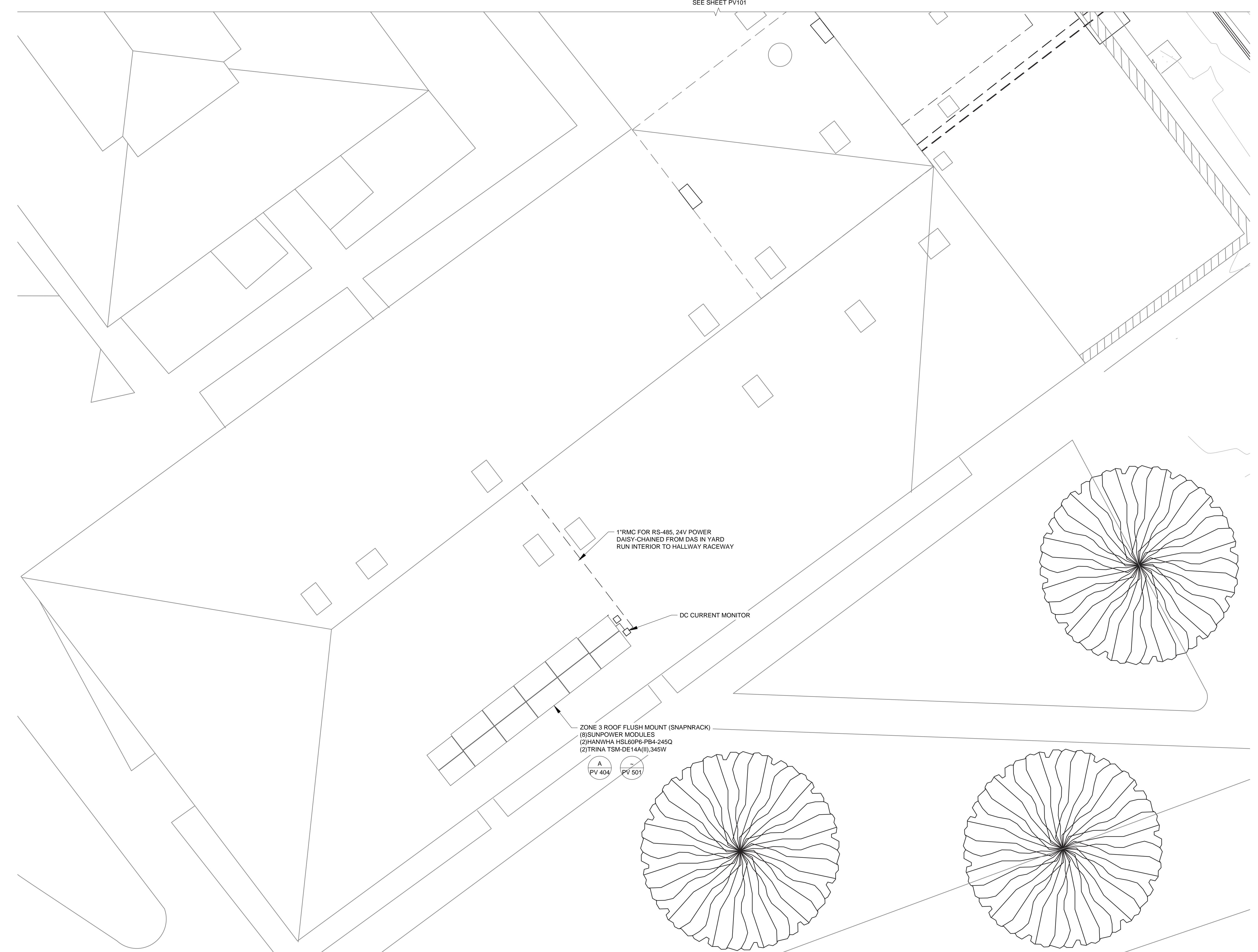
SHEET TITLE	EQUIPMENT PLAN - ZONE 3 - DC ROOF MOUNT
SHEET NUMBER	PV102

NOTE:  
THERE IS NO STRINGING IN THIS ZONE 3. ALL  
MODULES ARE INDIVIDUALLY CONNECTED TO  
LAB BUS LOADS

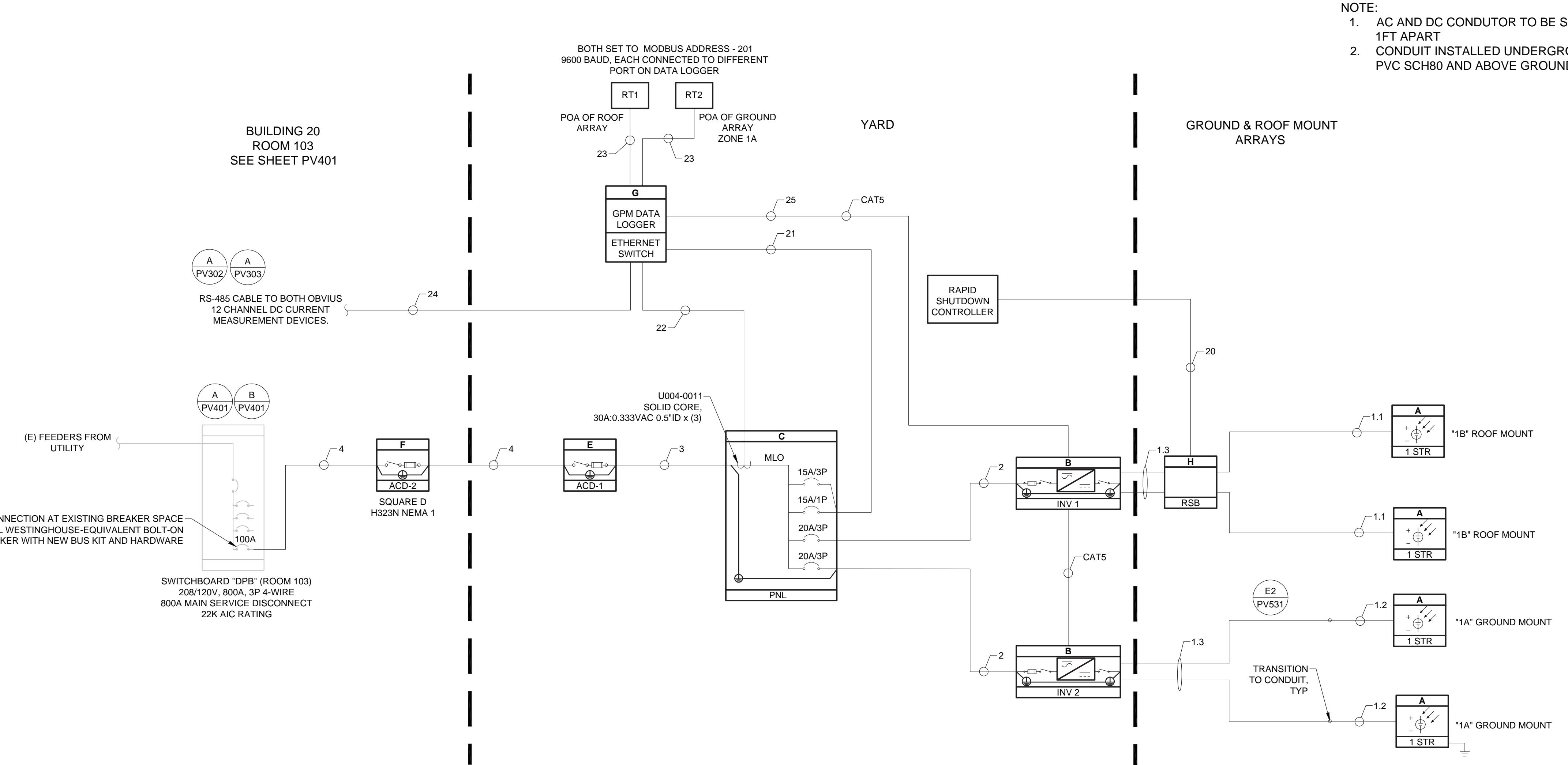


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4'  
8'  
16'

1/8" = 1'-0"

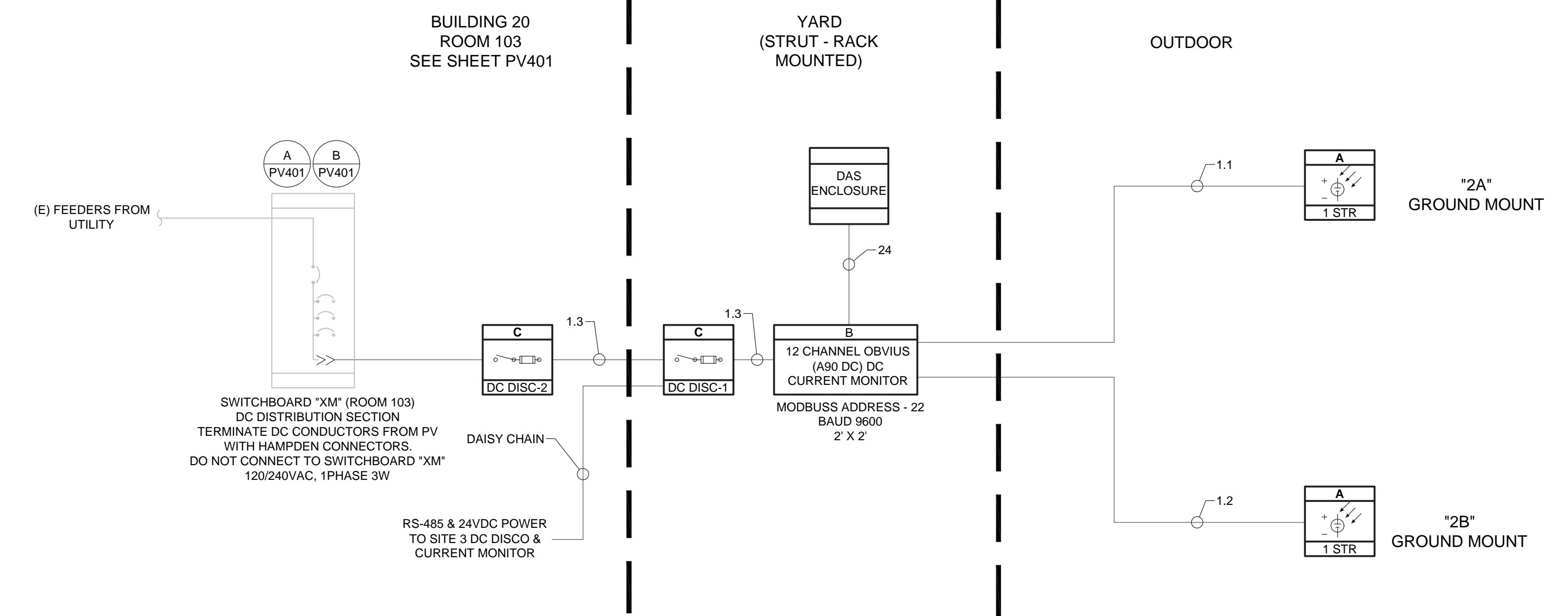
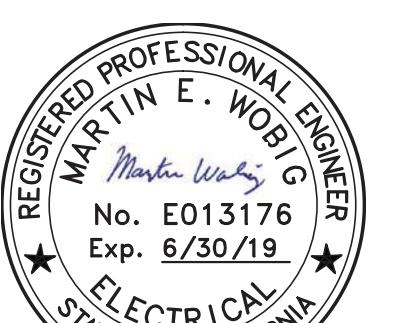


**A** EQUIPMENT PLAN - ZONE 3 - DC ROOF MOUNT



EQUIPMENT SCHEDULE							
ID	TYPE	MANUFACTURER	MODEL	QUANTITY	VOLTAGE AND CURRENT RATING	OCPD	NOTES
A	PV MODULE	TRINA	TSM-345DE14A (II)	40	46.7V 9.5A	15A	10 MODULES PER STRING
B	INVERTER	SMA	SB 5.0-1SP-US-40	2	208V 24A	24A	3 MPPTs
C	AC SUBPANEL	SQUARE D	NQ/NF LINE	1	208V 100A	MLO	
E	UTILITY AC DISCO - 1	SQUARE D	H323NRB	1	208V 100A	100A	VISIBLE, LOCKABLE PER PG & E, NEMA 3R
F	UTILITY AC DISCO - 2	SQUARE D	H323N	1	208V 100A	100A	VISIBLE, LOCKABLE PER PG & E, NEMA 1
G	PV MONITORING	GREEN POWER MONITORING		1			
H	RAPID SHUTDOWN	SMA	RSC-1X-US-10	1	600V 20A	20A	LOCATE WITHIN 10' OF PV ARRAY

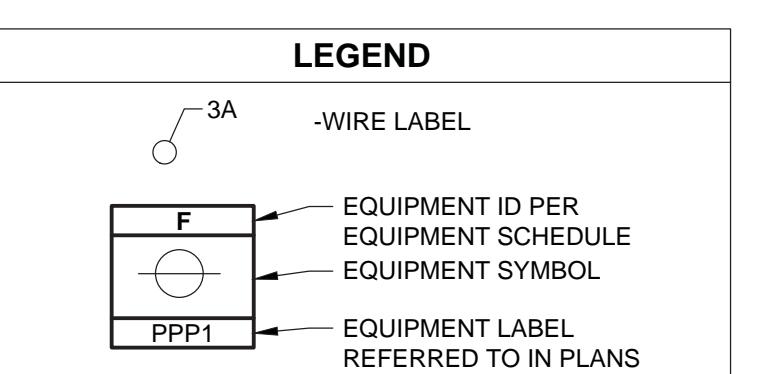
CONDUIT AND WIRE SCHEDULE									
CIRCUIT SEGMENT	CONDUIT	CONDUCTOR (per conduit)	NEUTRAL (per conduit)	GROUND (per conduit)	CIRCUIT TEMP. RATING	CALCULATED MIN. CIRCUIT AMPACITY (A) (per conductor)	SELECTED CONDUCTOR AMPACITY (A)	NOTES	VD %
1.1	-	(2) #10 AWG PV WIRE, Cu (600V), Cu	-	(1) #8 AWG Cu, SOLID BARE	90degC	15.63	40.00	ROOF MOUNT MODULES	0.67%
1.2	(1) 0.75" RMC	(2) #10 AWG PV WIRE, Cu (600V), Cu	-	(1) #8 AWG Cu, THHN/ THWN-2	90degC	14.84	40.00	GROUND MOUNT MODULES	0.57%
1.3	(1) 0.75" RMC	(4) #10 AWG PV WIRE, Cu (600V), Cu	-	(1) #8 AWG Cu, THHN/ THWN-2	90degC	19.53	40.00		0.62%
2	(1) 0.75" RMC	(2) #6 AWG THHN/ THWN-2, Cu	(1) #8 AWG, THHN/ THWN-2 Cu	(1) #8 AWG THHN/ THWN-2, Cu	75degC	30.00	65.00	INV TO PNL	0.15%
3	(1) 1.5" RMC	(3) #6 AWG THHN/ THWN-2, Cu	(1) #8 AWG, THHN/ THWN-2 Cu	(1) #8 AWG THHN/ THWN-2, Cu	75degC	60.00	65.00	PNL TO ACD	0.56%
4	(1) 1.5" RMC	(3) #10 AWG THHN/ THWN-2, Cu	(1) #8 AWG, THHN/ THWN-2 Cu	(1) #8 AWG THHN/ THWN-2, Cu	75degC	60.00	150.00	ACD TO POC	2.59%

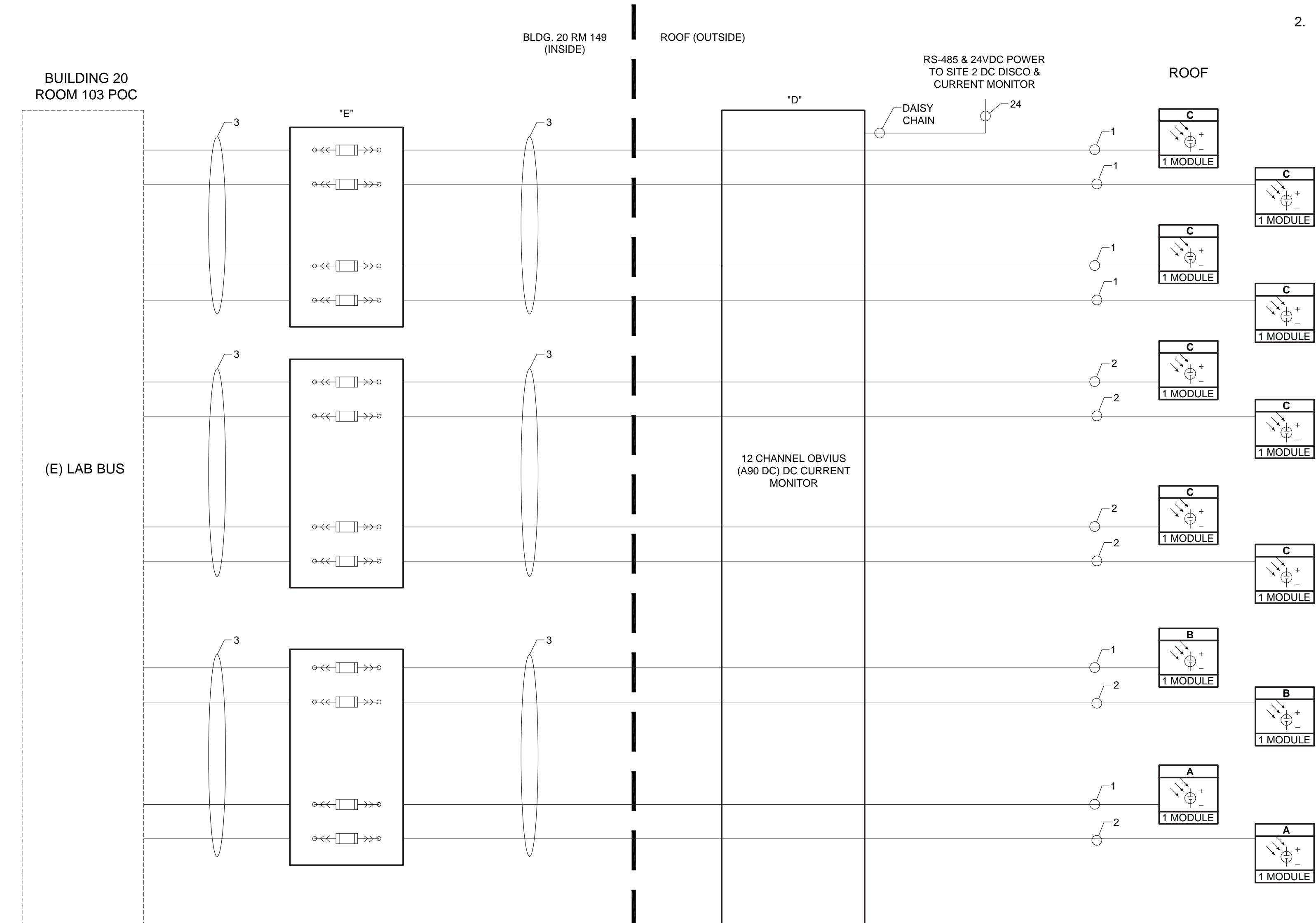


EQUIPMENT SCHEDULE							
ID	TYPE	MANUFACTURER	MODEL	QUANTITY	VOLTAGE AND CURRENT RATING	OCPD	NOTES
A	PV MODULE	TRINA	TSM-345DE14A (II)	20	46.7V 9.5A	15A	10 MODULES / STRING
B	CURRENT MONITORING ENCLOSURE	ELECTRO DESIGN	CUSTOM	1	600V 15A	15A	TOUCH SAFE FUSES
C	DC DISCONNECT - 1	SOLARBOS	F25K32-1.4XP	2	-	32A	
D	ENCLOSURES	HAMMOND	EN4SD12126GY	6	-	-	

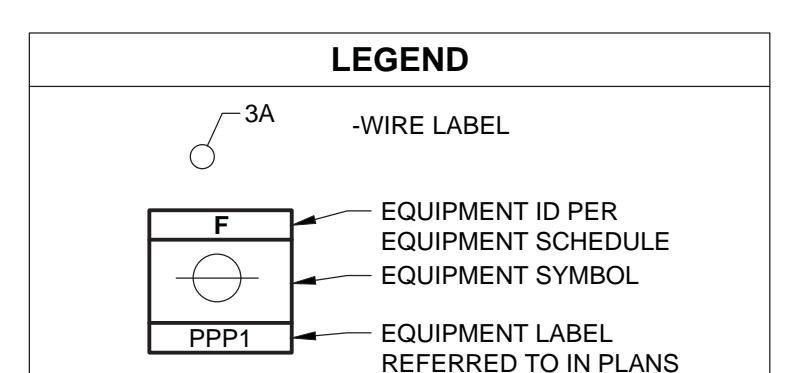
CONDUIT AND WIRE SCHEDULE - MONITORING				
CIRCUIT SEGMENT	CONDUIT	WIRE / CABLE	SPECIFICATION	NOTES
24	1" PVC SCHD 40	(1) BELDEN 3106A WITH WATERBLOCK TAPE FOR RS-485 & (2) 12 AWG RED AND BLACK FOR 24VDC POWER	--	POWER FROM DAS DAISY THROUGH DC CURRENT MONITORS

CONDUIT AND WIRE SCHEDULE						
CIRCUIT SEGMENT	CONDUIT	CONDUCTOR (per conduit)	NEUTRAL (per conduit)	GROUND (per conduit)	CIRCUIT TEMP. RATING	CALCULATED MIN. CIRCUIT AMPACITY (A) (per conductor)
1.1	(1) 1" RMC / PVC 80	(2) #10 AWG PV WIRE, Cu (600V) ,Cu	--	(1) #8 AWG Cu ,THHN/ THWN-2	90degC	14.84
1.2	(1) 1" RMC / PVC 80	(2) #10 AWG PV WIRE, Cu (600V) ,Cu	--	(1) #8 AWG Cu ,THHN/ THWN-2	90degC	15.63
1.3	(1) 1.5" RMC / PVC 80	(4) #2 AWG THHN/ THWN-2 ,Cu	--	(1) #8 AWG Cu ,THHN/ THWN-2	90degC	16.31



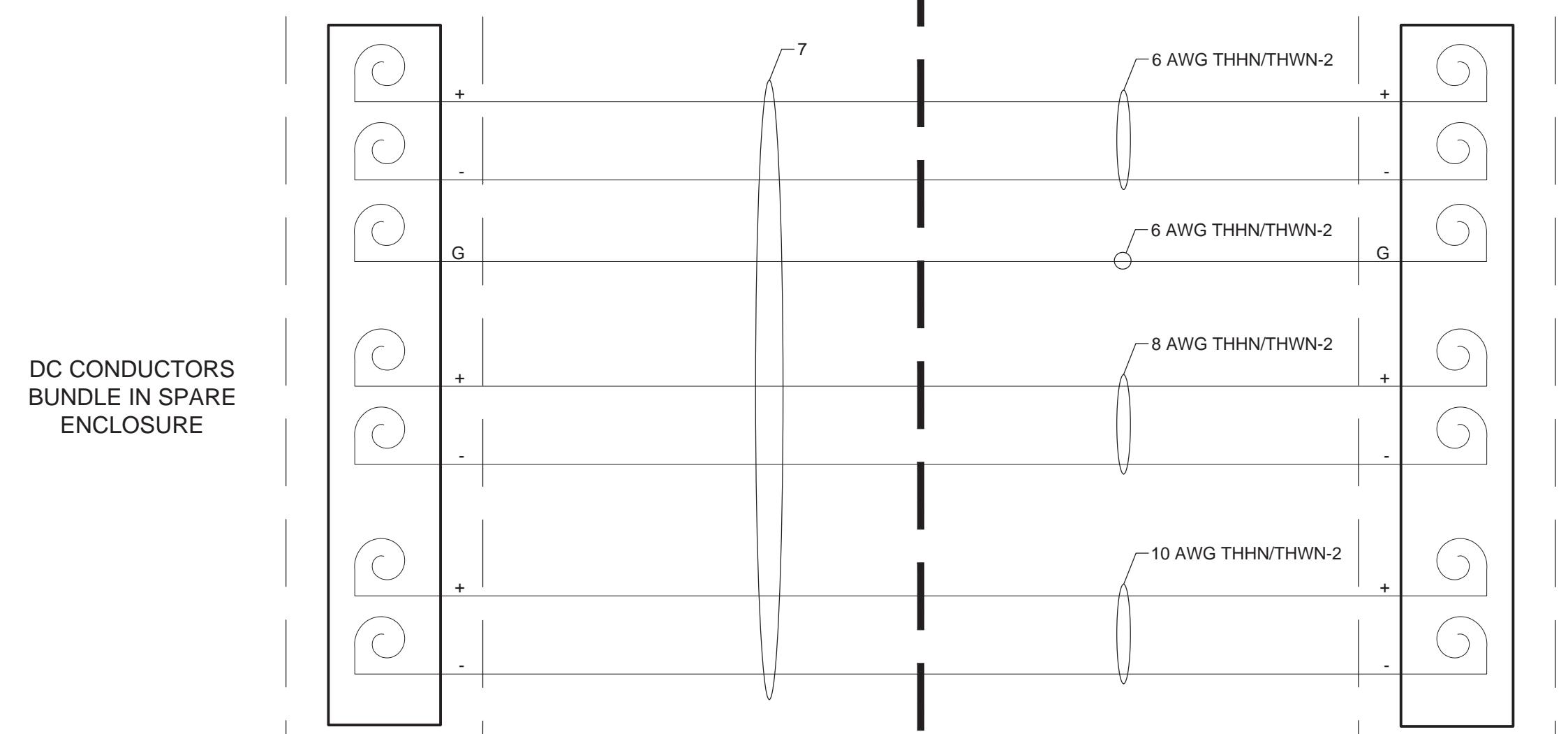
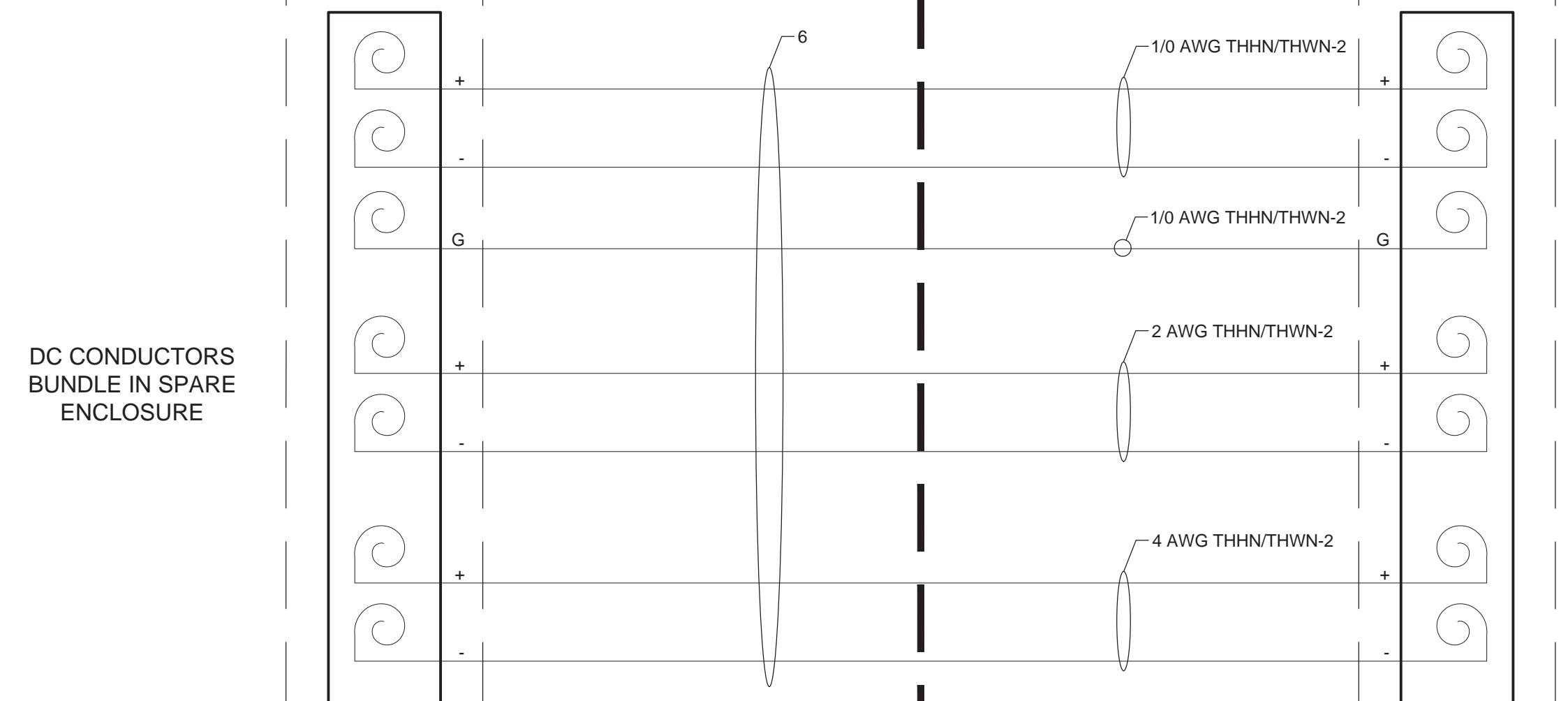
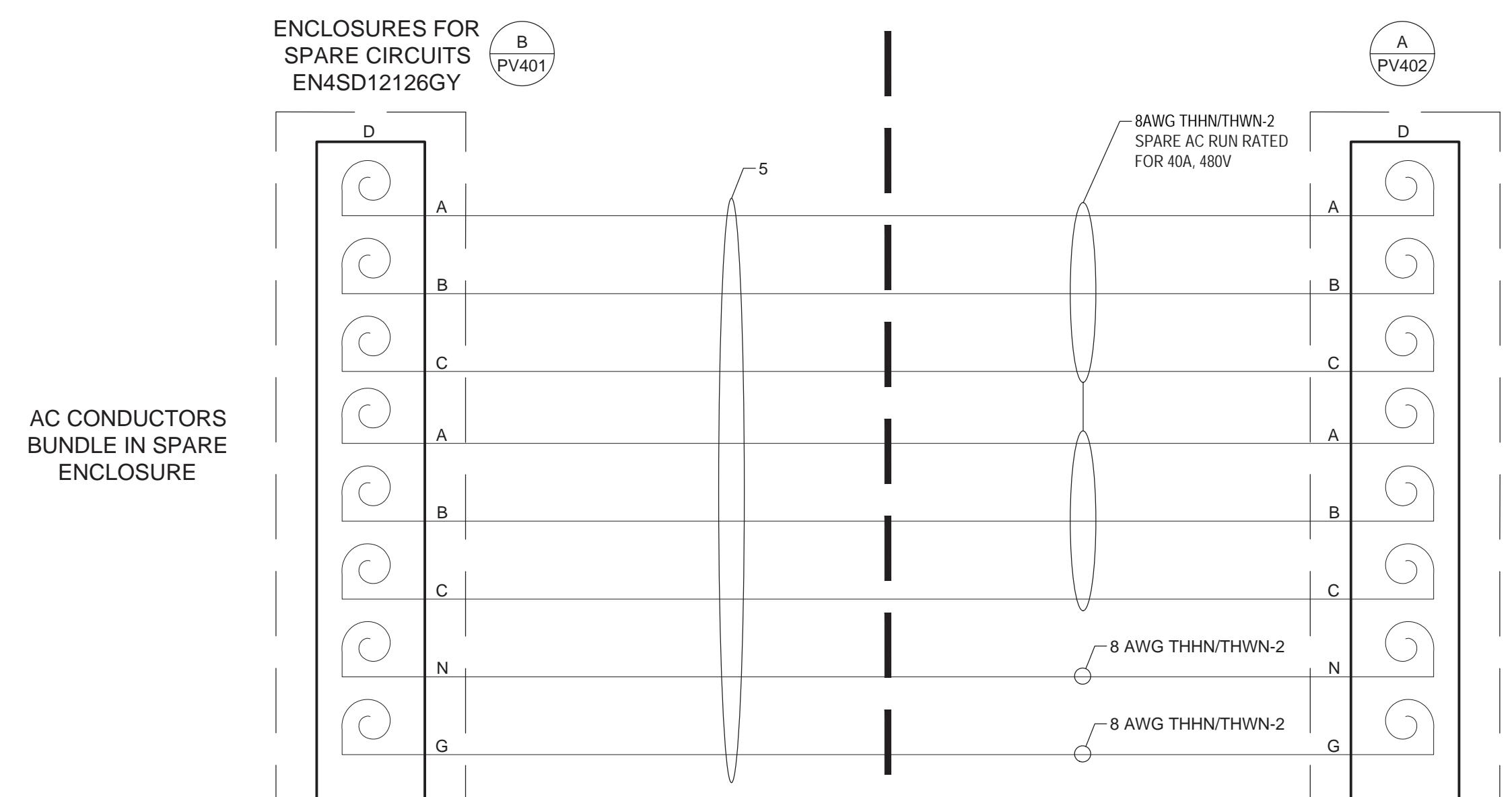


CONDUIT AND WIRE SCHEDULE - MONITORING				
CIRCUIT SEGMENT	CONDUIT	WIRE / CABLE	SPECIFICATION	NOTES
24	1" PVC SCHD 40	(1) BELDEN 3106A WITH WATERBLOCK TAPE FOR RS-485 & (2) 12 AWG (RED AND BLACK FOR 24VDC POWER		POWER FROM DAS DAISY THROUGH DC CURRENT MONITORS





NOTE:  
 1. AC AND DC CONDUTOR TO BE SEPERATED MIN 1FT APART  
 2. CONDUIT INSTALLED UNDERGROUND SHALL BE PVC SCH80 AND ABOVE GROUND SHALL BE RMC.



CONDUIT AND WIRE SCHEDULE					
CIRCUIT SEGMENT	CONDUIT	CONDUCTOR (per conduit)	NEUTRAL (per conduit)	GROUND (per conduit)	NOTES
5	(1) 1" RMC / PVC 80	(6) #8 AWG THHN/ THWN-2, Cu	(1) #8 AWG THHN/ THWN-2, Cu	(1) #8 AWG THHN/ THWN-2, Cu	AC SPARE CONDUCTORS
6	(1) 1.5" RMC / PVC 80	(2) #4 AWG THHN/ THWN-2, Cu (2) #2 AWG THHN/ THWN-2, Cu (2) #10 AWG THHN/ THWN-2, Cu	-	(1) #10 AWG THHN/ THWN-2, Cu	DC SPARE CONDUCTORS
7	(1) 1" RMC / PVC 80	(2) #10 AWG THHN/ THWN-2, Cu (2) #8 AWG THHN/ THWN-2, Cu (2) #6 AWG THHN/ THWN-2, Cu	-	(1) #6 AWG THHN/ THWN-2, Cu	DC SPARE CONDUCTORS

DATE 10/26/2018

PROJECT NUMBER 30250901

PROJECT MANAGER KIM STRICKLAND

PROJECT ENGINEER THOMAS CEMO

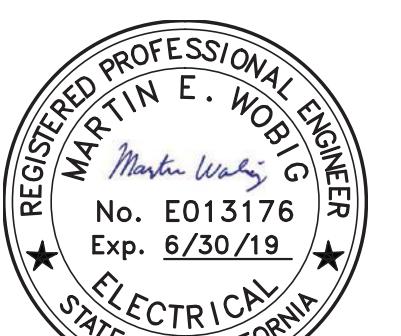
INTERN ENGINEER JASON CHAUVIN

CHECKED BY JESSICA KENDRICK

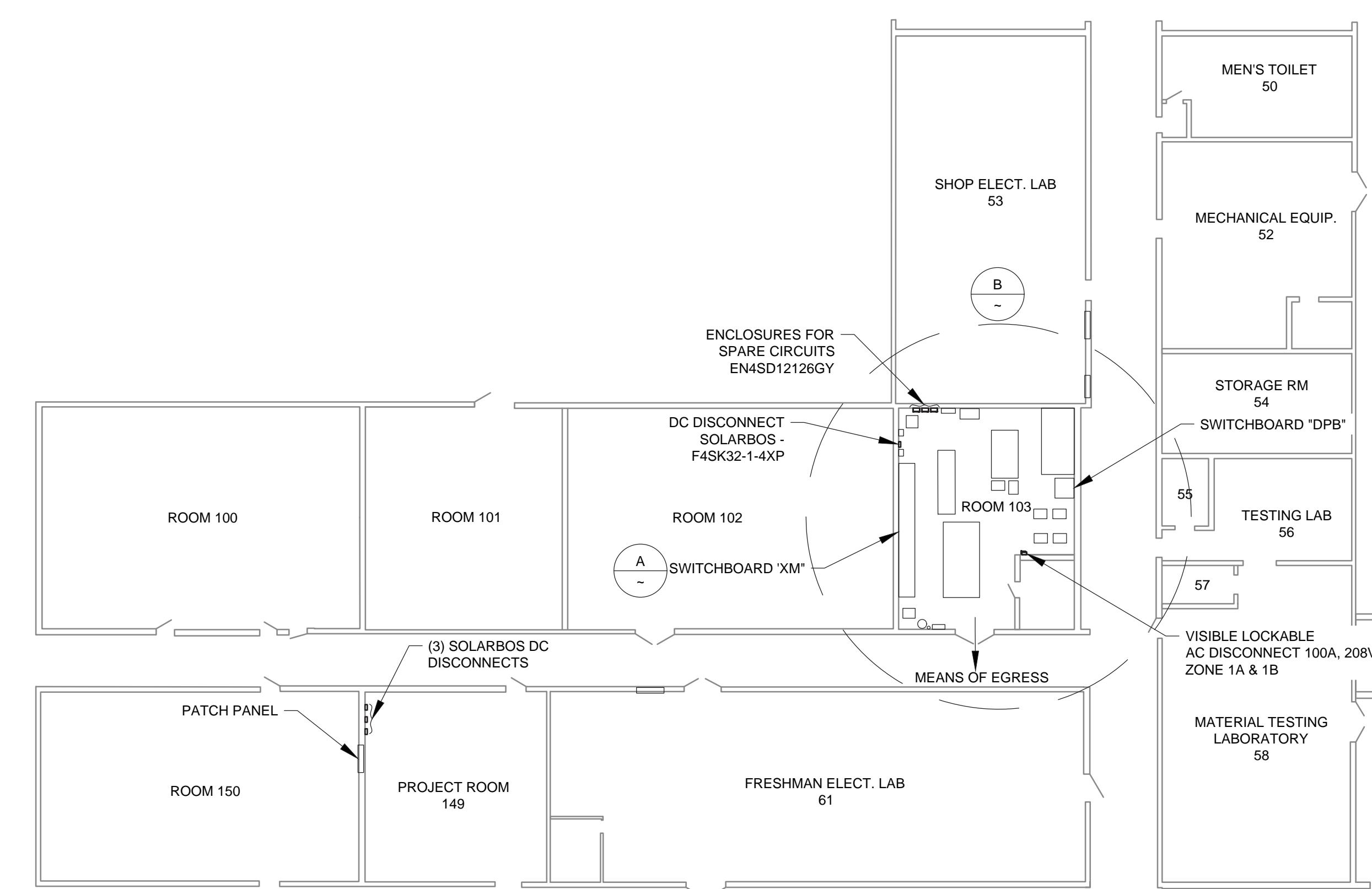
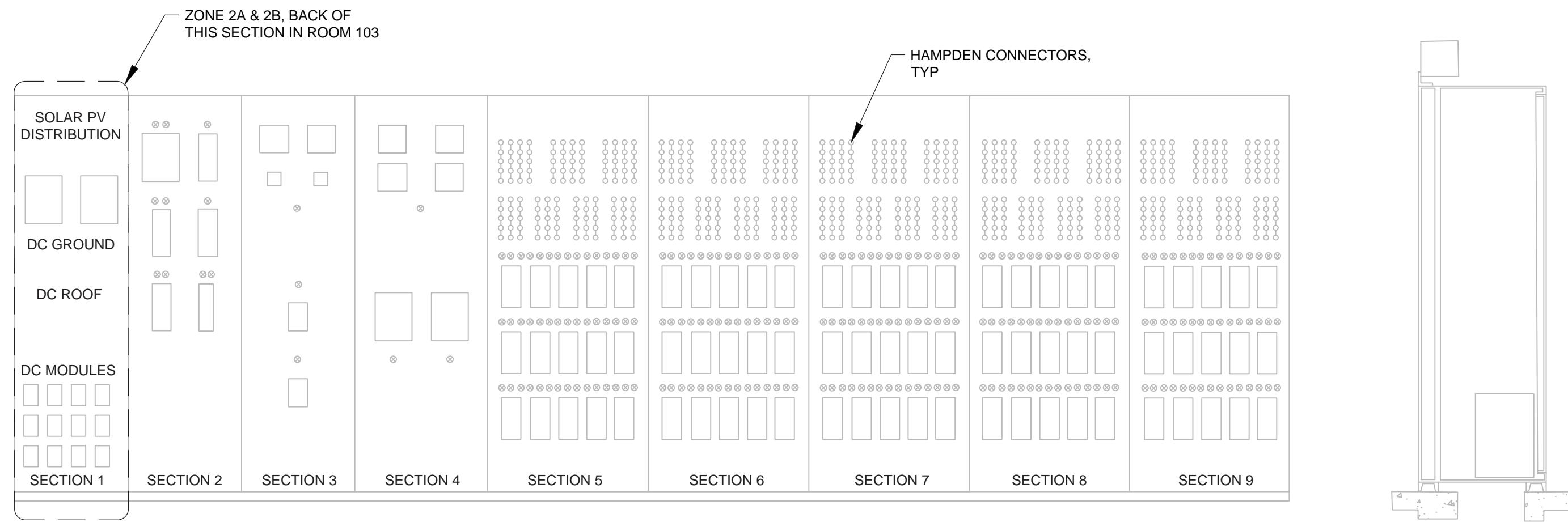
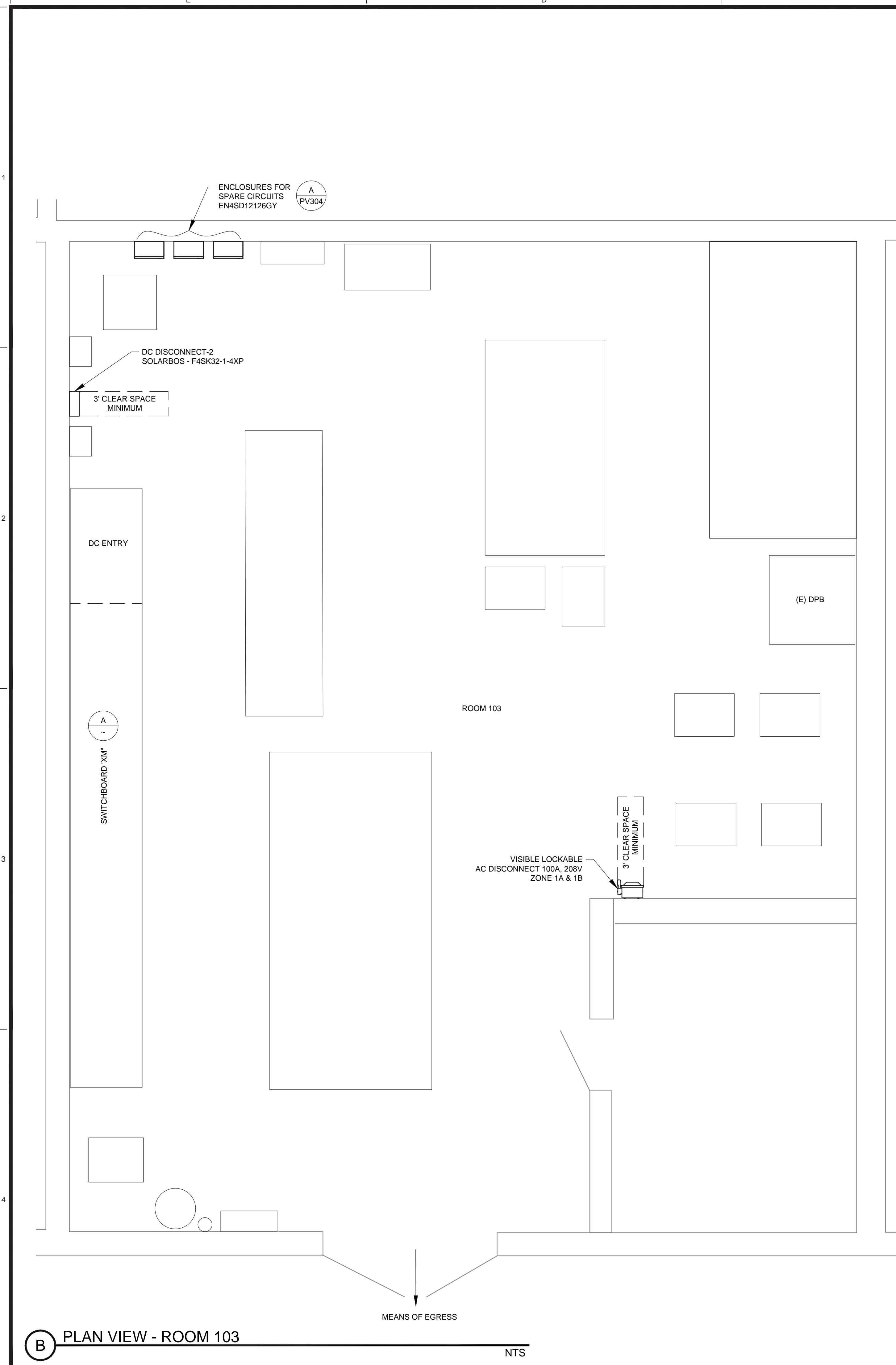
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SHEET TITLE THREE LINE DIAGRAM - SPARE CIRCUITS PER EE DEPT

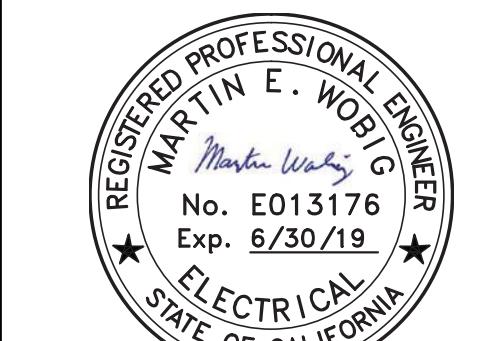
SHEET NUMBER PV304



REV	DATE	DESCRIPTION
6	10/26/2018	SEISMIC COMMENTS
5	07/12/2018	FENCE ADDED
4	06/19/2018	PLAN CHECK COMMENTS
3	04/20/2018	PERMIT SET
2	02/02/2018	ELECT. PROGRESS SET
1	01/05/2018	LANDSCAPE UPDATE
0	11/08/2017	INITIAL SUBMITTAL
REV	DATE	DESCRIPTION

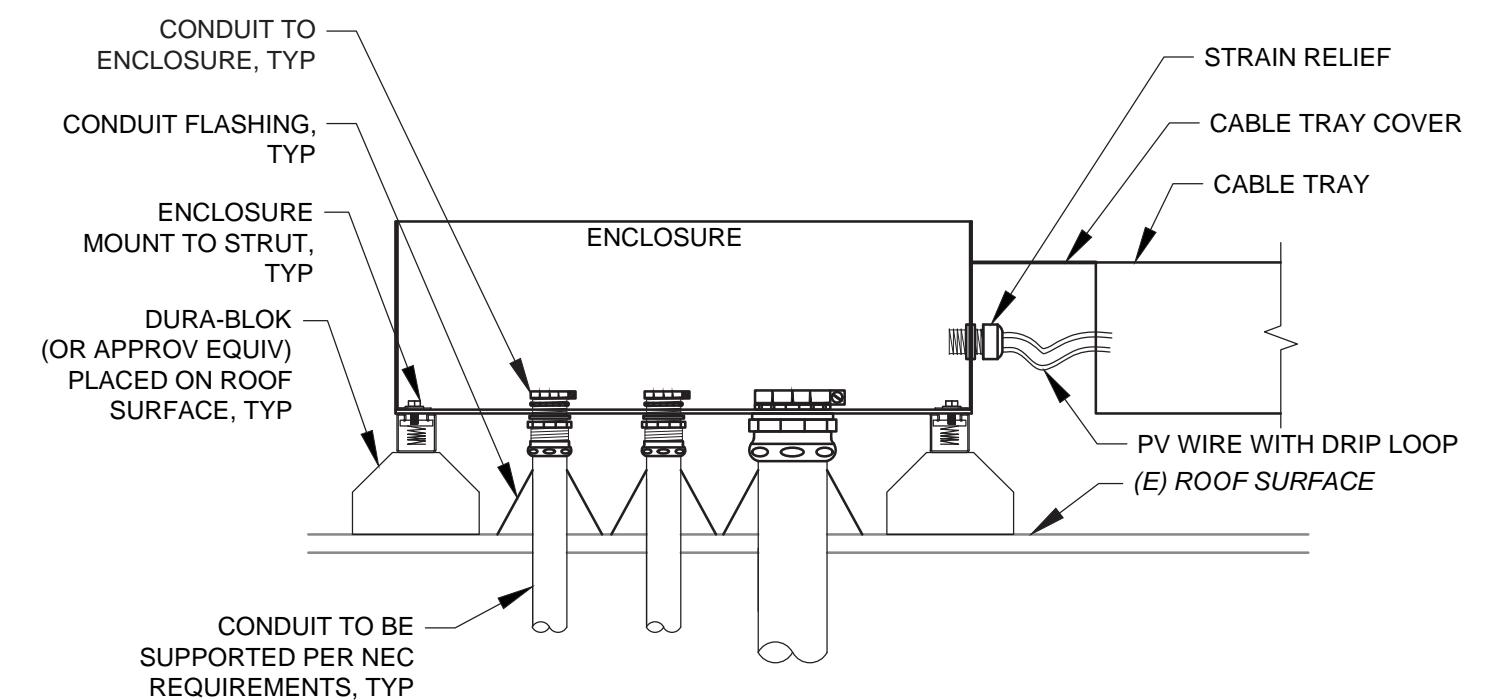






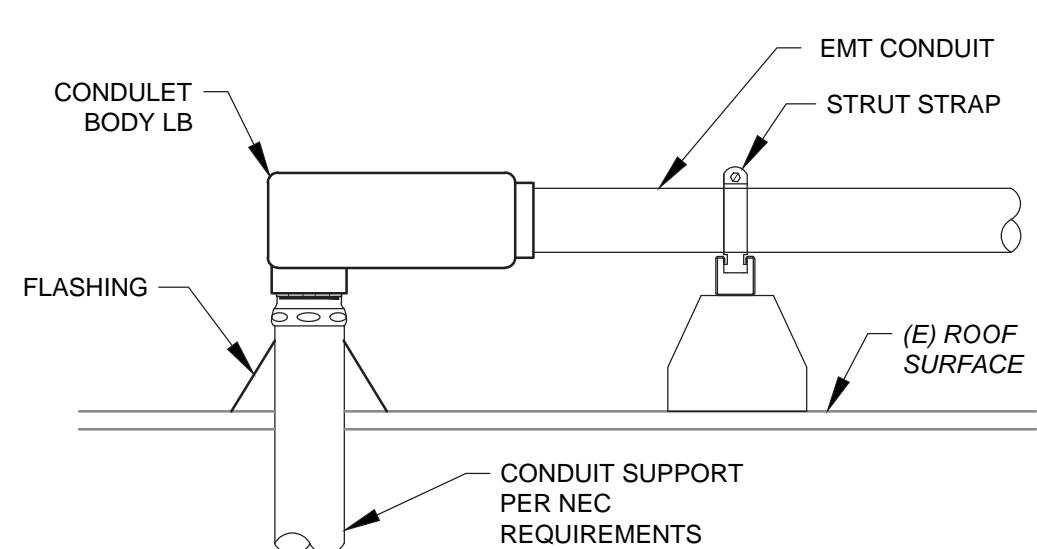
REV	DATE	DESCRIPTION
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6	10/26/2018	SEISMIC COMMENTS
5	07/12/2018	FENCE ADDED
4	06/19/2018	PLAN CHECK COMMENTS
3	04/20/2018	PERMIT SET
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1	01/05/2018	LANDSCAPE UPDATE
0	11/08/2017	INITIAL SUBMITTAL

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK



**C1 CONDUIT THRU ROOF - ENCLOSURE**

NTS



**D2 CONDUIT THRU ROOF - CONDULET**

ROOF MOUNT NTS

C2

A1

E1

D1

E2

D2

E3

D3

C3

B3

A3

E4

D4

C4

B4

A4

E

D

C

B

A

E

D

C

B

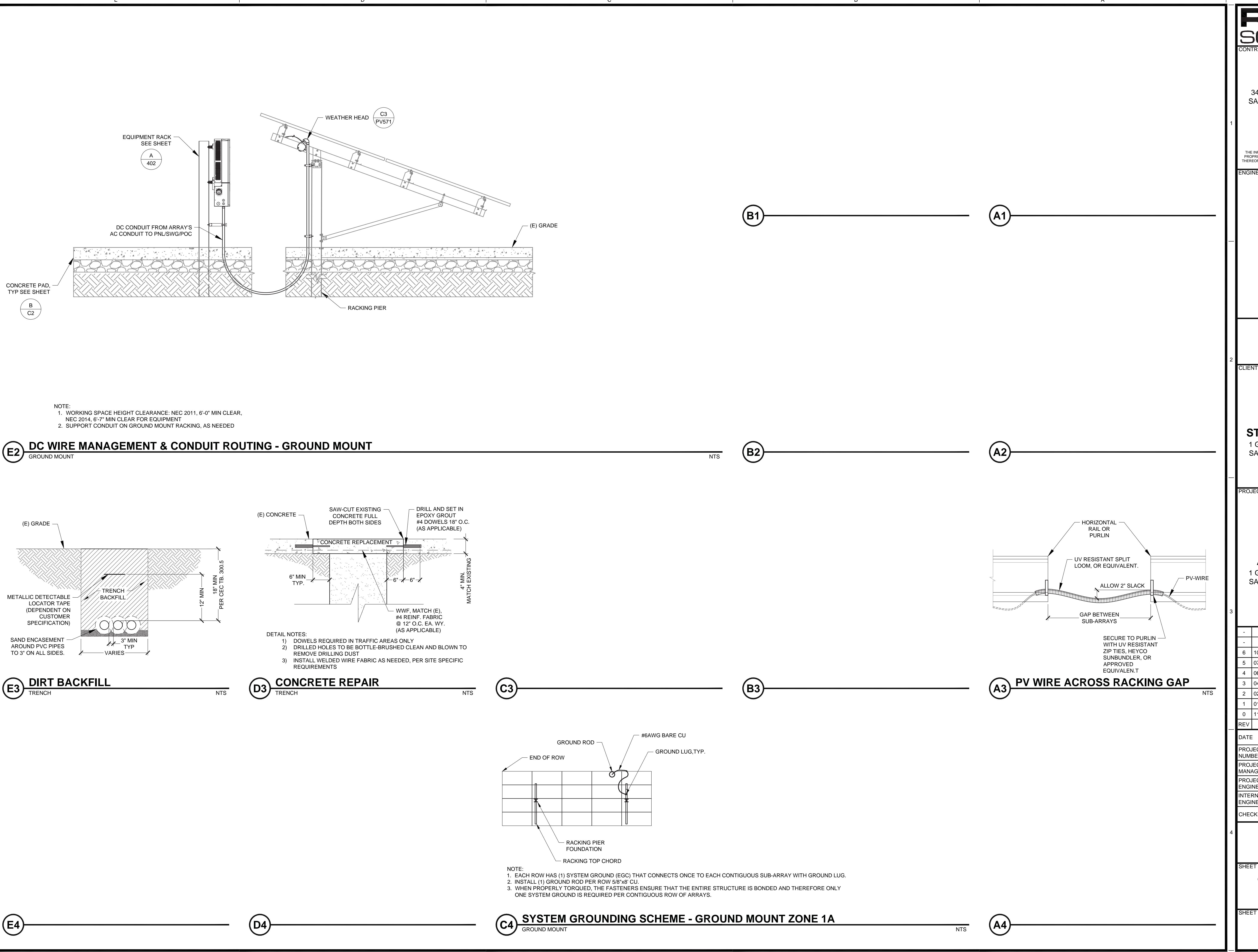
A

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

**PERMIT**

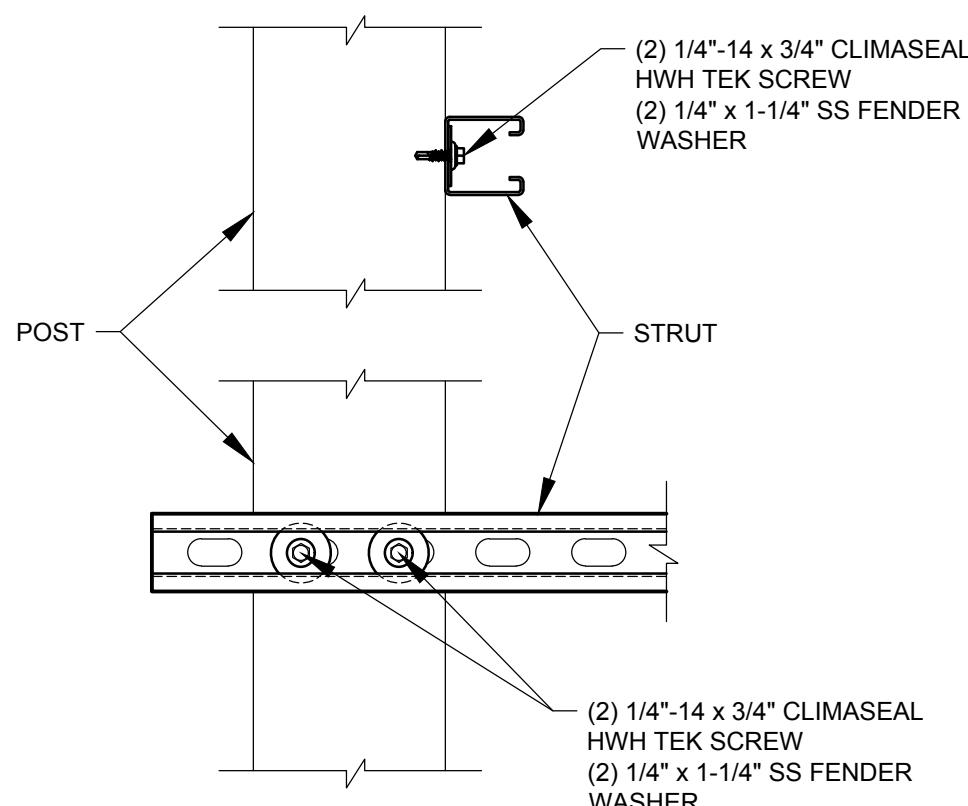
SHEET TITLE  
GROUND MOUNT/TRENCH DETAILS

SHEET NUMBER  
**PV531**









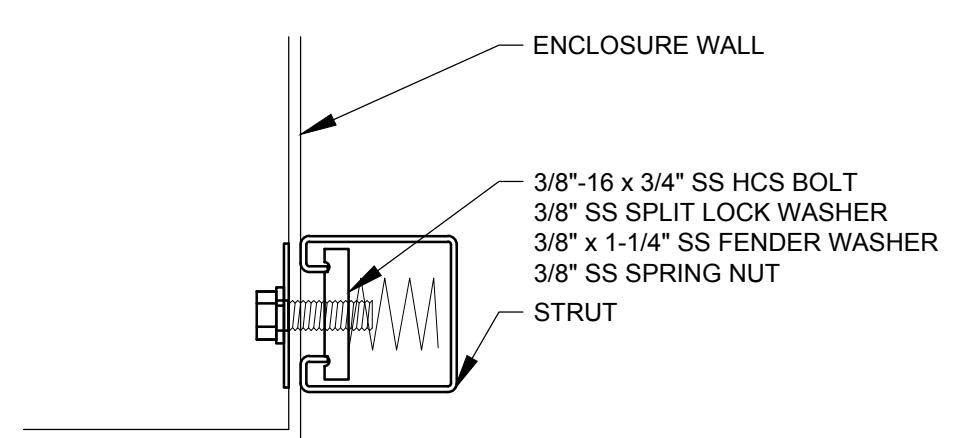
**D1 STRUT TO POST**  
EQUIPMENT NTS

E1

C1

B1

A1



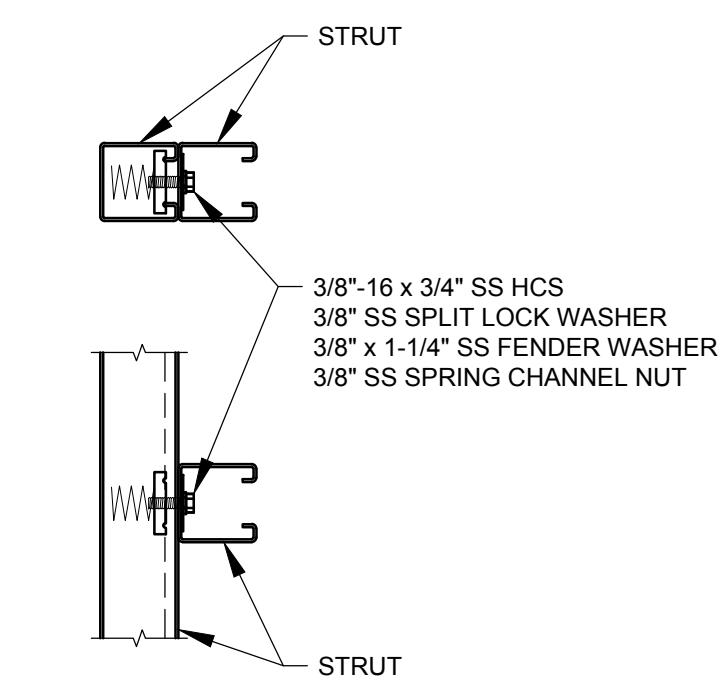
**B2 STRUT TO ENCLOSURE**  
EQUIPMENT NTS

E2

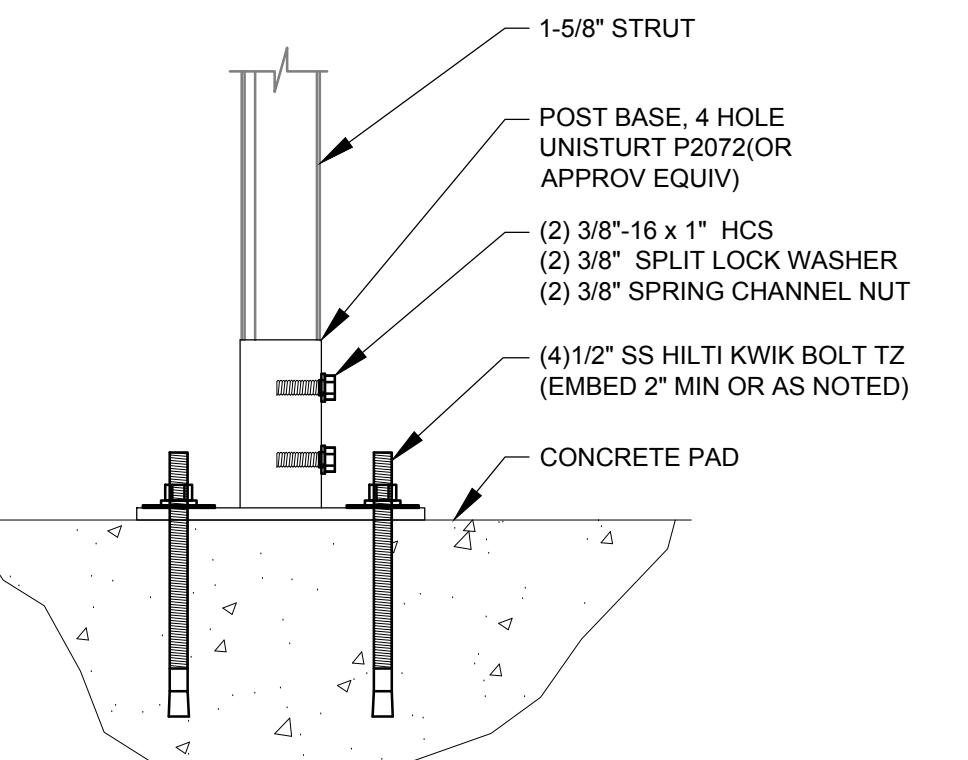
D2

C2

A2



**A2 STRUT TO STRUT**  
EQUIPMENT 3" = 1'0"



**B3 STRUT BASE TO CONCRETE**  
EQUIPMENT NTS

E3

D3

C3

A3

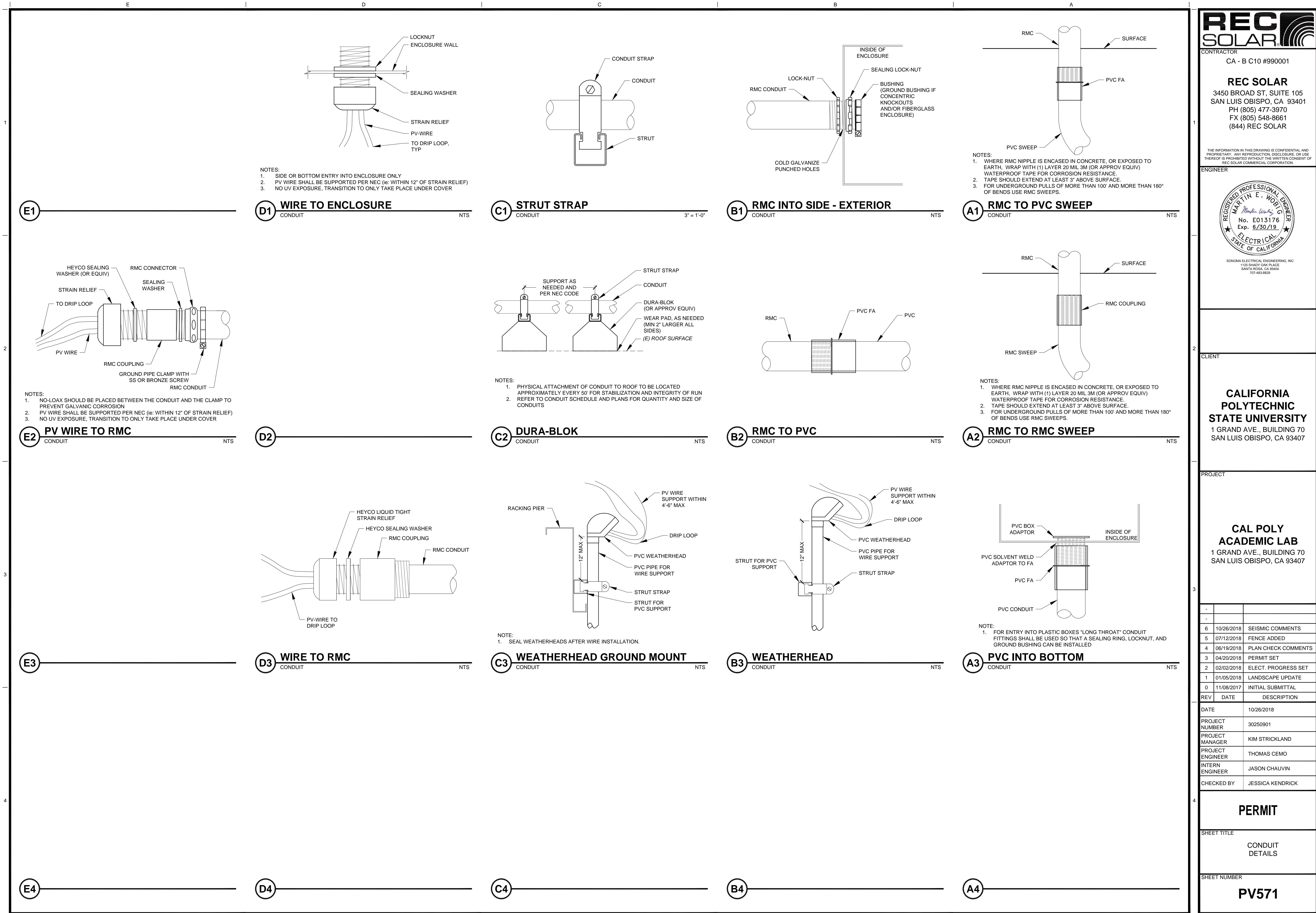
E4

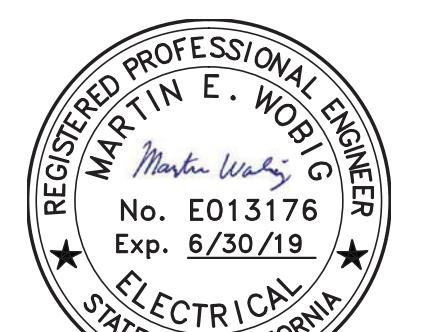
D4

C4

B4

A4



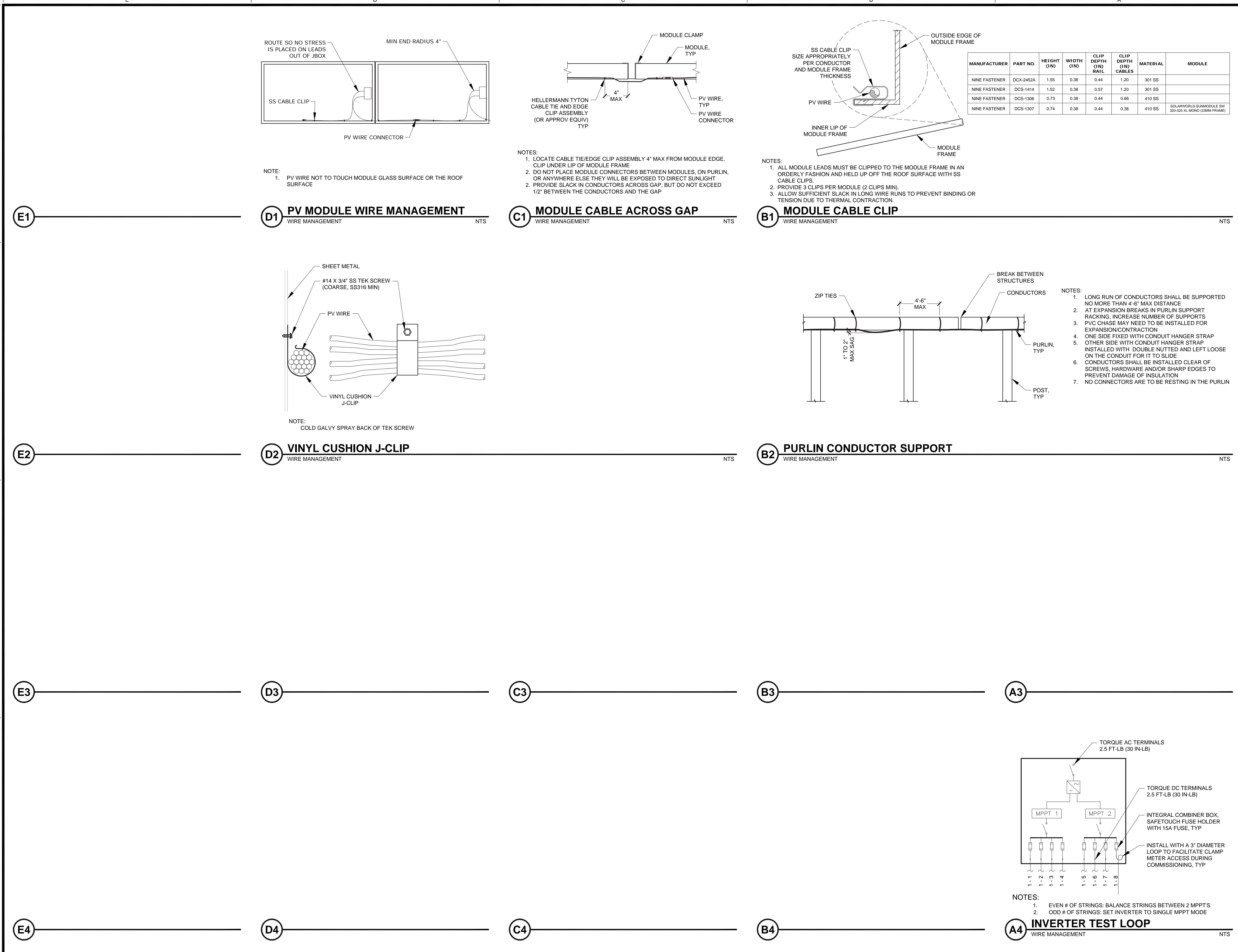


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-	-
6	10/26/2018 SEISMIC COMMENTS
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	DESCRIPTION

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

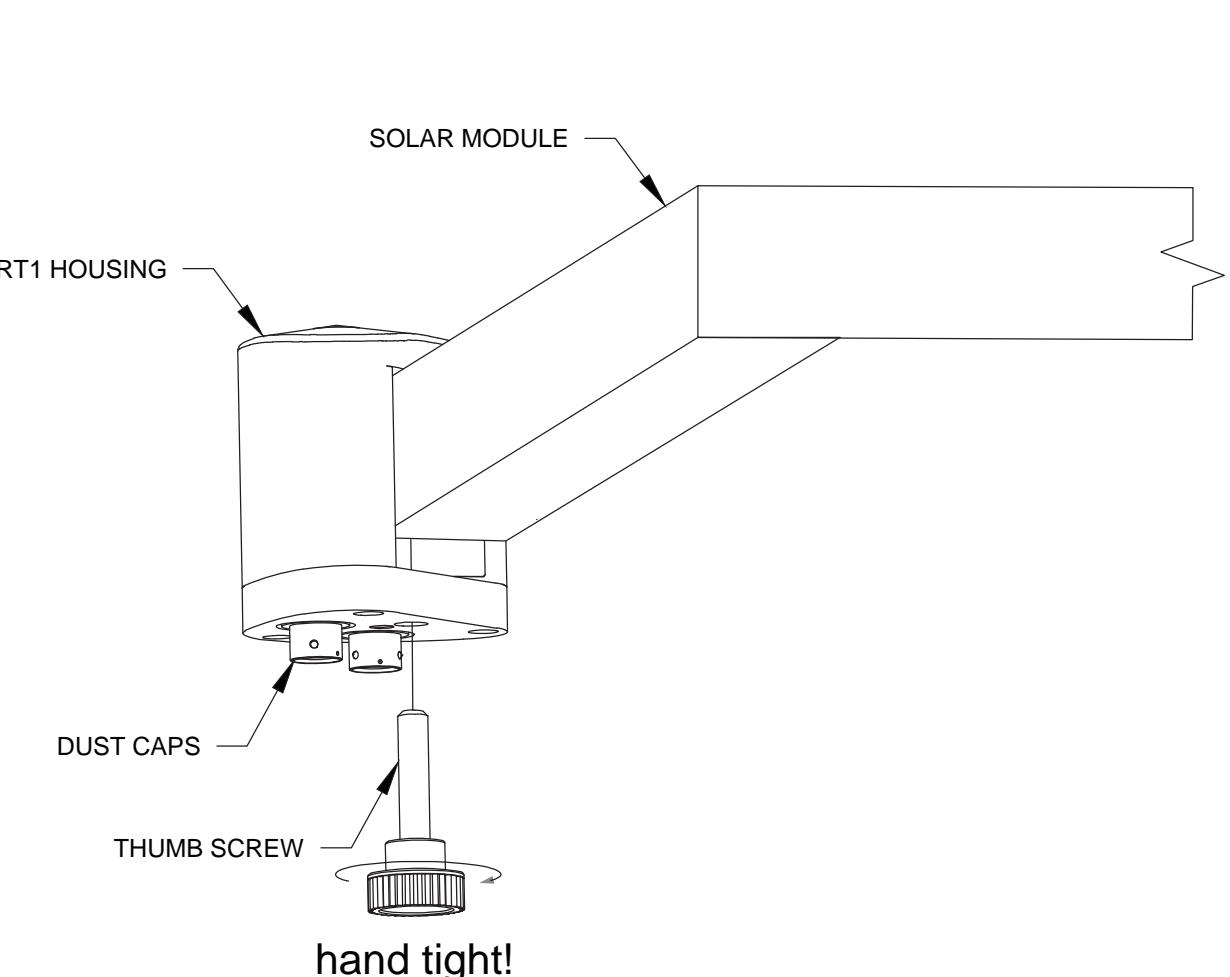
**PERMIT**

SHEET TITLE	WIRE MANAGEMENT DETAILS
SHEET NUMBER	PV581

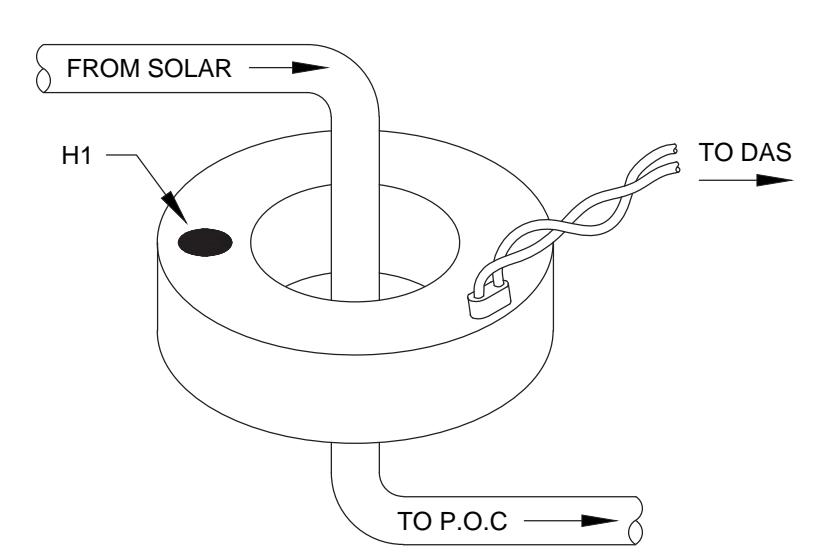
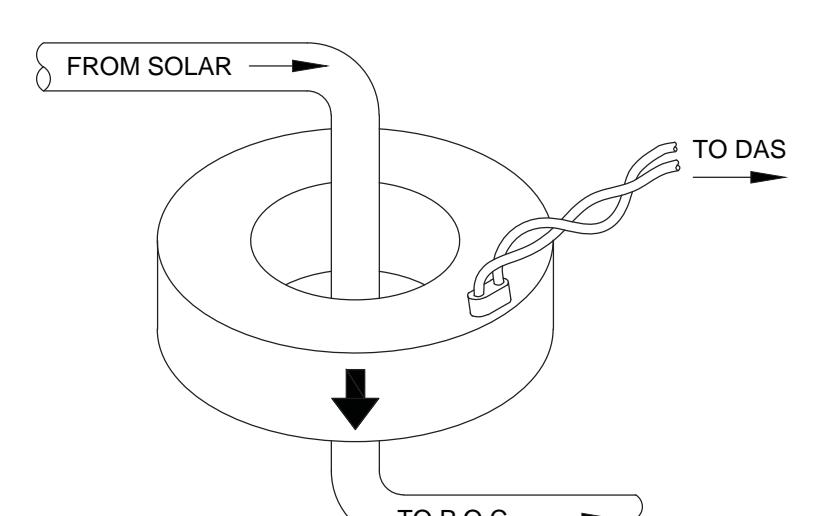
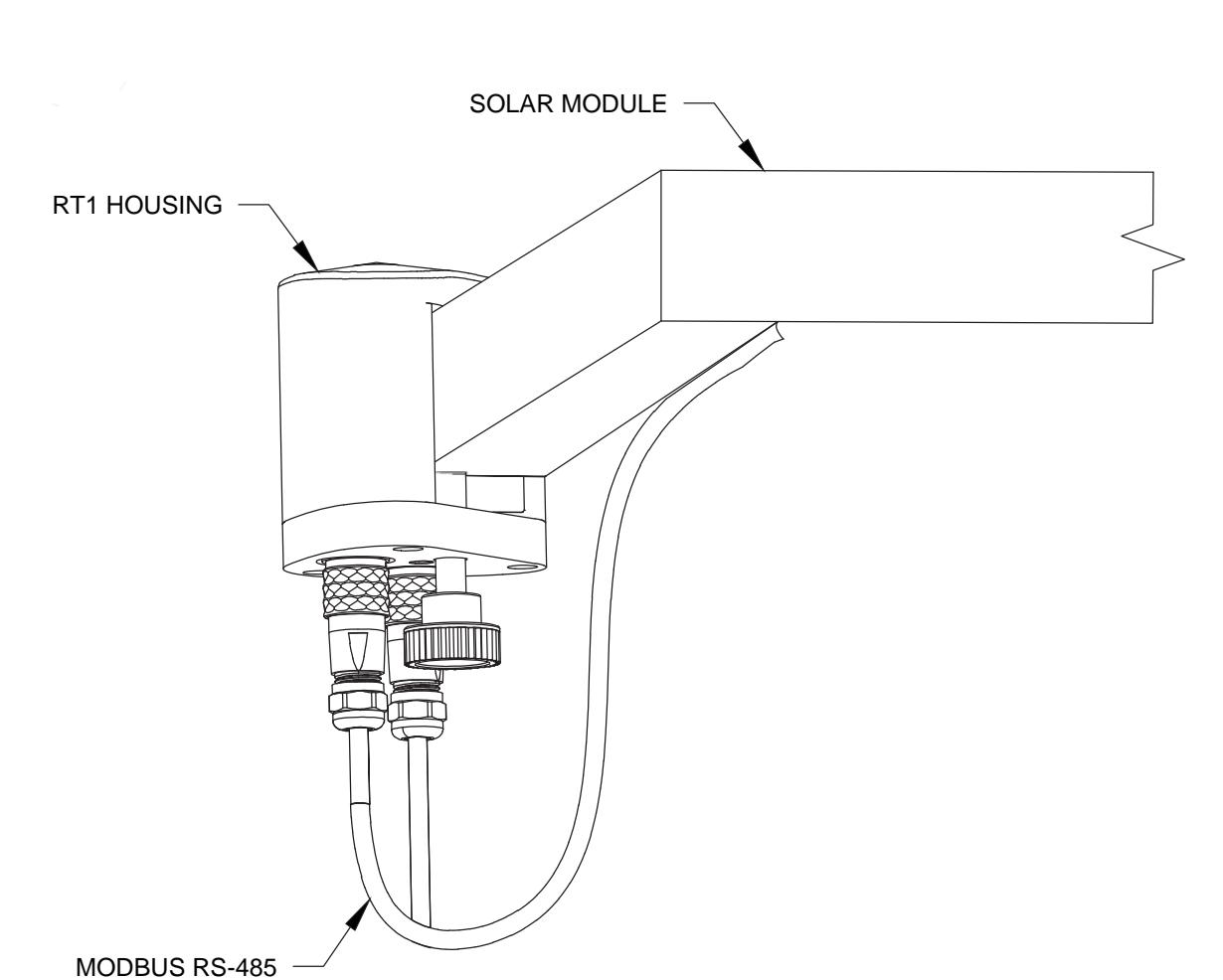




REV	DATE	DESCRIPTION
6	10/26/2018	SEISMIC COMMENTS
5	07/12/2018	FENCE ADDED
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0	11/08/2017	INITIAL SUBMITTAL



**A2** RT1-ROOFTOP MONITORING SYSTEM - CORNER MOUNTING  
MONITORING



**B4** CT INSTALLATION  
MONITORING

NOTES:

1. CT'S ARE DIRECTIONAL AND MUST BE ALIGNED WITH THE FLOW OF POWER. CT'S WILL HAVE AND ARROW OR COLORED DOT INDICATING DIRECTION.
2. CT'S TO BE CENTERED AROUND CONDUCTORS AND MOUNTED AS PERPENDICULAR AS POSSIBLE TO ENSURE ACCURATE READINGS.
3. CT CABLES CAN BE EXTENDED, THE METHOD AND DISTANCE VARIES DEPENDING ON THE CT'S USED:

ROPE CT'S (ROGOWSKI COILS)  
FACTORY CABLE HAS TWO (2) CONDUCTORS  
AND A SHIELD. EXTENSION CABLE MUST HAVE  
A SHIELD. BELDEN 3106A RECOMMENDED.  
20ft MAX EXTENSION.

VOLTAGE 0.333V AND 1V SECONDARY CT'S  
USE SAME WIRE GAUGE AS FACTORY CABLE  
OR LARGER. EXTENSION CABLE MUST HAVE  
THE SAME TWIST PROFILE AS FACTORY CABLE.  
TWISTED BELDEN1120A RECOMMENDED.  
100ft MAX EXTENSION.



## SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US



Value-Added Improvements	
• Superior integration with SMA's MIKE Power+ Solution	Reduced Labor
• World's first Secure Power Supply* now offers up to 2,000 W	Unmatched Flexibility
• Full grid management capabilities ensure a utility-compliant solution for any market	Trouble-Free Servicing
<b>SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US</b>	

## Reduce costs across your entire residential business model

The residential PV market is changing rapidly. Your bottom line matters more than ever—so we've designed a superior residential solution to help you decrease costs at every stage of your business operations. The Sunny Boy 3.0-US/3.8-US/5.0-US/6.0-US/7.0-US join the SMA lineup of field-proven solar technology backed by the world's #1 service team, along with a wealth of improvements. Simple design, improved stocking and ordering, value-driven sales support and streamlined installation are just some of the ways that SMA helps your business operate more efficiently. And, Sunny Boy's superior integration with the innovative Power+ Solution means installers have even more flexibility in addressing their toughest challenges. Finally, SMA Smart Connected will automatically detect errors and initiate the repair and replacement process so that installers can reduce service calls and save time and money.

[www.SMA-America.com](http://www.SMA-America.com)

## String Inverter Solutions



SolarBOS String Inverter Solutions provide low-cost and space-saving combiners and disconnects for residential and commercial solar systems that are utilizing string inverters. These solutions can be configured as combining or pass-through, with or without integrated disconnects. Contactor combiners or pass-through units, in connection with a SolarBOS Power Supply, serve as Rapid Shutdown devices. All products are ETL listed to UL-1741 for 1000 VDC photovoltaic systems and use compact NEMA-4X polycarbonate enclosures.

### SPECIFICATIONS

- ETL listed to UL-1741
- 2 to 6 input circuits per MPPT
- Rated for 1000 VDC and continuous duty
- Touch-safe fuse holders
- Ground block included
- NEMA-4X polycarbonate enclosures

### AVAILABLE OPTIONS

- Integrated load break disconnect(s) option
- Configurations for single or dual MPPT inverters
- Configurations for floating arrays
- Integrated load break contactors for rapid shutdown (per NEC 690.12 with compliant inverter)



SolarBOS Pass-Through Disconnect Unit, Part Number F45K32-1-4XP

Product Description	Junction Box	Combiners	Pass-Through Disconnect Units
Product Part Number	CSK6-1-4XP	CSK6-FF-4XP	FSK6-FF-4XP
Topology	Grounded or Floating	Floating	Floating
Maximum Voltage	1000 VDC	1000 VDC	1000 VDC
Integrated Load Break Disconnect	No	No	Yes
Number of Input Circuits	6	6	2x6
Number of Output Circuits	6	1	2
Input Conductor Size Range (AWG)	#20-6	#14-8	#14-8
Output Conductor Size Range (AWG)	#20-6	#14-2	#14-2
Max Rated Current (ADC cont. per output circuit)	30	75	2x75
Max Fuse Size (Amps)	N/A	30	30
Enclosure Size (Inches)	9x8x2	9x8x2	12x10x4
Approx. Weight (Pounds)	4	4	10
Enclosure NEMA Rating	4X	4X	4X

NOTE: In Product Part Numbers, substitute "FF" with the appropriate fuse amperage.

SolarBOS, Inc. | T: 925-456-7744 | [sales@solarbos.com](mailto:sales@solarbos.com) | [www.solarbos.com](http://www.solarbos.com)



## RAPID SHUTDOWN SYSTEM



RSB-25-US-10 & RSC-1X-US-10



IMAGE OF RAPID SHUTDOWN CONTROLLER FOR ILLUSTRATIVE PURPOSES ONLY

### Reliable

- Optimal system reliability with hybrid switches for disconnecting
- Automatic self-test upon startup to ensure functionality

### Perfect alignment

- UL Certified and compliant with 2014 NEC 690.12 Rapid Shutdown
- Pre-wired MCA connectors and snap terminals reduce materials and installation time

### Code compliant

- Incorporates junction box reduces equipment and speeds installation time
- Pre-wired MCA connectors and snap terminals reduce materials and installation time

### Cost effective

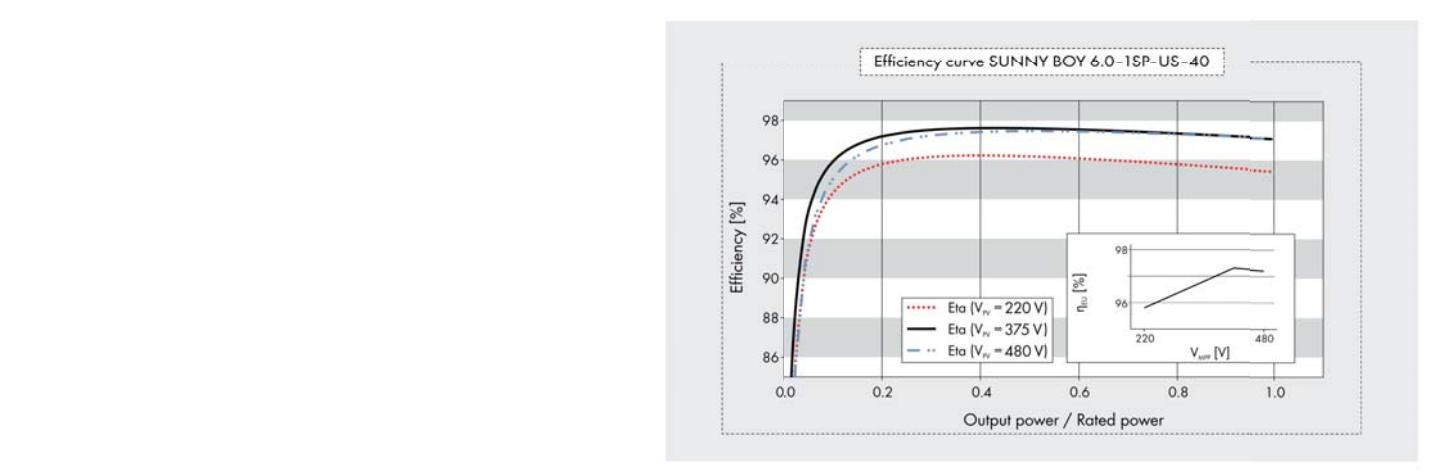
- Incorporated junction box reduces equipment and speeds installation time
- Pre-wired MCA connectors and snap terminals reduce materials and installation time

## RAPID SHUTDOWN SYSTEM

Cost-effective system compliance

The SMA Rapid Shutdown System is the most cost-effective way to achieve 2014 NEC 690.12 Rapid Shutdown compliance for systems using Sunny Boy inverters. This DC powered system allows for the use of Secure Power Supply, providing opportunity power to homeowners during daytime grid outages. Hybrid switches and automatic self-test ensure system safety and durability, reducing risk and costs. Each component plays a critical role in a PV system; don't compromise your Sunny Boy's performance with any other rapid shutdown solution.

Technical data	Sunny Boy 3.0-US	Sunny Boy 3.8-US	Sunny Boy 5.0-US
<b>Input [DC]</b>	208 V	208 V	208 V
Max. usable DC power	3100 W	3100 W	3450 W
Max. DC voltage	5150 V	5150 V	5150 V
Rated MPPT voltage range	155 - 480 V	195 - 480 V	220 - 480 V
MPPT operating voltage range	100 - 550 V	100 V / 125 V	100 V / 125 V
Max. DC voltage range	110 V	110 V	110 V
Max. operating input current per MPPT	10 A	18 A	24 A
Max. short circuit current per MPPT	18 A	24 A	30 A
Number of MPPT tracker / string per MPPT tracker	2/1	2/1	2/1
<b>Output [AC]</b>	3000 W	3000 W	3330 W
Max. AC apparent power	3000 VA	3000 VA	3330 VA
AC voltage range / frequency	208 V / 50 Hz	240 V / 50 Hz	208 V / 50 Hz
AC voltage range	193 - 229 V	211 - 264 V	193 - 229 V
AC grid frequency	50 Hz / 50 Hz	50 Hz / 50 Hz	50 Hz / 50 Hz
Max. output current	14.5 A	12.5 A	16.0 A
Power factor [cos φ]	1	1	1
Output phases / line connections	1 / 2	1 / 2	1 / 2
Harmonic content	< 4 %	< 4 %	< 4 %
<b>Efficiency</b>			
Max. efficiency	97.2 %	97.6 %	97.2 %
CEC efficiency	95 %	96.5 %	96.5 %
Protection devices			
DC disconnect device	•		
DC reverse current protection	•		
Ground fault monitoring / Grid monitoring	•		
AC short circuit protection	•		
All-pole sensitive residual current monitoring unit (RCMU)	•		
Arc fault circuit interrupter (AFCI)	•		
Protection class / overvoltage category	I / IV		
<b>General data</b>			
Dimensions / H / D in mm [in]	535 x 200 x 198 [21.1 x 7.8 x 7.8]	600 x 200 x 200 [23.6 x 7.8 x 11.0]	600 x 200 x 200 [23.6 x 7.8 x 11.0]
Packaging dimensions / H / D in mm [in]			
Weight / packaging weight	26 kg [57 lb] / 30 kg [66 lb]		
Operating temperature range	-25°C...+60°C		
Noise emission (typical)	39 dB(A)		
Interim power consumption at night	< 5 W		
Topology	Transformerless		
Cooling concept	Convection		
<b>Features</b>			
Ethernet ports	2		
Secure Power Supply	•		
Display (2 line x 16 characters)	•		
WAN	•		
Sensor module / External WAN antenna	•		
Warranty: 10 / 15 / 20 years	UL 1741, UL 1998, UL 16998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1		
Certificates and approvals	UL 1741, UL 1998, UL 16998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1		
• Standard features: ○ Optional features: - Not available	Data of nominal conditions. NOTE: US inverters ship with gray lids. * Not compatible with the Power+ Solution Shutdown functionality		
Type designation	SB3.0-US-40	SB3.8-US-40	SB5.0-US-40
<b>Accessories</b>			
■ SMA RoofTop Communication Kit (ROOFTOPKIT-P2-US)	■ External WAN antenna (EXTANTUS-40)	■ SMA Sensor module (MD-SEN1-US-40)	



Toll Free +1 888 4 SMA USA  
[www.SMA-America.com](http://www.SMA-America.com)

SMA America, LLC

**REC SOLAR**  
CONTRACTOR

CA - B C10 #990001

3450 BROAD ST, SUITE 105  
SAN LUIS OBISPO, CA 93401  
PH (805) 477-3970  
FX (805) 548-8661  
(844) REC SOLAR

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ENGINEER

MARTIN E. WOELL  
No. E013176  
Exp. 6/30/19  
ELECTRICAL  
STATE OF CALIFORNIA  
SONOMA ELECTRICAL ENGINEERING, INC  
1125 SHADY OAK PLACE  
SANTA ROSA, CA 95404  
707-483-8829

PROJECT

**CAL POLY ACADEMIC LAB**

1 GRAND AVE., BUILDING 70  
SAN LUIS OBISPO, CA 93407

Technical data	Rapid Shutdown Box
<b>General data</b>	
Maximum input voltage	600 V DC
Minimum input voltage	110 V DC
Number of DC inputs	4 strings, 2 in parallel per channel
DC operating current per channel	20 A DC
Maximum input short circuit current per channel	36 A DC
Integrated power supply	DC powered by PV array (max. 5W)
Ambient temperature range	-40°C to +72°C
Dimensions without pre-wired cables (W x H x D)	542 x 340 x 175 [21.3 x 13.4 x 2.95 in]
Weight	0.8 kg / 1.8 lbs
DC input	Cable whips with MCA connectors
Wire size DC outputs	AWG 12 to AWG 6
Wire size control wires	AWG 18 to AWG 6
Wire size grounding	AWG 10 to AWG 6
Enclosure rating	Type 4X
Enclosure finish	Aluminum
Condal size (home run)	3/4 inch conduit
Condal size (control wires)	2 x 1/2 inch for daisy chain wiring
Warranty	10 years
Compliance	NEC 2014, article 690.12
Safety listing and certification	UL 1741
Type designation	RSB-25-US-10
Technical data	Rapid Shutdown Controller
<b>General data</b>	
Status indicator	2 LEDs
Dimensions (W x H x D)	80 x 153 x 100 [3

# PLACARDS

**REC  
SOLAR**

CONTRACTOR

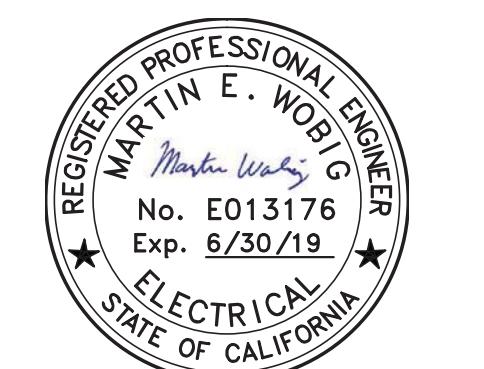
CA - B C10 #990001

## REC SOLAR

3450 BROAD ST, SUITE 105  
SAN LUIS OBISPO, CA 93401  
PH (805) 477-3970  
FX (805) 548-8661  
(844) REC SOLAR

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ENGINEER



SONOMA ELECTRICAL ENGINEERING, INC  
1125 SHADY OAK PLACE  
707-463-6629

CLIENT

CALIFORNIA  
POLYTECHNIC  
STATE UNIVERSITY

1 GRAND AVE., BUILDING 70  
SAN LUIS OBISPO, CA 93407

PROJECT

CAL POLY  
ACADEMIC LAB

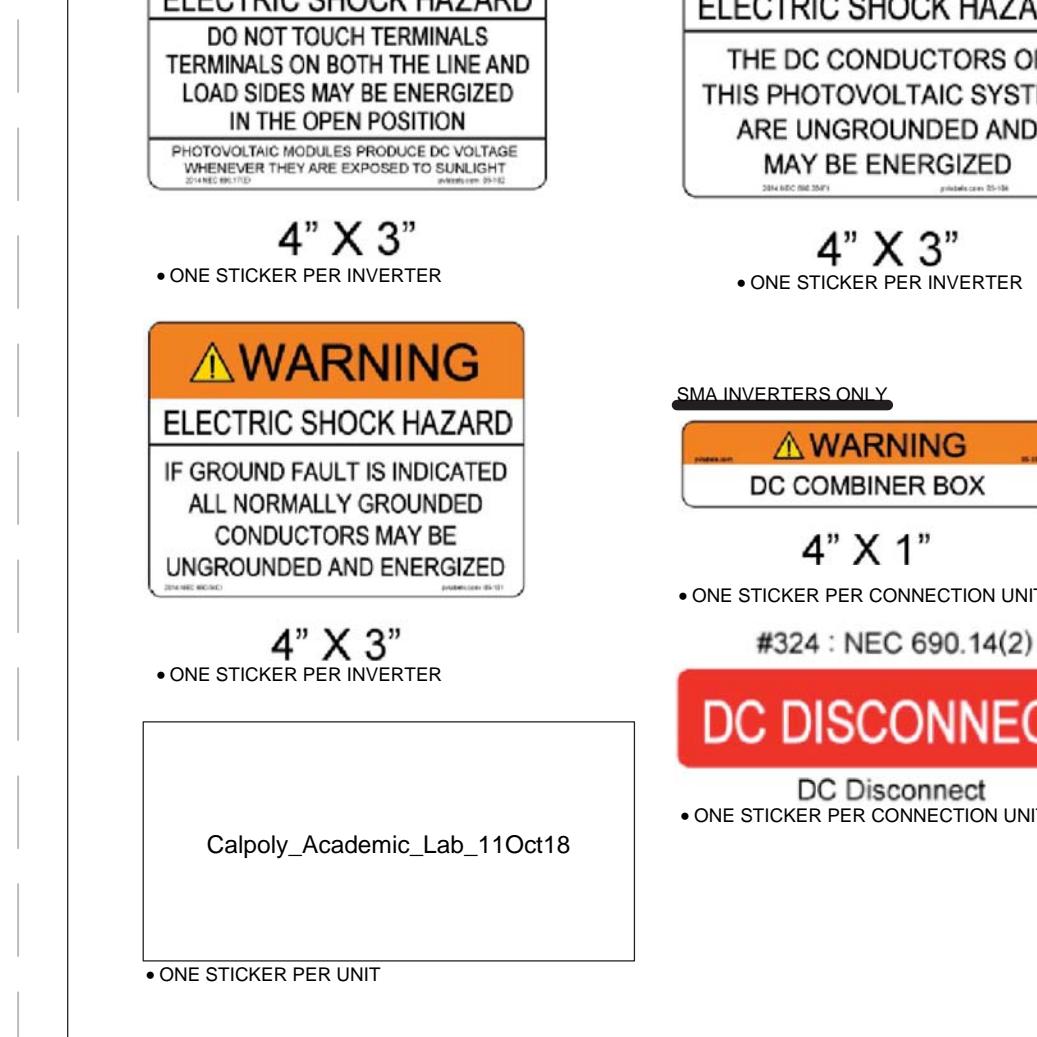
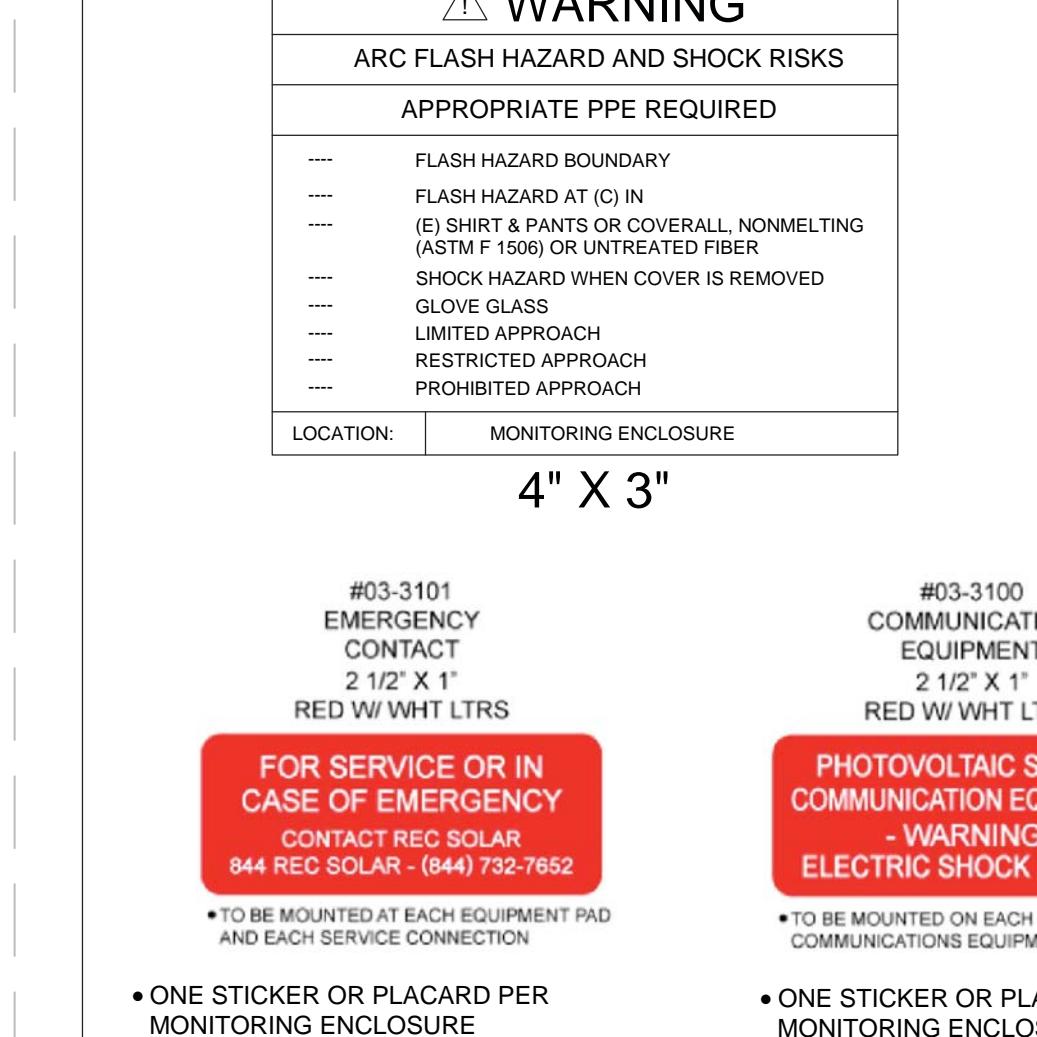
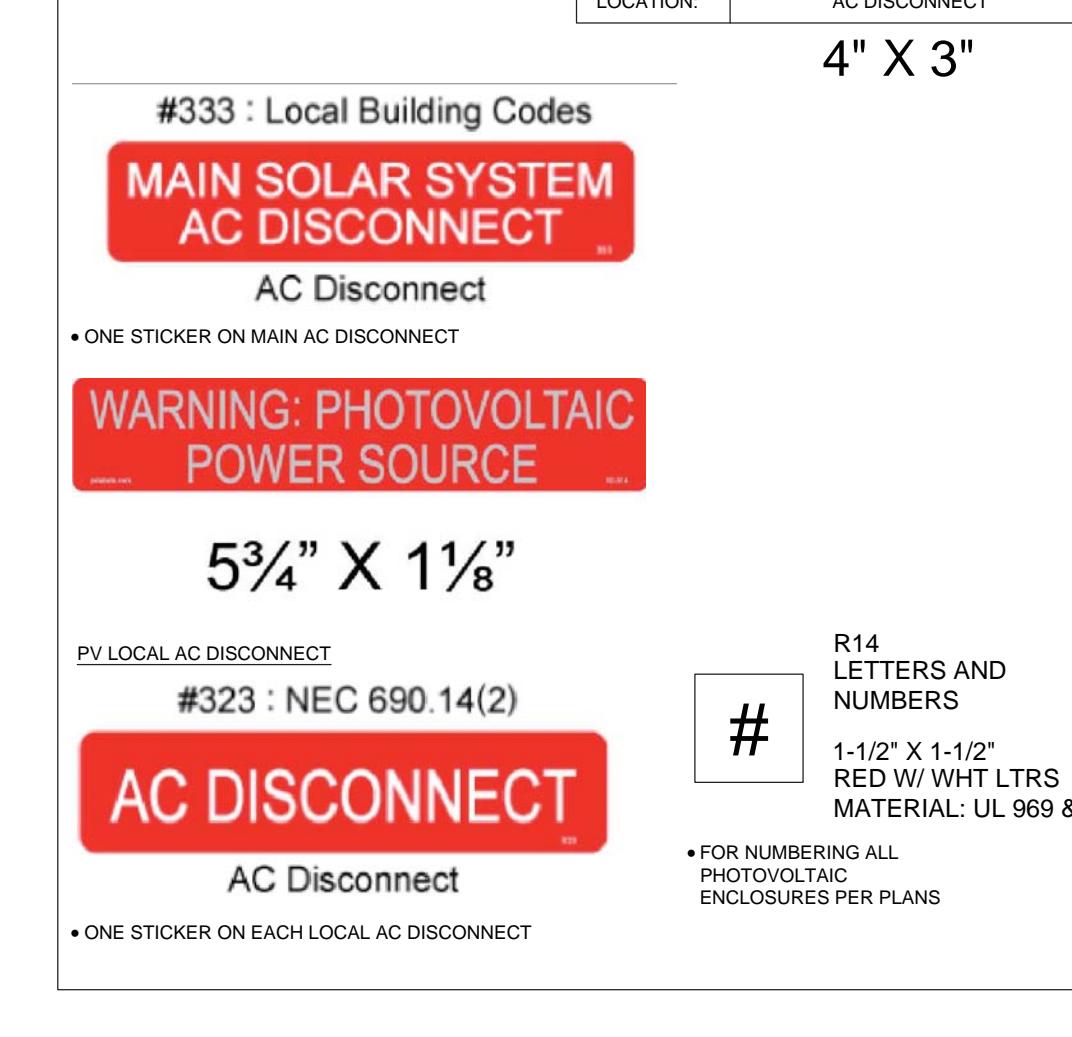
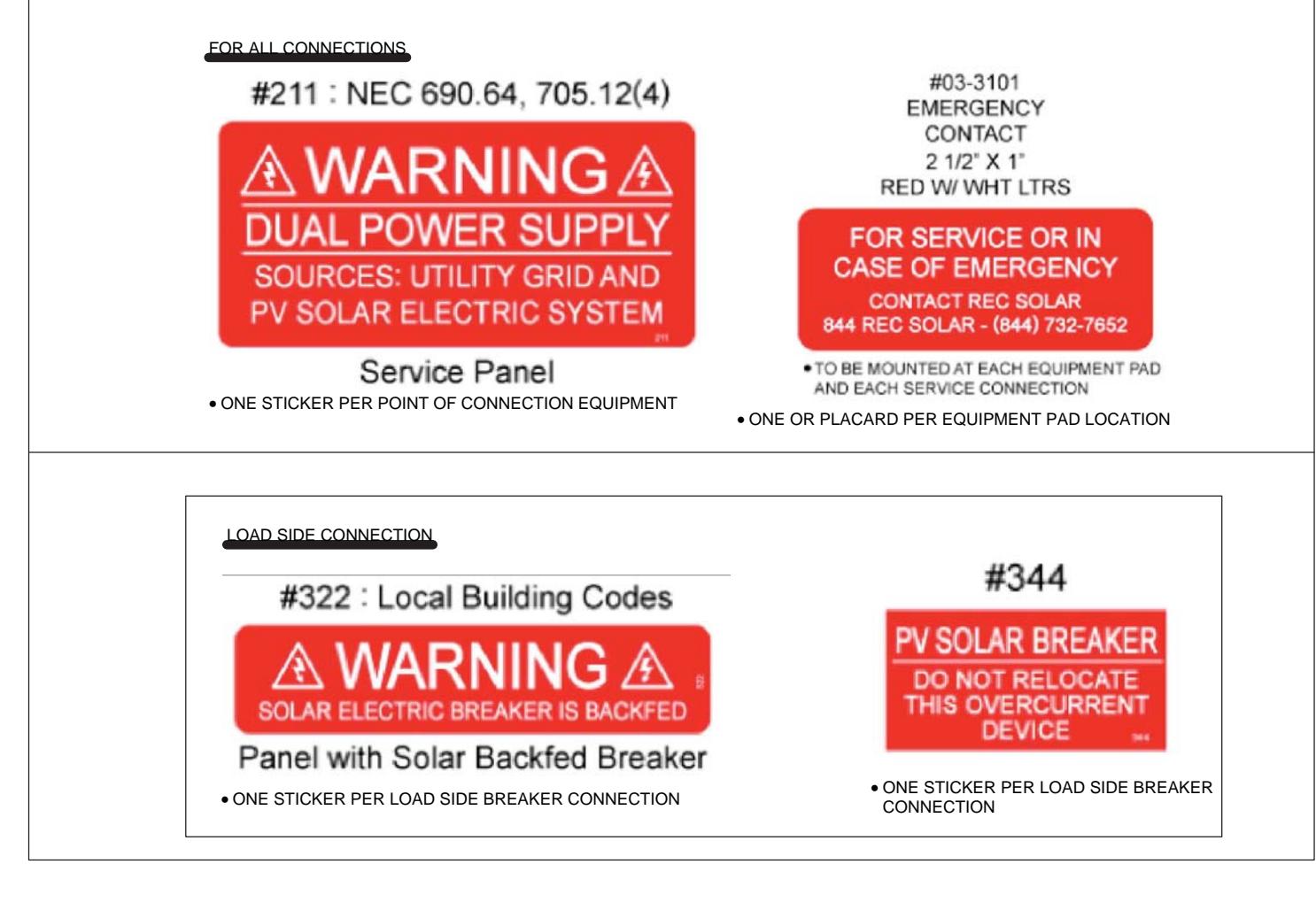
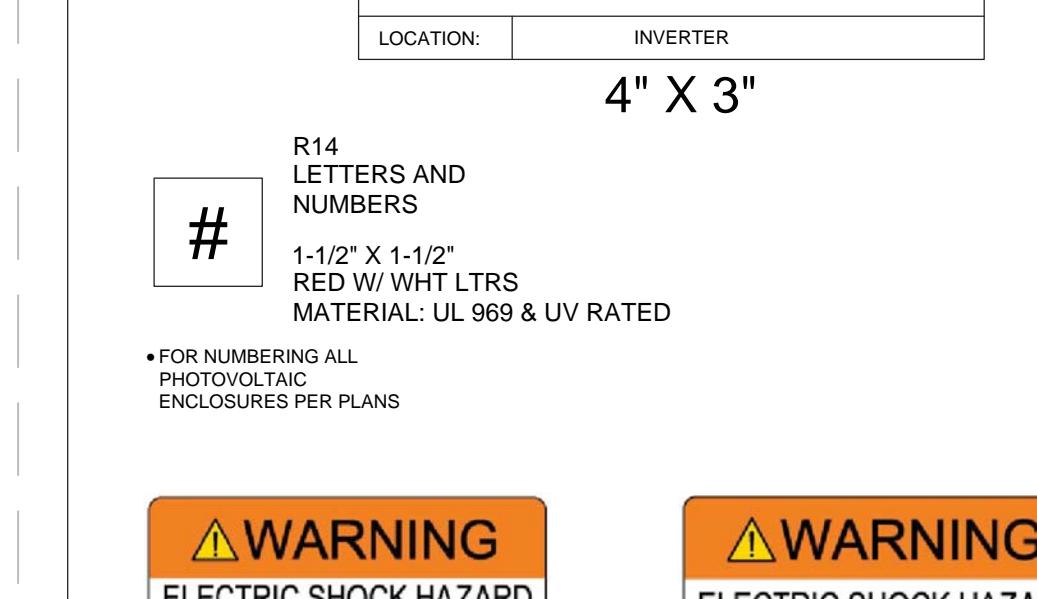
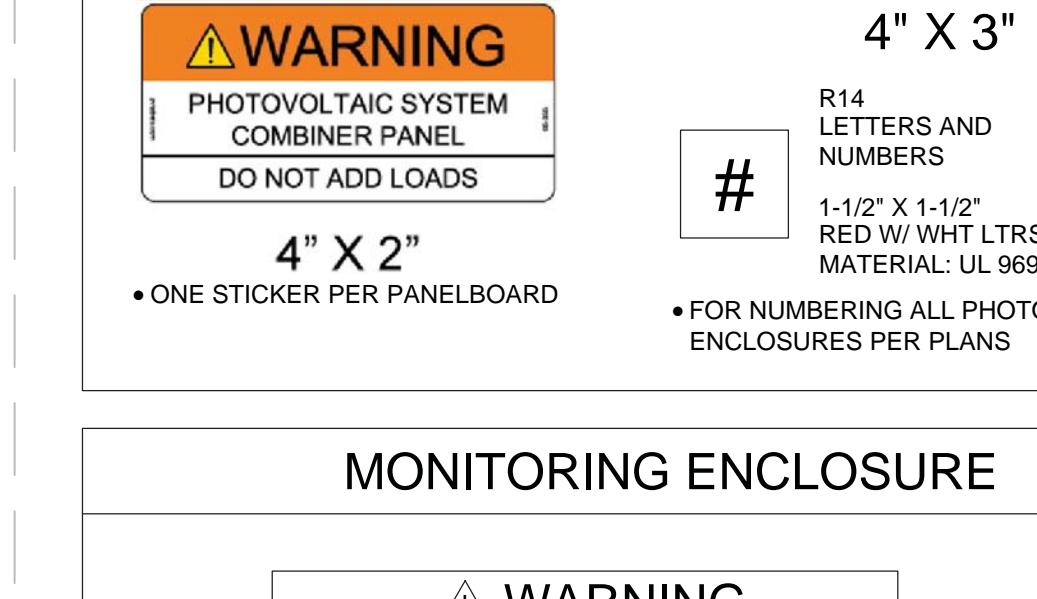
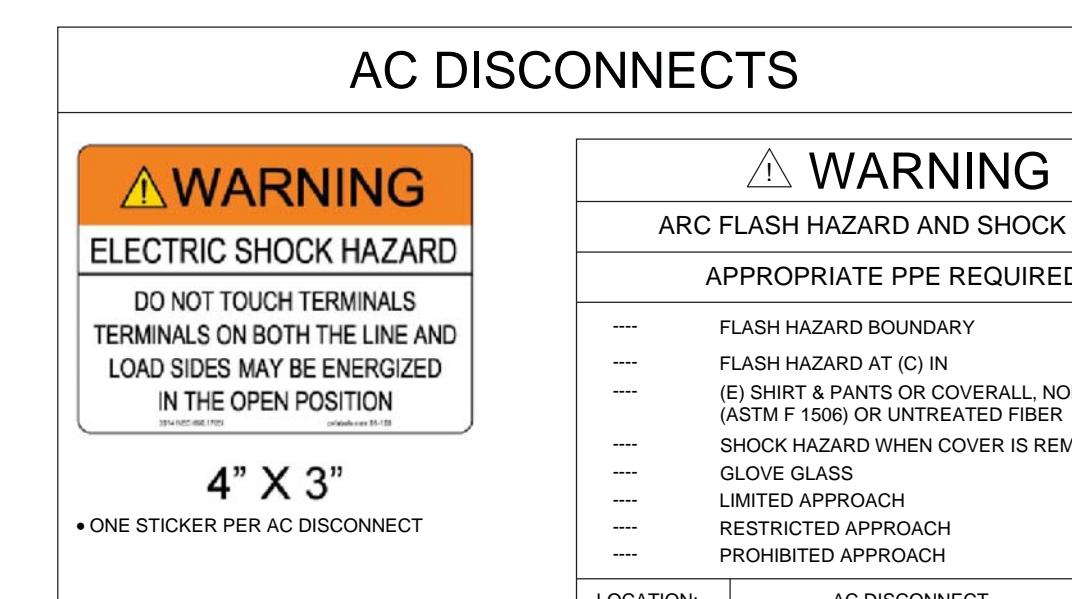
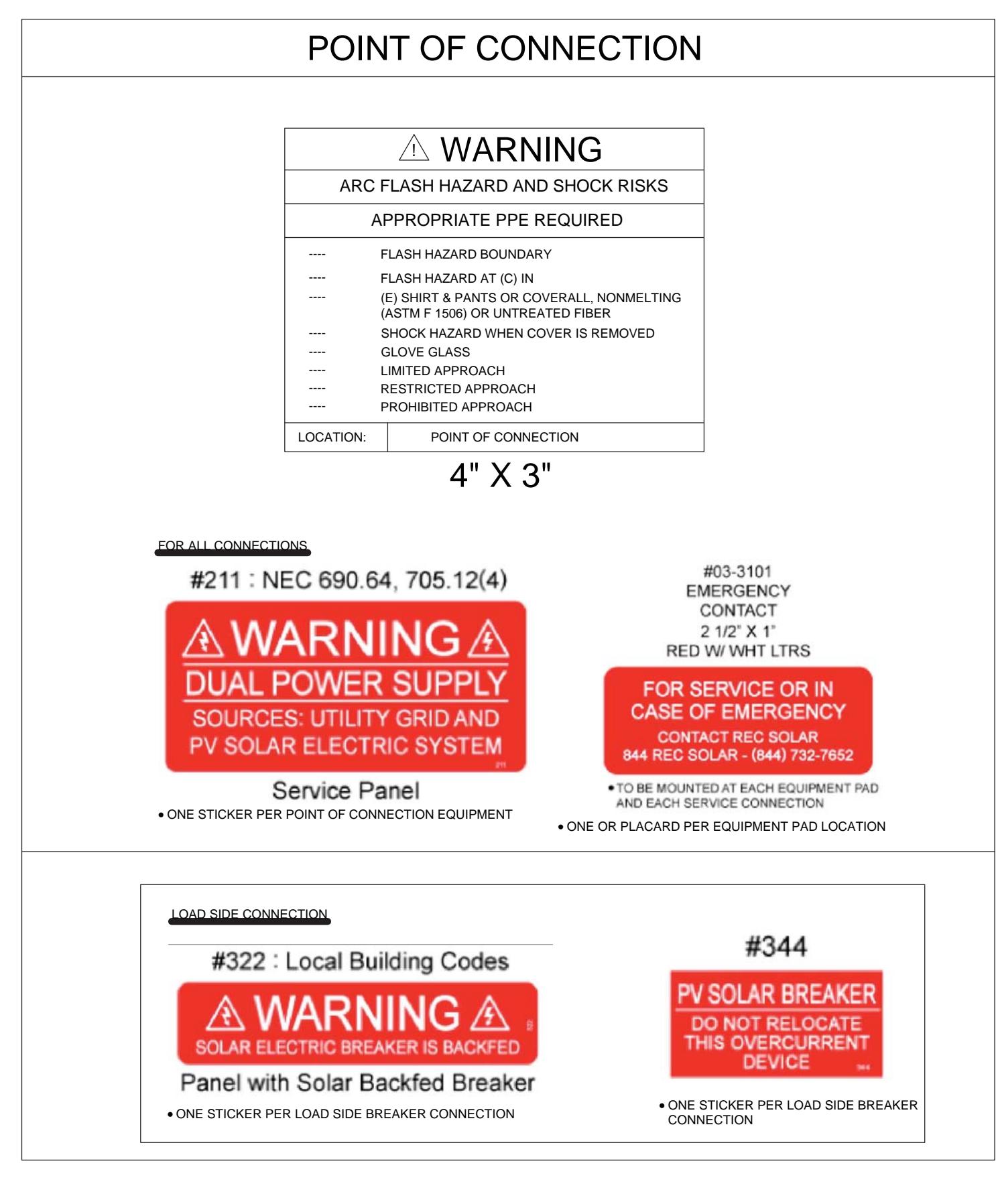
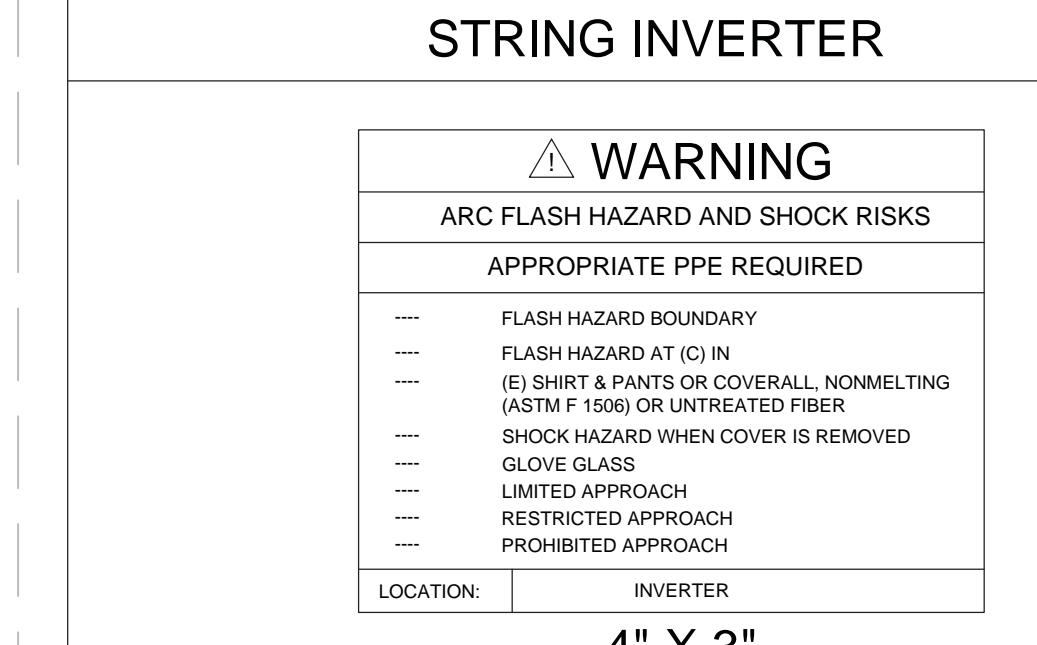
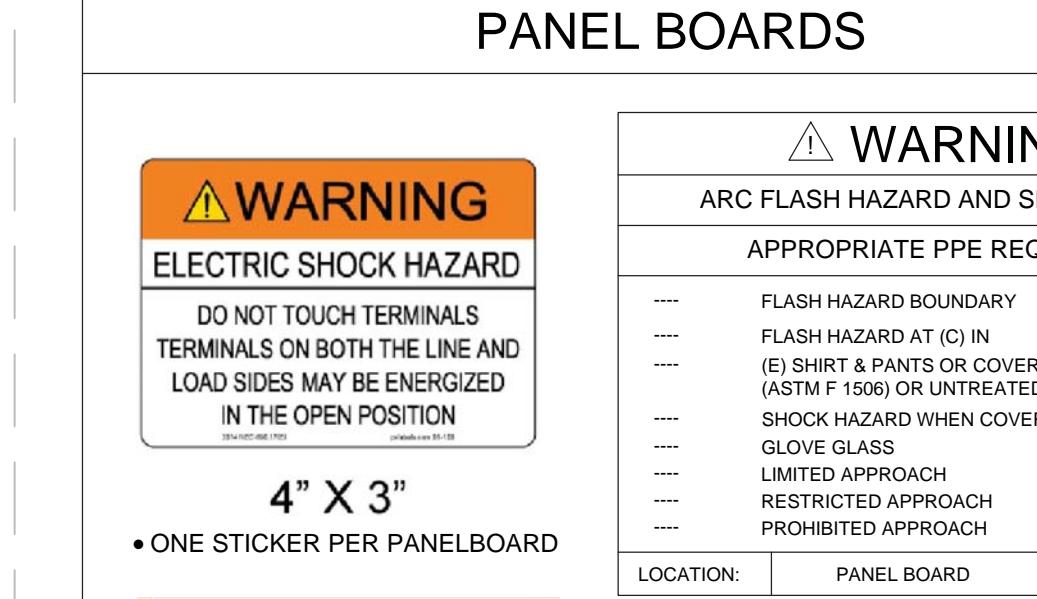
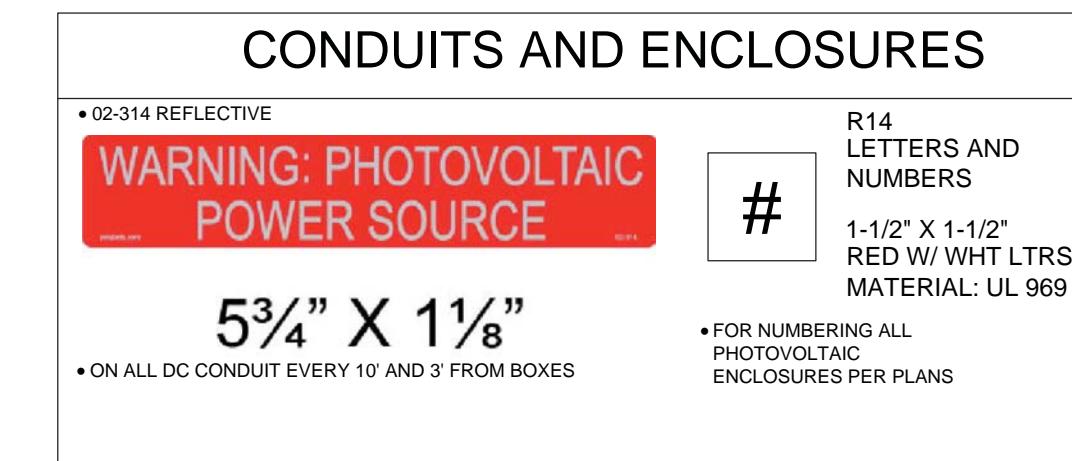
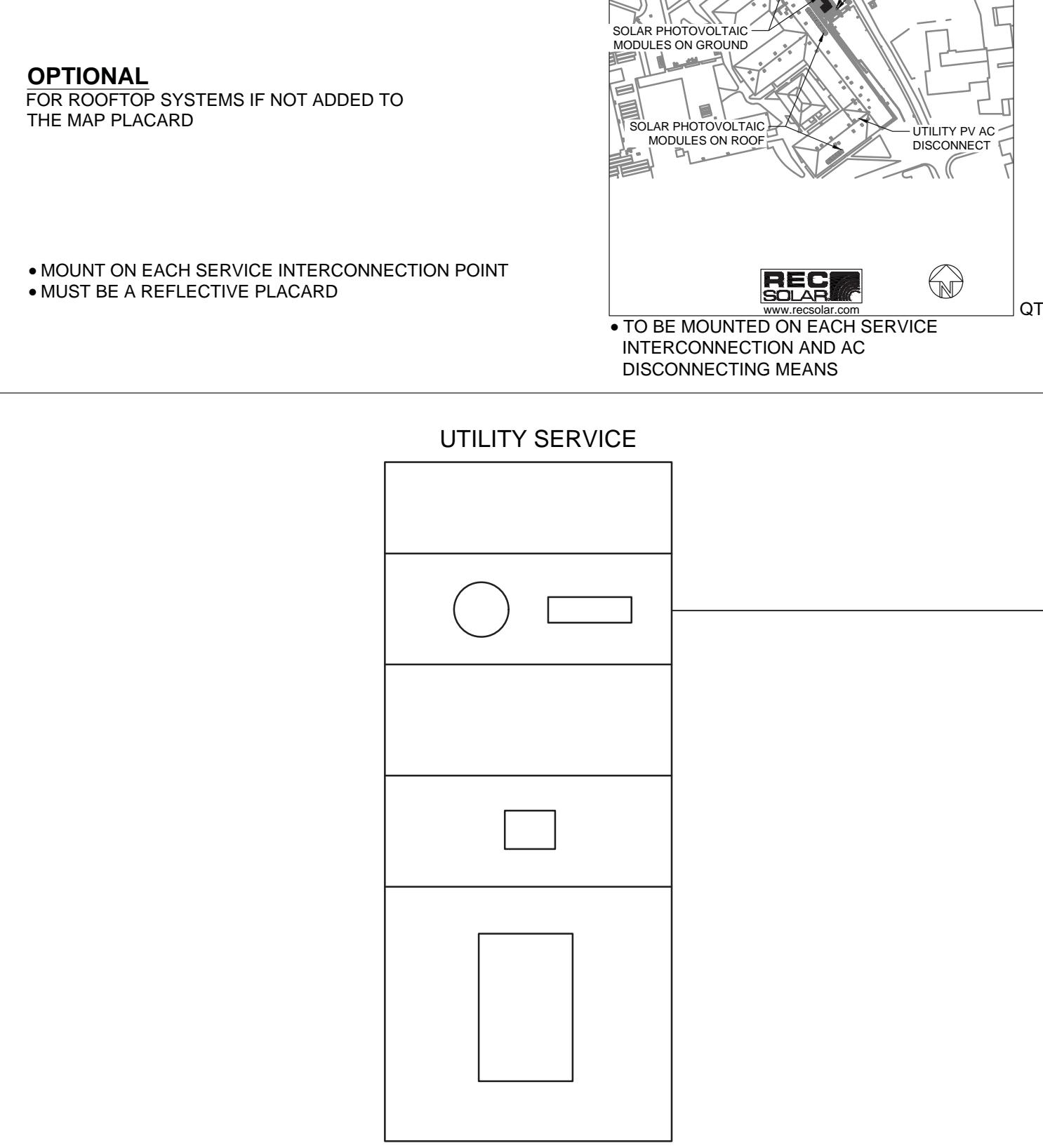
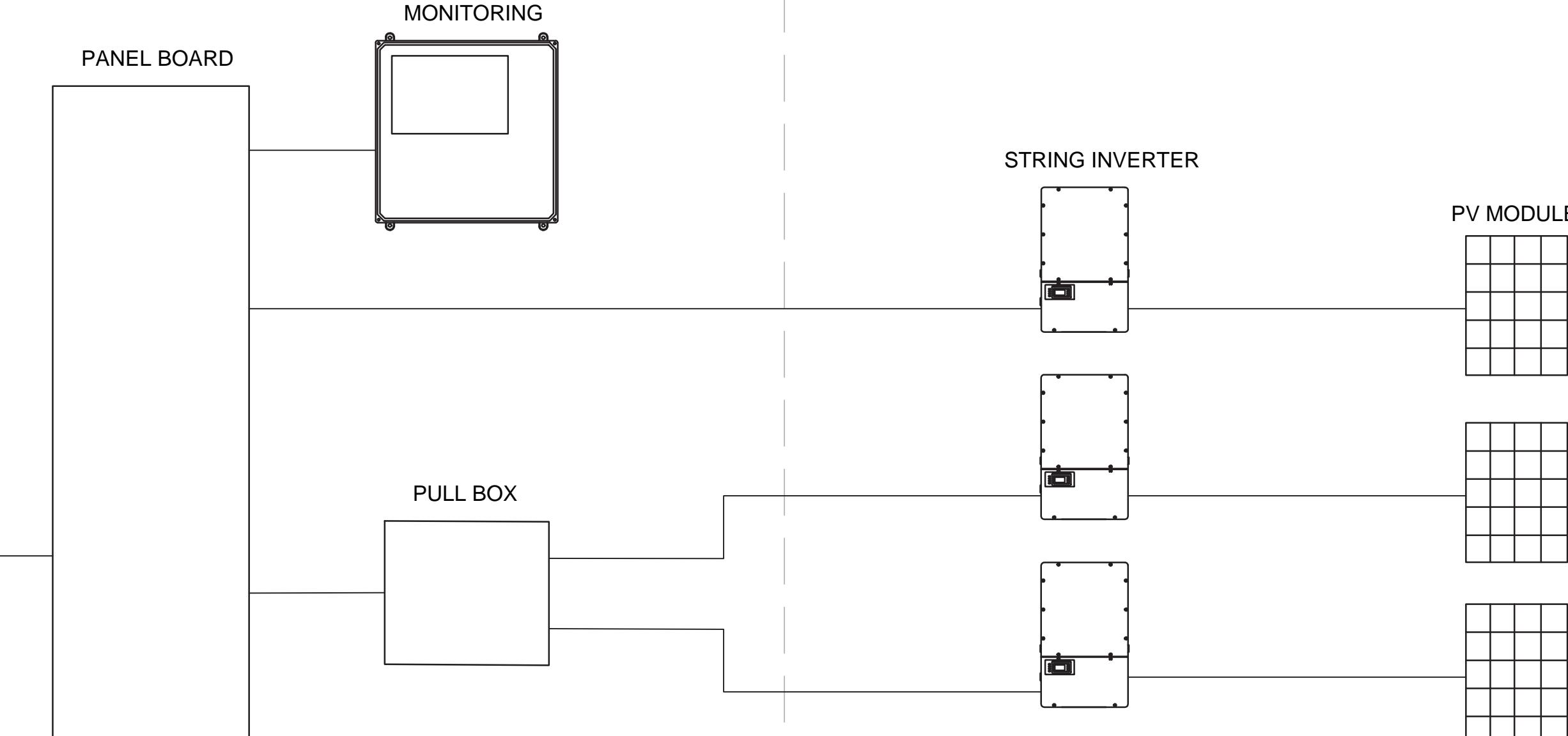
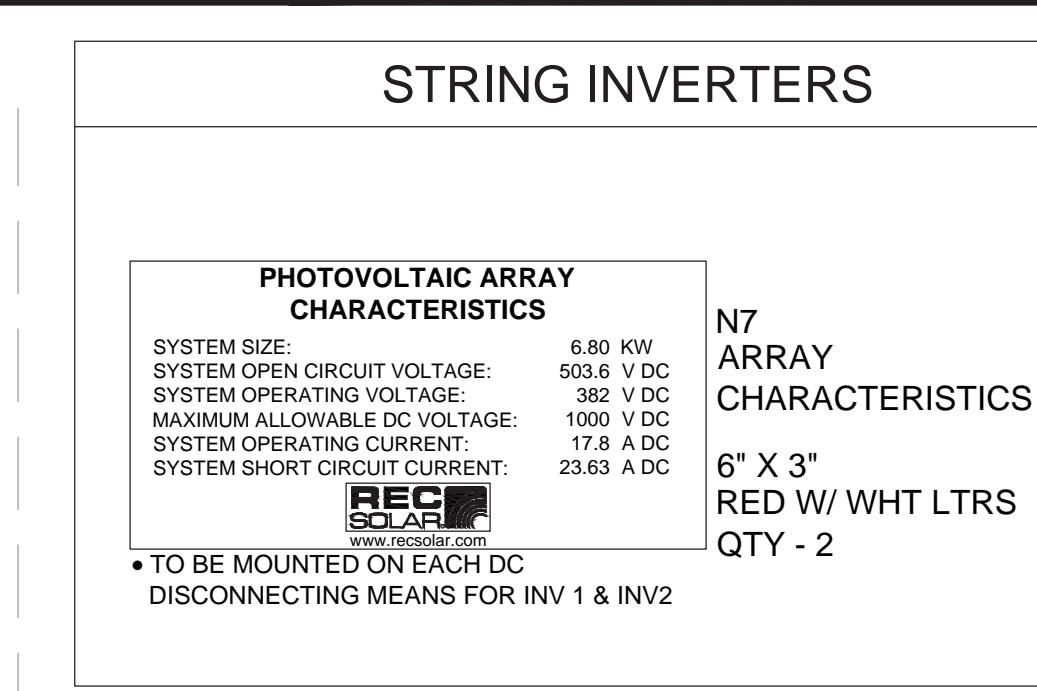
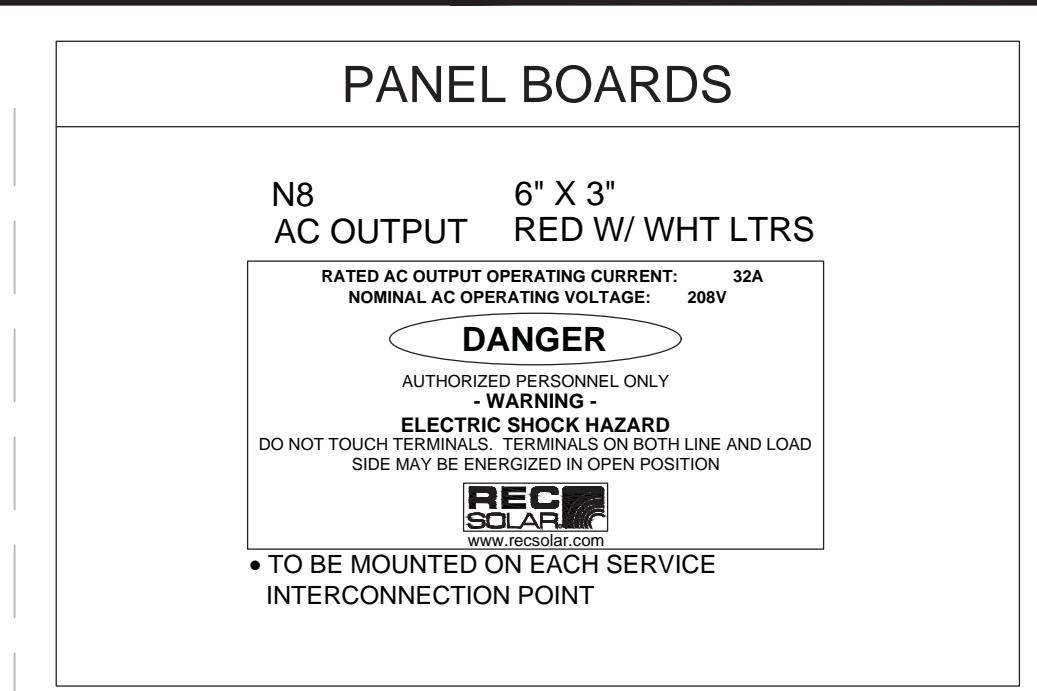
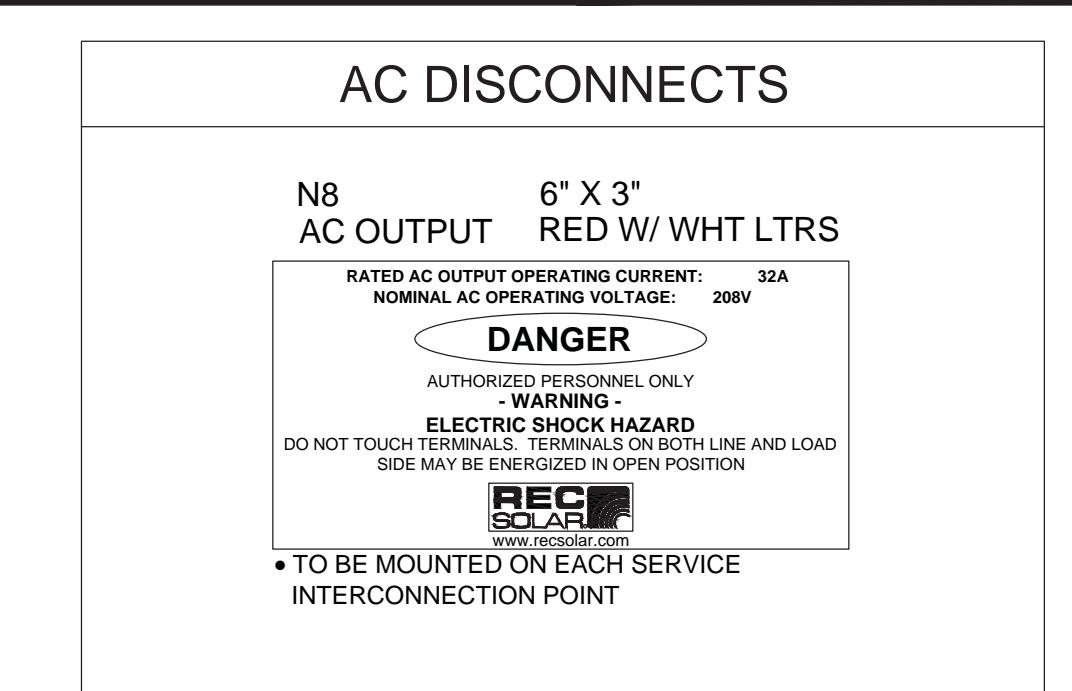
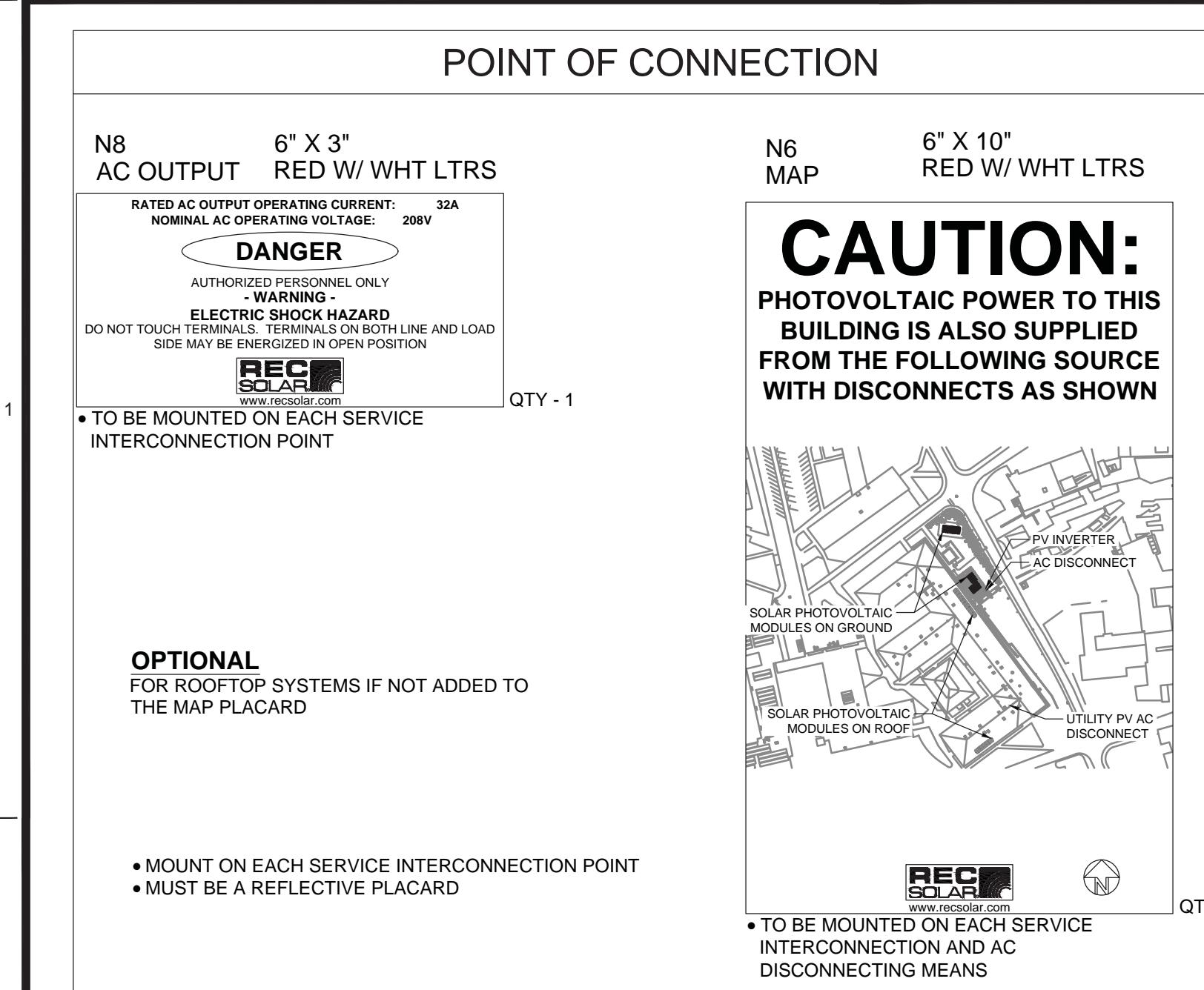
1 GRAND AVE., BUILDING 70  
SAN LUIS OBISPO, CA 93407

# LABELS

SHEET TITLE	
EQUIPMENT SIGNAGE	

SHEET NUMBER  
PV701

NTS



EQUIPMENT SIGNAGE

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK
REV DATE	DESCRIPTION
6	10/26/2018 SEISMIC COMMENTS
5	07/12/2018 FENCE ADDED
4	06/19/2018 PLAN CHECK COMMENTS
3	04/20/2018 ELECT, PROGRESS SET
2	02/02/2018 LANDSCAPE UPDATE
1	01/05/2018 INITIAL SUBMITTAL
0	11/08/2017
REV DATE	DESCRIPTION
DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK
4	PERMIT
SHEET TITLE	
EQUIPMENT SIGNAGE	
SHEET NUMBER	

-	-
-	-
6	10/26/2018 SEISMIC COMMENTS
5	07/12/2018 FENCE ADDED
4	06/19/2018 PLAN CHECK COMMENTS
3	04/20/2018 PERMIT SET
2	02/02/2018 ELECT, PROGRESS SET
1	01/05/2018 LANDSCAPE UPDATE
0	11/08/2017 INITIAL SUBMITTAL
REV	DATE
	DESCRIPTION

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

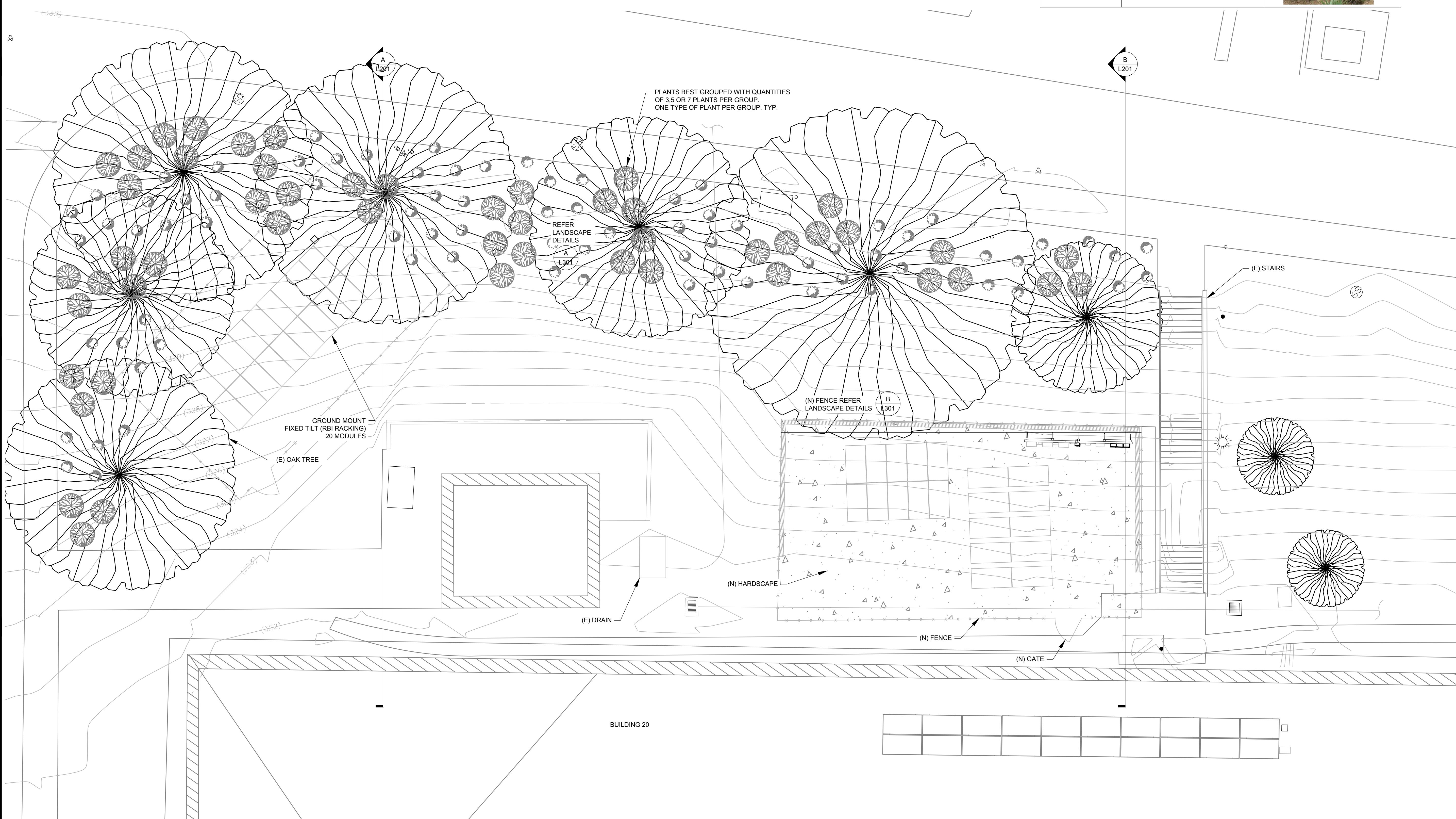
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SHEET TITLE  
LANDSCAPING & IRRIGATION -  
ZONE 1A, 2A & 2B - GROUND  
MOUNT

SHEET NUMBER

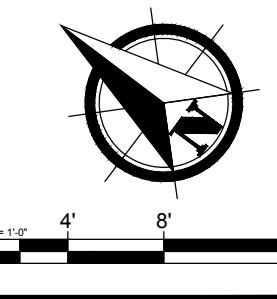
L101

SYMBOL	NAME OF PLANT	IMAGE
	RHAMNUS CALIFORNICA COFFEE BERRY	
	MUHLENBERGIA RIGENS DEER GRASS	

NOTE:  
1. THE COMMITTEE WOULD LIKE TO KEEP THE RHAMNUS CALIFORNICA BACK FROM ALONG THE SIDEWALK AS ITS MATURE SIZE WOULD ENROACH AND OBSTRUCT PEDESTRIANS. THE COMMITTEE WOULD PREFER THE MUHLENBERGIA RIGENS BE PLANTED ALONG THE SIDEWALK IN AN UNDULATING PATTERN WITH THE RHAMNUS PLANTED BEHIND IT IN GROUPINGS AS ILLUSTRATED ON THE PLAN. THE MUHLENBERGIA SHOULD ALSO BE PLANTED OFF THE SIDEWALK TO PREVENT IT FROM OBSTRUCTING PEDESTRIANS WHEN MATURE.  
2. EXISTING AGAVES AND ALOES AT THE SITE SHALL BE TRANSPLANTED TO A LOCATION TO BE DETERMINED BY LANDSCAPE SERVICES PRIOR TO CONSTRUCTION.  
3. THE ENTIRE SITE SHALL HAVE A 2.4" LAYER OF WOOD CHIP MULCH APPLIED TO ALL BARE SOIL UPON COMPLETION OF PLANTING.  
4. DRIP IRRIGATION IS THE PREFERRED METHOD OF IRRIGATION.



**A** LANDSCAPING & IRRIGATION - ZONE 1A, ZONE 2A & ZONE 2B - GROUND MOUNT



1/8" = 1'-0" XREF

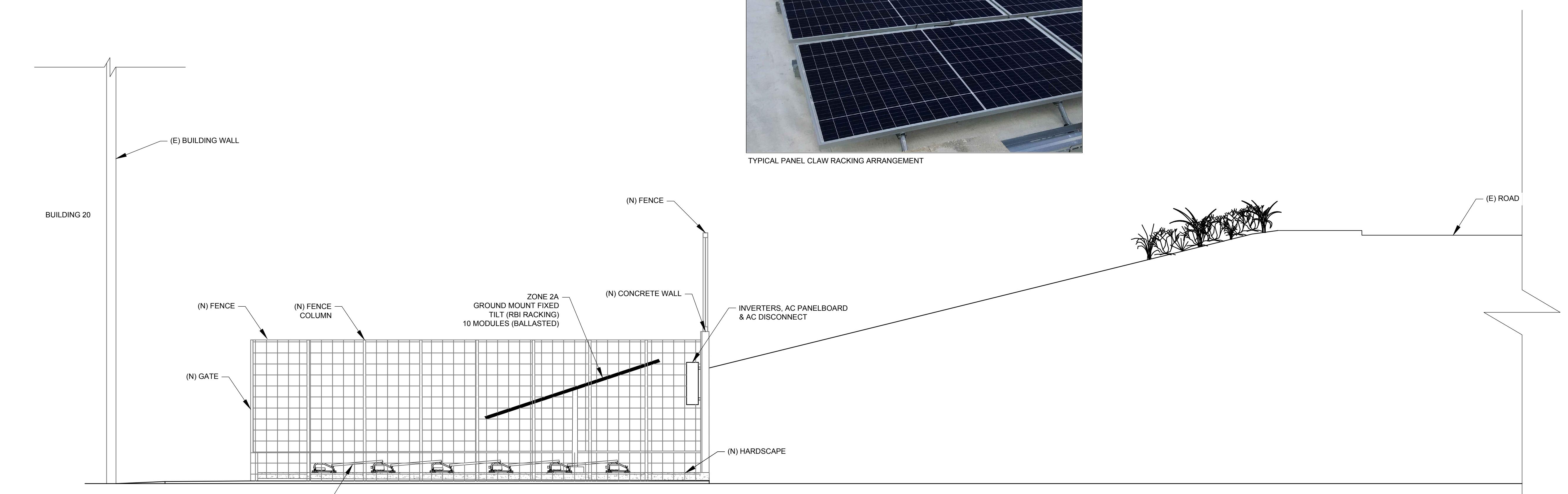
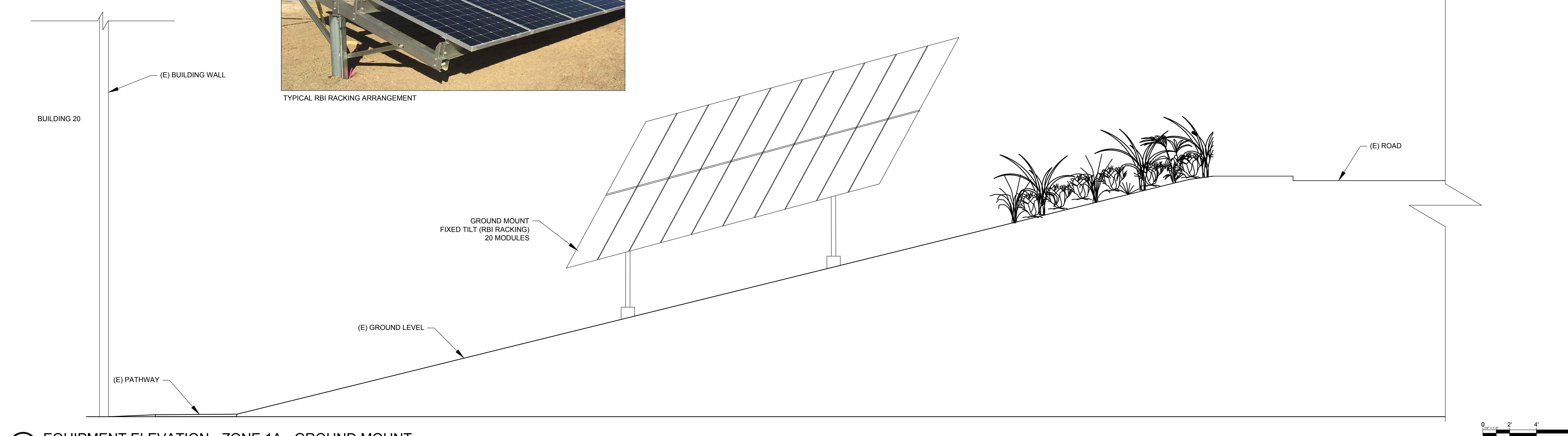
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5	07/12/2018	FENCE ADDED
4	06/19/2018	PLAN CHECK COMMENTS
3	04/20/2018	PERMIT SET
2	02/02/2018	ELECT. PROGRESS SET
1	01/05/2018	LANDSCAPE UPDATE
0	11/08/2017	INITIAL SUBMITTAL

**PERMIT**

**LANDSCAPING & IRRIGATION -  
GROUND MOUNT - ELEVATION**

**SHEET NUMBER**

**L201**



-	-
6	10/26/2018 SEISMIC COMMENTS
5	07/12/2018 FENCE ADDED
4	06/19/2018 PLAN CHECK COMMENTS
3	04/20/2018 PERMIT SET
2	02/02/2018 ELECT, PROGRESS SET
1	01/05/2018 LANDSCAPE UPDATE
0	11/08/2017 INITIAL SUBMITTAL
REV	DATE
	DESCRIPTION

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

**PERMIT**

SHEET TITLE

LANDSCAPE DETAILS

SHEET NUMBER

**L301**



SYMBOL	NAME OF PLANT	IMAGE
	RHAMNUS CALIFORNICA COFFEE BERRY	
	MUHLENBERGIA RIGENS DEER GRASS	

**A**

NTS

**B**

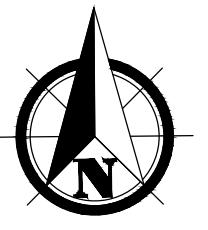
NTS

-	-
-	-
6	10/26/2018 SEISMIC COMMENTS
5	07/12/2018 FENCE ADDED
4	06/19/2018 PLAN CHECK COMMENTS
3	04/20/2018 PERMIT SET
2	02/02/2018 ELECT, PROGRESS SET
1	01/05/2018 LANDSCAPE UPDATE
0	11/08/2017 INITIAL SUBMITTAL
REV	DATE
	DESCRIPTION

DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

<b>PERMIT</b>	
SHEET TITLE	
TREE REMOVAL PLAN	

NOTE:  
1. IDENTIFIED TREES SHALL BE REMOVED FROM SITE AND TO BE REPLACED ON 1:1 BASIS WITH THE SPECIES AND LOCATION AS DETERMINED BY LANDSCAPE SERVICE DURING CONSTRUCTION.  
2. MUHLENBERGIA RIGENS TO BE PLANTED ALONG THE SIDEWALK IN AN UNDULATING PATTERN WITH THE RHAMNUS CALIFORNICA PLANTED BEHIND IT IN GROUPINGS.  
3. EXISTING AGAVES AND ALOES AT THE SITE TO BE TRANSPLANTED TO A LOCATION TO BE DETERMINED BY LANDSCAPE SERVICES PRIOR TO CONSTRUCTION.  
4. THE ENTIRE SITE SHALL HAVE A 2" TO 4" LAYER OF WOOD CHIP MULCH APPLIED TO ALL BARE SOIL UPON COMPLETION OF PLANTING.  
5. Drip Irrigation to be established. Drip Irrigation POC & controller location shall be at as determined by landscape service.



# PHOTOVOLTAIC MODULE GROUND MOUNT SYSTEM RBI SOLAR RACK MODEL: GM-2

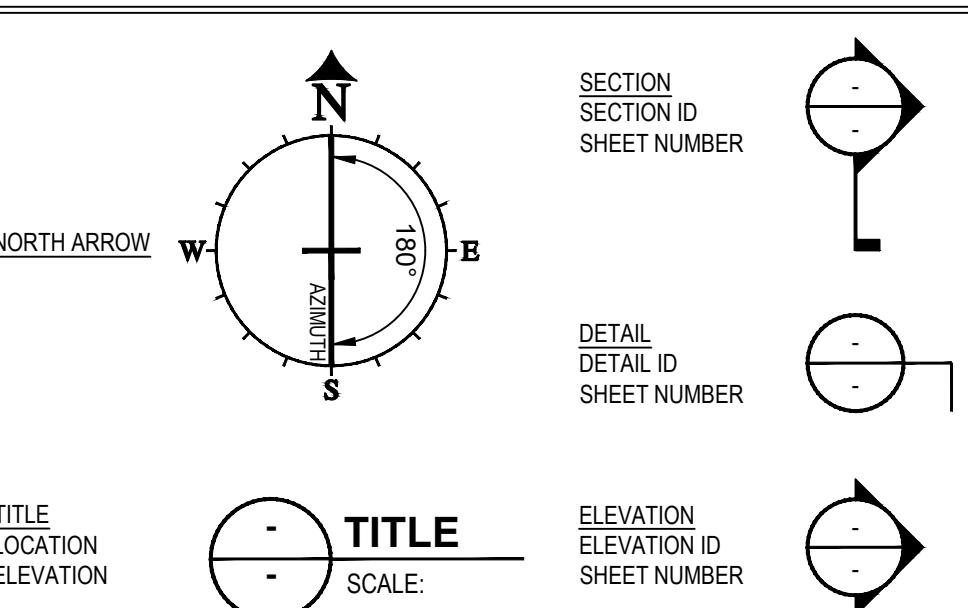
## FOR



AT

**CAL POLY ACADEMIC LAB  
CAL POLY UNIVERSITY, BUILDING 20  
N. POLYVIEW DR.  
SAN LUIS OBISPO, CA 93407**

## SYMBOLS LEGEND



# GOVERNING CODE

CALIFORNIA BUILDING CODE (CBC 2016)

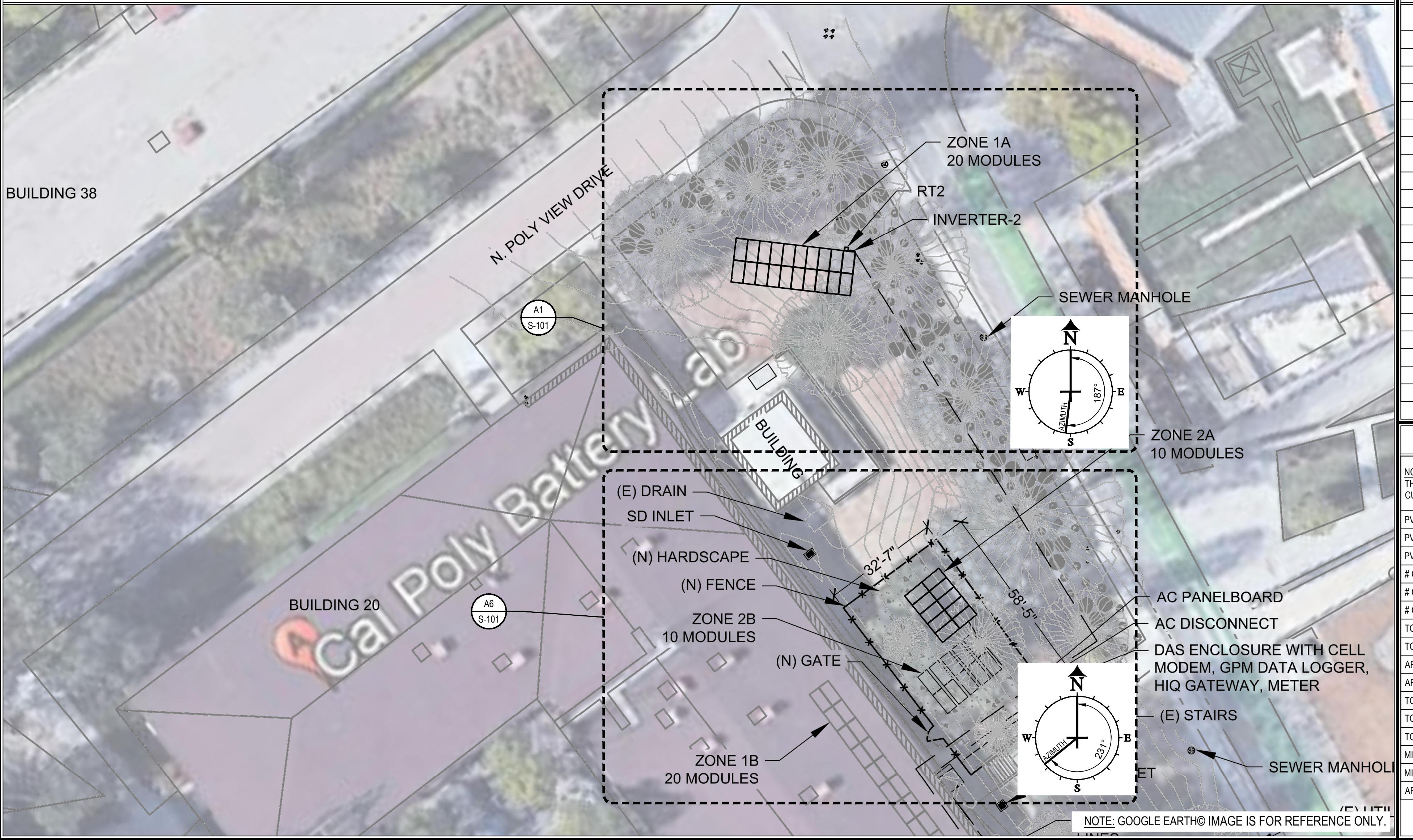
**SK CATEGORY: I**

## SIGN LOADS:

- DEAD LOADS:
  - STRUCTURE: 2.0 PSF
  - GLAZING: 3.0 PSF
$$\Sigma = 5.0 \text{ PSF}$$
- ROOF LIVE LOAD = 0 PSF
- SNOW LOAD:
  - $P_g$  = 0.0 PSF (GROUND SNOW)
  - $P_f$  = 0.0 PSF (FLAT ROOF SNOW)
  - $P_s$  = 0.0 PSF (SLOPED ROOF SNOW)
  - $C_e$  = N/A
  - $C_t$  = N/A
  - $C_s$  = N/A
  - $I_s$  = N/A

- WIND LOAD. (MAIN WIND FORCE RESISTING SYSTEM)
  - $V = 100 \text{ MPH}$
  - EXPOSURE: C
- SEISMIC:
  - $S_s = 1.153$
  - $S_1 = 0.439$
  - $S_{ds} = 0.798$
  - $S_{d1} = 0.457$
  - $I_{eq} = 1.00$
  - SITE CLASS: D
  - SEISMIC DESIGN CATEGORY: D
  - SEISMIC FORCE RESISTING SYSTEM =  
ORDINARY STEEL MOMENT FRAMES
  - DESIGN BASE SHEAR:  $V = 0.798 * W$   
 $C_s = 0.798$   
 $R = 2.00$
  - EQUIVALENT LATERAL FORCE ANALYSIS

# SITE PLAN OVERLAY



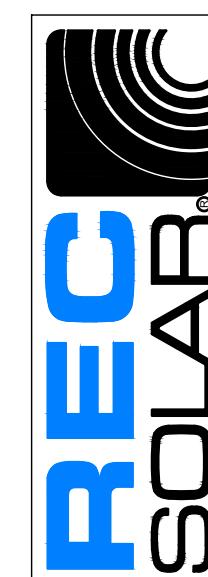
# **SHEET INDEX**

## SYSTEM SPECIFICATIONS

BMITTAL/CONSTRUCTION SET WAS PRODUCED FROM DOCUMENTS RECEIVED FROM

MODULE MANUFACTURE
MODULE MODEL #
MODULE WATTAGE
MODULES/STRING
ACTIVE PV MODULES
INACTIVE PV MODULES
# OF PV MODULES
PV SYSTEM WATTS
MODULE TYPE
MODULE TILT
# OF RACKING POSTS
# OF EQUIPMENT POSTS
# OF BALLAST
MODULE CLEARANCE D
MODULE CLEARANCE B
AZIMUTH

# GROUND MOUNT



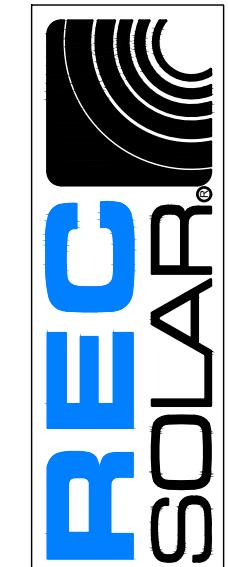
PROJECT INFORMATION	
TITLE & ADDRESS:	
<b>CAL POLY</b> <b>ACADEMIC LAB</b>	
<b>N. POLYVIEW DR.</b> <b>SAN LUIS OBISPO, CA</b> <b>93407</b>	
RBI SOLAR PROJECT No.:	
1835008	
DRAWN BY: KEJ	REVIEWED BY: JAB, BDS
SHEET TITLE:	
COVER SHEET	
SHEET No.:	
6 001	



PROFESSIONAL SEAL

ENGINEER'S SEAL APPLIES TO DESIGN  
 OF STRUCTURAL COMPONENTS ONLY

**GROUND MOUNT FOR**



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TABLE 1705.6

REQUIRED VERIFICATION AND INSPECTION OF SOILS			
VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED	
1. VERIFY MATERIAL BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	-	X	
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	-	X	
3. PERFORM CLASSIFICATION AND TESTING OF COMPAKTED FILL MATERIALS	-	X	
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPAKTED FILL	X	-	
5. PRIOR TO PLACEMENT OF COMPAKTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	-	X	

TABLE 1705.7

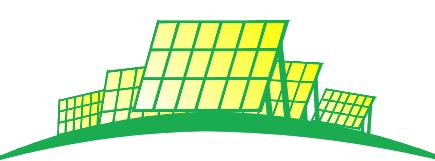
REQUIRED VERIFICATION AND INSPECTION OF DRIVEN DEEP FOUNDATION ELEMENTS			
VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED	
1. VERIFY ELEMENT MATERIAL, SIZES, AND LENGTHS COMPLY WITH THE REQUIREMENTS	-	-	
2. DETERMINE CAPACITIES OF TEST ELEMENTS AND CONDUCT ADDITIONAL LOAD TESTS, AS REQUIRED	-	-	
3. OBSERVE DRIVING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT	-	-	
4. VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM TYPE AND SIZE OF HAMMER, RECORD NUMBER OF BLOWS PER FOOT OF PENETRATION, DETERMINE REQUIRED PENETRATIONS TO ACHIEVE DESIGN CAPACITY, RECORD TIP AND BUTT ELEVATIONS AND DOCUMENT ANY DAMAGE TO FOUNDATION ELEMENT	-	-	
5. FOR STEEL ELEMENTS, PERFORM ADDITIONAL INSPECTIONS IN ACCORDANCE WITH SECTION 1705.2	-	-	
6. FOR CONCRETE ELEMENTS AND CONCRETE-FILLED ELEMENTS, PERFORM ADDITIONAL INSPECTIONS IN ACCORDANCE WITH SECTION 1705.3	-	-	
7. FOR SPECIALTY ELEMENTS, PERFORM ADDITIONAL INSPECTIONS AS DETERMINED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE	-	-	

TABLE 1705.3

REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION				
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1. INSPECTION OF REINFORCED STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT	-	X	ACI 318: 3.5, 7.1-7.7	1910.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1705.2.2, ITEM 2b	-	-	AWS D1.4; ACI 318: 3.5.2	-
3. INSPECTION OF ANCHORS CAST IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED	-	X	ACI 318: 8.1.3, 21.2.8	1908.5, 1909.1
4. INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS	-	-	ACI 318: 3.8.6, 8.1.3, 21.2.8	1909.1
5. VERIFYING USE OF REQUIRED DESIGN MIX	-	X	ACI 318: Ch. 4, 5.2-5.4	1904.2, 1910.2, 1910.3
6. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	-	ASTM C 172; ASTM C 31; ACI 318: 5.6, 5.8	1910.1
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	-	ACI 318: 5.9, 5.10	1910.6, 1910.7, 1910.8
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	-	X	ACI 318: 5.11-5.13	1910.9
9. INSPECTION OF PRESTRESSED CONCRETE: A. APPLICATION OF PRESTRESSING FORCES B. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE-RESISTING SYSTEM	-	-	ACI 318: 18.20 ACI 318: 18.18.4	-
10. ERECTION OF PRECAST CONCRETE MEMBERS	-	-	ACI 318: Ch. 16	-
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS	-	-	ACI 318: 6.2	-
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	-	X	ACI 318: 6.1.1	-

NOTE: ADDITIONAL INSPECTION TASKS AND ITEMS THAT MAY BE PERTINENT CAN BE FOUND IN AISC 360-10 TABLES N5.6-1, N5.6-2, AND N5.6-3, AISC 341-11 TABLE J9-1, J9-2, AND J9-3, AISC 360-10 SECTION N5.7.





**RBI SOLAR**  
Total Solar Service • Design • Fabrication  
Installation • Parts • Repair Service  
5513 VINE STREET  
CINCINNATI, OH 45217  
513.242.2051  
FAX: 513.242.0616

PROFESSIONAL SEAL

ENGINEER'S SEAL APPLIES TO DESIGN  
OF STRUCTURAL COMPONENTS ONLY



## GROUND MOUNT FOR REC SOLAR

### PROJECT INFORMATION

TITLE & ADDRESS:  
**CAL POLY ACADEMIC LAB**

N. POLYVIEW DR.  
SAN LUIS OBISPO, CA  
93407

RBI SOLAR PROJECT No.:  
1835008

DRAWN BY: KEJ  
REVIEWED BY: JAB, BDS

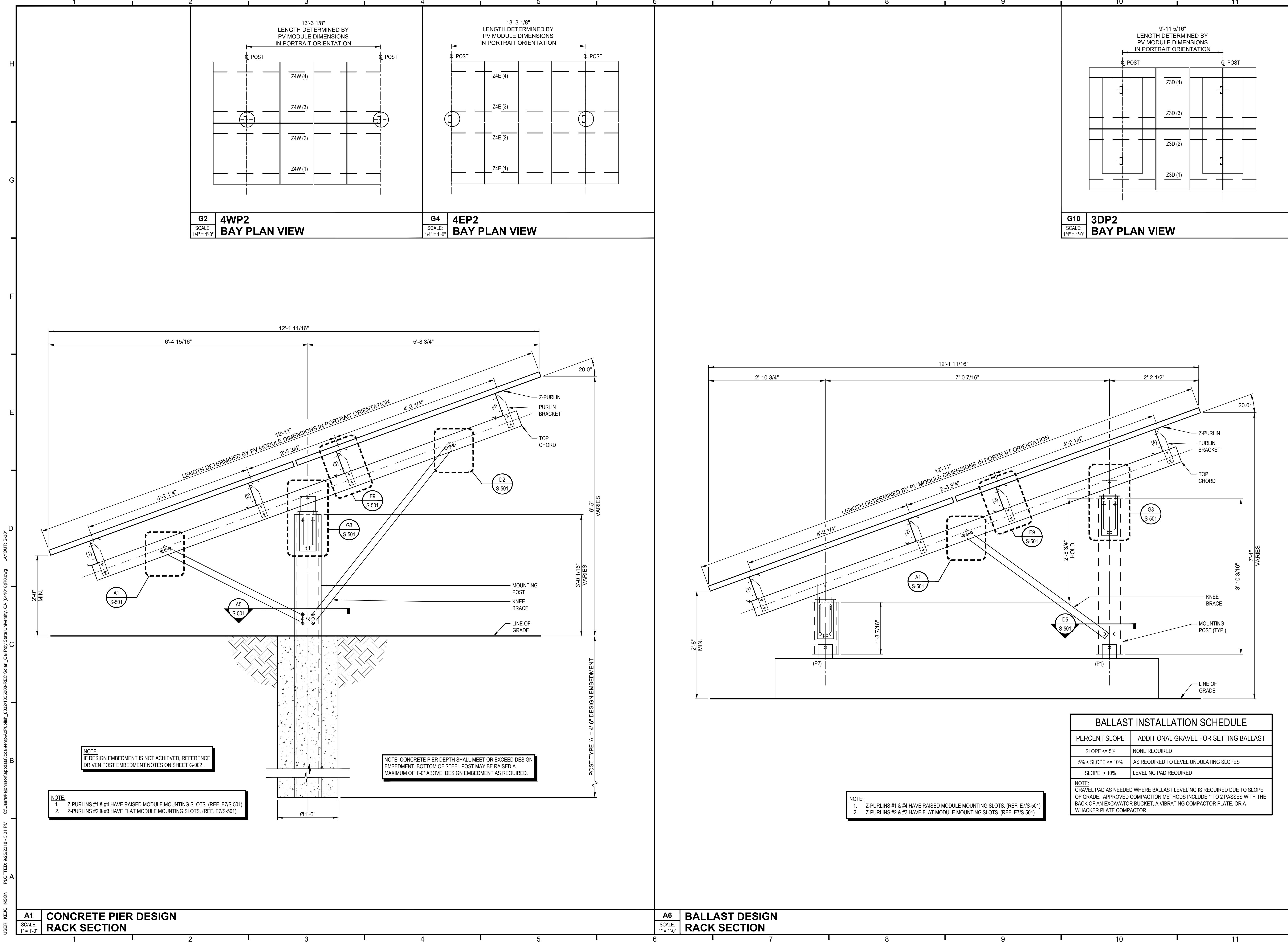
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RACK SECTION  
& BAY PLAN VIEWS

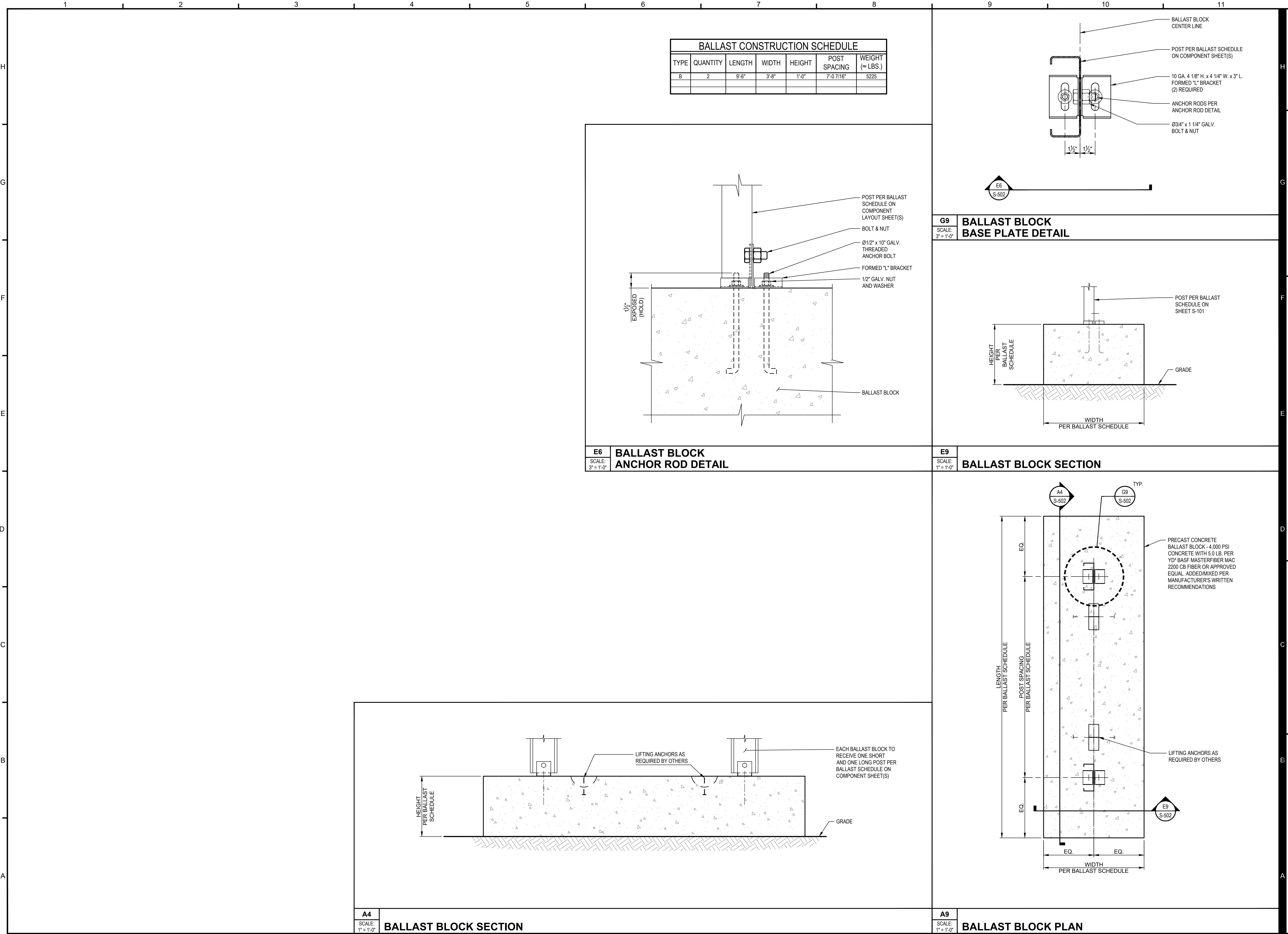
SHEET NO.:

**S-301**

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CINCINNATI, OH 45217  
513.242.2051  
FAX: 513.242.0616

PROFESSIONAL SEAL  
[REDACTED]  
ENGINEER'S SEAL APPLIES TO DESIGN  
OF STRUCTURAL COMPONENTS ONLY

**REC SOLAR**

**GROUND MOUNT FOR**

**REC SOLAR**

RELEASE RECORD  
[REDACTED]

09/25/18 CONS. SET R1

05/06/2018 CONS. SET

04/13/18 100% REVIEW SET

03/04/18 90% REVIEW SET

02/04/18 75% REVIEW SET

01/04/2018 50% REVIEW SET

MARK DATE DESCRIPTION

PROJECT INFORMATION  
TITLE & ADDRESS:  
**CAL POLY ACADEMIC LAB**  
**N. POLYVIEW DR.**  
**SAN LUIS OBISPO, CA**  
93407  
RBI SOLAR PROJECT No.:  
1835008  
DRAWN BY: KEJ  
REVIEWED BY: JAB, BDS  
SHEET TITLE:  
**BALLAST BLOCK DETAILS AND SCHEDULE**  
SHEET No.:  
**S-502**

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Site Design Criteria - Flat Roof PV System Basis of Design	
Roof Live Load (psf) <sup>1</sup>	20 (see note 1)
Ground Snow Pg (psf)	0
Flat Roof Snow Pf (psf)	0
Snow Importance Factor (Is)	1.1
<b>Wind Design Data</b>	
Ult. Wind Speed (mph)	115
Nom. Wind Speed (mph)	N/A
Risk Category	III
Internal Pressure Coefficient	N/A
Design Life (years)	50 YEARS
MRI Adjustment Factor	1
Wind Exposure	C
C and C pressure (psf)	(see note 2)
<b>Earthquake Design Data</b>	
Risk Category	III
Importance Factor (Ie)	1.25
Component Importance Factor (Ip)	1.0
Mapped Acceleration Parameter (Ss)	1.210
Mapped Acceleration Parameter(S1)	0.350
Seismic Site Class	D - ASSUMED
Design Spectral Acceleration Parameter (Sds)	0.82
Design Spectral Acceleration Parameter (Sd1)	0.397
Seismic Design Category (SDC)	D
Basic seismic-force-resisting system(s)	see note 3
Base Design Shear = Fp x W	0.39 W
Seismic Response Coefficient (Cs)	N/A (see note 4)
Response Modification Factor (R)	2.5
Analysis Procedure	see note 3
Design Code (with local amendments)	2016 CBC
	ASCE 7-10
ADDITIONAL CODE PROVISIONS	SEAOC PV1-2012
	SEAOC PV2-2012

1. Roof Live Load only applicable to areas not covered by PV modules. Reference SEAOC Design Guidelines  
 2. PV wind design per proprietary wind tunnel testing. Refer to calculations for additional information  
 3. Analysis procedure per ASCE 7 "Seismic Design Requirements for NonStructural Components" and SEAOC PV1-2012.  
 4. Design utilizes Fp which is calculated per procedure noted in note #3.

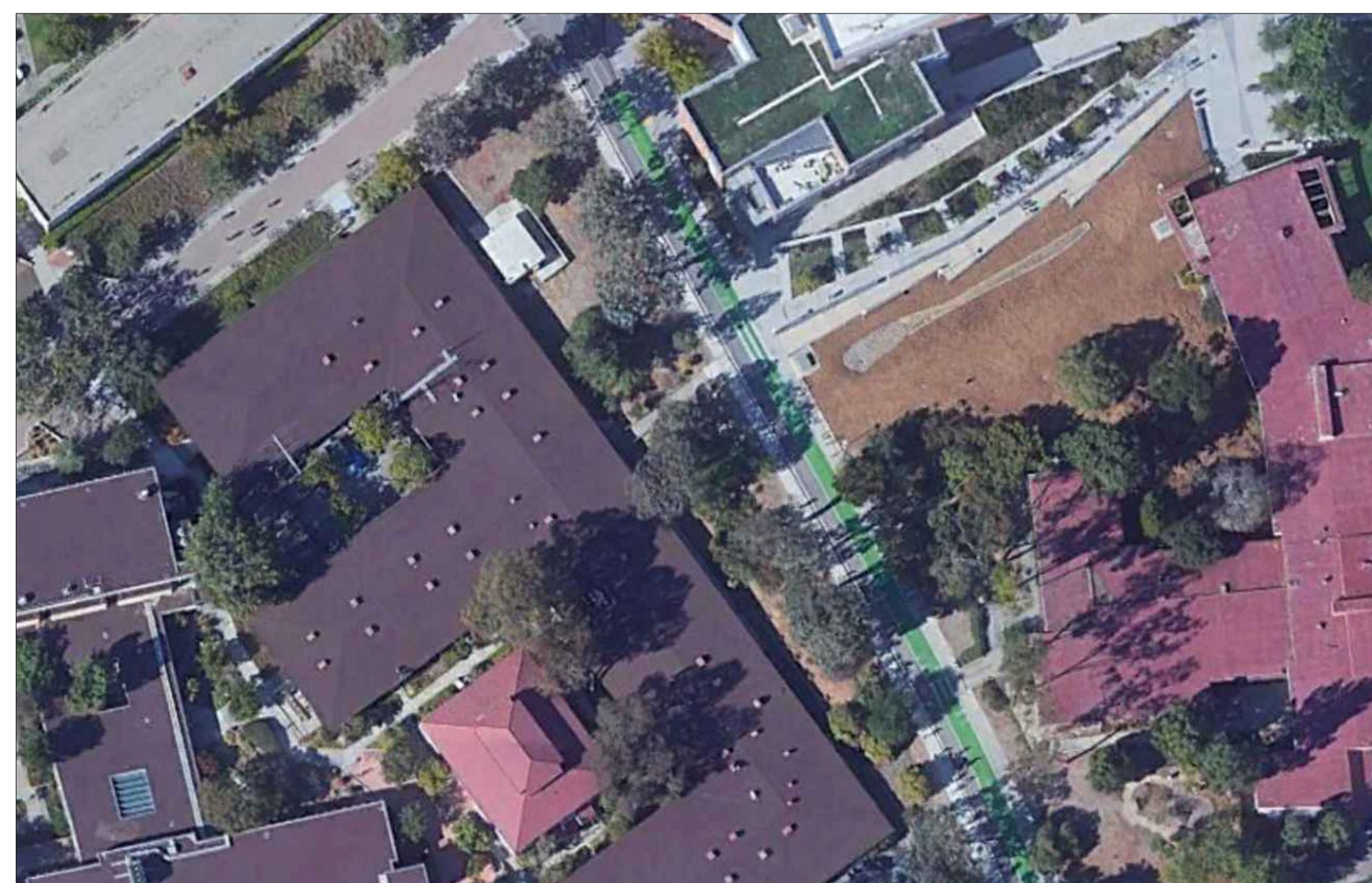
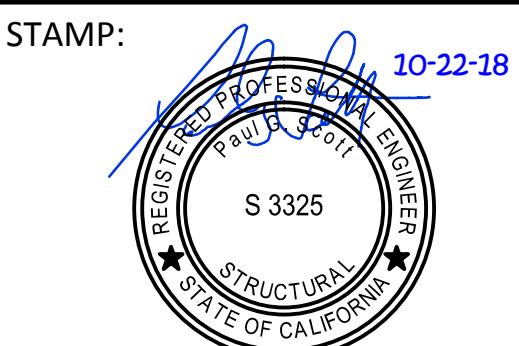
## GENERAL NOTES:

- ALL SITE, PROJECT, AND BUILDING DETAILS ARE PROVIDED BY CUSTOMER OR GENERATED VIA SATELLITE IMAGERY FROM INFORMATION PROVIDED BY CUSTOMER. PANELCLAW IS NOT RESPONSIBLE FOR SITE INACCURACIES THAT COULD LEAD TO CHANGES TO THESE DRAWING DETAILS AND ARRAY LAYOUT CONFIGURATIONS. ALL INFORMATION CONTAINED WITHIN THESE DOCUMENTS ARE TO BE FIELD VERIFIED BY CUSTOMER AND INSTALLER. ANY CHANGES OR MODIFICATIONS TO THESE DOCUMENTS, CONTAINED INFORMATION, OR FINAL ARRAY AND MOUNTING SYSTEM INSTALLATIONS MUST BE SUBMITTED TO PANELCLAW AND OTHER PROJECT AUTHORITIES FOR APPROVAL.
- REFER TO AND FOLLOW THE APPROPRIATE PANELCLAW INSTALLATION MANUALS AND PROCEDURES DURING THE INSTALLATION PROCESS. NOT FOLLOWING SUCH PROCEDURES AND METHODS COULD RESULT IN DAMAGE TO THE COMPONENTS OR MAY VOID THE PRODUCT WARRANTY.
- ARRAY SETBACKS: ALL ARRAYS ARE REQUIRED TO BE SETBACK 4-FEET FROM ALL ROOF EDGES UNLESS OTHERWISE SPECIFIED AND CALLED OUT ON THE ARRAY DIAGRAMS ON THIS PAGE OR ON ADDITIONAL ARRAY BALLAST PAGES.
- REFER TO THE SPECIFIC ARRAY BALLAST SHEETS FOR BALLASTING REQUIREMENTS BASED ON THE PROVIDED SITE INFORMATION.
- SYSTEM PSF INCLUDES ALL PANELCLAW RACKING COMPONENTS, MECHANICAL ATTACHMENTS(IF APPLICABLE), PV MODULE AND BALLAST BLOCKS. FOR MAXIMUM SYSTEM POINT LOAD SUMMARY (PLS), REFER TO CALCULATIONS.
- PANELCLAW AND/OR PANELCLAW CONSULTING ENGINEERS ARE NOT RESPONSIBLE FOR DETERMINING THE ADEQUACY OF THE STRUCTURE TO SUPPORT LOADS IMPOSED BY THE ARRAY AND MOUNTING SYSTEM. SUPPORT STRUCTURE TO BE CHECKED BY OTHERS.
- THIS DESIGN UTILIZES THIRD PARTY SEISMIC NON-LINEAR RESPONSE ANALYSIS, PER SEAOC PV-1, TO ESTIMATE MAXIMUM ARRAY SEISMIC DISPLACEMENT. THE PREDICTED MOVEMENT IS ONLY AN ESTIMATE. PANELCLAW IS NOT RESPONSIBLE OR LIABLE FOR ANY DAMAGES OR COSTS ASSOCIATED WITH PV ARRAY MOVEMENT INCLUDING MOVEMENT IN EXCESS OF THE PREDICTED MOVEMENT NOTED IN THIS DOCUMENT OR ANY REQUIREMENT TO REPOSITION THE ARRAYS IF MOVEMENT OCCURS.

SHEET INDEX	
NO.	DESCRIPTION
PC-1	COVER SHEET
PC-2	ARRAY SITE MAP
PC-3	TYPICAL ARRAY DIMENSIONS
PC-4	RACKING COMPONENTS
PC-5	BALLAST LEGEND
PC-6	BALLAST LAYOUT - 1

THIS DRAWING HAS BEEN PREPARED BY  
OTHERS AND REVIEWED BY:  
CARUSO TURLEY SCOTT, INC.  
CONSULTING STRUCTURAL ENGINEERS  
FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY  
CTS PROJECT NUMBER 18-242-1498.1

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AERIAL PHOTO / SITE DIAGRAM

ARRAY CLEARANCES PER SEAOC PV1-2012		
CONDITION	MINIMUM SEPARATION	DISTANCE*
BETWEEN SEPARATE SOLAR ARRAYS OF SIMILAR CONSTRUCTION	(0.5) (Ip) (Mpv)	10 in.
BETWEEN A SOLAR ARRAY AND A FIXED OBJECT ON THE ROOF OR SOLAR ARRAY OF DIFFERENT CONSTRUCTION	(Ip) (Mpv)	13 in.
BETWEEN A SOLAR ARRAY AND A ROOF EDGE WITH A QUALIFYING PARAPET	(Ie) (Mpv)	14 in.
BETWEEN A SOLAR ARRAY AND A ROOF EDGE WITHOUT A QUALIFYING PARAPET	(1.5) (Ie) (Mpv)	18 in.

\* PANELCLAW HAS ADDED AN ADDITIONAL 6 INCHES TO THE SEPARATION REQUIREMENTS FOR ADDITIONAL SAFETY.  
 NOTE: SUFFICIENT SLACK IN ARRAY ELECTRICAL WIRING MUST BE PROVIDED TO ACCOMMODATE ALL POTENTIAL ARRAY MOVEMENT.

ORIGINAL SIZE 36"X24"  
SHEET SIZE ARCH "D"

SCALE:	0"	1/2"	1"	2"
REV	2	revised ballast	1	revised ballast
DESCRIPTION	0 INITIAL BALLAST MAP LAYOUT			
PREP	RJH			
DATE	2018-09-17 2018-03-20 2018-01-22			
PROJECT:	REC SOLAR			
LOCATION:	1 GRAND AVENUE, BUILDING 20 SAN LUIS OBISPO CA 93401			
SHEET TITLE:	COVER SHEET			
REVISION:	2			
SHEET:	PC-1			

APPROVED FOR CONSTRUCTION

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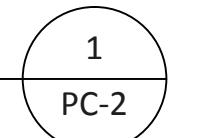
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## ARRAY SITE MAP

SCALE: NTS



## NOTES:

1. ALL DIMENSIONS SHOWN ARE BASED UPON INFORMATION PROVIDED TO PANELCLAW. FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION OF THE SOLAR ARRAY. NOTIFY PANELCLAW OF ANY DISCREPANCIES.

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CT-5DHD-3.2

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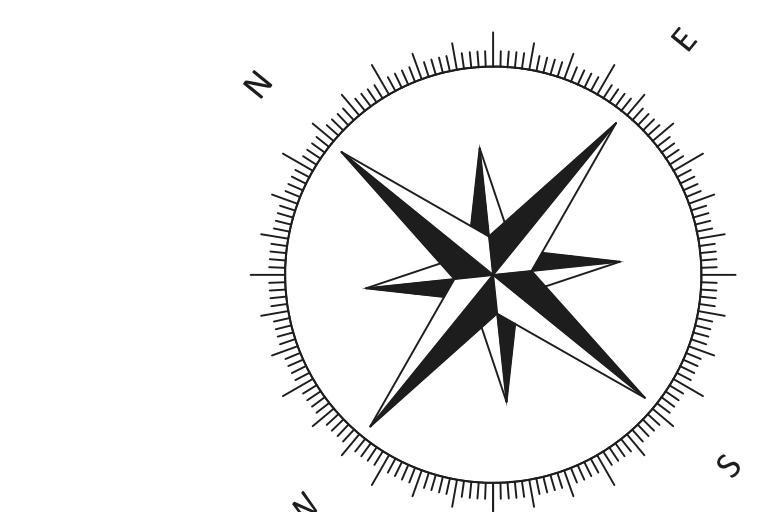
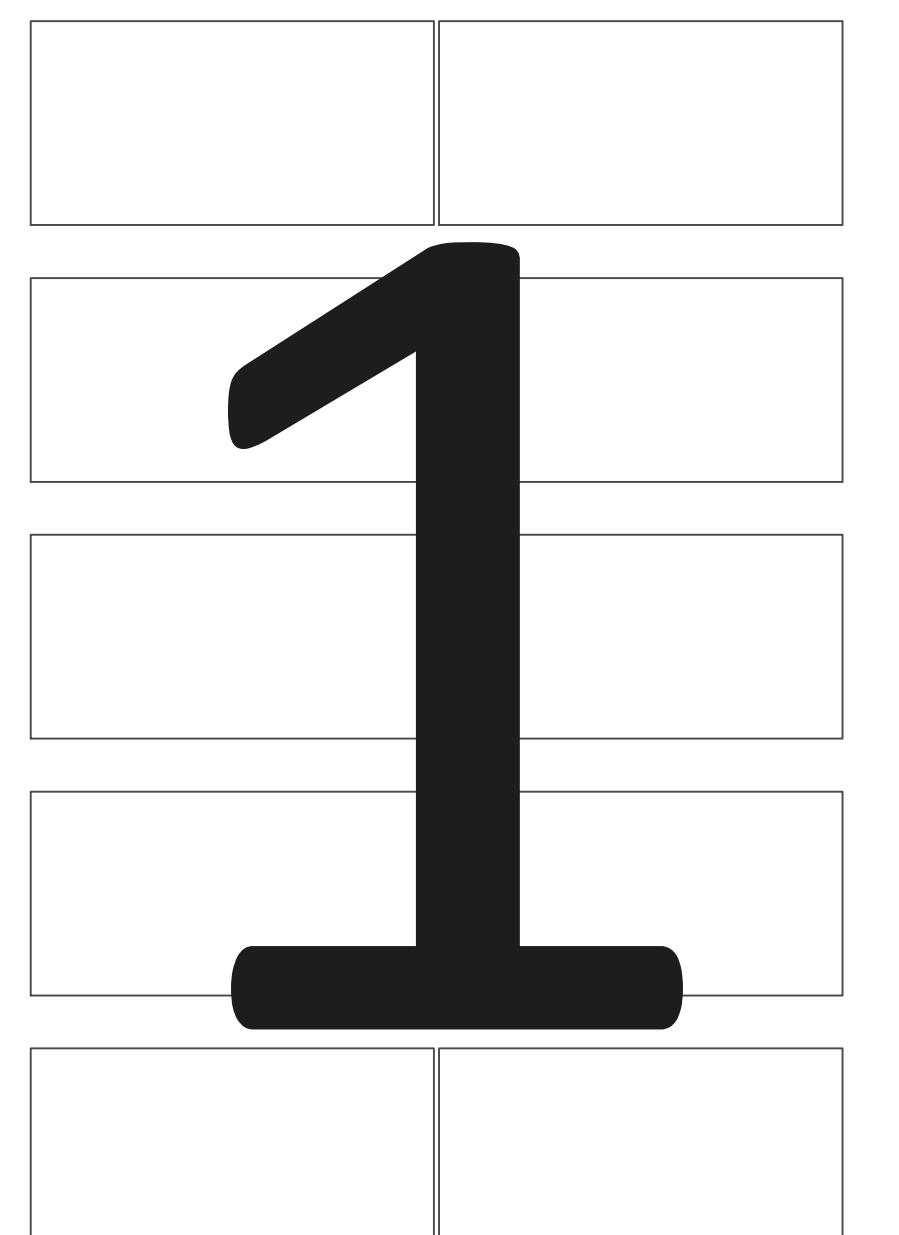
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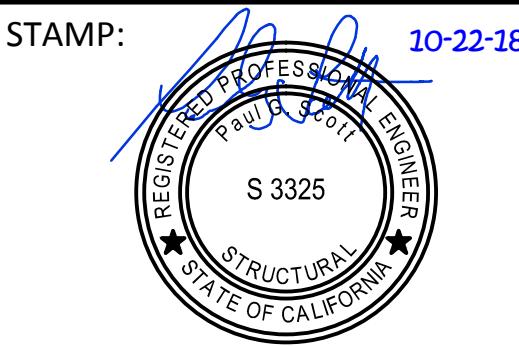
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PROJECT SUMMARY		
MODULE TYPE	Trina Solar TSM-DE14A(II)	
MODULE DIMENSIONS (IN.)	39.06 X 77.01 X 1.57	
NUMBER OF MODULES	10	
MODULE WATTAGE (W STC)	345	
SYSTEM SIZE (kW STC)	3.5	
SYSTEM WEIGHT (LB)	2698	
SYSTEM AREA (SQ FT.)	278	
NUMBER OF ARRAYS	1	
ARRAY TILT (DEG)	5.0	

POLAR BEAR® III HD 5° - 49in		
PROJECT PART QUANTITY		
ITEM	PART NUMBER	QTY
<b>SOUTH SUPPORT</b>	5000412	4
ASSY, SUPPORT, SOUTH, G90, POLAR BEAR III HD		
<b>STANDARD SUPPORT</b>	5000301	20
ASSY, SUPPORT, G90, POLAR BEAR III HD, 5 DEG		
<b>LONG BALLAST TRAY</b>	200054103	12
BALLAST TRAY, 80L, G90ST, PB3 5D		
<b>SHORT BALLAST TRAY</b>	200054101	6
BALLAST TRAY, 52L, G90ST, PB3 5D		
<b>CLAW</b>	200049301	20
CLAW, 1002, G90, POLAR BEAR III HD		
<b>HARDWARE - CLAW</b>	500015802	1
HEX, FLG, SERR, 1/4-20 X 1.75L & 5/16-18 X 0.5L, 304SS (100 / EACH BOLT & NUT TYPE)		
<b>BOLT KIT - BALLAST TRAY</b>	5000159	1
HEX, FLG, SERR, 1/4-20 X 0.5L, 304SS (100 BOLTS)		
<b>CONCRETE MASONRY UNIT</b>	N/A	60
BLOCK, CONCRETE, 32 LBS - Xin X Bin Xin NOMINAL, PARTNER SUPPLIED		

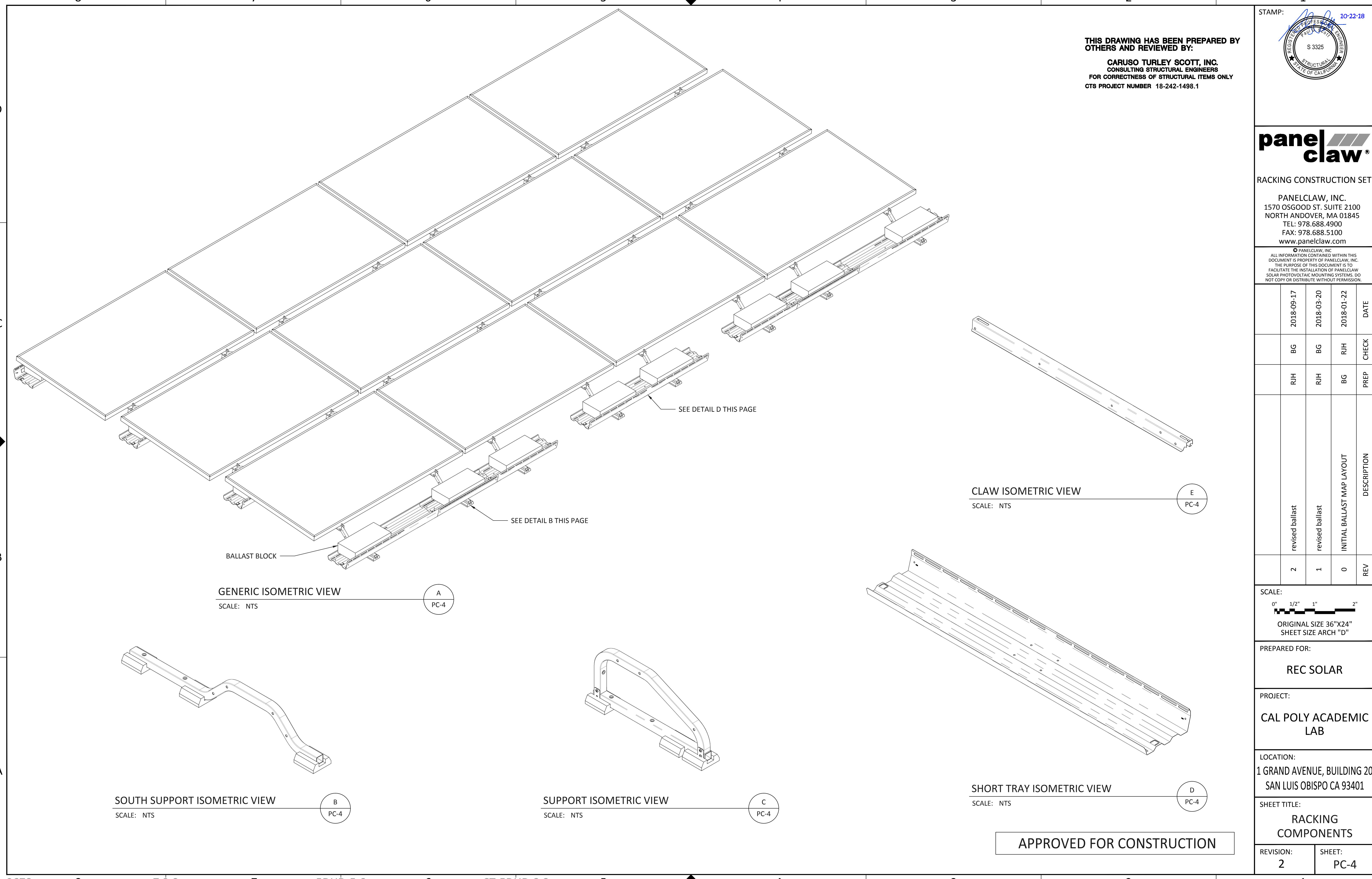
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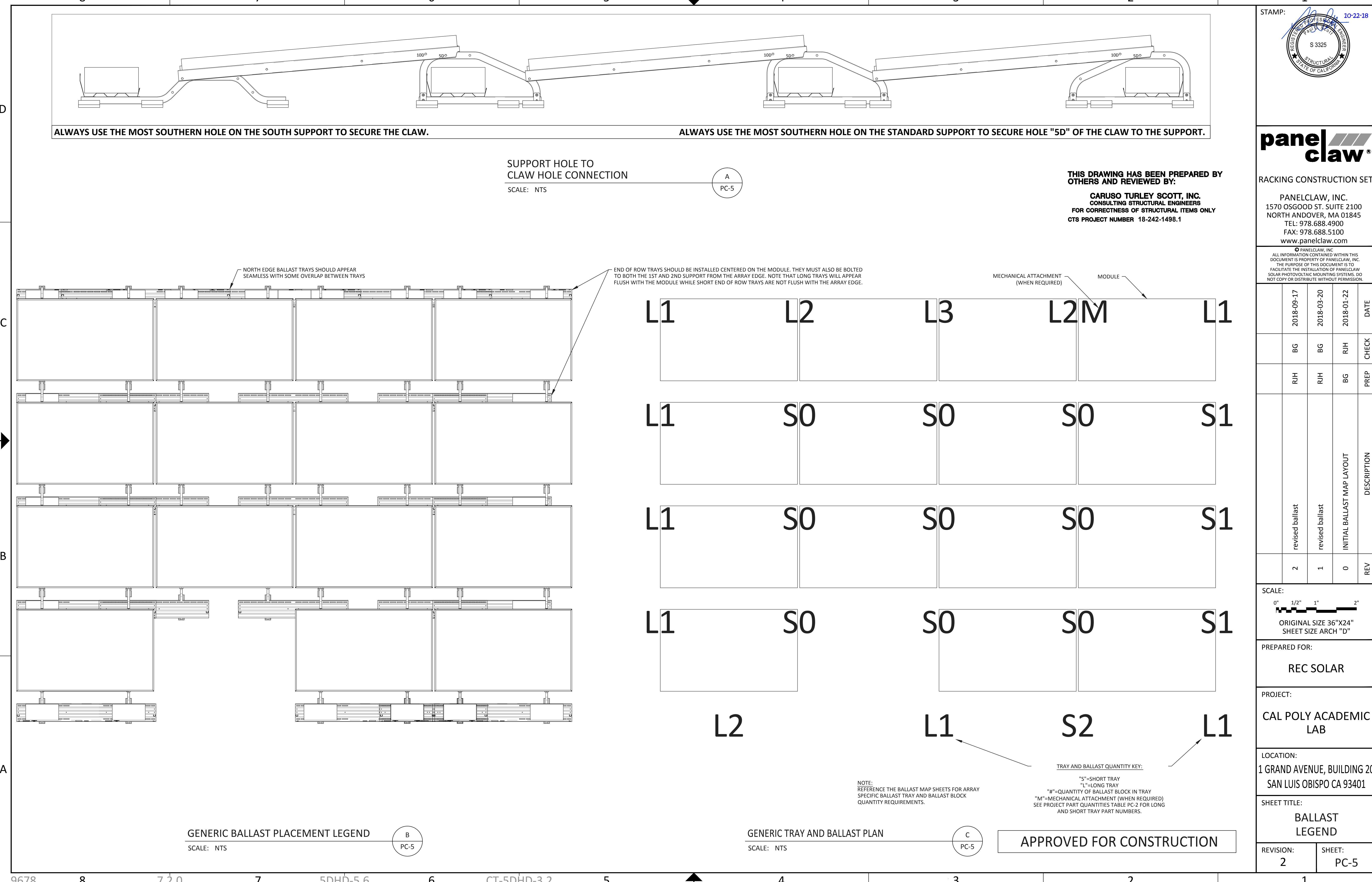
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2018-09-17	RJH	BG	RJH	BG	
2018-03-20	RJH	BG	RJH	BG	
2018-01-22					

SCALE:	0"	1/2"	1"	2"
ORIGINAL SIZE 36"X24" SHEET SIZE ARCH "D"				
PREPARED FOR:				
REC SOLAR				
PROJECT:				
CAL POLY ACADEMIC LAB				
LOCATION:				
1 GRAND AVENUE, BUILDING 20 SAN LUIS OBISPO CA 93401				
SHEET TITLE:				
ARRAY SITE MAP				

REVISION:	SHEET:
2	PC-2







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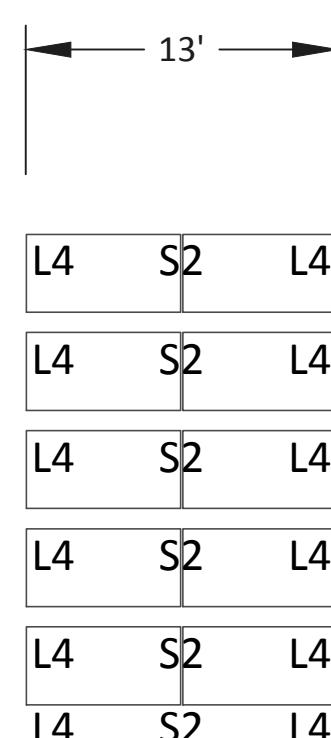
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BALLAST LAYOUT - ARRAY 1

SCALE: 1/8" = 1'-0"

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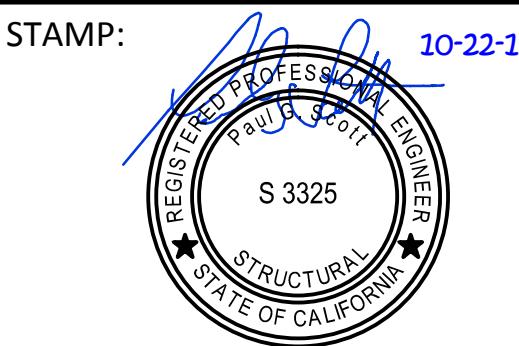
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CTS PROJECT NUMBER 18-242-1498.1

ARRAY 1	
ROOF INFORMATION	
ROOF HEIGHT (FT)	5
PARAPET HEIGHT (FT)	0
ROOF TILT (DEG)	1.4
ROOF TYPE	CONCRETE
SPECIFICATIONS	
NUMBER OF MODULES	10
MODULE POWER (W)	345
ARRAY OUTPUT (kW)	3.5
ARRAY AZIMUTH	231
PART QUANTITIES	
ITEM	QTY
SUPPORTS	20
SOUTH SUPPORTS	4
CLAWS	20
LONG BALLAST TRAY	12
SHORT BALLAST TRAY	6
BALLAST BLOCKS	60
LOADING DETAILS	
SINGLE MODULE WT (LB)	57.3
SINGLE CMU WT (LB)	32
TOTAL ARRAY WT (LB)	2698
ARRAY AREA (SQ. FT)	278
ARRAY LOAD (PSF)	9.7



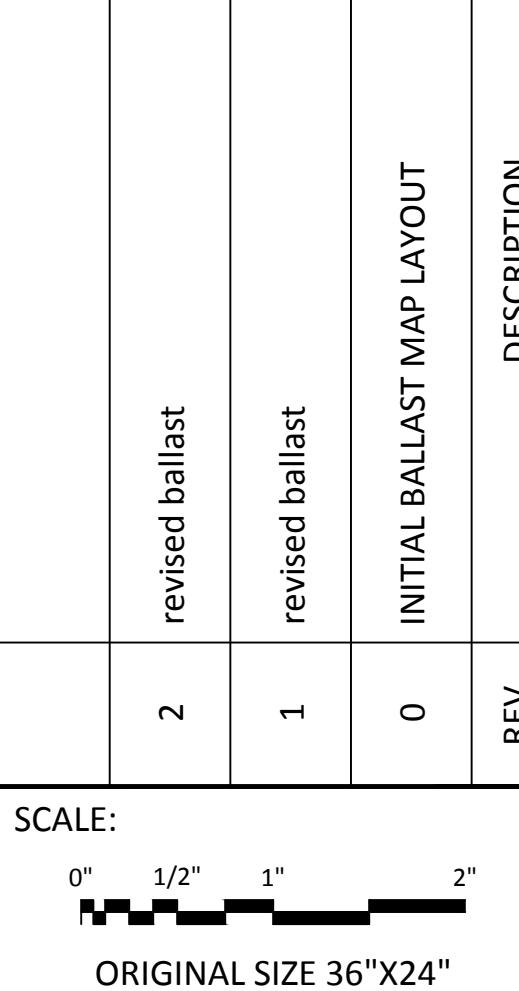
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SCALE:	0"	1/2"	1"	2"
2	revised ballast			
1	revised ballast			
0	INITIAL BALLAST MAP LAYOUT	BG	RJH	
REV	DESCRIPTION	PREP	CHECK	DATE



PREPARED FOR:  
**REC SOLAR**

PROJECT:  
**CAL POLY ACADEMIC LAB**

LOCATION:  
1 GRAND AVENUE, BUILDING 20  
SAN LUIS OBISPO CA 93401

SHEET TITLE:  
**BALLAST LAYOUT - 1**

REVISION: 2  
SHEET: PC-6

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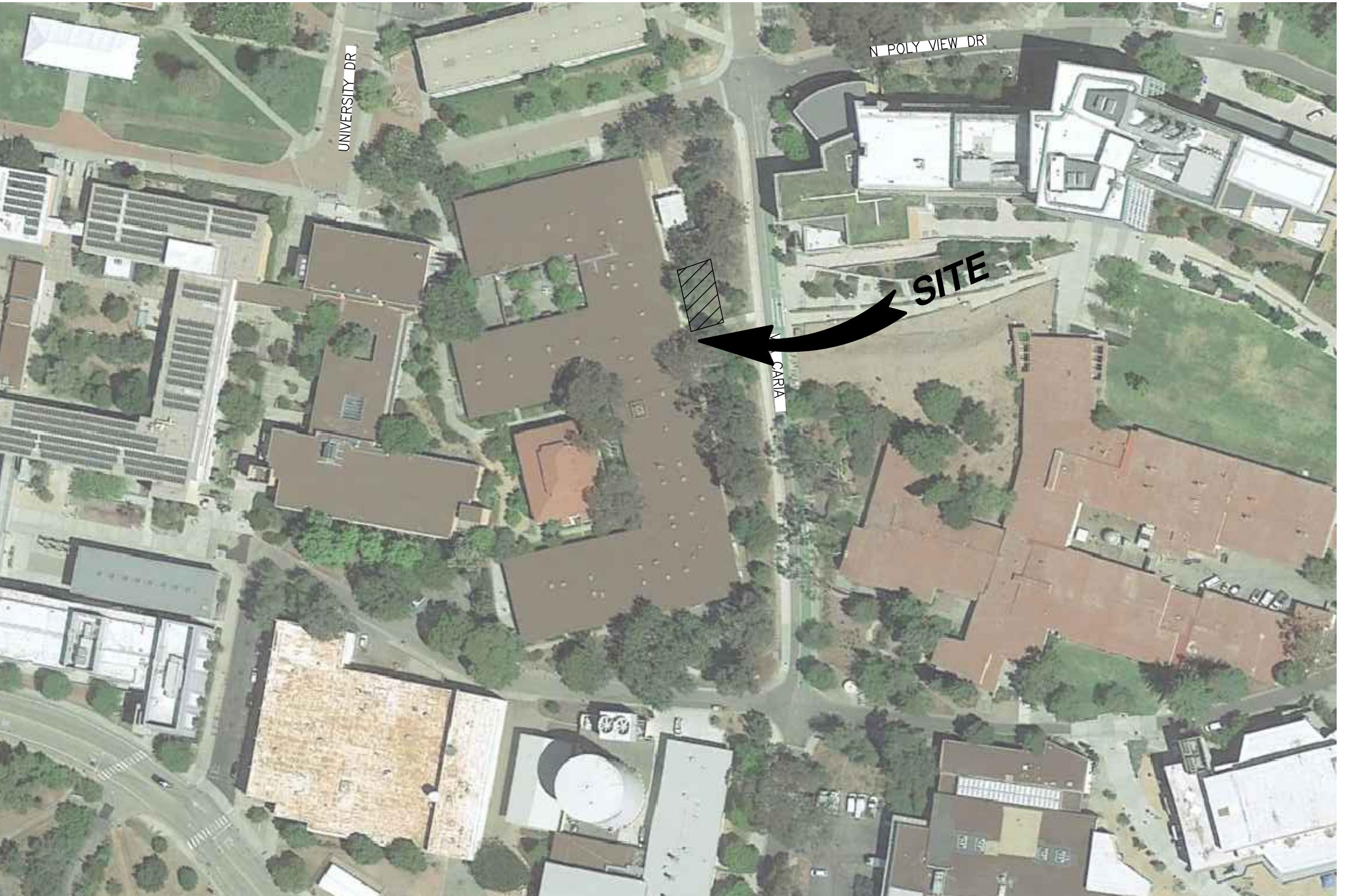
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# GRADING AND DRAINAGE PLANS FOR CAL POLY SOLAR LAB CITY OF SAN LUIS OBISPO, CALIFORNIA

## GRADING NOTES:

- THE CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES THE CONTRACTOR SHALL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE CONDITION OF THE JOB SITE DURING THE COURSE OF CONSTRUCTION FOR HIS PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY, AND THAT THIS AGREEMENT SHALL BE MADE TO HOLD THE CONTRACTOR HARMLESS FROM ANY LIABILITY WHICH MAY ARISE FROM ANY AND ALL LIABILITY REAL OR ALLEGED IN CONNECTION WITH THE PERFORMANCE OF WORK ON THE PROJECT, EXCEPTING LIABILITY ARISING FROM NEGLIGENCE OF THE OWNER OR ENGINEER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE PUBLIC AND PRIVATE PROPERTY ADJACENT TO THE WORK AREA AND SHALL EXERCISE DUE CAUTION TO AVOID DAMAGE TO SUCH PROPERTY. THE CONTRACTOR SHALL REPLACE AND REPAIR TO THEIR ORIGINAL CONDITIONS ALL EXISTING IMPROVEMENTS WITHIN OR ADJACENT TO THE WORK AREA WHICH ARE NOT DESIGNED FOR REMOVAL, AND ARE DAMAGED OR REMOVED AS A RESULT OF THAT OPERATION.
- IN THE EVENT THAT PROJECT CONSTRUCTION CONTINUES DURING WET WINTER MONTHS, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO MANTAIN OR WINTERIZE THE ROADS FOR EMERGENCY VEHICLES.
- THE CONTRACTOR IS RESPONSIBLE TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS, AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION, OR THE MATERIALS USED IN THE CONSTRUCTION.
- ALL GRADING SHALL CONFORM TO THE COUNTY OF SAN LUIS OBISPO ORDINANCES AND STANDARDS PERTAINING THERETO (2016 CALIFORNIA BUILDING CODE) AND SHALL BE SUPERVISED AS ENGINEERED GRADING IN ACCORDANCE WITH COUNTY OF SAN LUIS OBISPO ORDINANCES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MARKERS DURING CONSTRUCTION. ALL SUCH MONUMENTS OR MARKERS DISTURBED SHALL BE RESET AT CONTRACTOR'S EXPENSE.
- IN THE EVENT CONSTRUCTION STAKING BASED ON DPSI PLANS, DRAWINGS, OR OTHER DOCUMENTS IS PERFORMED BY ANOTHER FIRM, DPSI SHALL BE HELD HARLESS AND RELEASED FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS, OR OTHER DOCUMENTS.
- PRIOR TO COMMENCING ANY WORK WITHIN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL OBTAIN AN OPEN-STREET PERMIT FROM THE COUNTY PUBLIC WORKS DEPARTMENT, UNLESS SECURED BY A SUBDIVISION AGREEMENT, SECURITY BASED ON AN APPROVED DPSI'S ESTIMATE FOR THE WORK PERFORMED WITHIN THE RIGHT OF WAY AND INSURANCE AS REQUIRED SHALL BE PROVIDED PRIOR TO ISSUANCE OF A PERMIT.
- UNLESS OTHERWISE NOTED, ALL TREES ARE TO BE PROTECTED IN PLACE. ALL TREES LOCATED NEAR OR AROUND CONSTRUCTION OPERATIONS SHALL HAVE ORANGE BARRIER INSTALLED ON T-POST ALONG THE DRIP LINE OF THE TREE DURING CONSTRUCTION.
- SHOULD ANY CULTURAL MATERIALS BE DISCOVERED DURING GRADING OR DEVELOPMENT, ALL WORK SHALL BE HALTED AND A QUALIFIED ARCHAEOLOGIST / HISTORIAN CONTACTED TO ASSESS THE FINDS AND IMPOSE MITIGATION MEASURES, IF NECESSARY, PRIOR TO RESUMPTION OF CONSTRUCTION.
- IF, DURING GRADING OR CONSTRUCTION, ANY PLUGGED AND ABANDONED OR UNRECORDED WELLS ARE UNCOVERED OR DAMAGED, THE DEPARTMENT OF CONSERVATION OF OIL, GAS AND GEOTHERMAL RESOURCES SHALL BE CONTACTED TO INSPECT AND APPROVE ANY REMEDIATION REQUIRED.
- AN EFFORT HAS BEEN MADE TO DEFINE THE LOCATION OF UNDERGROUND FACILITIES WITHIN THE JOBSITE. HOWEVER, ALL EXISTING UTILITY AND OTHER UNDERGROUND STRUCTURES MAY NOT BE SHOWN ON THIS PLAN AND THEIR LOCATIONS WHEN SHOWN ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES AND OTHER FACILITIES, BOTH KNOWN AND UNKNOWN, PRIOR TO ANY DURING CONSTRUCTION. THE CONTRACTOR SHALL CONTACT U.S.A. (811) FOR UTILITY LOCATION 48 HOURS PRIOR TO ANY EXCAVATION OR TRENCHING.
- THE CONTRACTOR SHALL MARK ALL UTILITY LOCATIONS AND SHALL POTHOLE ALL UTILITY CROSSINGS, PRIOR TO STAKING AND PRIOR TO ANY PIPELINE EXCAVATION TO ALLOW GRADE REVISIONS IF NECESSITATED BY ACTUAL LOCATIONS.
- THE CONTRACTOR SHALL MAINTAIN AN UP TO DATE AND ACCURATE RECORD OF ALL CHANGES TO THE PLANS. NO CHANGES SHALL BE MADE WITHOUT APPROVAL OF THE PROJECT ENGINEER.
- ALL GRADING AND DRAINAGE IMPROVEMENTS SHALL BE OBSERVED BY A LICENSED CIVIL ENGINEER TO DETERMINE IF THE IMPROVEMENTS ARE IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED PLANS. THE CONTRACTOR SHALL MAKE THE REQUEST FOR THE FINAL INSPECTION ONLY WHEN THE IMPROVEMENTS HAVE BEEN COMPLETED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED PLANS. THE CIVIL ENGINEER SHALL BE PRESENT WHEN THE FINAL INSPECTION IS MADE.
- THE CUT AND FILL QUANTITIES SHOWN ON THIS PLAN ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR SHALL, AFTER EXAMINING THE PLAN, AND THE SITE TERRAIN, PREPARE HIS BID PRICE FOR THE PROJECT BASED ON HIS OWN ANALYSIS OF THE WORK REQUIRED.
- THE SOILS ENGINEER MUST APPROVE ALL SOIL COMPACTION INCLUDING THE STABILITY OF ALL SLOPES, BOTH THOSE THAT ARE CREATED BY AND THOSE REMAINING AFTER GRADING OPERATIONS.
- CIVIL ENGINEER SHALL BE NOTIFIED 48 HOURS PRIOR TO PLACEMENT OF ANY FILL.
- ALL WORK SHALL BE DONE IN CONFORMANCE WITH COUNTY OF SAN LUIS OBISPO STANDARDS, IF ANY. COMPACTION TESTS SHALL BE THE RESPONSIBILITY OF THE OWNER/CONTRACTOR. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE ENGINEER.
- FILL MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
- FILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING SIX (6) INCHES IN COMPACTED THICKNESS AND COMPACTED AT OPTIMUM MOISTURE CONTENT BY AN APPROVED METHOD.
- ENGINEERED FILL SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY UNLESS OTHERWISE NOTED.
- THE DESIGN ENGINEER SHALL EXERCISE SUFFICIENT SUPERVISORY CONTROL DURING GRADING AND CONSTRUCTION TO INSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODE WITHIN HIS PURVIEW.
- ALL GRADING SHALL CONFORM TO TITLE 19 OF THE CALIFORNIA BUILDING CODE AND STANDARDS PERTAINING THERETO.
- ALL CUT SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL UNLESS OTHERWISE APPROVED IN A SOILS REPORT.
- ALL FILL SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
- AN OSHA PERMIT IS REQUIRED WHEN WORKERS MUST ENTER TRENCHES OR EXCAVATION FIVE (5) FEET OR DEEPER.
- ALL TRENCHES AND EXCAVATIONS SHALL BE CONSTRUCTED IN STRICT COMPLIANCE WITH THE APPLICABLE SAFETY ORDINANCES. CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR TRENCH SHORING DESIGN AND INSTALLATION. CONTRACTORS SHALL OBTAIN APPLICABLE O.S.H.A. PERMITS WHEN WORKMEN MUST ENTER TRENCHES GREATER THAN FIVE FEET.
- ALL SLOPES IN EXCESS OF 3' IN VERTICAL HEIGHT SHALL BE PREPARED AND MAINTAINED TO CONTROL AGAINST EROSION.
- GRADING WORK WILL BE SUPERVISED AS ENGINEERED GRADING IN ACCORDANCE WITH TITLE 19 AND THE CALIFORNIA BUILDING CODE.
- FILL AREAS SLOPING STEEPER THAN 5:1 SHALL BE KEYED AND BENCHED TO SUPPORT THE FILL.
- BERMS OF DRAINAGE DEVICES SHALL BE PLACED AT THE TOP OF ALL FILL SLOPES.
- DPSI, INC. SHALL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THESE PLANS MUST BE APPROVED IN WRITING BY DPSI, INC.
- IF THE CONTRACTOR IS IN DOUBT AS TO THE MEANING OF ANY PART OF THE PLAN AND SPECIFICATIONS OR FINDS DISCREPANCIES IN OR OMISSIONS FROM THE DRAWING OR SPECIFICATIONS, HE SHALL SUBMIT A WRITTEN REQUEST FOR AN INTERPRETATION OR A CORRECTION THEREOF, PRIOR TO FILING HIS BID FOR THE PROJECT.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREVENT A DUST NUISANCE FROM ORIGINATING FROM THE SITE OF WORK AS A RESULT OF HIS OPERATIONS DURING THE EFFECTIVE PERIOD OF THIS CONTRACT. DUST CONTROL SHALL CONFORM TO THE SAN LUIS OBISPO COUNTY AIR POLLUTION CONTROL DISTRICT REGULATIONS. PREVENTATIVE MEASURES TO BE TAKEN BY THE CONTRACTOR SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
- WATER SHALL BE APPLIED TO ALL UNPAVED AREAS AS REQUIRED TO PREVENT THE SURFACES FROM BECOMING DRY ENOUGH TO PERMIT DUST FORMATION.
- PAVED SURFACES OVER WHICH VEHICULAR TRAFFIC IS PERMITTED TO TRAVEL SHALL BE KEPT FREE OF DIRT.



## SITE PLAN MAP

N.T.S.



## VICINITY MAP

APPROVED:	
DATE	
AGENCY REPRESENTATIVE	
DATE	
 <b>REGISTRED PROFESSIONAL ENGINEER</b> <b>DAVID W. CHANLEY</b> <b>NO. 70849</b> <b>STATE OF CALIFORNIA</b>	
DPSI, INC.	
7	
DIVERSIFIED PROJECT SERVICES	
INTERNATIONAL	
San Luis Obispo, CA	
www.dpsisinc.com	
APP	DC
REV	ISSUED FOR PERMIT
11/05/18	B
DATE	REV
11/05/18	B
REVISIONS	ISSUED FOR PERMIT
TITLE SHEET	
CAL POLY SOLAR LAB	
SAN LUIS OBISPO, CA	
SHEET	OF 5 SHEETS
C1	PROJECT: 180168
OF	5 SHEETS
PROTRACTED 2018-11-05	

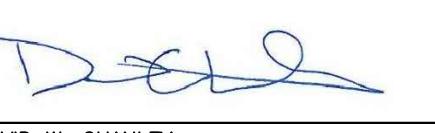
## Sheet List Table

SHEET NUMBER	SHEET TITLE
C1	TITLE SHEET
C2	GRADING PLAN
S1	STRUCTURAL NOTES AND SPECIFICATIONS
S2	STRUCTURAL NOTES, SPECIFICATIONS, AND SPECIAL INSPECTION REQUIREMENTS
S3	STRUCTURAL DETAIL SHEET

## DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARATE THAT I AM THE ENGINEER OF RECORD FOR THIS PROJECT AND THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE. THESE PLANS AND SPECIFICATIONS, TO THE BEST OF MY KNOWLEDGE, COMPLY WITH CURRENT STANDARDS.

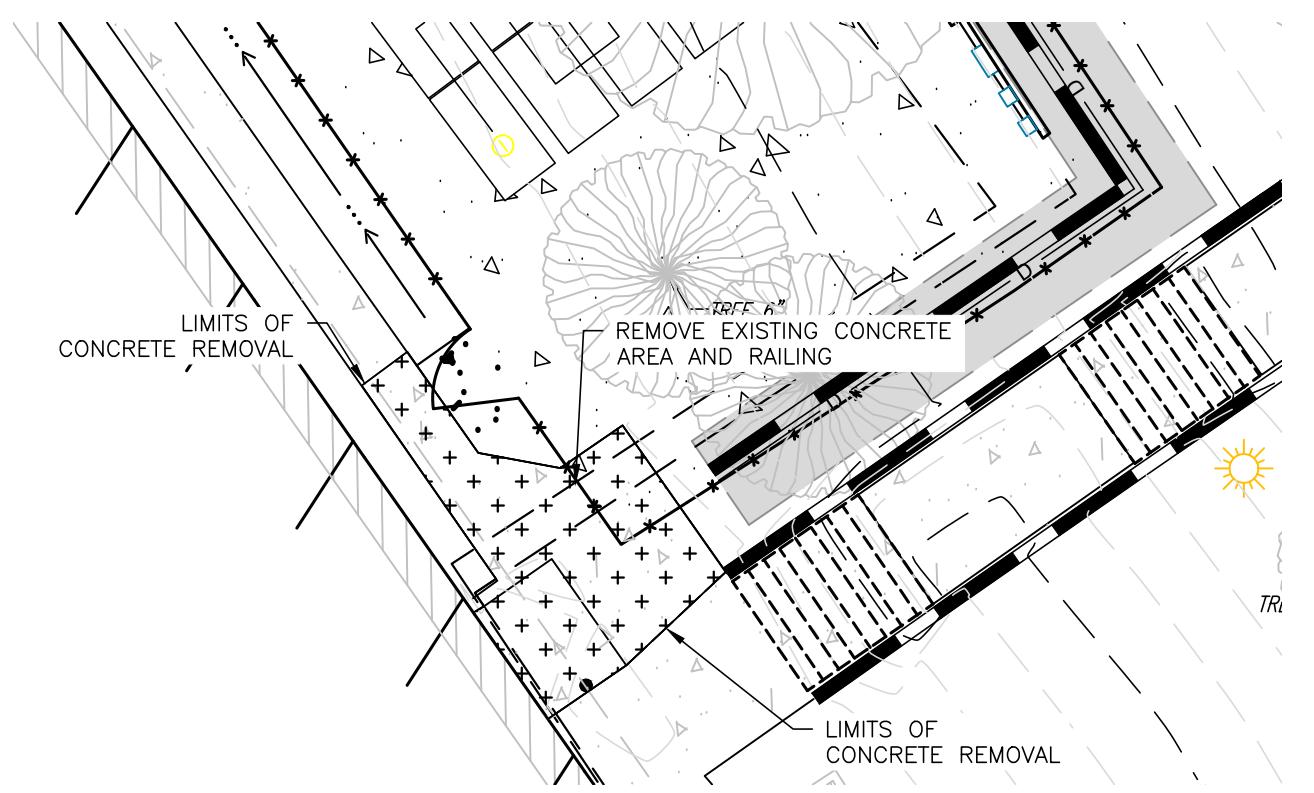
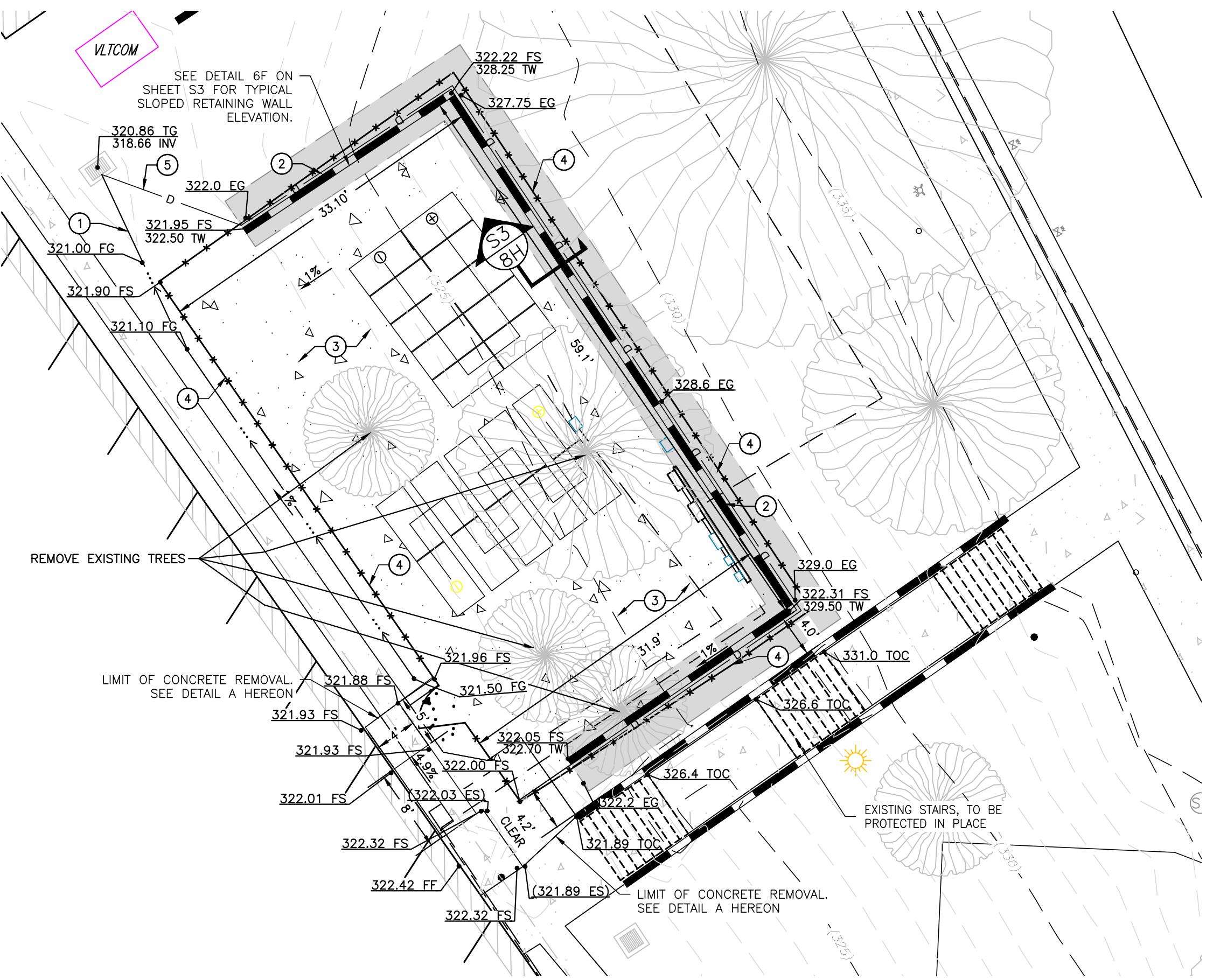
ANY ERRORS, OMISSIONS, OR OTHER VIOLATIONS OF THOSE ORDINANCES, STANDARDS OR DESIGN CRITERIA ENCOUNTERED DURING CONSTRUCTION SHALL BE CORRECTED AND SUCH CORRECTIONS REFLECTED ON CORRECTED PLANS.

  
 DAVID W. CHANLEY  
 R.C.E. 70849

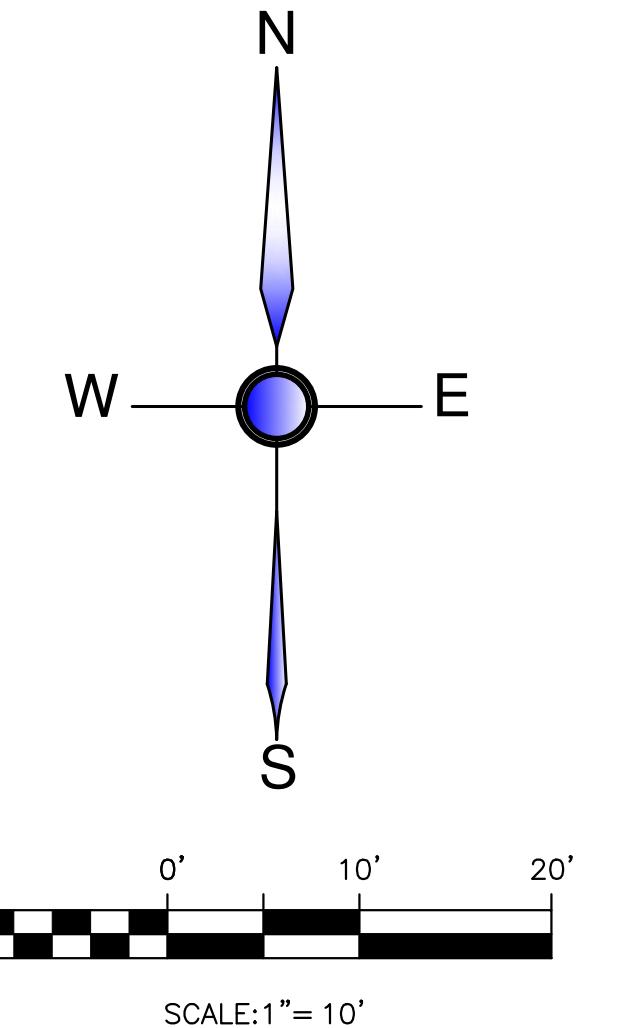


THE DELIVERY OF THIS DRAWING SHOULD NOT BE CONSTRUED TO PROVIDE AN EXPLANATION OR GUARANTEE OF THE DRAWINGS. ALL DIMENSIONS AND DETAILS ARE EXACT OR TO INDICATE THE USE OF THIS DRAWING FOR THE REVIEW AND APPROVAL OF DPSI OR ANY OTHER. ANY USE OF THIS INFORMATION IS AT THE SOLE RISK OF THE USER.

180168-007.CEDS180168.SITE2.Grade180168.dwg 11/05/18 02:47 PM SHUTS



# **DETAIL-A CONCRETE REMOVAL**



# LEGEND

●	SET LOCAL CONTROL
500.00	SPOT ELEVATION
	FIRE HYDRANT
	IRRIGATION CONTROL VALVE
	WATER VALVE
	LIGHT POLE
[E]	ELECTRICAL PANEL
	SANITARY SEWER MANHOLE
	STORM WATER MAN HOLE
	TELECOMMUNICATIONS MANHOLE
	TREE SIZE VARIES
/LT/COM	VAULT COMMUNICATIONS
/LT/E	VAULT ELECTRIC
/LT	VAULT UNKNOWN
( 100) — —	CONTOURS — MAJOR
( 100) — —	CONTOURS — MINOR
— — —	NATURAL GROUND TOP
	RETAINING WALL
— x — x —	FENCING SEE REC SOLAR DETAILS
	RETAINING WALL FOOTING OUTLINE

## CONSTRUCTION NOTES

CONSTRUCT 3' WIDE SWALE PER DETAIL A, SEE ON THIS SHEET.

CONSTRUCT CONCRETE RETAINING WALL PER DETAIL 8H ON SHEET S3.  
WALL TO BE:

WALL = 8" THICK  
TOP OF FOOTING=0.75 FT BELOW FS (LOW POINT)=321.20'  
BOTTOM OF FOOTING=2.25 FT BELOW FS (LOW POINT)=319.70'  
FTG WIDTH=5.25 FT'  
TYPICAL ALL SIDES

CONSTRUCT CONCRETE PAD PER DETAIL B, ON THIS SHEET.

CONSTRUCT FENCING/GUARDRAIL. DESIGN FOR OSHA AND CBC DESIGN LOADS TO BE PROVIDED BY REC SOLAR.

INSTALL 6" SCHEDULE 40 DRAIN PIPE TO DRAIN PERFORATED PIPE BEHIND WALL PER DETAIL 8F ON SHEET S3 AND PER SOILS REPORT REQUIREMENTS. SEE NOTE BELOW.

## NOTE:

TE FROM SOILS REPORT – ALL RETAINING WALLS SHOULD BE DRAINED WITH PERFORATED PIPE ENCASED IN A FREE-DRAINING  
AVEL BLANKET. THE PIPE SHOULD BE PLACED ATOP THE FOOTING WITH PERFORATIONS FACING DOWNWARD, AND SHOULD  
CHARGE IN A NON-EROSIVE MANNER AWAY FROM FOUNDATIONS AND OTHER IMPROVEMENTS. THE GRAVEL BLANKET SHOULD  
VE A WIDTH OF APPROXIMATELY 1-FOOT AND SHOULD EXTEND UPWARD TO APPROXIMATELY 1-FOOT FROM THE TOP OF THE  
LL BACKFILL. TO REDUCE INFILTRATION OF BACKFILL INTO THE GRAVEL DRAIN, A PERMEABLE SYNTHETIC FILTER FABRIC  
INFORMING TO THE STANDARD SPECIFICATIONS, SECTION 96-1.02B-CLASS C (CALTRANS 2015), SHOULD BE PLACED BETWEEN  
E TWO MATERIALS. THE FINAL FOOT BEHIND RETAINING WALLS SHOULD BE BACKFILLED WITH NATIVE SOIL. MANUFACTURED  
NTHETIC DRAINS, SUCH AS MIRADRAIN OR ENKADRAIN, ARE ACCEPTABLE ALTERNATIVES TO THE USE OF GRAVEL, PROVIDED THAT  
EY ARE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER.

## ABBREVIATIONS

&	AND	JST.	JOIST
L	ANGLE	JT.	JOINT
@	AT		
Ø	CENTERLINE		
//	DIAMETER OR ROUND	K.O.	KNOCK OUT
+	PARALLEL	K.O.P.	KNOCK OUT PANEL
#	PERPENDICULAR		
PLATE			
#	POUND OR NUMBER	LB(S)	POUND (POUNDS)
(C=)	CAMBER	L.F.	LINEAL FOOT
(E)	EXISTING	LL.	LEFT HAND
(N)	NEW	LLH.	LIVE LOAD
A.B.	ANCHOR BOLT	LLV.	LONG LEG HORIZ.
ABV.	ABOVE	LOC.	LONG LEG VERT.
ADDL.	ADDITIONAL	LST.	LOCATION
ADJC.	ADJACENT	LT.WT.	LIGHT WEIGHT
A.F.F.	ABOVE FINISH FLOOR	LVL.	LAMINATED VENEER LUMBER
A.F.G.	ABOVE FINISH GRADE		
AGG.	AGGREGATE	MACH.	MACHINE
ALT.	ALTERNATE	MAINT.	MAINTENANCE
ALUM.	ALUMINUM	MAX.	MAXIMUM
APPROX.	APPROXIMATE	M.B.	MACHINE BOLT
ARCH.	ARCHITECT(URAL)	M.B.M.	METAL BUILDING
BEL.	BELOW	MECH.	MECHANICAL
BLDG.	BUILDING	MED.	MEDIUM
BLK.	BLOCK	MFB.	MEDIAN
BLKG.	BLOCKING	MET.	METAL
BM.	BEAM	MEZZ.	MEZZANINE
B.N.	BOUNDARY NAILING	MFR.	MANUFACTURER
B.O.D.	BOTTOM OF DECK	MIL.	MILLIMETER
B.O.F.	BOTTOM OF FOOTING	MIN.	MINIMUM
BOT.	BOTTOM	MISC.	MISCELLANEOUS
BRG.	BEARING	MPH.	MILES PER HOUR
B.T.W.N.	BETWEEN	MTL.	METAL
B.U.	BUILT-UP	N	
CANT.	CANTILEVER	N.I.C.	NORTH
C.F.	CUBIC FOOT	N.I.C.	NOT IN CONTRACT
C.J.	CONSTRUCTION JOINT/	NOM.	NUMBER
CONTROL JOINT		NS.	NOMINAL
C.L.	CENTER LINE	N.T.S.	NEAR SIDE
CLG.	CEILING	N.W.	NOT TO SCALE
CLR.	CLEARANCE		NORMAL WEIGHT
CMU.	CONCRETE MASONRY	O/	OVER
COL.	COLUMN	O.C.	ON CENTER
CONN.	CONCRETE	O.C.H.	ON CENTER HORIZONTAL
CONN.	CONNECTION	O.C.V.	ON CENTER VERTICAL
CONST.	CONSTRUCTION	O.D.	OUTSIDE DIAMETER/DIM.
CONT.	CONTINUOUS	O.FOW.	OUTSIDE FACE OF WALL
COORD.	COORDINATES	O.H.	OPPOSITE HAN
CP.	COMPLETE PENETRATION	O.H.M.S.	OVAL HEAD MACH. SCREW
C.T.C.	CENTER TO CENTER	OPN.	OPENING
CTR.	CENTER	OPP.	OPPOSITE
CTR.D.	CENTERED	ORIG.	ORIGINAL
CTSK.	COUNTERSUNK	OVDH.	OVER HEAD
CU.	CUBIC	OWSJ.	OPEN WEB STEEL JOIST
C.Y.	YARD	P.A.F.	POWER ACTUATED FASTENER
DBL.	DOUBLE	PERP.	PERPENDICULAR
DEMO	DEMOLISH / DEMOLITION	PL.	PLATE
DET.	DETAIL	PLY.	PLYWOOD
D.F.	Douglas FIR	PP.	PARTIAL PENETRATION
DIA.	DIAMETER	PSF.	POUNDS PER SQUARE FOOT
DIAG.	DIAGONAL	PSI.	POUNDS PER SQUARE INCH
DIM.	DIMENSION	PSL.	PARALLEL STRAND LUMBER
DL.	DEAD LOAD	PT.	POINT
DN.	DOWN	P.T.D.F.	POST TENSION
DP.	DEEP	PTN.	DOUGLAS FIR
DWG.(S)	DRAWING(S)	PW.	PARTITION
DWL	DOWEL		PLYWOOD
E	EAST	R.	RADIUS
EA.	EACH	REINF.	REINFORCING
E.F.	EACH FACE	REM.	REMOVED
E.J.	EXPANSION JOINT	REQD.	REQUIRED
ELEV.	ELEVATION	R.H.	RIGHT HAND
ELEC.	ELECTRICAL	R.H.W.S.	ROUND HEAD WOOD SCREW
ELEV.	ELEVATOR	R.O.	ROUGH OPENING
EMB.	EMBEDMENT	S.	SOUTH
ENGR.	EDGE NAILING	SAD.	SEE ARCH. DRAWINGS
EQ.	EQUIP.	SCHED.	SCHEDULE
EQUIP.	EQUIPMENT	SCL.	STRUCTURAL COMPOSITE
ETC.	ETCETERA	SDS.	LUMBER
E.W.	EACH WAY	SECT.	SELF DRILLING SCREW
EXIST.	EXISTING	SECT.	SECTION
EXP.	EXPANSION	SP.	SQUARE FEET/FOOT
EXT.	EXTERIOR	SHTG.	SHEARING
FDN.	FOUNDATION	SIM.	SIMILAR
F.F.	FINISH FLOOR	S.M.	SHEET METAL
F.G.	FINISH GRADE	SMS.	SHEET METAL SCREW
FHMS	FLAT HEAD MACH. SCREW	S.O.G.	SLAB-ON-GRADE
FIN.	FINISH	SPEC.	SPECIAL
FLR.	FLOOR(ING)	SPEC(S).	SPECIFICATION(S)
F.O.	FACE OF	SO.	SPECIFICATION(S)
F.O.C.	FACE OF CONCRETE	S.S.	STAINLESS STEEL
F.O.M.	FACE OF MASONRY	STD.	STANDARD
F.O.S.	FACE OF STUD	STIFF.	STIFFENER
F.O.W.	FACE OF WALL	STL.	STEEL
FRMNG	FRAMING	STRUCT.	STRUCTURAL
F.S.	FAR SIDE	STS.	SEALING SCREW
FT.	FOOT/FEET	SUSP.	SUSPENDED
FTG.	FOOTING	SYM.	SYMMETRICAL
FUT.	FUTURE	T&B	TOP AND BOTTOM
		T&G	TONGUE AND GROOVE
		TEMP.	TEMPORARY
		THICK.	THICK
		THRD.	THREADED
		TMFD.	TEMPERED
		T.O.C.	TOP OF CONCRETE
		T.O.F.	TOP OF FOOTING
		T.O.P.	TOP OF PLATE
		T.O.PL.	TOP OF PLYWOOD
		T.O.S.	TOP OF STEEL
		TRTD.	TREATED
		TYP.	TYPICAL
GA.	GAUGE/GAGE	U.N.O.	UNLESS NOTED OTHERWISE
GALV.	GALVANIZED	U.O.N.	UNLESS OTHERWISE NOTED
G.C.	GENERAL CONTR.	U.T.	ULTRASONIC TESTED
GEN.	GENERAL	VERT.	VERTICAL
G.I.	GALVANIZED IRON	W	WEST OR
GL.	GLULAM	W/	WIDTH/WIDE
GLB	GLULAM BEAM	WF	WITHOUT
GR.	GRADE	W/O	WORKPOINT
GWB.	GYPSUM WALL BOARD	W.S.	WOOD SCREW
GYP.	GYPSUM	WT.	WEIGHT
H.C.	HOLLOW CORE	WWF.	WELDED WIRE FABRIC
HDR.	HEADER	WWM.	WELDED WIRE MESH
HORZ.	HANGER	YD	YARD
HSB.	HORIZONTAL		
HSS.	HIGH STRENGTH BOLT		
HT.	HOLLOW STEEL SECTION		
HT.	HEIGHT		
HVAC	HEATING/VENTILATING / AIR CONDITIONING		
I.D.	INSIDE DIAMETER/DIM.		
IFOW.	INSIDE FACE OF WALL		
INFO.	INFORMATION		
INSP.	INSPECTION		
INSUL.	INSULATION		
INT.	INTERIOR		

## GENERAL STRUCTURAL

- CODE: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE SECTIONS OF THE CALIFORNIA BUILDING CODE (CBC 2016 EDITION WITH CITY OF BERKELEY AMENDMENTS) AND ALL OTHER PUBLICATIONS AND STANDARDS LISTED HEREIN. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
- INTENT OF STRUCTURAL DRAWINGS: PROVIDE SUFFICIENT INFORMATION TO GUIDE THE GENERAL CONTRACTOR IN REGARD TO THE PRIMARY STRUCTURAL SYSTEMS ASPECTS OF THE PROJECT OTHER THAN THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH CIVIL DRAWINGS. SOME SECONDARY ELEMENTS ARE NOT DIMENSIONED SUCH AS: WALL CONFIGURATIONS, SLAB SLOPES AND DEPRESSIONS, CURBS, ETC. VERTICAL DIMENSIONAL CONTROL IS DEFINED BY CIVIL SITE PLANS. STRUCTURAL DETAILS SHOW DIMENSIONAL RELATIONSHIPS TO CONTROL DIMENSION DEFINED BY CIVIL DRAWINGS. DETAILING AND SHOP DRAWING PRODUCTION FOR STRUCTURAL ELEMENTS WILL REQUIRE DIMENSIONAL INFORMATION CONTAINED IN BOTH CIVIL AND STRUCTURAL DRAWINGS.
- PROJECTS WITH EXISTING STRUCTURES: ALL WORK SHALL BE PERFORMED TO MINIMIZE DAMAGE TO THE EXISTING STRUCTURES, LANDSCAPING, AND ROADWAYS.
- GOVERNMENT REQUIREMENTS: ALL WORK SHALL CONFORM TO THE LATEST APPLICABLE CONSTRUCTION SAFETY REQUIREMENTS OF O.S.H.A. AND ANY OTHER GOVERNMENTAL AGENCY HAVING JURISDICTION IN THE AREA OF THE WORK.
- ENGINEER OF RECORD EXCLUSIONS: THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR, AND DOES NOT HAVE CONTROL OF CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND SCHEDULING FOR JOB SITE CONDITIONS, FOR SAFER PREPARATIONS AND PROGRAMS IN CONNECTION WITH THE CONSTRUCTION WORK. THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR THE CONTRACTOR'S FULLY COORDINATING THE CONSTRUCTION WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR, AND DOES NOT HAVE CONTROL OR CHARGE OF ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS, OR ANY OF THEIR AGENTS OR EMPLOYEES, OR ANY OTHER PERSONS PERFORMING ANY OF THE CONSTRUCTION WORK. THE CONTRACTOR AGREES TO INDEMNIFY AND HOLD THE STRUCTURAL ENGINEER OF RECORD HARMLESS FROM AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.
- STRUCTURAL SYSTEM DURING CONSTRUCTION: THE STRUCTURAL SYSTEMS HAVE BEEN DESIGNED TO RESIST CODE REQUIRED VERTICAL AND LATERAL FORCES AFTER THE CONSTRUCTION OF ALL STRUCTURAL ELEMENTS HAS BEEN COMPLETED, AS PRESCRIBED BY THE GOVERNING BUILDING CODES AND IN ACCORDANCE WITH STANDARD ENGINEERING PRACTICES. NO SPECIAL PROVISIONS HAVE BEEN MADE FOR CARRYING CONCENTRATED LOADS FROM STORAGE AND HANDLING OF CONSTRUCTION MATERIALS OR FROM OPERATION OF CONSTRUCTION EQUIPMENT.
- STRUCTURAL NOTES AND DETAILS: GENERAL NOTES AND TYPICAL DETAILS APPLY IN ALL CASES UNLESS SPECIFICALLY SHOWN OTHERWISE IN THE DRAWINGS. PLAN NOTES AND SPECIFIC DETAILS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED, USE DETAILS OF A CHARACTER SIMILAR TO THE CONDITION SHOWN, SUBJECT TO REVIEW BY THE ENGINEER OF RECORD.
- OPENINGS, POCKETS, ETC.: SHALL NOT BE PLACED IN STRUCTURAL MEMBERS UNLESS DETAILED SPECIFICALLY ON THE STRUCTURAL DRAWINGS. FOR REQUIRED OPENINGS WITHIN STRUCTURAL MEMBERS WHICH ARE NOT SHOWN AND/OR DETAILED ON THE STRUCTURAL DRAWINGS, OBTAIN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD BEFORE PROCEEDING WITH WORK.
- STRUCTURAL SPECIFICATIONS: IF SPECIFICATIONS ARE PROVIDED FOR THE PROJECT, THE INFORMATION CONTAINED WITHIN THE SPECIFICATIONS APPLY TO THE PROJECT. IF INFORMATION IN THE GENERAL NOTES OR PLANS CONFLICT WITH THE SPECIFICATIONS IMMEDIATELY NOTIFY THE PROJECT COORDINATOR, WHO WILL RESOLVE THE CONFLICT IN WRITING BEFORE PROCEEDING.

## STRUCTURAL OBSERVATION PROGRAM

- CODE REQUIREMENTS: A REPRESENTATIVE OF THE STRUCTURAL ENGINEER OF RECORD OR THE STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE STRUCTURAL OBSERVATION AND OBSERVATION REPORTS PER **CBC SECTION 1704.5**.
- NOTIFICATION AND ELEMENTS REQUIRING OBSERVATION: CONTRACTOR SHALL NOTIFY STRUCTURAL ENGINEER 48 HOURS PRIOR TO COMPLETION OF THE FOLLOWING TO ARRANGE FOR STRUCTURAL OBSERVATION PRIOR TO THE ELEMENT BEING COVERED OR CAST IN CONCRETE OR GROUT:
  - CONCRETE WALL FOUNDATION REINFORCING.
  - CONCRETE WALL REINFORCING.
- STRUCTURAL OBSERVATION REPORTS: OBSERVED DEFICIENCIES AND/OR THE DATE OF THE OBSERVATION WILL BE DOCUMENTED IN WRITING AND PROVIDED TO THE OWNER'S REPRESENTATIVE, SPECIAL INSPECTOR OR INSPECTOR OF RECORD, PRIME CONSULTANT, AND CONTRACTOR. STRUCTURAL OBSERVATION REPORTS MUST BE SUBMITTED TO THE BUILDING OFFICIAL BY THE INSPECTOR OR CONTRACTOR AS A WRITTEN STATEMENT THAT CODE REQUIRED STRUCTURAL OBSERVATIONS HAVE BEEN COMPLETED AND ANY OBSERVED DEFICIENCIES HAVE BEEN REPORTED, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE. REPORTED DEFICIENCY WILL BE RESOLVED AND THE COMPLIANT CONDITION WILL BE DOCUMENTED BY THE BUILDING INSPECTOR OR INSPECTOR OF RECORD. NOTIFY THE STRUCTURAL OBSERVER IMMEDIATELY OF ANY UNRESOLVED OR UNCLAR DEFICIENCIES PRIOR TO PROCEEDING WITH CONSTRUCTION. THE STRUCTURAL OBSERVER WILL MAKE ADDITIONAL SITE VISITS AS NECESSARY TO ASSIST WITH RESOLVING THE REPORTED DEFICIENCIES.
- STRUCTURAL OBSERVATION LIMITATIONS: STRUCTURAL OBSERVATION(S) WILL BE PROVIDED BY A STRUCTURAL OBSERVER, BUT DO NOT RELIEVE THE CONTRACTOR OF HIS OR HER RESPONSIBILITY FOR BUILDING THE PROJECT, CONTROLLING THE PROGRESS, PROVIDING SAFE WORKING CONDITIONS, AND CORRECTING ANY DEVIATIONS FROM PROJECT REQUIREMENTS. SUCH OBSERVATIONS ARE NOT TO BE CONSTRUED AS INSPECTION OF THE WORK. RESPONSIBILITY FOR RESOLUTION OF ANY ITEMS NOTED DURING OBSERVATION AS NOT BEING IN CONFORMANCE WITH THE CONTRACT DOCUMENTS RESTS WITH THE CONTRACTOR, SUBJECT TO REVIEW AND APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.

## GEOTECHNICAL DESIGN CRITERIA AND PREPARATION

- DESIGN CRITERIA: THE FOUNDATION WAS DESIGNED IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED WITHIN THE GEOTECHNICAL INVESTIGATION REPORT SPECIFIED BELOW.
- GEOTECHNICAL REPORT #300986-13 PREPARED BY EARTH SYSTEMS DATED MARCH 8, 2018
- THE SOIL PARAMETERS ARE AS FOLLOWS:
- SOIL CLASSIFICATION: C WALL SITES
- ALLOWABLE DESIGN PARAMETERS:

PARAMETER	ALLOWABLE CAPACITY
DEAD + LIVE	3000 PSF
DEAD + LIVE + SEISMIC	4000 PSF
ACTIVE PRESSURE 2H1V (DRAINED)	67 PCF*
SEISMIC LATERAL EARTH PRESSURE	N/A **
PASSIVE PRESSURE	450 PCF
COEFFICIENT OF FRICTION	0.45

- 40 PCF PLUS 1 PCF INCREASE FOR EACH DEGREE OF INCLINATION FROM HORIZONTAL
- APPLY SEISMIC TO RETAINING WALLS SUPPORTING AN AVERAGE BACKFILL HEIGHT GREATER THAN 6 FEET. HOWEVER, PER SOILS REPORT, THE INCREMENTAL INCREASE IN LATERAL SOIL PRESSURE IS NEGIGIBLE FOR MODERATELY HARD TO HARD SANDSTONE BEDROCK.
- CONTRACTOR RESPONSIBILITIES:

  - REVIEW AND INCORPORATE GEOTECHNICAL RECOMMENDATIONS NOTED IN THE INVESTIGATION REPORT SPECIFIED NOTE #1 ABOVE.
  - BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES AND FOR PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES.
  - EXERCISE EXTREME CARE DURING EXCAVATION TO AVOID DAMAGE TO BURIED LINES, TANKS, AND OTHER CONCEALED ITEMS. UPON DISCOVERY, DO NOT PROCEED WITH WORK UNTIL RECEIVING WRITTEN INSTRUCTIONS FROM ARCHITECT.
  - DESIGN AND PROVIDE ADEQUATE SHORING, BRACING AND FORM WORK AS REQUIRED FOR THE CONSTRUCTION OF THE BUILDING. PROVIDE TEMPORARY BRACING AS REQUIRED TO HOLD THE VARIOUS ELEMENTS IN PLACE UNTIL FINAL SUPPORT IS SECURELY ANCHORED.
  - PROVIDE DRAINAGE AND DWATERING AROUND ALL WORK TO AVOID WATER-SOFTENED FOOTINGS.
  - GEOTECHNICAL ENGINEER RESPONSIBILITIES:

    - A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OF RECORD SHALL BE PRESENT DURING ALL SITE CLEARING AND GRADING OPERATIONS TO TEST AND OBSERVE EARTHWORK CONSTRUCTION.
    - PRIOR TO PLACEMENT OF REINFORCING STEEL IN FOUNDATION ELEMENTS, A REPRESENTATIVE OF THE SOILS ENGINEER OF RECORD SHALL INSPECT ALL FOOTING EXCAVATIONS FOR SUITABILITY OF BEARING SURFACES.
    - OVER EXCAVATION AND COMPACTION INFORMATION: RETAINING WALL CONTINUOUS FOOTINGS SHOULD BE AT LEAST 18 INCHES BELOW LOWEST ADJACENT GRADE AND SHOULD BE SUPPORTED BY FIRM SANDSTONE BEDROCK. FOOTINGS MAY BE PLACED DIRECTLY ON THE SANDSTONE BEDROCK, WHICH SHOULD BE NEAT CUT; NO SCARIFICATION, MOISTURE CONDITIONING OR COMPACTION IS NECESSARY.
    - BACKFILL AT RETAINING WALLS: DO NOT BACKFILL THE RETAINING WALL HAS BEEN FULLY CONSTRUCTED AND MATERIAL TESTING CONFIRMS DESIGN STRENGTHS HAVE BEEN ACHIEVED, UNLESS OTHERWISE NOTED.

## BASIS OF DESIGN

- DESIGN LOADS:
  - CONCRETE RETAINING WALL ..... 145 PCF
  - SURCHARGE ..... VARIES
- SEISMIC FACTORS: (REFERENCE CSU SEISMIC REQUIREMENTS, DOCUMENT DATED NOV. 1, 2016)
  - RISK CATEGORY ..... II
  - IMPORTANCE FACTOR ..... 1.0
  - Ss ..... 1.210
  - S1 ..... 0.350
  - SITE CLASS ..... C
  - SDS ..... 1.220
  - SD1 ..... 0.507
  - SEISMIC DESIGN CATEGORY ..... D
- WIND FACTORS:
  - RISK CATEGORY ..... II
  - ULTIMATE DESIGN WIND SPEED ..... 110 MPH
  - WIND EXPOSURE ..... C

## STRUCTURAL NOTES AND SPECIFICATIONS

STRUCTURAL NOTE SHEET  
CAL POLY SOLAR LAB  
SAN LUIS OBISPO, CA

SHEET 1 OF 5 SHEETS  
SHEET 1  
PROJECT: 180168  
PLATED: 2018-11-05

THE DELIVERY OF THIS DRAWING SHOULD NOT BE CONSTRUED AS AN EXPLANATION OR GUARANTEE TO



**STRUCTURAL DETAIL SHEET**  
CAL POLY SOLAR LAB  
SAN LUIS OBISPO, CA

**CONCRETE**  
**REINF. BAR SPLICE LENGTH - GRADE 60**

BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
	TOP (3)	28"	38"	47"	56"	61"	93"	105"	118"	131"	NP	NP	NP
3,000 PSI	BOT.	22"	29"	36"	43"	63"	72"	81"	91"	101"	NP	NP	NP
4,000 PSI	TOP (3)	25"	33"	41"	49"	71"	81"	91"	102"	114"	NP	NP	NP
	BOT.	19"	25"	31"	37"	54"	62"	70"	79"	87"	NP	NP	NP

\* NP: NOT PERMITTED

WIRE TOGETHER OR PROVIDE  $d_b$  OR 1" MIN. CLEARANCE

NOTES:

1. SPLICE LENGTHS ARE GIVEN FOR CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH AS GIVEN IN THE SCHEDULE AT 28 DAYS, BARS WITH A MINIMUM CLEAR COVER OF 1 BAR DIAMETER, AND BARS WITH A MINIMUM CLEAR SPACING OF 1 BAR DIAMETER.
2. FOR EPOXY COATED REBAR INCREASE SPLICE LENGTH BY 50 PERCENT.
3. ADJACENT SPLICES SHALL BE STAGGERED A MINIMUM OF TWICE THE SPLICE LENGTH.
4. TABLE VALUES BASED ON CLASS B SPLICE REQUIREMENTS.

**APPROVED:** [Signature]

**2B** **2D** **2F** **2H** **REINF. BAR SPLICE FOR CONC. N.T.S. 2K**

**4B** **4D** **4F** **6B** **REINFORCEMENT LAYOUT @ SLOPED RETAINING WALL 1/2" = 1'-0" 6F**

**6F** **RETANING WALL SECTION 1/2" = 1'-0" 8F**

**8H** **REINF. @ CONC. INTERSECT 3/4" = 1'-0" 8K**

**STANDARD HOOKS N.T.S. 4K**

**135° SEISMIC HOOK A or G APPROX. H**

BAR SIZE	D	DIMENSIONS OF STANDARD HOOKS ALL GRADES	
		180°	90°
#3	2 1/4"	5"	3"
#4	3"	6"	4"
#5	3 3/4"	7"	5"
#6	4 1/2"	8"	6"
#7	5 1/4"	10"	7"
#8	6"	11"	8"
#9	9 1/2"	1'-3"	11 3/4"
#10	10 3/4"	1'-5"	1'-1 1/4"
#11	12"	1'-7"	1'-2 3/4"
			2'-0"

**135°**

**STIRRUP AND HOOK N.T.S. 6K**

**ALTERNATE BARS LAP OPPOSITE WAYS IN THRU WALLS**

**SINGLE CURTAIN**

**DOUBLE CURTAIN**

**STRUCTURAL DETAIL SHEET**  
SHEET S3 OF 5 SHEETS  
PROJECT: 180168 DATE: 11/05/18