

CAL POLY ACADEMIC LAB SOLAR PHOTOVOLTAIC SYSTEM



CONTRACTOR
CA - B C10 #990001

REC SOLAR
3450 BROAD ST, SUITE 105
SAN LUIS OBISPO, CA 93401
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ENGINEER



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

TEAM

DESCRIPTION

LOCATION

CODES

SHEET INDEX

CLIENT
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93401

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

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SONOMA ELECTRICAL ENGINEERING, INC.
1125 SHADY OAK PLACE,
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CIVIL ENGINEER
DPSI
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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
SNAPRACK
775 FIERO LANE, STE 200
SAN LUIS OBISPO, CA 93401
PH: 805-547-2607
CONTACT: CODY NORMAN

LANDSCAPE ARCHITECT
XXXXXXX
XXXXXXX
XXXXXXX
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 & SNAPRACK

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

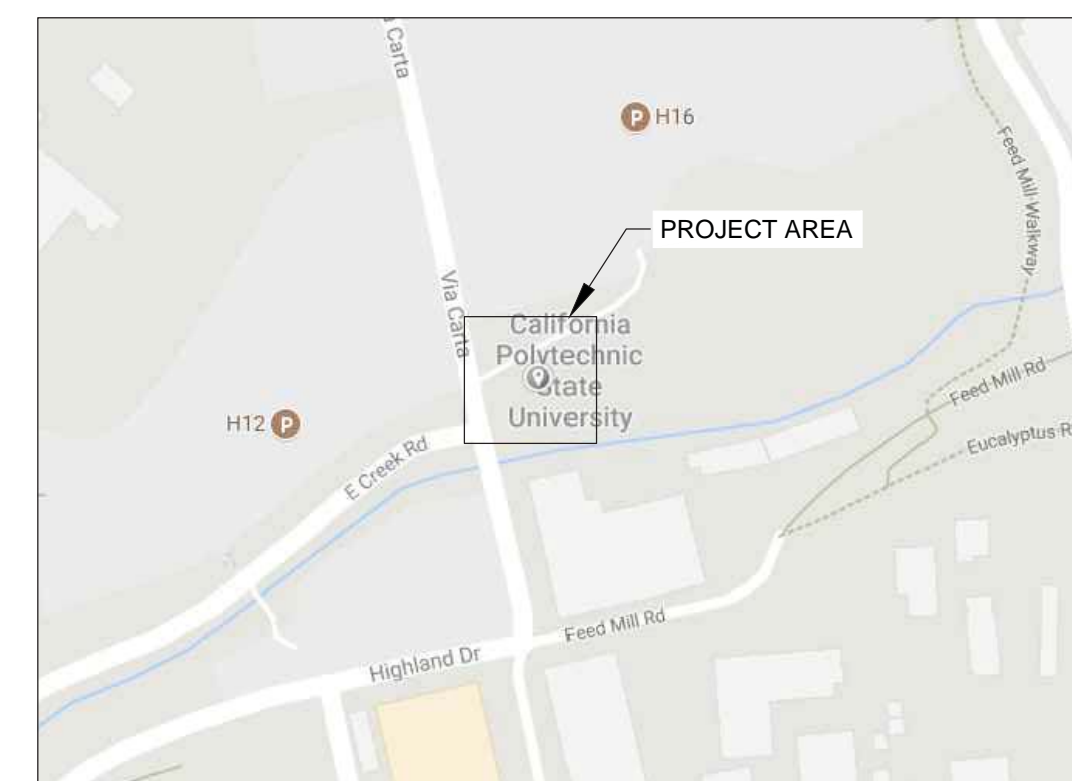
AC NAMEPLATE SYSTEM SIZE (kW)
ZONE 1A - 5.75
ZONE 1B - 5.75
TOTAL - 11.5

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



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.

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

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

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PROJECT

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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

DATE	DESCRIPTION
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
COVER SHEET

SHEET NUMBER
G101

ABBREVIATIONS

A/AMP	AMPERE
AC	ALTERNATING CURRENT
ACB	ARRAY COMBINER BOX
ACD	AC DISCONNECT (FUSED AND NON-FUSED)
AHJ	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	BLACK
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

FOR ADDITIONAL SYMBOLS SEE INDIVIDUAL SHEETS

	SECTION		DETAIL REFERENCE
	ELEVATION		REVISION TAG
	EQUIPMENT LABEL		METER
	CONDUIT REFERENCE		MAIN BREAKER, SWITCHGEAR
	GENERATOR		INVERTER
	TRANSFER SWITCH		COMBINER
	DISTRIBUTION PANEL		COMBINER W/ INTEGRATED DISCONNECT
	TRANSFORMER		MODULES
	UNFUSED AC OR DC DISCONNECT		FUSED AC OR DC DISCONNECT

GENERAL NOTES

- 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 Contractor's 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, existing 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.
 - All electrical components and materials shall be listed for their intended use and installed per manufacturer specifications.
 - 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 areas.
 - 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 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 IFP 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 sub-array 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	-Pull 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:
 - equipment three letter callout{equipment number}
 - If a site has two inverters, labels = inv1 and inv2.
 - If a site has 20 string combiners, labels = scb1 through scb20.
 - String labeling is to be completed in the following manner:
 - equipment three letter callout{equipment number}{string number}
 - If the string callout is 'SCB1.5' for string combiner 1, string 5.
 - Definitions
 - 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.
 - 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.
 - 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.
 - 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

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:
 - PURPOSE
 - SCOPE
 - Construction scope of work
 - Scope of EHS Plan
 - Management Commitment To EHS Compliance
 - Roles & Responsibilities
 - Designation Of Affected, Authorized, Competent, And Qualified Persons
 - Safety Requirements
 - Activity Hazard Assessment (Aha)
 - Job Safety & Quality Analyses (JSQA), Aka: Pre-Task Plans
 - Safety & Staging Map
 - Jobsite Safety Orientations
 - Chain Of Command
 - Employee Parking
 - Security, Badging, & Site Access
 - Evacuation
 - Accountability / Discipline
 - PPE
 - Training Requirements
 - Inspection/Audit Requirements
 - Injury/Illness Reporting & Investigating
 - Substance Abuse Policies (including drug/alcohol testing)
 - Health & Safety Specific requirements relating to following (items applicable to project only):
 - Aerial Lifts & Elevated Work Platforms
 - Bloodborne Pathogens
 - Confined Space
 - Crane & Rigging
 - Dual Employer
 - Equipment Safety / Operator Qualifications
 - Emergency Medical Services Plan
 - Emergency Action Plan Fall Protection
 - Excavation & Trenching
 - Fire Prevention & Protection
 - Hazardous Communication
 - Heat Illness Prevention
 - Ladder Safety
 - Lone Worker
 - Material Handling
 - Powered Industrial Trucks
 - Respiratory
 - Scaffolding
 - Signs And Barricades
 - Substance Abuse
 - Tools & Equipment
 - Traffic Control
 - Weather
 - Wildfire
 - Environmental Specific requirements relating to the following (as applicable):
 - SWPPP
 - Best Management Practices (Bmp)
 - Spill Prevention Control & Countermeasures
 - Air Pollution
 - Trash And Recycling

HRC rating	Incident energy (cal/cm²)	Arc flash rated clothing	PPE
1	Up to 4		• Hardhat • Safety Glasses
2	Up to 8	• Pants • Long Sleeve Shirt/Jacket	• Hearing protection (ear canal inserts) • Voltage rated rubber insulated gloves • Heavy duty leather gloves • Leather footwear
3	Up to 25	• Coversalls • Face-Shield • Ballacava • Sun Hood	
4	Up to 40		

C. Excavation & Trenching

- No excavation or trench shall be entered without first being inspected (documented) by a competent person excavation & trenching inspector.
 - Excavation & trenching inspections shall be documented and inspected daily and right after a rain event.
 - Access/egress ladders shall be placed no more than every 50' for any excavation/trench greater than 4'.
 - Protection shall be in place from preventing the public or unauthorized persons from entering an excavation/trench.
- D. Fall Prevention & Protection**
- Fall hazards should be eliminated whenever possible.
 - 100% fall protection is required for any work above 6'.
 - All fall prevention & protection equipment shall be OSHA compliant and installation in accordance with manufacturer's requirements.
 - A fall protection competent person shall be onsite overseeing all activities where fall protection is required.
 - All personnel to work at heights above 6' shall be trained in fall prevention and protection.
- E. Hazardous Communications & Substances**
- All materials brought on site that have a Safety Data Sheet (SDS) shall have the material's SDS kept on site and the SDS shall be submitted to REC Solar.
 - All SDSs shall be kept in a location with an organized table of contents that can be used for quick reference in the event of an emergency.
 - No asbestos, lead, or PCB containing material shall be installed or used during the construction of this project.
- F. Scaffolding**
- Scaffolding stair towers shall be used for access/egress of personnel for roof mount projects. Stair treads shall be at minimum 36" wide.
- G. Training**
- Contractor shall ensure that no employee works on site on this project without being properly authorized and trained to perform the work they are assigned to perform.
 - Contractor shall submit to REC Solar training records of personnel to be onsite.
- H. Inspections**
- All personnel should be visually inspecting their work area prior and during their work task for possible hazards.
 - Contractor's supervision shall performed visual inspections at least daily and these inspections shall be noted in contractor's daily log/report.
 - Contractor's supervision shall perform at least weekly a documented jobsite safety inspection using the PROCORE inspection tool inspection template.
 - All issues requiring corrective action identified during any inspection shall be documented in the PROCORE observation tool for corrective action assignment and completion.
 - All issues requiring corrective action discovered during an inspection, shall be corrected in a timely manner.
 - Any issue discovered during an inspection (or at any other time) that poses Immediate Danger to Life and Health (IDLH) of personnel or the public, work shall cease immediately (stop work), and the issue/hazard shall be corrected/abated by a qualified contractor prior to work resuming.
 - REC Solar will perform EHS compliance inspections periodically throughout the build process. Interim inspections are courtesy inspection help contractor meet regulatory and the site's EHS plan compliance. A final safety audit will be performed to determine how well the contractor is compliant with EHS requirements. This final safety audit will be scored and the score will remain as part of the overall contractor scorecard.



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707-463-8609

CLIENT

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

PROJECT

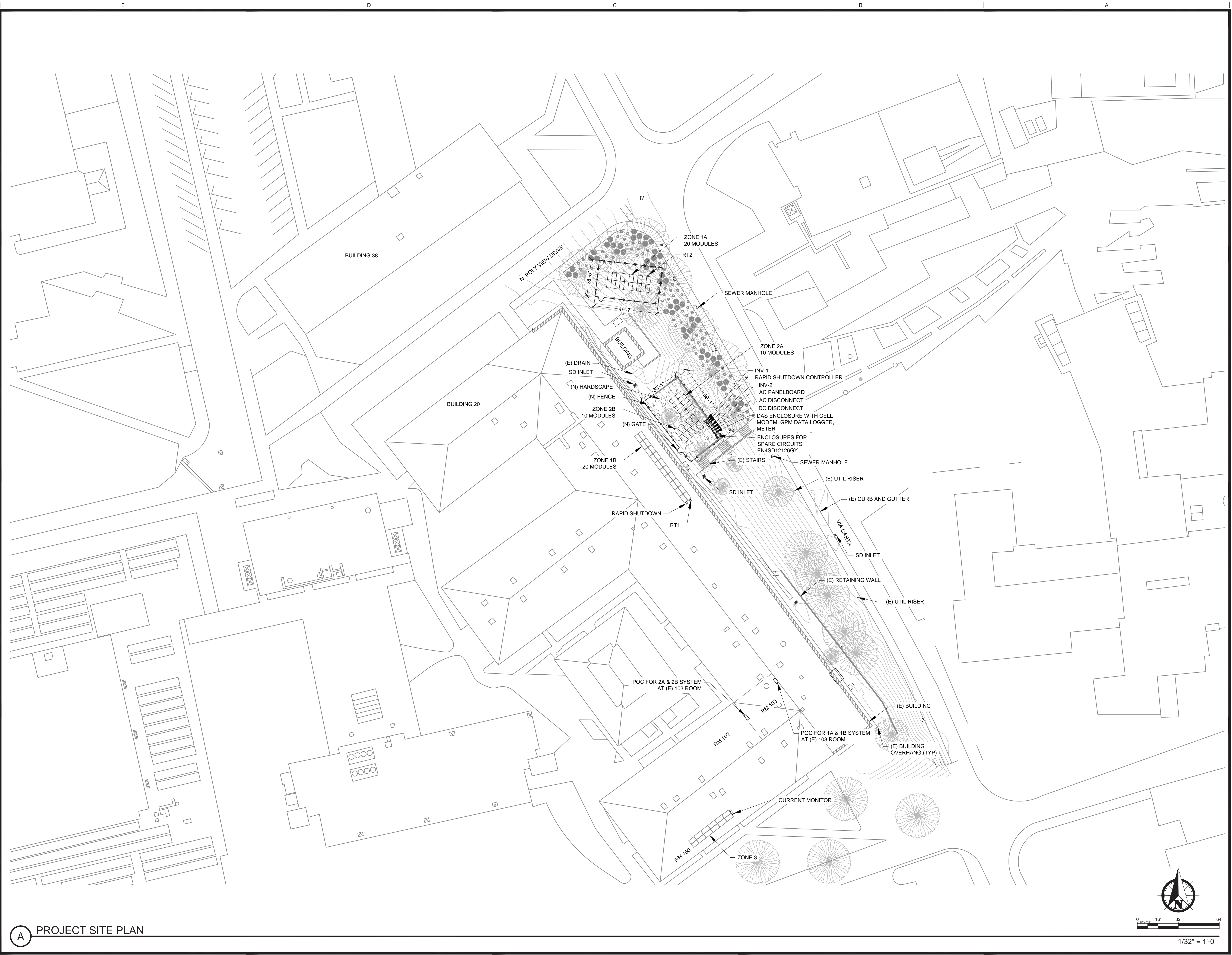
CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93407

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

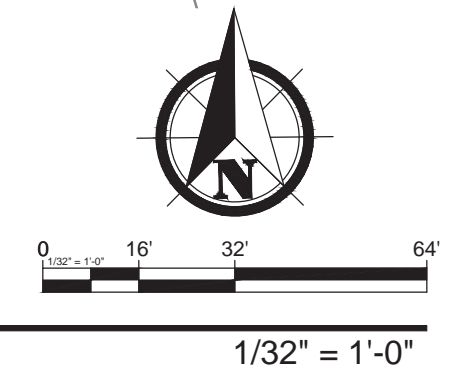
DATE	10/26/2018
PROJECT NUMBER	30250901
PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERIM ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT
SHEET TITLE
GENERAL NOTES, SYMBOLS & ABBREVIATIONS

SHEET NUMBER
G201



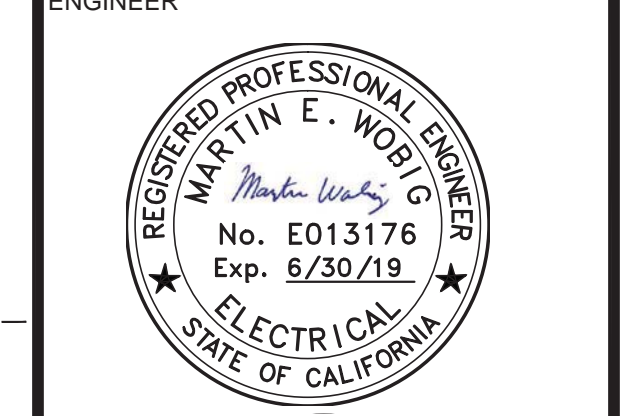
A PROJECT SITE PLAN



CONTRACTOR
CA - B C10 #990001

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3450 BROAD ST, SUITE 105
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CHECKED BY	JESSICA KENDRICK

PERMIT

SHEET TITLE
PROJECT SITE PLAN

SHEET NUMBER
G301

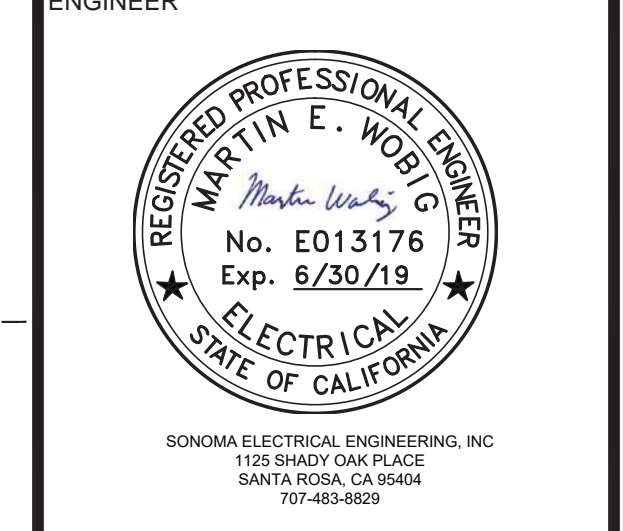
N. POLY VIEW DRIVE

LEGEND:

SYMBOL	DESCRIPTION
---	ELECTRIC CONDUIT
---	STRINGING LINE
⊕	POSITIVE SYMBOL
⊖	NEGATIVE SYMBOL

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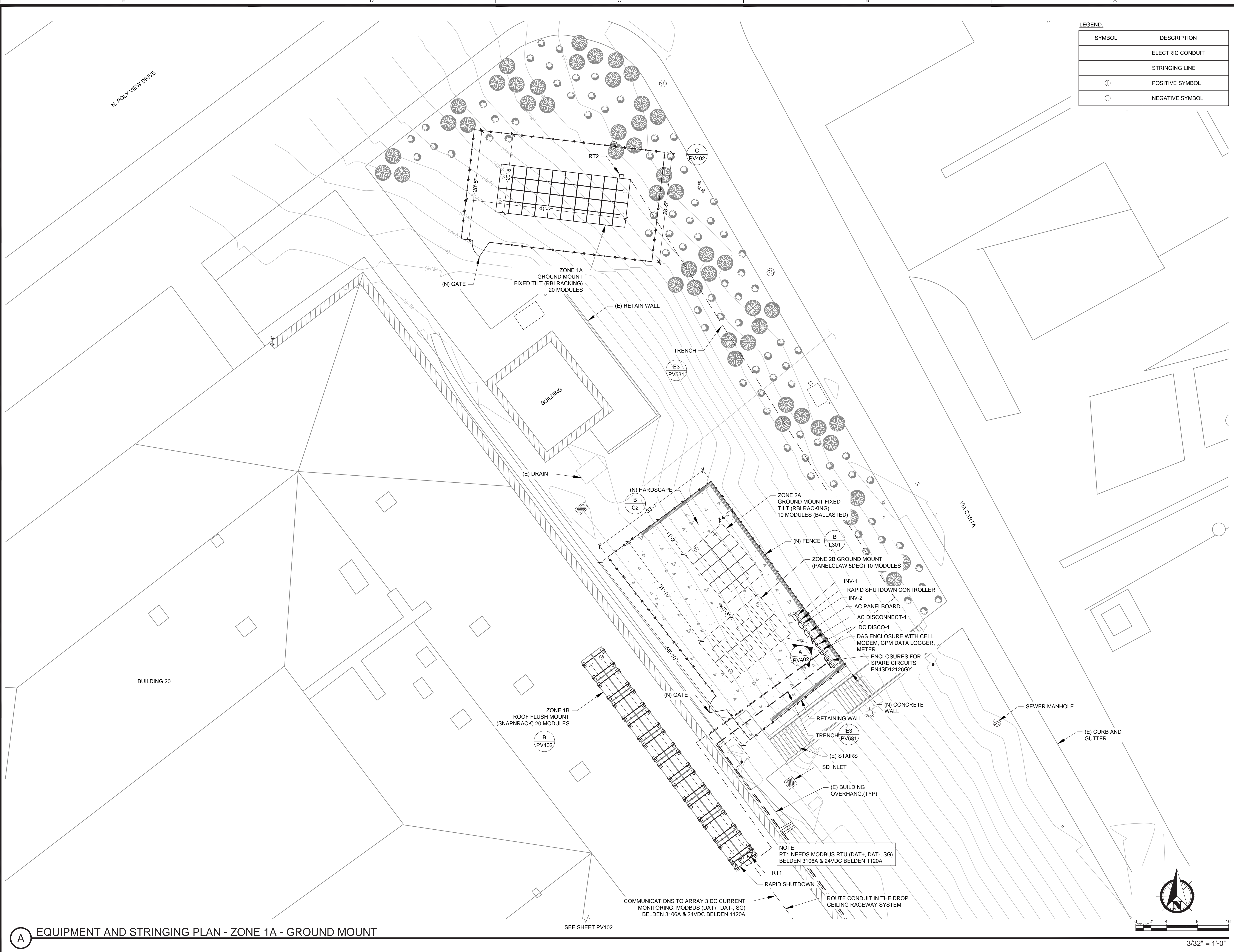
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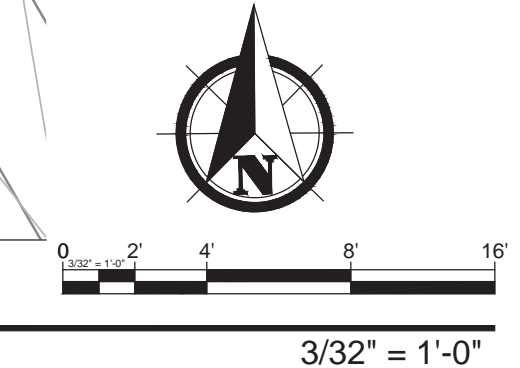
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INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT
 SHEET TITLE
 EQUIPMENT AND STRINGING PLAN - ZONE 1A, 1B, 2A, 2B
 SHEET NUMBER
PV101



NOTE:
 RT1 NEEDS MODBUS RTU (DAT+, DAT-, SG)
 BELDEN 3106A & 24VDC BELDEN 1120A

COMMUNICATIONS TO ARRAY 3 DC CURRENT MONITORING. MODBUS (DAT+, DAT-, SG) BELDEN 3106A & 24VDC BELDEN 1120A

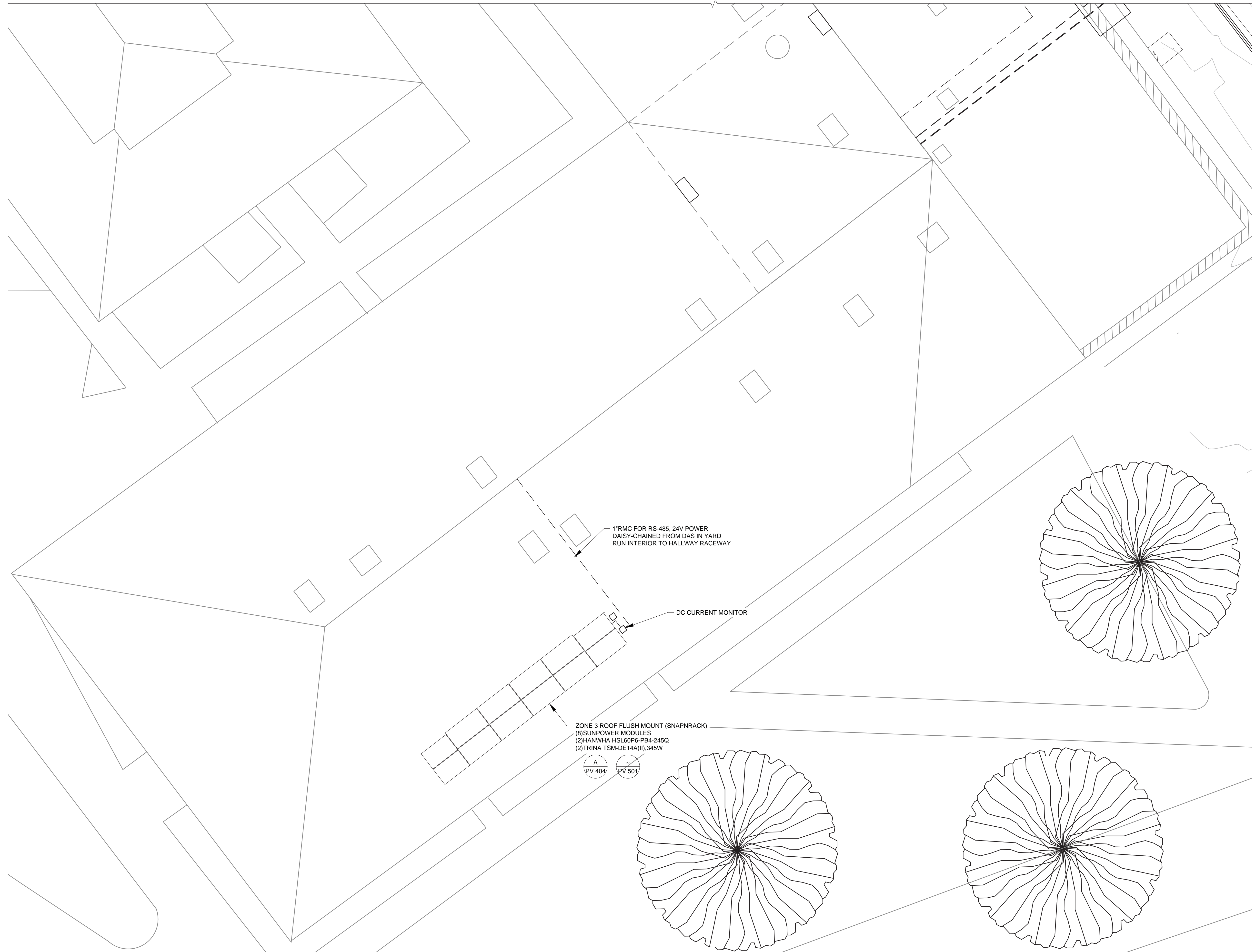


A EQUIPMENT AND STRINGING PLAN - ZONE 1A - GROUND MOUNT

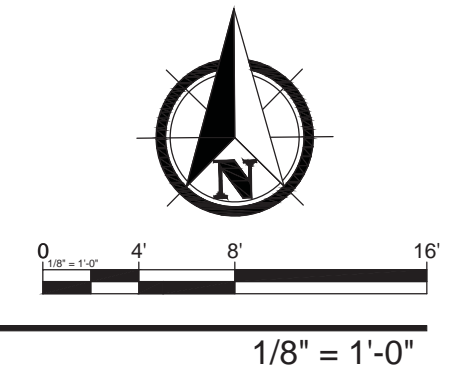
SEE SHEET PV102

3/32" = 1'-0"

SEE SHEET PV101



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



A EQUIPMENT PLAN - ZONE 3 - DC ROOF MOUNT



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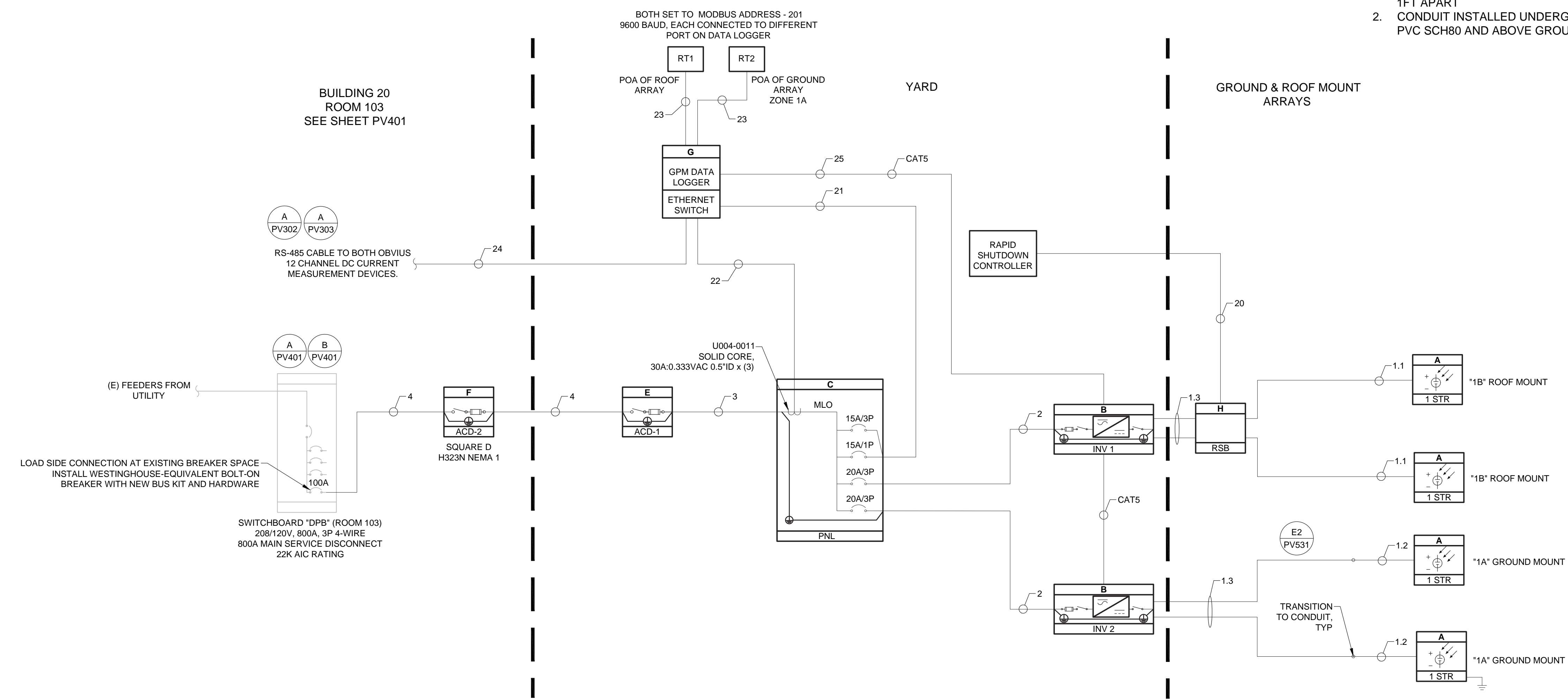
PERMIT

SHEET TITLE
EQUIPMENT PLAN - ZONE 3 - DC ROOF MOUNT

SHEET NUMBER
PV102



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

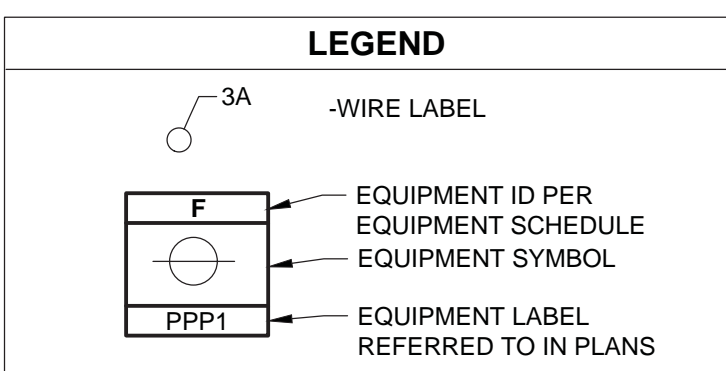


SYSTEM SPECIFICATIONS	
PV SYSTEM SIZE (DC)	13.8 kW
PV SYSTEM SIZE (AC)	10 kW
PV MODULE QTY	40
MODULES PER STRING	10
STRING VOLTAGE @ MAX TEMP	503.57 V
STRING SHORT CIRCUIT MAX	9.5 A
ASHRAE HIGH 2%	31.00
DC VOLTAGE	600 V
P.O.C. VOLTAGE	208 V
PV SYSTEM VOLTAGE DROP (LONGEST HOMERUN)	4.54%

EQUIPMENT SCHEDULE							
ID	TYPE	MANUFACTURER	MODEL	QUANTITY	VOLTAGE AND CURRENT RATING	OC PD	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) #1/0 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%

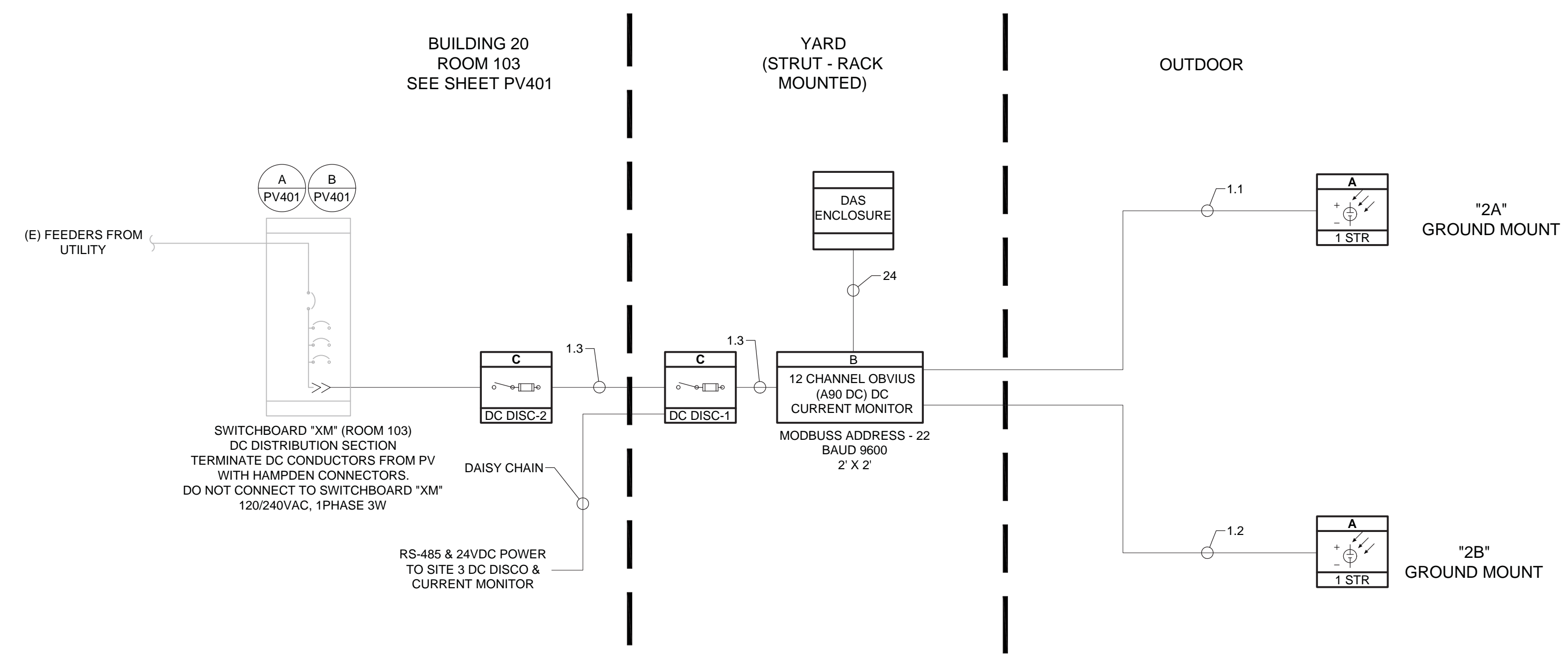
CONDUIT AND WIRE SCHEDULE - MONITORING				
CIRCUIT SEGMENT	CONDUIT	WIRE / CABLE	SPECIFICATION	NOTES
20	1/2" PVC SCHED 40	(5) 18AWG CU WIRE		RAPID SHUTDOWN BOX TO RAPID SHUTDOWN CONTROLLER
21	1" PVC SCHED 40	(1) WHITE & BLACK 12AWG FOR SINGLE POLE 15AMP TO DAS POWER SUPPLY. (2) BLACK, RED, BLUE & WHITE 12AWG FROM 15AMP 3 POLE TO METER REFERENCE VOLTAGES.		MON-1 POWER & PT CABLES
22	1" PVC SCHED 40	(3) PAIRS OF FACTORY CT WIRES.	LEADS ARE 8" IN LENGTH	KEEP CONDUIT AS SHORT AS POSSIBLE TO AVOID HAVING IN EXTEND WIRES, WHILE STILL KEEPING ENCLOSURE PENETRATION LOW.
23		RT1 CABLE CONTAINS RS-485 & 24VDC	FACTORY LEADS LENGTH IS 60'	DAT+ DAT- POWER SUPPLY + POWER SUPPLY - GROUND
24	1" PVC SCHED 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
25	1" PVC SCHED 40	CAT5	CAT5	



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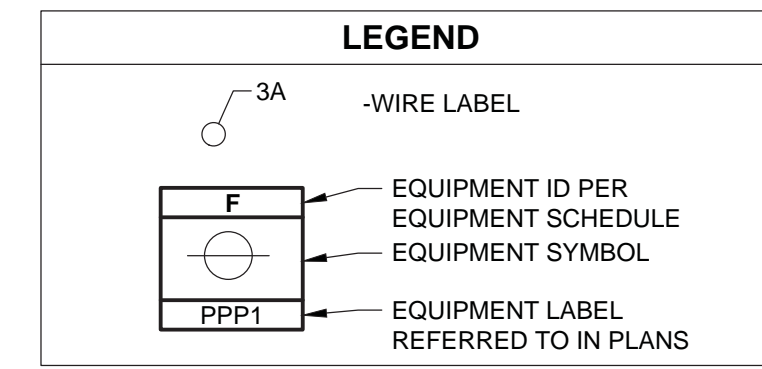
NOTE:
 1. AC AND DC CONDUITOR TO BE SEPERATED MIN 1FT APART
 2. CONDUIT INSTALLED UNDERGROUND SHALL BE PVC SCH80 AND ABOVE GROUND SHALL BE RMC.



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	F2SK32-1-4XP	2	-	32A	
D	ENCLOSURES	HAMMOND	EN4SD12126GY	6	-	-	

CIRCUIT SEGMENT	CONDUIT	CONDUCTOR (per conduit)	NEUTRAL (per conduit)	GROUND (per conduit)	CIRCUIT TEMP. RATING	CALCULATED MIN. CIRCUIT AMPACITY (A) (per conductor)	NOTES
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	RBI RACKING
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	PANELCLAW RACKING
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	DC PANELBOARD TO (N) HAMPDEN CONNECTORS 2 STRINGS IN SAME 1" CONDUIT

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





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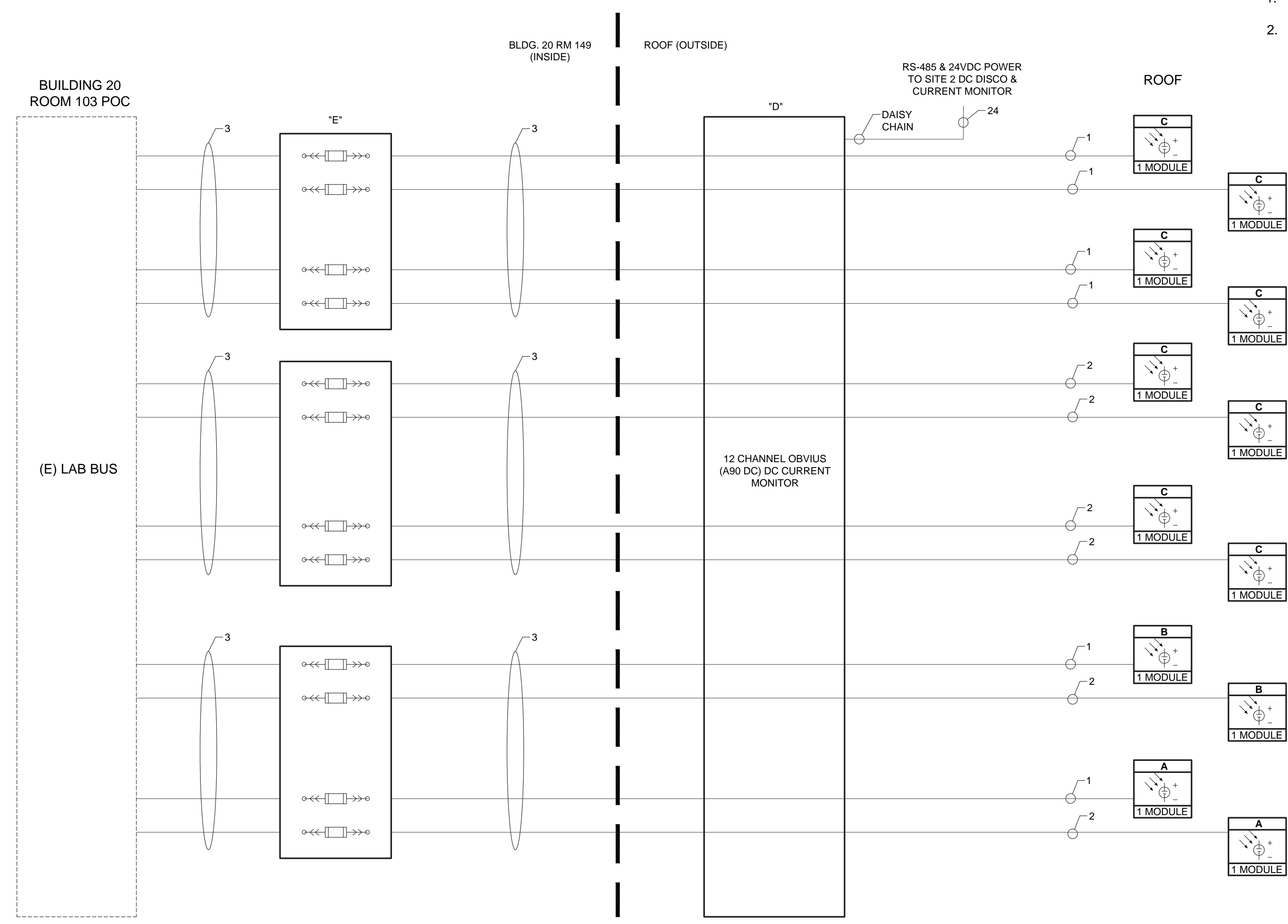
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PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT

SHEET TITLE
SINGLE LINE DIAGRAM - ZONE 3 - DC ARRAY

SHEET NUMBER
PV303

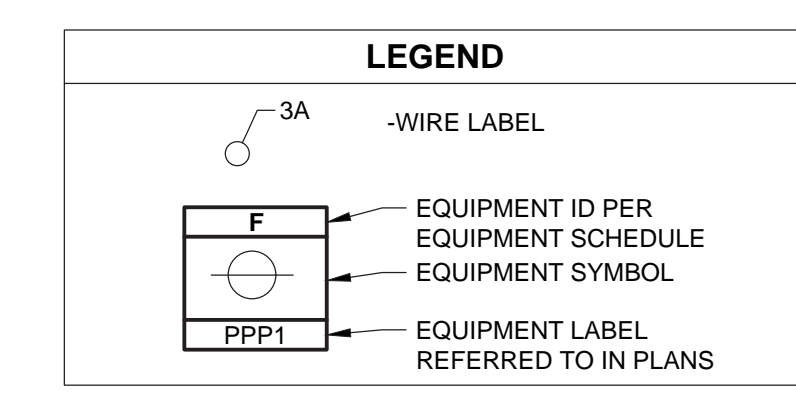
- NOTE:
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 - CONDUIT INSTALLED UNDERGROUND SHALL BE PVC SCH80 AND ABOVE GROUND SHALL BE RMC.

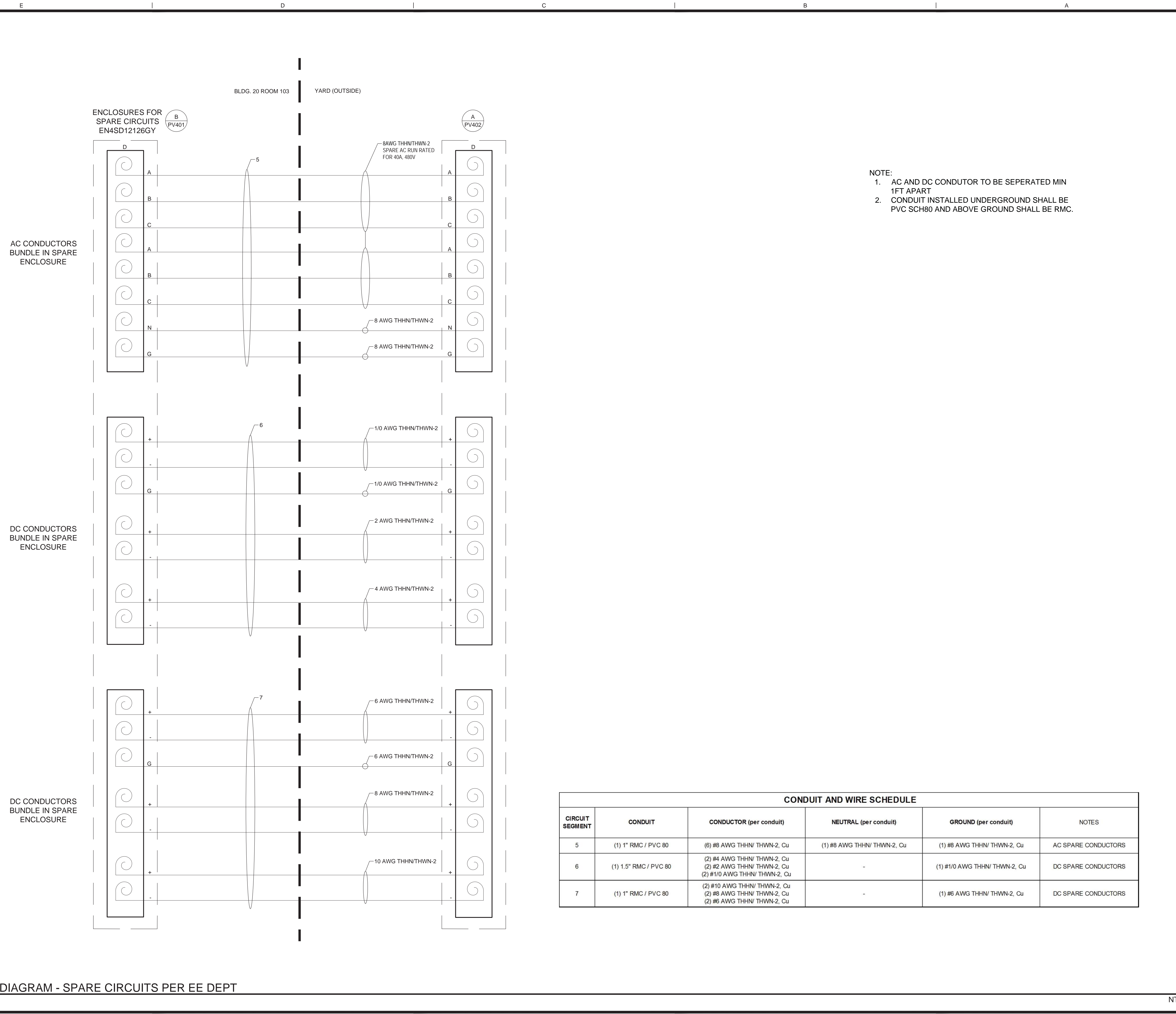


EQUIPMENT SCHEDULE							
ID	TYPE	MANUFACTURER	MODEL	QUANTITY	VOLTAGE AND CURRENT RATING	OCPD	NOTES
A	PV MODULE	TRINA	TSM-345DE14A (II)	2	46.7V 9.5A	15A	MODULE LEAD / HOMERUN TO DC DISCONNECT , 72 CELL
B	PV MODULE	HANWHA	HSL60P6-PB-4-245Q	2	37.2V 8.8A	15A	MODULE LEAD / HOMERUN TO DC DISCONNECT , 60 CELL
C	PV MODULE	SUNPOWER	SPR-E20-435-COM	8	85.6V 6.43A	15A	MODULE LEAD / HOMERUN TO DC DISCONNECT , 72 CELL
D	CURRENT MONITORING ENCLOSURE	ELECTRO DESIGN	CUSTOM	1	600V 15A	15A	
E	DC DISCONNECT - 2	SOLARBOS	F4SK32-1-4XP	3	1000V 32A		

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
1		(2) #8 AWG THHN/ THWN-2 ,Cu	--	--	--	14.84	75.00	
2		(2) #8 AWG THHN/ THWN-2 ,Cu	--	--	--	14.84	55.00	
3	(1) 1.5" RMC	(8) #8 AWG THHN/ THWN-2 ,Cu	--	MODULE FRAME GROUNDED THROUGH RACKING	90degC	--	75.00	
4	(1) 1.5" RMC	(8) #8 AWG THHN/ THWN-2 ,Cu	--	MODULE FRAME GROUNDED THROUGH RACKING	90degC	--	55.00	
5	(1) 1.5" RMC	(4) #8 AWG, (4) #6 AWG THHN/ THWN-2 ,Cu	--	MODULE FRAME GROUNDED THROUGH RACKING	90degC	--	75.00	

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 CONDUCTOR 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) #1/0 AWG THHN/ THWN-2, Cu	-	(1) #1/0 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

A THREE LINE DIAGRAM - SPARE CIRCUITS PER EE DEPT

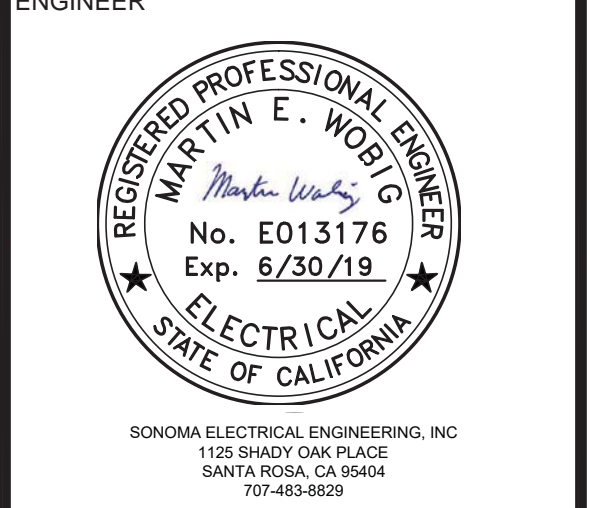
NTS



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PROJECT ENGINEER THOMAS CEMO

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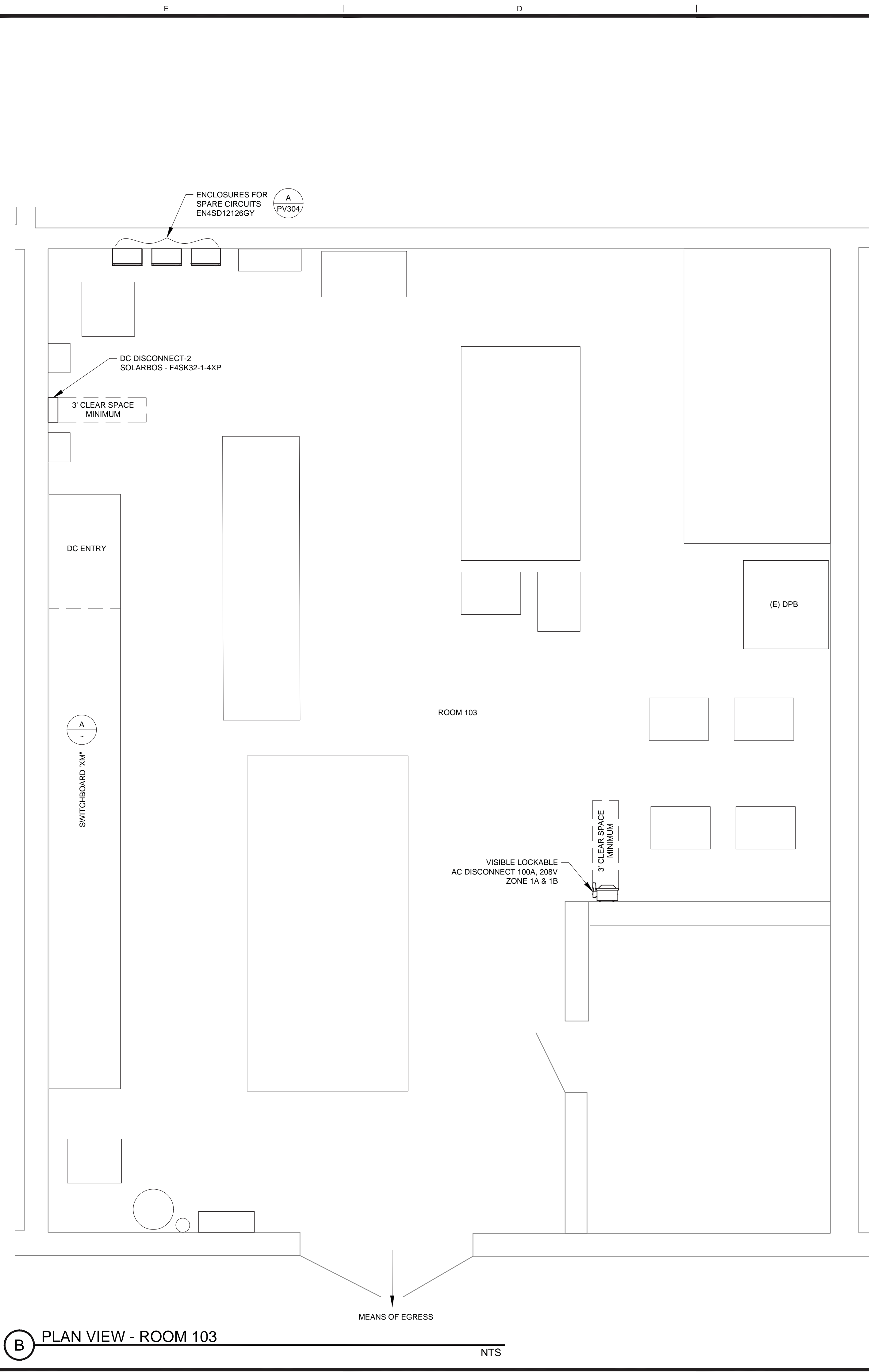
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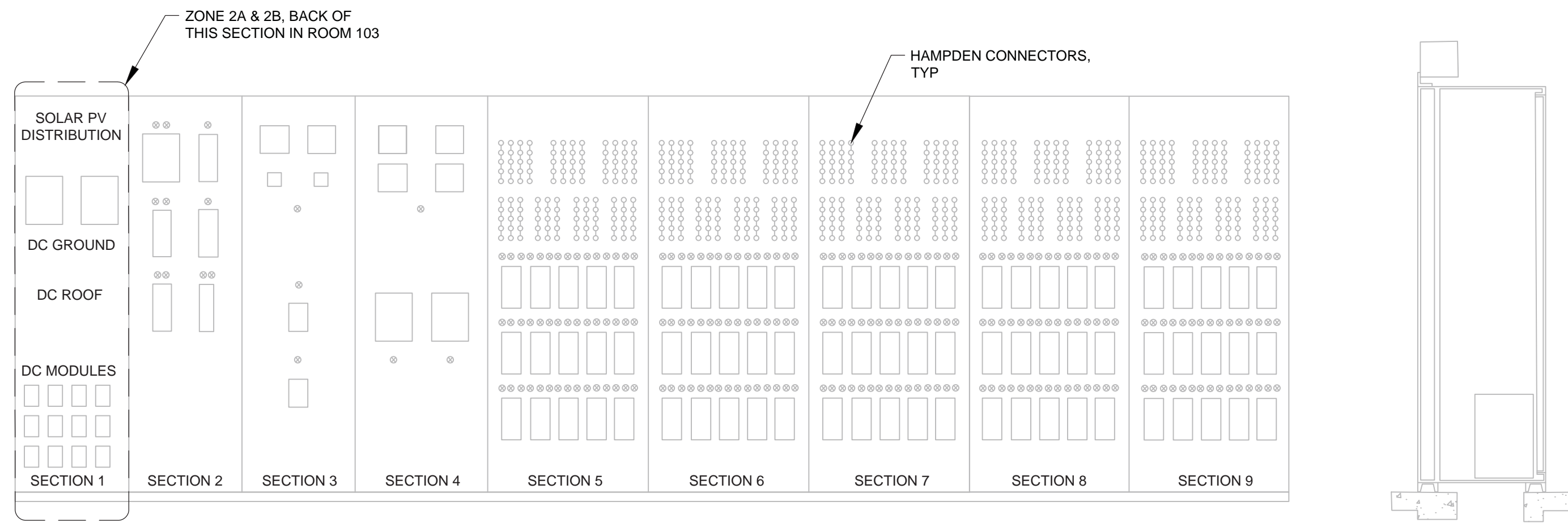
THREE LINE DIAGRAM - SPARE CIRCUITS PER EE DEPT

SHEET NUMBER

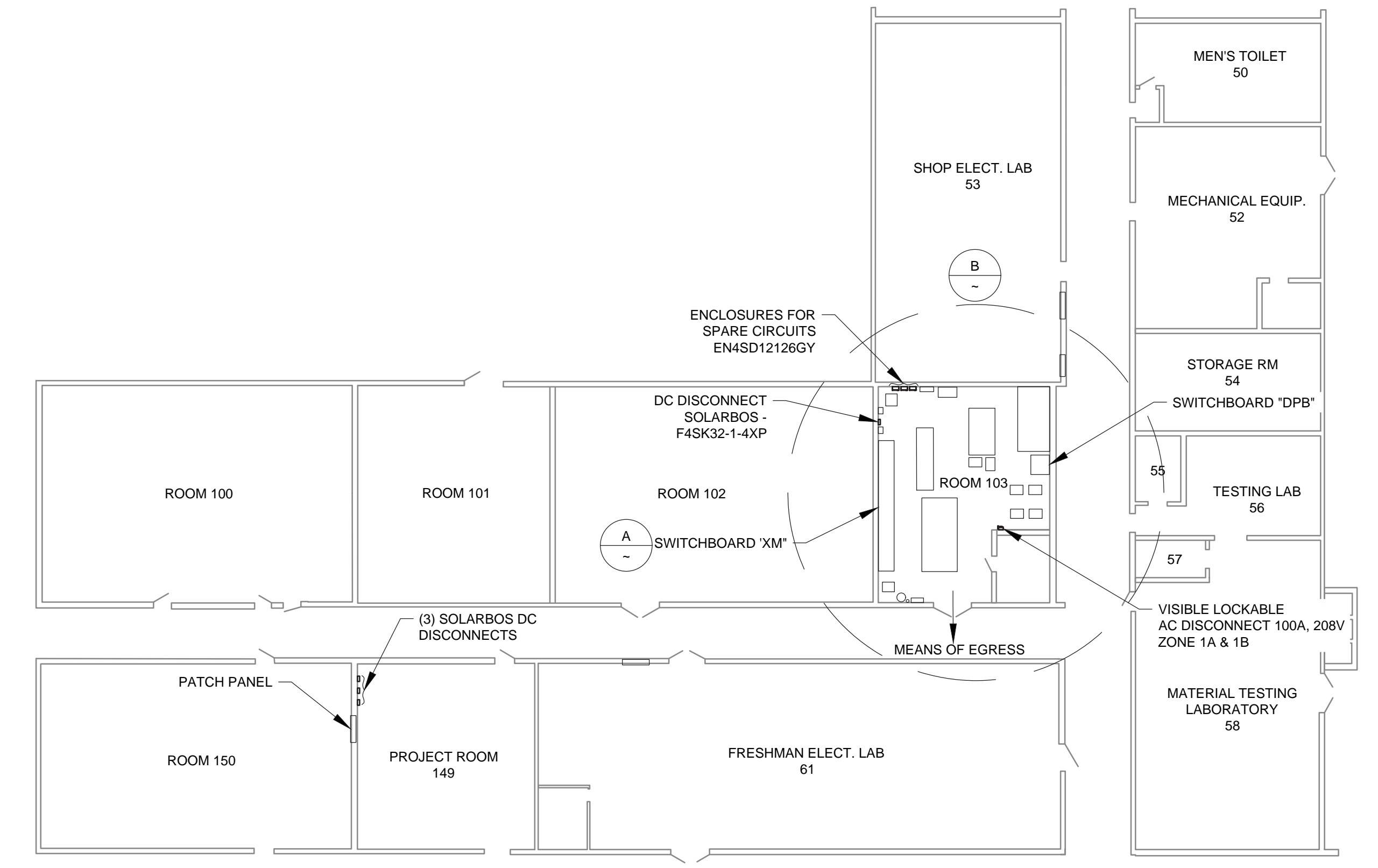
PV304



(B) PLAN VIEW - ROOM 103 NTS



(A) MAIN CONTROL AND DISTRIBUTION SWITCHBOARD XM NTS

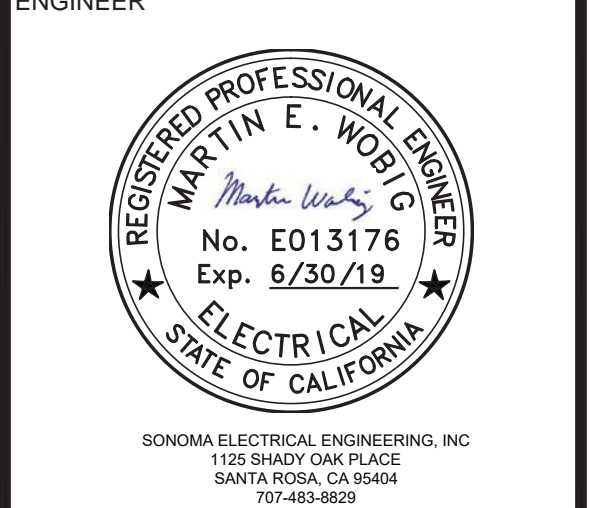


(C) POINT OF CONNECTION PLAN - BUILDING 20 ROOM 103 NTS



CONTRACTOR
 CA - B C10 #990001
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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
PERMIT
 SHEET TITLE
 POINT OF CONNECTION PLAN - BUILDING 20 ROOM 103
 SHEET NUMBER
PV401

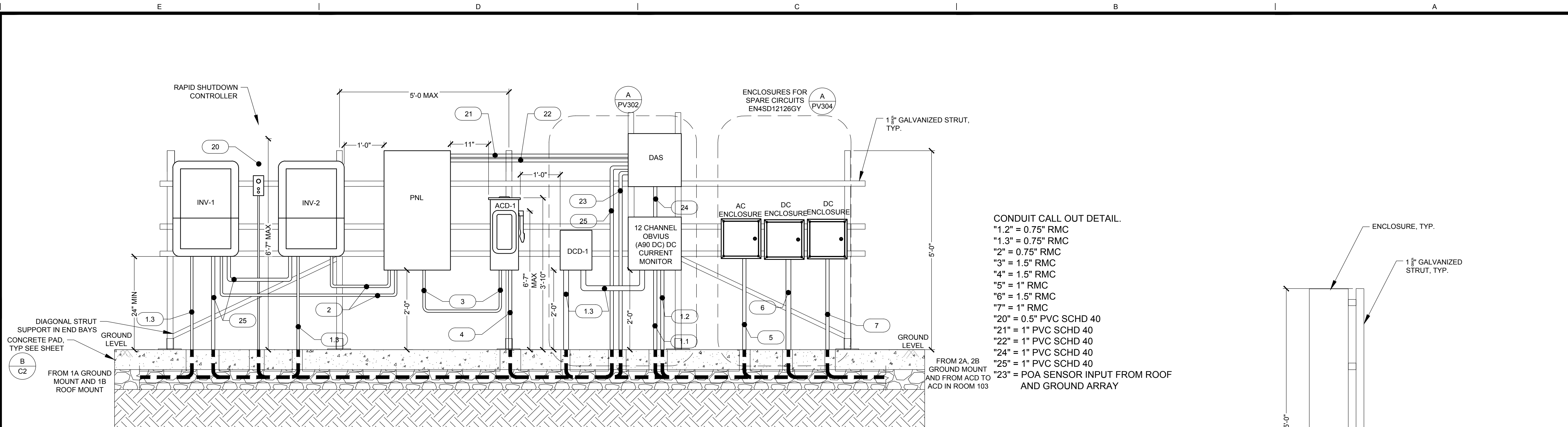
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5	07/12/2018	FENCE ADDED
4	06/19/2018	PLAN CHECK COMMENTS
3	04/20/2018	PERMIT SET
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0	11/08/2017	INITIAL SUBMITTAL

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PROJECT MANAGER	KIM STRICKLAND
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CHECKED BY	JESSICA KENDRICK

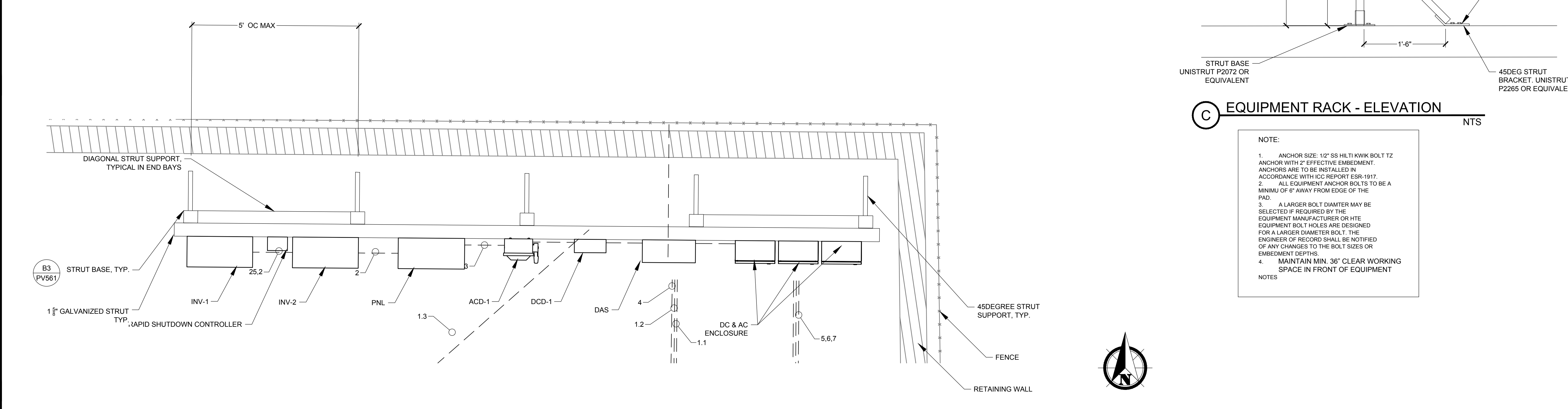
PERMIT

SHEET TITLE
EQUIPMENT ELEVATION

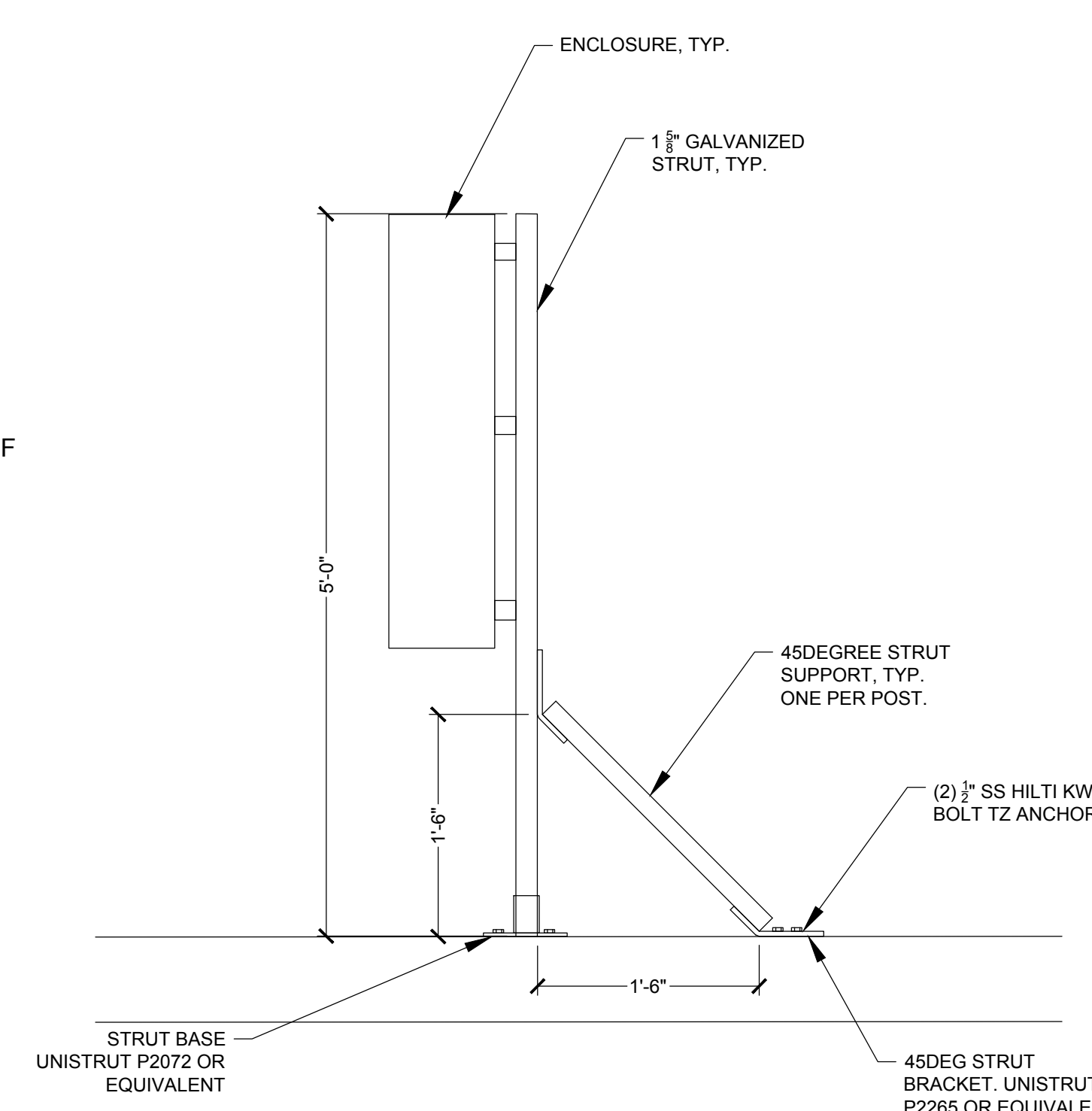
SHEET NUMBER
PV402



A EQUIPMENT ELEVATION 3/4" = 1'-0"

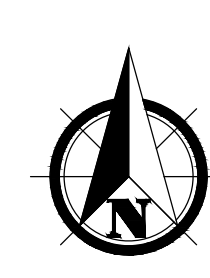


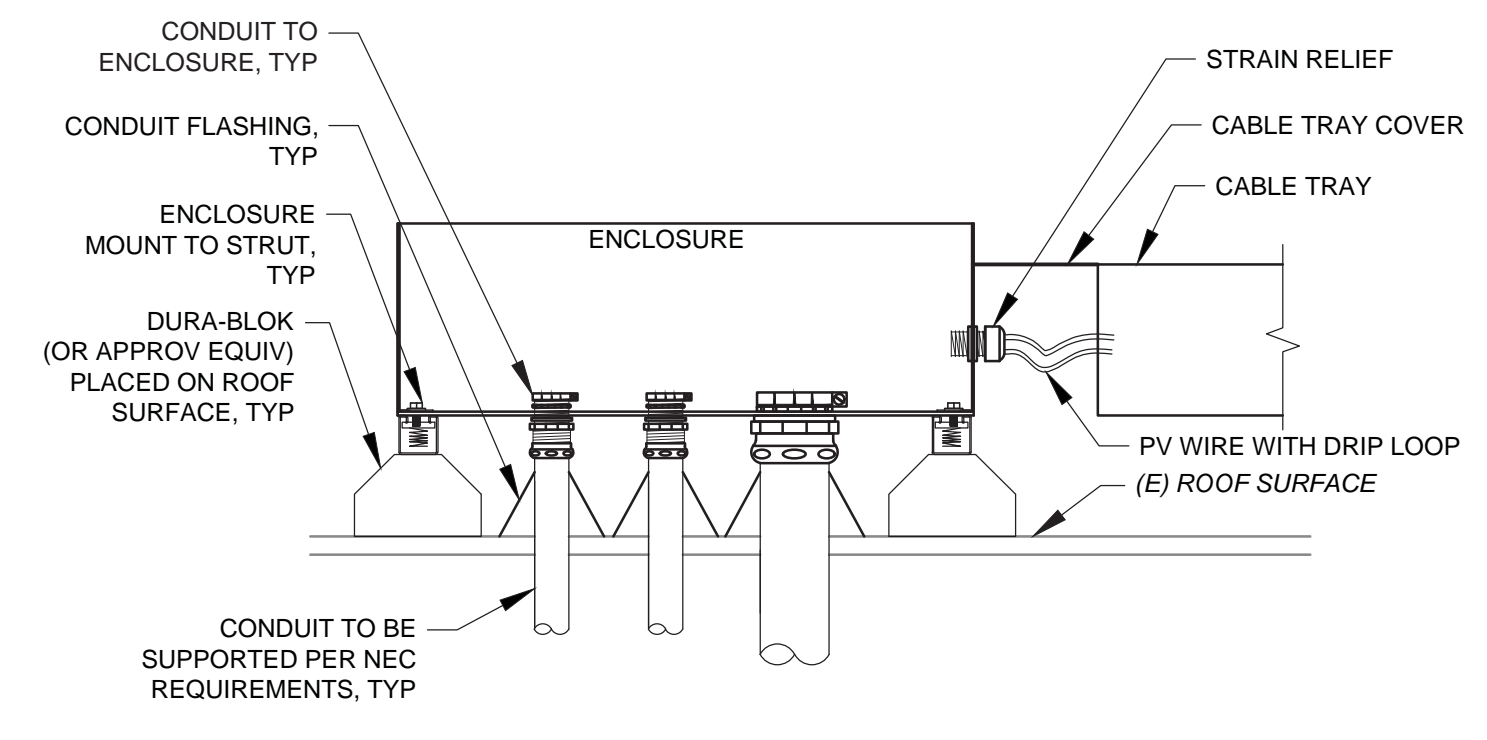
B EQUIPMENT RACK - PLAN VIEW NTS



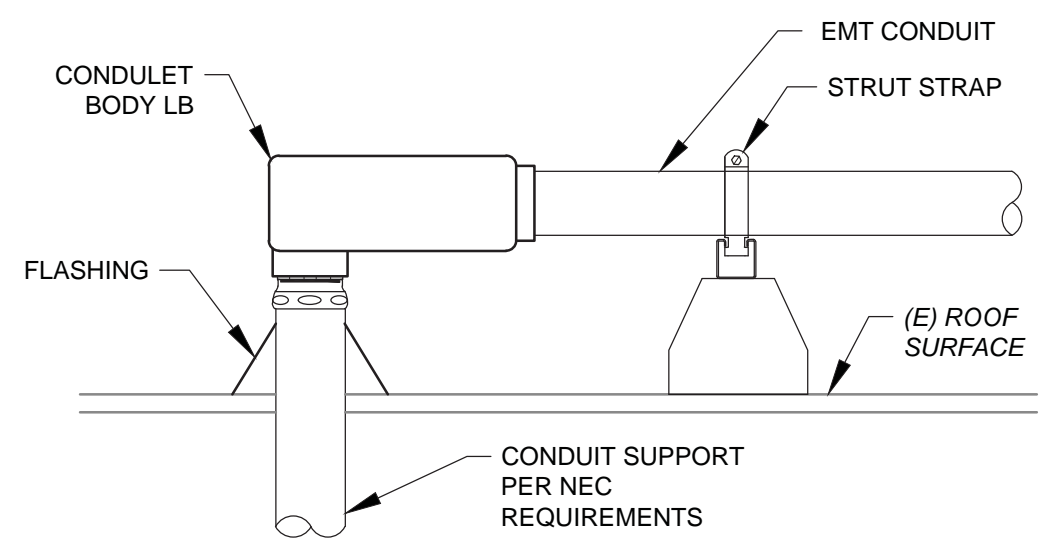
C EQUIPMENT RACK - ELEVATION NTS

- NOTE:
- ANCHOR SIZE: 1/2" SS HILTI KWIK BOLT TZ ANCHOR WITH 2" EFFECTIVE EMBEDMENT. ANCHORS ARE TO BE INSTALLED IN ACCORDANCE WITH ICC REPORT ESR-1917.
 - ALL EQUIPMENT ANCHOR BOLTS TO BE A MINIMUM OF 6" AWAY FROM EDGE OF THE PAD.
 - A LARGER BOLT DIAMETER MAY BE SELECTED IF REQUIRED BY THE EQUIPMENT MANUFACTURER OR HTE. EQUIPMENT BOLT HOLES ARE DESIGNED FOR A LARGER DIAMETER BOLT. THE ENGINEER OF RECORD SHALL BE NOTIFIED OF ANY CHANGES TO THE BOLT SIZES OR EMBEDMENT DEPTHS.
 - MAINTAIN MIN. 36" CLEAR WORKING SPACE IN FRONT OF EQUIPMENT





C1 CONDUIT THRU ROOF - ENCLOSURE
CONDUIT NTS



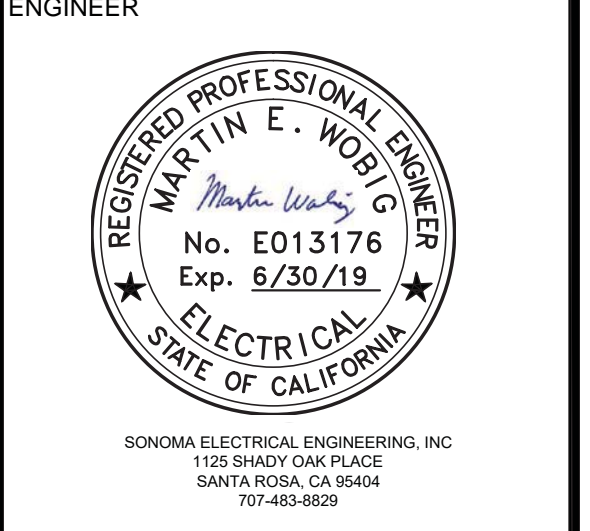
D2 CONDUIT THRU ROOF - CONDULET
ROOF MOUNT NTS



CONTRACTOR
CA - B C10 #990001

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(844) REC SOLAR

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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

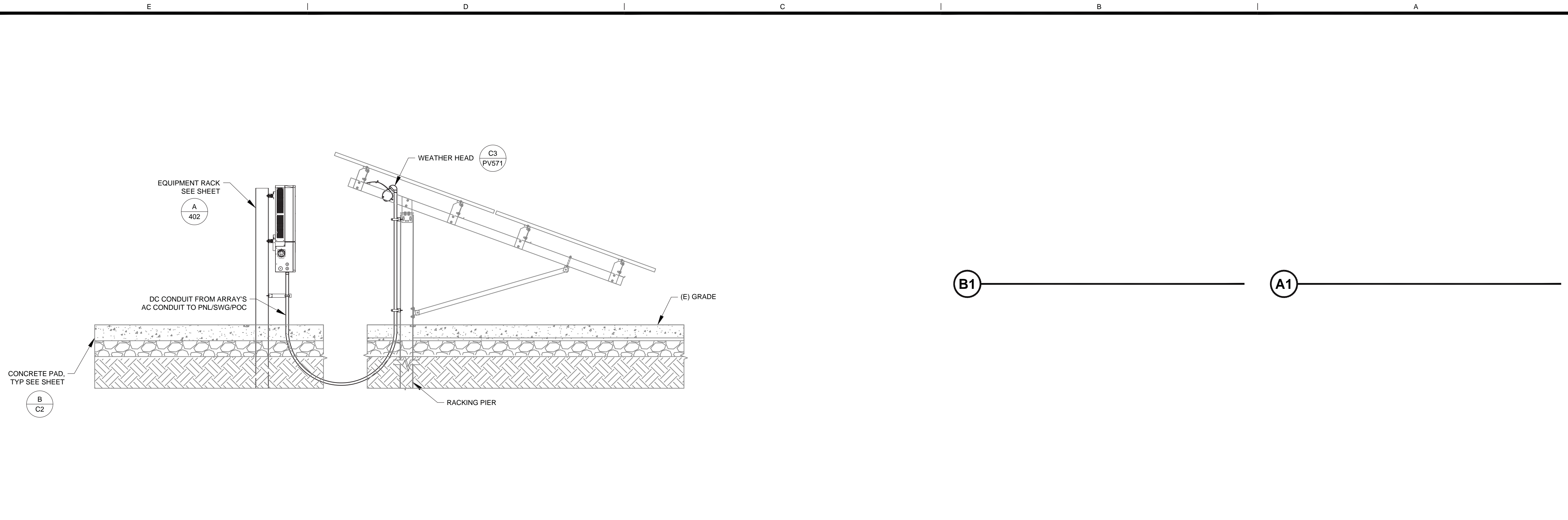
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INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT

SHEET TITLE
ROOF MOUNT DETAILS

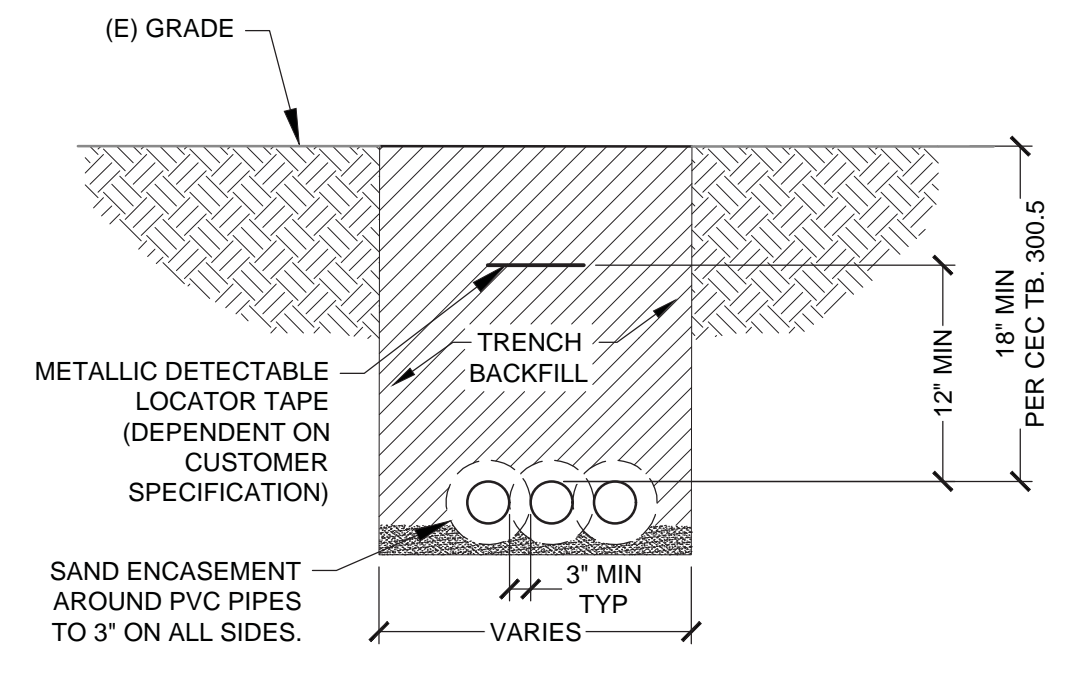
SHEET NUMBER
PV521



- NOTE:
1. WORKING SPACE HEIGHT CLEARANCE: NEC 2011, 6'-0" MIN CLEAR, NEC 2014, 6'-7" MIN CLEAR FOR EQUIPMENT
 2. SUPPORT CONDUIT ON GROUND MOUNT RACKING, AS NEEDED

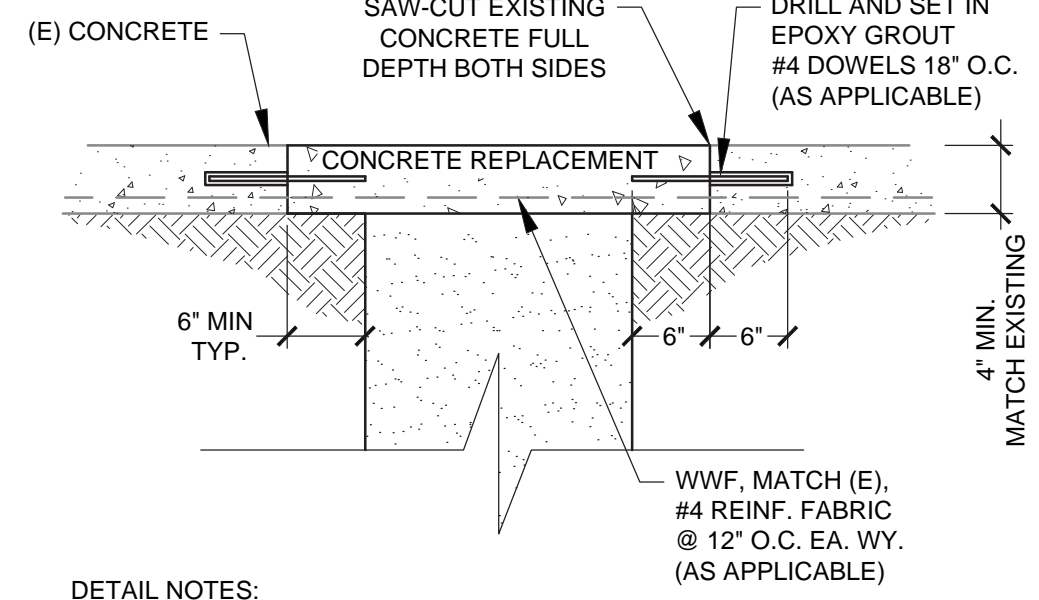
E2 DC WIRE MANAGEMENT & CONDUIT ROUTING - GROUND MOUNT

GROUND MOUNT NTS



E3 DIRT BACKFILL

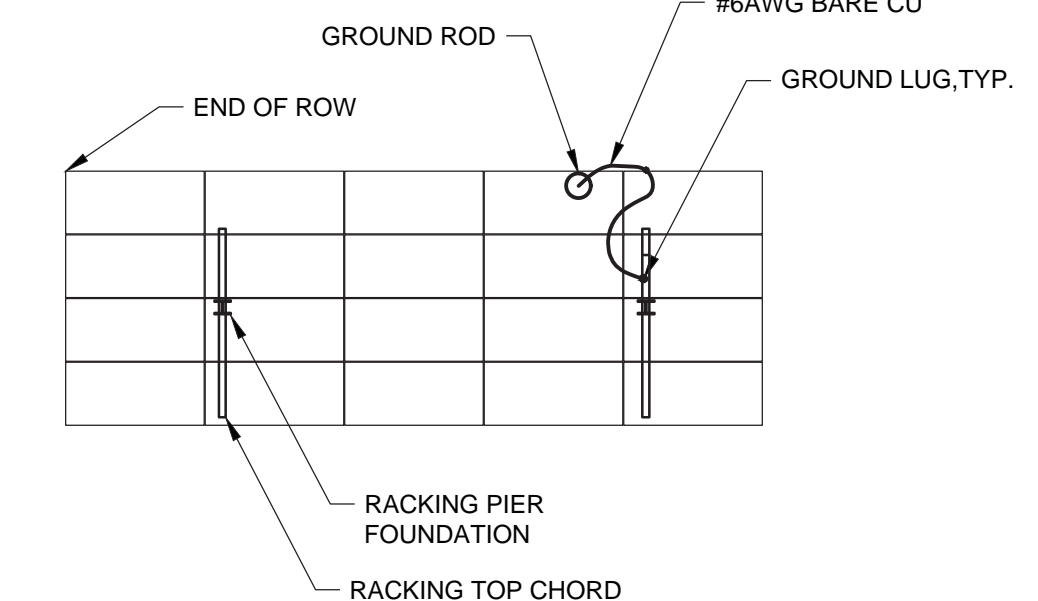
TRENCH NTS



- DETAIL NOTES:
- 1) DOWELS REQUIRED IN TRAFFIC AREAS ONLY
 - 2) DRILLED HOLES TO BE BOTTLE-BRUSHED CLEAN AND BLOWN TO REMOVE DRILLING DUST
 - 3) INSTALL WELDED WIRE FABRIC AS NEEDED, PER SITE SPECIFIC REQUIREMENTS

D3 CONCRETE REPAIR

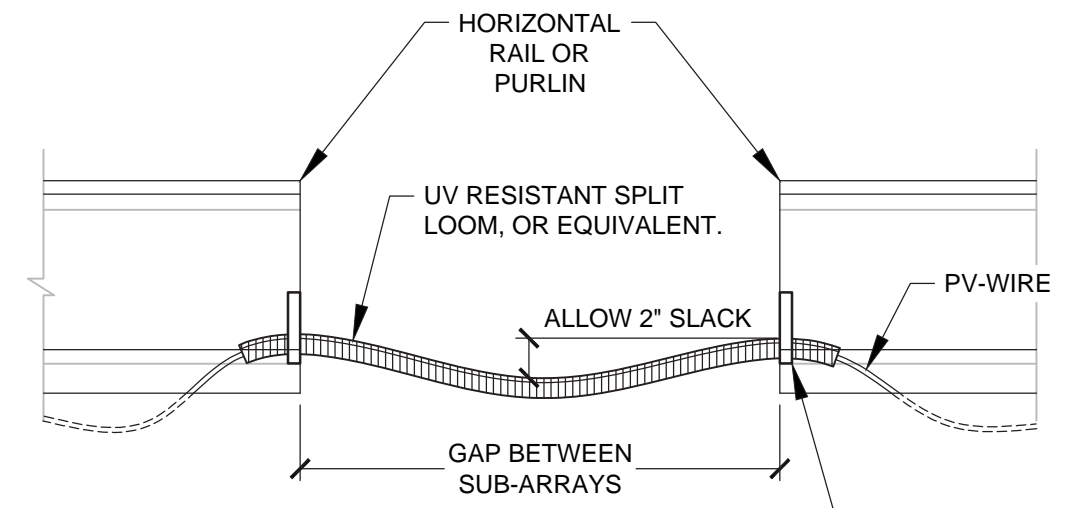
TRENCH NTS



- NOTE:
1. EACH ROW HAS (1) SYSTEM GROUND (EGG) THAT CONNECTS ONCE TO EACH CONTIGUOUS SUB-ARRAY WITH GROUND LUG.
 2. INSTALL (1) GROUND ROD PER ROW 5/8"x8" CU.
 3. WHEN PROPERLY TORQUED, THE FASTENERS ENSURE THAT THE ENTIRE STRUCTURE IS BONDED AND THEREFORE ONLY ONE SYSTEM GROUND IS REQUIRED PER CONTIGUOUS ROW OF ARRAYS.

C3 SYSTEM GROUNDING SCHEME - GROUND MOUNT ZONE 1A

GROUND MOUNT NTS



A3 PV WIRE ACROSS RACKING GAP

NTS

E4

D4

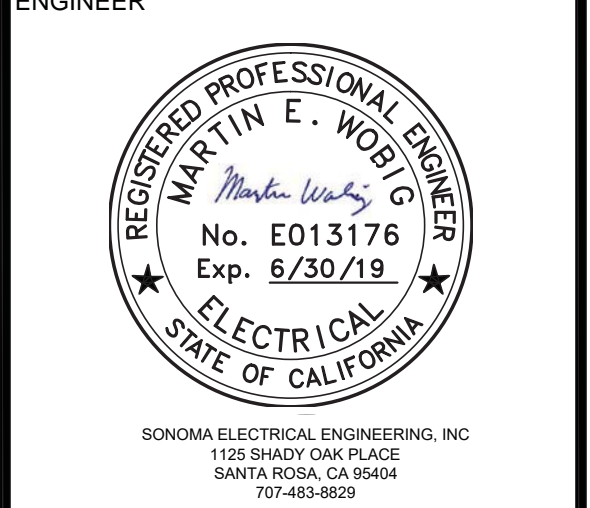
A4



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CALIFORNIA POLYTECHNIC STATE UNIVERSITY
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SAN LUIS OBISPO, CA 93407

PROJECT

CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93407

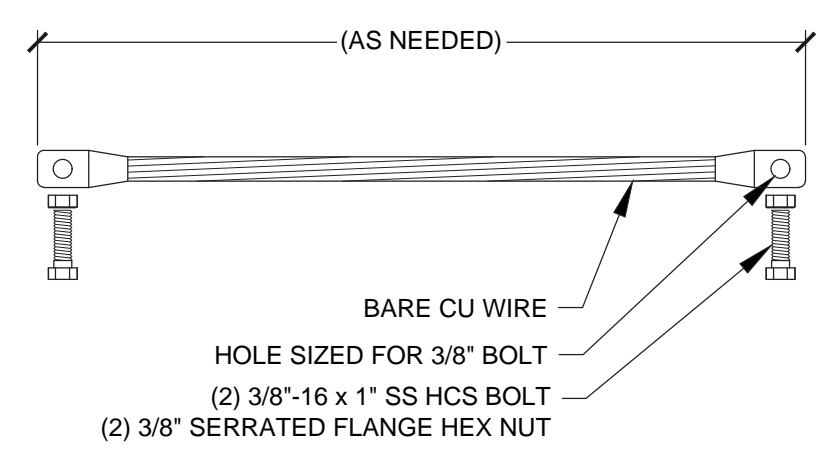
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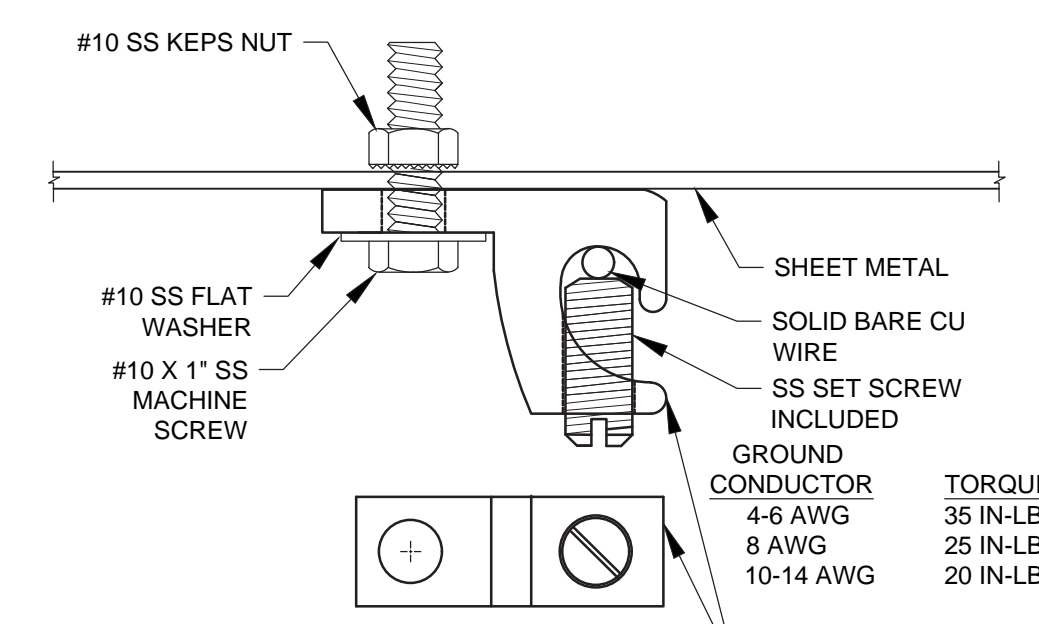
PERMIT

SHEET TITLE
GROUND MOUNT/TRENCH DETAILS

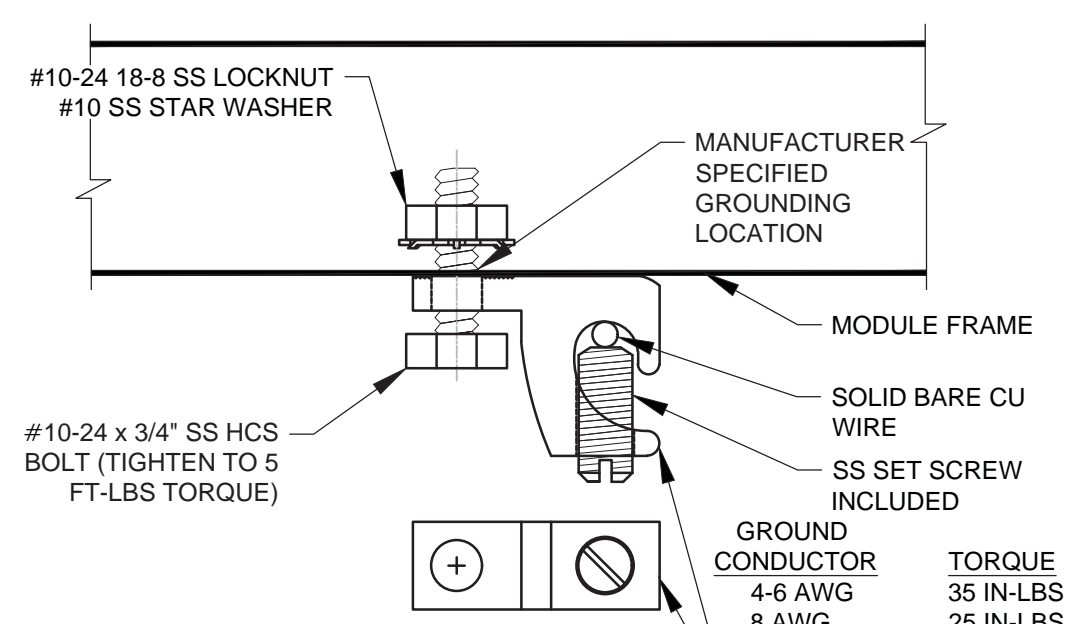
SHEET NUMBER
PV531



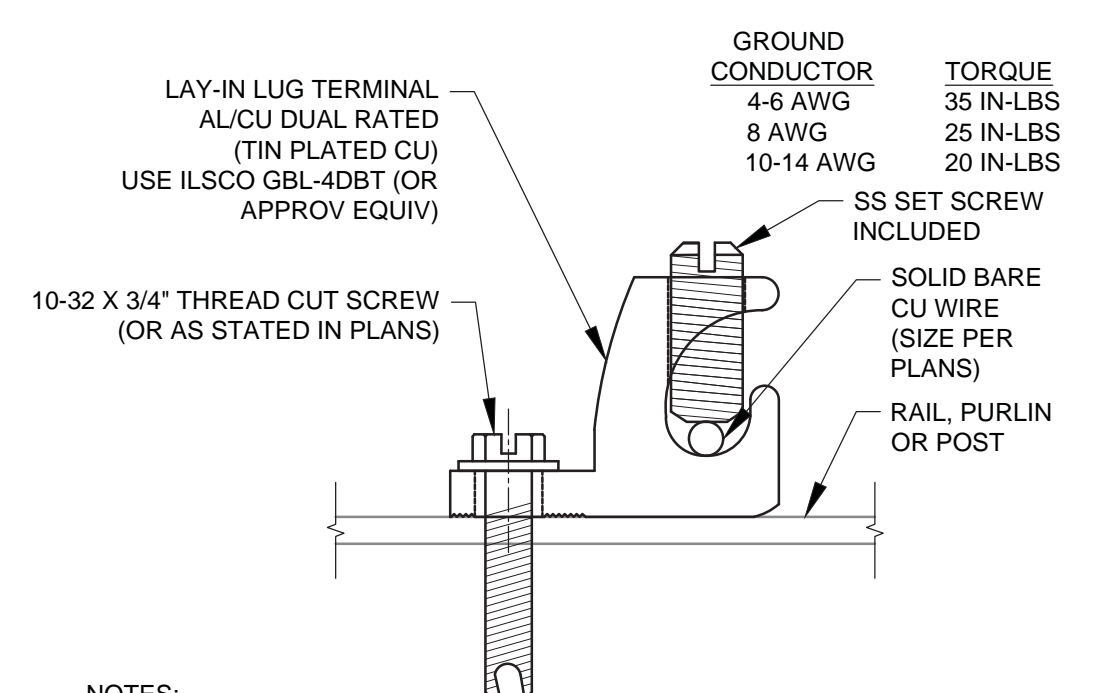
E1 BONDING JUMPER
GROUNDING NTS



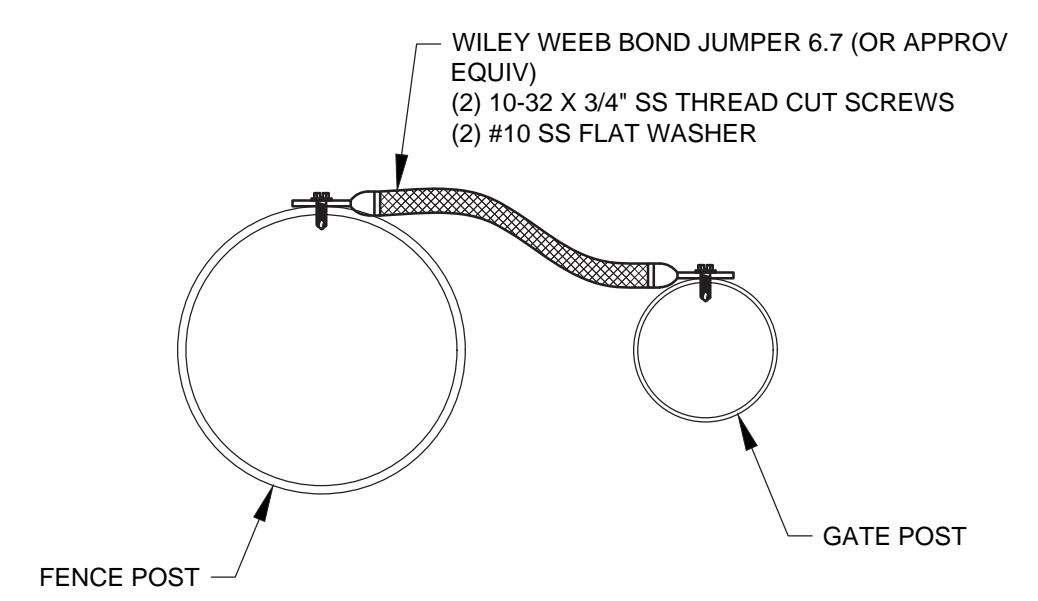
C1 SHEET METAL GROUND
GROUNDING NTS



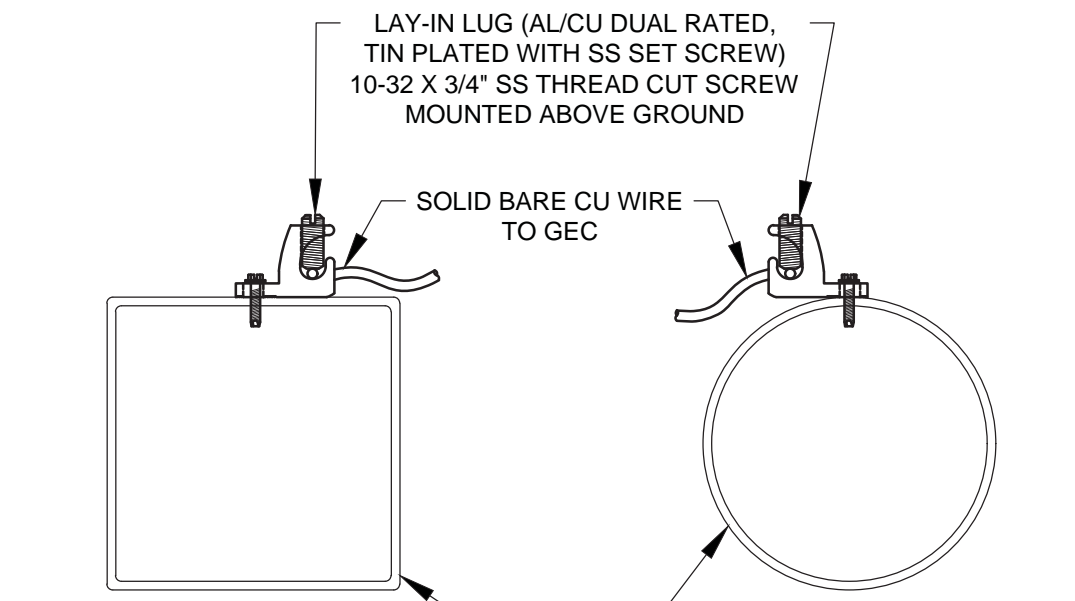
B1 MODULE
GROUNDING NTS



A1 LAY-IN LUG
GROUNDING NTS



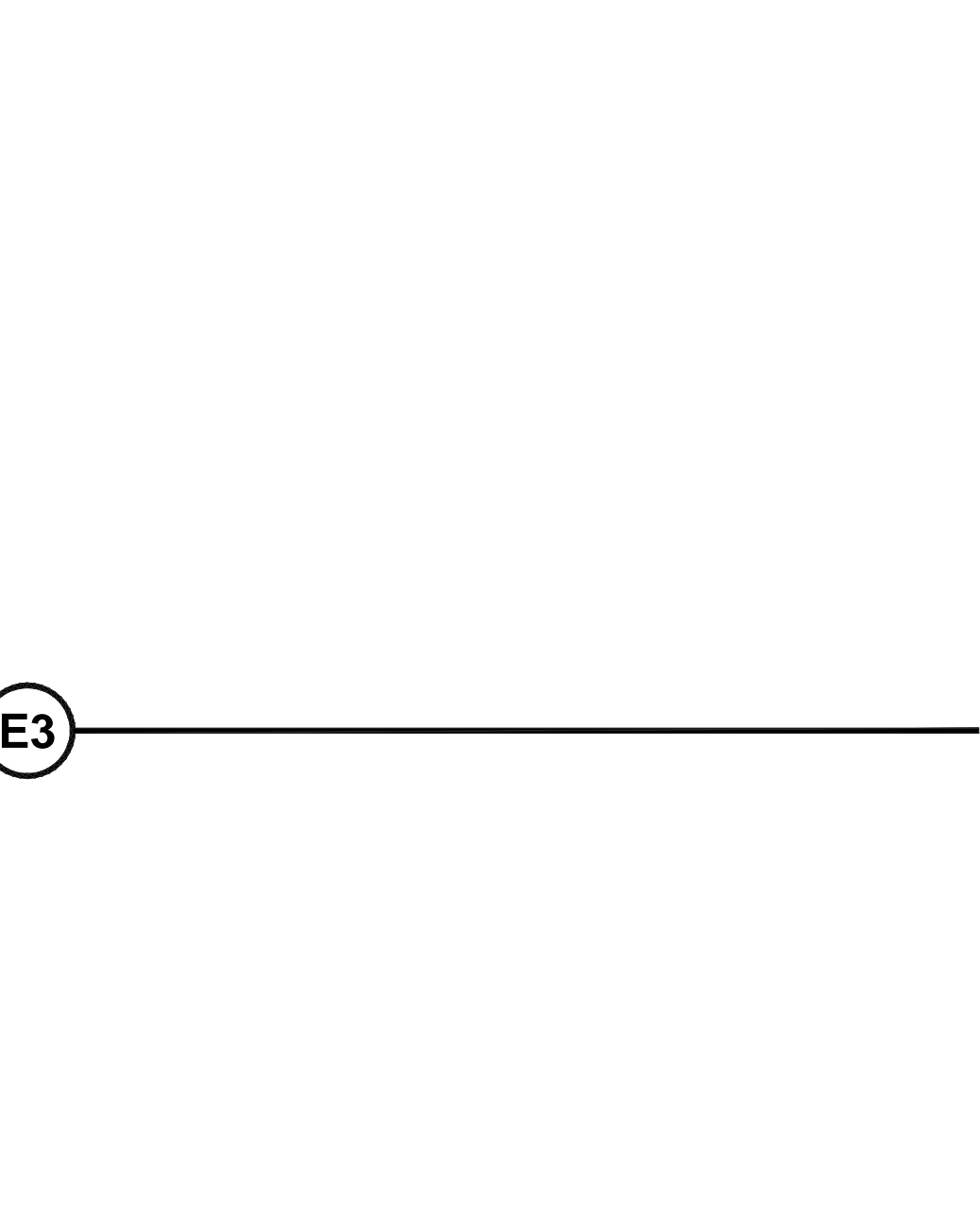
E2 FENCE TO GATE JUMPER
GROUNDING NTS



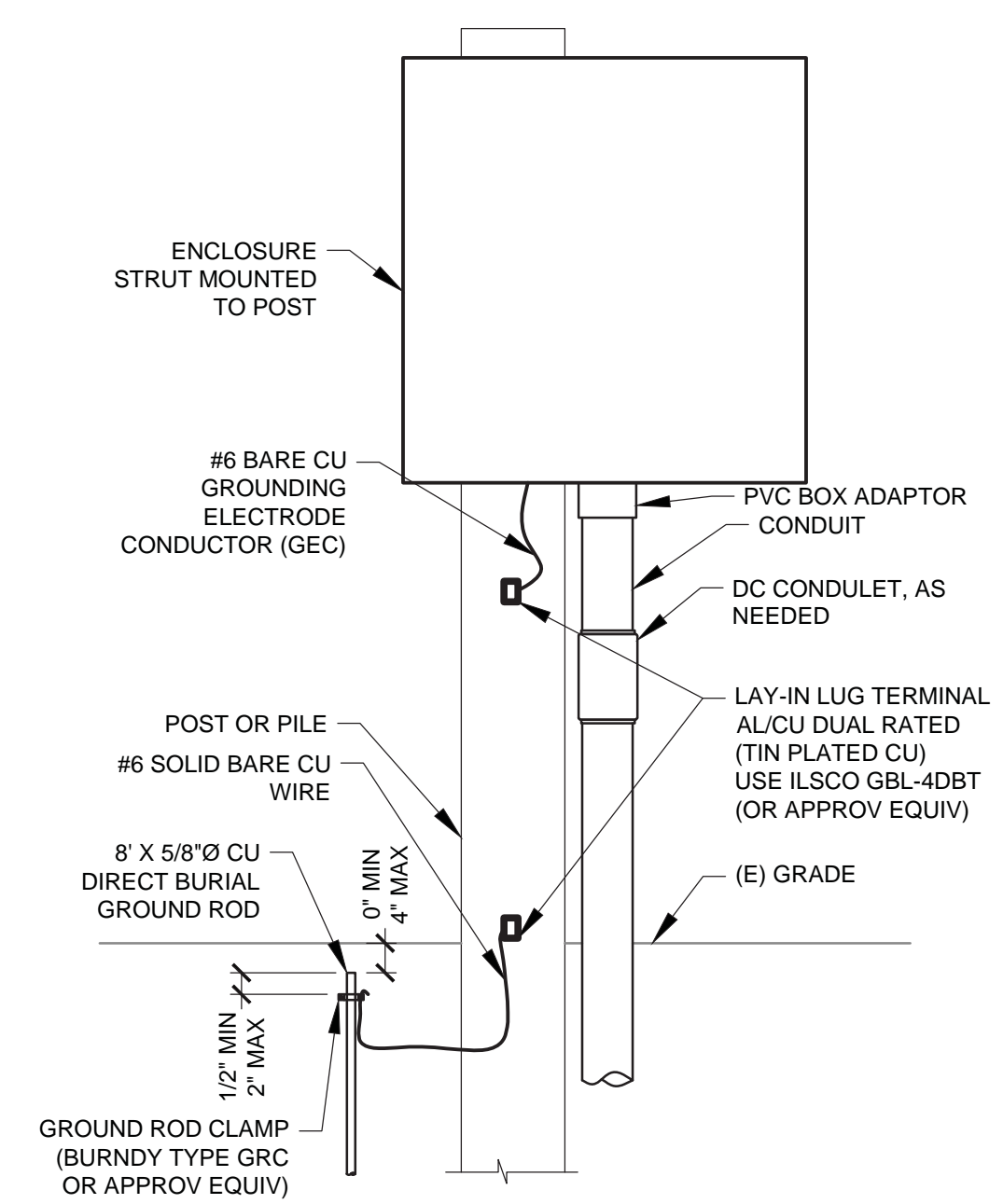
D2 VERTICAL POST GROUNDING
GROUNDING NTS



B2 GROUND CLAMP
GROUNDING NTS



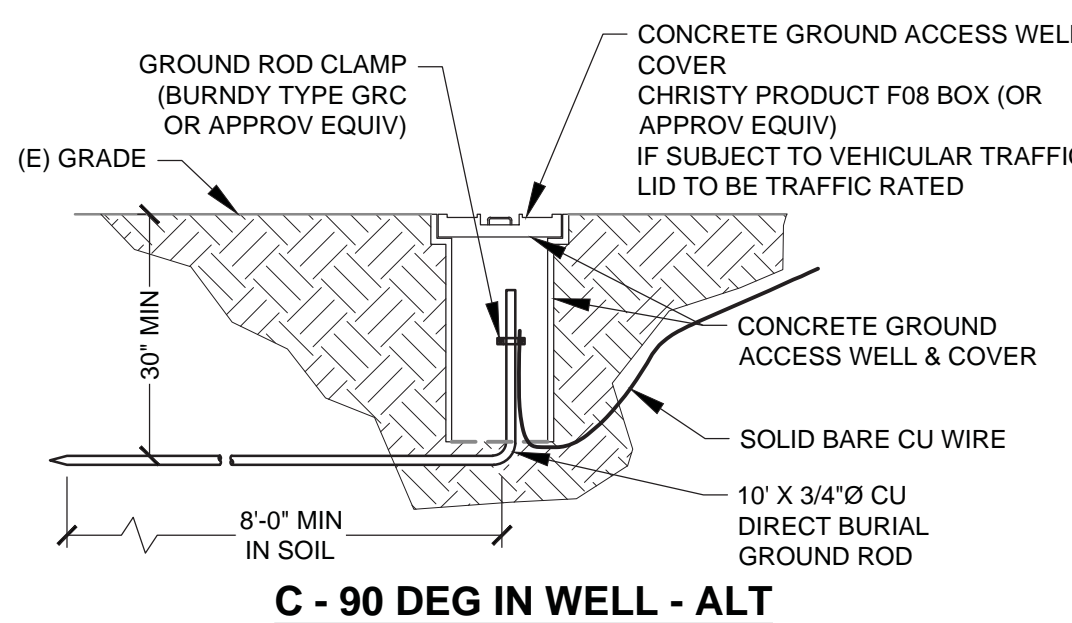
E3 ENCLOSURE MOUNT - GROUND
GROUNDING NTS



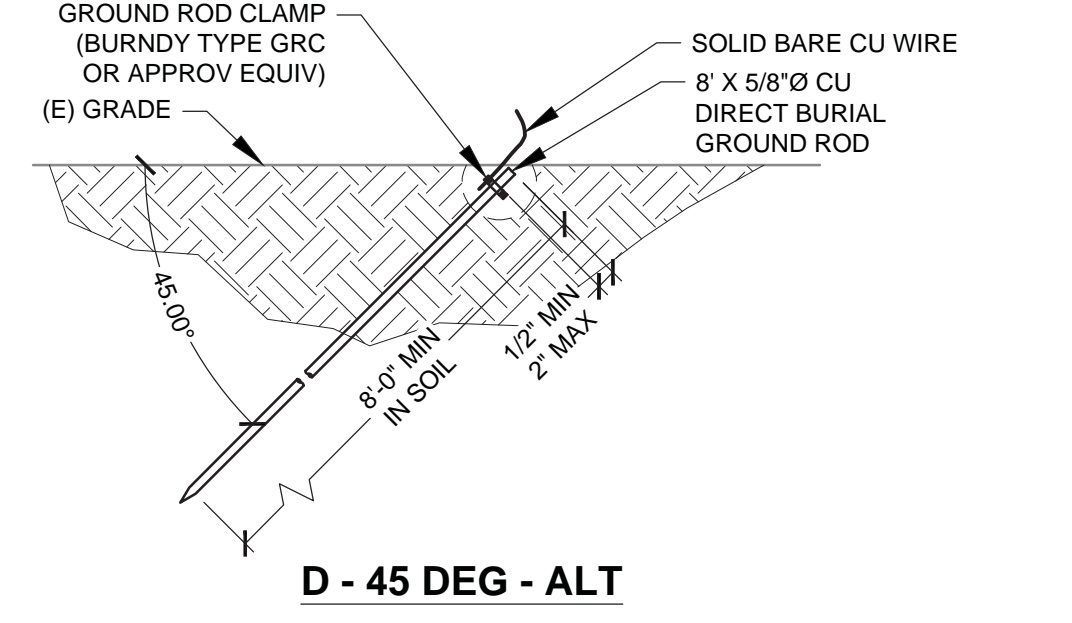
D4 ENCLOSURE MOUNT - GROUND
GROUNDING NTS

C2

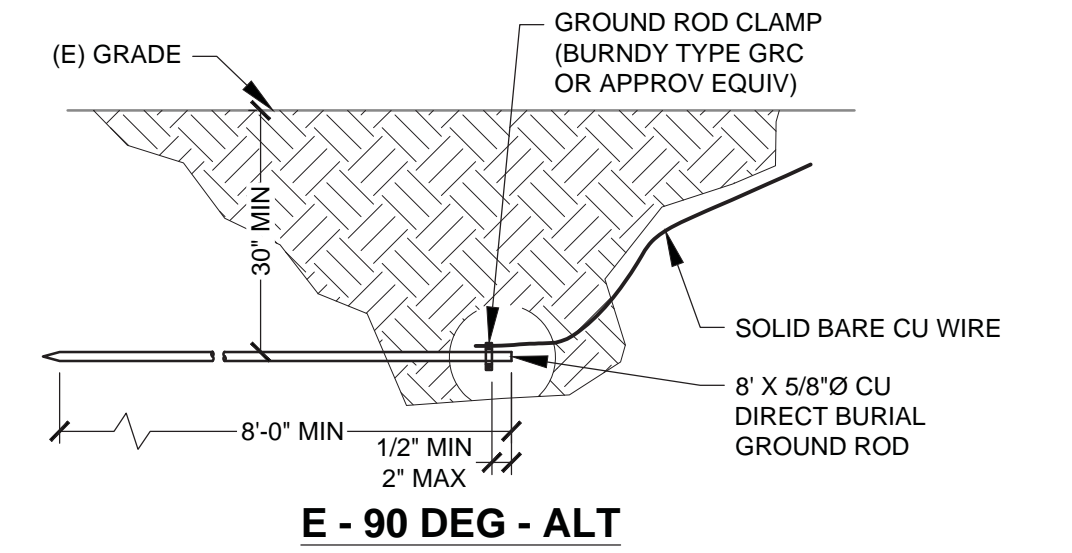
C3



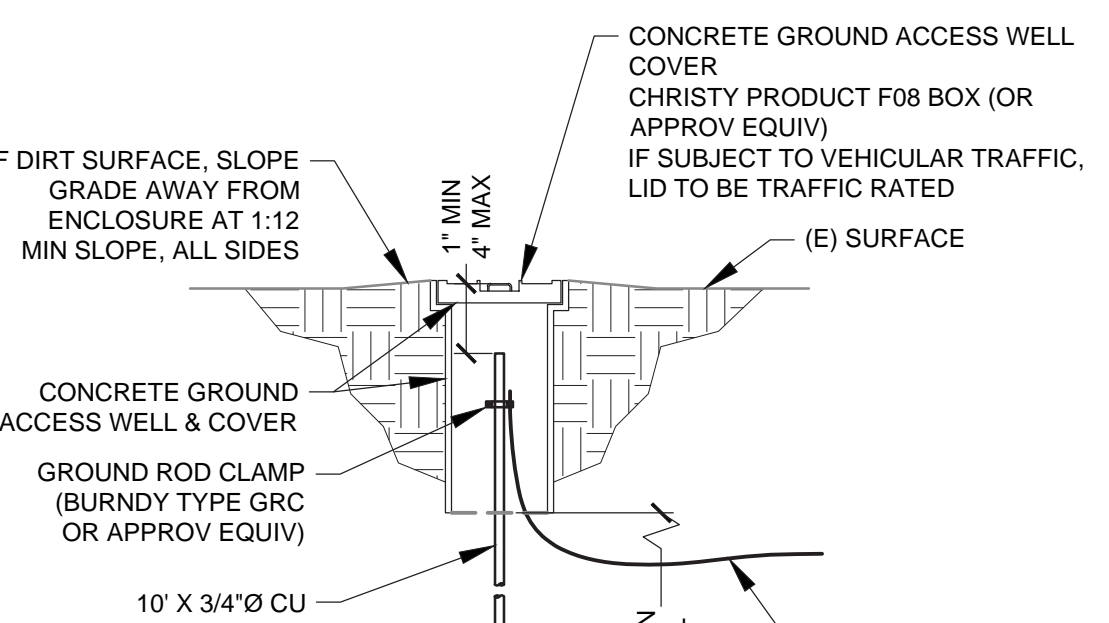
C - 90 DEG IN WELL - ALT



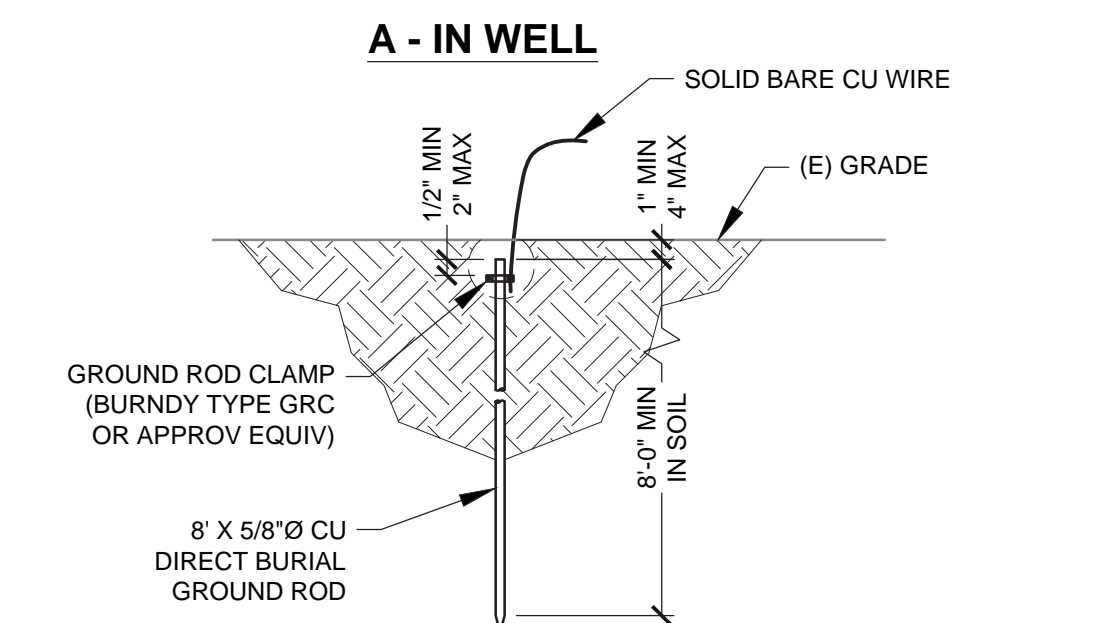
D - 45 DEG - ALT



E - 90 DEG - ALT



A - IN WELL



B - NO WELL

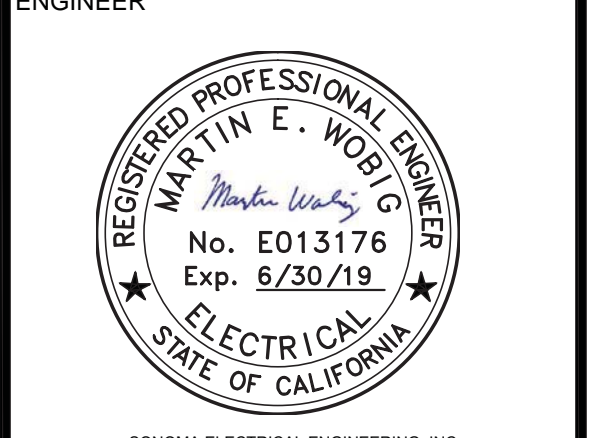
NOTES:
1. GROUND CLAMPS SHALL BE INSPECTED BEFORE BEING BURIED
2. OPTION 'E' SHALL ONLY BE USED WITH APPROVED RFI
3. ELECTRODE SHALL BE INSTALLED AT LEAST 8 FT OF LENGTH IN CONTACT WITH SOIL PER 250.53(G), NEC
4. (1) GROUND ROD SHALL BE INSTALLED PER ARRAY
5. GROUND ROD TO BE LOCATED AS CLOSE AS POSSIBLE TO A STRUCTURE
6. IF DIRT SURFACE, TOP OF GROUND WELL SHALL BE 1/2\"/>

B4 DIRECT BURIED CU GROUND ROD
GROUNDING



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CLIENT
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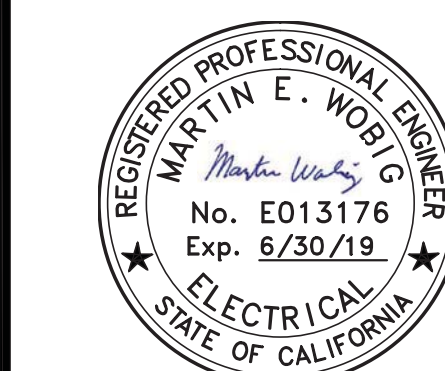
PROJECT
CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93407

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6	10/26/2018	SEISMIC COMMENTS
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PROJECT MANAGER: KIM STRICKLAND
PROJECT ENGINEER: THOMAS CEMO
INTERN ENGINEER: JASON CHAUVIN
CHECKED BY: JESSICA KENDRICK

PERMIT
SHEET TITLE: GROUNDING AND BONDING DETAILS
SHEET NUMBER: PV551

3/4" = 1'-0"



REV	DATE	DESCRIPTION
6	10/26/2018	SEISMIC COMMENTS
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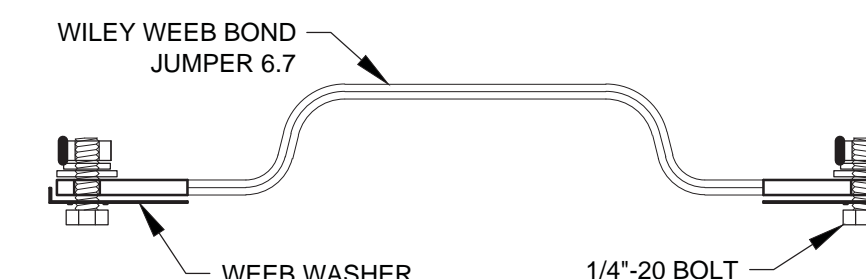
DATE	DESCRIPTION
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PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT

SHEET TITLE
GROUNDING AND BONDING DETAILS

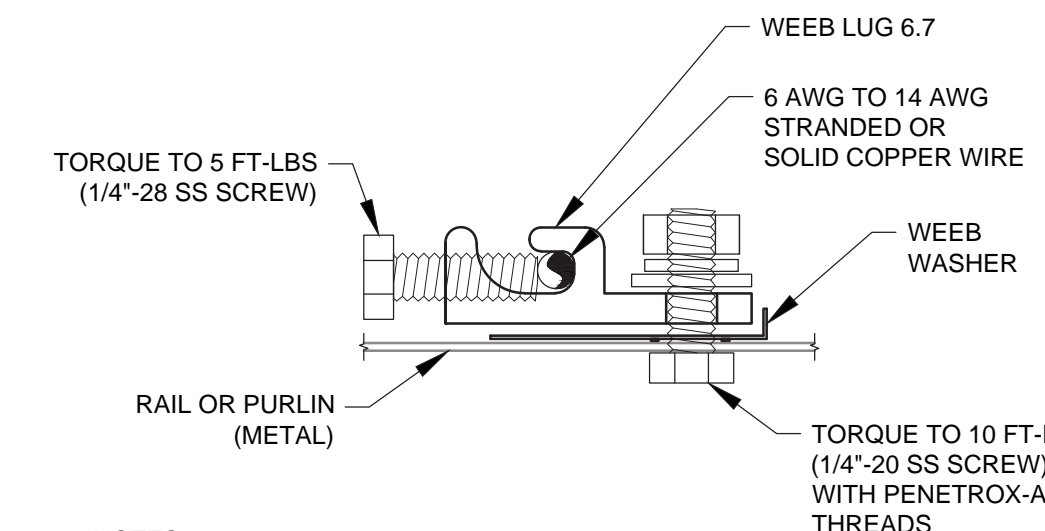
SHEET NUMBER

PV552



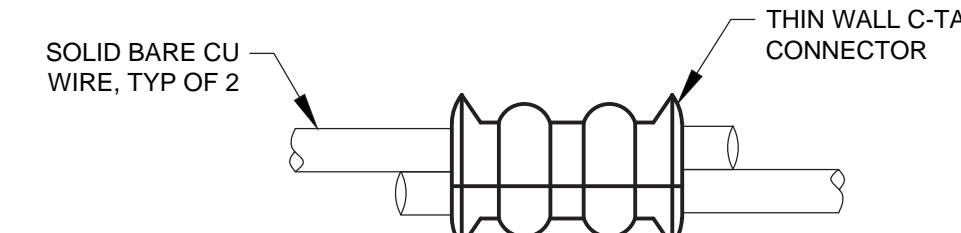
- NOTES:
1. ALL HARDWARE AND THE WEEB WASHER IS INCLUDED FROM MANUFACTURER
 2. WEEB WASHER TEETH MUST FACE TOWARDS OBJECT, NOT THE JUMPER
 3. DRILL A 17/64" HOLE TO INSTALL JUMPER (AS NEEDED)
 4. TORQUE THE 1/4" BOLT TO 10 FT-LB
 5. BONDING JUMPERS TO BE BOLTED AT A SPAN TO ALLOW FOR EXPANSION
 6. TO MAINTAIN ELECTRICAL CONTINUITY, BONDING JUMPERS SHOULD BE USED ACROSS ALL DISCONTINUITIES, EXPANSION JOINTS, AND ADJUSTABLE CONNECTIONS
 7. BONDING JUMPERS TO BE MOUNTED ON EXTERIOR TO ALLOW FOR VISUAL INSPECTION
 8. ADD ANTI-OXIDANT COMPOUND (NOALOX OR EQUIV) AT BONDING JUMPER CONNECTIONS
 9. INSTALL PER MANUFACTURER INSTALLATION MANUAL
 10. WEEB'S ARE ONE TIME USE ONLY PRODUCT

B1 WILEY - WEEB BOND JUMPER 6.7
GROUNDING NTS



- NOTES:
1. ALL HARDWARE IS INCLUDED FROM MANUFACTURER
 2. WEEB WASHER TEETH MUST FACE TOWARDS OBJECT, NOT THE GROUND LUG
 3. DRILL A 17/64" HOLE TO THE GROUND LUG (AS NEEDED)
 4. NO SURFACE PREPARATION IS NEEDED ON RAIL OR MODULE
 5. ADD ANTI-OXIDANT COMPOUND (NOALOX OR EQUIV) AT GROUND LUG WIRE TERMINATIONS
 6. INSTALL PER MANUFACTURER INSTALLATION MANUAL
 7. WEEB'S ARE ONE TIME USE ONLY

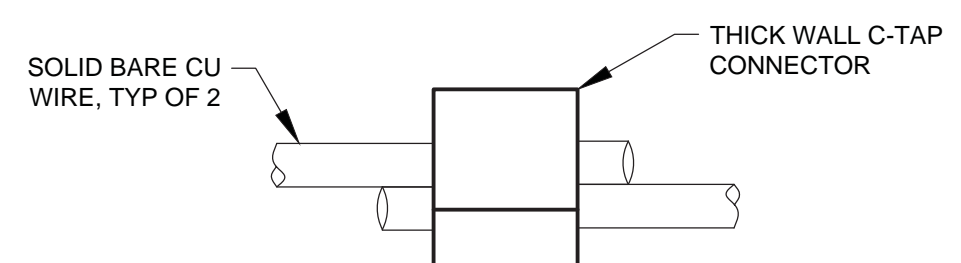
A1 WILEY - WEEB LUG 6.7
GROUNDING NTS



- NOTES:
1. USED FOR ALL ABOVE-GROUND GROUND WIRE SPlicing AND TAPPING ON ARRAY IN J-BOXES AND COULD BE USED TO TAP ONTO GROUND RING (EGC) THAT ARE 3/0-#2
 2. FOR GEC'S THAT REQUIRE IRREVERSIBLE CRIMP CONNECTIONS THAT ARE LISTED FOR THE PURPOSE REFER TO BURNDY YGHC SERIES C-TAPS
 3. SEE TABLE FOR CORRECT PART NUMBER AND TOOL. APPROVED EQUIVALENT MAY BE SUBSTITUTED
 4. AFTER A CONNECTION, THE FACTORY-STAMPED CONNECTOR IDENTIFICATION LETTERS, INCLUDING CONDUCTOR RANGES AND REQUIRED INSTALLATION DIE SHALL BE PRESENT.

COPPER C-TAP THIN WALL CRIMP CONNECTORS AND TOOLS													
Manuf.	Item ID	Length	Strip Length	Manuf.	Item ID	Length	Strip Length	Conductor Range Main	Conductor Range Tap	Color Code	Die Index Number	Tool Manuf.	Tool Part No.
ILSCO	TWCTR10T16	0.42000	0.483	Burndy	YC10L12	0.40000	0.375	10-14 AWG	14-16 AWG	RED	#9 00000	Burndy	Y1MRTC
ILSCO	TWCTR8T12	0.62000	0.683	Burndy	YC8L12	0.60000	0.625	8-10 AWG	10-12 AWG	BLUE	7.00000	Burndy	Y1MRTC
ILSCO	TWCTR6T12	0.62000	0.683	Burndy	YC6L12	0.60000	0.625	6-8 AWG	8-12 AWG	GRAY	8.00000	Burndy	Y1MRTC
ILSCO	TWCTR4T12	1.21000	1.273	Burndy	YC4L12	1.18000	1.188	4-6 AWG	6-12 AWG	BROWN	10.00000	Burndy	Y1MRTC
ILSCO	TWCTR3T12	1.20600	1.269	Burndy	YC3L12	1.18000	1.188	3-5 AWG	5-12 AWG	GREEN	11.00000	Burndy	Y1MRTC
ILSCO	TWCTR2T12	1.21000	1.273	Burndy	YC2L12	1.18000	1.188	2-4 AWG	4-12 AWG	PINK	12.00000	Burndy	Y1MRTC
ILSCO	TWCTR1T12	1.75000	1.813	Burndy	YC1L12	1.75000	1.813	1-3 AWG	3-12 AWG	BLACK	13.00000	Burndy	MD6
ILSCO	TWCTR1/0T12	1.75000	1.813	Burndy	YC25L12	1.75000	1.813	1/0 AWG-1 SOL	4 AWG-12 SOL	ORANGE	14.00000	Burndy	MD6
ILSCO	TWCTR2/0T12	1.75000	1.813	Burndy	YC26L12	1.75000	1.813	2/0-1/0 AWG	1-12 AWG	PURPLE	15.00000	Burndy	MD6
ILSCO	TWCTR3/0T12	1.75000	1.813	Burndy	YC27L12	1.75000	1.813	3/0-1/0 AWG	1/0-12 AWG	YELLOW	16.00000	Burndy	MD6

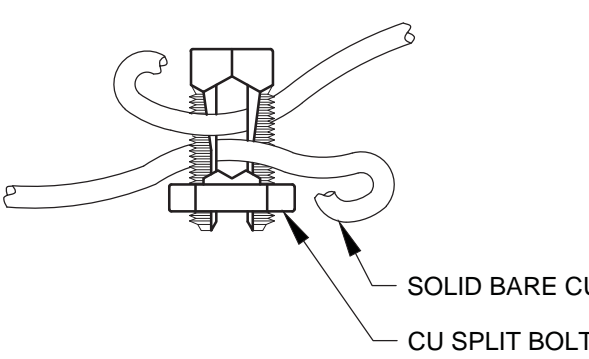
C2 IRREVERSIBLE SPLICE - BONDING ELECTRICAL CONDUCTOR
GROUNDING NTS



- NOTES:
1. SEE TABLE FOR CORRECT PART NUMBER AND TOOL. APPROVED EQUIVALENT MAY BE SUBSTITUTED
 2. AFTER A CONNECTION, THE FACTORY-STAMPED CONNECTOR IDENTIFICATION LETTERS, INCLUDING CONDUCTOR RANGES AND REQUIRED INSTALLATION DIE SHALL BE PRESENT.

COPPER C-TAP HEAVY DUTY CRIMP CONNECTORS AND TOOLS							
Manuf.	Item ID	Length	Conductor Range Main	Conductor Range Tap	Die Index No.	Tool Manuf.	Tool Part No.
Burndy	YGHC2C2	1.16000	6SOL - 2STR	6SOL - 2STR	C	Burndy	Y750
Burndy	YGHC26C2	1.41000	1STR - 2/0STR	6SOL - 2STR	0.00000	Burndy	Y751
Burndy	YGHC26C26	1.54000	1STR - 2/0STR	1STR - 2/0STR	0.00000	Burndy	Y752
Burndy	YGHC29C26	1.97000	3/0STR - 250KCMIL	6SOL - 2/0STR	997.00000	Burndy	Y753
Burndy	YGHC29C29	2.06000	3/0STR - 250KCMIL	3/0STR - 250KCMIL	997.00000	Burndy	Y754
Burndy	YGHC34C26	2.42000	300KCMIL - 500KCMIL	6SOL - 2/0STR	1011.00000	Burndy	Y755
Burndy	YGHC34C29	2.67000	300KCMIL - 500KCMIL	3/0STR - 250KCMIL	1011.00000	Burndy	Y756
Burndy	YGHC34C34	2.91000	300KCMIL - 500KCMIL	300KCMIL - 500KCMIL	1011.00000	Burndy	Y757

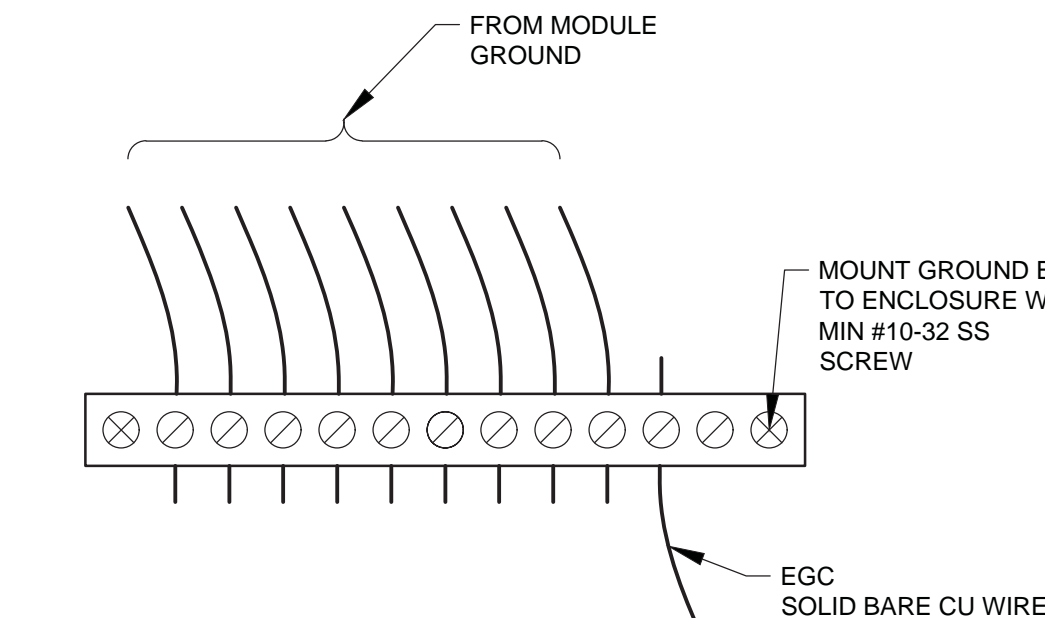
C3 IRREVERSIBLE SPLICE - GROUNDING ELECTRICAL CONDUCTOR
GROUNDING NTS



- NOTES:
1. ONLY USED FOR GROUNDING AND BONDING
 2. TORQUE TO MANUFACTURER'S RECOMMENDATION
 3. TRIM END AND CURL WIRE BACK ONTO ITSELF
 4. SEE TABLE FOR CORRECT PART NUMBER. APPROVED EQUIVALENT MAY BE SUBSTITUTED

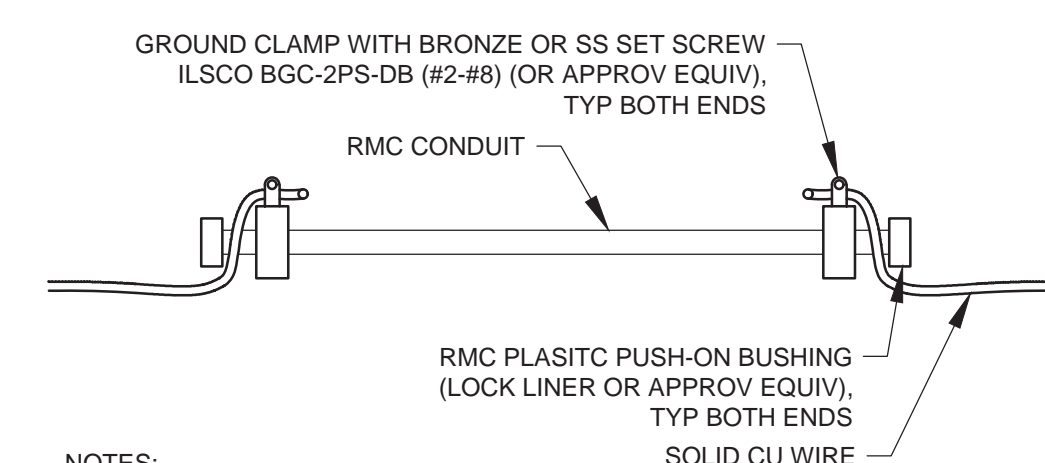
COPPER SPLIT BOLT							
Manf.	Item ID	Conductor Range for Equal Run & Tap	Conductor Range for Minimum Tap with Maximum Run	Manf.	Item ID	Copper Conductor Range (Sol. - Str.)	Rebar w/ (1) No. 8 Sol. Cu
IlSCO	IK-10	10 AWG-16 AWG	16 AWG	Burndy	KS15	12 AWG - 8 AWG	N/A
IlSCO	IK-8	8 AWG-16 AWG	16 AWG	Burndy	KS17	8 AWG - 6 AWG	N/A
IlSCO	IK-6	6 SOL -10 SOL	16 SOL	Burndy	KS20	8 AWG - 4 AWG	N/A
IlSCO	IK-4	4 SOL -8 SOL	16 SOL	Burndy	KS22	6 AWG - 3 AWG	N/A
IlSCO	IK-3	2 SOL -6 SOL	12 SOL	Burndy	KS23	6 AWG - 2 AWG	N/A
IlSCO	IK-2	2 AWG-6 SOL	14 AWG	Burndy	KS25	4 AWG - 1/0	N/A
IlSCO	IK-1/0	1/0 AWG-4 SOL	14 SOL	Burndy	KS26	2 AWG - 2/0 6 AWG - 8 AWG Str./Sol.	#3 (3/8")
IlSCO	IK-2/0	2/0 AWG-2 SOL	14 STR	Burndy	KS27	1 AWG - 3/0	N/A
IlSCO	IK-3/0	3/0 AWG-2 SOL	12 SOL	Burndy	KS29	1 AWG - 250 kcmil 6 AWG - 8 AWG Str./Sol.	#4 (1/2")
IlSCO	IK-250	250 kcmil-1/0 SOL	10 SOL	Burndy	KS31	1/0 AWG - 350 kcmil 6 AWG - 8 AWG Str./Sol.	#5 (5/8")
IlSCO	IK-350	350 kcmil-4/0 AWG	8 SOL	Burndy	KS34	2/0 AWG - 500 kcmil 6 AWG - 8 AWG Str./Sol.	#6 (3/4")
IlSCO	IK-500	500 kcmil-250 kcmil	8 SOL				
IlSCO	IK-750	750 kcmil-350 kcmil	8 SOL				
IlSCO	IK-1000	1000 kcmil-500 kcmil	8 SOL				

C4 SPLIT BOLT SPLICE
GROUNDING NTS



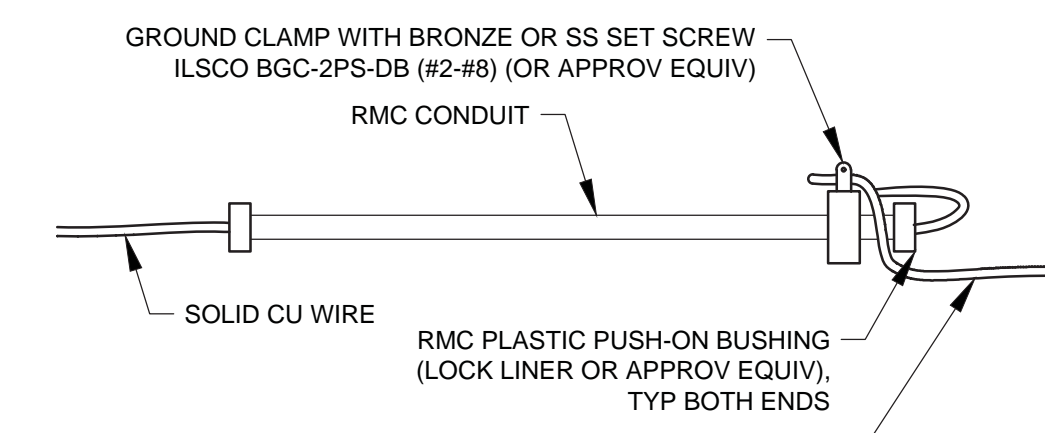
- NOTE:
1. INSTALL PER MANUFACTURER INSTALLATION
 2. ADD ANTI-OXIDANT COMPOUND (NOALOX OR EQUIV) AT GROUND LUG WIRE TERMINATIONS

A2 EGC BAR
GROUNDING NTS



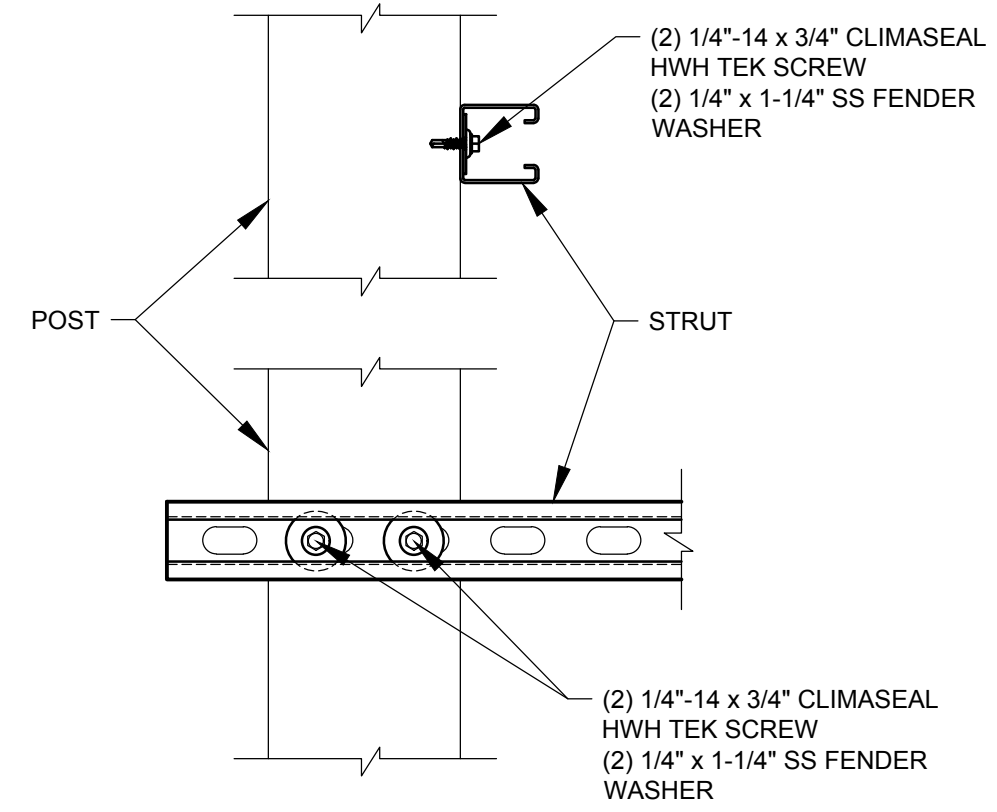
- NOTES:
1. NO EGC PASS-THROUGH
 2. ENSURE CONDUIT CHASE ENDS TERMINATE OUT OF DIRECT SUNLIGHT
 3. APPLY ANTI-OXIDANT (NOALOX OR APPROV EQUIV) BETWEEN THE CONDUIT AND THE CLAMP TO PREVENT GALVANIC CORROSION
 4. PV WIRE SHALL BE SUPPORTED PER NEC (ie: WITHIN 12" OF END)
 5. WHEN UNDER MODULES
 - EAST WEST DIRECTION: EXTEND CONDUIT UNDER MODULE MIN 24" - 36" FOR TILT MOUNT, 4" - 6" FOR FLUSH MOUNT
 - NORTH SOUTH DIRECTION: EXTEND CONDUIT UNDER MODULE MIN 2" - 4"
 6. TRIM END AND CURL WIRE BACK ONTO ITSELF
 7. ADD ANTI-OXIDANT COMPOUND (NOALOX OR EQUIV) AT GROUND LUG WIRE TERMINATION

A3 GRC/IMC/RMC CONDUIT CHASE
GROUNDING NTS

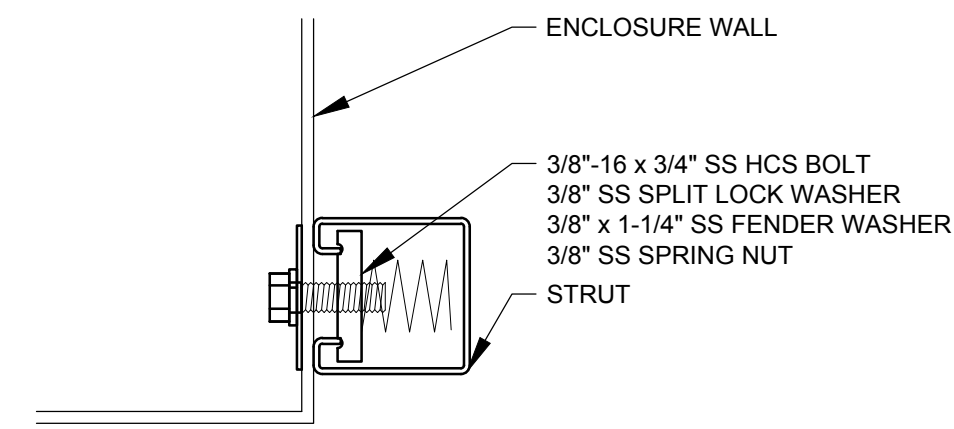


- NOTES:
1. WITH EGC PASS-THROUGH
 2. ENSURE CONDUIT CHASE ENDS TERMINATE OUT OF DIRECT SUNLIGHT
 3. APPLY ANTI-OXIDANT (NOALOX OR APPROV EQUIV) BETWEEN THE CONDUIT AND THE CLAMP TO PREVENT GALVANIC CORROSION
 4. PV WIRE SHALL BE SUPPORTED PER NEC (ie: WITHIN 12" OF END)
 5. WHEN UNDER MODULES
 - EAST WEST DIRECTION: EXTEND CONDUIT UNDER MODULE MIN 24" - 36" FOR TILT MOUNT, 4" - 6" FOR FLUSH MOUNT
 - NORTH SOUTH DIRECTION: EXTEND CONDUIT UNDER MODULE MIN 2" - 4"
 6. TRIM END AND CURL WIRE BACK ONTO ITSELF
 7. ADD ANTI-OXIDANT COMPOUND (NOALOX OR EQUIV) AT GROUND LUG WIRE TERMINATION

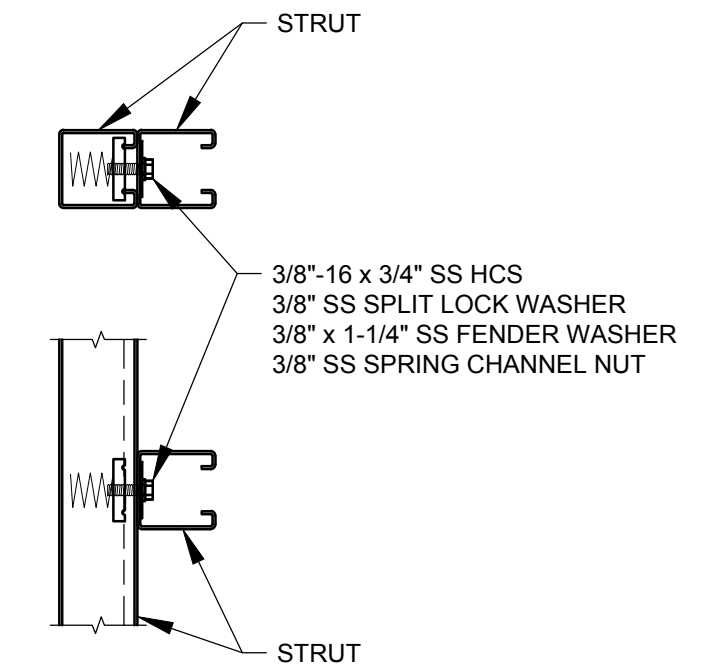
A4 GRC/IMC/RMC CONDUIT CHASE
GROUNDING NTS



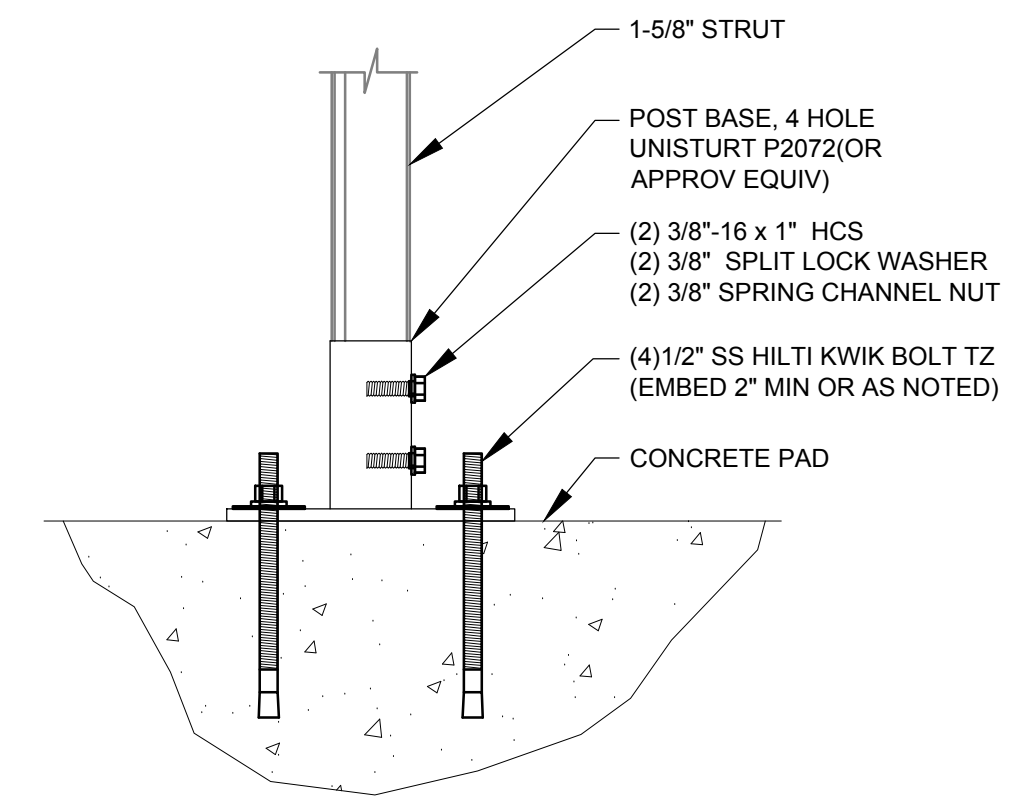
D1 STRUT TO POST
EQUIPMENT NTS



B2 STRUT TO ENCLOSURE
EQUIPMENT NTS



A2 STRUT TO STRUT
EQUIPMENT 3\"/>



B3 STRUT BASE TO CONCRETE
EQUIPMENT NTS



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Paso Robles, CA 93446



10/26/18
For Structural Elements Only
Electrical Design By Others
See "Structural Documentation Packet" for Additional Info.

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CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
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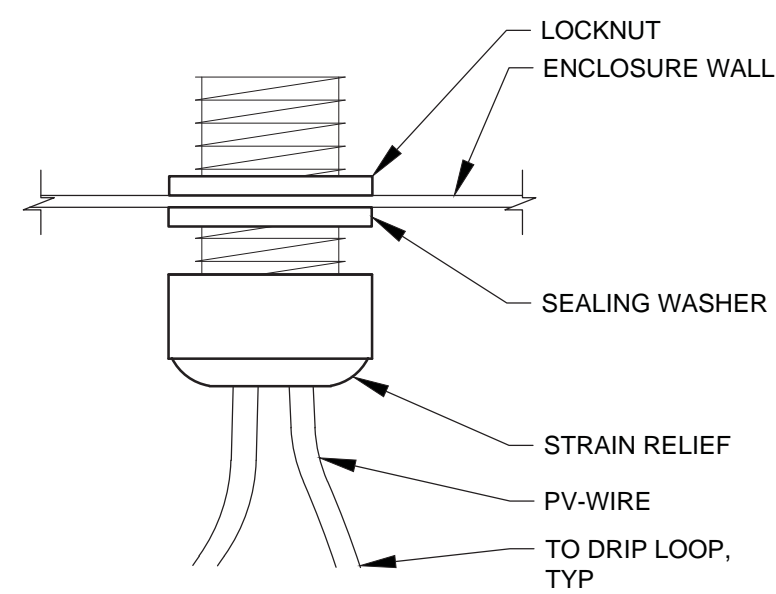
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PROJECT MANAGER	KIM STRICKLAND
PROJECT ENGINEER	THOMAS CEMO
INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT

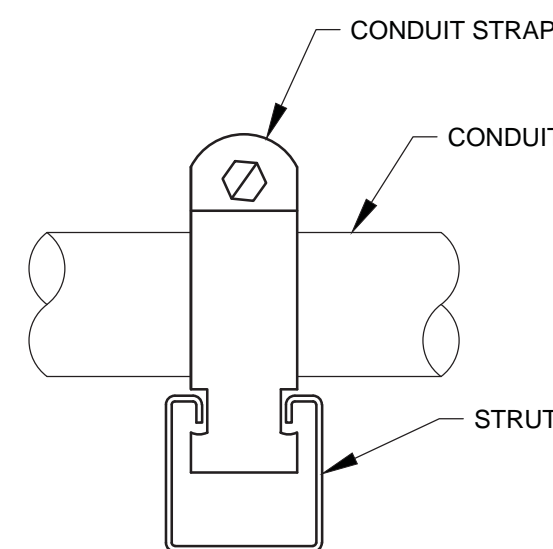
SHEET TITLE
EQUIPMENT MOUNTING DETAILS

SHEET NUMBER
PV561

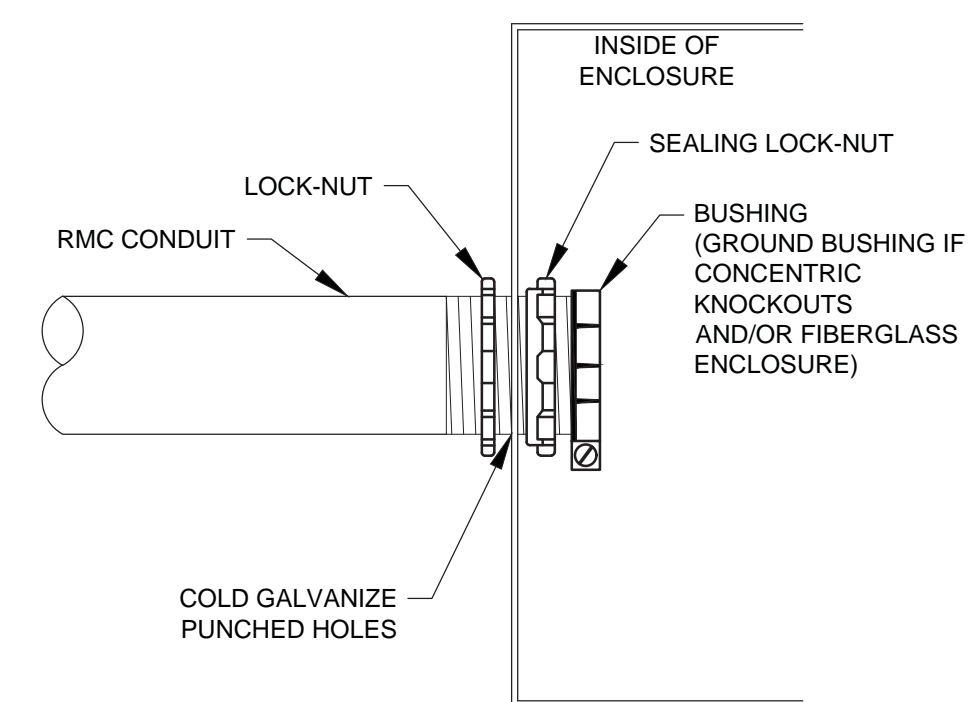


- NOTES:
1. SIDE OR BOTTOM ENTRY INTO ENCLOSURE ONLY
 2. PV WIRE SHALL BE SUPPORTED PER NEC (i.e. WITHIN 12" OF STRAIN RELIEF)
 3. NO UV EXPOSURE, TRANSITION TO ONLY TAKE PLACE UNDER COVER

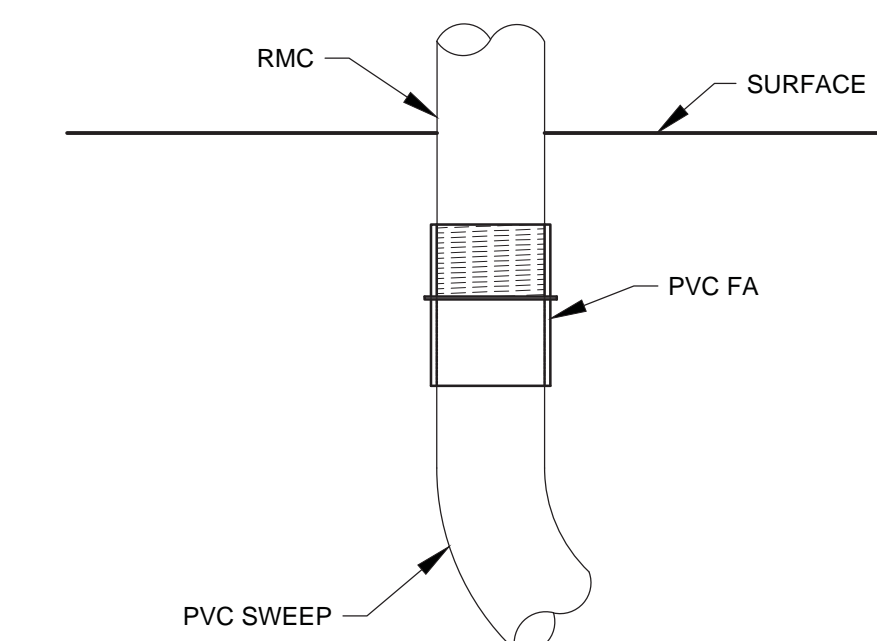
D1 WIRE TO ENCLOSURE
CONDUIT NTS



C1 STRUT STRAP
CONDUIT 3" = 1'-0"



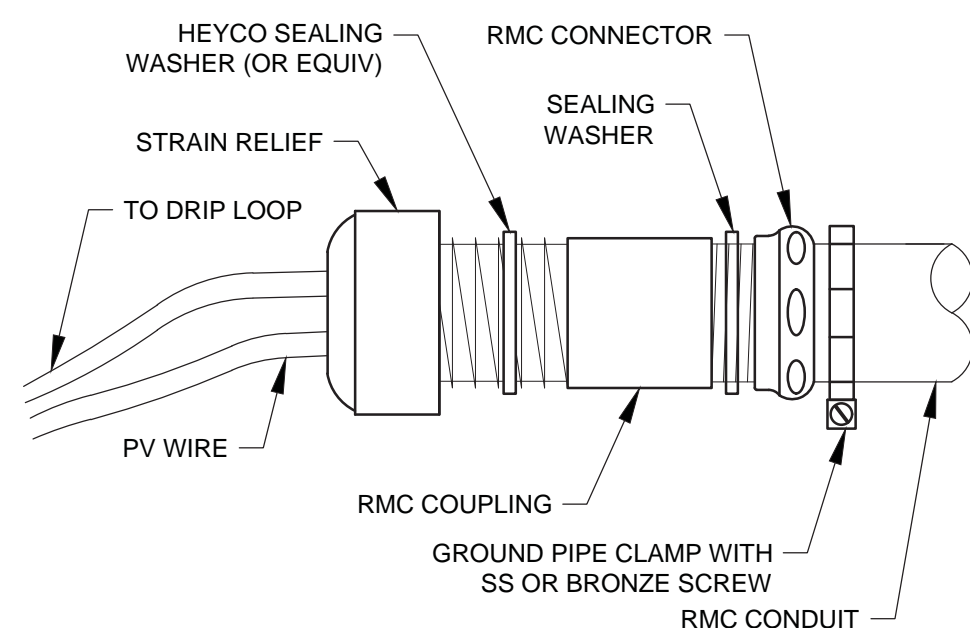
B1 RMC INTO SIDE - EXTERIOR
CONDUIT NTS



- NOTES:
1. WHERE RMC NIPPLE IS ENCASED IN CONCRETE, OR EXPOSED TO EARTH, WRAP WITH (1) LAYER 20 MIL 3M (OR APPROV EQUIV) WATERPROOF TAPE FOR CORROSION RESISTANCE.
 2. TAPE SHOULD EXTEND AT LEAST 3" ABOVE SURFACE.
 3. FOR UNDERGROUND PULLS OF MORE THAN 100' AND MORE THAN 180° OF BENDS USE RMC SWEEPS.

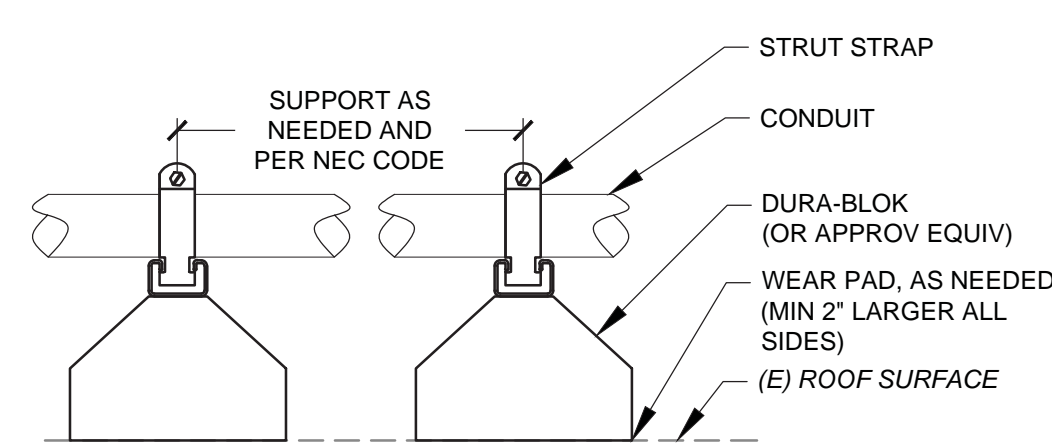
A1 RMC TO PVC SWEEP
CONDUIT NTS

E1



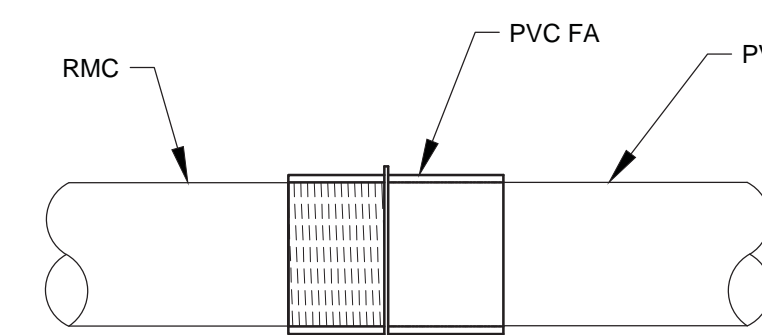
- NOTES:
1. NO-LOAX SHOULD BE PLACED BETWEEN THE CONDUIT AND THE CLAMP TO PREVENT GALVANIC CORROSION
 2. PV WIRE SHALL BE SUPPORTED PER NEC (i.e. WITHIN 12" OF STRAIN RELIEF)
 3. NO UV EXPOSURE, TRANSITION TO ONLY TAKE PLACE UNDER COVER

E2 PV WIRE TO RMC
CONDUIT NTS

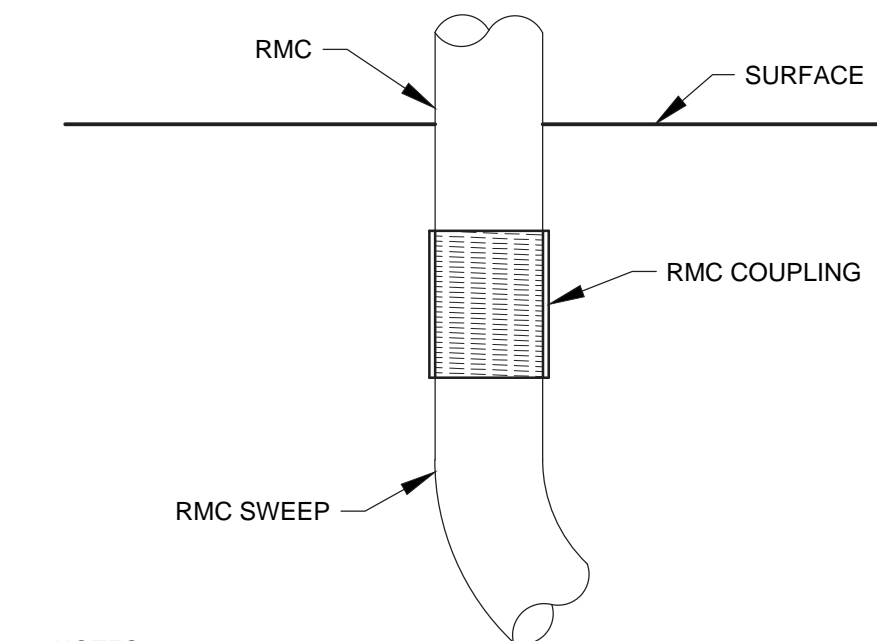


- NOTES:
1. PHYSICAL ATTACHMENT OF CONDUIT TO ROOF TO BE LOCATED APPROXIMATELY EVERY 50' FOR STABILIZATION AND INTEGRITY OF RUN
 2. REFER TO CONDUIT SCHEDULE AND PLANS FOR QUANTITY AND SIZE OF CONDUITS

C2 DURA-BLOK
CONDUIT NTS



B2 RMC TO PVC
CONDUIT NTS

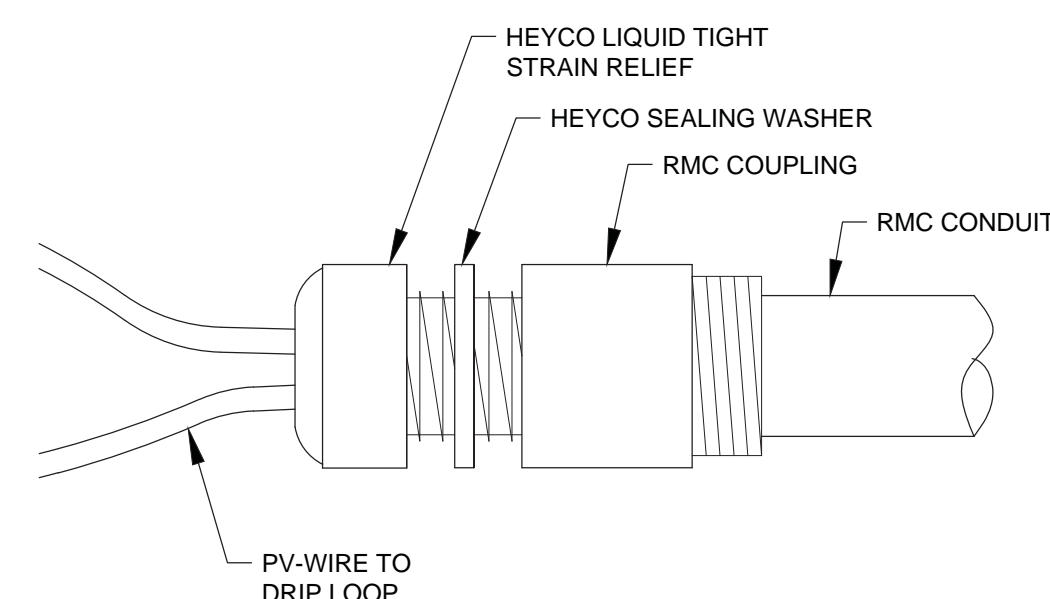


- NOTES:
1. WHERE RMC NIPPLE IS ENCASED IN CONCRETE, OR EXPOSED TO EARTH, WRAP WITH (1) LAYER 20 MIL 3M (OR APPROV EQUIV) WATERPROOF TAPE FOR CORROSION RESISTANCE.
 2. TAPE SHOULD EXTEND AT LEAST 3" ABOVE SURFACE.
 3. FOR UNDERGROUND PULLS OF MORE THAN 100' AND MORE THAN 180° OF BENDS USE RMC SWEEPS.

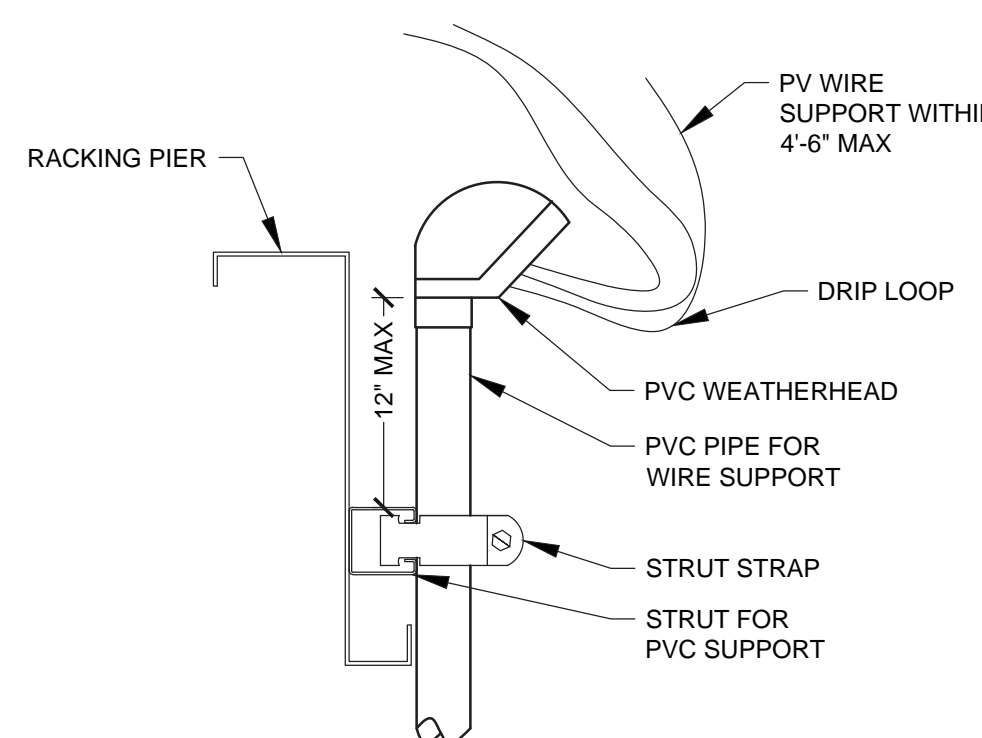
A2 RMC TO RMC SWEEP
CONDUIT NTS

E2

D2

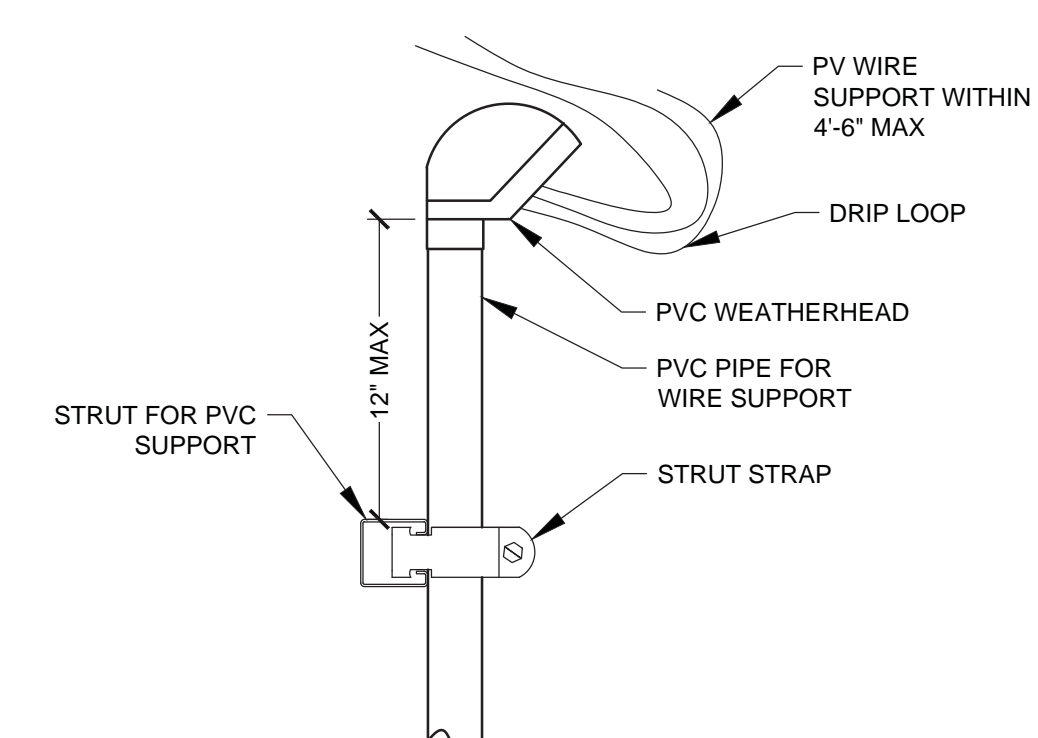


D3 WIRE TO RMC
CONDUIT NTS

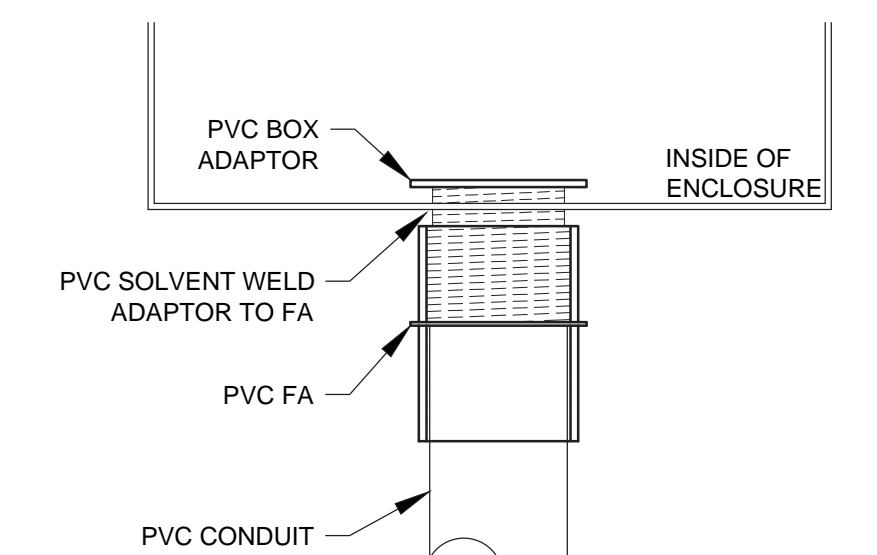


- NOTE:
1. SEAL WEATHERHEADS AFTER WIRE INSTALLATION.

C3 WEATHERHEAD GROUND MOUNT
CONDUIT NTS



B3 WEATHERHEAD
CONDUIT NTS



- NOTE:
1. FOR ENTRY INTO PLASTIC BOXES 'LONG THROAT' CONDUIT FITTINGS SHALL BE USED SO THAT A SEALING RING, LOCKNUT, AND GROUND BUSHING CAN BE INSTALLED

A3 PVC INTO BOTTOM
CONDUIT NTS

E3

E4

D4

C4

B4

A4



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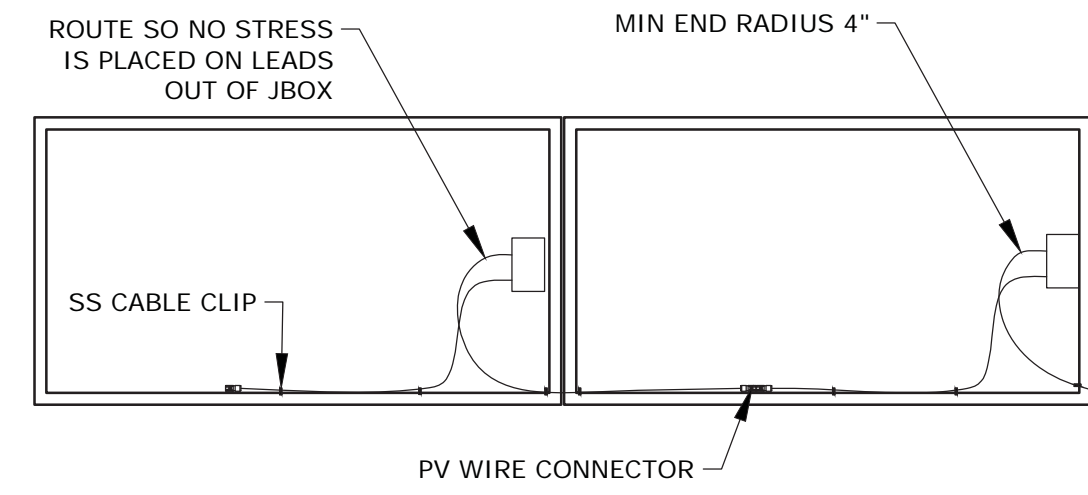
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CHECKED BY	JESSICA KENDRICK

PERMIT

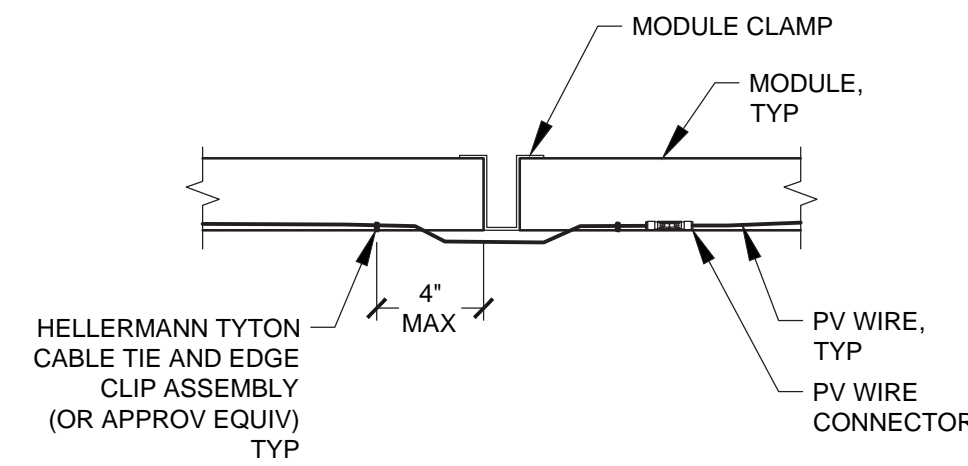
SHEET TITLE
CONDUIT DETAILS

SHEET NUMBER
PV571



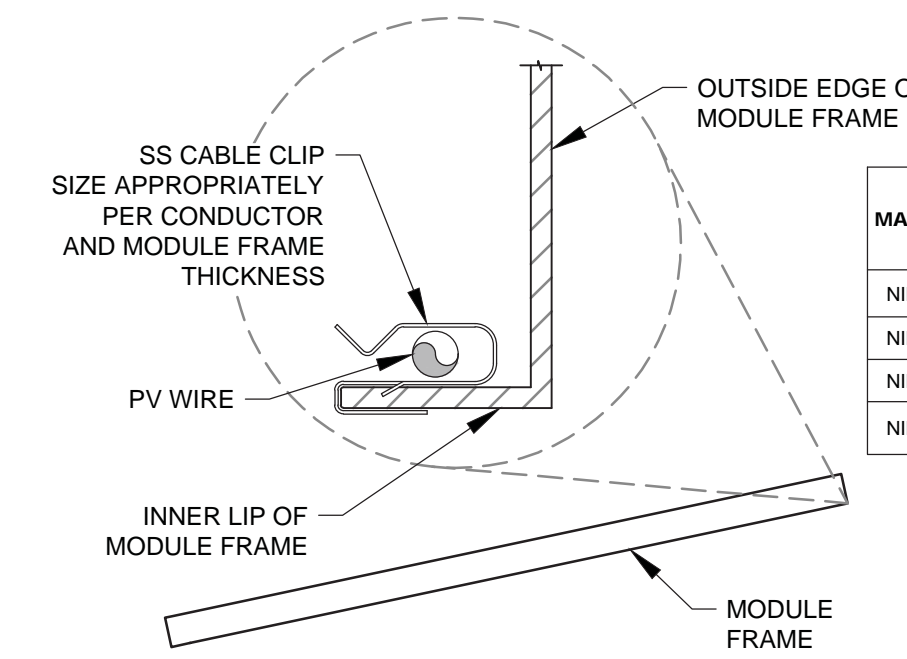
NOTE:
1. PV WIRE NOT TO TOUCH MODULE GLASS SURFACE OR THE ROOF SURFACE

D1 PV MODULE WIRE MANAGEMENT
WIRE MANAGEMENT NTS



NOTES:
1. LOCATE CABLE TIE/EDGE CLIP ASSEMBLY 4" MAX FROM MODULE EDGE. CLIP UNDER LIP OF MODULE FRAME
2. DO NOT PLACE MODULE CONNECTORS BETWEEN MODULES, ON PURLIN, OR ANYWHERE ELSE THEY WILL BE EXPOSED TO DIRECT SUNLIGHT
3. PROVIDE SLACK IN CONDUCTORS ACROSS GAP, BUT DO NOT EXCEED 1/2" BETWEEN THE CONDUCTORS AND THE GAP

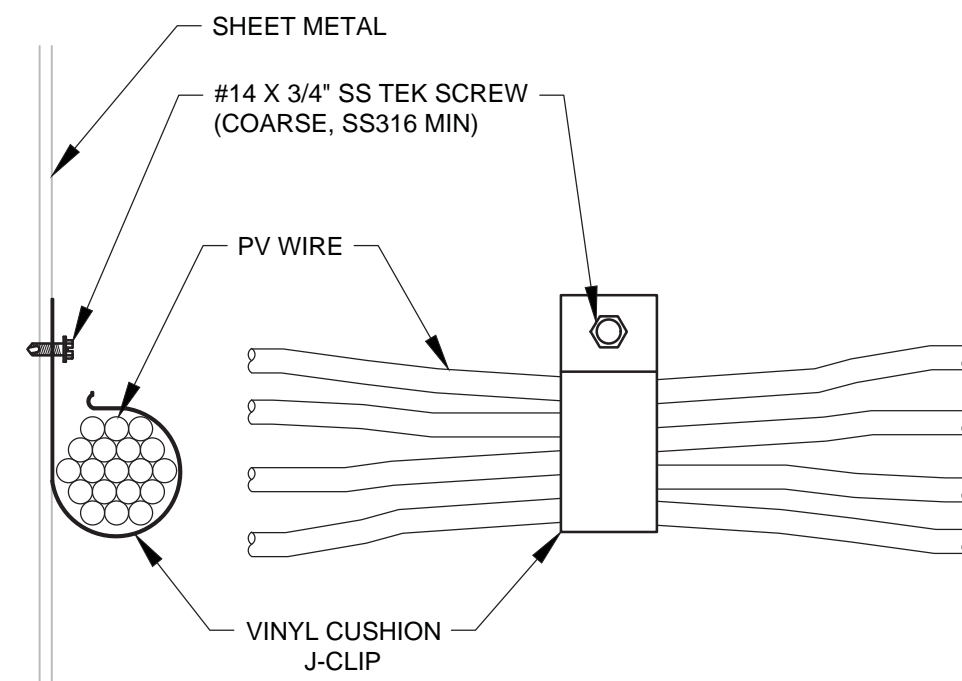
C1 MODULE CABLE ACROSS GAP
WIRE MANAGEMENT NTS



NOTES:
1. ALL MODULE LEADS MUST BE CLIPPED TO THE MODULE FRAME IN AN ORDERLY FASHION AND HELD UP OFF THE ROOF SURFACE WITH SS CABLE CLIPS.
2. PROVIDE 3 CLIPS PER MODULE (2 CLIPS MIN).
3. ALLOW SUFFICIENT SLACK IN LONG WIRE RUNS TO PREVENT BINDING OR TENSION DUE TO THERMAL CONTRACTION.

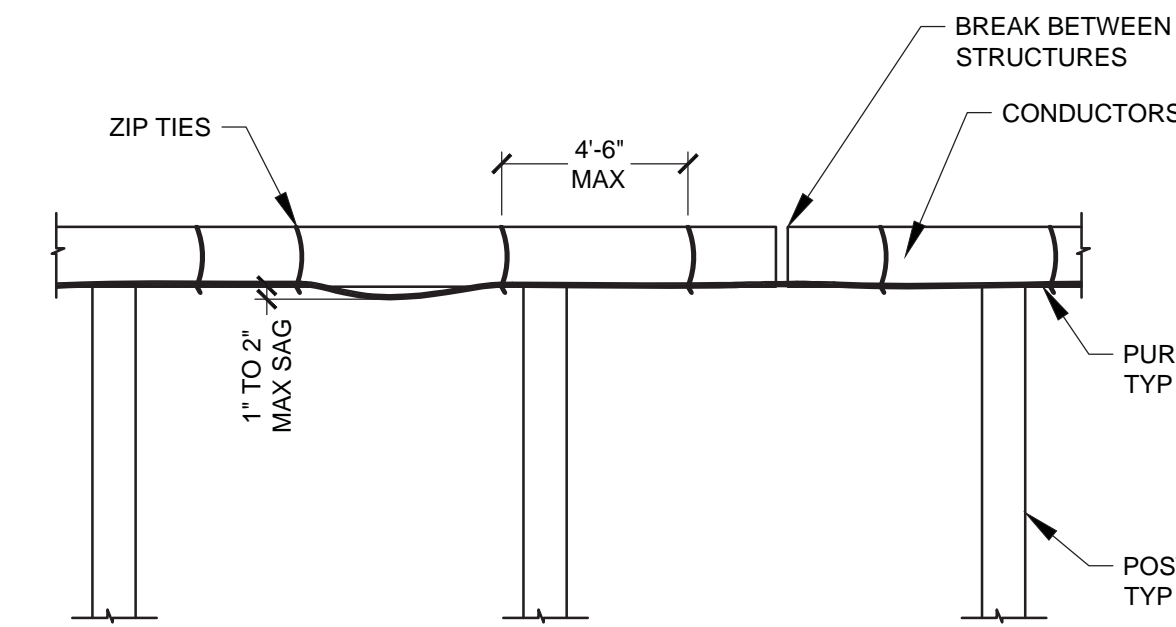
B1 MODULE CABLE CLIP
WIRE MANAGEMENT NTS

MANUFACTURER	PART NO.	HEIGHT (IN)	WIDTH (IN)	CLIP DEPTH (IN) RAIL	CLIP DEPTH (IN) CABLES	MATERIAL	MODULE
NINE FASTENER	DCX-2452A	1.55	0.38	0.44	1.20	301 SS	
NINE FASTENER	DCS-1414	1.52	0.38	0.57	1.20	301 SS	
NINE FASTENER	DCS-1306	0.73	0.38	0.44	0.66	410 SS	
NINE FASTENER	DCS-1307	0.74	0.38	0.44	0.38	410 SS	SOLARWORLD SUMMODULE SW 300-325 AL MONO (33MM FRAME)



NOTE:
COLD GALVY SPRAY BACK OF TEK SCREW

D2 VINYL CUSHION J-CLIP
WIRE MANAGEMENT NTS



NOTES:
1. LONG RUN OF CONDUCTORS SHALL BE SUPPORTED NO MORE THAN 4'-6" MAX DISTANCE
2. AT EXPANSION BREAKS IN PURLIN SUPPORT RACKING, INCREASE NUMBER OF SUPPORTS
3. PVC CHASE MAY NEED TO BE INSTALLED FOR EXPANSION/CONTRACTION
4. ONE SIDE FIXED WITH CONDUIT HANGER STRAP OTHER SIDE WITH CONDUIT HANGER STRAP INSTALLED WITH DOUBLE NUTTED AND LEFT LOOSE ON THE CONDUIT FOR IT TO SLIDE
5. CONDUCTORS SHALL BE INSTALLED CLEAR OF SCREWS, HARDWARE AND/OR SHARP EDGES TO PREVENT DAMAGE OF INSULATION
7. NO CONNECTORS ARE TO BE RESTING IN THE PURLIN

B2 PURLIN CONDUCTOR SUPPORT
WIRE MANAGEMENT NTS

D3

C3

B3

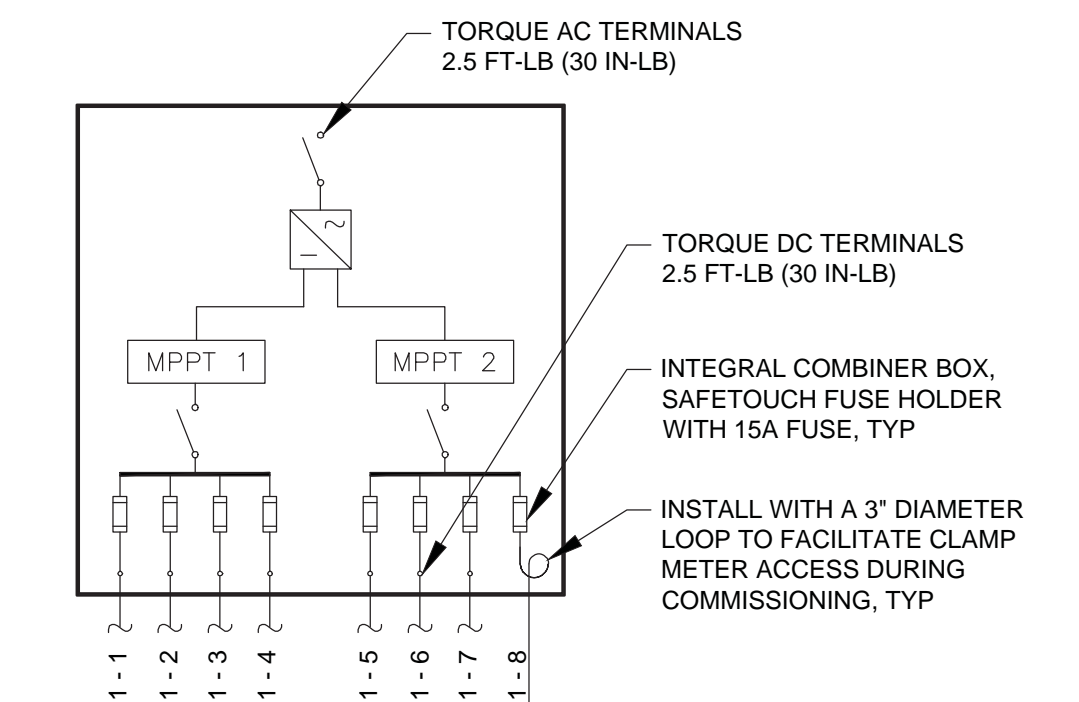
A3

D4

C4

B4

A4



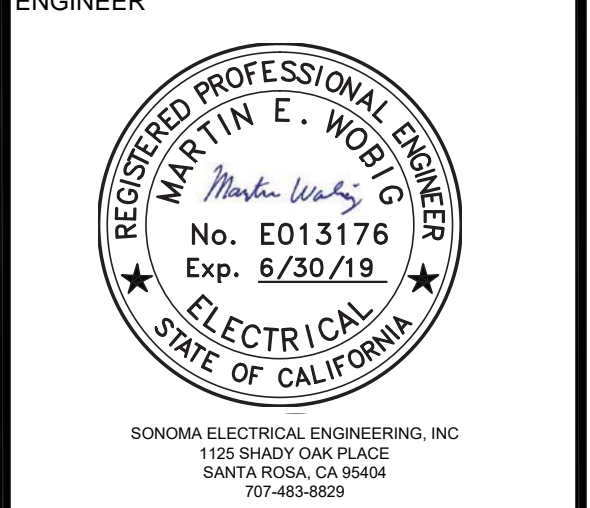
NOTES:
1. EVEN # OF STRINGS: BALANCE STRINGS BETWEEN 2 MPPTS
2. ODD # OF STRINGS: SET INVERTER TO SINGLE MPPT MODE

A4 INVERTER TEST LOOP
WIRE MANAGEMENT NTS



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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
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CHECKED BY	JESSICA KENDRICK

PERMIT

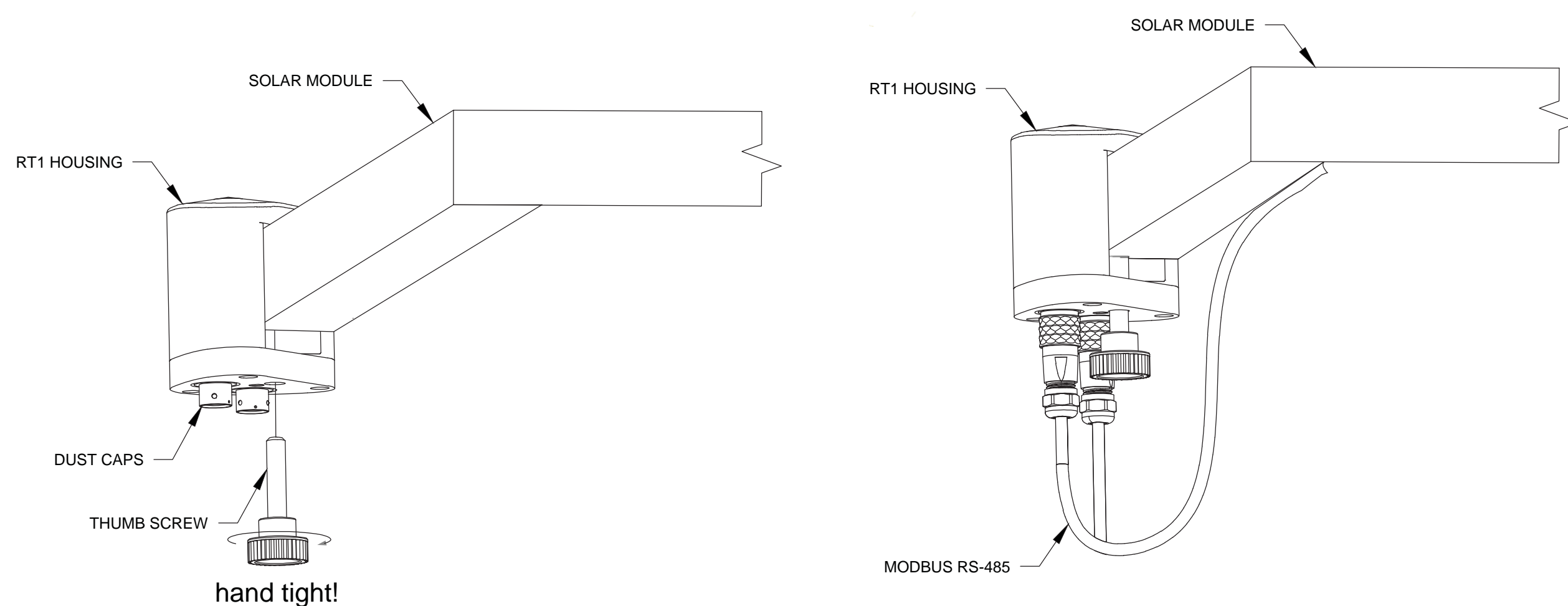
SHEET TITLE
MONITORING DETAILS

SHEET NUMBER
PV591

A1

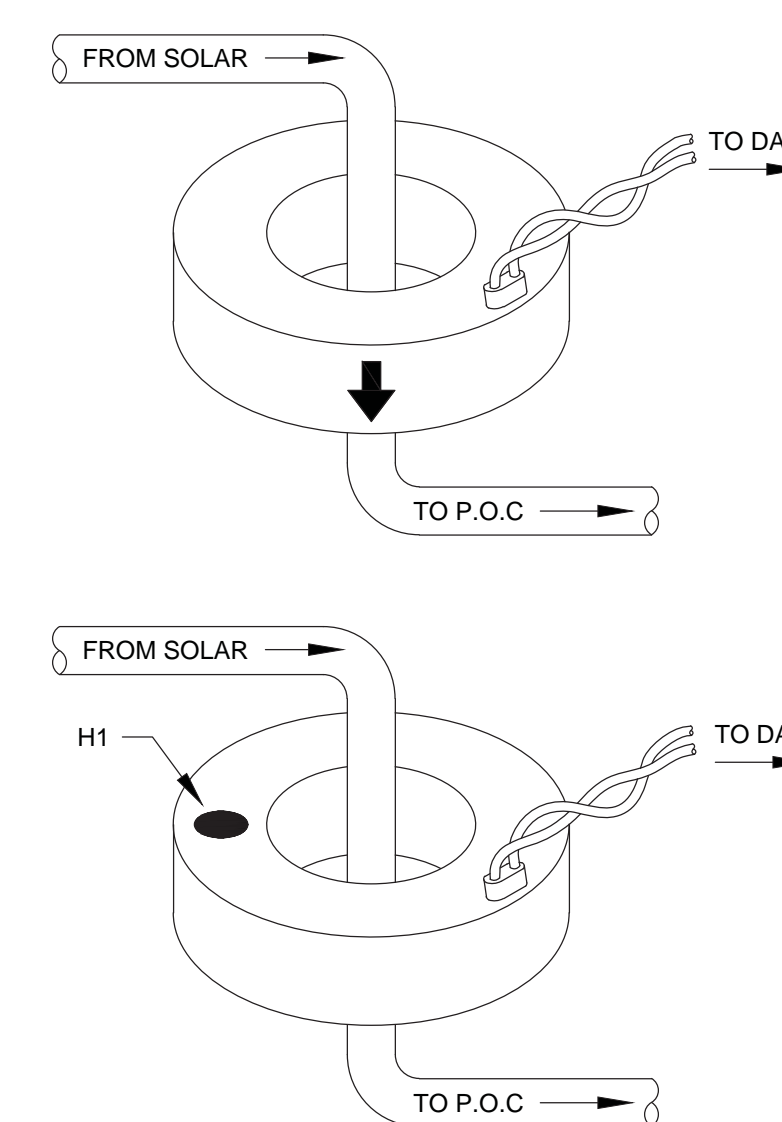
B1

B3



A2 RT1-ROOFTOP MONITORING SYSTEM - CORNER MOUNTING
MONITORING

NTS



- NOTES:
1. CT'S ARE DIRECTIONAL AND MUST BE ALIGNED WITH THE FLOW OF POWER. CT'S WILL HAVE AN 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 THE SAME TWIST PROFILE AS FACTORY CABLE. TWISTED BELDEN 1120A RECOMMENDED. 100ft 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 BELDEN 1120A RECOMMENDED. 100ft MAX EXTENSION.

B4 CT INSTALLATION
MONITORING

NTS

Mono Multi Solutions

THE TALLMAX^M plus^T

FRAMED 72-CELL MODULE (1500V)

72 CELL MONOCRYSTALINE MODULE

335-365W POWER OUTPUT RANGE

18.8% MAXIMUM EFFICIENCY

0~+5W POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading comprehensive solutions provider for solar energy. We believe close cooperation with our partners is critical to success. Trina Solar now distributes its PV products to over 60 countries all over the world. Trina is able to provide exceptional service to each customer in each market and support our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners.

Comprehensive Products And System Certificates

IEC61215/IEC61738/UL1709/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO 45001: Occupational Health and Safety Management System
OHSAS 18001: Occupational Health and Safety Management System

10 Year Product Warranty - 25 Year Linear Power Warranty

LINEAR PERFORMANCE WARRANTY

Additional value from Trina Solar's linear warranty

Trinasolar

TALLMAX^M plus^T

FRAMED 72-CELL MODULE (1500V)

PRODUCTS: TSM-DE14(M) | POWER RANGE: 335-365W

ELECTRICAL DATA (STC)

Power Class	335	340	345	350	355	360	365
Power Output (P _{max}) (W)	335	340	345	350	355	360	365
Maximum Power Voltage (V _{mp}) (V)	37.9	38.2	38.4	38.5	38.7	38.9	39.1
Maximum Power Current (I _{mp}) (A)	8.84	8.90	9.00	9.09	9.17	9.26	9.35
Open Circuit Voltage (V _{oc}) (V)	46.3	46.5	46.7	46.9	47.0	47.2	47.3
Short Circuit Current (I _{sc}) (A)	9.36	9.45	9.50	9.60	9.69	9.79	9.88
Module Efficiency (%)	17.3	17.5	17.8	18.0	18.3	18.5	18.8

ELECTRICAL DATA (NOCT)

Power Class	250	253	257	261	264	268	272
Maximum Power (P _{max}) (W)	250	253	257	261	264	268	272
Maximum Power Voltage (V _{mp}) (V)	35.1	35.2	35.5	35.6	35.8	35.9	36.1
Maximum Power Current (I _{mp}) (A)	7.12	7.19	7.25	7.33	7.40	7.47	7.54
Open Circuit Voltage (V _{oc}) (V)	43.1	43.2	43.4	43.5	43.7	43.8	43.9
Short Circuit Current (I _{sc}) (A)	7.56	7.63	7.67	7.75	7.82	7.88	7.95

MECHANICAL DATA

Solar Cells: Monocrystalline 156.75 x 156.75 mm (6 inches)

Cell Orientation: 72 cells (6 x 12)

Module Dimensions: 1956 x 992 x 40 mm (77.0 x 39.1 x 1.57 inches)

Weight: 26.0 kg (57.3 lb) with 4.0 mm glass

Glass: 4.0 mm (1.6 inches) High Transmission, AR Coated Tempered Glass

Backsheet: White

Frame: Silver Anodized Aluminum Alloy

J-Box: IP 67 or IP 68 rated

Cables: Photovoltaic Technology Cable 4.0mm² (0.006 inches²), 1200 mm (47.2 inches)

Connector: MC4 or Amphion H4/UTX (1500V)

Fire Type: Type 1 or Type 2

TEMPERATURE RATINGS

NOCT (Normal Operating Cell Temperature): 44°C (12°C)

Temperature Coefficient of P_{max}: -0.39%/°C

Temperature Coefficient of V_{oc}: -0.29%/°C

Temperature Coefficient of I_{sc}: 0.05%/°C

MAXIMUM RATINGS

Operational Temperature: -40~+85°C

Maximum System Voltage: 1500V DC (IEC)

Maximum Voltage (V_{oc}): 1500V DC (UL)

Max Series Fuse Rating: 15A

PACKAGING CONFIGURATION

10 year Product Workmanship Warranty

25 year Linear Power Warranty

Modules per box: 27 pieces

Modules per container: 648 pieces

WARRANTY

10 year Product Workmanship Warranty

25 year Linear Power Warranty

Please refer to product warranty for details

Trinasolar

HSL 60 | Poly UL

Hanwha Solar

Five Key Features

- Guaranteed quality: 12 year product warranty, 25 year linear performance warranty*
- Innovation solutions: UL certified up to 1000V for optimized system designs
- Robust design: certified to withstand up to 4000 Pa wind load and up to 7000 Pa snow load**
- Developed Technology: New Hanwha Q CELLS-cell based module
- Anti-PID: Modules are qualified to withstand PID***

Quality and Environmental Certificates

- ISO 9001 quality standards and ISO 14001 environmental standards
- OHSAS 18001 occupational health and safety standards
- UL 1703 1000V certification
- CEC listed

About Hanwha Solar

Hanwha Solar is a vertically integrated manufacturer of photovoltaic modules designed to meet the needs of the global energy consumer.

- High reliability, guaranteed quality, and excellent cost-efficiency due to vertically integrated production and control of the supply chain
- Optimization of product performance and manufacturing processes through a strong commitment to research and development
- Global presence throughout Europe, North America and Asia, offering regional technical and sales support

Hanwha Solar

HSL 60 | Poly UL

Electrical Characteristics

Electrical Characteristics at Standard Test Conditions (STC)

Power Class	240 W	245 W	250 W	255 W	260 W
Maximum Power (P _{max})	240W	245W	250W	255W	260W
Open Circuit Voltage (V _{oc})	37.3 V	37.5 V	37.7 V	37.9 V	38.1 V
Short Circuit Current (I _{sc})	8.64A	8.73 A	8.82 A	8.91A	8.99 A
Voltage at Maximum Power (V _{mp})	29.4V	29.6 V	29.8V	30.0 V	30.1 V
Current at Maximum Power (I _{mp})	8.17 A	8.28 A	8.39A	8.51 A	8.64A
Module Efficiency (%)	14.8 %	15.1 %	15.5 %	15.8 %	16.1 %

Electrical Characteristics at Normal Operating Cell Temperature (NOCT)

Power Class	240 W	245 W	250 W	255 W	260 W
Maximum Power (P _{max})	175 W	179 W	182 W	186 W	190 W
Open Circuit Voltage (V _{oc})	34.9 V	35.1 V	35.3 V	35.5 V	35.7 V
Short Circuit Current (I _{sc})	6.96 A	7.03 A	7.11 A	7.18 A	7.24 A
Voltage at Maximum Power (V _{mp})	26.6 V	26.8 V	26.9 V	27.1 V	27.2 V
Current at Maximum Power (I _{mp})	6.58 A	6.68 A	6.77 A	6.87 A	6.99 A
Module Efficiency (%)	13.5 %	13.8 %	14.1 %	14.4 %	14.7 %

Mechanical Characteristics

Dimensions: 1636mm x 988mm x 40mm

Weight: 19±0.5kg

Frame: Aluminum alloy, available in silver or black finish

Tempered Glass

Encapsulant: EVA

Back Cover: White or black back sheet

Cell Technology: Polycrystalline

Cell Size: 156 mm x 156 mm (6 in x 6 in)

Number of Cells (Pieces): 60 (6 x 10)

Junction Box: Protection class IP 67; with bypass-diode

Output Cables: Solar cable: 4 mm²; length: 1000 mm

Connector: Amphion H4

System Design

Operating Temperature: -40°C to 85°C

Hail Safety Impact Velocity: 25 mm at 23 m/s

Fire Safety Classification (IEC 61730): Class C

Static Load Wind/Snow: 4000Pa/7000Pa

Packaging and Storage

Storage Temperature: -40°C to 85°C

Packaging Configuration: 24 pieces per pallet

Loading Capacity (40 Ft. HQ Container): 672 pieces

Hanwha Solar

SunPower® E-Series Commercial Solar Panels | E20-435-COM

More than 20% Efficiency
Captures more sunlight and generates more power than conventional panels.

High Performance
Delivers excellent performance in real-world conditions, such as high temperatures, clouds and low light.^{1,2,4}

Utility Grade
Optimized to maximize returns, the E-Series panel is a bankable solution for large-scale power plants.

High Performance & Excellent Reliability

High Efficiency³
Generate more energy per square foot
E-Series commercial panels convert more sunlight to electricity by producing 31% more power per panel¹ and 60% more energy per square foot over 25 years.^{1,3}

High Energy Production⁴
Produce more energy per rated watt
More energy to power your operations. High year-one performance delivers 7-9% more energy per rated watt.² This advantage increases over time, producing 20% more energy over the first 25 years to meet your needs.³

Engineered for Peace of Mind
Designed to deliver consistent, trouble-free energy over a very long lifetime.^{1,4}

Designed for Reliability
The SunPower Maxeon Solar Cell is the only cell built on a solid copper foundation. Virtually impervious to the corrosion and cracking that degrade conventional panels.¹

#1 Rank in Fraunhofer durability test.⁵
100% power maintained in Atlas 25+ comprehensive durability test.¹⁰

20% More Energy per Rated Watt

Year 1 Energy Advantage

SUNPOWER

SunPower® E-Series Commercial Solar Panels | E20-435-COM

Power Warranty

Product Warranty

More guaranteed power: 95% for first 5 years, -0.4%/yr. to year 25¹

Combined Power and Product defect 25-year coverage²

Electrical Data

	SPR-E20-435-COM	SPR-E19-410-COM
Nominal Power (P _{nom}) ¹	435 W	410 W
Power Tolerance	+/- 5%	+/- 5%
Avg. Panel Efficiency ²	20.3%	19.1%
Rated Voltage (V _{mp})	72.9 V	72.9 V
Rated Current (I _{mp})	5.97 A	5.62 A
Open Circuit Voltage (V _{oc})	85.6 V	85.3 V
Short Circuit Current (I _{sc})	6.43 A	6.01 A
Max. System Voltage	1000 V UL & 1000 V IEC	1000 V UL & 1000 V IEC
Maximum Series Fuse	15 A	15 A
Power Temp. Coef.	-0.35% / °C	-0.35% / °C
Voltage Temp. Coef.	-235.5 mV / °C	-235.5 mV / °C
Current Temp. Coef.	2.6 mA / °C	2.6 mA / °C

Tests And Certifications

Standard Tests³: UL 703 (Type 2 Fire Rating), IEC 61215, IEC 61730

Quality Certs: ISO 9001:2008, ISO 14001:2004

EHS Compliance: RoHS, OHSAS 18001:2007, lead free, REACH

Sustainability: SVHC: 163, PV Cycle

Cradle to Cradle Certified⁴ Silver (eligible for LEED points)¹⁴

Armstrong Test: IEC 62716

Desert Test: 10.1109/PVSC.2013.6744437

Salt Spray Test: IEC 61701 (maximum severity)

PID Test: Potential-Induced Degradation free: 1000 V⁶

Available Listings: UL, TÜV, PSE, CEC

Operating Condition And Mechanical Data

Temperature: -40° F to +185° F (-40° C to +85° C)

Impact Resistance: 1 inch (25 mm) diameter hail at 52 mph (23 m/s)

Appearance: Class B

Solar Cells: 128 Monocrystalline Maxeon Gen II

Tempered Glass: High transmission tempered anti-reflective

Junction Box: IP-65, 680 mm cables / MC4 Compatible

Weight: 56 lbs (25.4 kg)

Max. Load: Wind: 50 psf, 2400 Pa, 244 kg/m² front & back
Snow: 11.2 psf, 5400 Pa, 550 kg/m² front

Frame: Class 2 silver anodized, stacked pips

REFERENCES

1. All comparisons are SPR-E20-327 vs. a representative conventional panel: 250 W, approx. 16.1% efficiency.

2. Typically 7-9% more energy per watt. ©NREL Engineering "SunPower Field Report" Jan 2013.

3. SunPower 620kW degradation vs. 120kW some panel. Campbell, Z. et al. "SunPower Module Degradation Rate." SunPower white paper, Feb 2013; Jordan, Dirk "SunPower Test Report." NREL, Q1-2015.

4. "SunPower Module: 40 Year Useful Life." SunPower white paper, May 2015. Useful life is 99 out of 100 panels operating at more than 70% of rated power.

5. Second highest, after SunPower V-Series, of over 3200 silicon solar panels, Photon Module Survey, Feb 2014.

6. 8% more energy than the average of the top 10 panel companies tested in 2012 (51 panels, 102 companies), Photon International, Feb 2013.

7. Compared with the top 15 manufacturers. SunPower Warranty Review, May 2015.

8. Some restrictions and exclusions may apply. See warranty for details.

9. 5 of top 8 panel manufacturers tested in 2013 report. 3 additional panels in 2014. Ferrara, C. et al. "Fraunhofer PV Durability Initiative for Solar Modules: Part 2." Photovoltaics International, 2014.

10. Compared with the non-stress tested control panel. Atlas 25+ Durability Test Report, Feb 2013.

11. Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25 °C, NREL calibration Standard: S065 current, LKCS-IF and voltage).

12. Based on average of measured power values during production.

13. Type 1 fire rating per UL 7103:2013, Class C fire rating per UL 7103:2002.

14. See datasheet for details.

SUNPOWER

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Exp. 6/30/19
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SAN LUIS OBISPO, CA 93407

PROJECT

CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93407

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

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: MODULE SPECIFICATIONS SHEETS

SHEET NUMBER: PV601

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



SB3.0-US-40 / SB3.8-US-40 / SB5.0-US-40 / SB6.0-US-40 / SB7.0-US-40 / SB7.7-US-40



COMPLIANT TO UL 1741 SA
GRID SUPPORT UTILITY INTERACTIVE INVERTER



Value-Added Improvements

- Superior integration with SMA's MPE Power Solution
- World's first Secure Power Supply* now offers up to 2,000 W
- Full grid management capabilities ensure a utility-compliant solution for any market

Reduced Labor

- New Installation Assistant with direct access via smartphone minimizes time in the field
- Advanced communication interface with fewer components creates 50% faster setup and commissioning

Unmatched Flexibility

- SMA's proprietary OptiTrac™ Global Peak technology mitigates shade with ease
- Multiple independent MPPTs accommodate hundreds of stringing possibilities

Trouble-Free Servicing

- Two-part enclosure concept allows for simple, expedient servicing
- Equipped with SMA Smart Connected, a proactive service solution that is integrated into Sunny Portal

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

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/7.7-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

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	
	CSK-1-40P	CSK-6-FF-40P	FSK-6-FF-40P	F2SK-6-FF-40P	F2SK64-4-FF-N4	F2SK32-1-40P	F4SK32-1-40P	
Product Part Number	CSK-1-40P	CSK-6-FF-40P	FSK-6-FF-40P	F2SK-6-FF-40P	F2SK64-4-FF-N4	F2SK32-1-40P	F4SK32-1-40P	
Topology	Grounded or Floating	Grounded	Floating	Floating	Floating	Floating	Floating	
Maximum Voltage	1000 VDC	1000 VDC	1000 VDC	1000 VDC	1000 VDC	1000 VDC	1000 VDC	
Integrated Load Break Disconnect	No	No	No	No	Yes	Yes	Yes	
Number of Input Circuits	6	6	6	2x6	2x4	2	4	
Number of Output Circuits	6	1	1	2	2	2	4	
Input Conductor Size Range (AWG)	#20-6	#14-8	#14-8	#14-8	#14-8	#14-8	#14-8	
Output Conductor Size Range (AWG)	#20-6	#14-2	#14-2	#14-2	#12-2	#14-8	#14-8	
Max Rated Current (ADC cont. per output circuit)	30	75	75	2x75	2x64	32	32	
Max Fuse Size (Amps)	N/A	30	30	30	30	N/A	N/A	
Enclosure Size (Inches)	9x8x2	9x8x2	12x10x4	16x14x7	20x20x6	10x8x4	12x10x4	
Approx. Weight (Pounds)	4	4	10	14	20	6	10	
Enclosure NEMA Rating	4X	4X	4X	4X	4	4X	4X	

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

SolarBOS, Inc. | T: 925-456-7744 | sales@solarbos.com | www.solarbos.com

RAPID SHUTDOWN SYSTEM



Reliable

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

Perfect alignment

- Engineered for Sunny Boy-US and Sunny Boy TL-US inverter lines with multiple MPPT tracking channels
- Compatible with Secure Power Supply

Code compliant

- UL Certified and compliant with 2014 NEC 690.12 Rapid Shutdown
- No interference with AFCI function of Sunny Boy inverters

Cost effective

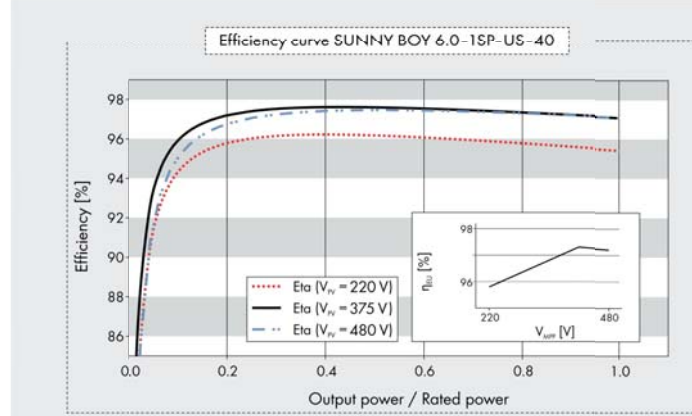
- Incorporated junction box reduces equipment and speeds installation time
- Pre-wired MC4 connectors and snap terminals reduce materials and installation time

RAPID SHUTDOWN SYSTEM

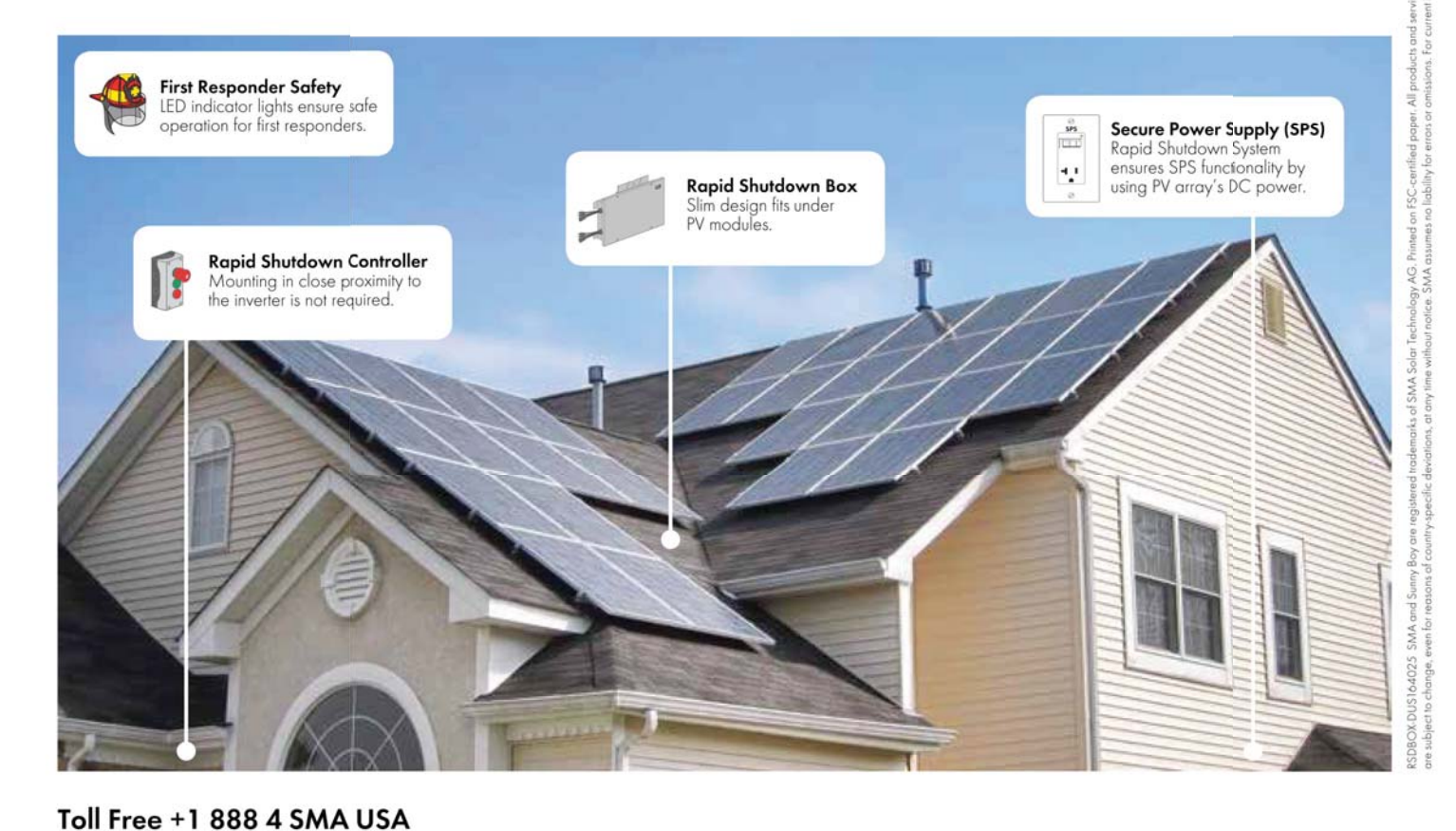
Cost-effective system compliance

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	
	208 V	240 V	208 V	240 V	208 V	240 V
Input (DC)						
Max. usable DC power	3100 W	3100 W	3450 W	4000 W	5150 W	5150 W
Max. DC voltage	600 V		600 V		600 V	
Rated MPPT voltage range	155 - 480 V		195 - 480 V		220 - 480 V	
MPPT operating voltage range	100 - 550 V		100 - 550 V		100 - 550 V	
Max. DC voltage / start voltage	100 V / 125 V		100 V / 125 V		100 V / 125 V	
Max. operating input current per MPPT	10 A		10 A		10 A	
Max. short circuit current per MPPT	18 A		18 A		18 A	
Number of MPPT tracker / string per MPPT tracker	2/1		2/1		5/1	
Output (AC)						
AC nominal power	3000 W	3000 W	3330 W	3800 W	5000 W	5000 W
Max. AC apparent power	3000 VA	3000 VA	3330 VA	3800 VA	5000 VA	5000 VA
Nominal voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V
AC grid frequency	60 Hz / 50 Hz		60 Hz / 50 Hz		60 Hz / 50 Hz	
Max. output current	14.5 A	12.5 A	16.0 A	16.0 A	24.0 A	24.0 A
Power factor (cos φ)	1 / 2		1 / 2		1 / 2	
Output phases / line connections	1 / 2		1 / 2		1 / 2	
Harmonics	< 4 %		< 4 %		< 4 %	
Efficiency						
Max. efficiency	97.2 %	97.6 %	97.2 %	97.5 %	97.2 %	97.5 %
CEC efficiency	96 %	96.5 %	96.5 %	96.5 %	96.5 %	97 %
Protection devices						
DC disconnect device	●					
DC reverse polarity protection	●					
Ground fault monitoring / Grid monitoring	●					
AC short circuit protection	●					
Allpole sensitive residual current monitoring unit (RCMU)	●					
AC fault circuit interrupter (AFCI)	●					
Protection class / overvoltage category	I / IV					
General data						
Dimensions (W x H x D) in mm (in)	335 x 730 x 198 (13.2 x 28.7 x 7.8)		335 x 730 x 198 (13.2 x 28.7 x 7.8)		600 x 800 x 300 (23.6 x 31.5 x 11.8)	
Packaging dimensions (W x H x D) in mm (in)	600 x 800 x 300 (23.6 x 31.5 x 11.8)		600 x 800 x 300 (23.6 x 31.5 x 11.8)		600 x 800 x 300 (23.6 x 31.5 x 11.8)	
Weight / packaging weight	26 kg (57 lb) / 30 kg (66 lb)		26 kg (57 lb) / 30 kg (66 lb)		26 kg (57 lb) / 30 kg (66 lb)	
Operating temperature range	-25°C to +60°C					
Noise emission (typical)	39 dB(A)					
Internal power consumption at night	< 5 W					
Topology	Transformerless					
Cooling concept	Convection					
Features						
Ethernet ports	2					
Secure Power Supply	●					
Display (2 x 16 characters)	●					
Wi-Fi	●					
Sensor module / External WLAN antenna	○ / ○					
Warranty: 10 / 15 / 20 years	● / ○ / ○					
Certificates and approvals	UL 1741, UL 1998, UL 16998, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1					
Standard features	○ Optional features — Not available					
Type designation	SB3.0-US-40		SB3.8-US-40		SB5.0-US-40	



Technical data	Rapid Shutdown Box
General data	
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	30 A DC
Integrated power supply	DC powered by PV array (max. 5W)
Ambient temperature range	-40°C to +75°C
Dimensions without pre-wired cables (W x H x D)	542 x 340 x 75 mm / 21.3 x 13.4 x 2.95 in
Weight	3.8 kg / 8.4 lb
DC input	Cable whip with MC4 connectors
Wire size DC outputs	AWG 12 to AWG 6
Wire size control wires	AWG 18 to 16
Wire size grounding	AWG 10 to AWG 6
Enclosure rating	Type 4X
Enclosure finish	Aluminum
Conduit size (home run)	3/4 inch conduit
Conduit size (control wiring)	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	RSB25US-10
Technical data	
General data	
Status indicator	2 LEDs
Dimensions (W x H x D)	80 x 153 x 104 mm / 3.15 x 6.02 x 4.1 in
Weight	0.3 kg / 0.72 lb
Ambient temperature range	-25°C to +70°C
Enclosure rating	Type 4X
Enclosure finish	Polycarbonate
Type designation	RSC1XUS-10



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www.SMA-America.com

SMA America, LLC

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PROJECT

CAL POLY ACADEMIC LAB
1 GRAND AVE., BUILDING 70
SAN LUIS OBISPO, CA 93407

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
10/26/2018	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
INVERTER SPECIFICATIONS SHEETS

SHEET NUMBER
PV602

POINT OF CONNECTION

N8 AC OUTPUT 6" X 3" RED W/ WHT LTRS

RATED AC OUTPUT OPERATING CURRENT: 32A
NOMINAL AC OPERATING VOLTAGE: 208V

DANGER

AUTHORIZED PERSONNEL ONLY
- WARNING -
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDE MAY BE ENERGIZED IN OPEN POSITION

REC SOLAR
www.rec-solar.com

• TO BE MOUNTED ON EACH SERVICE INTERCONNECTION POINT

QTY - 1

N6 MAP 6" X 10" RED W/ WHT LTRS

CAUTION:
PHOTOVOLTAIC POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCE WITH DISCONNECTS AS SHOWN

REC SOLAR
www.rec-solar.com

• TO BE MOUNTED ON EACH SERVICE INTERCONNECTION AND AC DISCONNECTING MEANS

QTY - 2

OPTIONAL
FOR ROOFTOP SYSTEMS IF NOT ADDED TO THE MAP PLACARD

- MOUNT ON EACH SERVICE INTERCONNECTION POINT
- MUST BE A REFLECTIVE PLACARD

AC DISCONNECTS

N8 AC OUTPUT 6" X 3" RED W/ WHT LTRS

RATED AC OUTPUT OPERATING CURRENT: 32A
NOMINAL AC OPERATING VOLTAGE: 208V

DANGER

AUTHORIZED PERSONNEL ONLY
- WARNING -
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDE MAY BE ENERGIZED IN OPEN POSITION

REC SOLAR
www.rec-solar.com

• TO BE MOUNTED ON EACH SERVICE INTERCONNECTION POINT

PANEL BOARDS

N8 AC OUTPUT 6" X 3" RED W/ WHT LTRS

RATED AC OUTPUT OPERATING CURRENT: 32A
NOMINAL AC OPERATING VOLTAGE: 208V

DANGER

AUTHORIZED PERSONNEL ONLY
- WARNING -
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDE MAY BE ENERGIZED IN OPEN POSITION

REC SOLAR
www.rec-solar.com

• TO BE MOUNTED ON EACH SERVICE INTERCONNECTION POINT

STRING INVERTERS

PHOTOVOLTAIC ARRAY CHARACTERISTICS

SYSTEM SIZE: 6.80 KW
SYSTEM OPEN CIRCUIT VOLTAGE: 503.6 V DC
SYSTEM OPERATING VOLTAGE: 382 V DC
MAXIMUM ALLOWABLE DC VOLTAGE: 1000 V DC
SYSTEM OPERATING CURRENT: 17.8 A DC
SYSTEM SHORT CIRCUIT CURRENT: 23.63 A DC

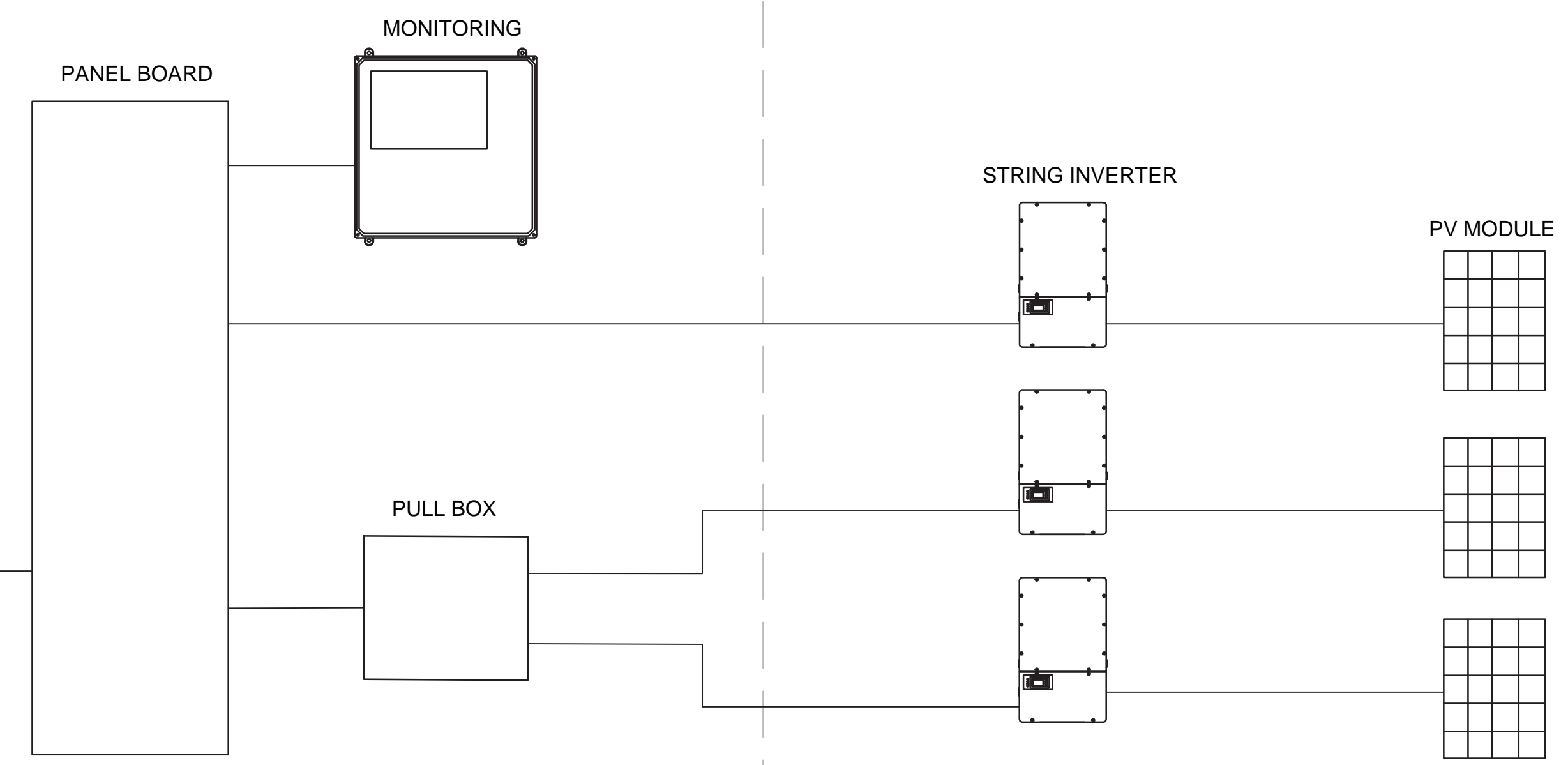
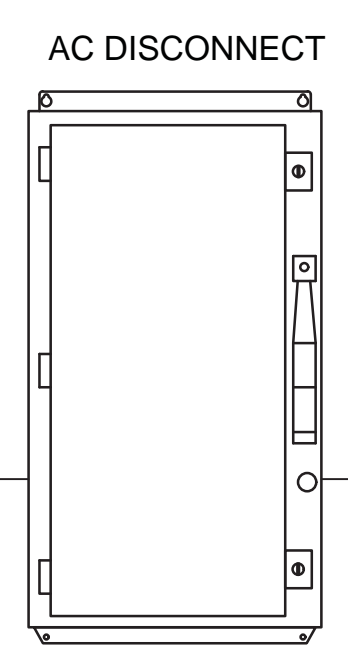
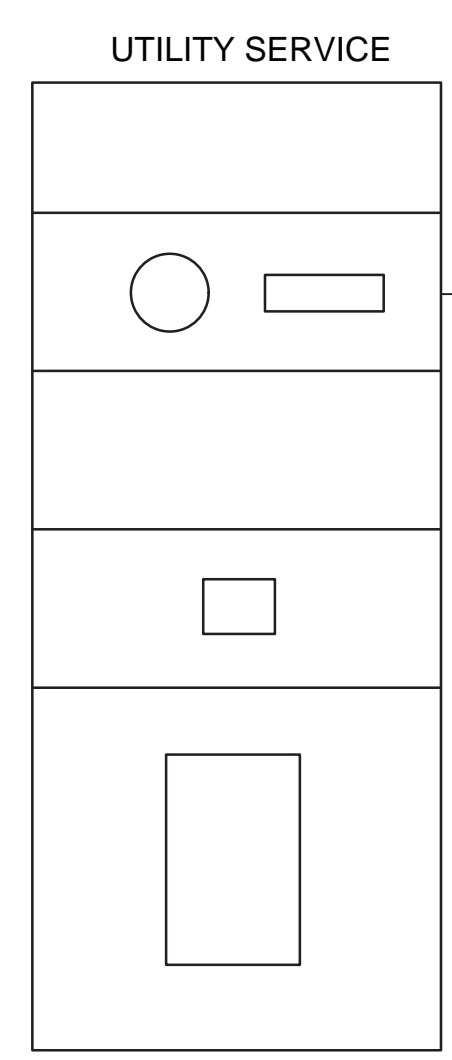
N7 ARRAY CHARACTERISTICS

6" X 3" RED W/ WHT LTRS

QTY - 2

• TO BE MOUNTED ON EACH DC DISCONNECTING MEANS FOR INV 1 & INV2

PLACARDS



CONDUITS AND ENCLOSURES

#02-314 REFLECTIVE

WARNING: PHOTOVOLTAIC POWER SOURCE

#

1-1/2" X 1-1/2" RED W/ WHT LTRS
MATERIAL: UL 969 & UV RATED

5 3/4" X 1 1/8"

• ON ALL DC CONDUIT EVERY 10' AND 3' FROM BOXES

R14 LETTERS AND NUMBERS

• FOR NUMBERING ALL PHOTOVOLTAIC ENCLOSURES PER PLANS

PANEL BOARDS

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

4" X 3"

• ONE STICKER PER PANELBOARD

WARNING
PHOTOVOLTAIC SYSTEM COMBINER PANEL
DO NOT ADD LOADS

4" X 2"

• ONE STICKER PER PANELBOARD

WARNING
ARC FLASH HAZARD AND SHOCK RISKS

APPROPRIATE PPE REQUIRED

- FLASH HAZARD BOUNDARY
- FLASH HAZARD AT (C) IN
- (E) SHIRT & PANTS OR COVERALL, NONMELTING (ASTM F 1506) OR UNTREATED FIBER
- SHOCK HAZARD WHEN COVER IS REMOVED
- GLOVE GLASS
- LIMITED APPROACH
- RESTRICTED APPROACH
- PROHIBITED APPROACH

LOCATION: PANEL BOARD

R14 LETTERS AND NUMBERS

1-1/2" X 1-1/2" RED W/ WHT LTRS
MATERIAL: UL 969 & UV RATED

• FOR NUMBERING ALL PHOTOVOLTAIC ENCLOSURES PER PLANS

STRING INVERTER

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

4" X 3"

• ONE STICKER PER INVERTER

WARNING
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

4" X 3"

• ONE STICKER PER INVERTER

WARNING
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

4" X 3"

• ONE STICKER PER INVERTER

WARNING
DC DISCONNECT

DC Disconnect

• ONE STICKER PER CONNECTION UNIT

R14 LETTERS AND NUMBERS

1-1/2" X 1-1/2" RED W/ WHT LTRS
MATERIAL: UL 969 & UV RATED

• FOR NUMBERING ALL PHOTOVOLTAIC ENCLOSURES PER PLANS

POINT OF CONNECTION

WARNING
ARC FLASH HAZARD AND SHOCK RISKS

APPROPRIATE PPE REQUIRED

- FLASH HAZARD BOUNDARY
- FLASH HAZARD AT (C) IN
- (E) SHIRT & PANTS OR COVERALL, NONMELTING (ASTM F 1506) OR UNTREATED FIBER
- SHOCK HAZARD WHEN COVER IS REMOVED
- GLOVE GLASS
- LIMITED APPROACH
- RESTRICTED APPROACH
- PROHIBITED APPROACH

LOCATION: POINT OF CONNECTION

4" X 3"

#211 : NEC 690.64, 705.12(4)

WARNING
DUAL POWER SUPPLY SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

Service Panel

• ONE STICKER PER POINT OF CONNECTION EQUIPMENT

#03-3101 EMERGENCY CONTACT
2 1/2" X 1" RED W/ WHT LTRS

FOR SERVICE OR IN CASE OF EMERGENCY CONTACT REC SOLAR 844 REC SOLAR - (844) 732-7652

• TO BE MOUNTED AT EACH EQUIPMENT PAD AND EACH SERVICE CONNECTION

• ONE OR PLACARD PER EQUIPMENT PAD LOCATION

#322 : Local Building Codes

WARNING
SOLAR ELECTRIC BREAKER IS BACKFED

Panel with Solar Backfed Breaker

• ONE STICKER PER LOAD SIDE BREAKER CONNECTION

#344

PV SOLAR BREAKER
DO NOT RELOCATE THIS OVERCURRENT DEVICE

• ONE STICKER PER LOAD SIDE BREAKER CONNECTION

AC DISCONNECTS

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

4" X 3"

• ONE STICKER PER AC DISCONNECT

WARNING
ARC FLASH HAZARD AND SHOCK RISKS

APPROPRIATE PPE REQUIRED

- FLASH HAZARD BOUNDARY
- FLASH HAZARD AT (C) IN
- (E) SHIRT & PANTS OR COVERALL, NONMELTING (ASTM F 1506) OR UNTREATED FIBER
- SHOCK HAZARD WHEN COVER IS REMOVED
- GLOVE GLASS
- LIMITED APPROACH
- RESTRICTED APPROACH
- PROHIBITED APPROACH

LOCATION: AC DISCONNECT

4" X 3"

#333 : Local Building Codes

MAIN SOLAR SYSTEM AC DISCONNECT

AC Disconnect

• ONE STICKER ON MAIN AC DISCONNECT

WARNING: PHOTOVOLTAIC POWER SOURCE

5 3/4" X 1 1/8"

PV LOCAL AC DISCONNECT

#323 : NEC 690.14(2)

AC DISCONNECT

AC Disconnect

• ONE STICKER ON EACH LOCAL AC DISCONNECT

R14 LETTERS AND NUMBERS

1-1/2" X 1-1/2" RED W/ WHT LTRS
MATERIAL: UL 969 & UV RATED

• FOR NUMBERING ALL PHOTOVOLTAIC ENCLOSURES PER PLANS

MONITORING ENCLOSURE

WARNING
ARC FLASH HAZARD AND SHOCK RISKS

APPROPRIATE PPE REQUIRED

- FLASH HAZARD BOUNDARY
- FLASH HAZARD AT (C) IN
- (E) SHIRT & PANTS OR COVERALL, NONMELTING (ASTM F 1506) OR UNTREATED FIBER
- SHOCK HAZARD WHEN COVER IS REMOVED
- GLOVE GLASS
- LIMITED APPROACH
- RESTRICTED APPROACH
- PROHIBITED APPROACH

LOCATION: MONITORING ENCLOSURE

4" X 3"

#03-3101 EMERGENCY CONTACT
2 1/2" X 1" RED W/ WHT LTRS

FOR SERVICE OR IN CASE OF EMERGENCY CONTACT REC SOLAR 844 REC SOLAR - (844) 732-7652

• TO BE MOUNTED AT EACH EQUIPMENT PAD AND EACH SERVICE CONNECTION

#03-3100 COMMUNICATION EQUIPMENT
2 1/2" X 1" RED W/ WHT LTRS

PHOTOVOLTAIC SYSTEM COMMUNICATION EQUIPMENT - WARNING
ELECTRIC SHOCK HAZARD

• TO BE MOUNTED ON EACH COMMUNICATIONS EQUIPMENT BOX

• ONE STICKER OR PLACARD PER MONITORING ENCLOSURE

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

4" X 3"

• ONE STICKER PER INVERTER

WARNING
IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

4" X 3"

• ONE STICKER PER INVERTER

WARNING
DC DISCONNECT

DC Disconnect

• ONE STICKER PER CONNECTION UNIT

R14 LETTERS AND NUMBERS

1-1/2" X 1-1/2" RED W/ WHT LTRS
MATERIAL: UL 969 & UV RATED

• FOR NUMBERING ALL PHOTOVOLTAIC ENCLOSURES PER PLANS

LABELS

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

MARTIN E. WOJCIK
No. E013176
Exp. 6/30/19
ELECTRICAL
STATE OF CALIFORNIA

SONOMA ELECTRICAL ENGINEERING, INC.
1125 SHADY OAK PLACE
SANTA ROSA, CA 95401
707-483-8829

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

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

DATE	DESCRIPTION
10/26/2018	

PROJECT NUMBER	PROJECT MANAGER	PROJECT ENGINEER	INTERN ENGINEER	CHECKED BY
30250901	KIM STRICKLAND	THOMAS CEMO	JASON CHAUVIN	JESSICA KENDRICK

PERMIT

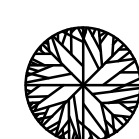



SHEET TITLE
EQUIPMENT SIGNAGE

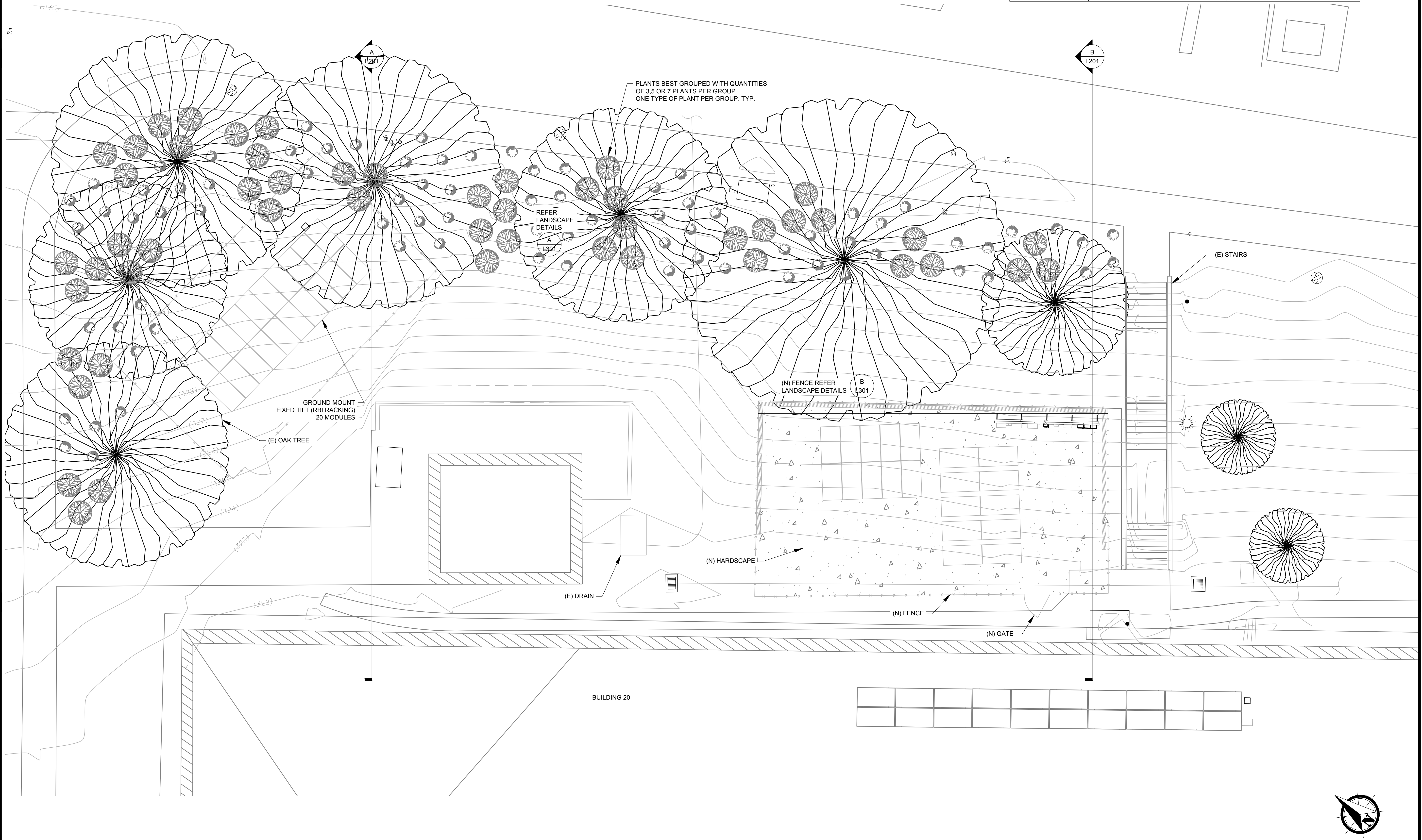
SHEET NUMBER
PV701

EQUIPMENT SIGNAGE

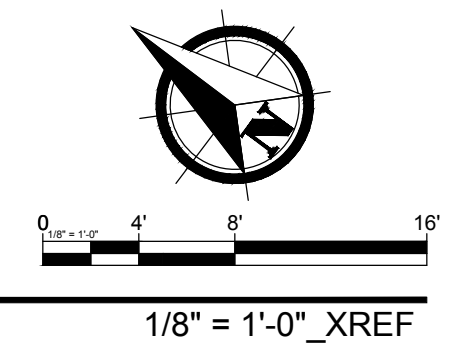
NTS

NOTE:
 1. THE COMMITTEE WOULD LIKE TO KEEP THE RHAMNUS CALIFORNICA BACK FROM ALONG THE SIDEWALK AS ITS MATURE SIZE WOULD ENCROACH 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.

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



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



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ENGINEER

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 SAN LUIS OBISPO, CA 93407

PROJECT
CAL POLY ACADEMIC LAB
 1 GRAND AVE., BUILDING 70
 SAN LUIS OBISPO, CA 93407

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0	11/08/2017	INITIAL SUBMITTAL

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

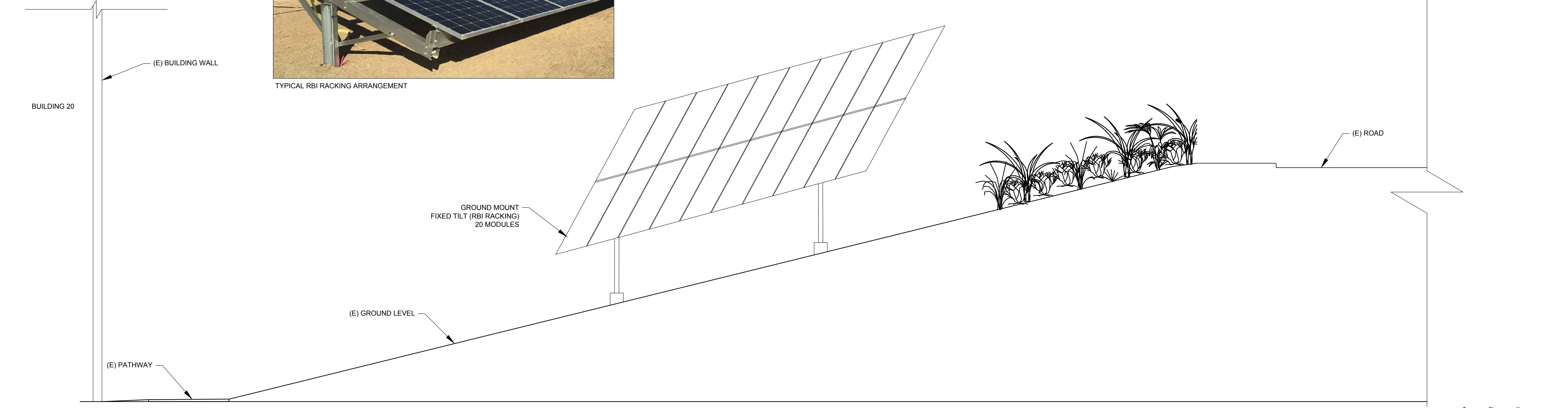
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SHEET TITLE
 LANDSCAPING & IRRIGATION - ZONE 1A, 2A & 2B - GROUND MOUNT

SHEET NUMBER
L101



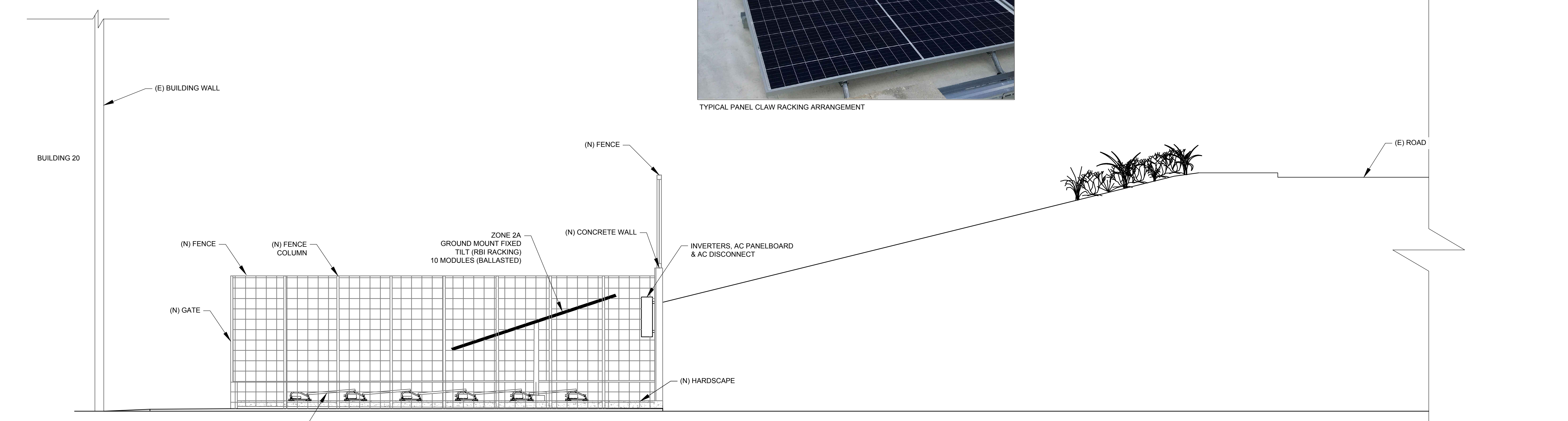
TYPICAL RBI RACKING ARRANGEMENT



A EQUIPMENT ELEVATION - ZONE 1A - GROUND MOUNT



TYPICAL PANEL CLAW RACKING ARRANGEMENT



B EQUIPMENT ELEVATION - ZONE 2A & 2B



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 SAN LUIS OBISPO, CA 93407

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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
 LANDSCAPING & IRRIGATION - GROUND MOUNT - ELEVATION
 SHEET NUMBER
L201



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

A

NTS



B

NTS



CONTRACTOR
CA - B C10 #990001
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INTERN ENGINEER	JASON CHAUVIN
CHECKED BY	JESSICA KENDRICK

PERMIT
SHEET TITLE
LANDSCAPE DETAILS
SHEET NUMBER
L301

NOTE:
 1. WHERE TREES ARE REMOVED, STUMPS SHALL BE REMOVED BY EXCAVATION OR STUMP GRINDING.
 2. THE PROJECT SHALL REPLACE TREES ON A 1:1 BASIS AT A LOCATION TBD WITH A 15 GALLON CONTAINER STOCK. SPECIES TBD.

(E) STREET TREES TO REMAIN

(E) OAK TREE TO BE REMOVED

(E) STREET TREES TO REMAIN

(E) OAK TREE TO BE REMOVED

(E) LARGE PINE TREE TO BE REMOVED

(E) TREES TO BE CUT & REMOVED

(E) TREES TO REMAIN

(E) LARGE EUCALYPTUS TO BE REMOVED

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. MUILENBERGIA 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.

A TREE REMOVAL PLAN



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 CA - B C10 #990001

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ENGINEER

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CHECKED BY	JESSICA KENDRICK

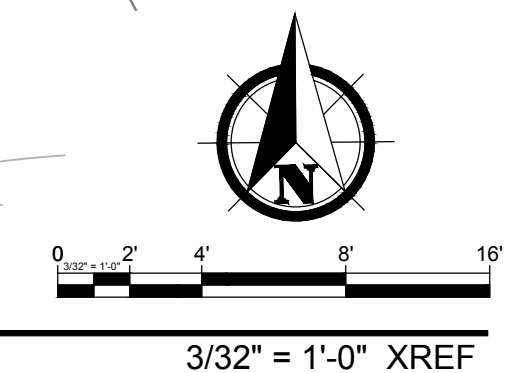
PERMIT

SHEET TITLE

TREE REMOVAL PLAN

SHEET NUMBER

L401



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

FOR



AT

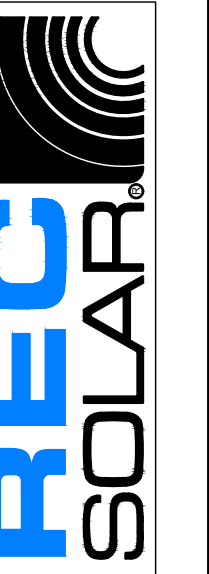
**CAL POLY ACADEMIC LAB
CAL POLY UNIVERSITY, BUILDING 20
N. POLYVIEW DR.
SAN LUIS OBISPO, CA 93407**



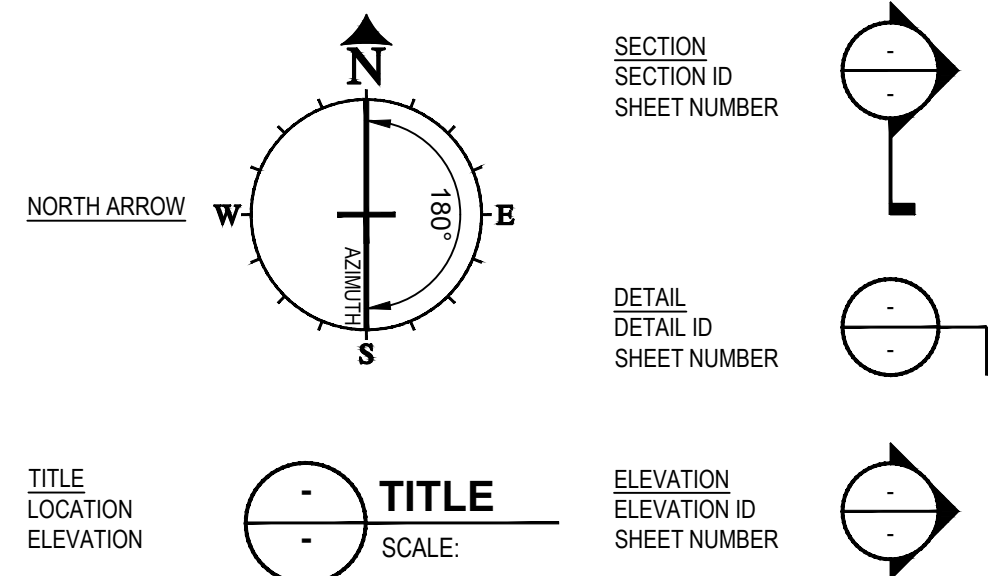
PROFESSIONAL SEAL

ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

GROUND MOUNT
FOR



SYMBOLS LEGEND



GOVERNING CODE

CALIFORNIA BUILDING CODE (CBC 2016)

RISK CATEGORY: I

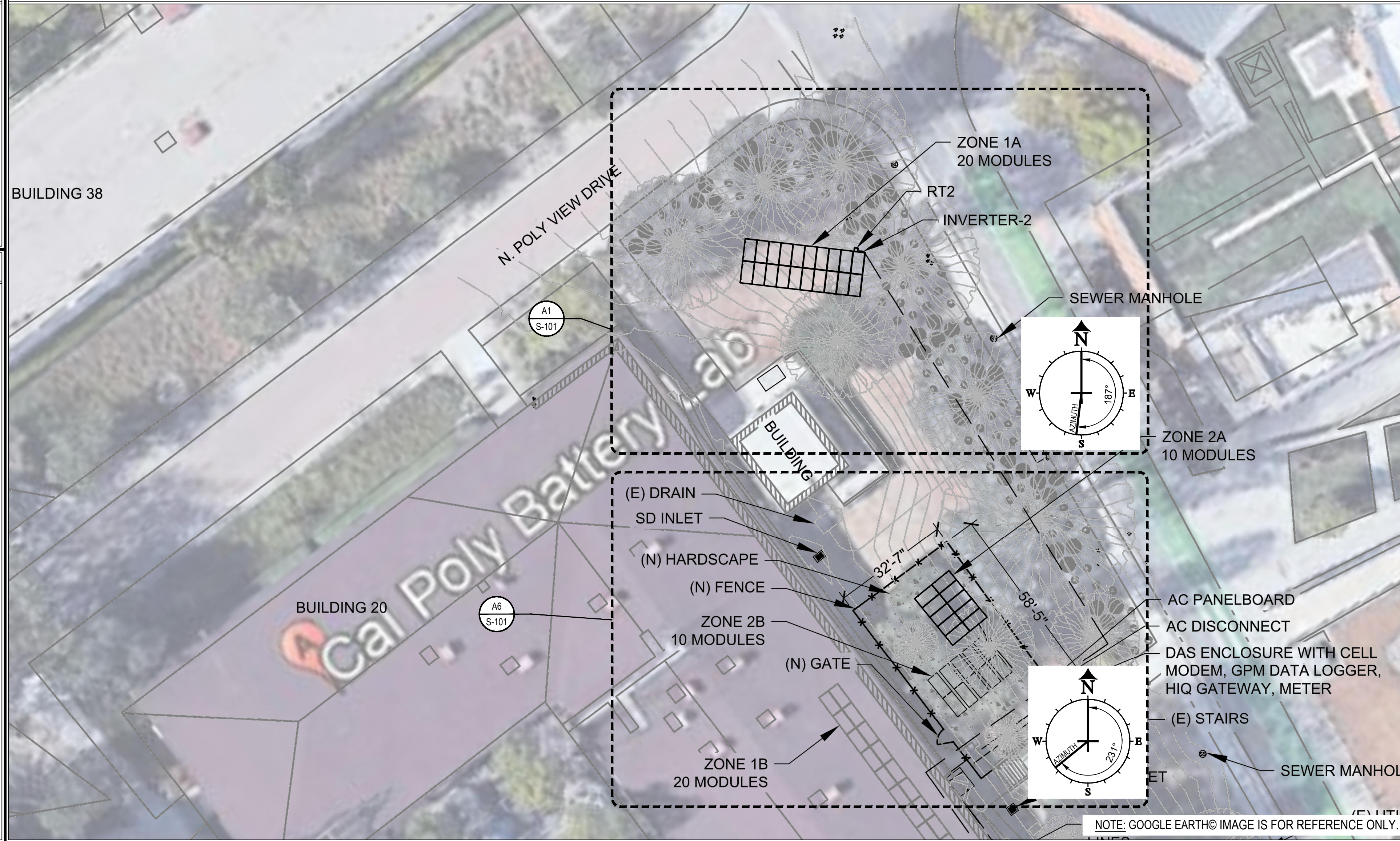
DESIGN LOADS:

- DEAD LOADS:
 - STRUCTURE: 2.0 PSF
 - GLAZING: 3.0 PSF
 - Z = 5.0 PSF
- ROOF LIVE LOAD = 0 PSF
- SNOW LOAD:
 - $P_g = 0.0$ PSF (GROUND SNOW)
 - $P_{g,s} = 0.0$ PSF (FLAT ROOF SNOW)
 - $P_{g,r} = 0.0$ PSF (SLOPED ROOF SNOW)
 - $C_{d,s} = N/A$
 - $C_{d,r} = N/A$
 - $C_{d,e} = N/A$
 - $I_s = N/A$
- WIND LOAD: (MAIN WIND FORCE RESISTING SYSTEM)
 - V = 100 MPH

EXPOSURE: C

- SEISMIC:
 - $S_{ds} = 1.153$
 - $S_{d1} = 0.439$
 - $S_{d2} = 0.798$
 - $S_{d3} = 0.457$
 - $I_e = 1.00$
 - SITE CLASS: D
 - SEISMIC DESIGN CATEGORY: D
 - SEISMIC FORCE RESISTING SYSTEM = ORDINARY STEEL MOMENT FRAMES
 - DESIGN BASE SHEAR: V = 0.798W
 - $C_d = 0.798$
 - R = 2.00
- EQUIVALENT LATERAL FORCE ANALYSIS

SITE PLAN OVERLAY



SHEET INDEX

SHEET	SHEET DESCRIPTION
G-001	COVER SHEET
G-002	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

SYSTEM SPECIFICATIONS

NOTE: THIS SUBMITTAL/CONSTRUCTION SET WAS PRODUCED FROM DOCUMENTS RECEIVED FROM CUSTOMER ON 01/19/18.

PV MODULE MANUFACTURER	TRINA 72 CELL
PV MODULE MODEL #	TSM345DD14A (II)
PV MODULE WATTAGE	345
# OF PV MODULES/STRING	TO BE PROVIDED TO RBI BY CUSTOMER
# OF ACTIVE PV MODULES	30
# OF SPARE PV MODULES	0
TOTAL # OF PV MODULES	30
TOTAL PV SYSTEM WATTS	10.35 KW DC
ARRAY TYPE	FIXED TILT
ARRAY TILT	20° +/- 2°
TOTAL # OF RACKING POSTS	3
TOTAL # OF EQUIPMENT POSTS	TO BE PROVIDED TO RBI BY CUSTOMER
TOTAL # OF BALLAST	2
MIN MODULE CLEARANCE DRIVEN	2'-0"
MIN MODULE CLEARANCE BALLAST	2'-8"
ARRAY AZIMUTH	VARIABLE (NOT ADJUSTED FOR MAGNETIC DECLINATION)

RELEASE RECORD


MARK	DATE	DESCRIPTION
06	09/25/18	CONS. SET R1
05	06/25/18	CONS. SET
04	04/13/18	100% REVIEW SET
03	04/13/18	90% REVIEW SET
02	04/10/18	75% REVIEW SET
01	04/02/18	50% REVIEW SET

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: COVER SHEET	
SHEET No.: G-001	

MODULE SPECIFICATION SHEETS

Mono Multi Solutions



THE TALLMAX plus
FRAMED 72-CELL MODULE (1500V)

72 CELL
MONOCRSTALLINE MODULE

335-365W
POWER OUTPUT RANGE

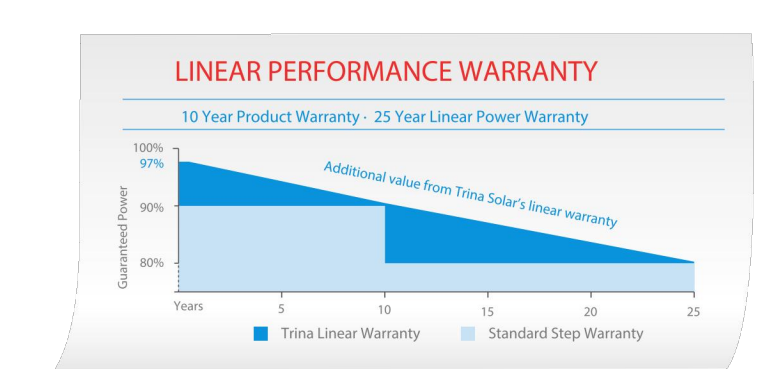
18.8%
MAXIMUM EFFICIENCY

0~+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading comprehensive solutions provider for solar energy. We believe close cooperation with our partners is critical to success. Trina Solar now distributes its PV products to over 80 countries all over the world. Trina is able to provide exceptional service to each customer in each market and supports our innovative, reliable products with the backing of Trina as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaborations with installers, developers, distributors and other partners.

Comprehensive Products And System Certificates
ISO 14001: Environmental Management System
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO 14001: Greenhouse gases (Emissions Verification)
OHSAS 18001: Occupational Health and Safety Management System

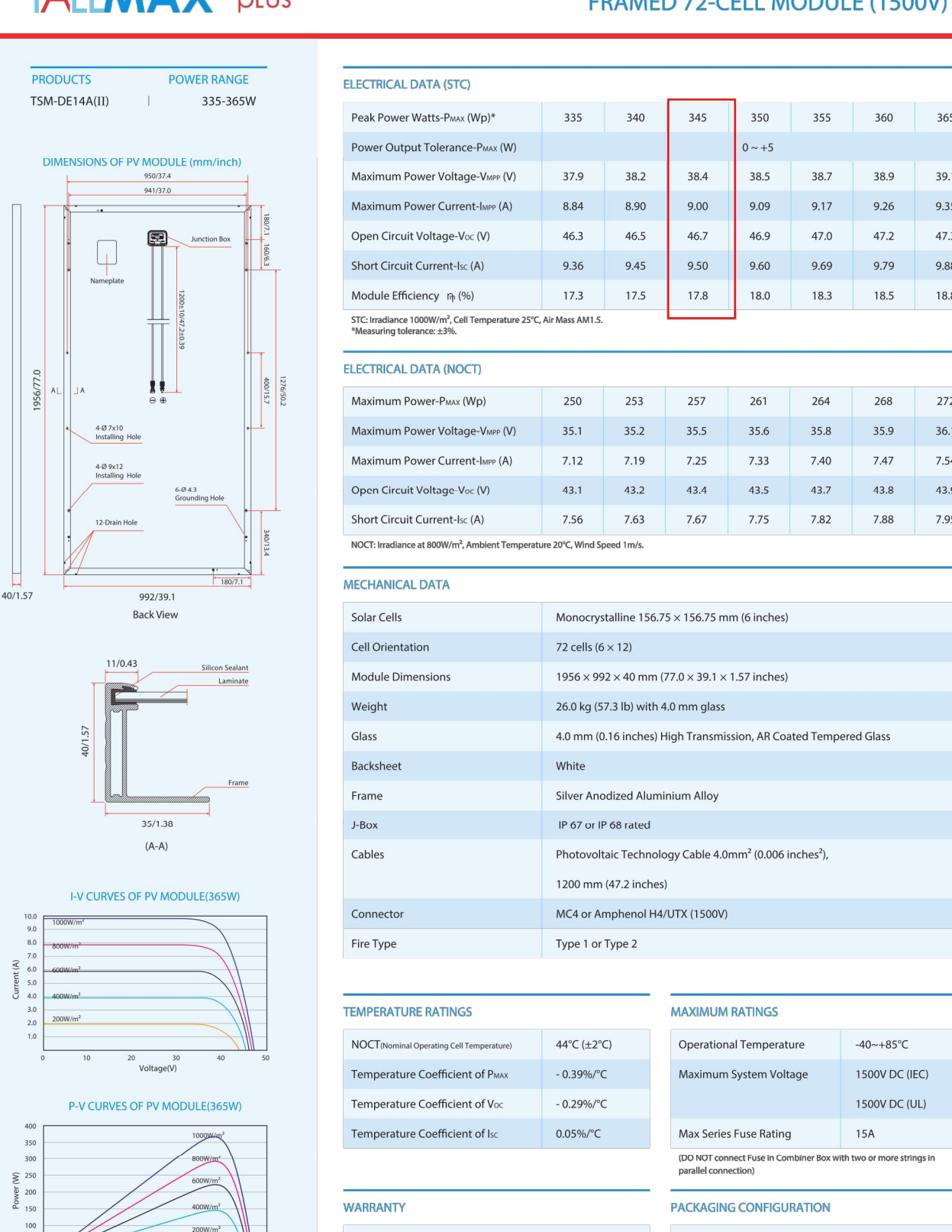
Linear Performance Warranty



Trinasolar

TALLMAX plus FRAMED 72-CELL MODULE (1500V)

PRODUCTS POWER RANGE
TSM-DE14800 | 335-365W



ELECTRICAL DATA (STC)	
Peak Power Watts (Wp)	335 340 345 350 355 360 365
Power Output Tolerance (Pwr)	0 ~ +5
Maximum Power Voltage (Vmp)	37.9 38.2 38.4 38.5 38.7 38.9 39.1
Maximum Power Current (Imp)	8.84 8.90 9.00 9.09 9.17 9.26 9.35
Open Circuit Voltage (Voc)	46.3 46.5 46.7 46.9 47.0 47.2 47.3
Short Circuit Current (Isc)	9.36 9.45 9.50 9.60 9.69 9.79 9.88
Module Efficiency (%)	17.3 17.5 17.8 18.0 18.3 18.5 18.8
1% tolerance tolerance of Cell Temperature 25°C, Air Mass AM1.5, Manufacturing tolerance ±3%	

ELECTRICAL DATA (NOCT)	
Maximum Power Watts (Wp)	250 253 257 261 264 268 272
Maximum Power Voltage (Vmp)	35.3 35.2 35.5 35.6 35.8 35.9 36.1
Maximum Power Current (Imp)	7.12 7.19 7.25 7.33 7.40 7.47 7.54
Open Circuit Voltage (Voc)	43.1 43.2 43.4 43.5 43.7 43.8 43.9
Short Circuit Current (Isc)	7.56 7.63 7.67 7.75 7.82 7.88 7.95
NOCT: Irradiance at 800W/m ² , Ambient Temperature 25°C, Wind Speed 1m/s	

MECHANICAL DATA	
Solar Cells	Monocrystalline 156.75 x 156.75 mm (6 inches)
Cell Orientation	72 cells (6 x 12)
Module Dimensions	1956 x 992 x 40 mm (77.8 x 39.1 x 1.57 inches)
Weight	26.0 kg (57.3 lb) with 4.0 mm glass
Glass	4.0 mm (0.16 inches) High Transmission, All Coated Tempered Glass
Backsheet	White
Frame	Silver Anodized Aluminum Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches) ² , 1200 mm (47.2 inches)
Connector	MC4 or Amphenol HAVUTX (1500V)
Frame Type	Type 1 or Type 2

TEMPERATURE RATINGS	
NOCT Maximal Operating Cell Temperature	44°C (122°F)
Temperature Coefficient of Pwr	-0.39%/°C
Temperature Coefficient of Voc	-0.29%/°C
Temperature Coefficient of Isc	0.05%/°C

MAXIMUM RATINGS	
Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	15A

WARRANTY
10 Year Product Workmanship Warranty
25 Year Linear Power Warranty
Please refer to product warranty for details

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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Version number: TSM_EH_2017_A www.trinasolar.com

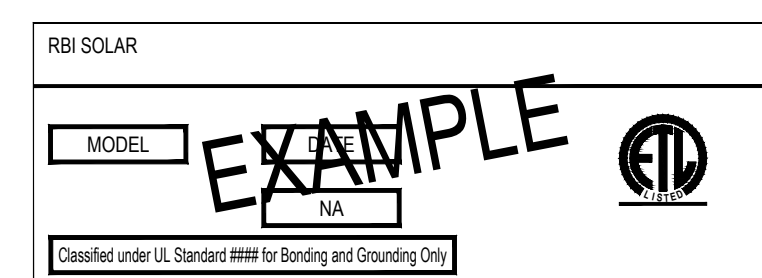
GENERAL NOTES

- GENERAL/CONSTRUCTION/SAFETY:**
- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE CONSTRUCTION CODE AND THE PROJECT SPECIFICATIONS.
 - LOCATION OF UNDERGROUND UTILITIES SHALL BE VERIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION. IN ADDITION, ALL PRIVATE UTILITIES NEED TO BE VERIFIED BEFORE EXCAVATION.
 - CONTRACTOR SHALL CALL 811 72 HOURS MINIMUM BEFORE EXCAVATION.
 - DIMENSIONS SHOWN ON PLAN SHALL BE VERIFIED IN FIELD.
 - LAYOUT IS SUBJECT TO CHANGE PER REQUEST AND/OR EXISTING CONDITIONS IN THE FIELD.
 - ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY CONTRACTOR.
 - CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. ANY UNEXPECTED CONDITIONS OR DISCREPANCIES WITH THE DESIGN DOCUMENTS SHALL BE REPORTED TO THE ENGINEER PRIOR TO INSTALLATION OR ERECTION OF MATERIALS.
 - THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. WHEN ON SITE, THE ENGINEER IS RESPONSIBLE FOR HIS OWN SAFETY BUT HAS NO RESPONSIBILITY FOR THE SAFETY OF OTHER PERSONNEL OR SAFETY CONDITIONS AT THE SITE.
 - NO PERSONNEL SHALL STEP OR STAND ON PHOTOVOLTAIC (PV) MODULES (SOLAR PANELS) AT ANY TIME. RACK STRUCTURE AND PV MODULES ARE NOT DESIGNED FOR LIVE LOADS AND MAY VOID WARRANTY.
 - THIS RBI SOLAR CONSTRUCTION SET IS DESIGNED FROM PV MODULE DATA SHEET(S) PROVIDED BY THE CUSTOMER. CUSTOMER IS RESPONSIBLE FOR VERIFYING THAT THE PV MODULE(S) DELIVERED TO SITE MATCH DATA SHEET(S) PROVIDED TO RBI SOLAR. RBI SOLAR IS NOT RESPONSIBLE FOR PV MODULE DIMENSIONAL DISCREPANCIES DUE TO FURNISHED PV MODULES NOT MATCHING CUSTOMER FURNISHED PV MODULE DATA SHEETS.
- SPECIAL FIELD INSPECTIONS:**
- SPECIAL INSPECTION REQUIRED. MINIMUM INSPECTION SHALL INCLUDE THE FOLLOWING NOTES AND TABLE:
- ALL SPECIAL INSPECTORS SHALL BE RETAINED BY OWNER/CUSTOMER. THE EXTENT OF THE INSPECTION SHALL COMPLY WITH THE CONTRACT DOCUMENTS, THE BUILDING CODE REQUIREMENTS, AND LOCAL JURISDICTION. IT IS THE OWNER/CUSTOMER'S RESPONSIBILITY TO GIVE PROPER NOTIFICATION TO THE SPECIAL INSPECTOR AND PROCEED WITH THE WORK ONLY AFTER THE SPECIAL INSPECTOR'S APPROVAL.
 - FAILURE TO NOTIFY THE SPECIAL INSPECTOR MAY RESULT IN OWNER/CUSTOMER HAVING TO REMOVE WORK FOR THE PURPOSE OF INSPECTION AT THE OWNER'S/CUSTOMER'S EXPENSE.
 - PREMATURE NOTIFICATION FOR INSPECTION WILL RESULT IN AN ADDITIONAL INSPECTION WITH ALL EXPENSES AND FEES PAID BY THE OWNER/CUSTOMER.
 - SPECIAL INSPECTORS SHALL KEEP RECORDS OF ALL INSPECTIONS. RECORDS SHALL BE FURNISHED TO THE OWNER, ENGINEER OF RECORD, AND LOCAL JURISDICTION AS REQUIRED. ANY AND ALL DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR. CORRECTIONS SHALL BE MADE AND A FINAL REPORT OF INSPECTIONS SHALL BE PROVIDED NOTING COMPLETION OF INSPECTIONS AND CORRECTIONS OF DISCREPANCIES. FAILURE TO CORRECT DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD AND THE LOCAL JURISDICTION AND MAY RESULT IN REMOVAL OF COMPLETED WORK AND ADDITIONAL WORK TO CORRECT DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
 - REFERENCE SHEET G-003 FOR INSPECTION TASKS.
- STRUCTURAL STEEL:**
- ALL STRUCTURAL STEEL SHALL BE DESIGNED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST VERSION OF AISI "MANUAL OF STEEL CONSTRUCTION," LIGHT GAGE COLD-FORMED SECTIONS SHALL CONFORM TO LATEST VERSION OF AISI SPECIFICATIONS FOR COLD-FORMED STEEL STRUCTURAL MEMBERS.
 - MATERIALS:
 - ROLLED SHAPES: ASTM A992 OR A572 GRADE 55, Fy = 55 KSI MINIMUM
 - PLATES: ASTM A36
 - TUBULAR SHAPES: ASTM A500 GRADE C, Fy = 50 KSI MINIMUM
 - FIELD BOLTS (TYP. U.N.O.): SAE J429 GRADE 5
 - SCREWS: #12 TEKs - GALVANIZED
 - COLD-FORMED/LIGHT GAGE: ASTM A653 GRADE 55
 - ANCHOR RODS: ASTM A307 (TYPICAL U.N.O.)
 - TEK SCREWS ARE TO BE INSTALLED USING A 2500 RPM MAX. NON-IMPACTING VARIABLE SPEED DRILL WITH CLUTCH OUT.
 - REFER TO THE LATEST RBI SOLAR MODEL GM-I OR GM-2 INSTALLATION GUIDE FOR STRUCTURAL CONNECTION TORQUE VALUES.
 - ALL WELDING OF STEEL SHALL BE DONE IN ACCORDANCE WITH THE LATEST VERSION OF THE AMERICAN WELD SOCIETY'S SPECIFICATIONS - AWS D1.1. ELECTRODES SHALL BE E70 SERIES UNLESS NOTED OTHERWISE.
 - GALVANIZING SPECIFICATIONS
 - STRUCTURAL SHAPES: HOT-DIPPED GALVANIZING SHALL BE PER ASTM A123.
 - PRE-GALVANIZED MATERIALS SHALL COMPLY WITH ASTM A653 - G90 MINIMUM.
 - ALL STRUCTURAL HARDWARE (NOT MODULE MOUNTING HARDWARE): HOT-DIPPED GALVANIZING SHALL BE PER ASTM F2329 UNLESS NOTED OTHERWISE.
- MISCELLANEOUS FASTENERS:**
- ALL BOLTS SHALL BE THE TYPE AND SIZE INDICATED ON DRAWINGS.
 - ALL HARDWARE USED FOR MOUNTING PV MODULES SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE.
 - ALL PV MODULE MOUNTING HARDWARE SHALL BE INSTALLED AND TORQUED PER THE LATEST RBI SOLAR MODEL GM-I OR GM-2 INSTALLATION GUIDE.
- FOUNDATIONS/CONCRETE:**
- THE FOUNDATION DESIGN IS BASED ON ASSUMED MINIMUM CODE ALLOWABLE VALUES AND GEOTECHNICAL REPORT, PREPARED BY: EARTH SYSTEMS PACIFIC DATED 02/02/18 (REPORT # 1802-011 PRP).
 - CONCRETE SPECIFICATIONS: STRENGTH: 2500 PSI MINIMUM @ 28 DAYS FOR FOOTINGS OR 4000 PSI MINIMUM @ 28 DAYS FOR BALLASTS
AIR CONTENT: 4-6% AGGREGATE SIZE: 3/4" MAXIMUM MINIMUM COVER: 3" UNLESS NOTED OTHERWISE
 - GROUT SPECIFICATIONS: 8000 PSI MINIMUM, NON-SHRINK
 - REINFORCING STEEL: ASTM A615 GRADE 60 BILLET STEEL
 - CUSTOMER IS RESPONSIBLE FOR VERIFYING FINAL SOIL CONDITIONS DURING CONSTRUCTION HAVE NOT BEEN PURPOSELY ALTERED IN ANY WAY TO ENSURE THE SOIL IS CONSISTENT WITH FINDINGS INCLUDED IN GEOTECHNICAL REPORT. VARIATIONS IN SOIL CONDITIONS SHALL BE REPORTED TO GEOTECHNICAL ENGINEER AND/OR ENGINEER OF RECORD RESPONSIBLE FOR FOUNDATION DESIGN PRIOR TO INSTALLATION OF ANY FOUNDATION MATERIALS.
 - CUSTOMER IS RESPONSIBLE FOR VERIFYING CORROSION COMPATIBILITY WITH FOUNDATIONS.
 - INSTALLER/CONTRACTOR SHALL COORDINATE PLACEMENT OF FOUNDATIONS AND/OR ANCHOR BOLTS PER DESIGN DRAWINGS AND/OR MANUFACTURER'S SPECIFICATIONS.
 - RBI SOLAR, INC. DESIGN FOUNDATIONS BASED ON SOIL PROPERTIES OUTLINED IN CERTIFIED GEOTECHNICAL REPORTS AND/OR DATA FROM FIELD TESTING. ALL DESIGNS ASSUME UNDISTURBED SOIL CONDITIONS, AND DO NOT TAKE INTO ACCOUNT TRENCHING NEAR FOUNDATIONS. FOR CASES WHERE TRENCHING FOR ELECTRICAL WORK IS AT OR NEAR A FOUNDATION, RBI SOLAR RECOMMENDS A MINIMUM OF 3'-0" CLEAR FROM THE EDGE OF THE TRENCH TO THE EDGE OF THE FOUNDATION FOR "NORMAL GOOD SOIL CONDITIONS." IN CASES OF "POOR SOIL" CONDITIONS, RBI SOLAR RECOMMENDS A MINIMUM CLEAR DISTANCE EQUAL TO OR GREATER THAN THE DEPTH OF THE FOUNDATION. IF IN DOUBT OF SOIL CONDITIONS, RBI SOLAR RECOMMENDS CONSULTING A QUALIFIED GEOTECHNICAL ENGINEER TO ASSESS SOIL CONDITIONS AT THE SITE.
- NOTE: TRENCHING/EXCAVATION WITHIN 3'-0" OF ANY RACK SUPPORT POST REQUIRES REPLACING THE ORIGINAL SOIL AND COMPACTION TO 95% STANDARD PROCTOR DENSITY. FOR FURTHER CLARIFICATION ON COMPACTION REQUIREMENTS, RBI SOLAR RECOMMENDS CONSULTING A QUALIFIED GEOTECHNICAL ENGINEER.

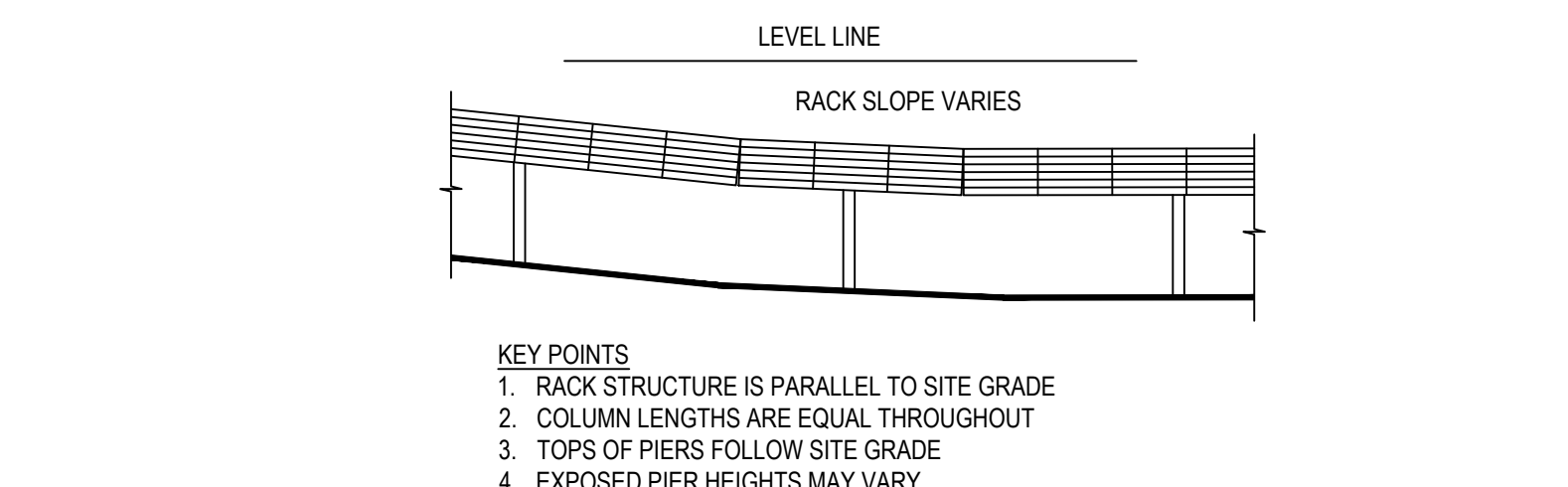
- WORK BY OTHERS:**
- SITE WORK AND DEVELOPMENT.
 - ALL ELECTRICAL WORK INCLUDING WIRING, CONDUIT, PANELS AND LIGHTS TO BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
 - GROUNDING REQUIREMENTS.
 - ALL SHADING ANALYSIS AND/OR PRODUCTION ANALYSIS SHALL BE PERFORMED AND VERIFIED BY OTHERS. RBI SOLAR IS NOT RESPONSIBLE FOR PV SYSTEM DESIGN AS IT PERTAINS TO ELECTRICAL OR PV SYSTEM PRODUCTION.

ETL CLASSIFIED:

THIS PROJECT CONTAINS RACKING LABELED AS ETL CLASSIFIED UNDER UL SUBJECT 2703 OR UL STANDARD 2703. LABELS ARE APPLIED AT THE FACTORY ON COMPONENTS THAT MAY BE ASSEMBLED AT THE FACTORY OR IN THE FIELD. SEE DETAIL SHEET IN THIS DRAWING SET FOR MORE INFORMATION.



RACK SYSTEM TOPOGRAPHIC RELATIONSHIP




RBI SOLAR
Total Solar Service: Design • Fabrication
Installation • Parts • Repair Service

5513 VINE STREET
CINCINNATI, OH 45217
513.242.2051
FAX: 513.242.0816

PROFESSIONAL SEAL

ENGINEERS SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

GROUND MOUNT FOR **RECSOLAR**



RELEASE RECORD

MARK	DATE	DESCRIPTION
09/25/18	CONS. SET R1	
05/06/18	CONS. SET	
04/13/18	100% REVIEW SET	
03/13/18	90% REVIEW SET	
02/10/18	75% REVIEW SET	
01/04/18	50% REVIEW SET	

PROJECT INFORMATION

TITLE & ADDRESS:
CAL POLY ACADEMIC LAB

N. POLYVIEW DR.
SAN LUIS OBISPO, CA 93407

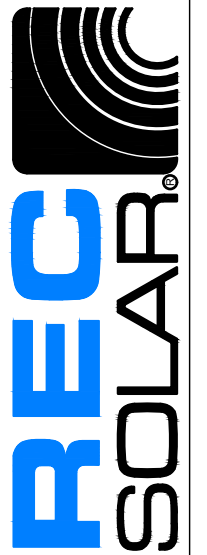
RBI SOLAR PROJECT No.: 1835008

DRAWN BY: KEJ	REVIEWED BY: JAB, BDS
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SHEET TITLE:
GENERAL NOTES/ MODULE SPECIFICATION SHEETS

SHEET No.: **G-002**

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

GROUND MOUNT
 FOR


RELEASE RECORD

MARK	DATE	DESCRIPTION
06	09/25/18	CONS. SET R1

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:
 GENERAL NOTES/
 MODULE SPECIFICATION
 SHEETS

SHEET No.:
G-003

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	-

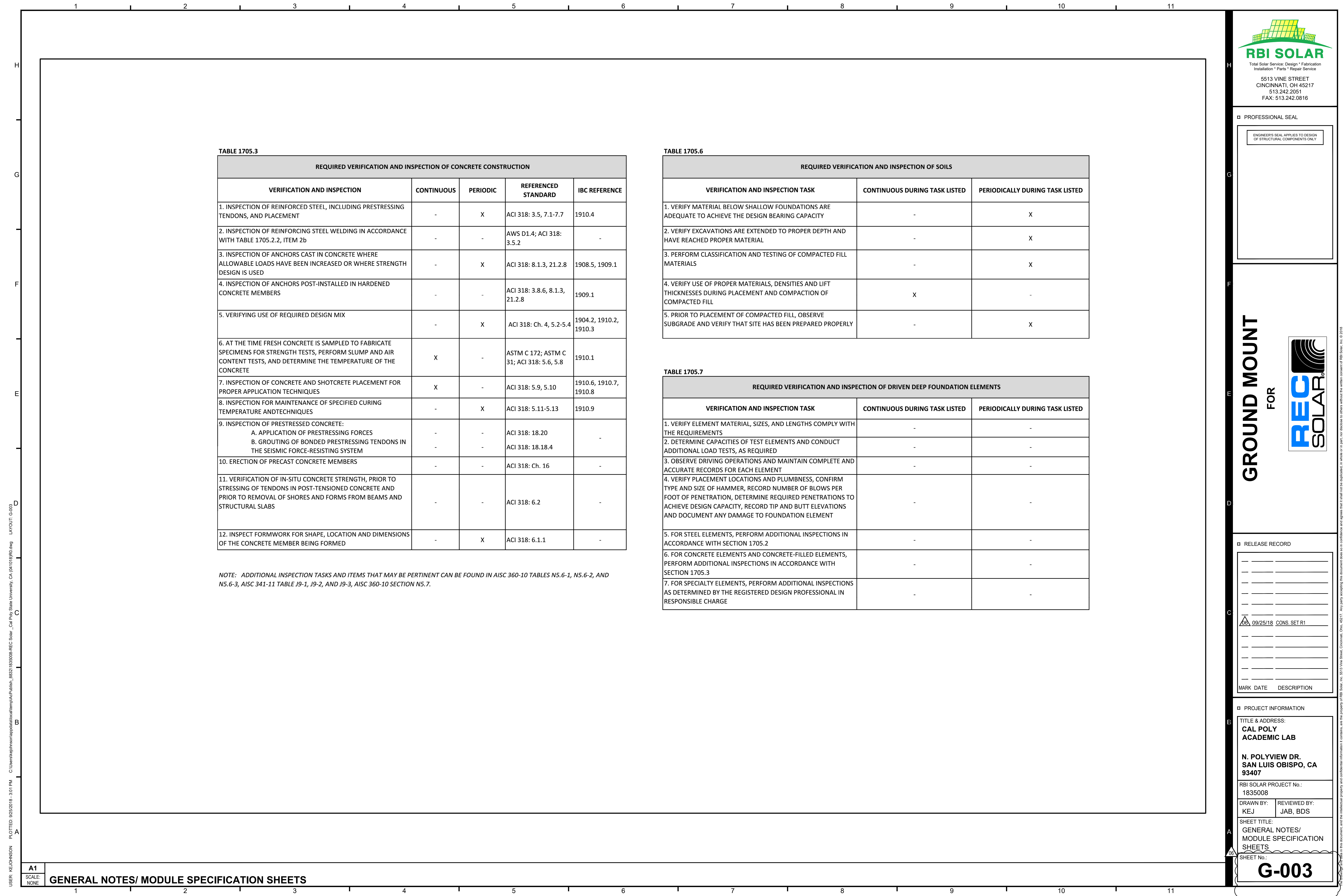
NOTE: ADDITIONAL INSPECTION TASKS AND ITEMS THAT MAY BE PERTINENT CAN BE FOUND IN AISC 360-10 TABLES N5.6-1, N5.6-2, AND N5.6-3, AISC 341-11 TABLE J9-1, J9-2, AND J9-3, AISC 360-10 SECTION N5.7.

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 COMPACTED FILL MATERIALS	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	-
5. PRIOR TO PLACEMENT OF COMPACTED 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	-	-



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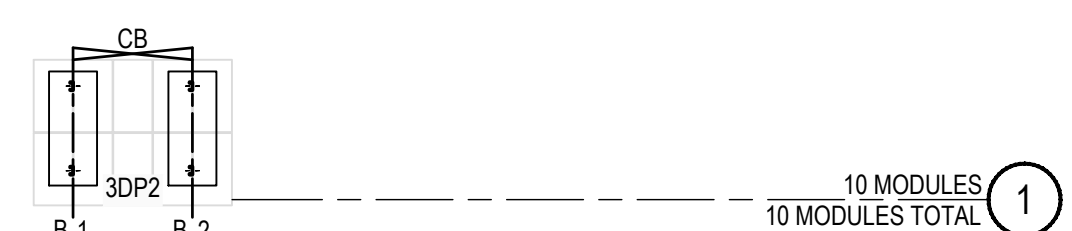
PROFESSIONAL SEAL
ENGINEER'S SEAL APPLIES TO DESIGN OF STRUCTURAL COMPONENTS ONLY

GROUND MOUNT FOR
REC SOLAR

RELEASE RECORD

MARK	DATE	DESCRIPTION
09/25/18	CONS. SET R1	
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N. POLYVIEW DR. SAN LUIS OBISPO, CA 93407
RBI SOLAR PROJECT No.: 1835008
DRAWN BY: KEJ REVIEWED BY: JAB, BDS
SHEET TITLE: COMPONENT LAYOUT
SHEET No.: **S-101**



X-BRACE SCHEDULE

SYMBOL	DESCRIPTION	SETS	DETAIL
CB	2 STRANDS OF 22-0" LONG 3/16" GALV. 7x19 WIRE ROPE WITH 2 GRIPPLE D4 WIRE CLAMPS	1	C7/S-501

NOTES:
1. X-BRACING MAY BE MOVED EAST OR WEST ONE (1) BAY AS NEEDED

POST SCHEDULE

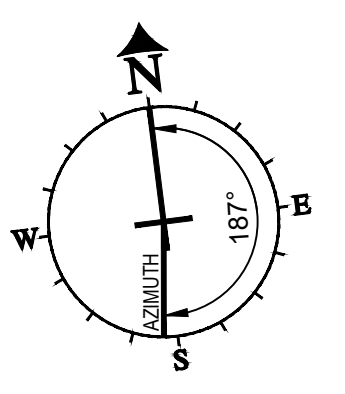
SYMBOL	MARK	DESCRIPTION	LENGTH	PIECES	DETAIL
X# OR PER PLAN	A	CEE 8X3 POST	7'-7"	3	A1/S-301

POST SETTING NOTES:
1. ALL POST DIMENSIONS SHOWN ARE CENTERLINE TO CENTERLINE OF POST
2. REFERENCE DETAIL A1/S-301 FOR ADDITIONAL INFORMATION ON REQUIRED POST EMBED DEPTHS
3. POST LENGTH INCLUDES ADDITIONAL MATERIAL TO ALLOW FOR TOPOGRAPHICAL VARIANCE

BAY SCHEDULE

TYPE	QTY.	POST-POST	BAYS			PURLINS			DETAIL
			DESCRIPTION	MARK	#/BAY	PCS.	MARK	#/BAY	
4EP2	1	SEE BAY PLAN	TSM345DD14A (II) PORTRAIT MODULES 4 WIDE x 2 HIGH WITH 1 CANTILEVER EAST SIDE AND 20.0° TILT	Z4E	4	4	G4/ S-301		
4WP2	1	SEE BAY PLAN	TSM345DD14A (II) PORTRAIT MODULES 4 WIDE x 2 HIGH WITH 1 CANTILEVER WEST SIDE AND 20.0° TILT	Z4W	4	4	G2/ S-301		

NOTES THIS BAY:
1. PURLINS ARE 2 3/4" x 7" x 2 3/4" ZEE 16 GA. GALVANIZED UNLESS NOTED OTHERWISE.
2. TOP CHORDS ARE 134 1/4" x 4" x 4 3/4" CEE 14 GA. GALVANIZED UNLESS NOTED OTHERWISE.
3. LOWER KNEE BRACES ARE 47 1/2" x 2" SQ. 15 GA. GALVANIZED UNLESS NOTED OTHERWISE.
4. UPPER KNEE BRACES ARE 67 3/8" x 2" SQ. 15 GA. GALVANIZED UNLESS NOTED OTHERWISE.



X-BRACE SCHEDULE

SYMBOL	DESCRIPTION	SETS	DETAIL
CB	2 STRANDS OF 22-0" LONG 3/16" GALV. 7x19 WIRE ROPE WITH 2 GRIPPLE D4 WIRE CLAMPS	1	C7/S-501

BALLAST SCHEDULE

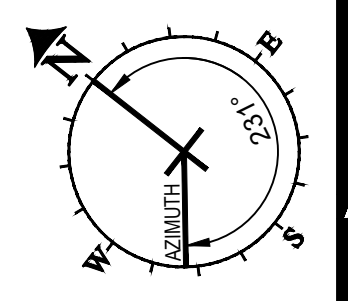
SYMBOL	MARK	DESCRIPTION	WEIGHT (LBS.)	PIECES	DETAIL
B		9'-6" L. x 3'-8" W. x 1'-0" H. REINFORCED CONCRETE BALLAST BLOCK W/ ONE (P1) 3'-10 3/16" & ONE (P2) 1'-3 7/16" CEE 8X3 POST	5225	2	A6/S-301 A9/S-502

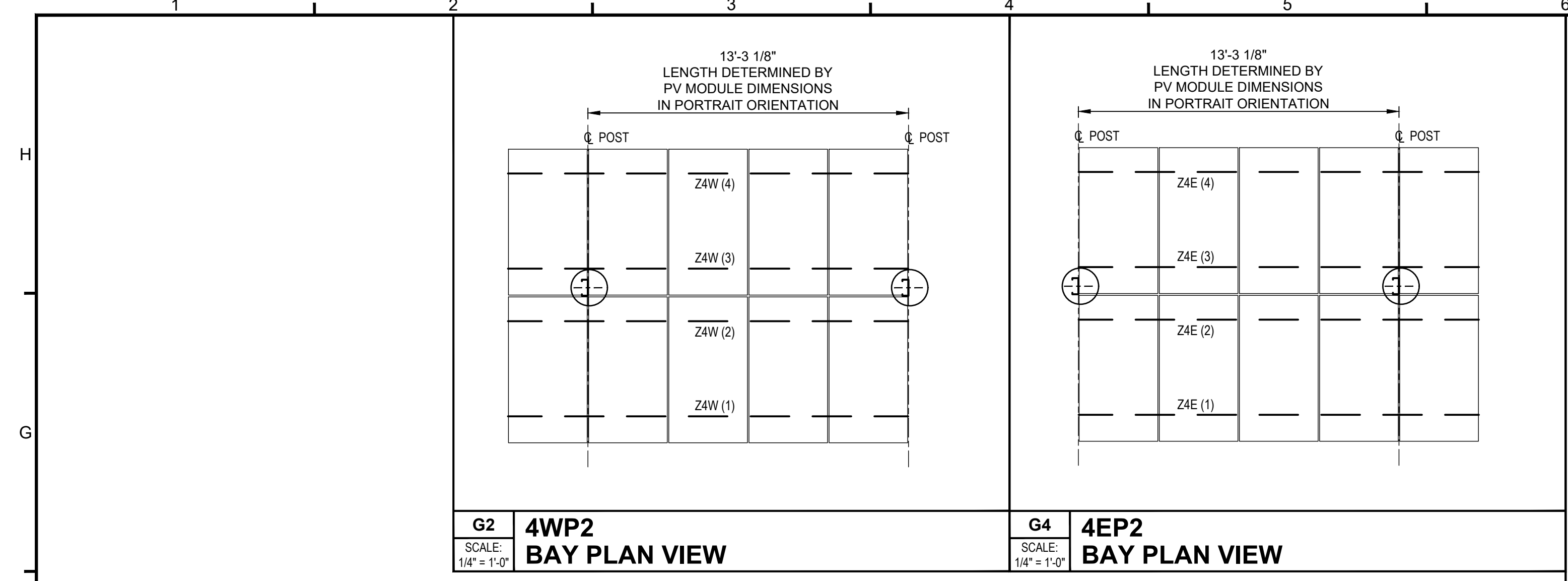
NOTES THIS BAY:
1. ALL BALLAST DIMENSIONS SHOWN ARE CENTERLINE TO CENTERLINE OF BALLAST
2. REFERENCE SHEET S-502 FOR ADDITIONAL INFORMATION ON REQUIRED BALLASTS

BAY SCHEDULE

TYPE	QTY.	POST-POST	BAYS			PURLINS			DETAIL
			DESCRIPTION	MARK	#/BAY	PCS.	MARK	#/BAY	
3DP2	1	SEE BAY PLAN	TSM345DD14A (II) PORTRAIT MODULES 3 WIDE x 2 HIGH WITH 1 CANTILEVER EACH END AND 20.0° TILT	Z3D	4	4	G10/ S-301		

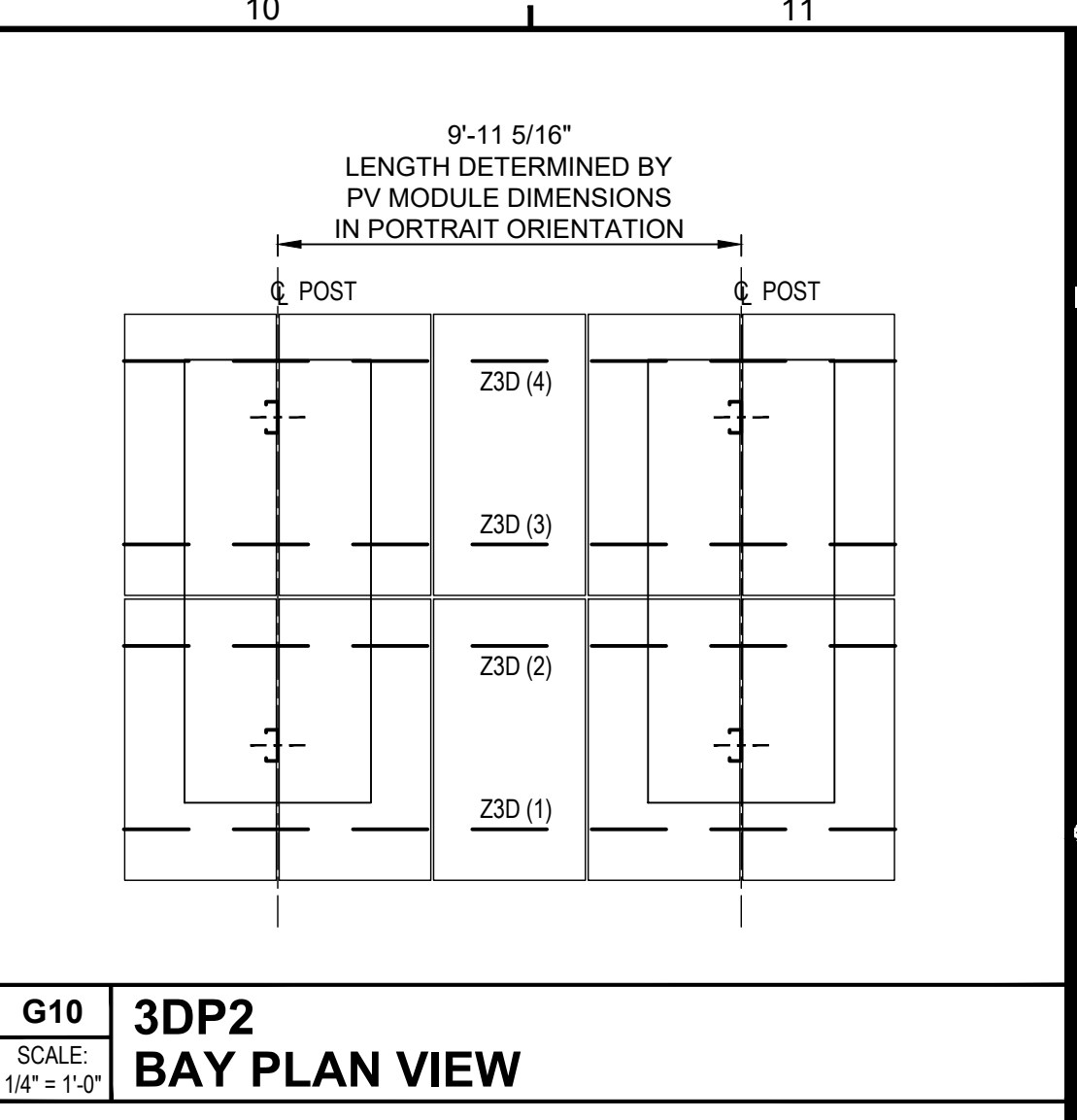
NOTES THIS BAY:
1. PURLINS ARE 2 3/4" x 7" x 2 3/4" ZEE 16 GA. GALVANIZED UNLESS NOTED OTHERWISE.
2. TOP CHORDS ARE 134 1/4" x 4" x 4 3/4" CEE 14 GA. GALVANIZED UNLESS NOTED OTHERWISE.
3. KNEE BRACES ARE 52 5/16" x 2" SQ. 15 GA. GALVANIZED UNLESS NOTED OTHERWISE.



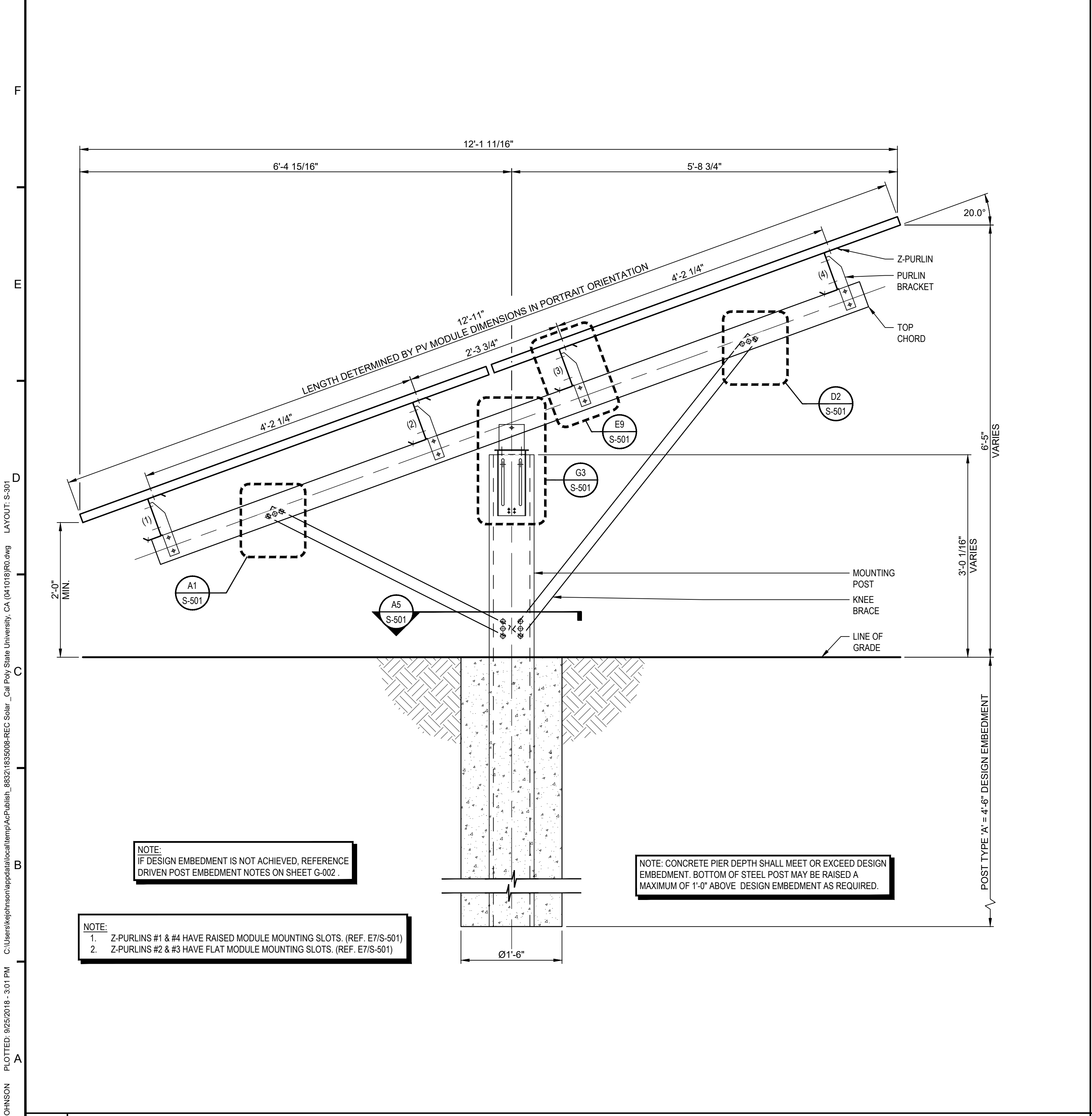


G2 4WP2
SCALE: 1/4" = 1'-0"
BAY PLAN VIEW

G4 4EP2
SCALE: 1/4" = 1'-0"
BAY PLAN VIEW



G10 3DP2
SCALE: 1/4" = 1'-0"
BAY PLAN VIEW

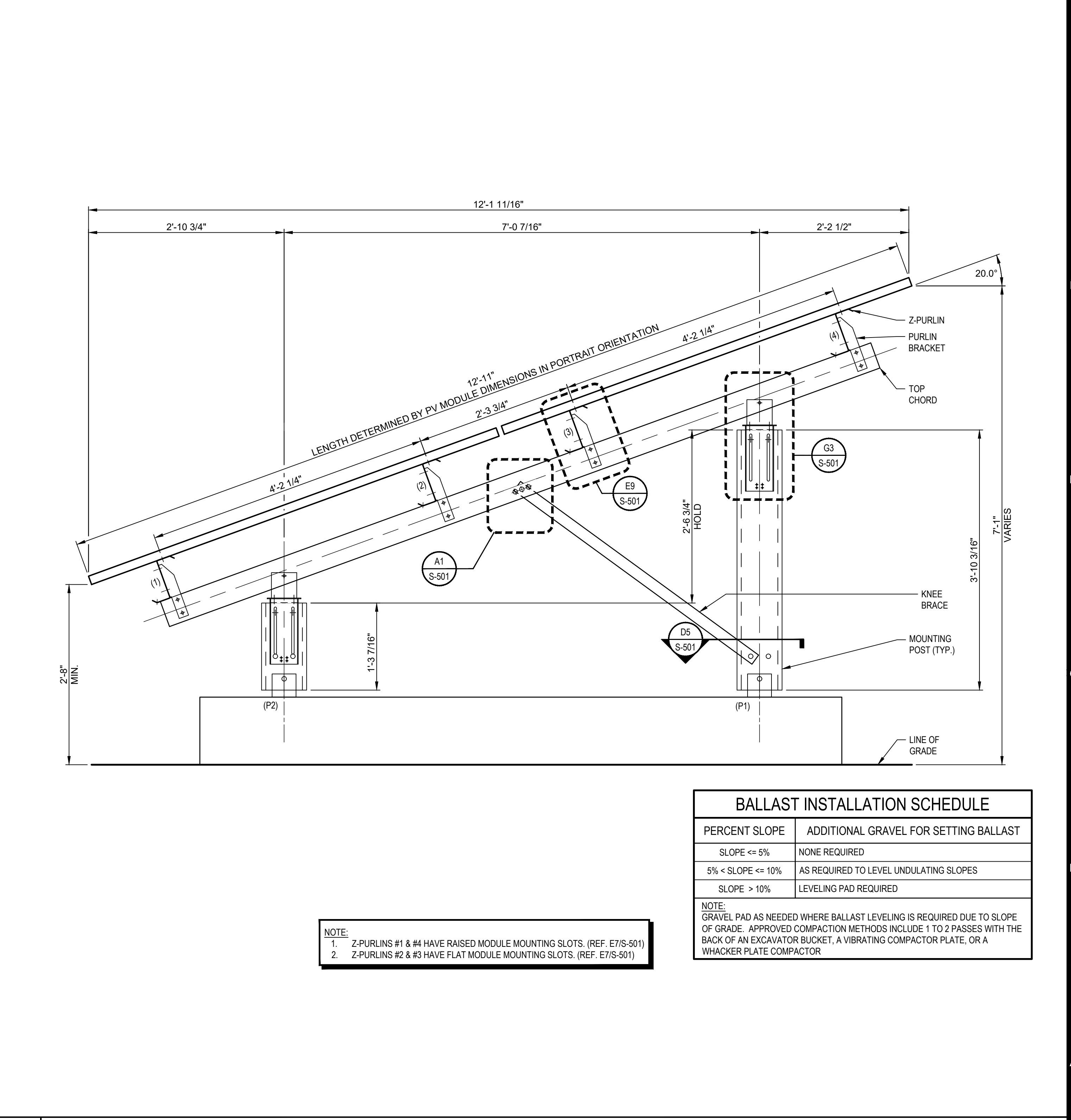


NOTE:
IF DESIGN EMBEDMENT IS NOT ACHIEVED, REFERENCE DRIVEN POST EMBEDMENT NOTES ON SHEET G-002.

NOTE:
1. Z-PURLINS #1 & #4 HAVE RAISED MODULE MOUNTING SLOTS. (REF. E7/S-501)
2. Z-PURLINS #2 & #3 HAVE FLAT MODULE MOUNTING SLOTS. (REF. E7/S-501)

NOTE: CONCRETE PIER DEPTH SHALL MEET OR EXCEED DESIGN EMBEDMENT. BOTTOM OF STEEL POST MAY BE RAISED A MAXIMUM OF 1'-0" ABOVE DESIGN EMBEDMENT AS REQUIRED.

A1 CONCRETE PIER DESIGN
SCALE: 1" = 1'-0"
RACK SECTION



NOTE:
1. Z-PURLINS #1 & #4 HAVE RAISED MODULE MOUNTING SLOTS. (REF. E7/S-501)
2. Z-PURLINS #2 & #3 HAVE FLAT MODULE MOUNTING SLOTS. (REF. E7/S-501)

BALLAST INSTALLATION SCHEDULE	
PERCENT SLOPE	ADDITIONAL GRAVEL FOR SETTING BALLAST
SLOPE <= 5%	NONE REQUIRED
5% < SLOPE <= 10%	AS REQUIRED TO LEVEL UNDULATING SLOPES
SLOPE > 10%	LEVELING PAD REQUIRED

NOTE:
GRAVEL PAD AS NEEDED WHERE BALLAST LEVELING IS REQUIRED DUE TO SLOPE OF GRADE. APPROVED COMPACTION METHODS INCLUDE 1 TO 2 PASSES WITH THE BACK OF AN EXCAVATOR BUCKET, A VIBRATING COMPACTOR PLATE, OR A WHACKER PLATE COMPACTOR.

A6 BALLAST DESIGN
SCALE: 1" = 1'-0"
RACK SECTION



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

GROUND MOUNT FOR REC SOLAR

RELEASE RECORD

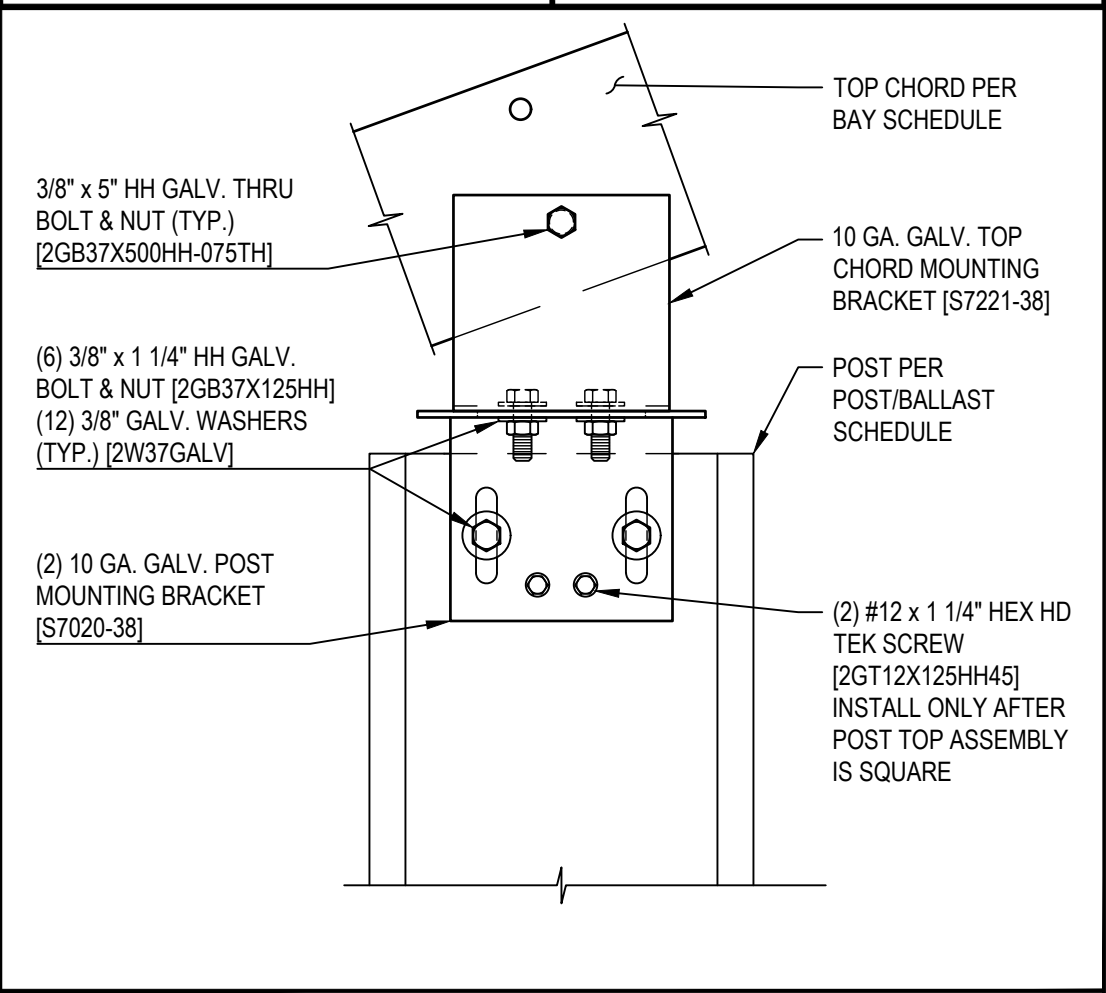
MARK	DATE	DESCRIPTION
09/25/18	CONS. SET R1	
05/06/25/18	CONS. SET	
04/04/13/18	100% REVIEW SET	
03/04/13/18	90% REVIEW SET	
02/04/10/18	75% REVIEW SET	
01/04/02/18	50% REVIEW SET	

PROJECT INFORMATION
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:
RACK SECTION & BAY PLAN VIEWS
SHEET No.: **S-301**

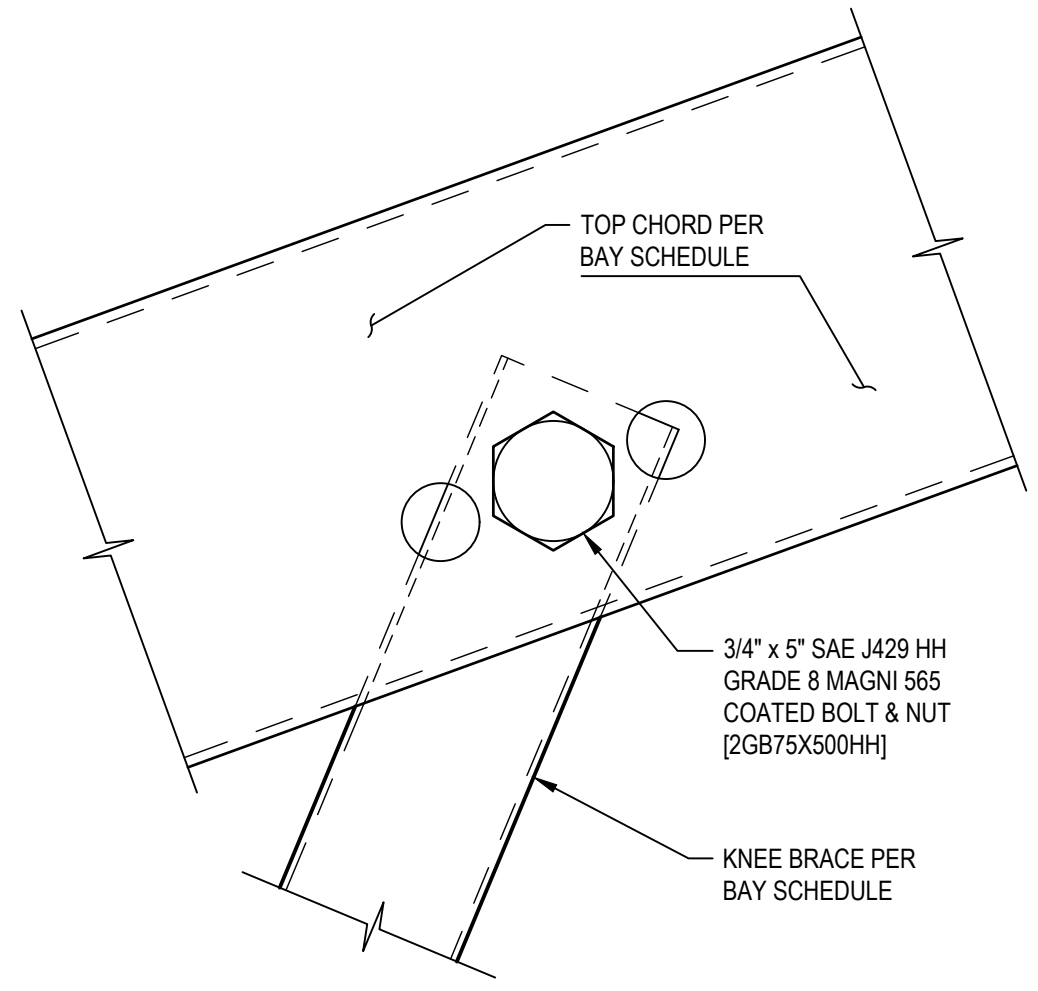
USER: NEJOHNSON PLOTTED: 9/25/2018 - 3:01 PM C:\Users\nejohnson\appdata\local\temp\appdata\publ\h_83221835008-REC-Solar_Cal Poly State University, CA (041018)R00.dwg LAYOUT: S-301

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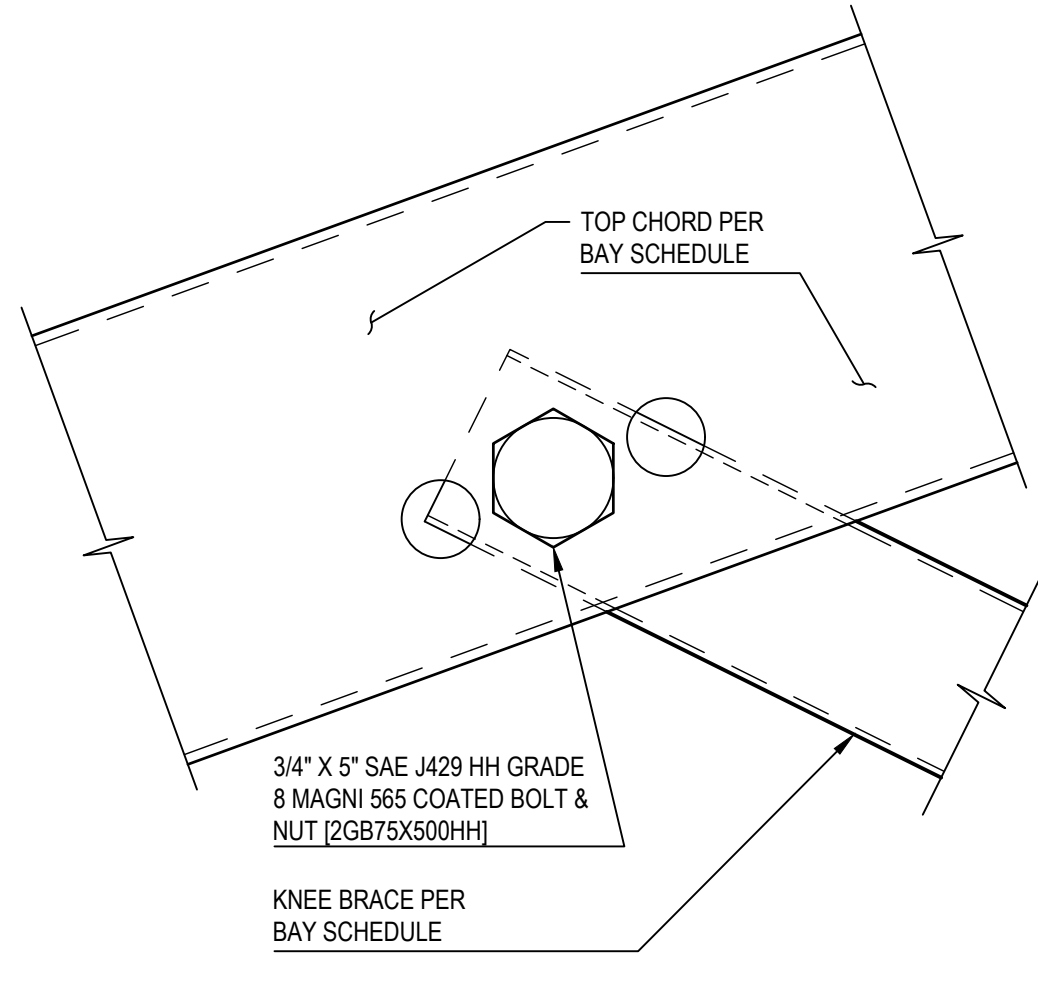
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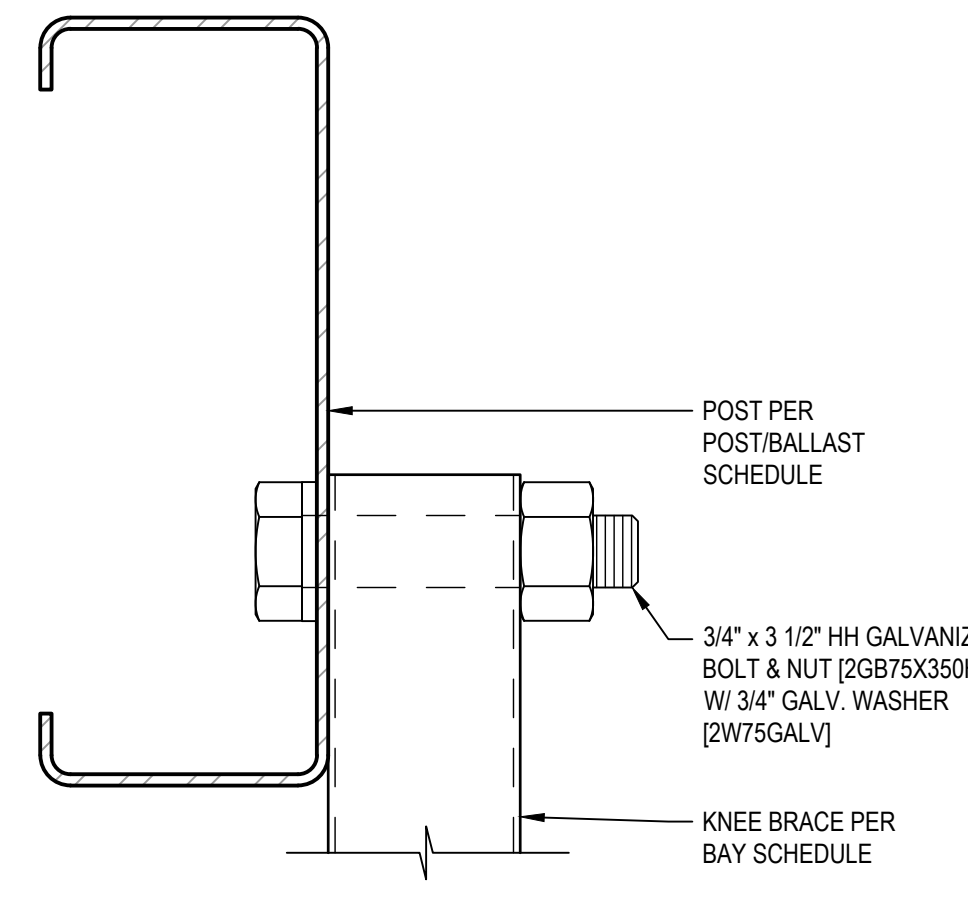
G3 TOP CHORD TO POST CONNECTION DETAIL
SCALE: 3" = 1'-0"



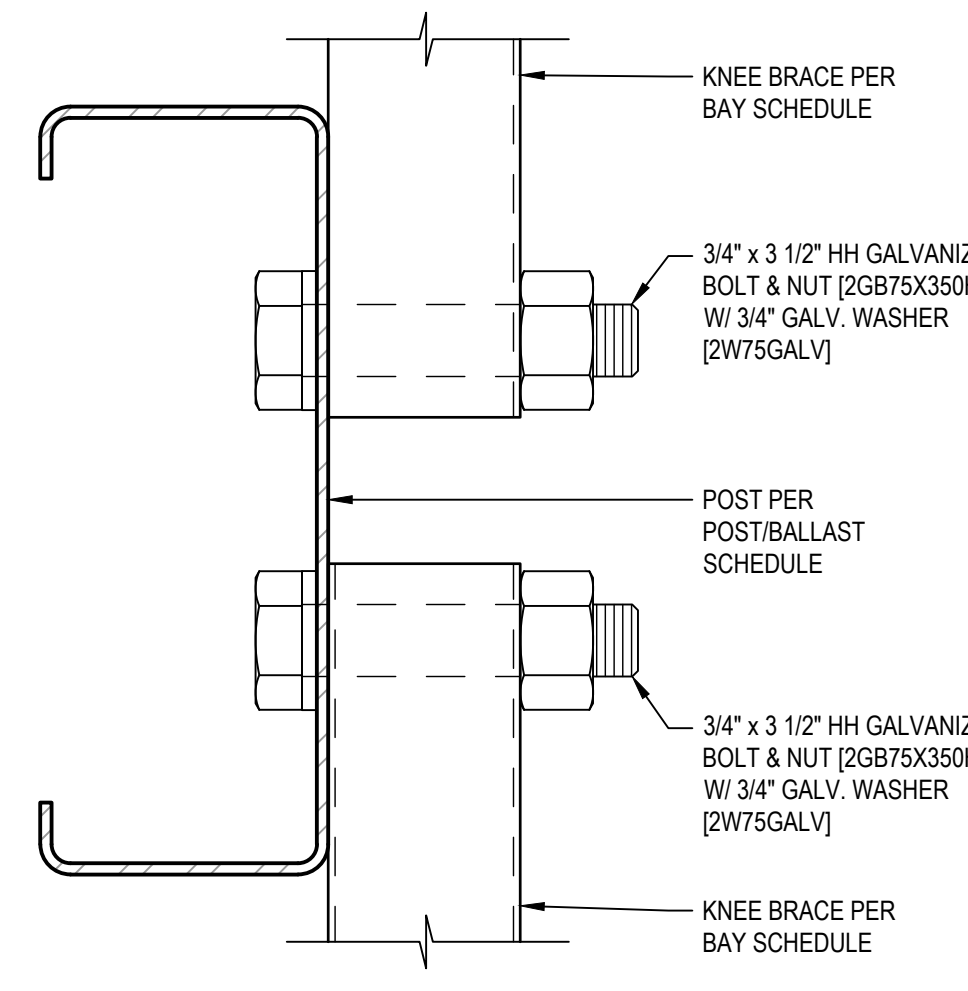
D1 UPPER KNEE BRACE TO TOP CHORD CONNECTION DETAIL
SCALE: 6" = 1'-0"



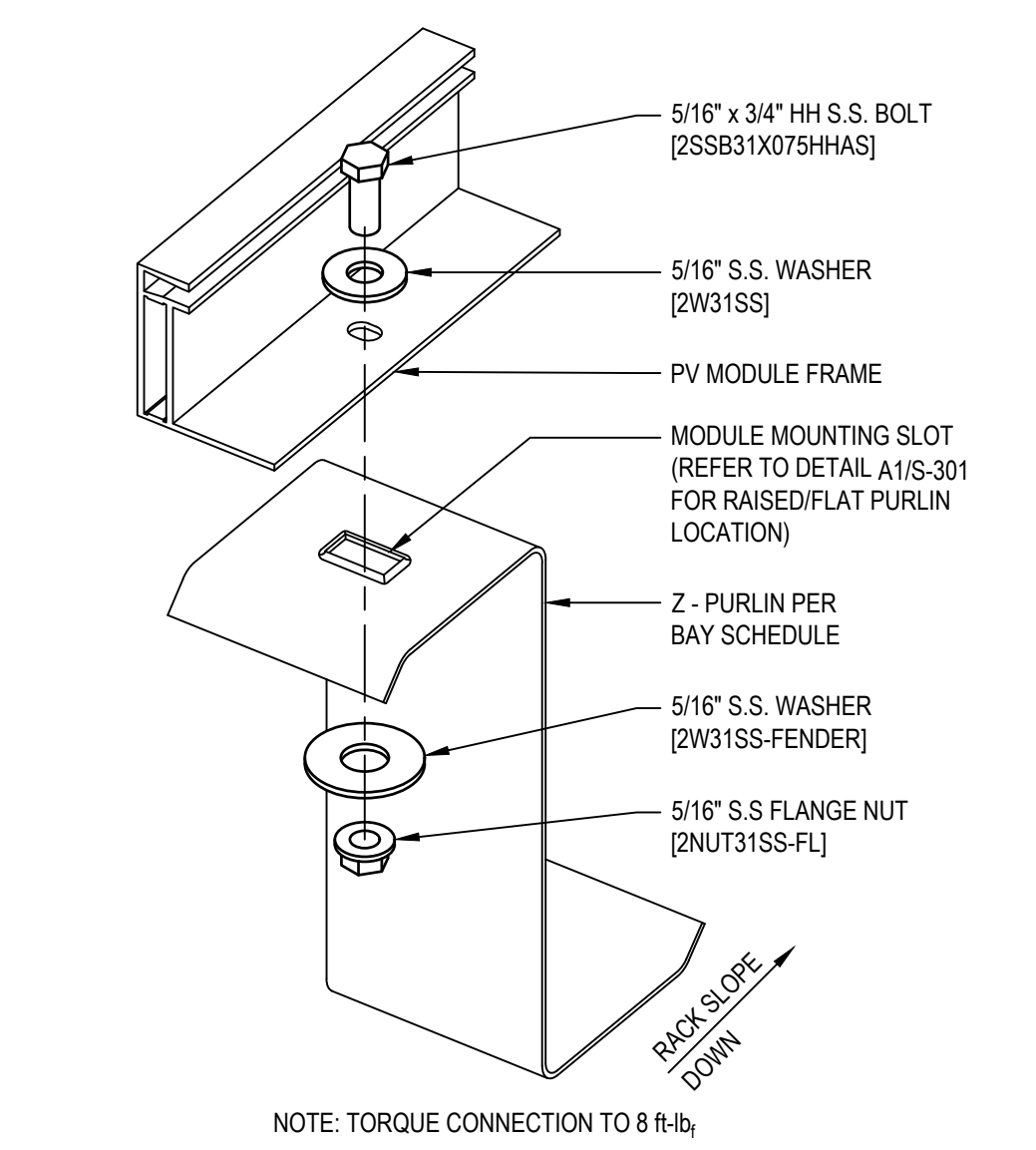
A1 LOWER KNEE BRACE TO TOP CHORD CONNECTION DETAIL
SCALE: 6" = 1'-0"



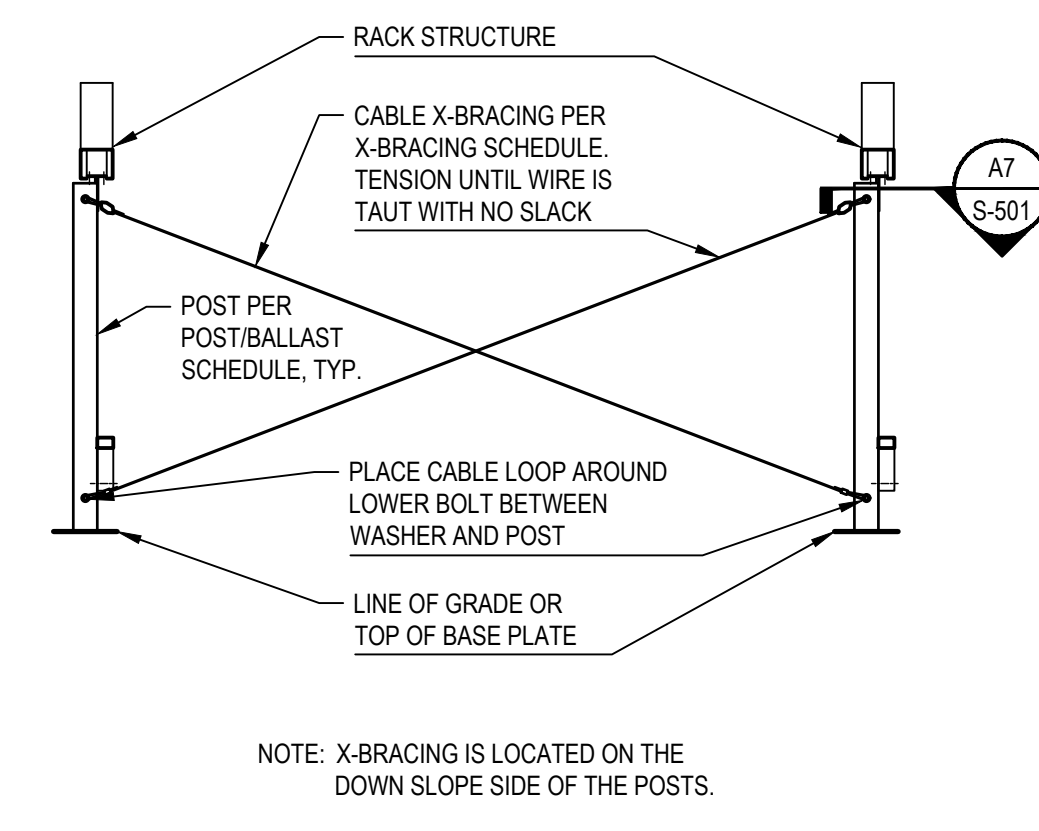
D5 BALLAST KNEE BRACE TO POST CONNECTION DETAIL
SCALE: 6" = 1'-0"



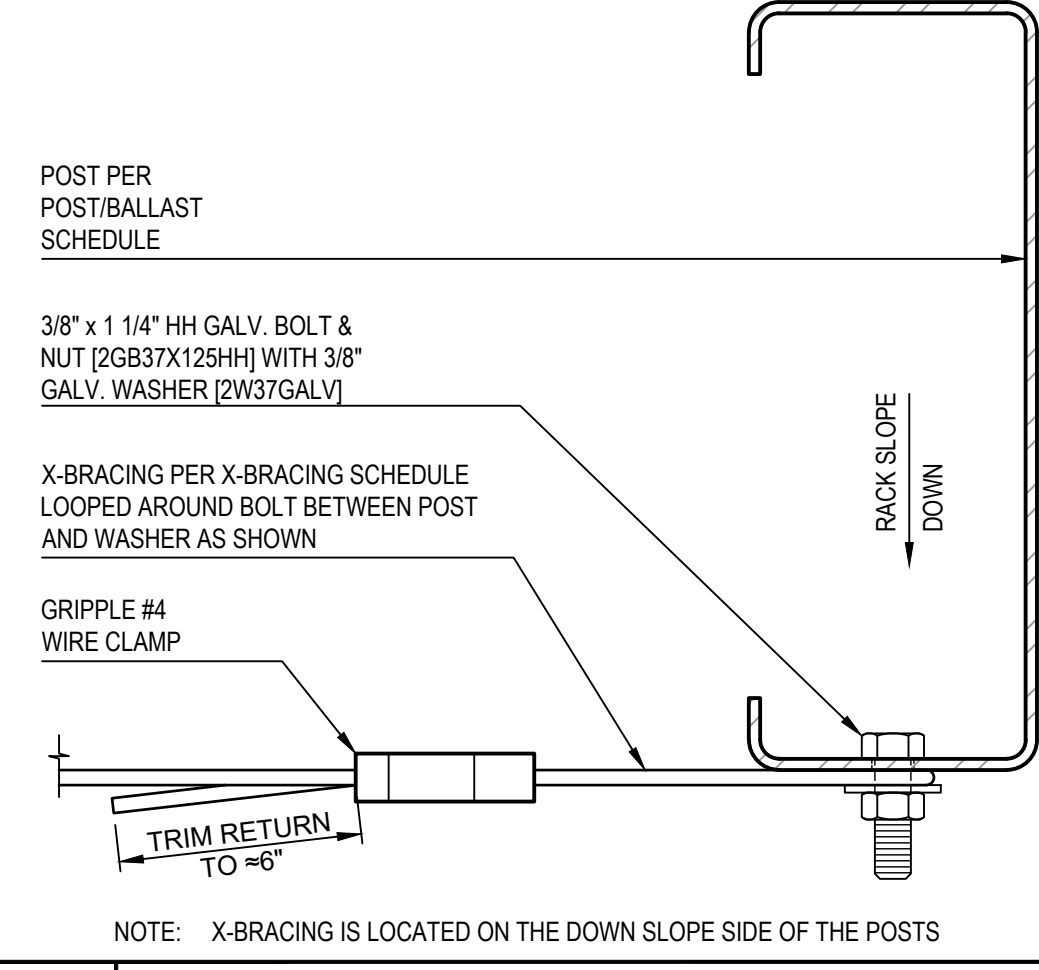
A5 DRIVEN KNEE BRACE TO POST CONNECTION DETAIL
SCALE: 6" = 1'-0"



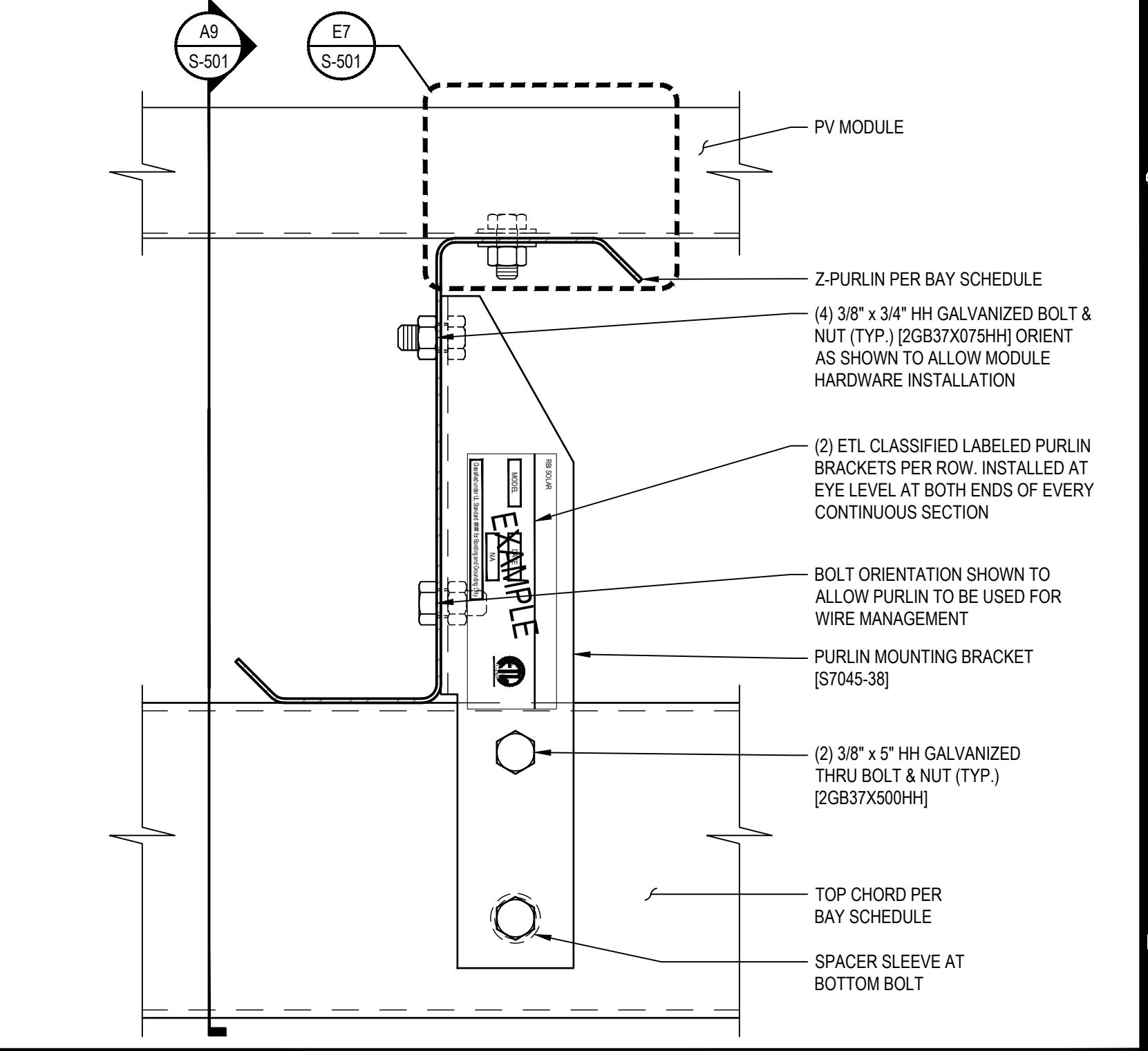
E7 PV MODULE TO PURLIN CONNECTION DETAIL
SCALE: NONE



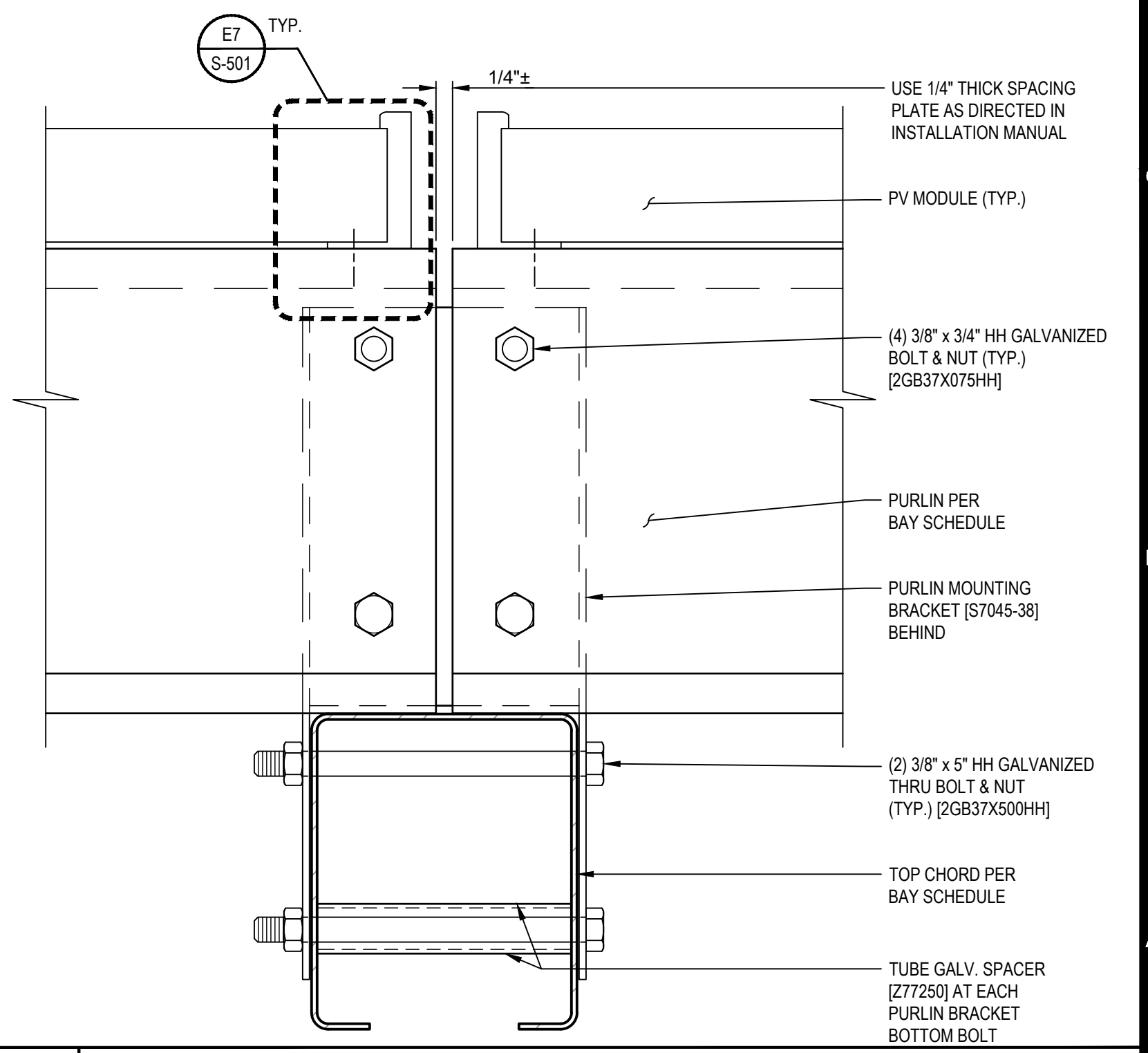
C7 X-BRACING ELEVATION
SCALE: 1/2" = 1'-0"



A7 X-BRACE TO POST CONNECTION DETAIL
SCALE: 6" = 1'-0"



E9 TRANSVERSE PURLIN CONNECTION DETAIL
SCALE: 6" = 1'-0"



A9 LONGITUDINAL PURLIN CONNECTION DETAIL
SCALE: 6" = 1'-0"

RBI SOLAR
Total Solar Service: Design • Fabrication
Installation • Parts • Repair Service
5513 VINE STREET
CINCINNATI, OH 45217
513.242.2051
FAX: 513.242.0816

PROFESSIONAL SEAL
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GROUND MOUNT FOR REC SOLAR

RELEASE RECORD

MARK	DATE	DESCRIPTION
09/25/18	CONS. SET R1	
06/25/18	CONS. SET	
04/13/18	100% REVIEW SET	
04/13/18	90% REVIEW SET	
04/10/18	75% REVIEW SET	
04/02/18	50% REVIEW SET	

PROJECT INFORMATION

TITLE & ADDRESS:
CAL POLY ACADEMIC LAB

N. POLYVIEW DR. SAN LUIS OBISPO, CA 93407

RBI SOLAR PROJECT No.: 1835008

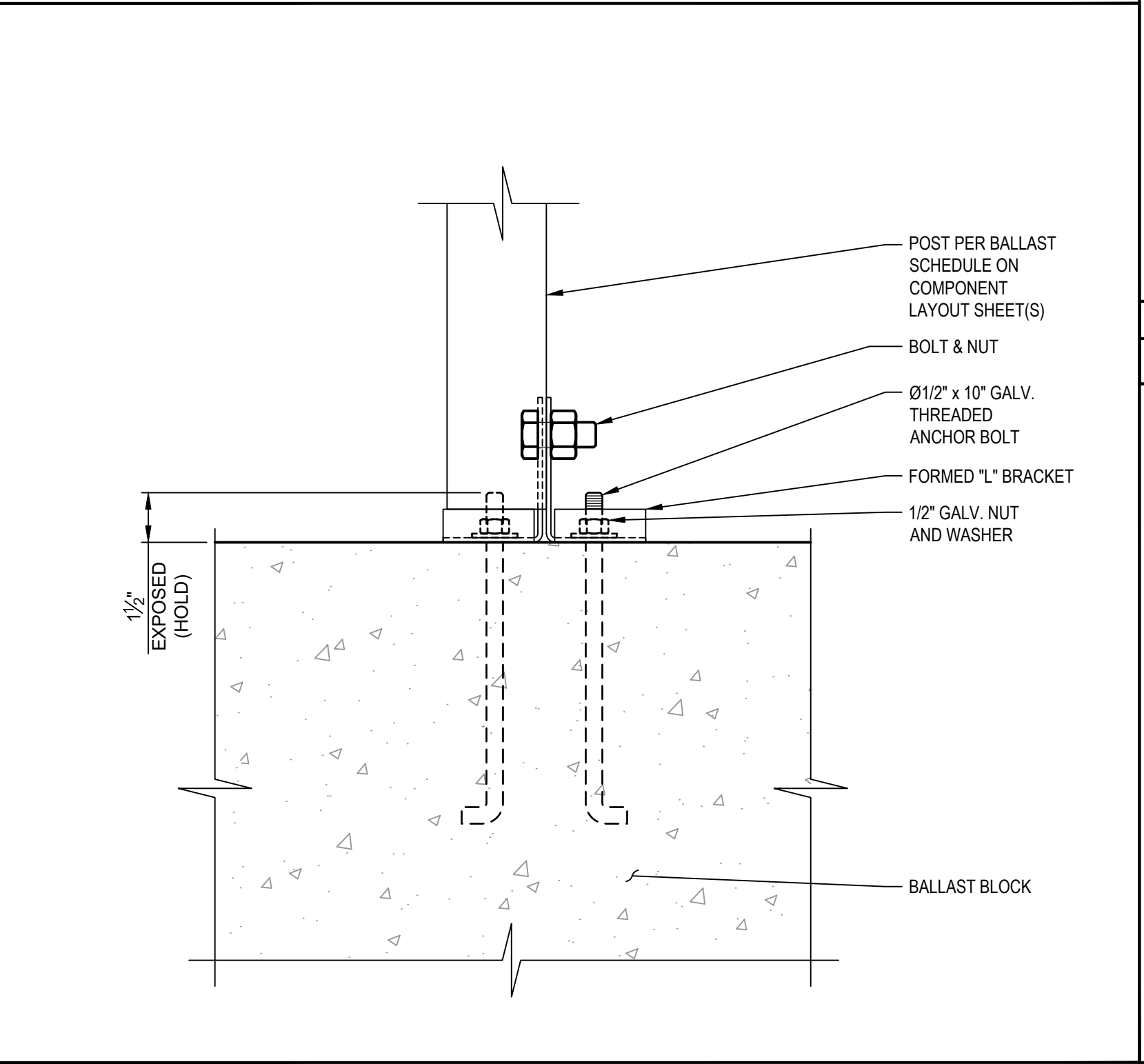
DRAWN BY: KEJ REVIEWED BY: JAB, BDS

SHEET TITLE: DETAILS

SHEET No.: **S-501**

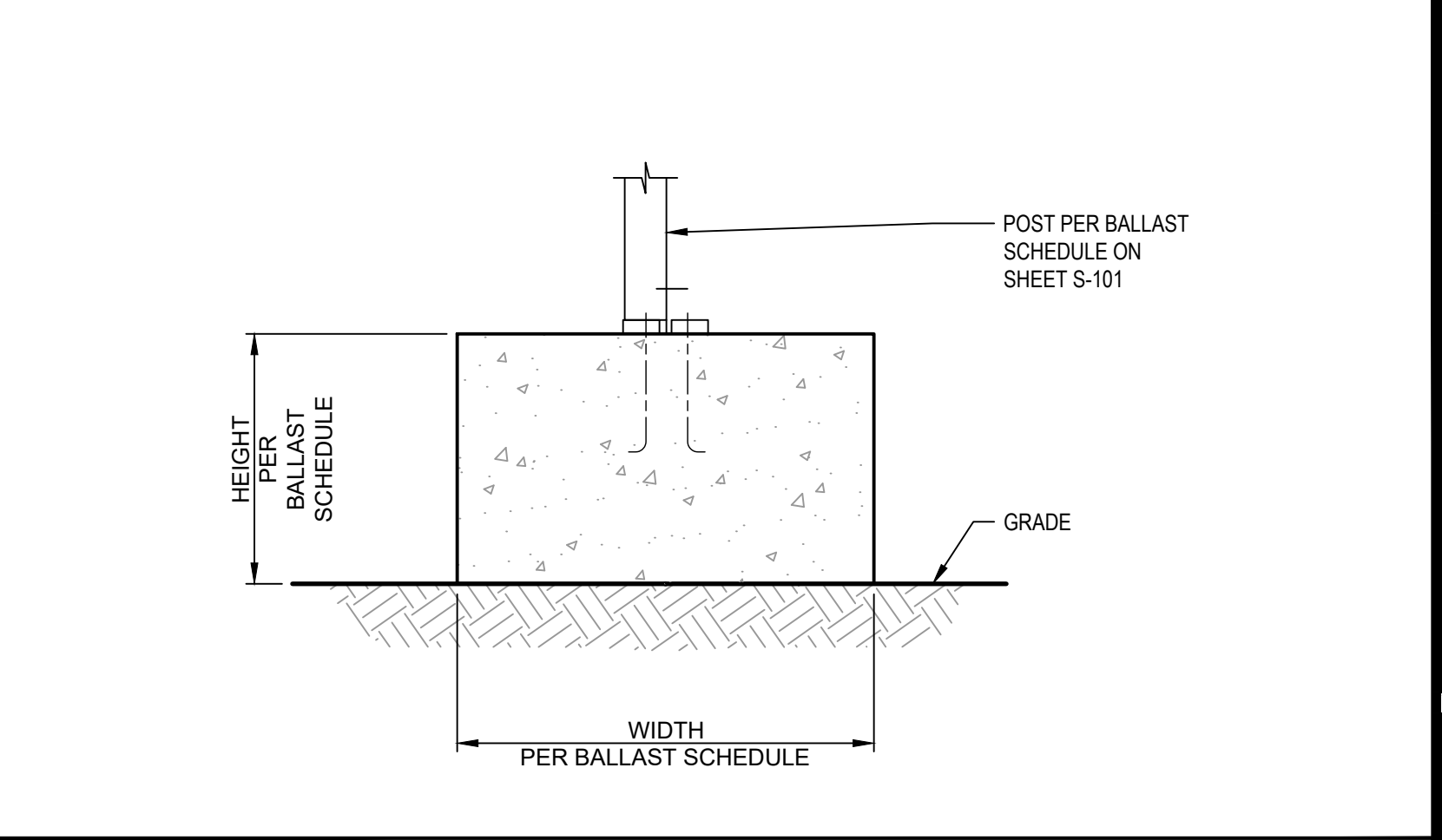
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BALLAST CONSTRUCTION SCHEDULE						
TYPE	QUANTITY	LENGTH	WIDTH	HEIGHT	POST SPACING	WEIGHT (≈ LBS.)
B	2	9'-6"	3'-8"	1'-0"	7'-0" 7/16"	5225

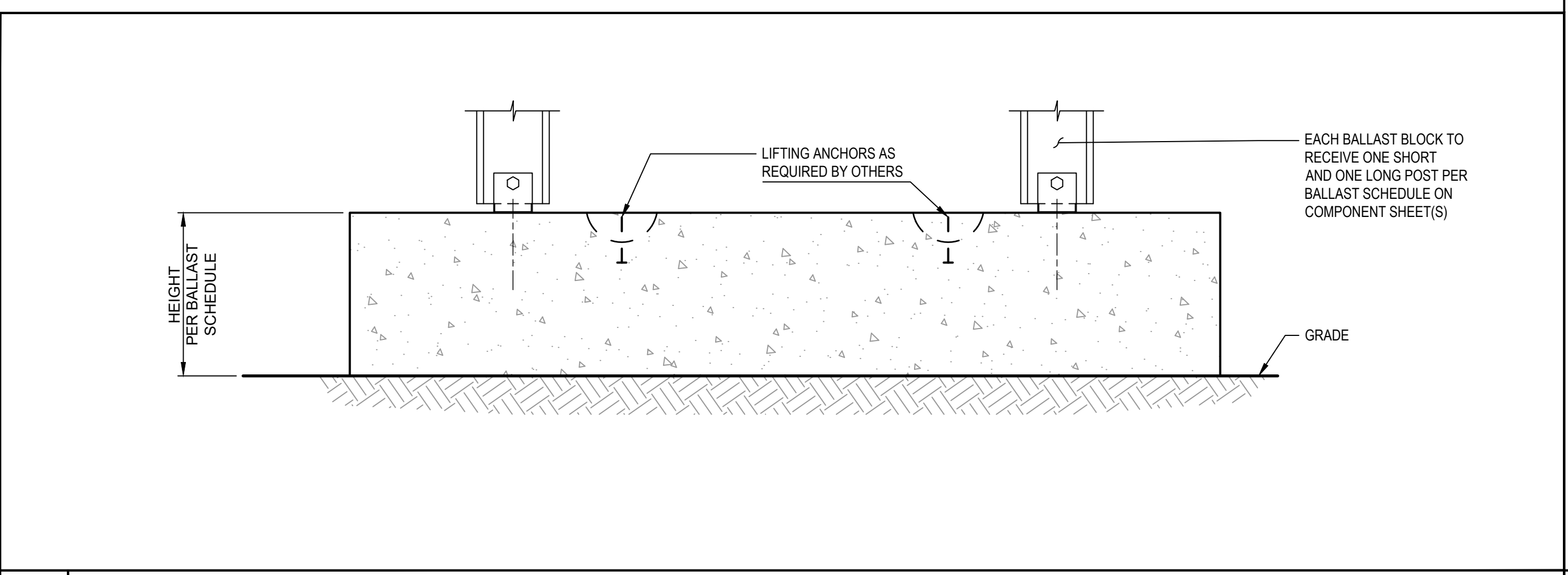


E6 BALLAST BLOCK ANCHOR ROD DETAIL
SCALE: 3" = 1'-0"

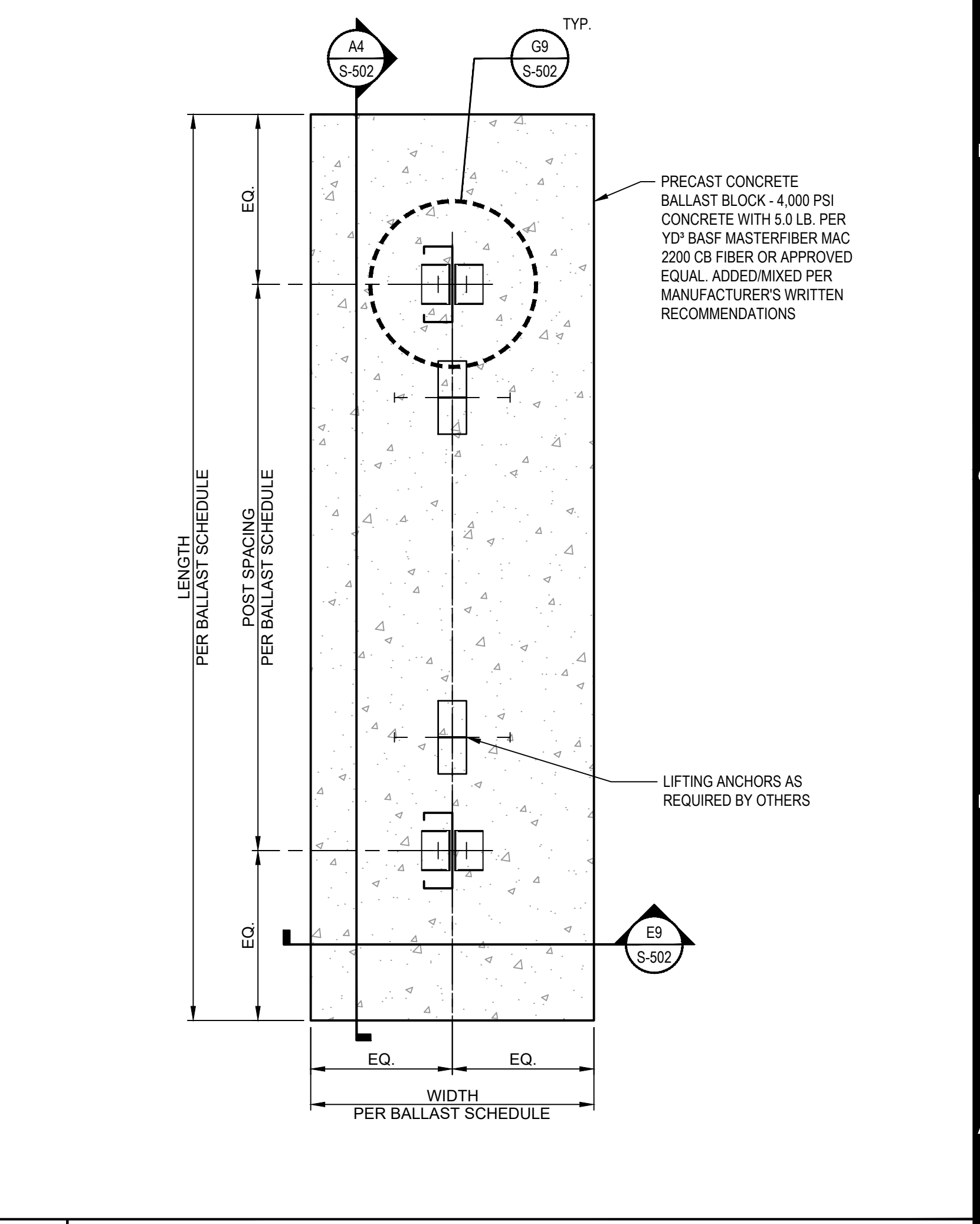
G9 BALLAST BLOCK BASE PLATE DETAIL
SCALE: 3" = 1'-0"



E9 BALLAST BLOCK SECTION
SCALE: 1" = 1'-0"



A4 BALLAST BLOCK SECTION
SCALE: 1" = 1'-0"



A9 BALLAST BLOCK PLAN
SCALE: 1" = 1'-0"

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Installation • Parts • Repair Service
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CINCINNATI, OH 45217
513.242.2051
FAX: 513.242.0816

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

GROUND MOUNT FOR
REC SOLAR

RELEASE RECORD

MARK	DATE	DESCRIPTION
09/25/18	CONS. SET R1	
06/25/18	CONS. SET	
04/13/18	100% REVIEW SET	
04/13/18	90% REVIEW SET	
04/10/18	75% REVIEW SET	
04/02/18	50% REVIEW SET	

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**

USER: NEJOHNSON PLOTTED: 9/25/2018 - 3:01 PM C:\Users\nejohnson\AppData\Local\Temp\AcPPlot\83221835008-REC Solar - Cal Poly State University, CA (041018)R01.dwg LAYOUT: S-502

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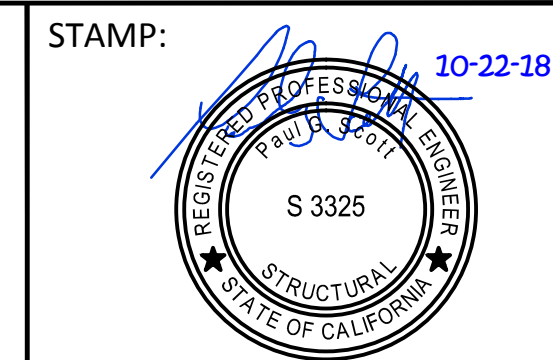
Site Design Criteria - Flat Roof PV System Basis of Design	
Roof Live Load (psf)1	20 (see note 1)
Ground Snow Pg (psf)	0
Flat Roof Snow Pf (psf)	0
Snow Importance Factor (Is)	1.1
Wind Design Data	
Ult. Wind Speed (mph)	115
Nom. Wind Speed (mph)	N/A
Risk Category	III
Internal Pressure Coefficient	N/A
Design Life (years)	50 YEARS
MRI Adjustment Factor	1
Wind Exposure	C
C and C pressure (psf)	(see note 2)
Earthquake Design Data	
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 = $F_p \times W$	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 F_p which is calculated per procedure noted in note #3.	

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- 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

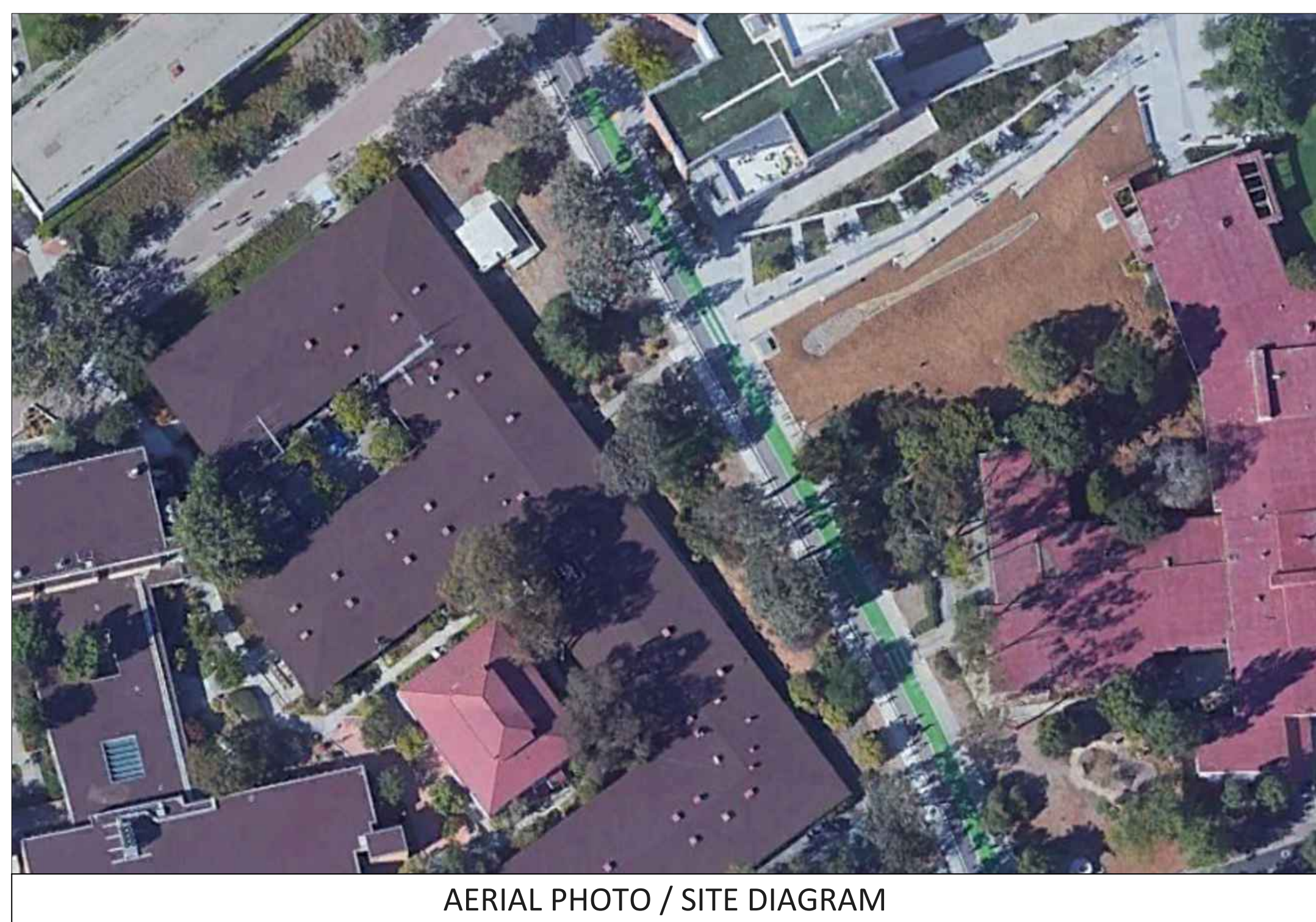
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 CONSULTING STRUCTURAL ENGINEERS
 FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY
 CTS PROJECT NUMBER 18-242-1498.1



RACKING CONSTRUCTION SET
 PANELCLAW, INC.
 1570 OSGOOD ST. SUITE 2100
 NORTH ANDOVER, MA 01845
 TEL: 978.688.4900
 FAX: 978.688.5100
 www.panelclaw.com

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REV	DESCRIPTION	DATE	CHECK
2	revised ballast	2018-09-17	BG
1	revised ballast	2018-03-20	BG
0	INITIAL BALLAST MAP LAYOUT	2018-01-22	RJH



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.		

APPROVED FOR CONSTRUCTION

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:
COVER SHEET

REVISION: 2 SHEET: PC-1

8 7 6 5 4 3 2 1

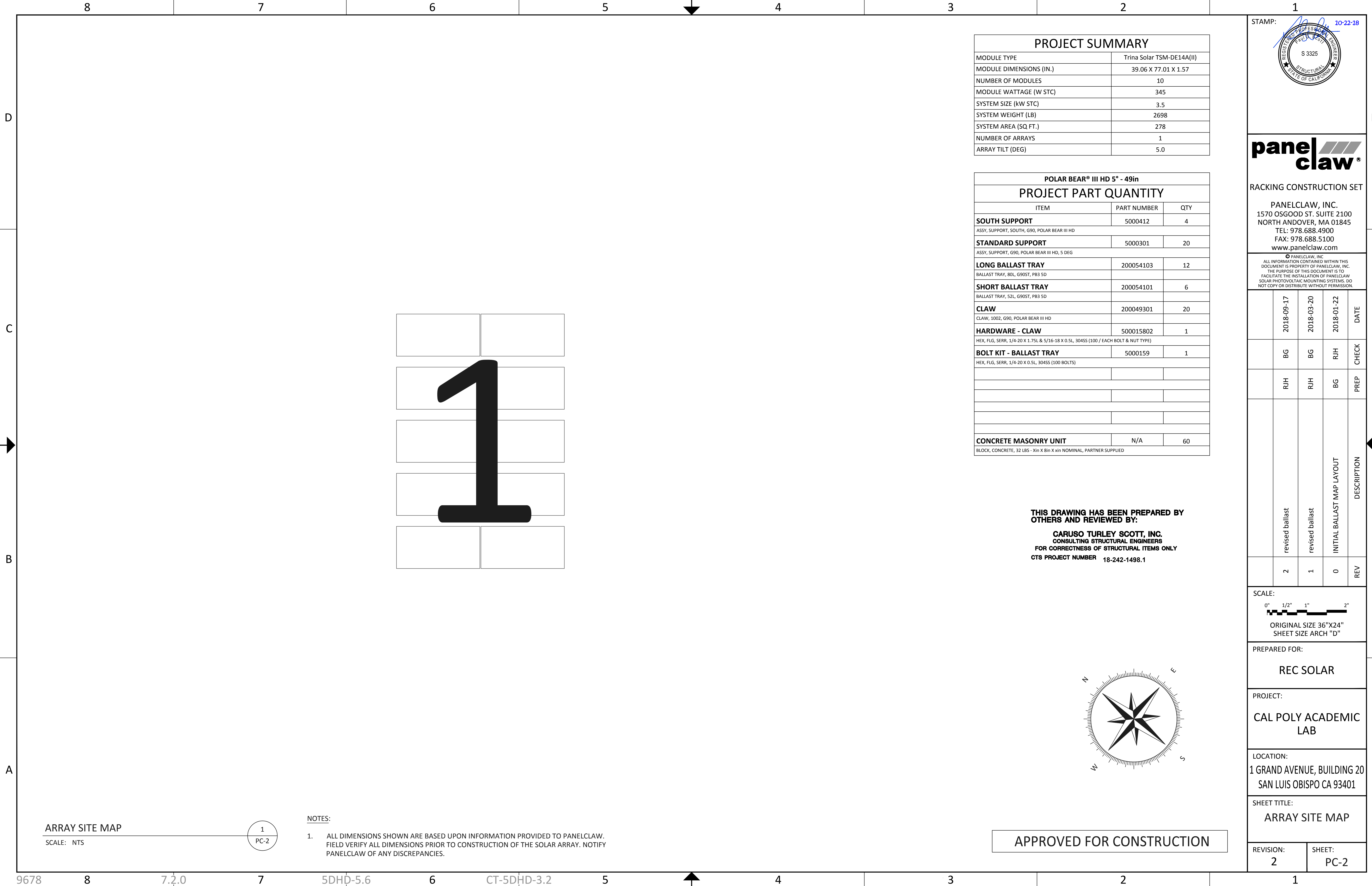
D

C

B

A

9678 8 7.2.0 7 5DHD-5.6 6 CT-5DHD-3.2 5 4 3 2 1

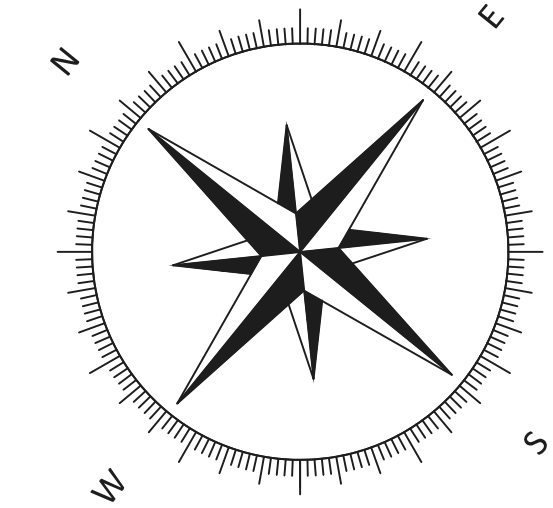


PROJECT SUMMARY	
MODULE TYPE	Trina Solar TSM-DE14A(II)
MODULE DIMENSIONS (IN.)	39.06 X 77.01 X 1.57
NUMBER OF MODULES	10
MODULE WATTAGE (W STC)	345
SYSTEM SIZE (kW STC)	3.5
SYSTEM WEIGHT (LB)	2698
SYSTEM AREA (SQ. FT.)	278
NUMBER OF ARRAYS	1
ARRAY TILT (DEG)	5.0

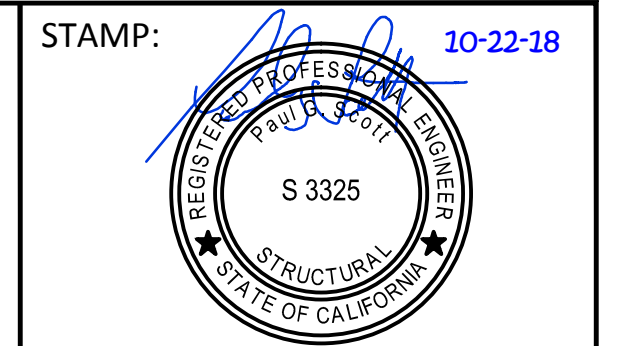
POLAR BEAR® III HD 5° - 49in PROJECT PART QUANTITY		
ITEM	PART NUMBER	QTY
SOUTH SUPPORT	5000412	4
ASSY, SUPPORT, SOUTH, G90, POLAR BEAR III HD		
STANDARD SUPPORT	5000301	20
ASSY, SUPPORT, G90, POLAR BEAR III HD, 5 DEG		
LONG BALLAST TRAY	200054103	12
BALLAST TRAY, 80L, G90ST, PB3 5D		
SHORT BALLAST TRAY	200054101	6
BALLAST TRAY, 52L, G90ST, PB3 5D		
CLAW	200049301	20
CLAW, 1002, G90, POLAR BEAR III HD		
HARDWARE - CLAW	500015802	1
HEX, FLG, SERR, 1/4-20 X 1.75L & 5/16-18 X 0.5L, 304SS (100 / EACH BOLT & NUT TYPE)		
BOLT KIT - BALLAST TRAY	5000159	1
HEX, FLG, SERR, 1/4-20 X 0.5L, 304SS (100 BOLTS)		
CONCRETE MASONRY UNIT	N/A	60
BLOCK, CONCRETE, 32 LBS - X in X 8 in X in NOMINAL, PARTNER SUPPLIED		

**THIS DRAWING HAS BEEN PREPARED BY
OTHERS AND REVIEWED BY:**

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 CONSULTING STRUCTURAL ENGINEERS
 FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY
 CTS PROJECT NUMBER 18-242-1498.1



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	2018-09-17	2018-03-20	2018-01-22	DATE
	BG	BG	RJH	CHECK
	RJH	RJH	BG	PREP
	revised ballast	revised ballast	INITIAL BALLAST MAP LAYOUT	DESCRIPTION
2		1	0	REV

SCALE:
 0" 1/2" 1" 2"
 ORIGINAL SIZE 36"X24"
 SHEET SIZE ARCH "D"

PREPARED FOR:
REC SOLAR

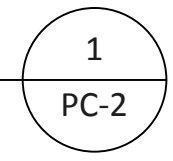
PROJECT:
CAL POLY ACADEMIC LAB

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

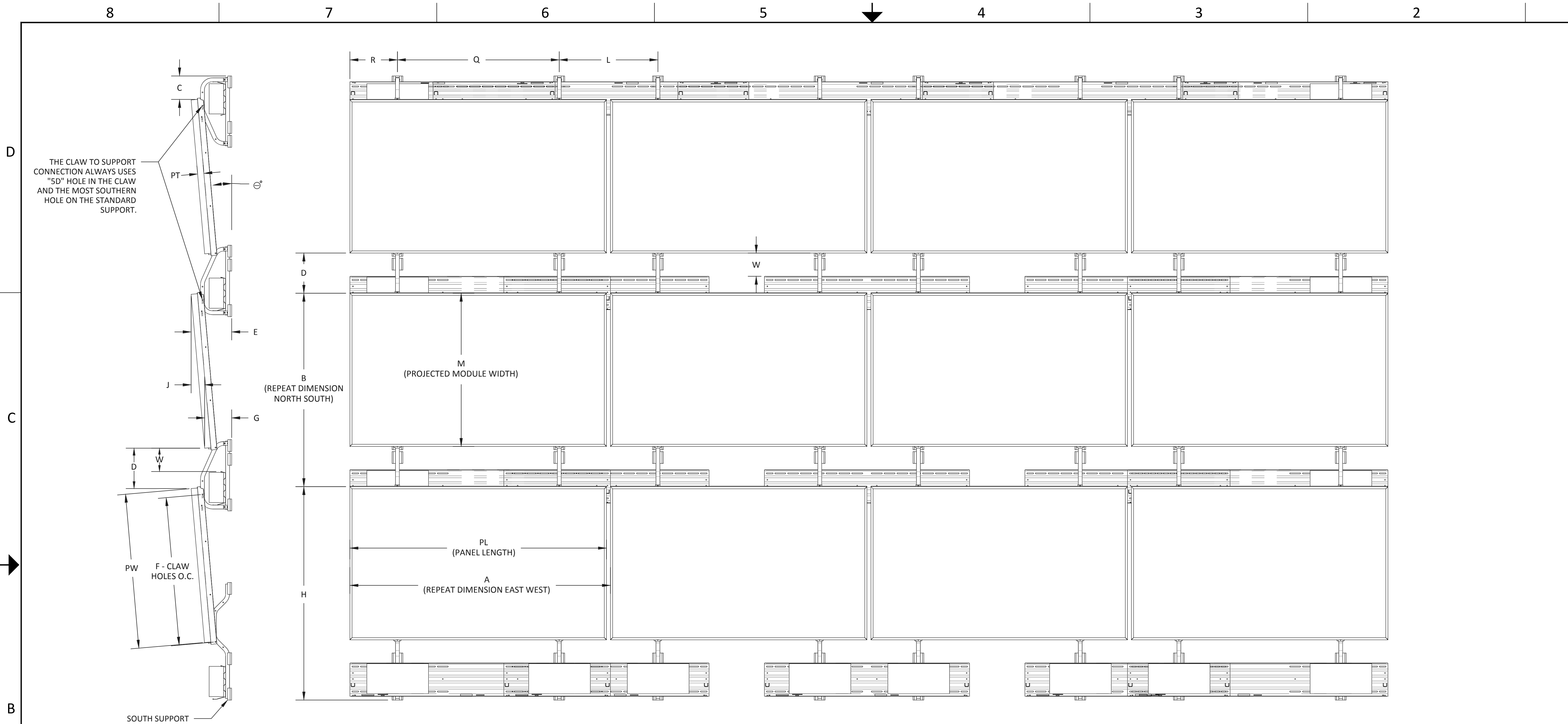
SHEET TITLE:
ARRAY SITE MAP

REVISION: 2 SHEET: PC-2

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.



ARRAY CROSS SECTION VIEW

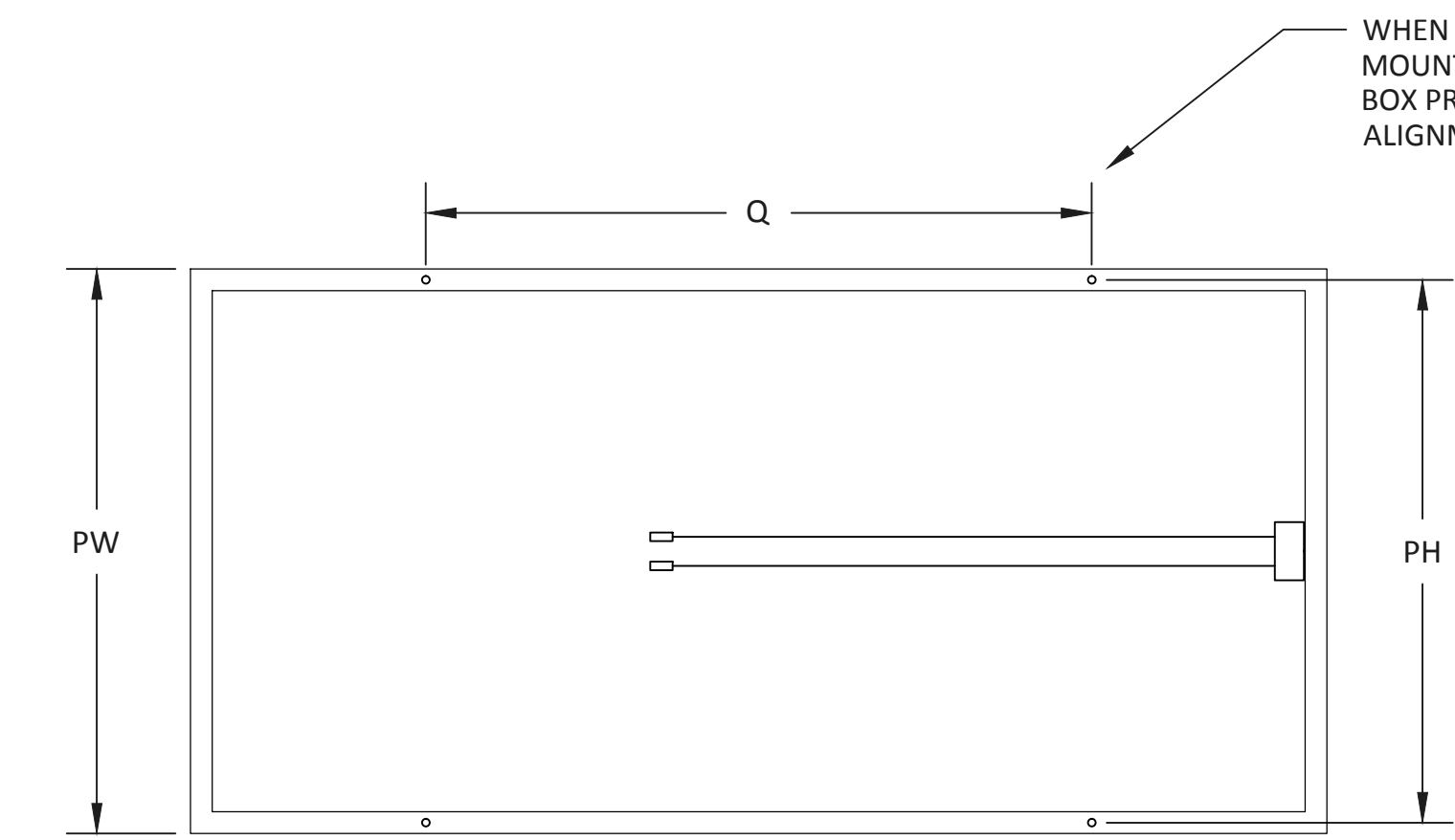
SCALE: NTS

A
PC-3

ARRAY TOP VIEW

SCALE: NTS

B
PC-3



MODULE BACK VIEW DIMENSIONS

SCALE: NTS

C
PC-3

WHEN INSTALLING CLAWS TO MODULES, BE SURE TO USE THE MODULE MOUNTING HOLES WITH THIS SPACING. SLIDE CLAWS TOWARD JUNCTION BOX PRIOR TO TORQUEING TO MAINTAIN CONSISTENT SUPPORT ALIGNMENT.

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CARUSO TURLEY SCOTT, INC.
CONSULTING STRUCTURAL ENGINEERS
FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY
CTS PROJECT NUMBER 18-242-1498.1

STAMP: 10-22-18
S 3325
REGISTERED PROFESSIONAL ENGINEER
STRUCTURAL
STATE OF CALIFORNIA

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REV	DESCRIPTION	DATE	CHECK
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0	INITIAL BALLAST MAP LAYOUT	2018-01-22	RJH

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

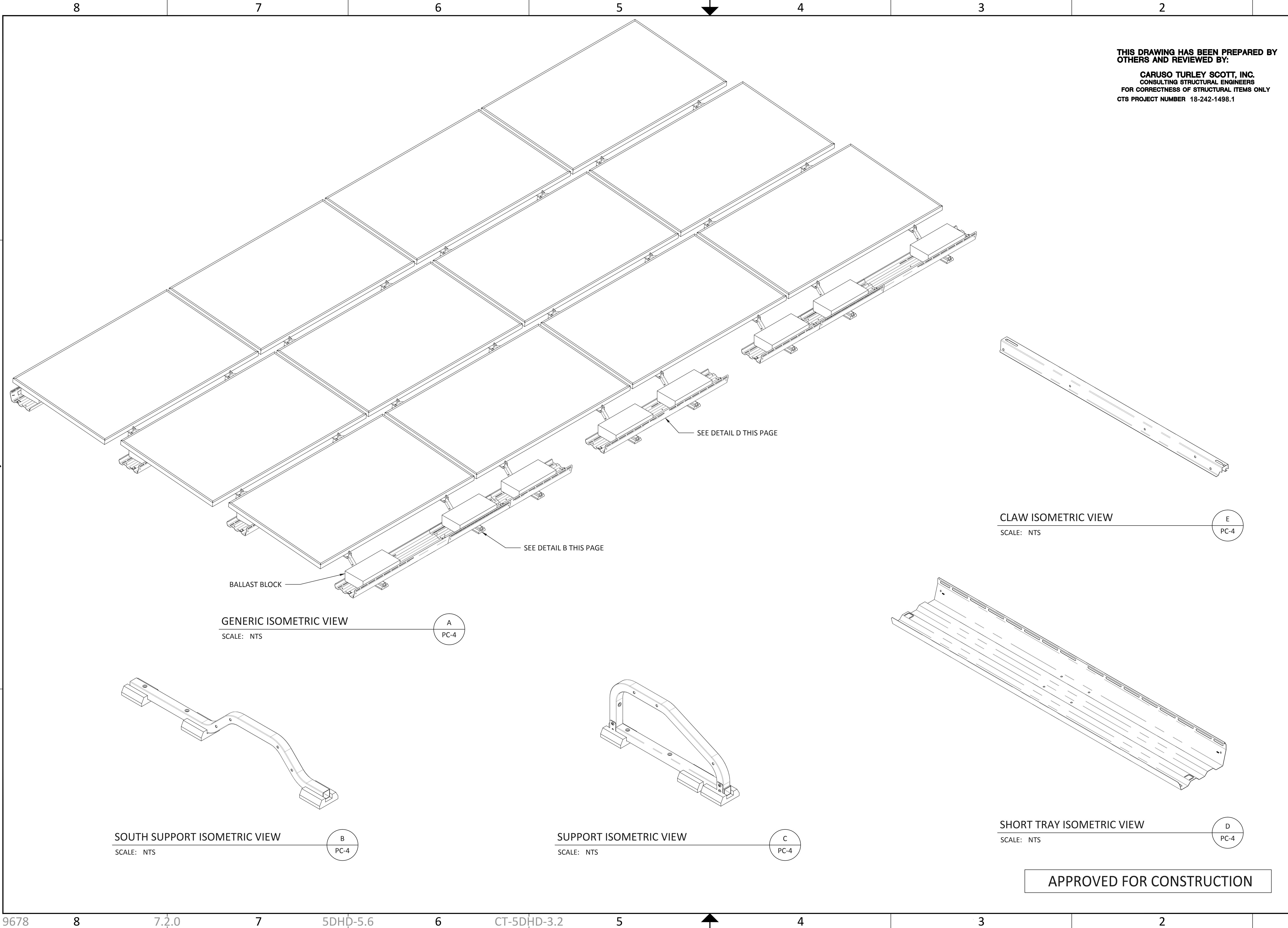
SHEET TITLE:
TYPICAL ARRAY DIMENSIONS

REVISION: 2 SHEET: PC-3

		PL	PW	PT	PH	A	B	C	D	E	F	G	H	J	L	M	Q	R	W	Hole Diameter	Ø (DEG)	D / J (#:1)	G.C.R.*
UNITS	mm	1956	992	40	941	1981	1245	154	257	260	949	173	1374	86	705	988	1276	340	145	9.0	5.0	3.0	0.79
	IN	77.01	39.06	1.57	37.05	78.01	49.03	6.06	10.12	10.23	37.35	6.83	54.10	3.40	27.77	38.91	50.24	13.39	5.73	0.35	5.0	3.0	0.79

* G.C.R. - Ground coverage ratio calculation = (PL*M) / (A*B)

APPROVED FOR CONSTRUCTION



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

STAMP: *[Signature]* 10-22-18



RACKING CONSTRUCTION SET
PANELCLAW, INC.
 1570 OSGOOD ST. SUITE 2100
 NORTH ANDOVER, MA 01845
 TEL: 978.688.4900
 FAX: 978.688.5100
 www.panelclaw.com

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	2018-09-17	2018-03-20	2018-01-22	DATE
	BG	BG	RJH	CHECK
	RJH	RJH	BG	PREP
	revised ballast	revised ballast	INITIAL BALLAST MAP LAYOUT	DESCRIPTION
	2	1	0	REV

SCALE:

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

PREPARED FOR:
REC SOLAR

PROJECT:
CAL POLY ACADEMIC LAB

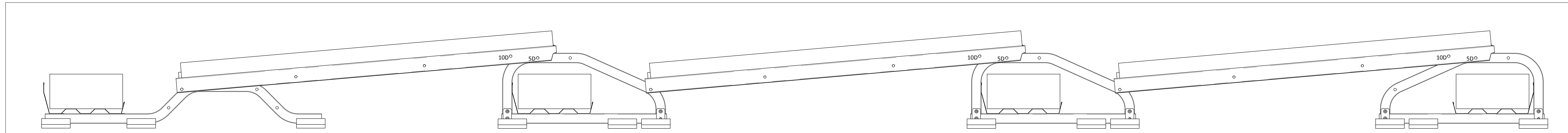
LOCATION:
 1 GRAND AVENUE, BUILDING 20
 SAN LUIS OBISPO CA 93401

SHEET TITLE:
RACKING COMPONENTS

REVISION: **2** SHEET: **PC-4**

APPROVED FOR CONSTRUCTION

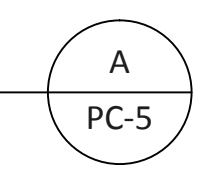
8 7 6 5 4 3 2 1



ALWAYS USE THE MOST SOUTHERN HOLE ON THE SOUTH SUPPORT TO SECURE THE CLAW. ALWAYS USE THE MOST SOUTHERN HOLE ON THE STANDARD SUPPORT TO SECURE HOLE "5D" OF THE CLAW TO THE SUPPORT.

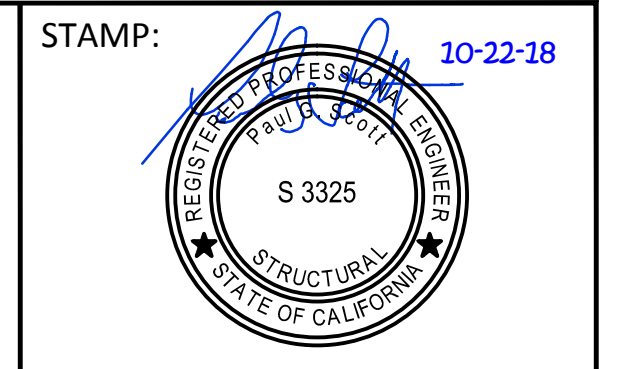
SUPPORT HOLE TO CLAW HOLE CONNECTION

SCALE: NTS



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CARUSO TURLEY SCOTT, INC.
CONSULTING STRUCTURAL ENGINEERS
FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY
CTS PROJECT NUMBER 18-242-1498.1
www.panelclaw.com



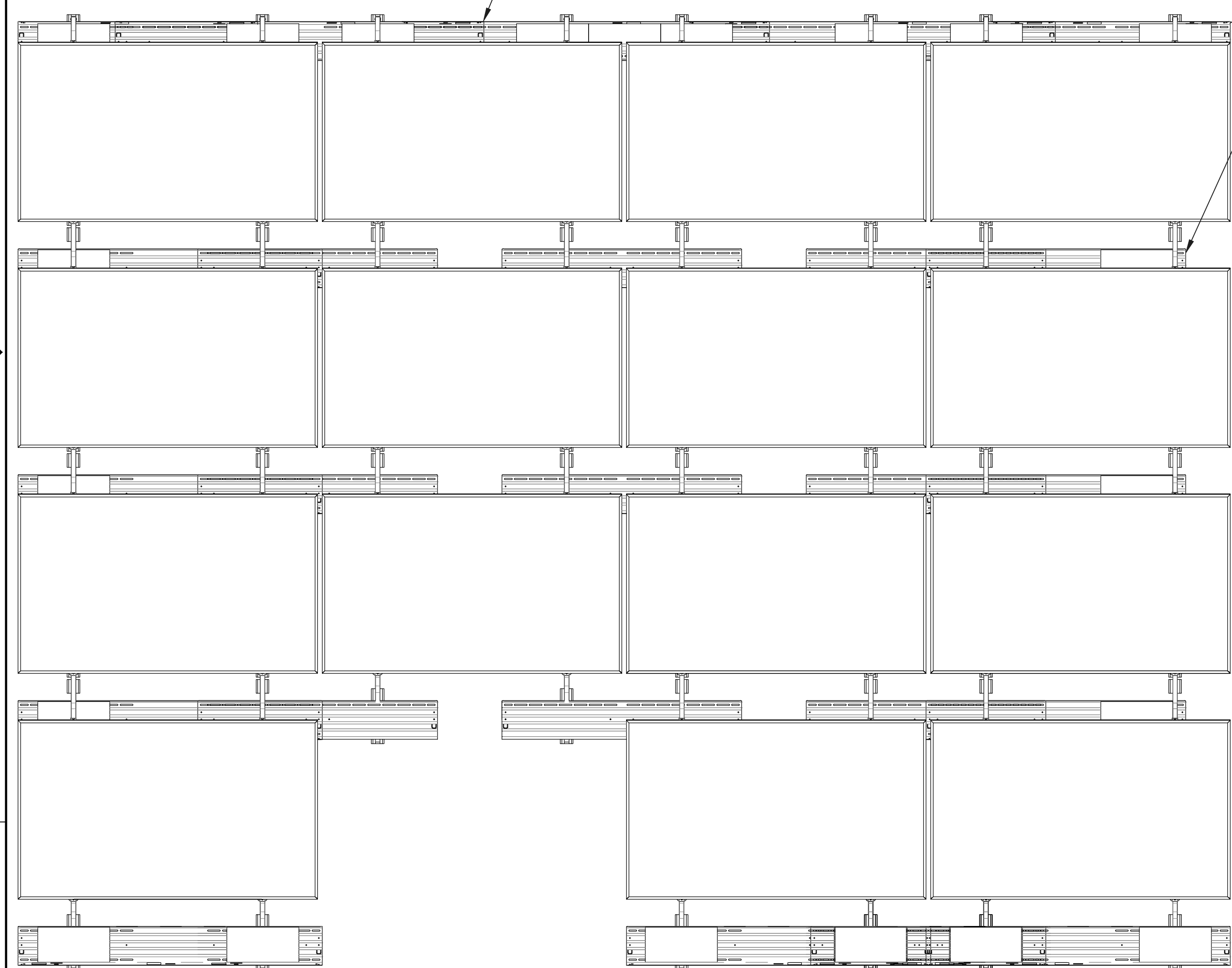
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1570 OSGOOD ST. SUITE 2100
NORTH ANDOVER, MA 01845
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NORTH EDGE BALLAST TRAYS SHOULD APPEAR SEAMLESS WITH SOME OVERLAP BETWEEN TRAYS

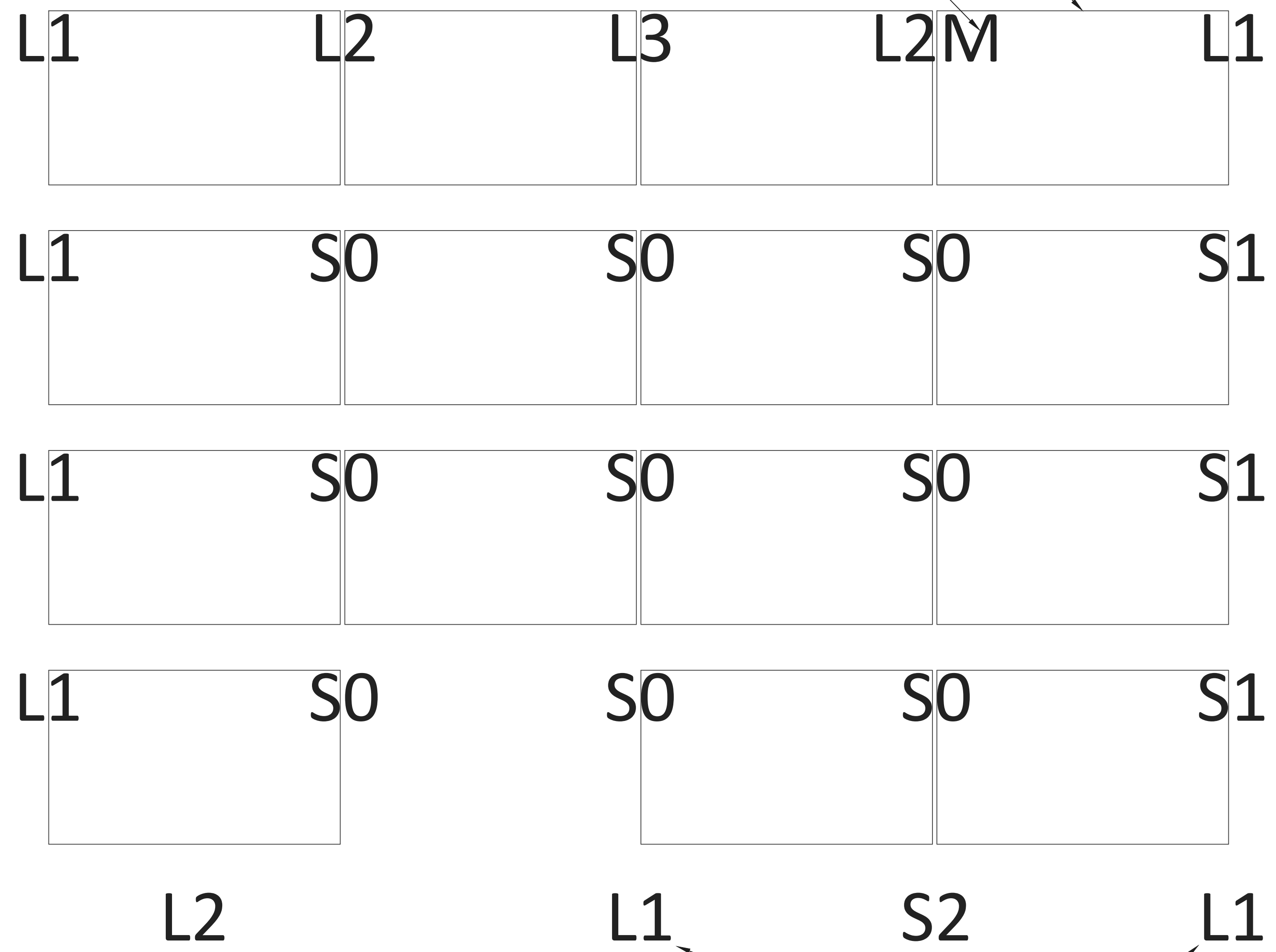
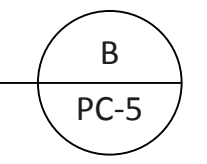
END OF ROW TRAYS SHOULD BE INSTALLED CENTERED ON THE MODULE. THEY MUST ALSO BE BOLTED TO BOTH THE 1ST AND 2ND SUPPORT FROM THE ARRAY EDGE. NOTE THAT LONG TRAYS WILL APPEAR FLUSH WITH THE MODULE WHILE SHORT END OF ROW TRAYS ARE NOT FLUSH WITH THE ARRAY EDGE.

MECHANICAL ATTACHMENT (WHEN REQUIRED) MODULE



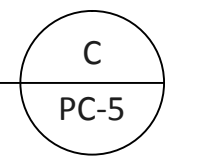
GENERIC BALLAST PLACEMENT LEGEND

SCALE: NTS



GENERIC TRAY AND BALLAST PLAN

SCALE: NTS



APPROVED FOR CONSTRUCTION

NOTE: REFERENCE THE BALLAST MAP SHEETS FOR ARRAY SPECIFIC BALLAST TRAY AND BALLAST BLOCK QUANTITY REQUIREMENTS.

TRAY AND BALLAST QUANTITY KEY:
"S"=SHORT TRAY
"L"=LONG TRAY
"#"-QUANTITY OF BALLAST BLOCK IN TRAY
"M"=MECHANICAL ATTACHMENT (WHEN REQUIRED)
SEE PROJECT PART QUANTITIES TABLE PC-2 FOR LONG AND SHORT TRAY PART NUMBERS.

	2018-09-17	2018-03-20	2018-01-22	DATE
	BG	BG	RJH	CHECK
	RJH	RJH	BG	PREP
	revised ballast	revised ballast	INITIAL BALLAST MAP LAYOUT	DESCRIPTION
	2	1	0	REV

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:
BALLAST LEGEND

REVISION: 2 SHEET: PC-5

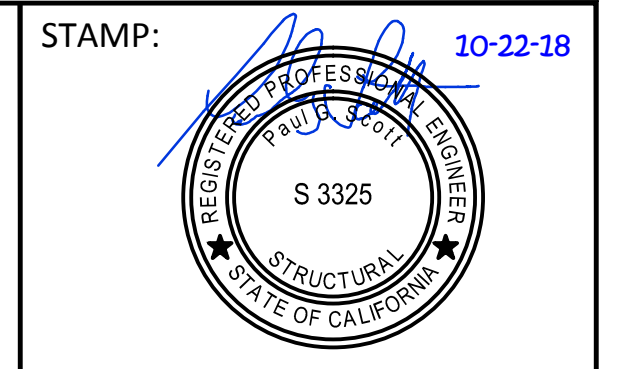
9678 8 7.2.0 7 5DHD-5.6 6 CT-5DHD-3.2 5 4 3 2 1

8 7 6 5 4 3 2 1

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OTHERS AND REVIEWED BY:**

CARUSO TURLEY SCOTT, INC.
CONSULTING STRUCTURAL ENGINEERS
FOR CORRECTNESS OF STRUCTURAL ITEMS ONLY
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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	2018-09-17	2018-03-20	2018-01-22	DATE
	BG	BG	RJH	CHECK
	RJH	RJH	BG	PREP
	revised ballast	revised ballast	INITIAL BALLAST MAP LAYOUT	DESCRIPTION
2	1	0	REV	

SCALE:
0" 1/2" 1" 2"
ORIGINAL SIZE 36"X24"
SHEET SIZE ARCH "D"

PREPARED FOR:
REC SOLAR

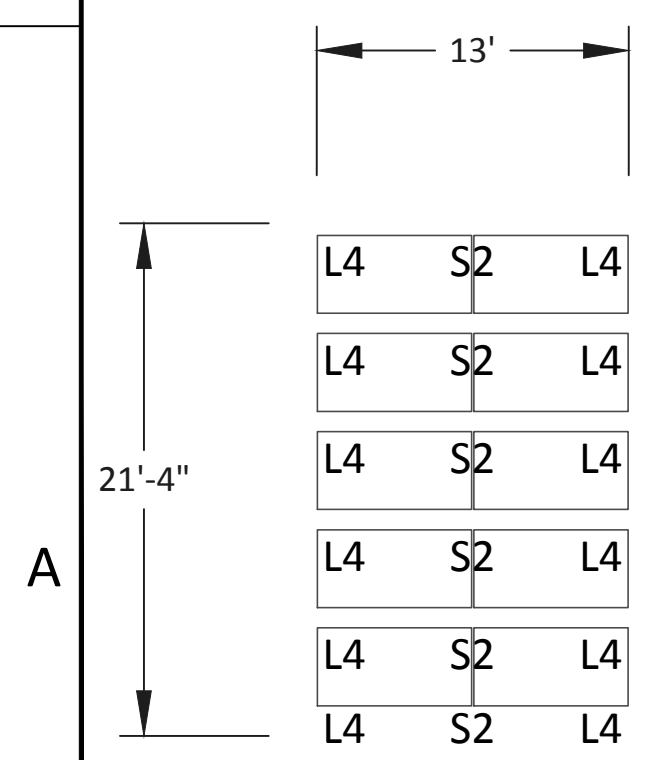
PROJECT:
CAL POLY ACADEMIC LAB

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

SHEET TITLE:
BALLAST LAYOUT - 1

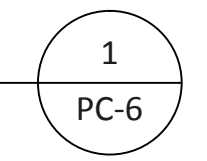
REVISION: 2 SHEET: PC-6

D
C
B
A



BALLAST LAYOUT - ARRAY 1

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



APPROVED FOR CONSTRUCTION

9678 8 7.2.0 7 5DHD-5.6 6 CT-5DHD-3.2 5 4 3 2 1

GRADING AND DRAINAGE PLANS

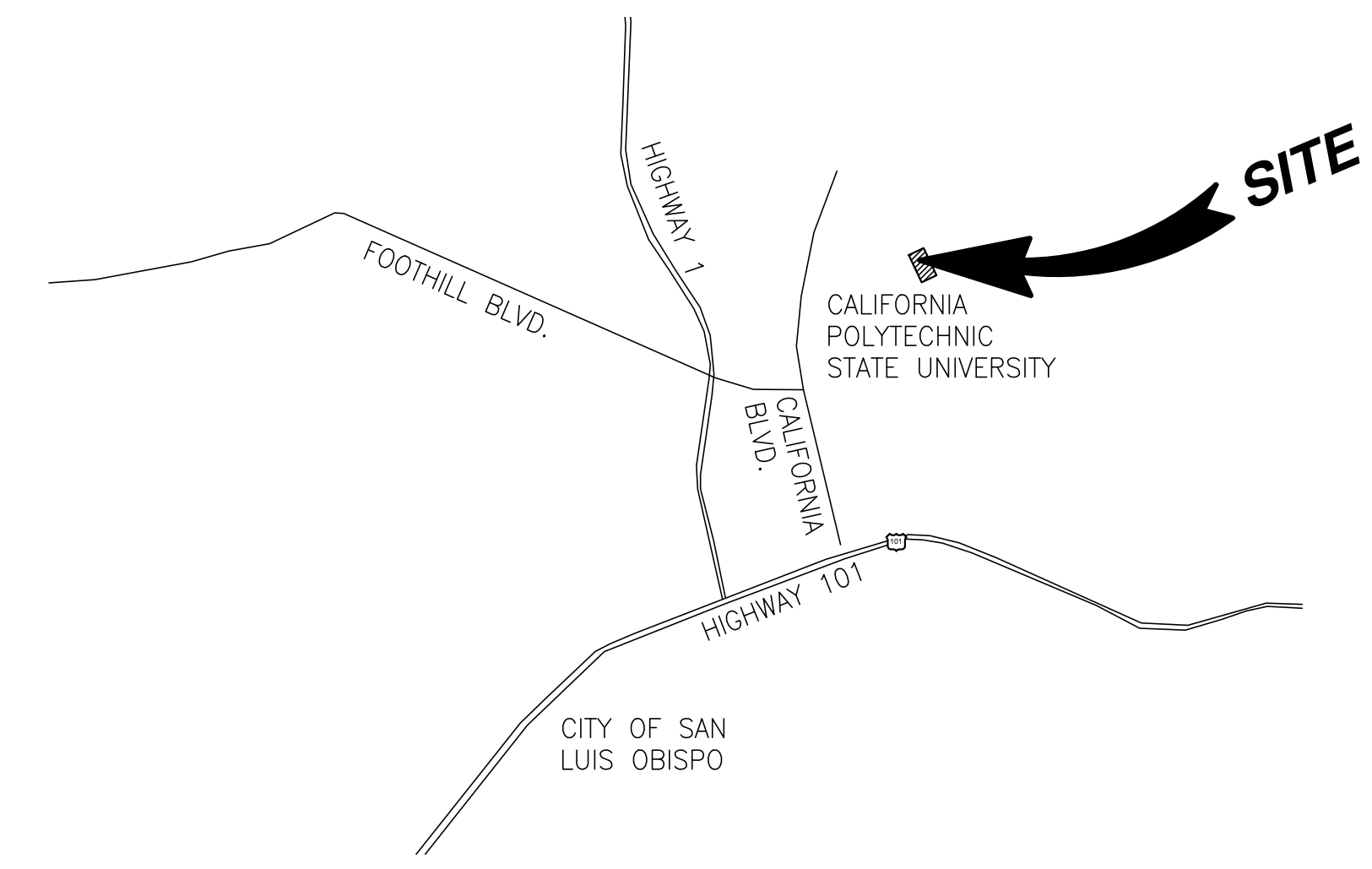
FOR

CAL POLY SOLAR LAB

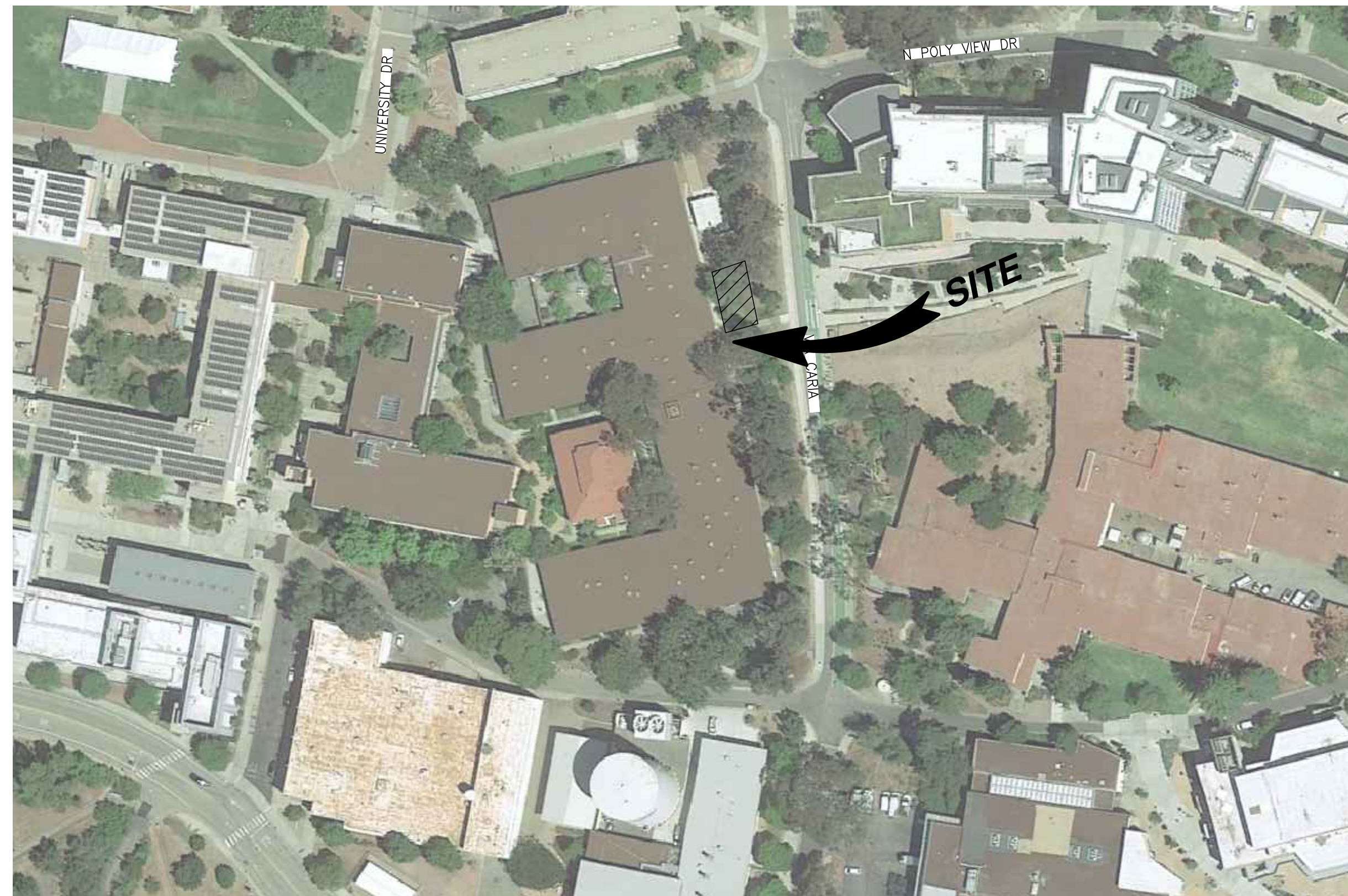
CITY OF SAN LUIS OBISPO, CALIFORNIA

GRADING NOTES:

1. 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 THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY, AND THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS THE OWNER AND THE DESIGN PROFESSIONAL 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.
2. 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 THIS OPERATION.
3. IN THE EVENT THAT PROJECT CONSTRUCTION CONTINUES DURING WET WINTER MONTHS, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO MAINTAIN OR WINTERIZE THE ROADS FOR EMERGENCY VEHICLES.
4. 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.
5. 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.
6. 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.
7. IN THE EVENT CONSTRUCTION STAKING BASED ON DPSI PLANS, DRAWINGS, OR OTHER DOCUMENTS IS PERFORMED BY ANOTHER FIRM, DPSI SHALL BE HELD HARMLESS AND RELEASED FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS, OR OTHER DOCUMENTS.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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 AND DURING CONSTRUCTION. THE CONTRACTOR SHALL CONTACT U.S.A. (811) FOR UTILITY LOCATION 48 HOURS PRIOR TO ANY EXCAVATION OR TRENCHING.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. CIVIL ENGINEER SHALL BE NOTIFIED 48 HOURS PRIOR TO PLACEMENT OF ANY FILL.
19. 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.
20. FILL MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
21. 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.
22. ENGINEERED FILL SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY UNLESS OTHERWISE NOTED.
23. THE DESIGN ENGINEER SHALL EXERCISE SUFFICIENT SUPERVISORY CONTROL DURING GRADING AND CONSTRUCTION TO INSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODE WITHIN HIS PURVIEW.
24. ALL GRADING SHALL CONFORM TO TITLE 19 OF THE CALIFORNIA BUILDING CODE AND STANDARDS PERTAINING THERETO.
25. ALL CUT SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL UNLESS OTHERWISE APPROVED IN A SOILS REPORT.
26. ALL FILL SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
27. AN OSHA PERMIT IS REQUIRED WHEN WORKERS MUST ENTER TRENCHES OR EXCAVATION FIVE (5) FEET OR DEEPER.
28. 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.
29. ALL SLOPES IN EXCESS OF 3" IN VERTICAL HEIGHT SHALL BE PREPARED AND MAINTAINED TO CONTROL AGAINST EROSION.
30. GRADING WORK WILL BE SUPERVISED AS ENGINEERED GRADING IN ACCORDANCE WITH TITLE 19 AND THE CALIFORNIA BUILDING CODE.
31. FILL AREAS SLOPING STEEPER THAN 5:1 SHALL BE KEYED AND BENCHED TO SUPPORT THE FILL.
32. BERMS OF DRAINAGE DEVICES SHALL BE PLACED AT THE TOP OF ALL FILL SLOPES.
33. 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.
34. 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.
35. 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:
 - 35.a. WATER SHALL BE APPLIED TO ALL UNPAVED AREAS AS REQUIRED TO PREVENT THE SURFACES FROM BECOMING DRY ENOUGH TO PERMIT DUST FORMATION.
 - 35.b. PAVED SURFACES OVER WHICH VEHICULAR TRAFFIC IS PERMITTED TO TRAVEL SHALL BE KEPT FREE OF DIRT.



VICINITY MAP
N.T.S.



SITE PLAN MAP
N.T.S.

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 DECLARE 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
DAVID W. CHANLEY R.C.E. 70849



LEGEND

- SET LOCAL CONTROL
- × 500.00 SPOT ELEVATION
- ☼ FIRE HYDRANT
- ⊕ IRRIGATION CONTROL VALVE
- ⊕ WATER VALVE
- ☀ LIGHT POLE
- ⊞ ELECTRICAL PANEL
- ⊞ SANITARY SEWER MANHOLE
- ⊞ STORM WATER MAN HOLE
- ⊞ TELECOMMUNICATIONS MANHOLE
- TREE SIZE VARIES
- VLTCOM VAULT COMMUNICATIONS
- VLTE VAULT ELECTRIC
- VLT VAULT UNKNOWN
- (100) — CONTOURS - MAJOR
- (100) — CONTOURS - MINOR
- — — NATURAL GROUND TOP
- — — RETAINING WALL
- — — FENCING SEE REC SOLAR DETAILS
- — — RETAINING WALL FOOTING OUTLINE

SCOPE OF WORK

GRADING AND DRAINAGE PLAN FOR CAL POLY SOLAR LAB.

SITE INFORMATION

APN: 073-341-020

LOCATION:

LEGAL DESCRIPTION: BEING A PORTION OF SECTION 23, TOWNSHIP 30 SOUTH, RANGE 12 EAST, MOUNT Diablo MERIDIAN, AND A PORTION OF THE RANCHO POTRERO DE SAN LUIS OBISPO, IN THE COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA.

PROJECT AREA: 1950 SQ. FT.

EARTHWORK

AREA: 1950 SQ. FT.
CUT: 150 CUBIC YARDS
FILL: 0 CUBIC YARDS
EXPORT: 150 CUBIC YARDS

ABBREVIATIONS

- AC - ASPHALT CONCRETE
- ARV - AIR AND VACUUM RELIEF VALVE
- CL - CENTERLINE
- DIP - DUCTILE IRON PIPE
- EP - EDGE OF PAVEMENT
- ESMT - EASEMENT
- EXIST - EXISTING
- FS - FINISHED GRADE ELEVATION
- FH - FIRE HYDRANT
- FL - FINISHED FLOOR ELEVATION
- FL - FLOW LINE OF GUTTER ELEVATION
- FS - FINISHED SURFACE ELEVATION
- GB - GRADE BREAK
- GP - GRADING PLAN
- HDPE - HIGH DENSITY POLYETHYLENE
- HP - HIGH POINT
- INV - PIPE/DRAIN INVERT ELEVATION
- LF - LINEAR FEET
- LP - LOW POINT
- Lt - LEFT
- MH - MANHOLE
- MJ - MECHANICAL JOINT
- PL - PROPERTY LINE
- POC - POINT OF CONNECTION
- PVC - POLYVINYL CHLORIDE
- R - RADIUS
- RCP - REINFORCED CONCRETE PIPE
- ROW - RIGHT OF WAY
- RI - RIGHT
- STE - STATION
- TF - TOP OF FOOTING ELEVATION
- TG - TOP OF GRATE
- TW - TOP OF WALL ELEVATION
- WL - WATER LINE
- WM - WATER METER
- WV - WATER VALVE
- (XX.XX) = EXISTING ELEVATION

THE DELIVERY OF THIS DRAWING SHOULD NOT BE CONSTRUED TO PROVIDE AN EXPRESS WARRANTY OR GUARANTEE TO ANYONE THAT ALL DIMENSIONS AND DETAILS ARE EXACT OR TO INDICATE THAT THE USE OF THIS DRAWING IMPLIES THE REVIEW AND APPROVAL OF DPSI OF ANY FUTURE USE. ANY USE OF THIS INFORMATION IS AT THE SOLE RISK OF THE USER.

APPROVED:

DATE

DATE

AGENCY REPRESENTATIVE

APP	DC	REVISIONS	ISSUED FOR PERMIT	REV	DATE
				B	11/05/18

TITLE SHEET

CAL POLY SOLAR LAB

SAN LUIS OBISPO, CA

SHEET

C1

OF 5 SHEETS

PROJECT: 180168

DATE: 0105-11-05

N:\180168\07_CEDesign\5_Sheets\5_Grade\CE 180168_1200.dwg, 11/05/18, 02:49 PM, gphillips

ABBREVIATIONS

Table with columns for abbreviations and their corresponding full names. Includes categories like AND ANGLE, CENTERLINE, ANCHOR BOLT, etc.

GENERAL STRUCTURAL

- 1. 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.

STRUCTURAL OBSERVATION PROGRAM

- 1. 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.

GEOTECHNICAL DESIGN CRITERIA AND PREPARATION

1. DESIGN CRITERIA: THE FOUNDATION WAS DESIGNED IS 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:

- 1.1. SOIL CLASSIFICATION: C WALL SITES

- 1.2. ALLOWABLE DESIGN PARAMETERS:

Table with 2 columns: PARAMETER and ALLOWABLE CAPACITY. Rows include DEAD + LIVE, DEAD + LIVE + SEISMIC, ACTIVE PRESSURE 2H:1V (DRAINED), SEISMIC LATERAL EARTH PRESSURE, PASSIVE PRESSURE, COEFFICIENT OF FRICTION.

* 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 NEGLIGIBLE FOR MODERATELY HARD TO HARD SANDSTONE BEDROCK.

2. CONTRACTOR RESPONSIBILITIES:

- 2.1. REVIEW AND INCORPORATE GEOTECHNICAL RECOMMENDATIONS NOTED IN THE INVESTIGATION REPORTED SPECIFIED NOTE #1 ABOVE.
2.2. BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES AND FOR PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES.
2.3. 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.
2.4. 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.
2.5. PROVIDE DRAINAGE AND DEWATERING AROUND ALL WORK TO AVOID WATER-SOFTENED FOOTINGS.
3. GEOTECHNICAL ENGINEER RESPONSIBILITIES:
3.1. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OF RECORD SHALL BE PRESENT DURING ALL SITE CLEARING AND GRADING OPERATIONS TO TEST AND OBSERVE EARTHWORK CONSTRUCTION.
3.2. 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.
4. 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.
6. 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

- 1. DESIGN LOADS: CONCRETE RETAINING WALL 145 PCF SURCHARGE VARIES
2. 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
3. WIND FACTORS: RISK CATEGORY II ULTIMATE DESIGN WIND SPEED 110 MPH WIND EXPOSURE C

SUBMITTALS AND SPECIAL CONDITIONS

- 1. GEOTECHNICAL: PRIOR TO COMMENCEMENT OF EXCAVATION FOR FOUNDATIONS (AT LEAST 48 HOURS) THE CONTRACTOR IS TO CONTACT THE GEOTECHNICAL ENGINEER, WHO IS TO ADVISE THE BUILDING OFFICIAL IN WRITING THAT: THE RETAINING WALL PAD WAS PREPARED IN ACCORDANCE WITH THE STRUCTURAL DRAWINGS. A COPY OF THE REPORT SHALL BE GIVEN TO THE STRUCTURAL ENGINEER OF RECORD.
2. SPECIAL INSPECTION: SUBMIT REPORTS DIRECTLY TO THE ENFORCEMENT AGENCY PER CBC SECTION 1704.2.4. SEND COPIES OF THE REPORT TO THE ENGINEER, GENERAL CONTRACTOR, PRIME CONSULTANT, AND OWNER.
2.1. SPECIAL INSPECTORS BACKGROUND AND QUALIFICATIONS SHALL BE FORWARDED TO THE BUILDING DEPARTMENT AT LEAST 3 DAYS BEFORE ANY INSPECTIONS ARE PERFORMED.
3. SHOP DRAWINGS/SUBMITTALS: PROVIDE THE FOLLOWING FOR REVIEW BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO FABRICATION OR DELIVERY.
- CONCRETE MIX DESIGN
- REINFORCING STEEL
- CONDUIT EMBEDDED IN CONCRETE
- CONTRACTORS STATEMENT OF RESPONSIBILITY
6. PRODUCT SUBSTITUTIONS: MAY BE ALLOWED ONLY IF THEY MEET THE REQUIREMENTS OF THESE GENERAL NOTES AND THE SPECIFICATIONS, AND IF COMPLETE WRITTEN ENGINEERING DATA FOR EACH CONDITION REQUIRED FOR THIS PROJECT IS PROVIDED TO THE STRUCTURAL ENGINEER OF RECORD TWO (2) WEEKS PRIOR TO BID DATE AND APPROVED IN WRITTEN ADDENDA BY THE PRIME CONSULTANT. DATA IS TO INDICATE CODE BASIS BY YEAR, AUTHORITY FOR STRESSES AND STRESS INCREASES, IF ANY, AND AMOUNT OF EXPECTED DEFLECTION FOR FLEXURAL MEMBERS UNDER (1) TOTAL LOAD AND (2) LIVE LOAD ONLY. ALL INCREASED COSTS IN CIVIL OR STRUCTURAL REDESIGN RESULTING FROM SUBSTITUTION SHALL BE BORNE BY THE GENERAL CONTRACTOR.

CONTRACTOR RESPONSIBILITY (CBC 2016 SECTION 1704.4)

- 1. READ AND FOLLOW ALL REFERENCED ICC-ES REPORTS OR IAPMO-ES REPORTS FOR INSTALLATION OF ITEMS SHOWN. ALTERNATE INSTALLATION MAY BE SUBMITTED FOR APPROVAL TO THE PROJECT COORDINATOR WITH APPLICABLE ICC-ES OR IAPMO-ES REPORTS.
2. COORDINATING THE WORK OF ALL TRADES AND VERIFICATION OF ALL DIMENSIONS, CONDITIONS, AND ELEVATIONS BEFORE STARTING WORK OR FABRICATION ON NEW (N) OR EXISTING (E) CONSTRUCTION. ANY DISCREPANCIES FOUND AMONG THE DRAWINGS, SPECIFICATIONS, GENERAL NOTES, AND THE SITE CONDITIONS SHALL BE IMMEDIATELY CALLED TO THE ATTENTION OF THE PROJECT COORDINATOR AND SHALL BE RESOLVED IN WRITING BEFORE PROCEEDING. ANY WORK PERFORMED BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY, AND PRIOR TO RECEIVING WRITTEN CLARIFICATION, SHALL BE PERFORMED AT THE CONTRACTORS'S RISK.
3. ALL WORK SHALL BE PERFORMED IN A WORKMAN LIKE MANNER IN ACCORDANCE WITH ACCEPTED CONSTRUCTION PRACTICES.
4. USE ADEQUATE NUMBERS OF SKILLED WORKMAN WHO ARE THOROUGHLY TRAINED AND EXPERIENCED IN THE NECESSARY CRAFTS AND WHO ARE COMPLETELY FAMILIAR WITH THE SPECIFIED REQUIREMENTS AND METHODS NEEDED FOR PROPER PERFORMANCE OF THE WORK.
5. ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT APPLIES CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
6. PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE'S STABILITY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO: JOB SITE SAFETY, ERECTION MEANS, METHODS AND SEQUENCES, TEMPORARY SHORING, FORMWORK AND BRACING, USE OF EQUIPMENT, AND CONSTRUCTION PROCEDURES. PROVIDE ADEQUATE RESISTANCE TO LOADS IMPED ON THE STRUCTURE(S) DURING CONSTRUCTION PER DESIGN LOADS ON STRUCTURES DURING CONSTRUCTION (SEI/ASCE 37-02).

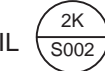
Vertical sidebar containing: APPROVED: (signature line), PROJECT REPRESENTATIVE (signature line), PROFESSIONAL ENGINEER seal, DIVERSIFIED PROJECT SERVICES INTERNATIONAL logo, and project information: STRUCTURAL NOTE SHEET, CAL POLY SOLAR LAB, SAN LUIS OBISPO, CA, SHEET S1, OF 5 SHEETS, PROJECT: 180168, PLOTTED: 2018-11-05.

THE DELIVERY OF THIS DRAWING SHOULD NOT BE CONSTRUED TO PROVIDE AN EXPRESS WARRANTY OR GUARANTEE TO ANYONE THAT ALL DIMENSIONS AND DETAILS ARE EXACT OR TO INDICATE THAT THE USE OF THIS DRAWING IMPLIES THE REVIEW AND APPROVAL OF DPMI OF ANY FUTURE USE. ANY USE OF THIS INFORMATION IS AT THE SOLE RISK OF THE USER.

CONCRETE MIX, PLACEMENT, AND FINISH

- GOVERNING CODES:** THE QUALITY AND DESIGN OF CONCRETE SHALL BE IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE (LATEST EDITION). ITEMS NOT SPECIFICALLY COVERED THEREIN SHALL CONFORM TO THE REQUIREMENTS OF ACI STANDARD FOR STRUCTURAL CONCRETE (ACI 318, LATEST EDITION).
 - MIX DESIGN:** THE CONTRACTOR SHALL DESIGN CONCRETE MIXES THAT MEET OR EXCEED THE REQUIREMENTS OF THE CONCRETE MIX TABLE. THE MIX DESIGNS SHALL FACILITATE ANTICIPATED PLACEMENT METHODS, WEATHER, REBAR CONGESTION BRICK VENEER FINISHES, CONSTRUCTION SEQUENCING, STRUCTURAL DETAILS, AND ALL OTHER FACTOR REQUIRED TO PROVIDE A STRUCTURALLY SOUND, AESTHETICALLY ACCEPTABLE FINISHED PRODUCT. WATER REDUCING ADMIXTURES WILL LIKELY BE REQUIRED TO MEET THESE REQUIREMENTS. CONCRETE MIX DESIGNS SHALL CLEARLY INDICATE THE TARGET SLUMP, SLUMP TOLERANCE SHALL BE +/- 1 1/2 INCHES.
- | CONCRETE MIX DESIGN MINIMUM REQUIREMENTS ^{D, E, F, G, H} | | | | | |
|---|------------------------|----------------------------|--------------|-----------|----------------------------|
| USE/LOCATION | f'c (PSI) ^B | CONC WT (PCF) ^C | SLUMP (INCH) | W/C RATIO | MAX AGGR SIZE ^A |
| FOUNDATION | 4,000 | NWC | 4 | 0.53 | 1" HR |
| RETAINING WALLS | 4,000 | NWC | 4 | 0.53 | 1" HR |
- NOTES:
- AGGREGATE SPECIFICATION SHALL BE AS FOLLOWS:
 - ASTM C33 FOR NORMAL WEIGHT CONCRETE AGGREGATE.
 - GAP-GRADED MIX IS NOT PERMITTED FOR SLAB ON GRADE. AGGREGATE MUST COMPLY WITH ACI STANDARD FOR CONCRETE FLOOR AND SLAB CONSTRUCTION (ACI 302.1R, LATEST EDITION).
 - ULTIMATE COMPRESSIVE STRENGTH (f'c) SPECIFIED IS BASED ON 28 DAY STRENGTH.
 - NORMAL WEIGHT CONCRETE (145 PCF).
 - CEMENT SHALL BE TYPE II (NON-CORROSIVE SOILS) -OR-TYPE V (CORROSIVE SOILS).
 - TOTAL CEMENTITIOUS MATERIAL SHALL BE THE SUM OF ALL CEMENT PLUS FLYASH AND SLAG. AT THE CONTRACTORS OPTION, FLYASH OR SLAG MAY BE SUBSTITUTED FOR CEMENT BUT SHALL NOT EXCEED 25% (15% FOR DSA OR OSHPD) BY WEIGHT OF TOTAL CEMENTITIOUS MATERIAL. MIXES SHALL NOT CONTAIN LESS THAN 5 1/2 SACKS OF CEMENTITIOUS MATERIAL PER CUBIC YARD, UNLESS NOTED OTHERWISE.
 - FLYASH SHALL CONFORM TO ASTM C618 CLASS C OR F. MAXIMUM LOSS OF IGNITION SHALL BE 1.0%.
 - SLAG SHALL BE GROUND GRANULATED BLAST-FURNACE (GGBF) SLAG AND CONFORM TO ASTM C989 GRADE 100 OR 120.
 - ADMIXTURES SHALL BE BY MASTER BUILDERS, W.R.GRACE, OR PRE-APPROVED EQUAL. ALL MANUFACTURERS RECOMMENDATIONS SHALL BE FOLLOWED. NO ADMIXTURES SHALL BE ADDED TO THE MIX DESIGN WITHOUT PRIOR APPROVAL OF THE ENGINEER.
- CONCRETE PLACEMENT:** FOLLOWING ALL APPLICABLE ACI RECOMMENDATIONS, CONCRETE SHALL BE PROPERLY CONSOLIDATED PER ACI GUIDE FOR CONSOLIDATION OF CONCRETE (ACI 309, LATEST EDITION) USING INTERIOR MECHANICAL VIBRATORS, DO NOT OVER VIBRATE. CONCRETE SHALL BE POURED MONOLITHICALLY BETWEEN CONSTRUCTION OR EXPANSION JOINTS. IF CONCRETE IS PLACED BY THE PUMP METHOD, HORSES SHALL BE PROVIDED TO SUPPORT THE HOSE, THE HOSE SHALL NOT BE ALLOWED TO RIDE ON THE REINFORCING. WEATHER FORECASTS SHALL BE MONITORED AND ACI RECOMMENDATIONS FOR HOT AND COLD WEATHER CONCRETING SHALL BE FOLLOWED AS REQUIRED. CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT WITHOUT WRITTEN APPROVAL OF STRUCTURAL ENGINEER.
 - UTILITY COORDINATION:** REFER TO BOTH CIVIL AND PG&E DRAWINGS FOR LOCATION AND SPACING OF ALL EXISTING AND NEW DISTRIBUTION LINES.
 - MEP LIMITATION IN FOOTINGS:** NO PIPES OR DUCTS SHALL BE PLACED IN CONCRETE FOOTINGS UNLESS SPECIFICALLY DETAILED.
 - CONSTRUCTION JOINTS:** SHALL BE CONSTRUCTED AS DETAILED AND WHERE INDICATED ON PLANS. IF JOINTS ARE NOT INDICATED ON THE DRAWINGS, THEY SHALL BE CONSTRUCTED AND LOCATED AS NOT TO IMPAIR THE STRENGTH OF THE STRUCTURE. PROVISION SHALL BE MADE FOR TRANSFER OF SHEAR AND OTHER FORCES THROUGH THE JOINTS.
 - CURING :** ALL CONCRETE FLATWORK SHALL BE WET CURED BY MIST CURING, BY MOISTURE-RETAINING CURING, OR BY COMBINATIONS THEREOF IN ACCORDANCE WITH PROCEDURES OUTLINED IN ACI SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301, LATEST EDITION). KEEP CONTINUOUSLY MOIST FOR NOT LESS THAN 7 DAYS AFTER THE FINISHING OPERATION IS COMPLETE. ALTERNATELY, A CURING COMPOUND MEETING ASTM C309 TYPE 1, CLASS B AND AASHTO M-148, TYPE 1 SPECIFICATIONS AND STATE OF CALIFORNIA AIR REGULATION BOARD SOLVENT EMISSIONS STANDARDS MAY BE USED SUCH AS "EUCLID" SUPER DIAMOND CLEAR VOX.
 - TEST SAMPLES :** CONTRACTOR MUST MAINTAIN A MINIMUM OF TWO (2) UNDAMAGED CONCRETE CYLINDERS SAMPLES FOR EACH RETAINING WALL BEYOND THE 28 DAY COMPRESSION TESTING FOR ADDITIONAL TESTING IF NECESSARY.

CONCRETE REINFORCING

- MIX DESIGN:** CONCRETE SHALL BE AS SPECIFIED IN THE CONCRETE MIX, PLACEMENT AND FINISH SHEET SPECIFICATIONS.
- MATERIAL TYPE AND GRADE:** ARE THE FOLLOWING:
 - ALL REINFORCING STEEL MUST BE NEW STOCK DEFORMED BARS CONFIRMING TO ASTM A615, GRADE 60, UNLESS NOTED OTHERWISE.
- BENDS:** BAR BENDS SHALL BE COLD BENT, WHERE REQUIRED.
- SPICES:**
 - LAP PER REQUIREMENTS OF STANDARD DETAIL 
 - SPICES OF REINFORCING STEEL, WHICH ARE NOT SPECIFICALLY SHOWN ON DRAWINGS, WITHIN FOOTINGS, PIERS, AND WALLS WILL BE PERMITTED ONLY WITH SEOR APPROVAL.
- SPACING:** SEPARATE ADJACENT REINFORCING STEEL BY 1.5 BAR DIAMETERS OR 1 INCH CLEAR, WHICHEVER IS GREATER. REINFORCING STEEL INDICATED AS CONTINUOUS MAY BE FABRICATED IN CONVENIENT LENGTHS, STAGGER LAP SPLICE LOCATIONS A MINIMUM OF 24 INCHES. FABRICATION DETAILS SHALL CONFORM TO CRSI MANUAL OF STANDARD PRACTICE (LATEST EDITION).
- WELDING OF REINFORCING:** IS THE FOLLOWING:
 - REINFORCING BARS: SHALL BE ALLOWED ONLY WHERE DETAILED ON DRAWINGS. ALL REINFORCING THAT IS TO BE WELDED SHALL BE ASTM A706, GRADE 60, IN ACCORDANCE WITH AWS SPECIFICATIONS. FABRICATION DETAILS SHALL CONFORM TO ACI STANDARD FOR DETAILS AND DETAILING OF CONCRETE REINFORCEMENT (ACI 315, LATEST EDITION) AND CRSI MANUAL OF STANDARD PRACTICE (LATEST EDITION). WELDING SHALL NOT BE DONE WITHIN TWO BAR DIAMETERS OF ANY BENT PORTION OF A BAR WHICH HAS BEEN BENT COLD. WELDING OF CROSSING BARS SHALL NOT BE PERMITTED FOR ASSEMBLY OF REINFORCEMENT UNLESS AUTHORIZED BY THE STRUCTURAL ENGINEER.
 - WELDED WIRE REINFORCEMENT FABRIC: SHALL CONFORM TO ASTM A-497 AND ASTM A-185. LAP ONE FULL MESH ON SIDES AND ENDS. WELDED WIRE REINFORCEMENT SHALL BE SUPPORTED TO WITHSTAND CONCRETE PLACEMENT. PULLING OF MESH INTO PLACE AFTER PLACEMENT IS NOT ALLOWED.
- MINIMUM CONCRETE COVER:** CAST-IN PLACE, NONPRESTRESSED REINFORCING ARE AS FOLLOWS:

CONCRETE EXPOSURE	MEMBER TYPE(S)	REINFORCEMENT SIZE / TYPE	MIN. COVER (INCHES)
CAST AGAINST AND PERMANENTLY IN CONTACT WITH GROUND	ALL	ALL	3
EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	ALL	#6 THROUGH #18 REBAR #5 REBAR AND SMALLER, WWF	2 1 1/2"

PREPARATION REQUIREMENTS FOR CONCRETE POUR:

- ALL REINFORCING STEEL, ANCHOR RODS, DOWELS AND OTHER INSERTS SHALL BE IN PLACE AND SHALL BE WELL SECURED IN POSITION PRIOR TO POURING CONCRETE.
- CLEAN FORMWORK OF ALL SCRAP MATERIAL, DEBRIS, AND DIRT.

SPECIAL INSPECTION

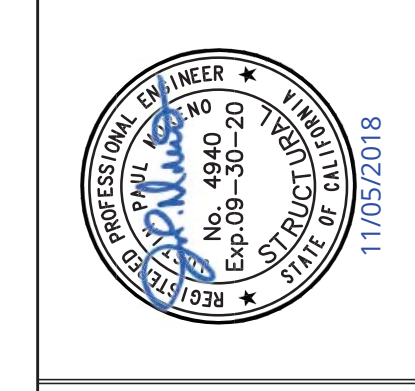
- IN ACCORDANCE WITH CBC SECTION 110, SECTION 1704, AND SECTION 1705, OWNER SHALL EMPLOY AN INDEPENDENT AGENCY TO PERFORM REQUIRED TESTS AND SPECIAL INSPECTIONS DURING CONSTRUCTION PER THE REQUIREMENTS OF CBC CHAPTER 17, THE LOCAL BUILDING OFFICIAL OR APPLICABLE JURISDICTION, AND THE CONTRACT DOCUMENTS.
- TESTING AND SPECIAL INSPECTION REPORTS SHALL BE PREPARED FOR EACH INSPECTION ITEM ON A DAILY BASIS WHENEVER WORK IS PERFORMED ON THAT ITEM FOLLOWING THE CONTINUOUS OR PERIODIC REQUIREMENTS SPECIFIED.
- REPORTS SHALL INDICATE WHETHER THE WORK INSPECTED WAS DONE IN CONFORMANCE OR NONCONFORMANCE WITH APPROVED CONSTRUCTION DOCUMENTS. NONCONFORMITIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF NOT CORRECTED, THE NONCONFORMITIES SHALL BE BROUGHT TO THE ATTENTION OF THE GOVERNING CODE AUTHORITY AND THE CIVIL ENGINEER (STRUCTURAL ENGINEER) PRIOR TO THE COMPLETION OF THAT PHASE OF WORK. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF NONCONFORMITIES SHALL BE SUBMITTED UPON COMPLETION OF WORK.
- TESTING AND SPECIAL INSPECTION REPORTS SHALL BE DISTRIBUTED TO OWNER, CONTRACTOR, BUILDING OFFICIAL, CIVIL ENGINEER AND STRUCTURAL ENGINEER.
- TESTING AND SPECIAL INSPECTION SHALL BE PROVIDED ON THE ITEMS AS INDICATED IN THE TABLES FOLLOWING.

INSPECTION OF CONCRETE CONSTRUCTION					
VERIFICATION AND INSPECTION	C	P	COMMENTS	REFERENCED STANDARD	CBC REFERENCE
<input checked="" type="checkbox"/> 1. Inspect reinforcement and verify placement.		X		ACI 318:Ch. 20, 25.2, 25.3, 26.5.1-26.5.3	Table 1705.3 1908.4
<input type="checkbox"/> 2. Reinforcing bar welding:					
<input type="checkbox"/> A. Verify weldability of reinforcing bars other than ASTM A706;		X	WELDING OF REINFORCING STEEL IS NOT ANTICIPATED	AWS D1.4 ACI 318: 26.5.4	
<input type="checkbox"/> B. Inspect single-pass fillet welds, maximum 5/16";		X			
<input type="checkbox"/> C. Inspect all other welds.		X			
<input type="checkbox"/> 3. Inspect anchors cast in concrete.		X		ACI 318: 17.8.2	
<input type="checkbox"/> 4. Inspect anchors post-installed in hardened concrete members.					
<input type="checkbox"/> A. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.		X		ACI 318: 17.8.2.4	
<input type="checkbox"/> B. Mechanical anchors and adhesive anchors not defined in 4.a.		X		ACI 318:17.8.2	
<input checked="" type="checkbox"/> 5. Verify use of required design mix.		X		ACI 318:CH.19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
<input checked="" type="checkbox"/> 6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.		X		ASTM C172 ASTM C31 ACI 318: 26.4.5, 26.12	1908.10
<input checked="" type="checkbox"/> 7. Inspect concrete and shotcrete placement for proper application techniques.		X		ACI 318: 26.4.5	1908.6, 1908.7, 1908.8
<input checked="" type="checkbox"/> 8. Verify maintenance of specified curing temperature and techniques.		X		ACI 318: 26.4.7-26.4.9	1908.9
<input type="checkbox"/> 9. Inspect of prestressed concrete for:					
<input type="checkbox"/> A. Application of prestressing forces; and		X		ACI 318: 26.9.2.1	
<input type="checkbox"/> B. Grouting of bonded prestressing tendons.		X		ACI 318: 26.9.2.3	
<input type="checkbox"/> 10. Inspect erection of precast concrete members.		X		ACI 318:CH.26.8	
<input type="checkbox"/> 11. Verify 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.		X		ACI 318:26.10.2	
<input checked="" type="checkbox"/> 12. Inspect formwork for shape, location and dimensions of the concrete member being formed.		X		ACI 318: 26.10.1(B)	

INSPECTION OF SOILS					
VERIFICATION AND INSPECTION	C	P	COMMENTS	REFERENCED STANDARD	CBC REFERENCE
<input checked="" type="checkbox"/> 1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.		X	REFERENCE GEOTECHNICAL MEMO		Table 1705.6
<input checked="" type="checkbox"/> 2. Verify excavations are extended to proper depth and have reached proper material.		X	REFERENCE GEOTECHNICAL MEMO		
<input checked="" type="checkbox"/> 3. Perform classification and testing of compacted fill materials.		X	REFERENCE GEOTECHNICAL MEMO		
<input checked="" type="checkbox"/> 4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.		X	REFERENCE GEOTECHNICAL MEMO		
<input checked="" type="checkbox"/> 5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.		X	REFERENCE GEOTECHNICAL MEMO		

APPROVED: _____ DATE _____

AGENCY REPRESENTATIVE _____ DATE _____



DATE	REV	REVISIONS	ISSUED FOR	PERMIT	APP
11/05/18	B				

STRUCTURAL NOTE SHEET

CAL POLY SOLAR LAB
SAN LUIS OBISPO, CA

SHEET S2 OF 5 SHEETS

PROJECT: 180168

PLOTTED: 2018-11-05

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STRUCTURAL NOTES, SPECIFICATIONS AND SPECIAL INSPECTION REQUIREMENTS

CONCRETE												
REIN. BAR SPLICE LENGTH - GRADE 60												
BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18	
	3,000 PSI	TOP ⁽³⁾	28"	38"	47"	56"	81"	93"	105"	118"	131"	NP
	BOT.	22"	29"	36"	43"	63"	72"	81"	91"	101"	NP	NP
4,000 PSI	TOP ⁽³⁾	25"	33"	41"	49"	71"	81"	91"	102"	114"	NP	NP
	BOT.	19"	25"	31"	37"	54"	62"	70"	79"	87"	NP	NP

* NP: NOT PERMITTED

NOTES:

- 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.
- FOR EPOXY COATED REBAR INCREASE SPLICE LENGTH BY 50 PERCENT.
- ADJACENT SPLICES SHALL BE STAGGERED A MINIMUM OF TWICE THE SPLICE LENGTH.
- TABLE VALUES BASED ON CLASS B SPLICE REQUIREMENTS.

REIN. BAR SPLICE FOR CONC. N.T.S. 2K

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

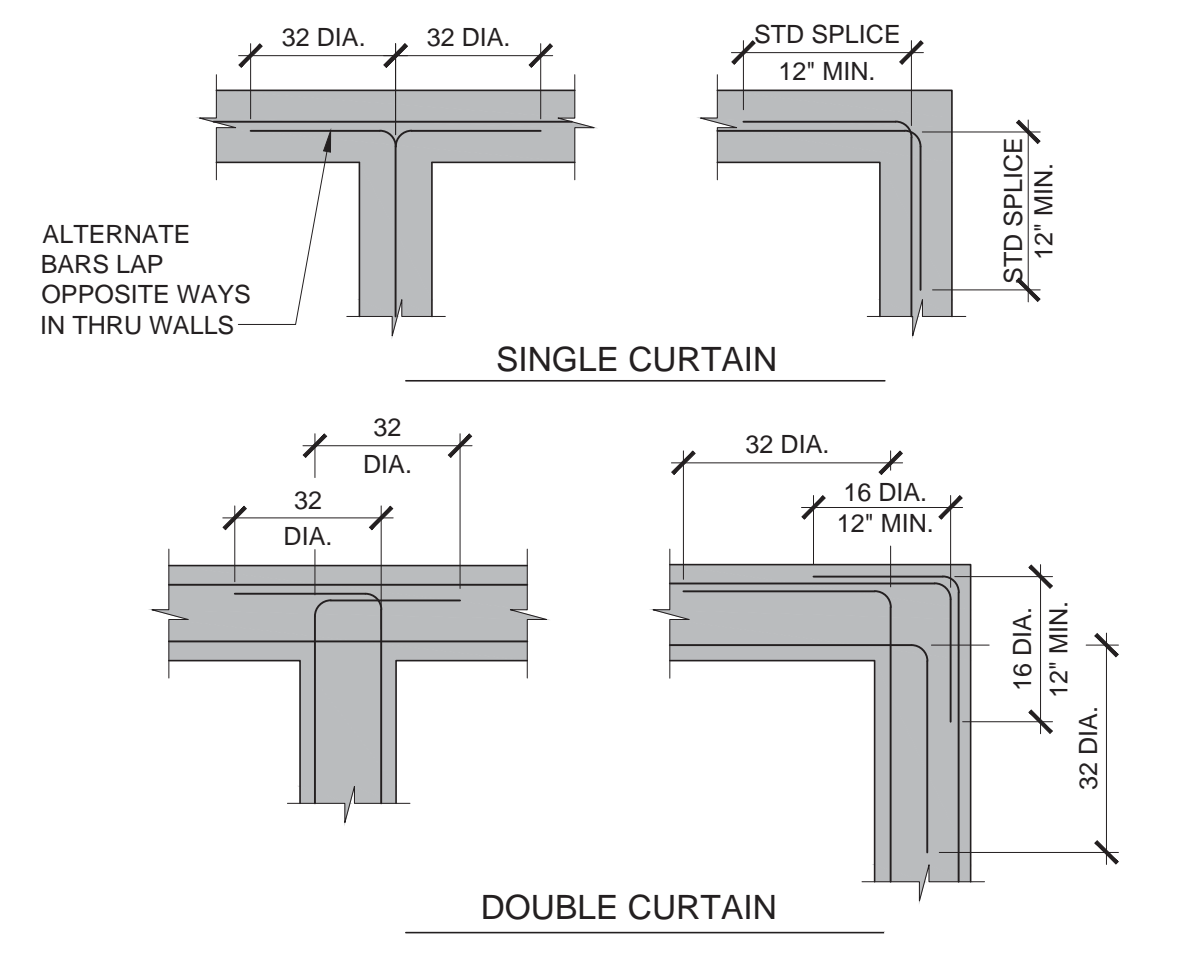
STANDARD HOOKS N.T.S. 4K

NOTES:

- 135-DEG COLUMN TIE HOOKS MAY NOT BE BENT TO LESS DIAMETER OF COLUMN VERTICAL BAR ENCLOSED IN HOOK.
- INSIDE DIAMETER OF BENDS IN WELDED WIRE FABRIC, PLAIN OR DEFORMED, FOR STIRRUPS AND TIES SHALL BE AT LEAST FOUR WIRE DIAMETERS FOR WIRE LARGER THAN D6 OR W6 AND TWO WIRE DIAMETERS FOR ALL OTHER WIRES. BENDS WITH INSIDE DIAMETER OF LESS THAN EIGHT WIRE DIAMETER SHALL BE LESS THAN FOUR DIAMETERS FROM THE NEAREST WELD INTERSECTION.

BAR SIZE	D	135° SEISMIC HOOK	
		A or G	APPROX. H
#3	1 1/2"	5"	3 3/4"
#4	2"	5 1/2"	4"
#5	2 1/2"	6"	4 1/4"

STIRRUP AND HOOK N.T.S. 6K



REIN. @ CONC. INTERSECT 8K

2B

2D

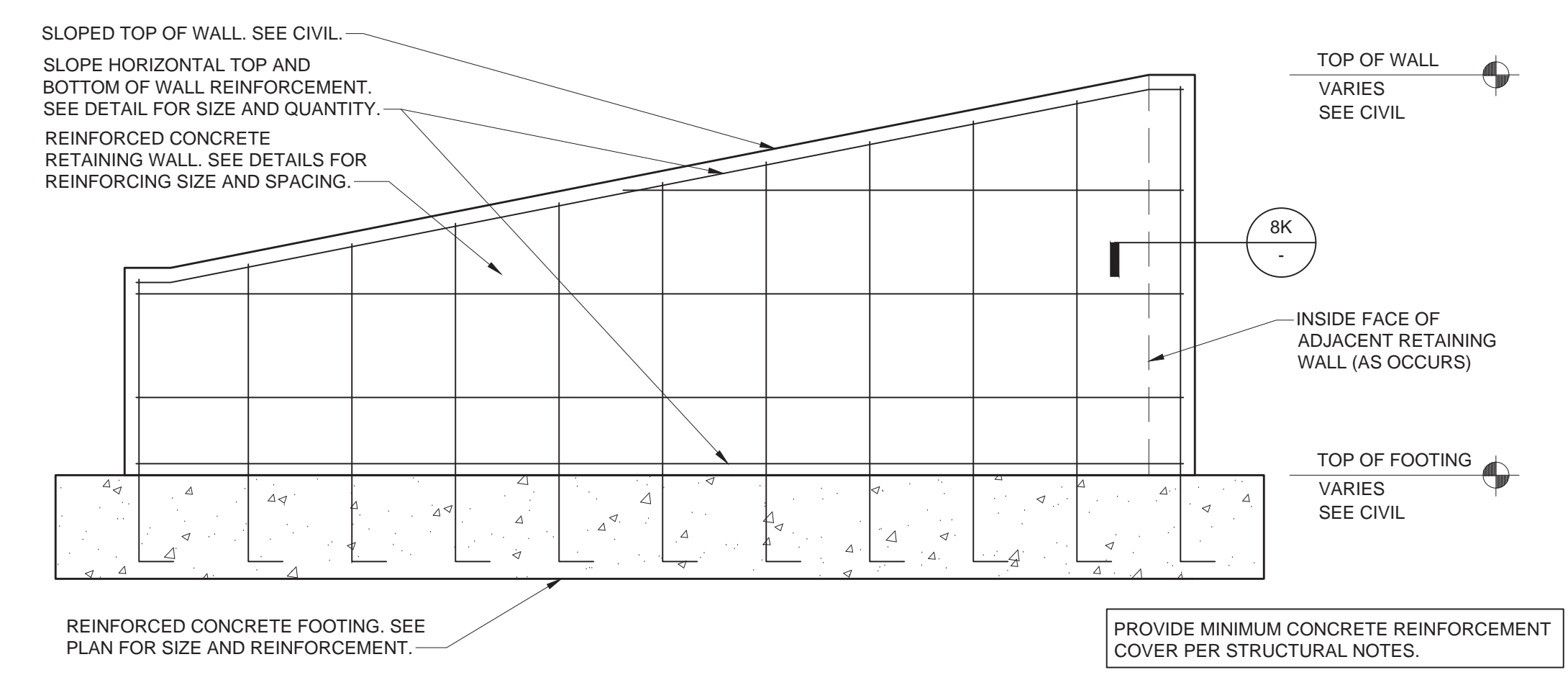
2F

2H

4B

4D

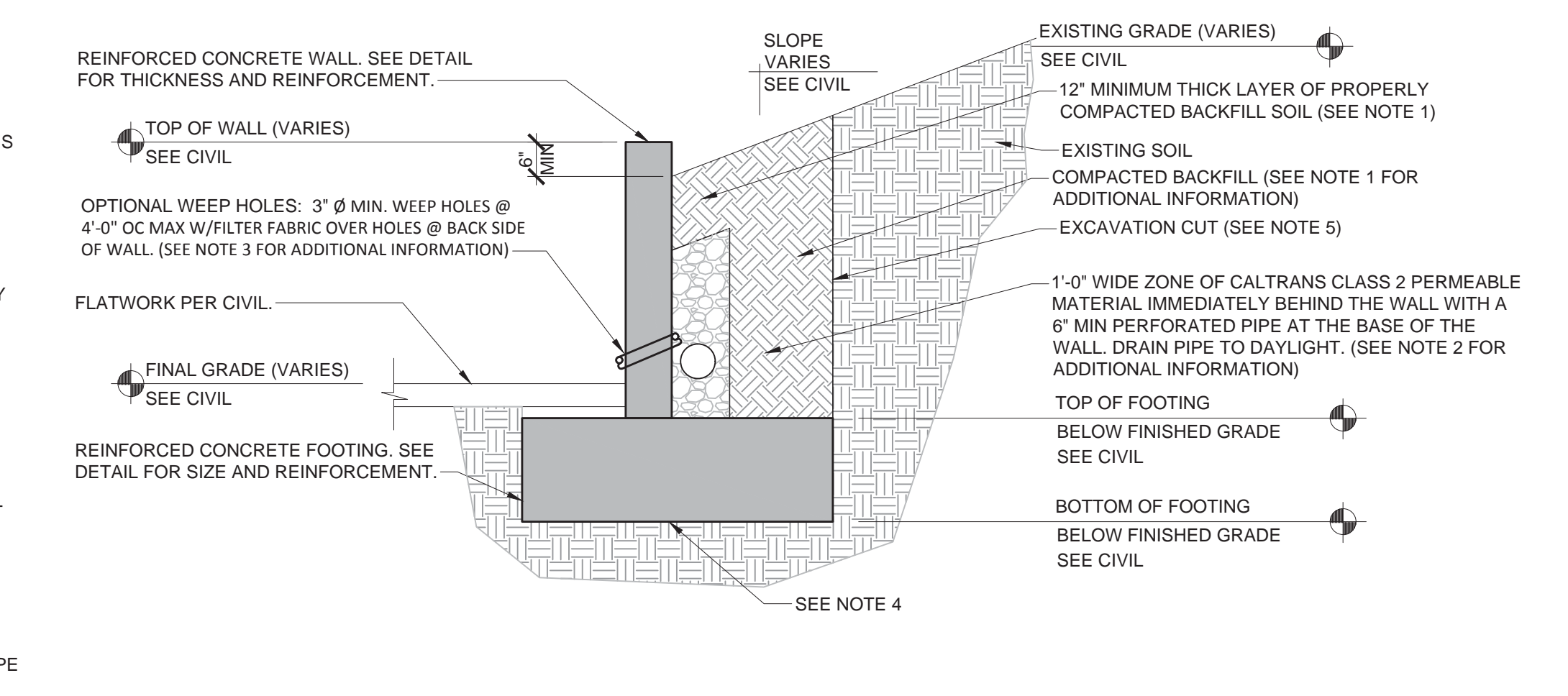
4F



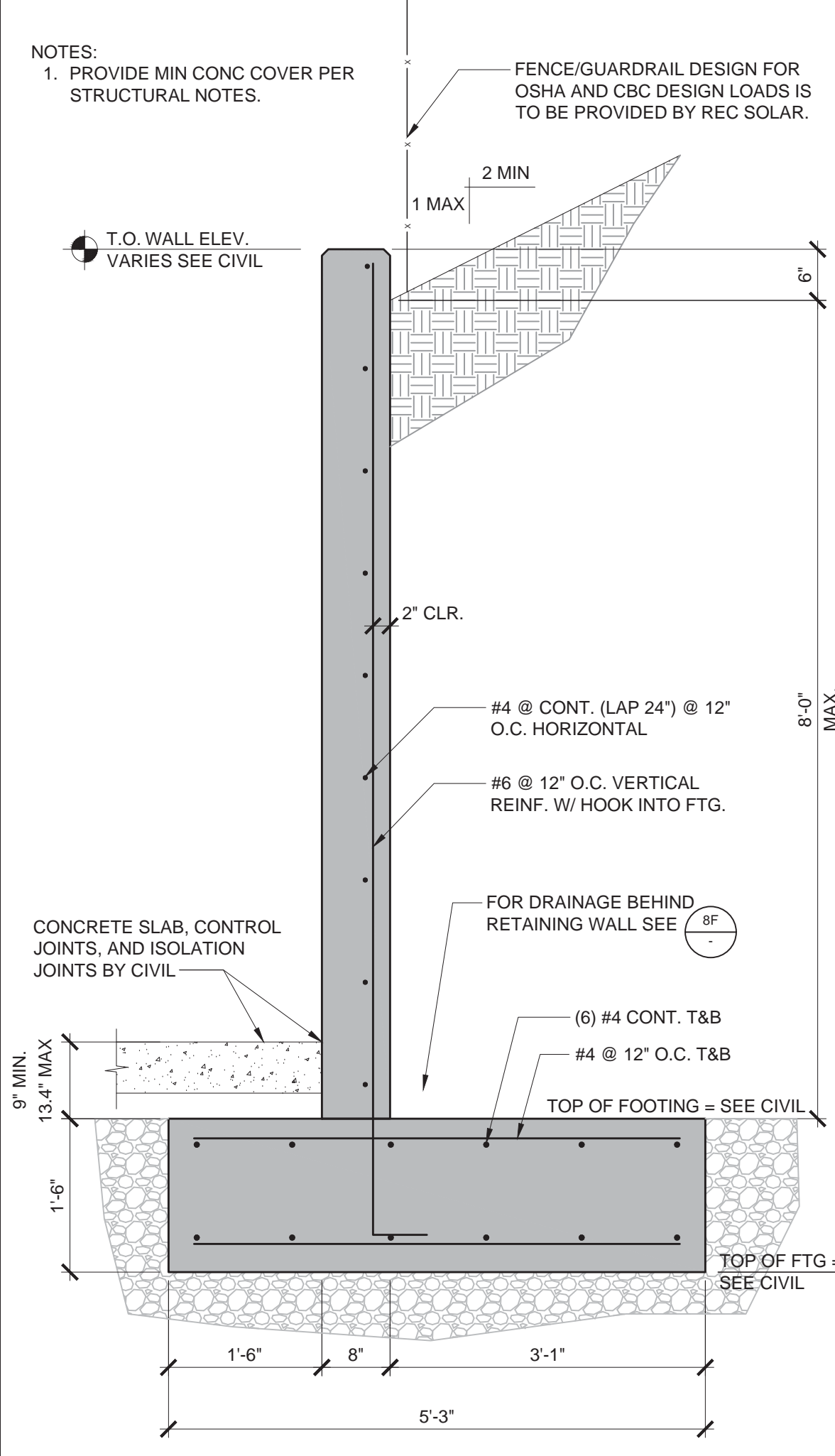
REINFORCEMENT LAYOUT @ SLOPED RETAINING WALL 1/2" = 1'-0" 6F

NOTES:

- COMPACTED BACKFILL TO BE NATIVE SOIL OR IMPORTED SOILS. COMPACTED BACKFILL SHOULD BE PLACED IN LIFTS AND COMPACTED TO AT LEAST 90 PERCENT OF MAXIMUM DRY DENSITY. ANY PROPOSED IMPORT SOIL SHOULD BE NONEXPANSIVE AND SHOULD BE EVALUATED BY THE GEOTECHNICAL ENGINEER BEFORE BEING USED, AND ON AN INTERMITTENT BASIS DURING PLACEMENT ON THE SITE. NONEXPANSIVE MATERIALS ARE DEFINED AS MATERIALS THAT FALL IN THE GW, GP, GM, GC, SP, SW, SC, AND SM CATEGORIES PER ASTM D 2487-11, THAT HAVE AN EXPANSION INDEX OF 10 OR LESS (ASTM D 4829-11), AND DO NOT HAVE FINES (PERCENT PASSING THE NO. 200 SIEVE) CONTENTS OVER 20 PERCENT BY WEIGHT.
- RETAINING WALL SHOULD BE DRAINED WITH PERFORATED PIPE ENCASED IN A 1'-0" WIDE CALTRANS CLASS 2 PERMEABLE MATERIAL. THE PIPE SHOULD BE PLACED ATOP THE FOOTING WITH PERFORATION FACING DOWNWARD AND SHOULD DISCHARGE IN A NON-EROSIVE MANNER AWAY FROM FOUNDATIONS AND OTHER IMPROVEMENTS. THE CLASS 2 PERMEABLE MATERIAL SHOULD EXTEND UPWARD TO APPROXIMATELY 1'-0" FROM THE TOP OF THE WALL BACKFILL. THE FINAL FOOT BEHIND RETAINING WALLS SHOULD BE BACKFILLED WITH NATIVE SOIL. MANUFACTURED SYNTHETIC DRAINS, SUCH AS MIRADRAIN OR ENKADRAIN, ARE ACCEPTABLE ALTERNATIVES TO THE USE OF GRAVEL, PROVIDED THAT THEY ARE INSTALLED WITH THE RECOMMENDATIONS OF THE MANUFACTURER.
- INSTALLATION OF WEEP HOLES IS OPTIONAL, AT THE OWNERS DISCRETION IF INSTALLED. A FILTER FABRIC SHOULD BE PLACED BETWEEN THE WEEP HOLES AND THE DRAIN GRAVEL. THE FILTER FABRIC SHOULD CONFORM TO THE STANDARD SPECIFICATIONS, SECTION 96-1.02 - CLASS C (CALTRANS 2015).
- RETAINING WALL CONTINUOUS FOOTINGS SHOULD BE AT LEAST 18 INCHES BELOW LOWEST ADJACENT GRADE AND SHOULD BE SUPPORTED BY FIRM SANDSTONE BEDROCK. ALL FOOTINGS MAY BE EXCAVATED NEATLY INTO BEDROCK; NO SCARIFICATION, MOISTURE CONDITIONING OR COMPACTION NECESSARY.
- THE EXCAVATION BEHIND THE RETAINING WALL SHOULD BE SLOPED BACK PER OSHA REQUIREMENTS (OSHA 1926). IT IS ASSUMED THAT THE MATERIAL BEHIND THE WALL IS BEDROCK. THE CUT SHOWN IS 90 DEGREES, WHICH IS ALLOWED FOR STABLE ROCK. IF THE MATERIAL IS DIFFERENT THAN WHAT IS ASSUMED, CONTRACTOR SHALL NOTIFY STRUCTURAL ENGINEER OF RECORD AND DETERMINE APPROPRIATE CUT SLOPE TO MEET OSHA REQUIREMENTS.

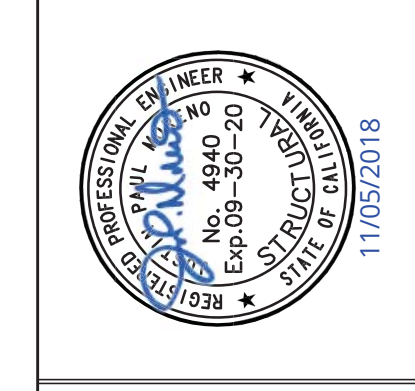


DRAINAGE @ RETAINING WALL 1/2" = 1'-0" 8F



RETAINING WALL SECTION 3/4" = 1'-0" 8H

APPROVED: _____ DATE _____
 AGENCY REPRESENTATIVE _____ DATE _____



DATE	REV	ISSUED FOR	REVISIONS
11/05/18	B	APP	ISSUED FOR PERMIT

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

SHEET S3
 OF 5 SHEETS
 PROJECT: 180168
 PLOTTED: 2018-11-05

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