



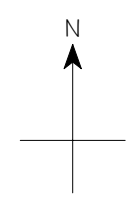
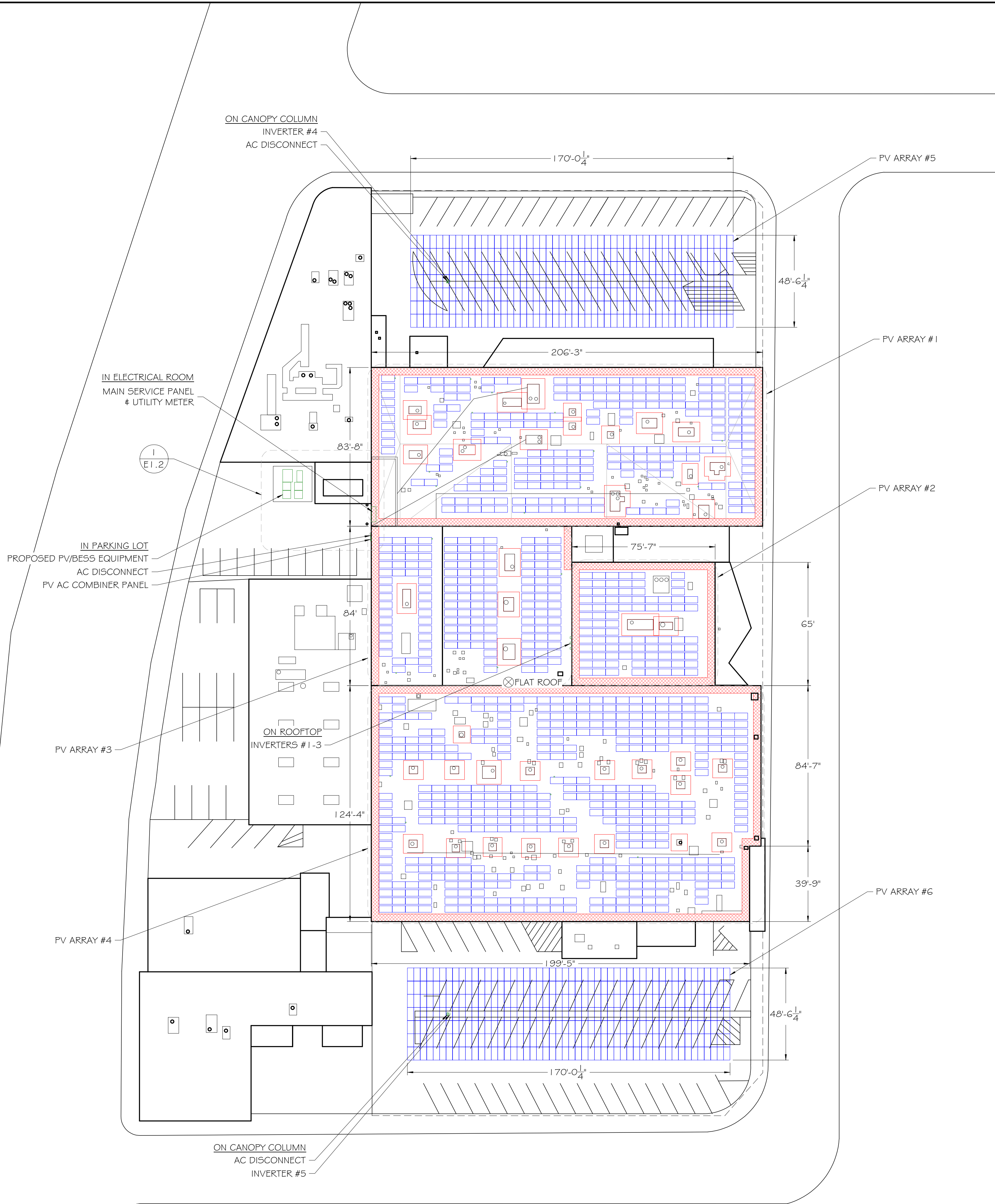
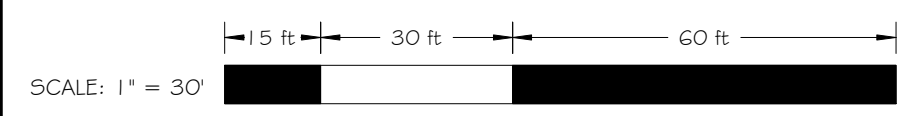


SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	PV MOD.	PHONO PS450M4H-24/TH
	FIRE SETBACK	CA FIRE REQUIRED PATHWAYS 4' TYP.
	ROOF HATCH	
	ROOF VENT	
	SKYLIGHT	
	HVAC UNIT	

PV SYSTEM SUMMARY TABLE					
Array ID	Inverter ID	Mod Qty.	kW size	Tilt	Azimuth
1	Inv 1.A	100	45.00	5°	180°
	Inv 1.B	100	45.00	5°	180°
	Inv 1.C	32	14.40	5°	180°
2	Inv 1.C	68	30.60	5°	180°
	Inv 2.A	20	9.00	5°	180°
3	Inv 2.A	80	36.00	5°	180°
	Inv 2.B	74	33.30	5°	180°
4	Inv 2.B	26	11.70	5°	180°
	Inv 2.C	100	45.00	10°	180°
	Inv 3.A	98	44.10	10°	180°
	Inv 3.B	98	44.10	10°	180°
	Inv 3.C	96	43.20	10°	180°
5	Inv 4	350	157.50	10°	180°
6	Inv 5	350	157.50	10°	180°
Totals:		1592	716.4		

SYSTEM SUMMARY:  
 (1592) PHONO PS450M4H-24/TH  
 (804) SolarEdge P960 Optimizer  
 (3) SolarEdge 5E100KUS (480V)  
 (2) SolarEdge 5E120KUS (480V) (DERATED TO 116 kW)  
 716.4 kWdc, 532 kW AC

NOTE:  
 SITE DIMENSIONS DERIVED FROM EAGLEVIEW AERIAL IMAGERY.  
 DIMENSIONS PRECISE WITHIN 1cm +/-



Developer:

Contractor:

Project: SURGICAL

Project Details: 716.40 kWdc, 532.0 kW AC

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:  
**SITE PLAN**

Sheet Number:  
**A1.0**

Sheet Size:  
**ARCH D - 36" x 24"**

Design & Drafting by:  
 RICHARD DOBBINS  
 # PV-102216-011268

"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."  
 - Douglas Adams

Reviewed & Approved by:  
 RD

# TERMS AND ABBREVIATIONS

ABBRV	TERM
(#)	NUMERICAL QUANTITIES WHEN ENCLOSED IN PARENTHESES
AE	ARCHITECT/ENGINEER
AB	ANCHOR BOLT
ABC	AGGREGATE BASE COURSE
ARCH	ARCHITECT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
CBC	CALIFORNIA BUILDING CODE
CIP	CAST-IN-PLACE
CD	CONTRACT DOCUMENTS
CJ	CONSTRUCTION JOINT
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
D	DEPTH
DIA	DIAMETER
DM	DIMENSION
DL	DEAD LOAD
EA	EACH
EL	ELEVATION
EQ	EQUAL
EXT	EXTERIOR
EW	EACH WAY
(F)	FUTURE
FF	FINISH FLOOR ELEVATION
FLR	FLOOR
FT	FEET
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GSN	GENERAL STRUCTURAL NOTES
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION MOMENT OF INERTIA
I	INTERNATIONAL BUILDING CODE
IBC	INSIDE DIAMETER
ID	ONE THOUSAND POUNDS
KIP, K	KIP PER LINEAR FOOT
KLF	STEEL ANGLE
L	POUND
LB	LIVE LOAD
LL	LONG LEG BACK TO BACK
LLBB	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
MCJ	MASONRY CONTROL JOINTS
MECH	MECHANICAL
MFR	MANUFACTURER
NA	NOT APPLICABLE
NTS	NOT TO SCALE
OC	ON CENTER
PERP	PERPENDICULAR
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
QA	QUALITY ASSURANCE
QC	QUALITY CONTROL
REINF	REINFORCING
REQD	REQUIRED
RFI	REQUEST FOR INFORMATION
SF	SQUARE FOOT
SIM	SIMILAR
SPEC	SPECIFICATION
STD	STANDARD
T&B	TOP AND BOTTOM
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W/C	WATER TO CEMENT RATIO
W/O	WITHOUT
WL	WINDLOAD

## CODE:

2019 EDITION OF THE CALIFORNIA BUILDING CODE (CBC)

## DESIGN LOADS:

1. ROOF:	
LIVE LOAD (UNREDUCIBLE)	12 PSF
DEAD LOAD	8 PSF
2. WIND LOAD:	
RISK CATEGORY	II
BASIC WIND SPEED, V	95 MPH
EXPOSURE CATEGORY	C
IMPORTANCE FACTOR, Iw	1.0
MEAN ROOF HEIGHT:	11.5 FT
G	0.85
Kd	0.85
Kzt	1.0
Kz	0.85
ENCLOSURE CLASSIFICATION:	OPEN BUILDING
3. SEISMIC LOADS:	
RISK CATEGORY	II
IMPORTANCE FACTOR, Ie	1.0
SEISMIC SITE CLASS:	D - DEFAULT
Ss	1.829
S1	0.646
SDS	1.463
SD1	0.732
SEISMIC DESIGN CATEGORY:	D
BASIC SEISMIC FORCE RESISTING SYSTEM:	
STEEL ORDINARY CANTILEVER COLUMN SYSTEMS	
R	1.25
O	1.25
Cd	1.25
Cs	0.819
BASE SHEAR, V	0.819W

## GENERAL:

- THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES.
- THE CONTRACTOR IS RESPONSIBLE FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK THAT CONFORMS TO THE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY AND HEALTH STANDARDS FOR THE CONSTRUCTION INDUSTRY.
- WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
- OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY IF HE CHOOSES AN OPTION AND HE SHALL COORDINATE ALL DETAILS.
- NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS. WHERE NO SPECIFIC DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT.
- TYPICAL DETAILS ARE NOT CUT ON DRAWINGS, BUT APPLY UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS WITH ACTUAL SITE CONDITIONS AND GENERAL CONTRACTOR PRIOR TO START OF CONSTRUCTION. ALL DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS ARE TO ASSIST CONTRACTOR IN VERIFICATION. DO NOT SCALE DIMENSIONS FROM DRAWINGS.
- ITEMS SHOWN BY OTHER DISCIPLINES WITH REFERENCE TO STRUCTURAL DRAWINGS BUT NOT SHOWN ON THESE STRUCTURAL DRAWINGS SHALL BE CONSIDERED DESIGN BUILT ITEMS. CONTRACTOR SHALL SUBMIT DESIGN BY OTHERS FOR REVIEW

## FOUNDATIONS:

- GEOTECHNICAL CONSULTANT: N/A
- DESIGN SOIL BEARING VALUES WERE ASSUMED IN ACCORDANCE WITH SOIL CLASS 5 AS DEFINED IN IBC/CBC TABLE 1806.2 "PRESUMPTIVE LOAD-BEARING VALUES". DESIGN BEARING VALUE OF 1,500 PSF AND LATERAL BEARING VALUE OF 100 PSF/FT WAS USED IN DESIGN. IF ACTUAL SOIL CONDITIONS DIFFER NOTIFY THE STRUCTURAL ENGINEER PRIOR TO PROCEEDING WITH WORK.
- SPREAD FOOTINGS SHALL BEAR ON COMPACTED NATIVE SOILS. BOTTOM OF FOOTINGS SHALL BEAR AT A DEPTH NOT LESS THAN 2.0 FT BELOW LOWEST ADJACENT GRADE WITHIN 5 FEET OF STRUCTURE OR FOUNDATION. FOUNDATION EXCAVATIONS SHALL BE INSPECTED BY GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF CONCRETE. DRILLED POLE FOUNDATIONS SHALL BEAR ON MACHINE CLEANED, INSPECTED SOIL STRATA. POLE FOUNDATIONS WERE DESIGNED IN ACCORDANCE WITH THE PRESCRIPTIVE METHOD OF IBC/CBC SECTION 1807.3.2. FOR TOP OF POLE FOUNDATION ELEVATIONS, SEE FOUNDATION PLANS AND SECTIONS. IF WATER IS ENCOUNTERED DURING DRILLING, STOP AND CONSULT STRUCTURAL ENGINEER OR GEOTECHNICAL ENGINEER FOR RESOLUTION.

## SHOP DRAWINGS:

- SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL ITEMS AND ITEMS REQUIRED BY ARCHITECTURAL SPECIFICATIONS. UNITED STRUCTURAL DESIGN, LLC ASSUMES NO RESPONSIBILITY FOR THE FAILURE OF THE CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR REVIEW.
- ITEMS NOT IN ACCORDANCE WITH CONTRACT DOCUMENTS SHALL BE FLAGGED UPON CONTRACTORS REVIEW.
- THE CONSTRUCTION DOCUMENTS MAY NOT BE REPRODUCED FOR USE AS SHOP DRAWINGS.
- ELECTRONIC FILES OF CONSTRUCTION DOCUMENTS WILL NOT BE MADE AVAILABLE FOR USE AS SHOP DRAWINGS.
- FIELD VERIFY ALL DIMENSIONS AND FINISHED GRADE PRIOR TO CONSTRUCTION AND PRIOR TO BEGINNING SHOP DRAWINGS.
- THE ENGINEER OF RECORD HAS THE RIGHT TO APPROVE OR DISAPPROVE ANY CHANGES TO CONTRACT DOCUMENTS AT ANYTIME BEFORE OR AFTER SHOP DRAWING REVIEW.
- ITEMS OMITTED OR SHOWN INCORRECTLY AND ARE NOT FLAGGED BY THE STRUCTURAL ENGINEER OR ARCHITECT SHALL NOT BE CONSIDERED CHANGES TO THE CONTRACT DOCUMENTS.
- SHOP DRAWINGS DO NOT REPLACE THE CONTRACT DOCUMENTS. REVIEWING IS INTENDED ONLY AS AN AID TO THE CONTRACTOR IN OBTAINING CORRECT SHOP DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL ITEMS ARE CORRECTLY CONSTRUCTED ACCORDING TO THE CONTRACT DOCUMENTS.

## CONCRETE:

- CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301, "STANDARD SPECIFICATIONS FOR STRUCTURAL CONCRETE" AND ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".
- ADDITION OF WATER TO THE BATCH FOR MATERIAL WITH INSUFFICIENT SLUMP WILL NOT BE PERMITTED, UNLESS THE SUPPLIER HAS SPECIFICALLY WITHHELD WATER FROM THE BATCH AT THE PLANT. IN SUCH CASE THE MIX DESIGN AND TRUCK TICKET MUST CLEARLY STATE THE MAXIMUM AMOUNT OF WATER THAT CAN BE ADDED TO THE BATCH ON SITE. IN NO CASE SHALL THE DESIGN WATER TO CEMENTITIOUS MATERIAL RATIO BE EXCEEDED.
- MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED, EXCEPT THAT SLABS ON GRADE NEED BE VIBRATED ONLY AROUND SLAB EDGES, REINFORCING, AND COLUMNS. MECHANICALLY VIBRATE ONE TOP 5 FEET OF DRILLED PIER CONCRETE. REVIBRATE TOP OF DRILLED PIER 15 MINUTES AFTER PLACING CONCRETE.
- TEST DATA FOR CONCRETE SUBMITTALS SHALL BE SUBMITTED FOR REVIEW PRIOR TO PLACEMENT OF CONCRETE. REFERENCE ACI 318 CHAPTER 5, TABLE R5.3 FOR SPECIFIC REQUIREMENTS.
- DRILLED PIER CONCRETE SHALL BE CHANNLED TO FREE FALL DOWN THE SHAFT WITHOUT STRIKING THE REINFORCING OR THE SIDES OF THE SHAFT. MAXIMUM HEIGHT OF FREE-FALL IS 15'-0".
- CONCRETE PROPERTIES:

CONCRETE USE	MINIMUM 28 DAY
STRENGTH	COMPRESSIVE
UNLESS NOTED OTHERWISE	
ALL CONCRETE SHALL BE	3,000 PSI

## PHOTOVOLTAIC PANELS:

- THE PANEL MANUFACTURER IS RESPONSIBLE FOR THE DESIGN OF THE PANELS AND THE DESIGN OF THE PANEL CONNECTIONS TO THE STRUCTURE INCLUDING ALL COMPONENTS REQUIRED TO MAKE THE CONNECTIONS. PHOTOVOLTAIC PANELS, COMPONENTS AND CONNECTIONS SHALL BE DESIGNED TO SUPPORT PANEL WEIGHT PLUS SNOW, WIND, OR SEISMIC LOADING, WHICHEVER COMBINATION PRODUCES THE MOST SEVERE CONDITION IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE.
- OWNER TO PROVIDE PANEL CAPABLE OF SUPPORTING IN MANOR IN WHICH IS INTENDED BY THESE DRAWINGS (I.E. SUPPORTED BY SHORT END, DUAL SUPPORTS, ETC) SUBMIT PANEL SPEC SHEETS FOR REVIEW PRIOR TO PURCHASING ANY PANELS.
- CONTRACTOR TO VERIFY PV PANELS WITH OWNER PRIOR TO FABRICATION.
- THIS IS A DEFERRED SUBMITTAL ITEM.

## STRUCTURAL STEEL:

- LATEST AISC AND AWS CODES APPLY. THE WORD APPROVED INSPECTION 4.4 OF THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES IS REDEFINED AS REVIEWED.
- STEEL SHALL BE FINISHED AT LOCATIONS EXPOSED TO WEATHER WITH A CORROSION RESISTANT COATING APPLICABLE TO WEATHER AND EXPOSURE CONDITIONS OF PROJECT LOCATION.
- WHEN STRUCTURAL STEEL IS FURNISHED TO A SPECIFIED MINIMUM YIELD POINT GREATER THAN 36 KSI, THE ASTM OR OTHER SPECIFICATION DESIGNATION SHALL BE INCLUDED NEAR THE ERECTION MARK ON EACH SHIPPING ASSEMBLY OR IMPORTANT CONSTRUCTION COMPONENT OVER ANY SHOP COAT OF PAINT PRIOR TO SHIPMENT FROM THE FABRICATORS PLANT.
- IF IT IS NECESSARY TO SPLICE ANY MEMBER, SPLICE LOCATIONS ARE SUBJECT TO REVIEW BY STRUCTURAL ENGINEER. SPLICES SHALL BE FULL PENETRATION WELDED AND TESTED PER THIS SECTION. INDICATE ALL SPLICE LOCATIONS, AND WELDING PROCEDURES ON SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
- ALL BEAMS SHALL BE ERECTED WITH THE NATURAL CAMBER UPWARDS.
- ALL BOLTS SHALL BE INSTALLED WITH STEEL WASHERS.
- ALL WELDING BY WELDERS HOLDING VALID CERTIFICATES AND HAVING CURRENT EXPERIENCE IN TYPE OF WELD SHOWN ON THE DRAWINGS OR NOTES. CERTIFICATES SHALL BE THOSE ISSUED BY AN INDEPENDENT TESTING AGENCY.
- ALL WELDING DONE BY E70 SERIES LOW HYDROGEN RODS. USE E90 SERIES FOR ASTM A706 REINFORCING BARS.
- ALL WELDING PER AMERICAN WELDING SOCIETY STANDARDS. ALL WELDS ON DRAWINGS ARE SHOWN AS SHOP WELDS. CONTRACTOR MAY SHOP WELD OR FIELD WELD AT THE DISCRETION. SHOP WELDS OR FIELD WELDS SHALL BE SHOWN ON SHOP DRAWINGS.
- SLAG SHALL BE REMOVED FROM ALL COMPLETED WELDS, AND THE WELD AND ADJACENT BASE METAL SHALL BE CLEANED BY BRUSHING OR OTHER SUITABLE MEANS. WELDED JOINTS SHALL NOT BE PAINTED UNTIL AFTER WELDING HAS BEEN COMPLETED AND THE WELD ACCEPTED.
- ALL STRUCTURAL STEEL SHALL BE FABRICATED BY A FABRICATOR WITH ANY ONE OF THE FOLLOWING MINIMUM QUALIFICATIONS. QUALIFICATIONS SHALL BE IN EFFECT AT TIME OF BID.
- AWSD CERTIFIED FABRICATOR (STD).
- STEEL PROPERTIES
  - WIDE FLANGE COLUMNS, BEAMS AND TEES: ASTM A992 (Fy = 50 KSI)
  - STEEL PLATES: ASTM A572 (Fy = 50 KSI)
  - CHANNELS AND ANGLES: ASTM A36 (Fy = 36 KSI)
  - HSS RECTANGULAR STEEL: ASTM A500 Gr. B (Fy = 46 KSI)
  - BOLTS: ASTM A325 OR ASTM A F1852 TWIST-OFF TYPE
  - ANCHOR RODS: ASTM F1554 Gr. 55 (Fy = 55 KSI)
- STEEL BOLTS SHALL BE PRETENSIONED UNLESS OTHERWISE NOTED AS SNUG-TIGHT CONNECTION ON THE DRAWINGS OR DETAILS. ONE OF THE FOLLOWING METHODS SHALL BE USED TO ASSURE ADEQUATE PRETENSIONING IS ACHIEVED:
  - TURN-OF-NUT METHOD
  - DIRECT TENSION INDICATOR WASHERS
  - CALIBRATED WRENCH
  - TWIST-OFF TYPE BOLT

## STEEL REINFORCING:

- ALL BARS PER CRSI SPECIFICATIONS AND HANDBOOK, LATEST ACI CODE AND DETAILING MANUAL APPLY. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE. REINFORCING BAR SPACING GIVEN ARE MAXIMUM ON CENTERS.
- ALL REINFORCING TO BE WELDED SHALL BE WELDED IN ACCORDANCE WITH AWS D1.4. NO TACK WELDING OF REINFORCING BARS IS ALLOWED WITHOUT PRIOR REVIEW OF PROCEDURE BY STRUCTURAL ENGINEER.
- REINFORCING LAP SPLICES IN CONCRETE SHALL BE PER TYPICAL DETAIL UNLESS NOTED OTHERWISE. ALL SPLICE LOCATIONS ARE SUBJECT TO APPROVAL. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT CORNERS AND INTERSECTIONS OF FOOTINGS AND WALLS
- TYPICAL REINFORCING BAR STRENGTHS
- REINFORCING (WELDABLE): ASTM A706, DEFORMED, Fy = 60 KSI
- TYPICAL CLEAR CONCRETE COVERAGE
  - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"
  - FORMED CONCRETE EXPOSED TO EARTH OR WEATHER: #6 AND LARGER: 2" #5 AND SMALLER: 1 1/2"

ALL OTHERS PER LATEST EDITION OF ACI 318.

## COLD-FORMED STEEL FRAMING:

- ALL COLD-FORMED STEEL FRAMING SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS BY THE AMERICAN IRON AND STEEL INSTITUTE AND THE STEEL STUD MANUFACTURERS ASSOCIATION AND I.C.C. ESR-3064P).
- STEEL FOR ALL MEMBERS AND FOR ALL STRAPS SHALL HAVE A MINIMUM YIELD STRENGTH OF 55,000 PSI.
- STEEL SHALL BE GALVANIZED AT LOCATIONS EXPOSED TO WEATHER AND WHENEVER NOTED ON THE DRAWINGS.
- ALL MEMBERS SHALL BE SECURELY SEATED FOR FULL BEARING UNLESS NOTED OTHERWISE.
- ALL WELDING SHALL BE PERFORMED BY WELDERS EXPERIENCED IN LIGHT GAGE STEEL FRAMING WORK.
- ALL SCREWS REFERENCED IN THE DRAWINGS FOR LIGHT GAUGE CONNECTIONS SHALL BE DRILL-FLEX BY HILLTI OR APPROVED EQUIVALENT (I.C.C. ESR-3332).
- STEEL STUD SIZES ARE AS INDICATED IN PLANS AND KEYNOTES. THICKNESS REFERENCED IN THE DRAWINGS ARE AS FOLLOWS:
  - 16 GAUGE MATERIAL - 0.059 INCHES
  - 14 GAUGE MATERIAL - 0.075 INCHES
  - 12 GAUGE MATERIAL - 0.105 INCHES
  - 10 GAUGE MATERIAL - 0.134 INCHES

NOTE: THE UNCOATED MINIMUM STEEL THICKNESS OF THE COLD-FORMED STEEL PRODUCTS AS DELIVERED TO THE JOB SITE SHALL NOT AT ANY LOCATION BE LESS THAN 95 PERCENT OF THE DESIGN THICKNESS INDICATED ABOVE.

## 1704.2.5 SPECIAL INSPECTION OF FABRICATORS:

SPECIAL INSPECTION OF FABRICATION OF STRUCTURAL STEEL BEING PERFORMED ON THE PREMISES OF A FABRICATOR'S SHOP IS REQUIRED.

- EXCEPTION: SPECIAL INSPECTIONS OF FABRICATORS WITH ONE OF THE FOLLOWING QUALIFICATIONS IS NOT REQUIRED:
- INTERNATIONAL ACCREDITATION SERVICE, INC. (IAS) APPROVED FABRICATOR.
  - AISC CERTIFIED FABRICATOR (STD).

THE SPECIAL INSPECTOR SHALL VERIFY THAT THE FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES THAT PROVIDE A BASIS FOR INSPECTION CONTROL OF THE WORKMANSHIP AND THE FABRICATOR'S ABILITY TO CONFORM TO APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. THE SPECIAL INSPECTOR SHALL REVIEW THE PROCEDURES FOR COMPLETENESS AND ADEQUACY RELATIVE TO THE CODE REQUIREMENTS FOR THE FABRICATOR'S SCOPE OF WORK.

## SPECIAL STRUCTURAL INSPECTIONS:

PER IBC/CBC SECTION 1704 AND 1705 SPECIAL INSPECTIONS ARE IN ADDITION TO THE REQUIRED INSPECTION CONDUCTED BY THE BUILDING JURISDICTION PER IBC/CBC SECTION 110. THE TYPES OF WORK LISTED BELOW SHALL BE INSPECTED BY A SPECIAL INSPECTOR.

- ALL SPECIAL INSPECTORS SHALL BE UNDER THE SUPERVISION OF A REGISTERED CIVIL OR STRUCTURAL ENGINEER.
- THE QUALIFICATIONS OF ALL SPECIAL INSPECTORS SHALL BE REVIEWED AND APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
- THE MINIMUM QUALIFICATIONS FOR THE SPECIAL INSPECTORS ARE AS FOLLOWS:
  - CONCRETE INSPECTION - I.C.C. CERTIFICATION IN REINFORCED CONCRETE OR E.I.T. CERTIFICATION
  - STRUCTURAL WELDING INSPECTION
  - VISUAL TESTING - I.C.C. CERTIFICATION IN STRUCTURAL STEEL AND WELDING OR A.W.S. CERTIFIED WELD INSPECTOR (C.W.I.).
  - NON-DESTRUCTIVE TESTING - A.W.S. C.W.I.
- DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR:
  - THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK REQUIRING SPECIAL INSPECTION FOR CONFORMANCE WITH THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS.
  - THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO BE KEPT AT THE SITE FOR USE BY THE BUILDING OFFICIAL, THE CONTRACTOR, THE STRUCTURAL ENGINEER OF RECORD, AND THE ARCHITECT OF RECORD. IF SPECIAL INSPECTION IS PROVIDED BY ANYONE OTHER THAN THE STRUCTURAL ENGINEER OF RECORD, INSPECTION REPORTS SHALL BE SUBMITTED TO THE OFFICE OF THE STRUCTURAL ENGINEER ON A WEEKLY BASIS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN IF UNCORRECTED, TO THE DESIGN AUTHORITY AND THE BUILDING OFFICIAL.
  - UPON COMPLETION OF THE ASSIGNED WORK, THE SPECIAL INSPECTOR SHALL COMPLETE AND SIGN A FINAL REPORT CERTIFYING THAT TO THE BEST OF HIS KNOWLEDGE, THE WORK IS IN CONFORMANCE WITH THE APPROVED PLANS AND SPECIFICATIONS, AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE CODE.
- DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR:
  - NOTIFY THE RESPONSIBLE INSPECTOR THAT WORK IS READY FOR INSPECTION AT LEAST ONE WORKING DAY (24 HOURS MINIMUM) BEFORE SUCH INSPECTION IS REQUIRED.
  - ALL WORK REQUIRING SPECIAL STRUCTURAL INSPECTION SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT IS OBSERVED BY THE SPECIAL STRUCTURAL INSPECTOR.
- SPECIAL INSPECTION
  - INSPECTION OF FABRICATORS
  - INSPECTION OF CONCRETE CONSTRUCTION
  - INSPECTION OF STRUCTURAL STEEL
  - INSPECTION OF SOILS

SEE TABLES ON GSN FOR ADDITIONAL INFORMATION.

## 1705.6 SPECIAL INSPECTION OF SOILS

SPECIAL INSPECTION FOR EXISTING SITE SOIL CONDITIONS, FILL PLACEMENT AND LOAD-BEARING REQUIREMENTS SHALL BE AS REQUIRED BY TABLE 1705.6.

TABLE 1705.6: REQUIRED VERIFICATION AND INSPECTION OF SOILS				
VERIFICATION AND INSPECTION TASK			CONTINUOUS	
			PERIODIC	
1. VERIFY MATERIALS 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

## 2018 1705.3 SPECIAL INSPECTION OF CONCRETE CONSTRUCTION

SPECIAL INSPECTION AND VERIFICATIONS FOR CONCRETE CONSTRUCTION SHALL BE AS REQUIRED BY TABLE 1705.3.

- EXCEPTIONS: SPECIAL INSPECTIONS SHALL NOT BE REQUIRED FOR:
- ISOLATED SPREAD CONCRETE FOOTINGS OF BUILDING THREE STORIES OR LESS ABOVE GRADE PLANE THAT ARE FULLY SUPPORTED ON EARTH OR ROCK.
  - CONTINUOUS CONCRETE FOOTINGS SUPPORTING WALLS OF BUILDINGS THREE STORIES OR LESS ABOVE GRADE PLANE THAT ARE FULLY SUPPORTED ON EARTH OR ROCK WHERE:
  - THE FOOTINGS SUPPORT WALLS OF LIGHT-FRAME CONSTRUCTION.
  - THE STRUCTURAL DESIGN OF THE FOOTING IS BASED ON A SPECIFIED COMPRESSIVE STRENGTH,  $f_c$ , NO GREATER THAN 2,500 PSI REGARDLESS OF THE COMPRESSIVE STRENGTH SPECIFIED.
  - CONCRETE SLABS ON GRADE. STEEL REINFORCING STILL REQUIRES SPECIAL INSPECTION.

TABLE 1705.3: REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION				
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCE STANDARD	IBC/CBC REFERENCE
2. REINFORCING BAR WELDING. a. VERIFY WELDABILITY OF REINFORCING BARS. b. INSPECT SINGLE PASS FILLET WELDS, MAXIMUM 5/16". c. INSPECT ALL OTHER WELDS.	---	X	AWS D1.4 ACI 318: 26.6.4	---
3. VERIFYING USE OF REQUIRED DESIGN MIX.	---	X	ACI 318: Ch 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	---	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	---	X	ACI 318: 26.5.3-26.5.5	1908.9
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	---	X	ACI 318: 26.11.2 (b)	---

Sheet List	
Sheet Number	Sheet Name
S0.1	GENERAL STRUCTURAL NOTES
S2.3	3 PANEL STRUCTURE PLANS
S2.7	7 PANEL STRUCTURE PLANS
S4.1	SOLAR CANOPY DETAILS



## SHEET NOTES

- FOR STRUCTURE LOCATIONS REFERENCE PROJECT SITE PLAN. COLUMN SPACING AND LOCATIONS SHALL BE COORDINATED WITH PROJECT ARCHITECT OR PROFESSIONAL RESPONSIBLE FOR SITE PLAN.
- VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION. DIMENSIONS, ELEVATIONS WHERE SHOWN ARE TO BE USED AS AN AID AND SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR PRIOR TO CONSTRUCTION.
- FOR ADDITIONAL INFORMATION, REFERENCE GENERAL STRUCTURAL NOTES.

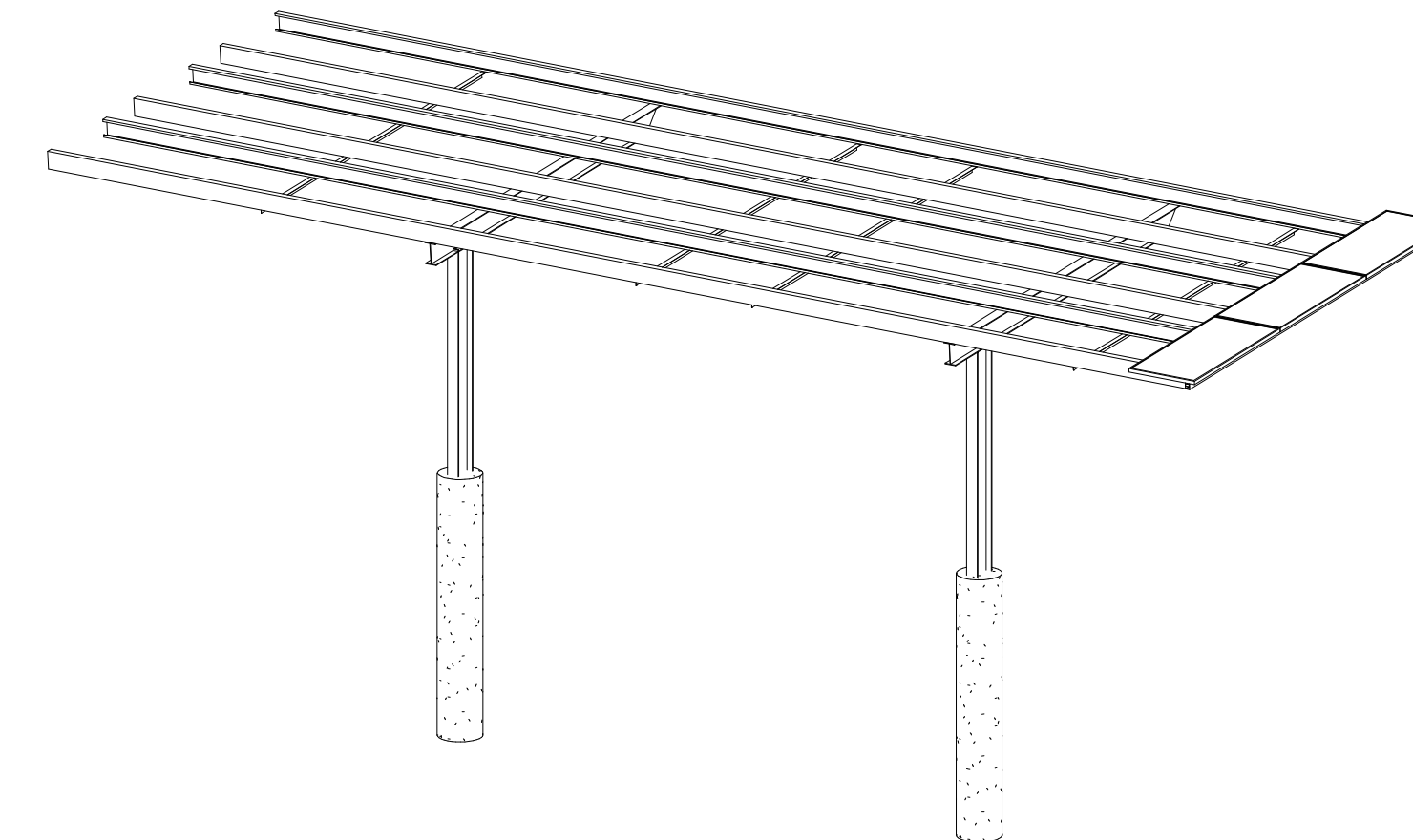
## PV PANEL INFORMATION

- CONTRACTOR TO VERIFY PANEL INFORMATION PRIOR TO FABRICATION AND ERECTION.
- THE PANEL INFORMATION BELOW AND IN THE PLANS WAS PROVIDED BY THE OWNER DURING THE DESIGN PHASE AND PRIOR TO THE START OF CONSTRUCTION. ALL PANEL INFORMATION INDICATED IN THESE DRAWINGS IS FOR REFERENCE ONLY AND SHALL BE VERIFIED WITH THE OWNER, THE ELECTRICAL DRAWINGS AND THE GENERAL CONTRACTOR PRIOR TO FABRICATION AND PRIOR TO CONSTRUCTION.
- THE OWNER IS TO PROVIDE A PANEL CAPABLE OF SUPPORTING IN MANNER IN WHICH IS INTENDED BY THESE DRAWINGS (I.E. SUPPORTED BY SHORT END, DUAL SUPPORTS, ETC). SUBMIT PANEL SPEC SHEETS FOR REVIEW PRIOR TO PURCHASING ANY PANELS.
- THE PANEL MANUFACTURER IS RESPONSIBLE FOR THE DESIGN OF THE PANELS INCLUDING ALL ITS COMPONENTS, PHOTOVOLTAIC PANELS AND ITS COMPONENTS SHALL BE DESIGNED TO SUPPORT PANEL WEIGHT PLUS SNOW, WIND, OR SEISMIC LOADING, WHICHEVER COMBINATION PRODUCES THE MOST SEVERE CONDITION IN ACCORDANCE WITH THE BUILDING CODE.

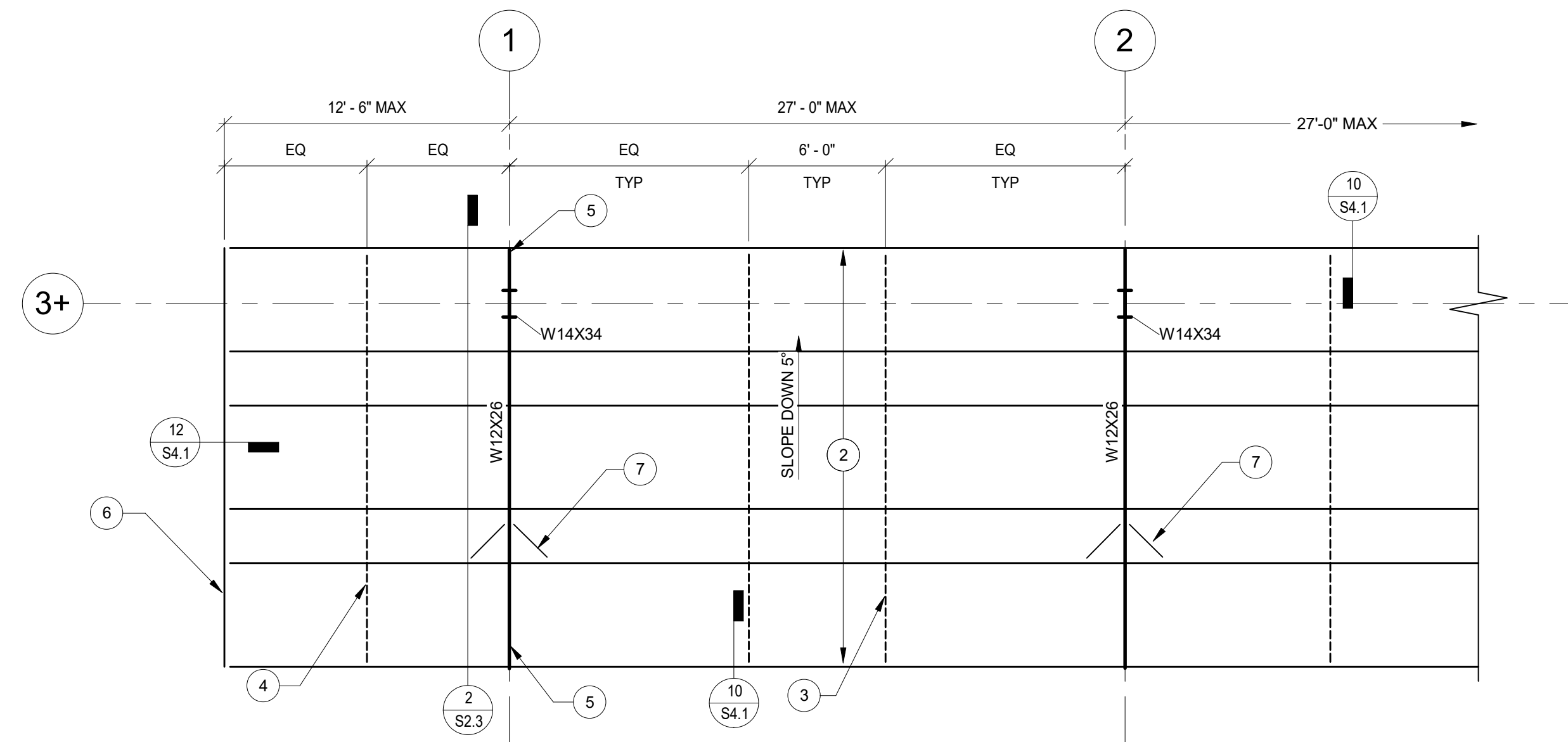
PANEL MODEL	LENGTH	WIDTH
HIGH EFFICIENCY MONO-PERC M4-9B-R	82.8"	40.94"

## KEYNOTES

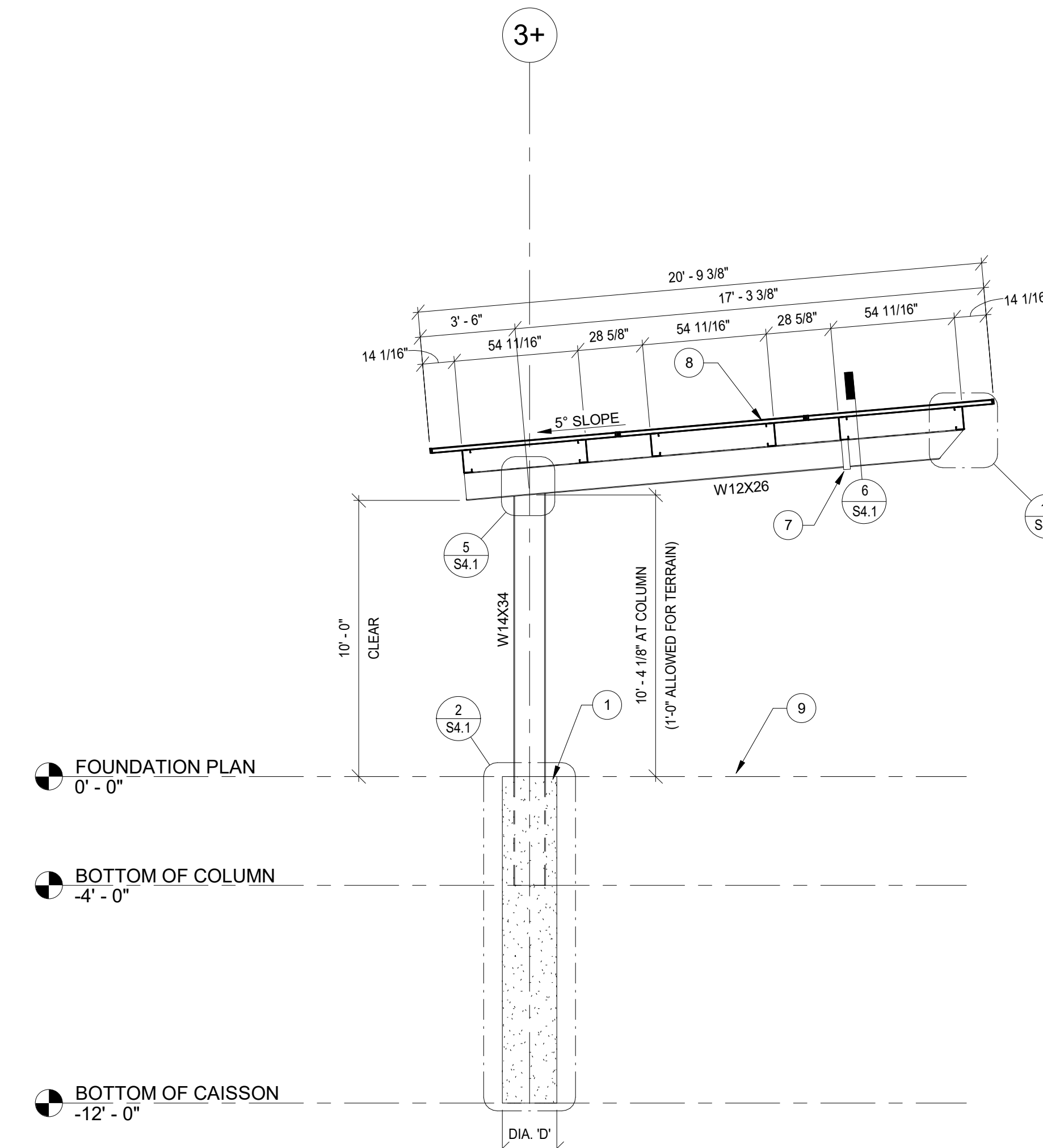
- DRILLED CONCRETE POLE FOOTING. FOR DIAMETER AND EMBEDMENT OF FOOTING SEE FOUNDATION PLAN AND SECTION ON THIS SHEET. SEE DETAIL 2/S4.1 FOR REINFORCING AND STEEL COLUMN ANCHORAGE.
- C9"x3"x14 GAUGE COLD FORMED STEEL PURLINS. TYPICAL. COORDINATE EXACT LOCATION WITH SOLAR PANEL MANUFACTURER SPECIFICATIONS. SEE DETAIL 9/S4.1 FOR MORE INFORMATION ON SECTION.
- SAG ROD AS SHOWN ON PLANS. (1) MINIMUM AT SPANS LESS THAN 18'-0" AND (2) MINIMUM AT SPANS LESS THAN 27'-0". REFERENCE DETAIL 10/S4.1.
- (1) SAG ROD REQUIRED BETWEEN SUPPORT AND CANTILEVER END AS SHOWN. REFERENCE DETAIL 10/S4.1. SAG ROD NOT REQUIRED WHERE CANTILEVER IS LESS THAN 5'-0".
- DO NOT SPLICE PURLINS AT SUPPORT AT CANTILEVER ENDS.
- 16 GAUGE END CAP WITH 2" LEGS EACH END OF STRUCTURE.
- BEAM FLANGE BRACES AS SHOWN ON PLANS. REFERENCE DETAIL 6/S4.1 FOR MORE INFORMATION.
- PV MODULE BY OTHERS. ATTACH PER DETAILS.
- FINISHED GRADE. FINISHED GRADE IS DEFINED AS THE LOWEST ADJACENT FINISHED GRADE WITHIN 5 FEET OF THE STRUCTURAL COLUMN.



3 3 PANEL + 5 DEG  
NO SCALE



1 3 PANEL - 5 DEG + FRAMING PLAN  
3/16" = 1'-0"



2 3 PANEL 5 DEG SECTION  
1/4" = 1'-0"

## SHEET NOTES

- FOR STRUCTURE LOCATIONS REFERENCE PROJECT SITE PLAN. COLUMN SPACING AND LOCATIONS SHALL BE COORDINATED WITH PROJECT ARCHITECT OR PROFESSIONAL RESPONSIBLE FOR SITE PLAN.
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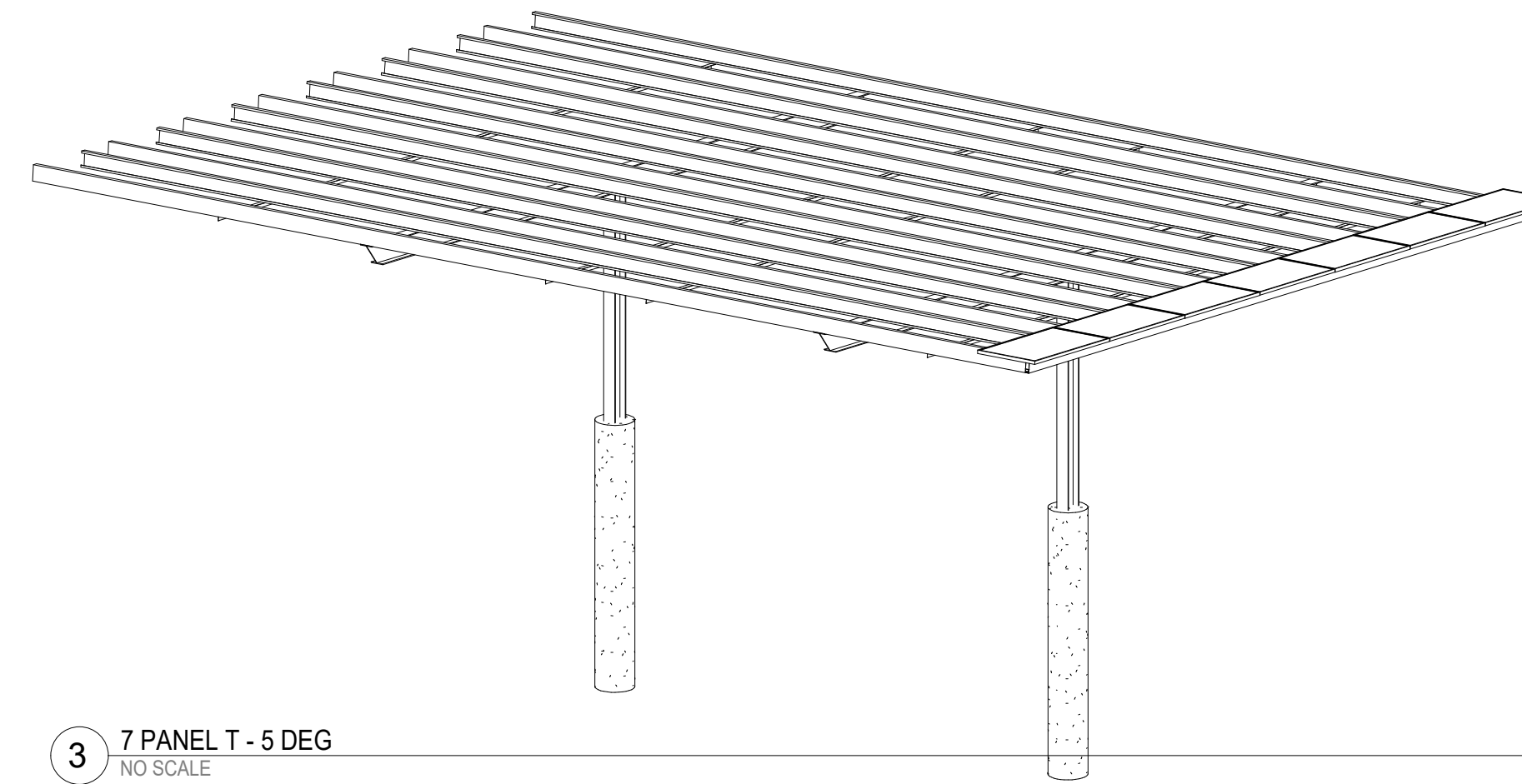
## PV PANEL INFORMATION

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- THE PANEL MANUFACTURER IS RESPONSIBLE FOR THE DESIGN OF THE PANELS INCLUDING ALL ITS COMPONENTS: PHOTOVOLTAIC PANELS AND IT'S COMPONENTS SHALL BE DESIGNED TO SUPPORT PANEL WEIGHT PLUS SNOW, WIND, OR SEISMIC LOADING, WHICHEVER COMBINATION PRODUCES THE MOST SEVERE CONDITION IN ACCORDANCE WITH THE BUILDING CODE.

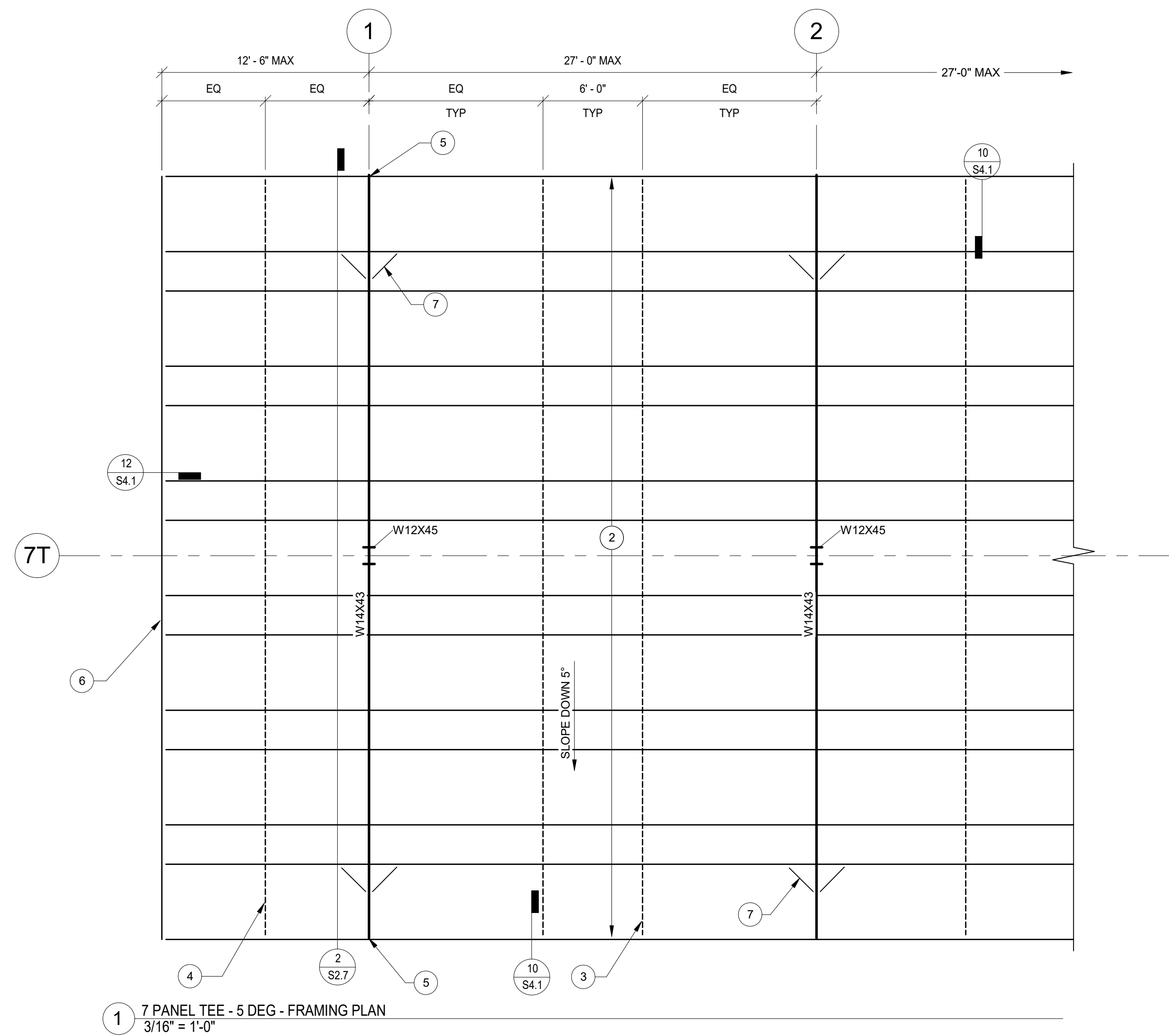
PANEL MODEL	LENGTH	WIDTH
HIGH EFFICIENCY MONO-PERC M4-9B-R	82.8"	40.94"

## KEYNOTES

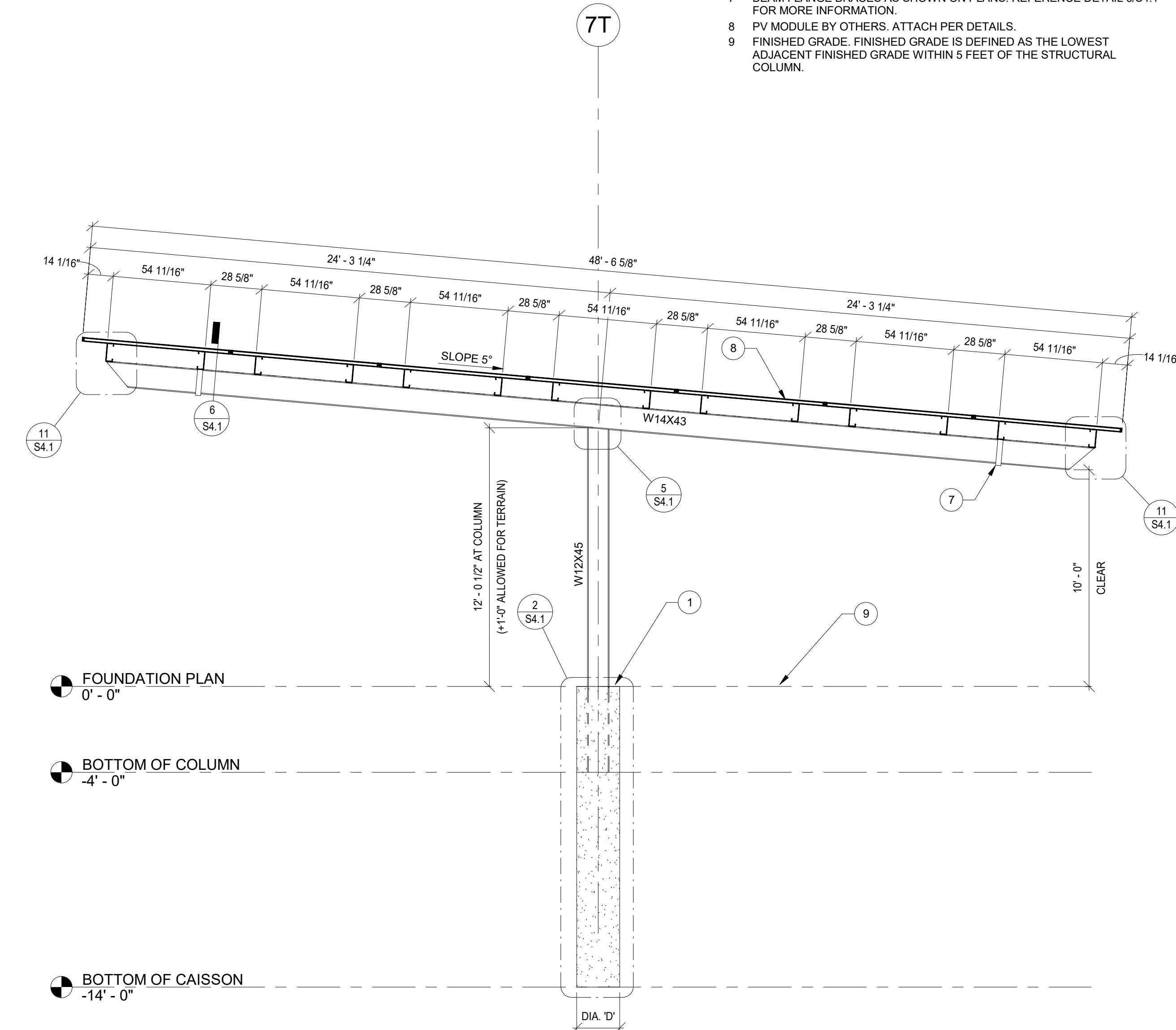
- DRILLED CONCRETE POLE FOOTING. FOR DIAMETER AND EMBEDMENT OF FOOTING SEE FOUNDATION PLAN AND SECTION ON THIS SHEET. SEE DETAIL 2/S4.1 FOR REINFORCING AND STEEL COLUMN ANCHORAGE.
- C9"x3"x14 GAUGE COLD FORMED STEEL PURLINS. TYPICAL. COORDINATE EXACT LOCATION WITH SOLAR PANEL MANUFACTURER SPECIFICATIONS. SEE DETAIL 9/S4.1 FOR MORE INFORMATION ON SECTION.
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- (1) SAG ROD REQUIRED BETWEEN SUPPORT AND CANTILEVER END AS SHOWN. REFERENCE DETAIL 10/S4.1. SAG ROD NOT REQUIRED WHERE CANTILEVER IS LESS THAN 5'-0".
- DO NOT SPLICE PURLINS AT SUPPORT AT CANTILEVER ENDS.
- 16 GAUGE END CAP WITH 2" LEGS EACH END OF STRUCTURE.
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- PV MODULE BY OTHERS. ATTACH PER DETAILS.
- FINISHED GRADE. FINISHED GRADE IS DEFINED AS THE LOWEST ADJACENT FINISHED GRADE WITHIN 5 FEET OF THE STRUCTURAL COLUMN.



3 7 PANEL T - 5 DEG  
NO SCALE



1 7 PANEL TEE - 5 DEG - FRAMING PLAN  
3/16" = 1'-0"

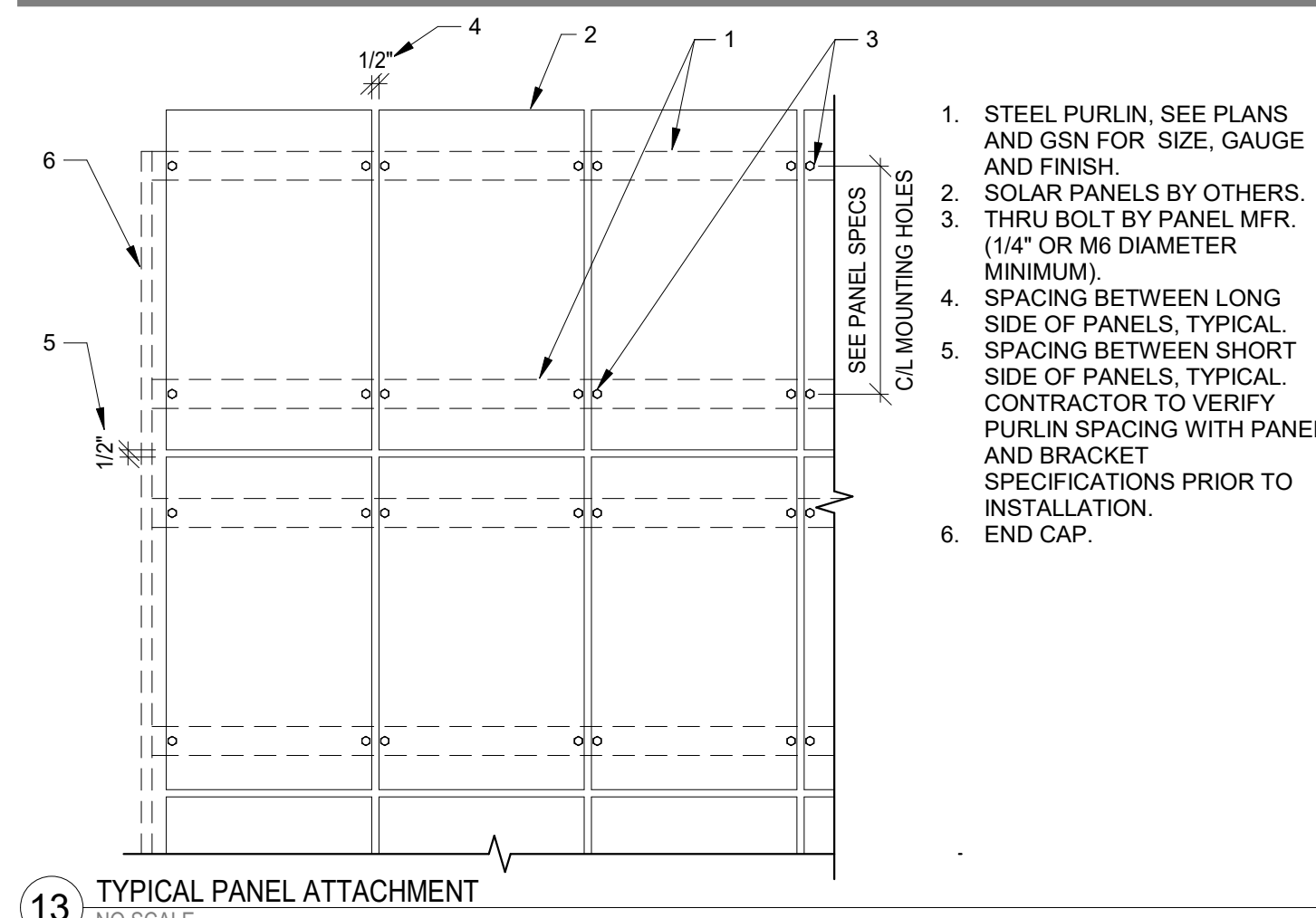


FOUNDATION PLAN  
0' - 0"

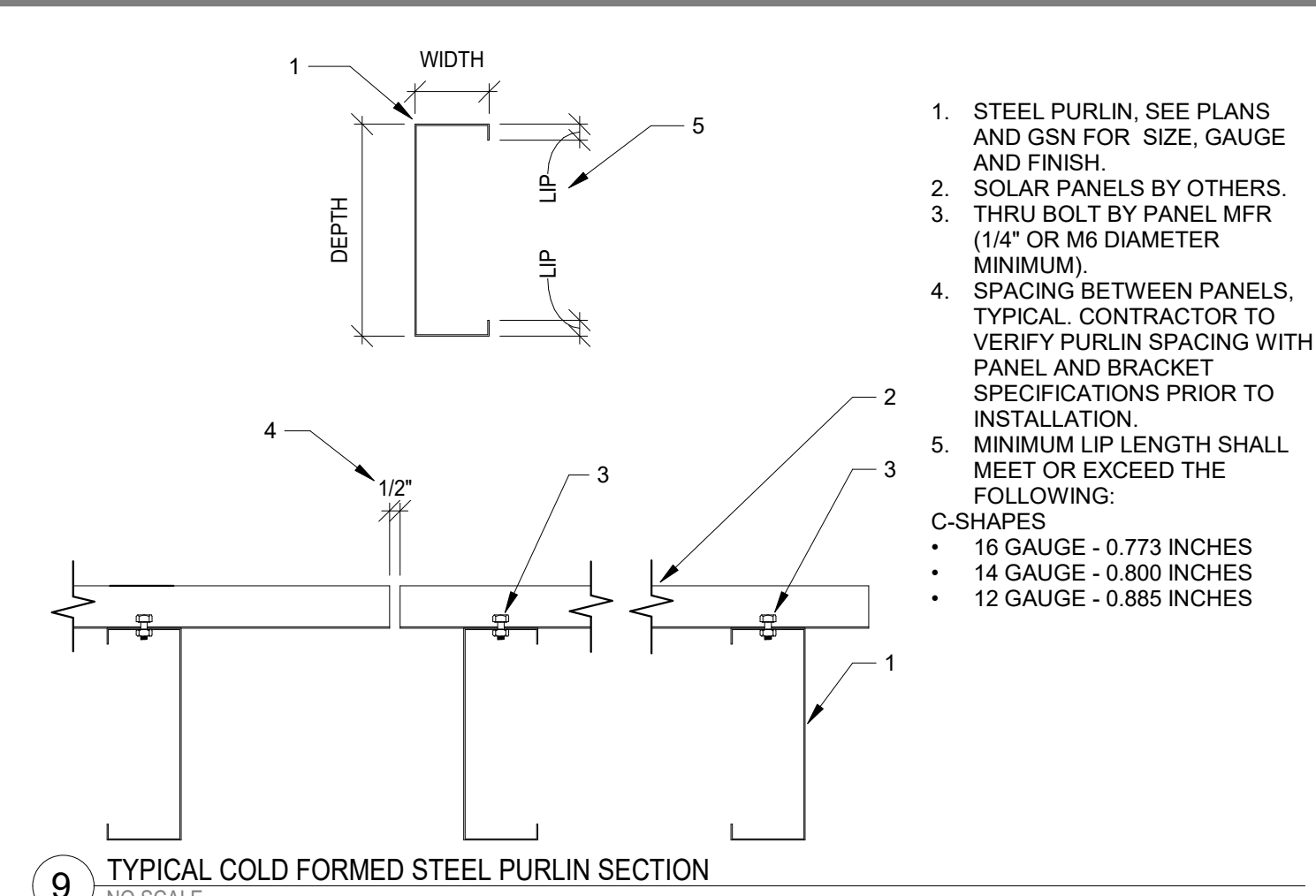
BOTTOM OF COLUMN  
-4' - 0"

BOTTOM OF CAISSON  
-14' - 0"

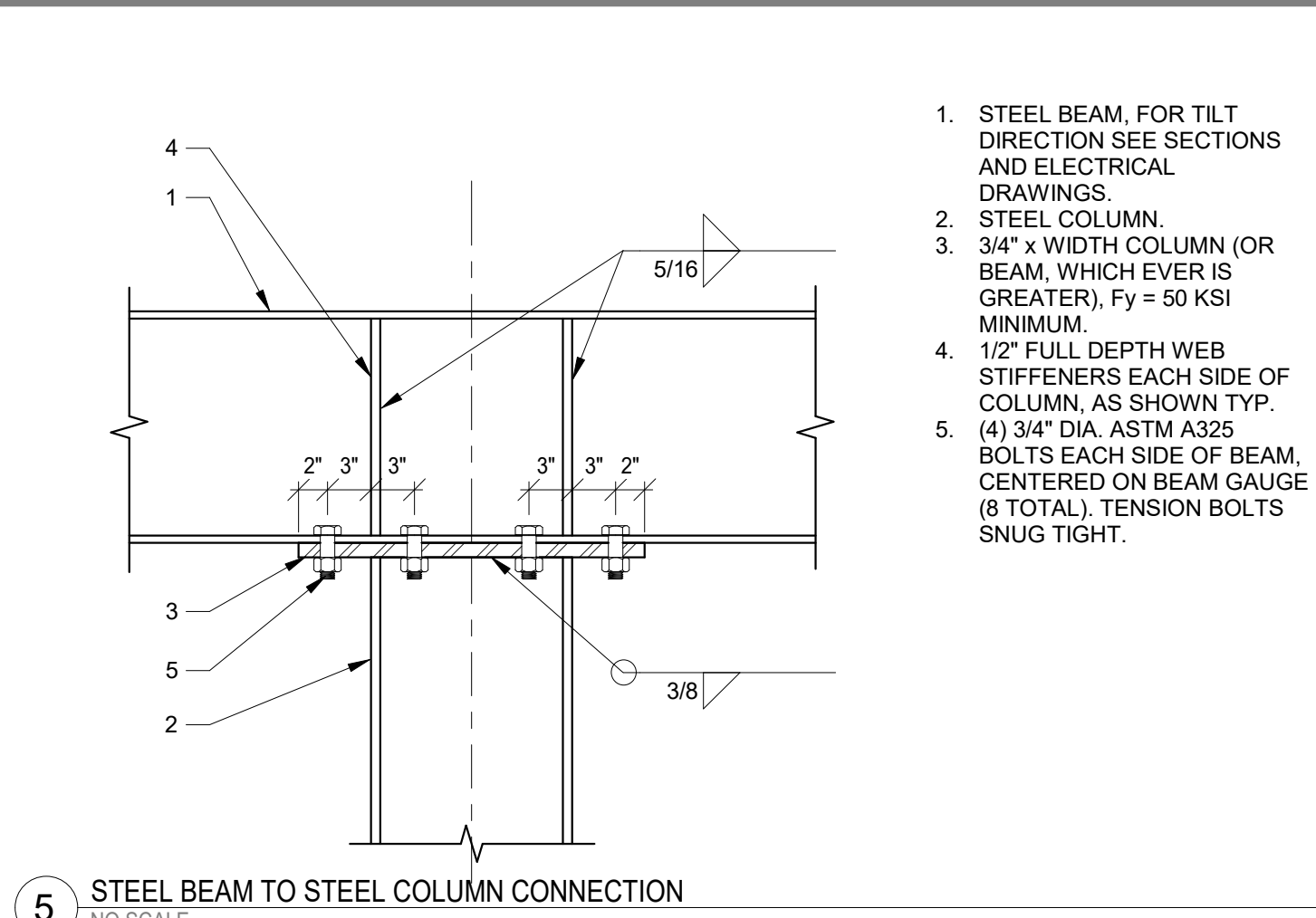
2 7 PANEL 5 DEG TEE SECTION  
1/4" = 1'-0"



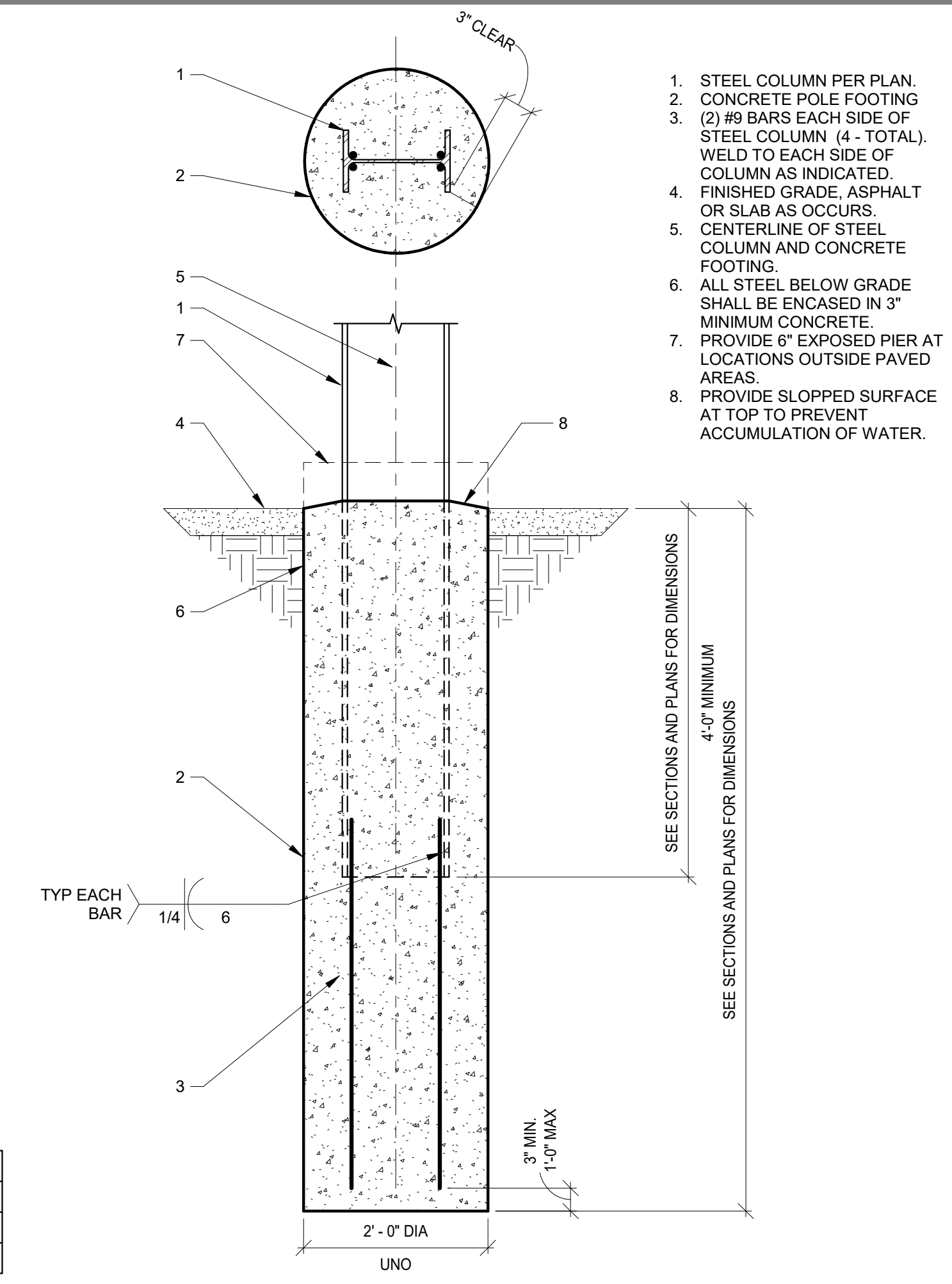
1. STEEL PURLIN, SEE PLANS AND GSN FOR SIZE, GAUGE AND FINISH.
2. SOLAR PANELS BY OTHERS, THRU BOLT BY PANEL MFR. (1/4" OR M6 DIAMETER MINIMUM).
3. SPACING BETWEEN LONG SIDE OF PANELS, TYPICAL. CONTRACTOR TO VERIFY PURLIN SPACING WITH PANEL AND BRACKET SPECIFICATIONS PRIOR TO INSTALLATION.
4. SPACING BETWEEN SHORT SIDE OF PANELS, TYPICAL. CONTRACTOR TO VERIFY PURLIN SPACING WITH PANEL AND BRACKET SPECIFICATIONS PRIOR TO INSTALLATION.
5. END CAP.
6. END CAP.



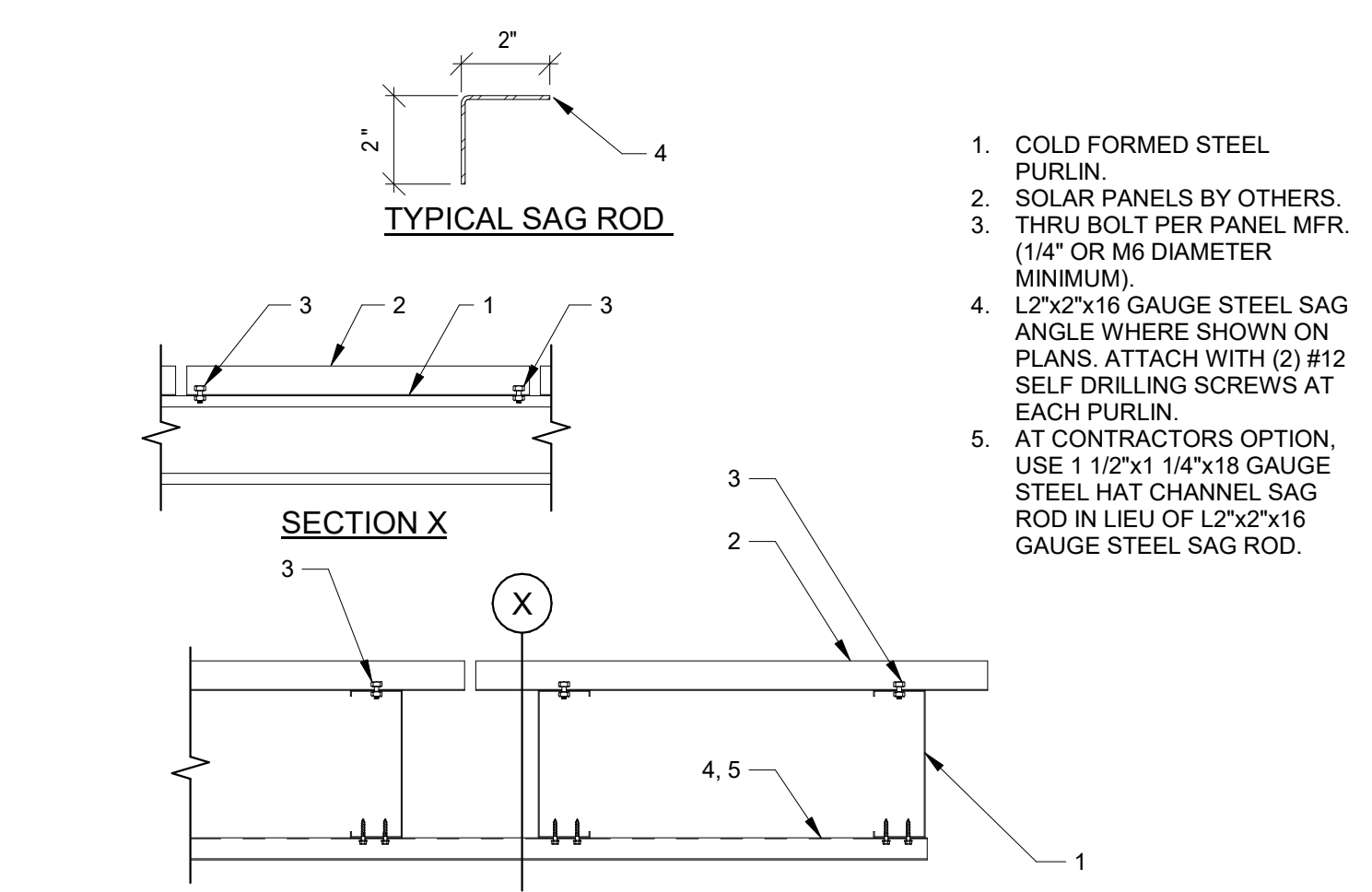
1. STEEL PURLIN, SEE PLANS AND GSN FOR SIZE, GAUGE AND FINISH.
2. SOLAR PANELS BY OTHERS, THRU BOLT BY PANEL MFR. (1/4" OR M6 DIAMETER MINIMUM).
3. SPACING BETWEEN PANELS, TYPICAL. CONTRACTOR TO VERIFY PURLIN SPACING WITH PANEL AND BRACKET SPECIFICATIONS PRIOR TO INSTALLATION.
4. MINIMUM LIP LENGTH SHALL MEET OR EXCEED THE FOLLOWING:  
C-SHAPES  
• 16 GAUGE - 0.773 INCHES  
• 14 GAUGE - 0.800 INCHES  
• 12 GAUGE - 0.885 INCHES



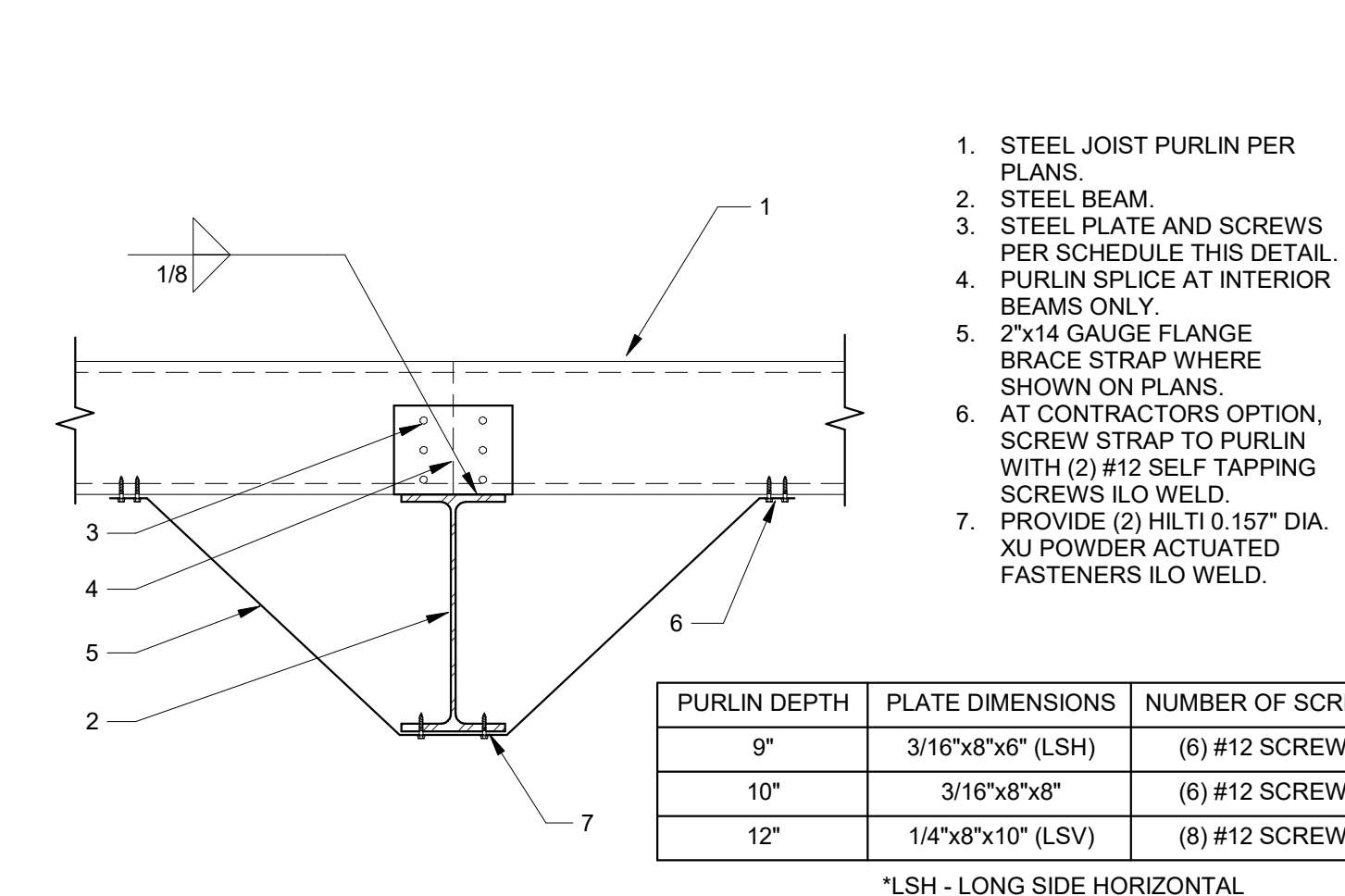
1. STEEL BEAM, FOR TILT DIRECTION SEE SECTIONS AND ELECTRICAL DRAWINGS.
2. STEEL COLUMN.
3. 3/4" x WIDTH COLUMN (OR BEAM, WHICH EVER IS GREATER), Fy = 50 KSI MINIMUM.
4. 1/2" FULL DEPTH WEB STIFFENERS EACH SIDE OF COLUMN, AS SHOWN TYP.
5. (4) 3/4" DIA. ASTM A325 BOLTS EACH SIDE OF BEAM, CENTERED ON BEAM GAUGE (8 TOTAL), TENSION BOLTS SNUG TIGHT.



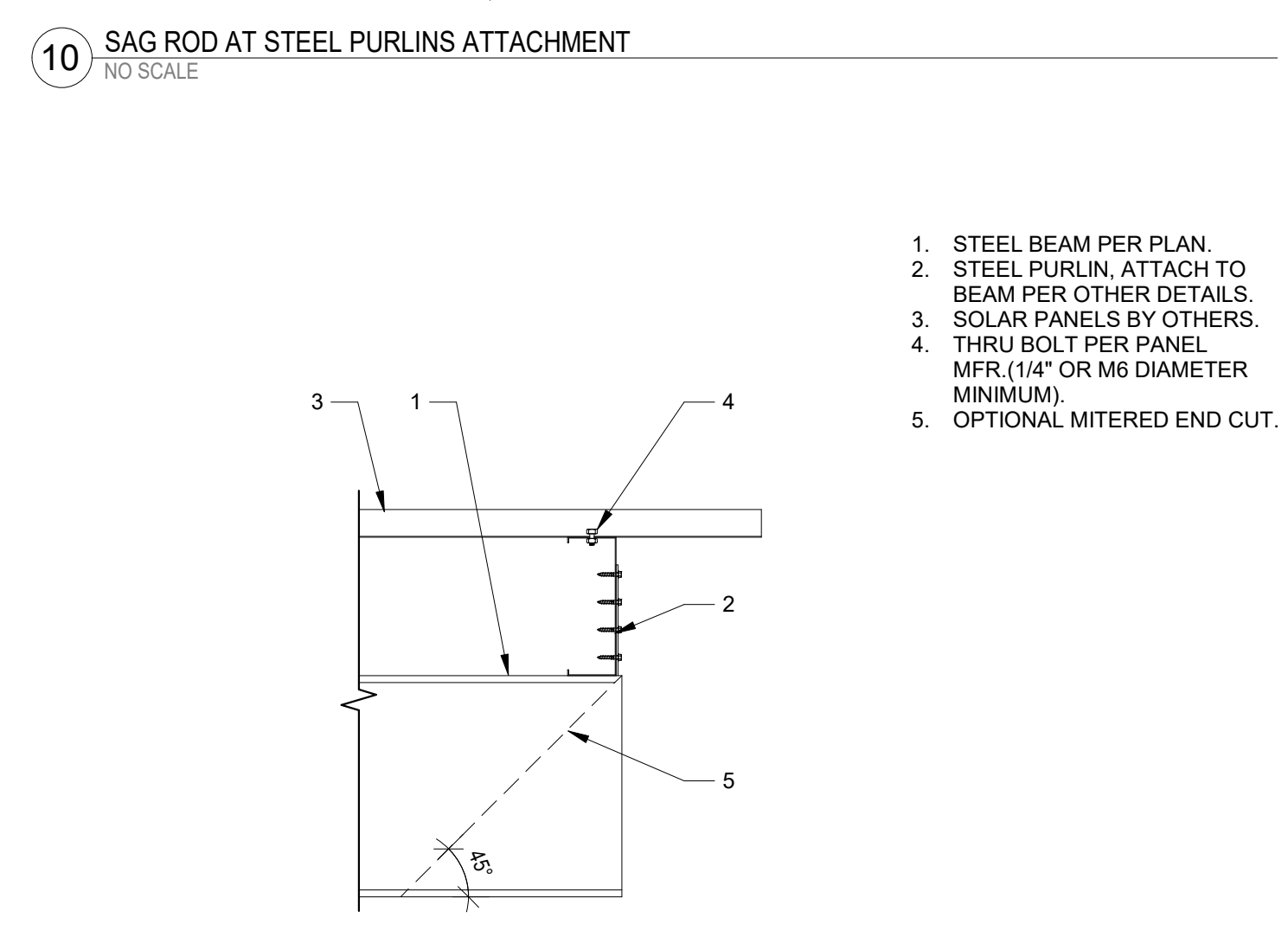
1. STEEL COLUMN PER PLAN.
2. CONCRETE POLE FOOTING.
3. (2) #9 BARS EACH SIDE OF STEEL COLUMN (4 - TOTAL), WELD TO EACH SIDE OF COLUMN AS INDICATED.
4. FINISHED GRADE, ASPHALT OR SLAB AS OCCURS.
5. CENTERLINE OF STEEL COLUMN AND CONCRETE FOOTING.
6. ALL STEEL BELOW GRADE SHALL BE ENCASED IN 3" MINIMUM CONCRETE.
7. PROVIDE 6" EXPOSED PIER AT LOCATIONS OUTSIDE PAVED AREAS.
8. PROVIDE SLOPPED SURFACE AT TOP TO PREVENT ACCUMULATION OF WATER.



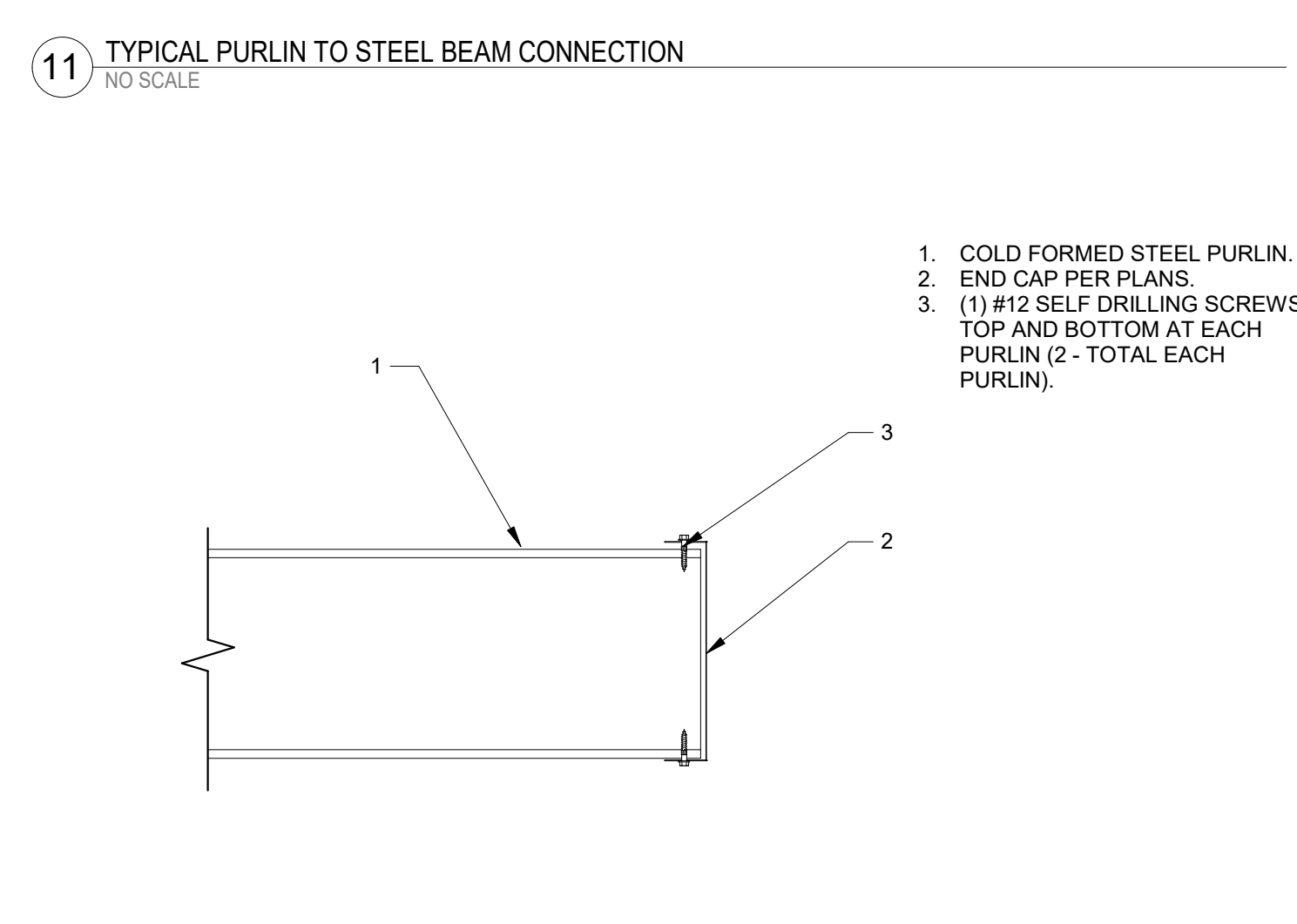
1. COLD FORMED STEEL PURLIN.
2. SOLAR PANELS BY OTHERS, THRU BOLT PER PANEL MFR. (1/4" OR M6 DIAMETER MINIMUM).
3. L2"x2"x16 GAUGE STEEL SAG ANGLE WHERE SHOWN ON PLANS, ATTACH WITH (2) #12 SELF DRILLING SCREWS AT EACH PURLIN.
4. AT CONTRACTORS OPTION, USE 1 1/2"x1 1/4"x18 GAUGE STEEL HAT CHANNEL SAG ROD IN LIEU OF L2"x2"x16 GAUGE STEEL SAG ROD.



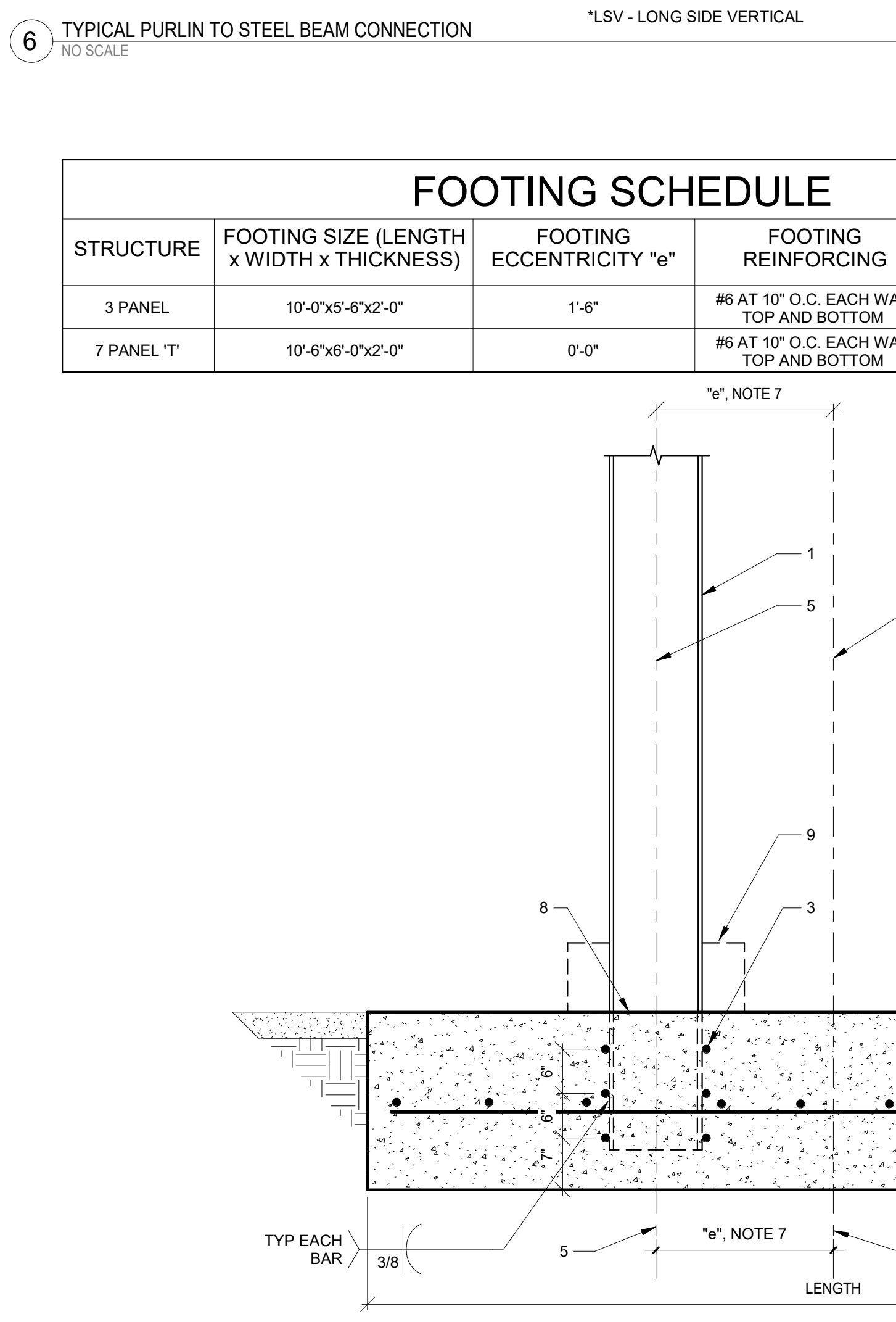
1. STEEL JOIST PURLIN PER PLANS.
2. STEEL BEAM.
3. STEEL PLATE AND SCREWS PER SCHEDULE THIS DETAIL.
4. PURLIN SPLICE AT INTERIOR BEAMS ONLY.
5. 2"x14 GAUGE FLANGE BRACE STRAP WHERE SHOWN ON PLANS.
6. AT CONTRACTORS OPTION, SCREW STRAP TO PURLIN WITH (2) #12 SELF TAPPING SCREWS I/O WELD.
7. PROVIDE (2) HILTI 0.157" DIA. XU POWDER ACTUATED FASTENERS I/O WELD.



1. STEEL BEAM PER PLAN.
2. STEEL PURLIN, ATTACH TO BEAM PER OTHER DETAILS.
3. SOLAR PANELS BY OTHERS, THRU BOLT PER PANEL MFR. (1/4" OR M6 DIAMETER MINIMUM).
4. OPTIONAL MITERED END CUT.



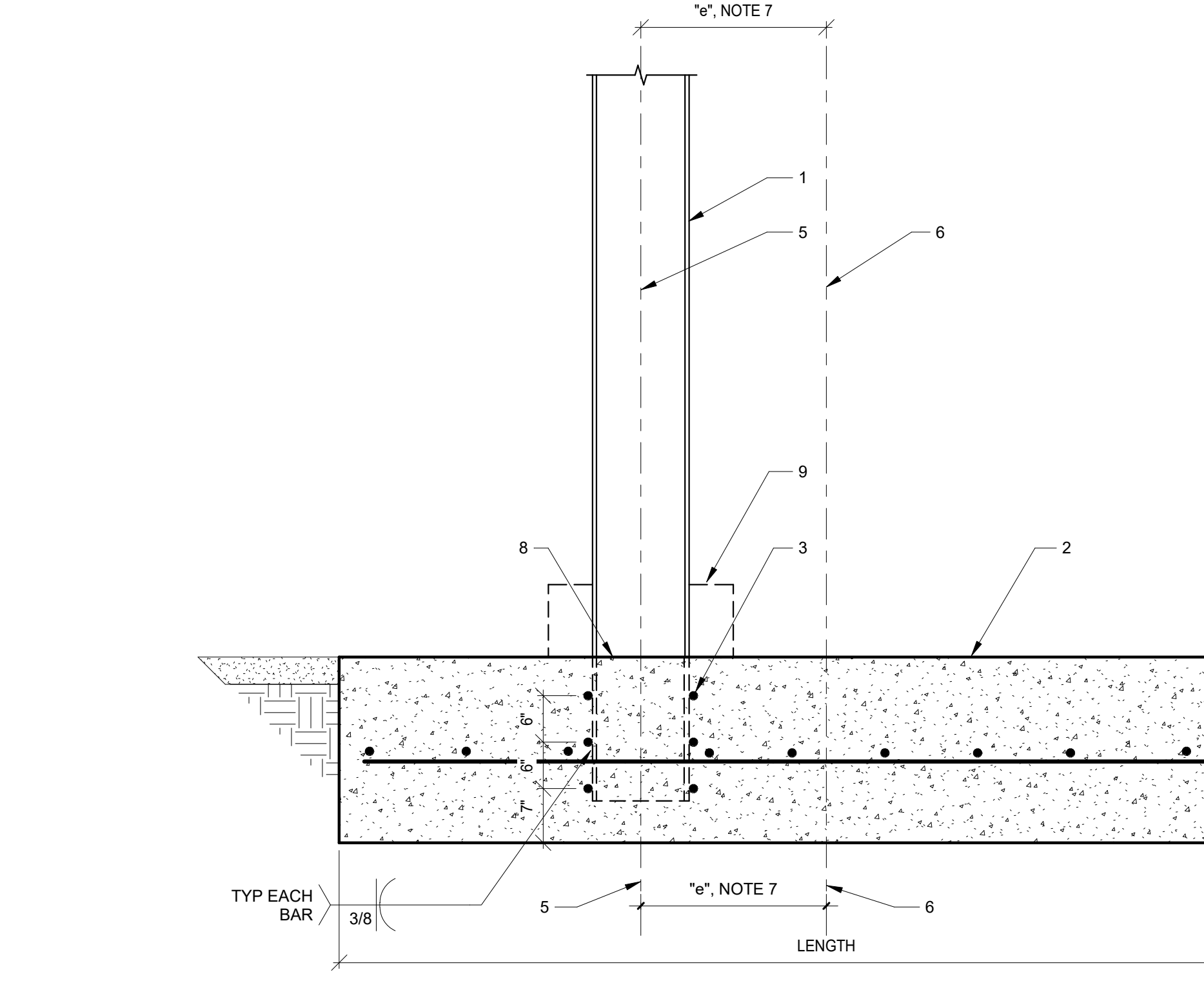
1. COLD FORMED STEEL PURLIN.
2. END CAP PER PLANS.
3. (1) #12 SELF DRILLING SCREWS TOP AND BOTTOM AT EACH PURLIN (2 - TOTAL EACH PURLIN).



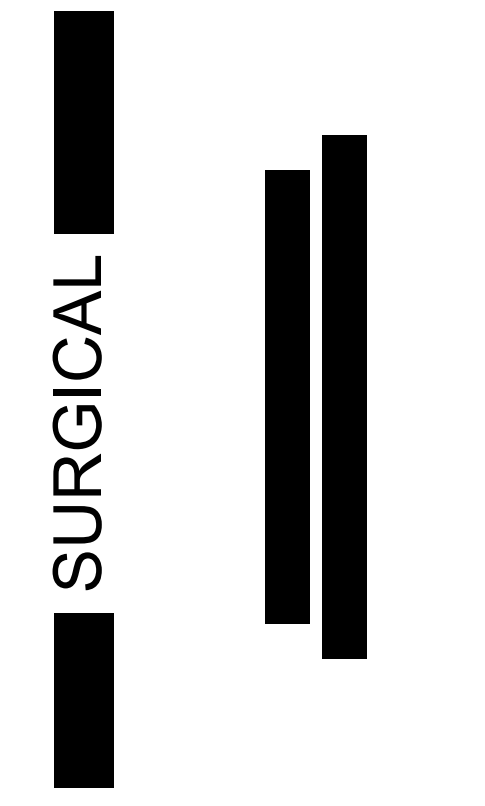
1. STEEL COLUMN PER PLAN.
2. CONCRETE SPREAD FOOTING, SEE SCHEDULE THIS DETAIL FOR SIZE AND REINFORCING.
3. (3) #9 x 5'-0" BARS AT 6" O.C. VERTICAL WELDED TO EACH SIDE OF COLUMN FLANGE (6 TOTAL PER COLUMN).
4. FINISHED GRADE OR SLAB AS OCCURS.
5. CENTERLINE OF STEEL COLUMN AND CONCRETE FOOTING WIDTH.
6. CENTERLINE OF FOOTING LENGTH.
7. OFFSET COLUMN PER FOOTING SCHEDULE, WHERE FOOTING ECCENTRICITY EXISTS, LONGER FOOTING TOE SHALL OCCUR ON THE SAME SIDE OF THE COLUMN.
8. PROVIDE SLOPPED SURFACE AT COLUMN TO PREVENT ACCUMULATION OF WATER AGAINST STEEL.
9. PROVIDE 6" EXPOSED PIER AT LOCATIONS OUTSIDE PAVED AREAS.

### FOOTING SCHEDULE

STRUCTURE	FOOTING SIZE (LENGTH x WIDTH x THICKNESS)	FOOTING ECCENTRICITY "e"	FOOTING REINFORCING	CONCRETE STRENGTH
3 PANEL	10'-0"x5'-6"x2'-0"	1'-6"	#6 AT 10" O.C. EACH WAY TOP AND BOTTOM	3,000 PSI
7 PANEL T	10'-6"x6'-0"x2'-0"	0'-0"	#6 AT 10" O.C. EACH WAY TOP AND BOTTOM	3,000 PSI



\*THIS DETAIL MAY BE USED IN LIEU OF DETAIL 2/S4.1



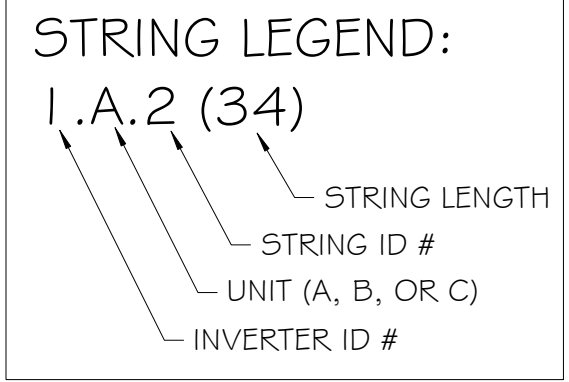
No.	Description	Date

PROJECT NUMBER: 21415  
DRAWN BY: KS  
CHECKED BY: JE  
DATE: 12/17/2021

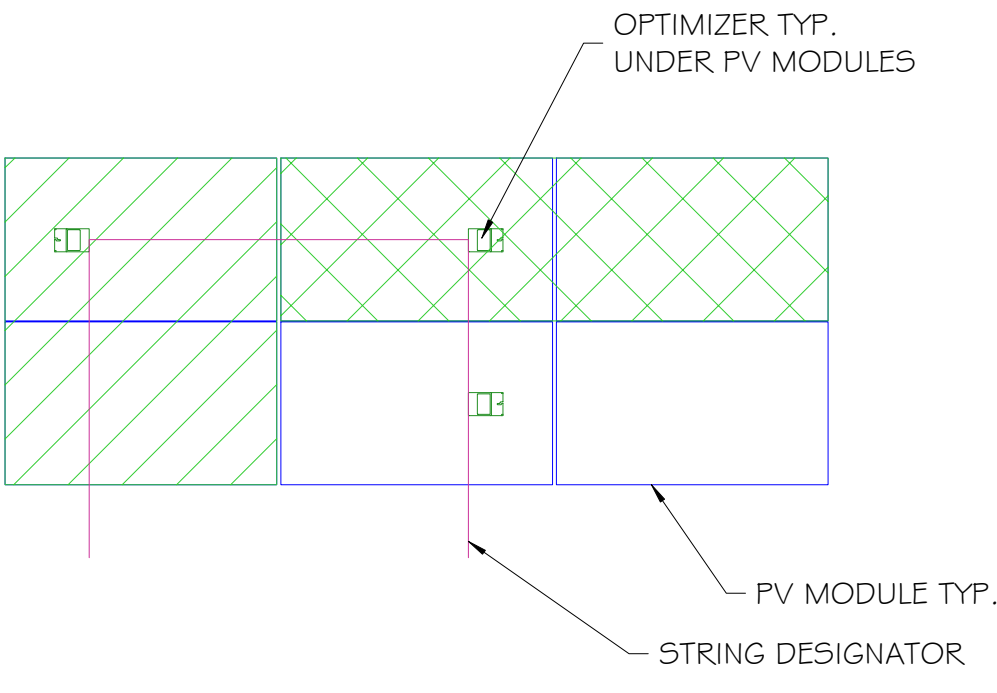
SHEET NAME  
SOLAR CANOPY  
DETAILS

S4.1

SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	ROOFTOP PV MOD.	PHONO PS450M4H-24/TH
	ROOF HATCH	
	ROOF VENT	
	SKYLIGHT	
	HVAC UNIT	



**NOTES:**  
 MODULE PAIRS ARE IDENTIFIED BY THE HATCHED AREA ENCLOSING THEM. EACH OPTIMIZER CONNECTS TO (2) MODULES. THE STRING IS IDENTIFIED BY THE LINE CONNECTING THE HATCHED AREAS.



ON ROOFTOP INVERTERS #1-3

IN ELECTRICAL ROOM MAIN SERVICE PANEL & UTILITY METER

IN PARKING LOT PROPOSED PV/BESS EQUIPMENT AC DISCONNECT PV AC COMBINER PANEL

(1) 2" SCH40 PVC IN 24" DEEP TRENCH FROM NORTHERN CANOPY

OPTIMIZER WITH (1) MODULE (TYP.)

(1) 2" SCH40 PVC IN 24" DEEP TRENCH FROM SOUTHERN CANOPY

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

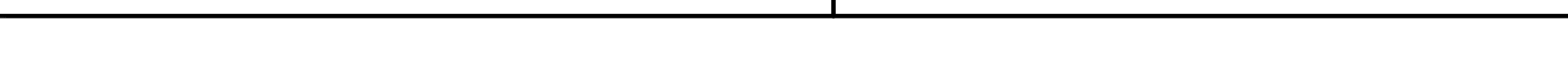
EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)

EMT ON ROOFTOP (TYP.)



Developer:

Contractor:

Project: SURGICAL

Project Details: 716.40 kWdc, 532.0 kW AC

Engineering Approval:

**REVISIONS**

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:

**ELECTRICAL LAYOUT**

Sheet Number: **E1.0**

Sheet Size: **ARCH D - 36" x 24"**

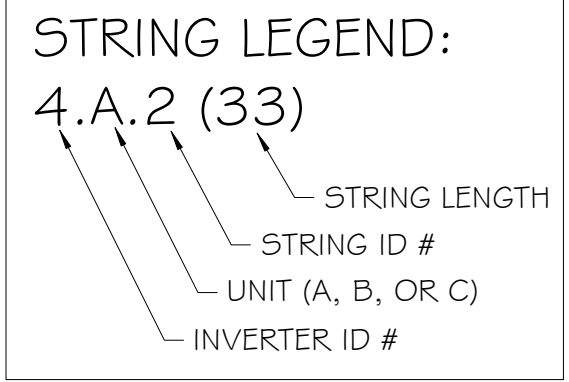
Design & Drafting by: RICHARD DOBBINS # PV-103216-011268

"In the beginning the Universe was created. This has made a lot of people very angry, and been widely regarded as a bad move."  
 - Douglas Adams

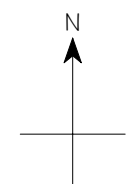
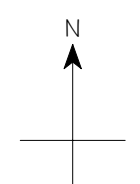
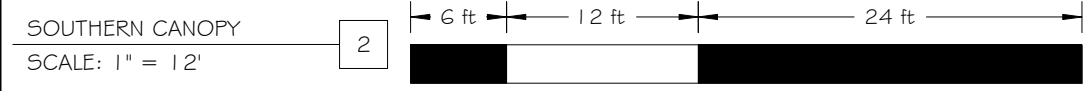
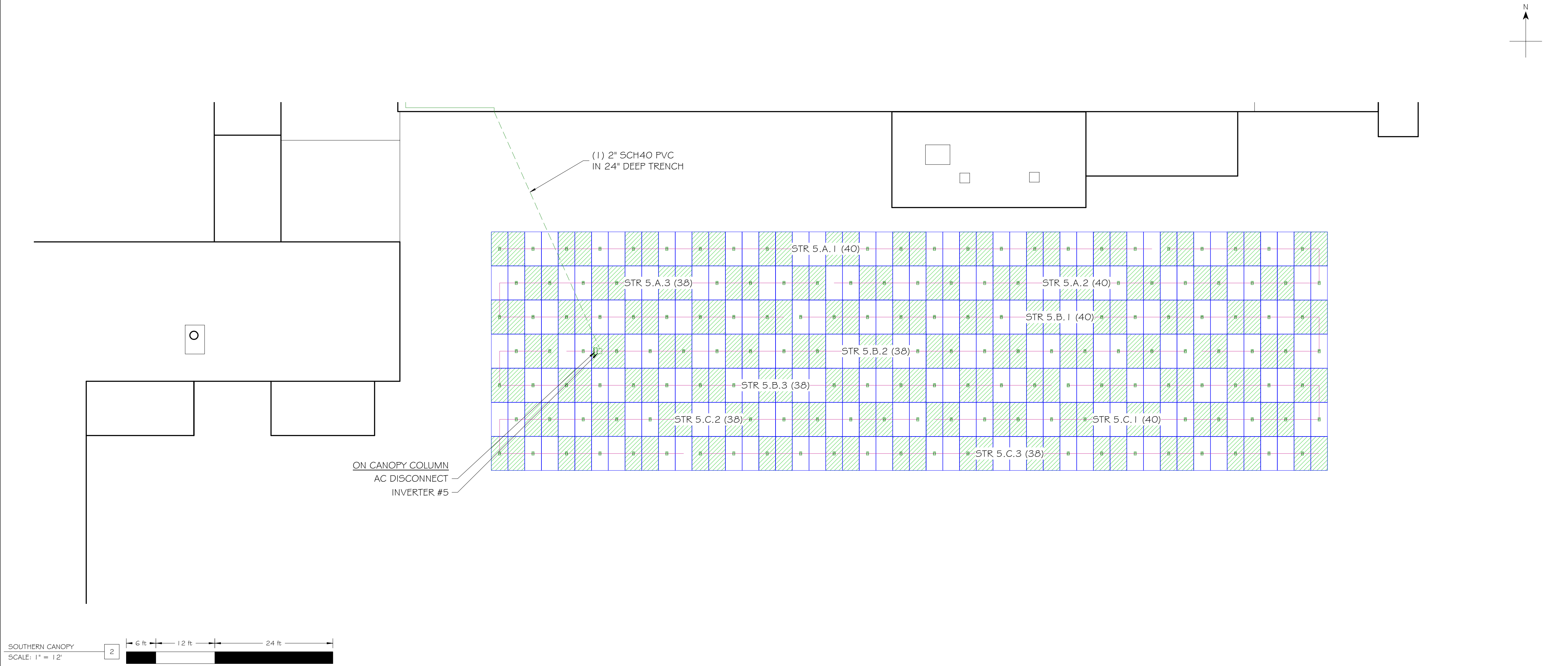
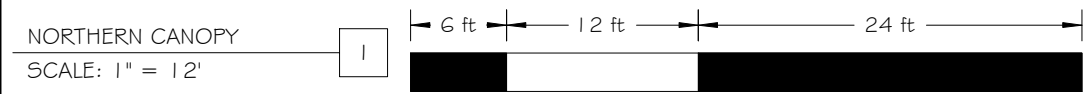
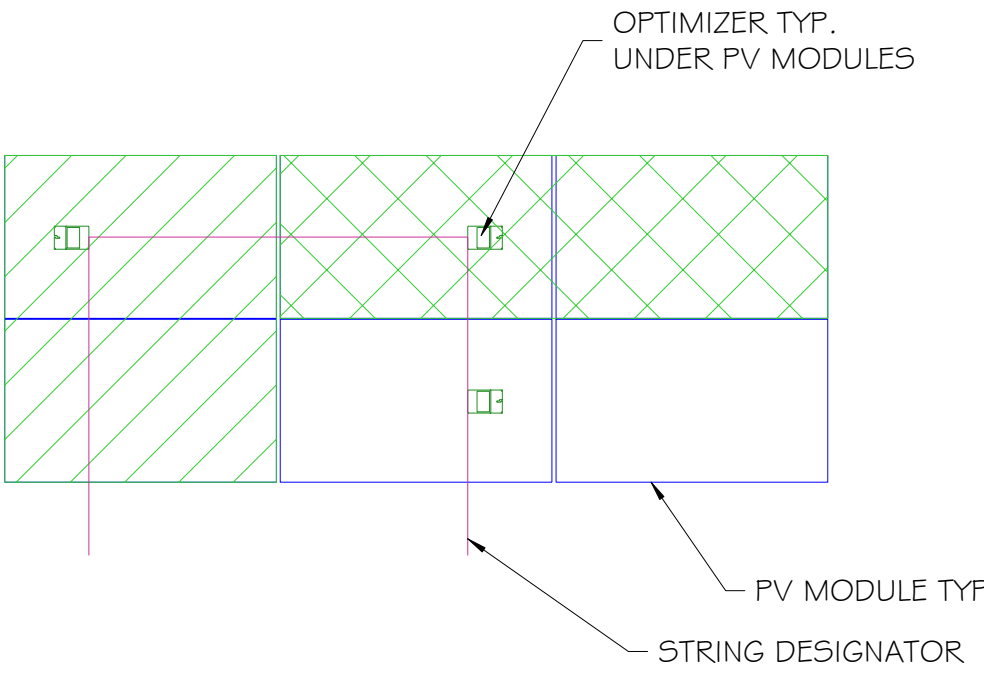
Reviewed & Approved by:

RD

SYMBOL LEGEND		
SYMBOL	NAME	DESCRIPTION
	ROOFTOP PV MOD.	PHONO PS450M4H-24/TH
	ROOF HATCH	
	ROOF VENT	
	SKYLIGHT	
	HVAC UNIT	



**NOTES:**  
MODULE PAIRS ARE IDENTIFIED BY THE HATCHED AREA ENCLOSING THEM. EACH OPTIMIZER CONNECTS TO (2) MODULES. THE STRING IS IDENTIFIED BY THE LINE CONNECTING THE HATCHED AREAS.



Developer:

Contractor:

Project:  
SURGICAL

Project Details:  
716.40 kWdc, 532.0 kW AC

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:  
**CANOPY ELECTRICAL LAYOUT**

Sheet Number:  
**E1.1**

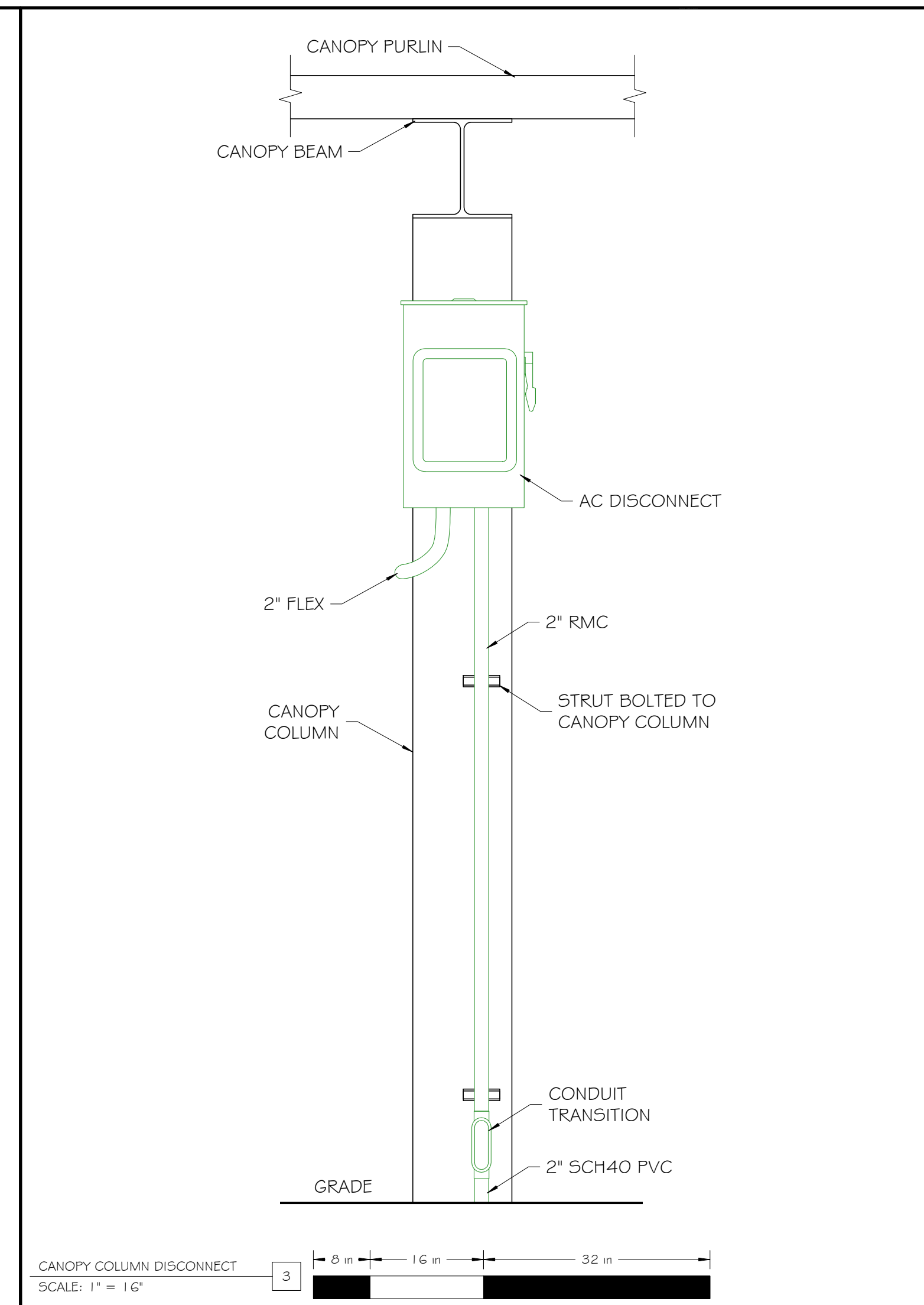
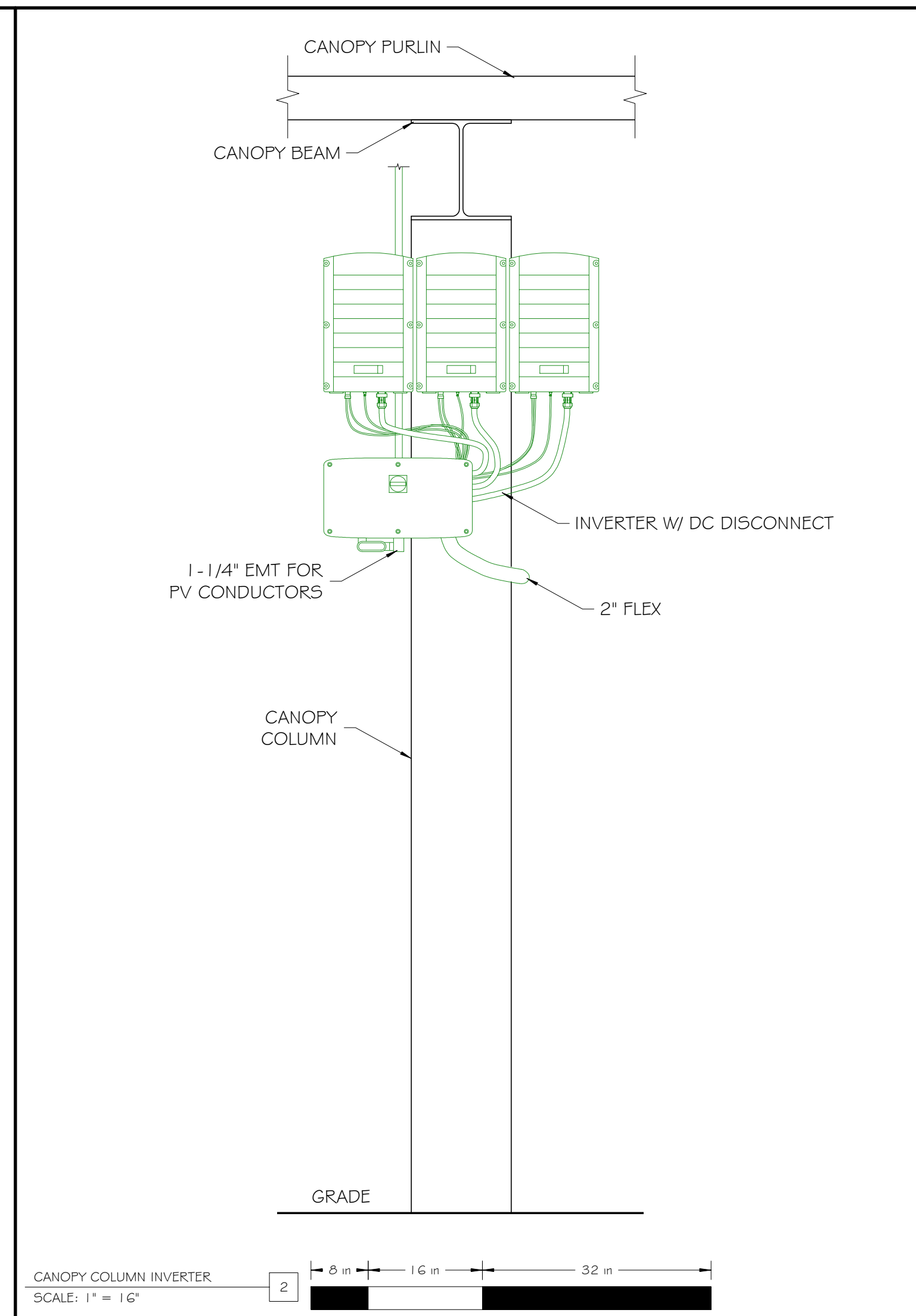
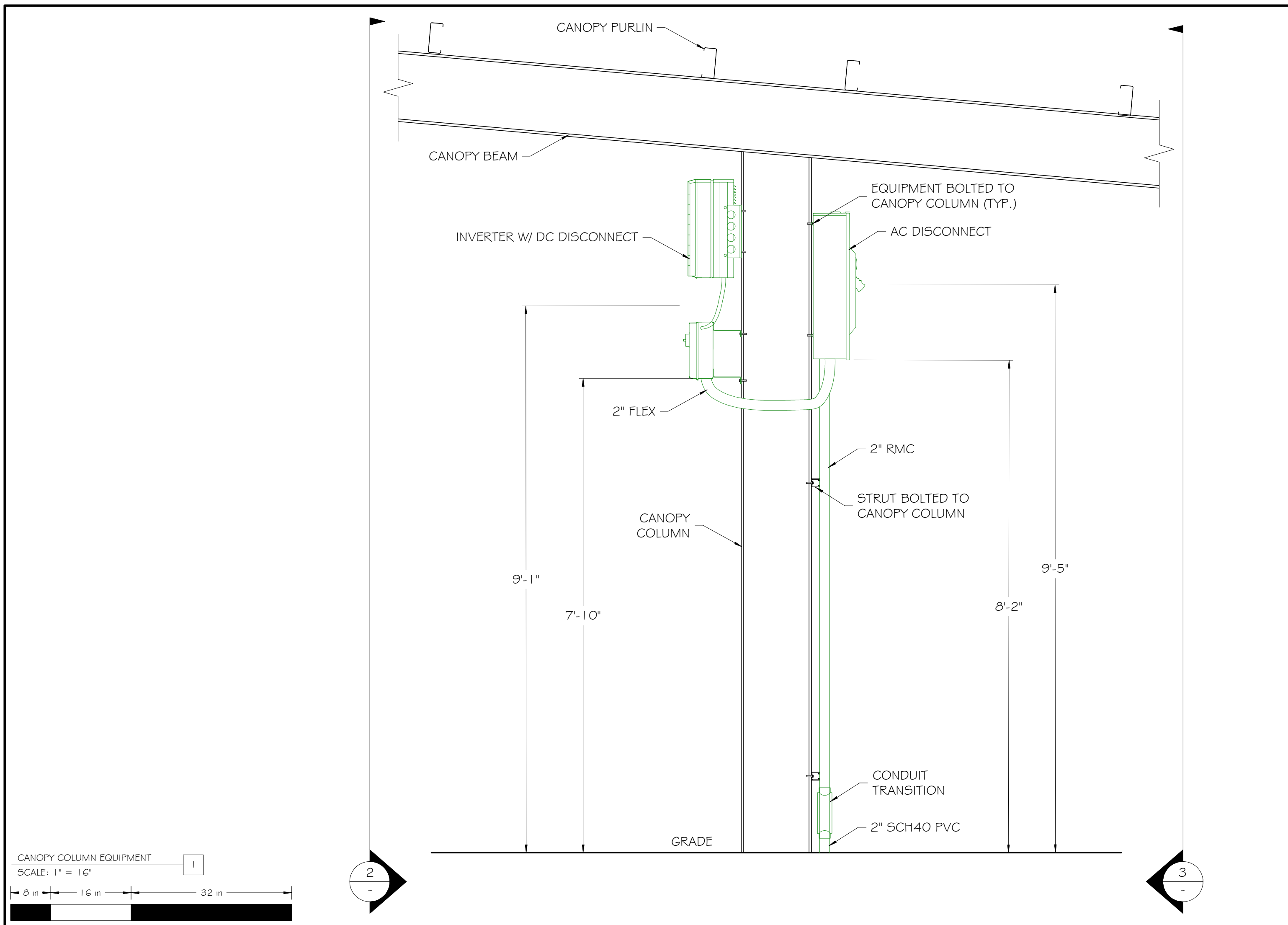
Sheet Size:  
**ARCH D - 36" x 24"**

Design & Drafting by:  
RICHARD DOBBINS  
PV-103216-011268

*"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."  
- Douglas Adams*

Reviewed & Approved by:  
RD

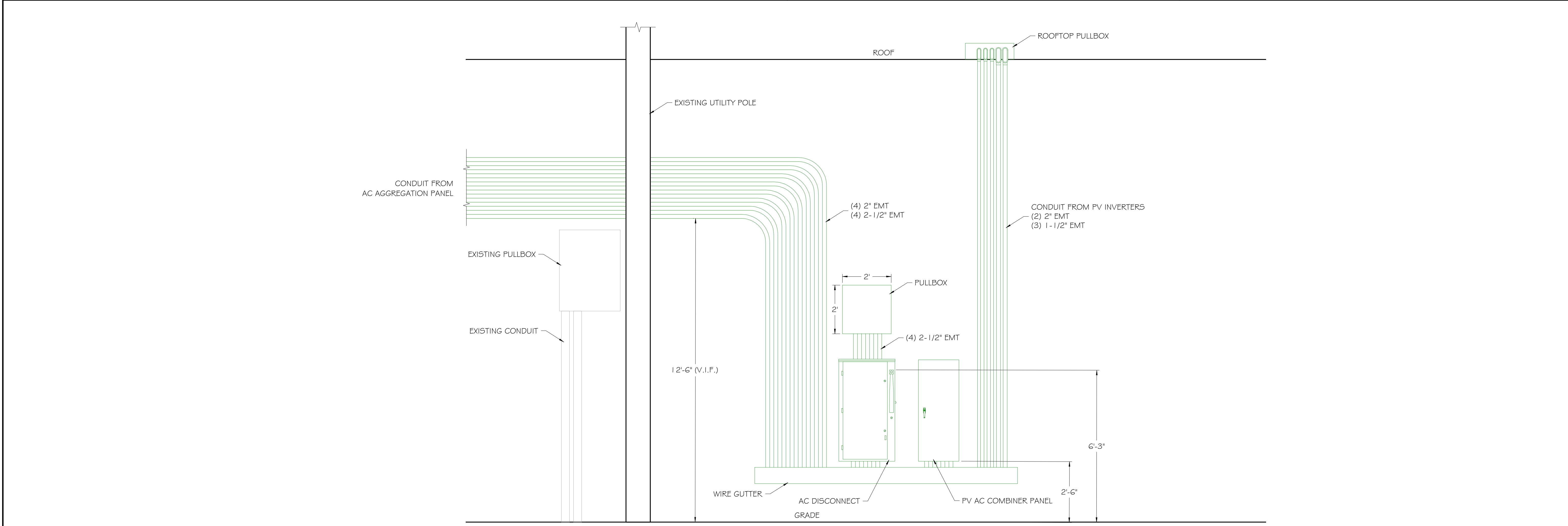




CANOPY COLUMN EQUIPMENT  
SCALE: 1" = 16"

CANOPY COLUMN INVERTER  
SCALE: 1" = 16"

CANOPY COLUMN DISCONNECT  
SCALE: 1" = 16"



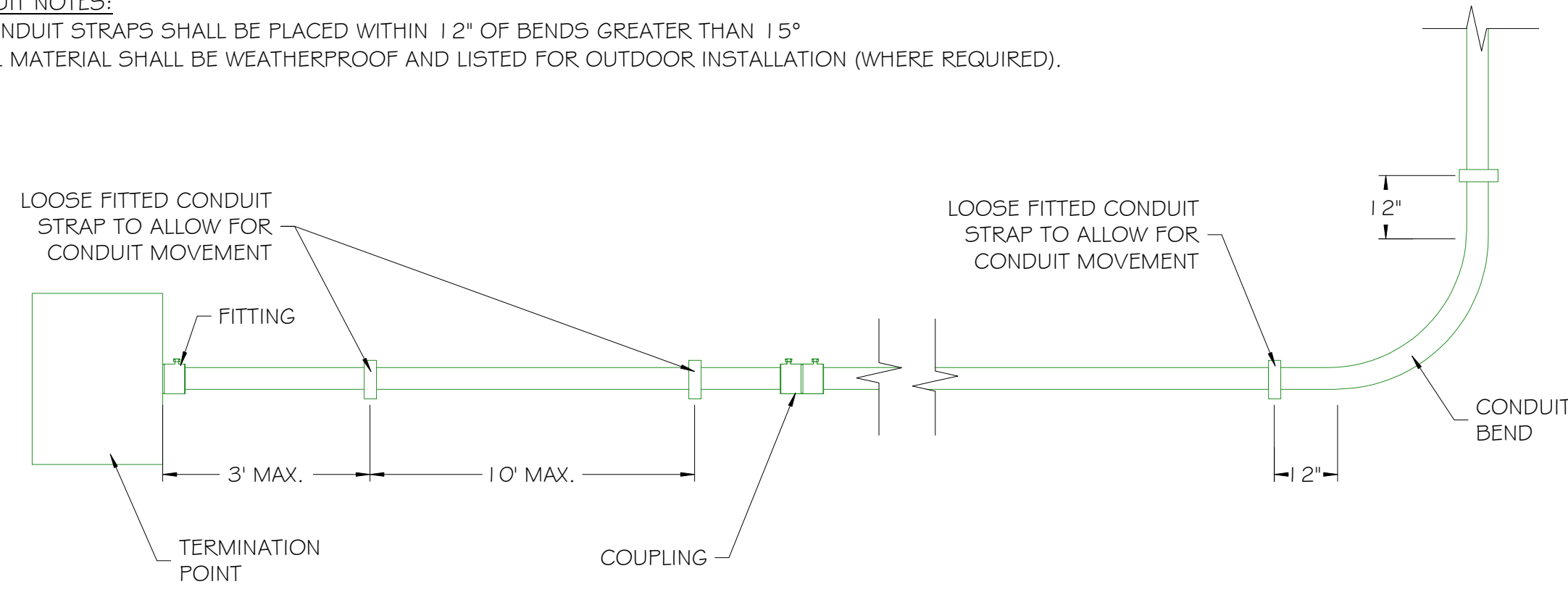
WALL MOUNT EQUIPMENT  
SCALE: 1" = 24"

Developer:  
Contractor:  
Project:  
SURGICAL  
Project Details:  
716.40 kWetc, 532.0 kW AC  
Engineering Approval:

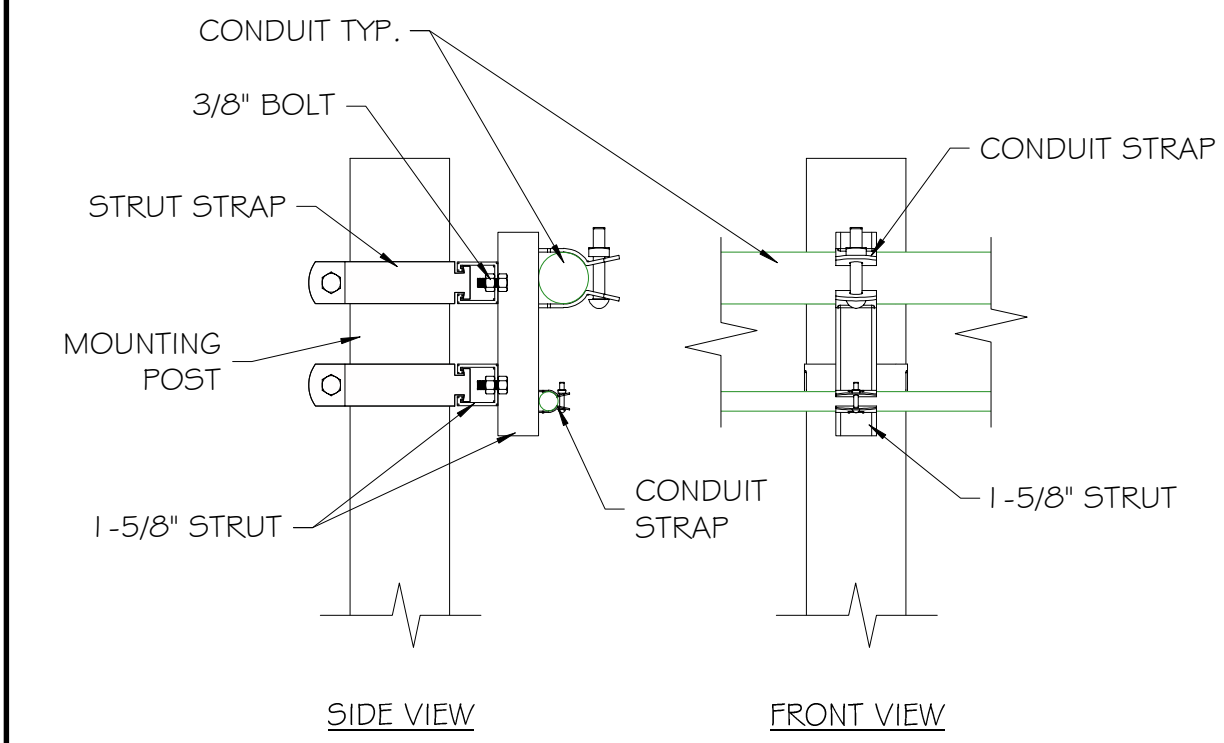
REVISIONS		
DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:  
**ELECTRICAL ELEVATIONS**  
Sheet Number:  
**E1.3**  
Sheet Size:  
**ARCH D - 36" x 24"**  
Design & Drafting by:  
RICHARD DOBBINS  
PV-102216-011268  
*"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."*  
- Douglas Adams  
Reviewed & Approved by:  
RD

**CONDUIT NOTES:**  
 1.) CONDUIT STRAPS SHALL BE PLACED WITHIN 12" OF BENDS GREATER THAN 15°  
 2.) ALL MATERIAL SHALL BE WEATHERPROOF AND LISTED FOR OUTDOOR INSTALLATION (WHERE REQUIRED).

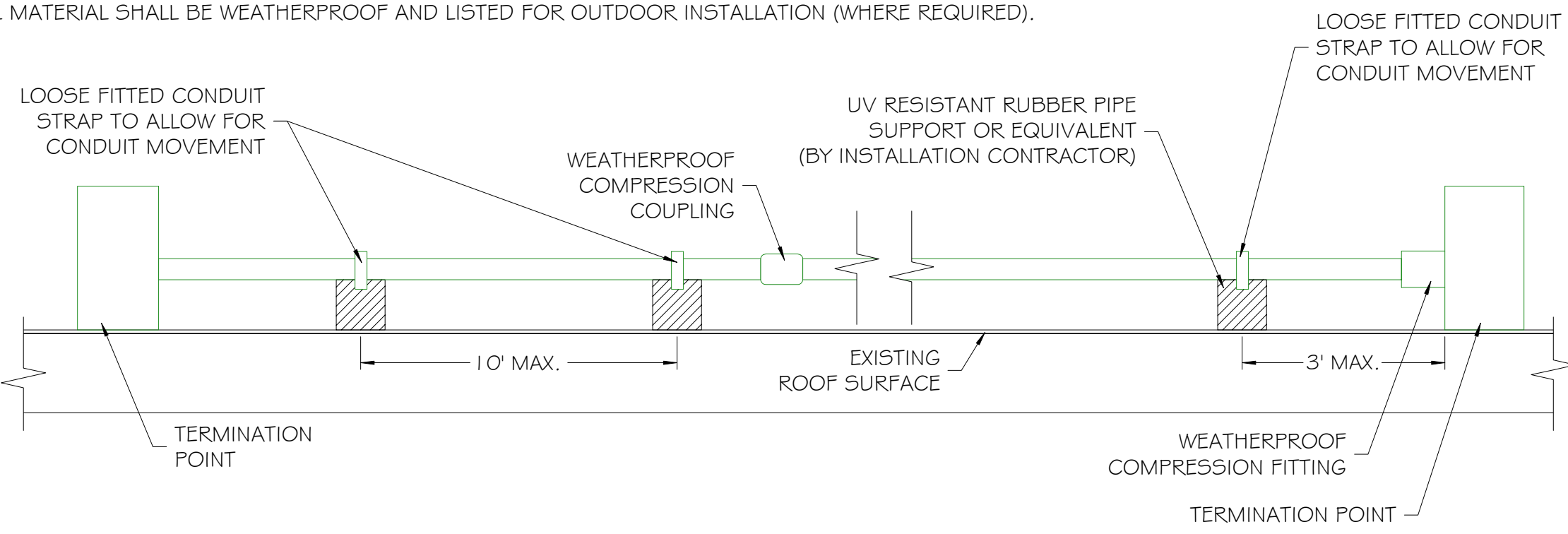


CONDUIT DETAIL  
SCALE: NTS

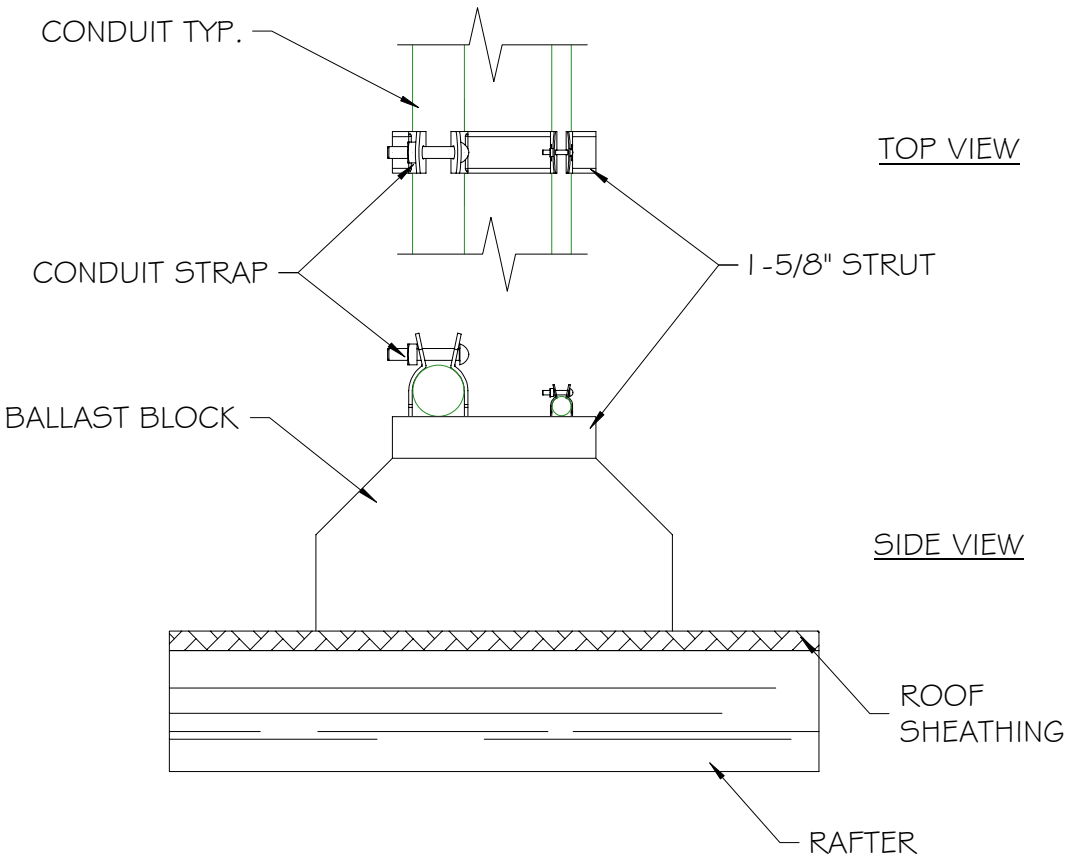


CONDUIT POLE MOUNT  
SCALE: NTS

**CONDUIT NOTES:**  
 1.) CONDUIT SHALL HAVE MIN. 1" CLEARANCE ABOVE ROOF SURFACE.  
 2.) CONDUIT MOUNTING HEIGHT SPECIFIED IN CALCULATIONS ON ELECTRICAL DIAGRAM.  
 3.) CONDUIT SUPPORTS SHALL BE PLACED WITHIN 12" OF BENDS GREATER THAN 15°  
 4.) ALL MATERIAL SHALL BE WEATHERPROOF AND LISTED FOR OUTDOOR INSTALLATION (WHERE REQUIRED).

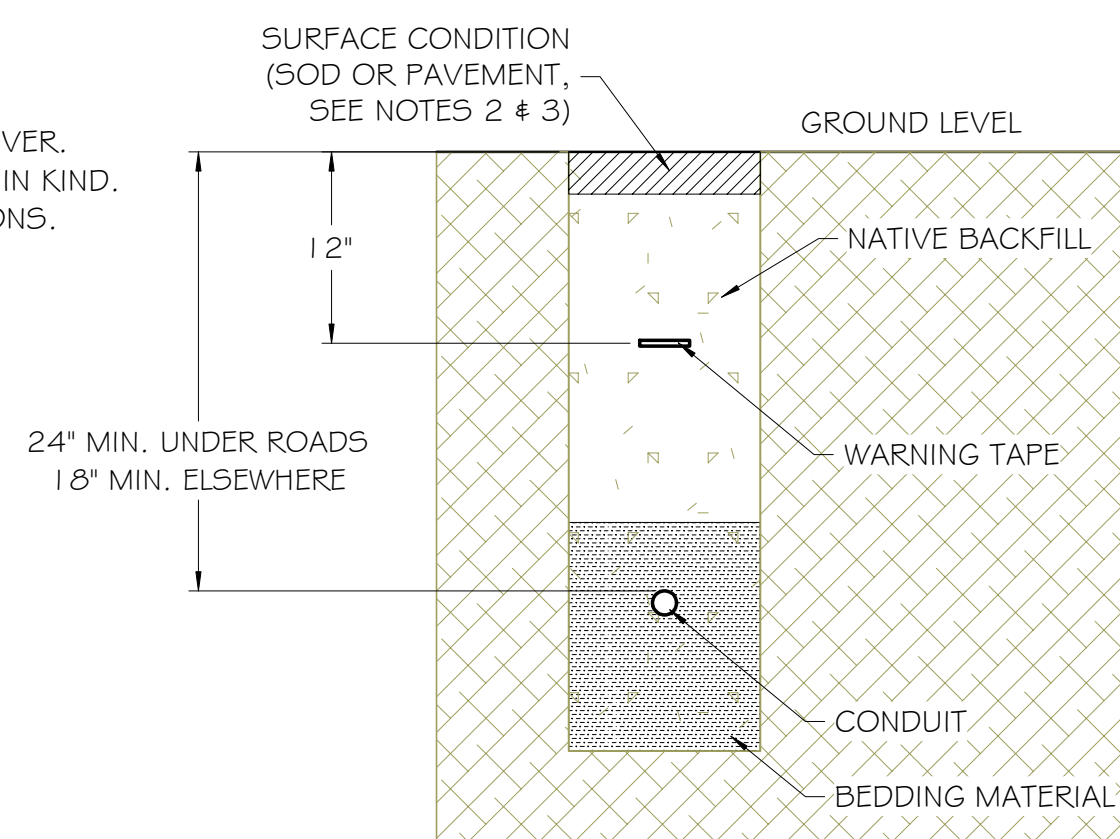


CONDUIT DETAIL  
SCALE: NTS



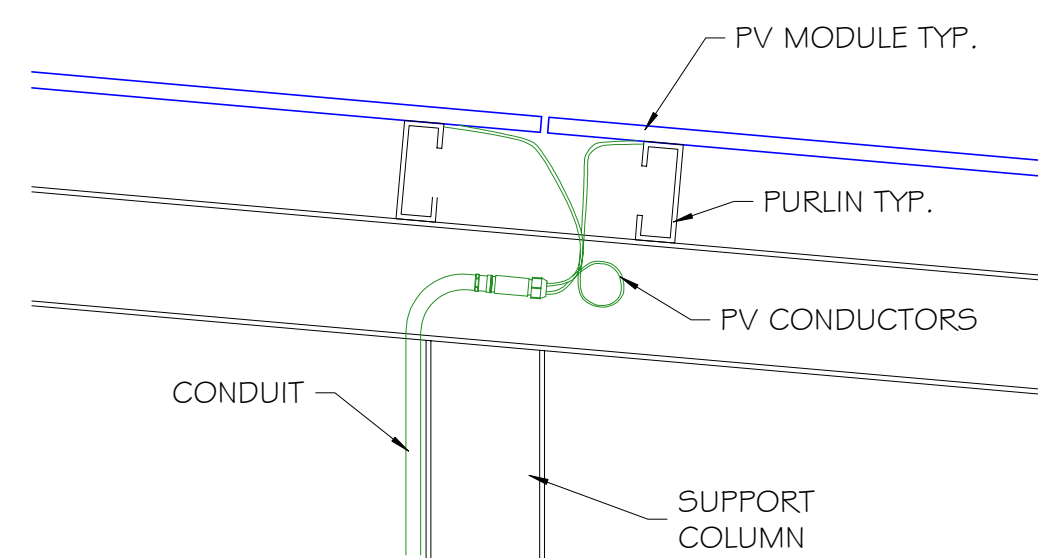
CONDUIT ROOF MOUNTING  
SCALE: NTS

**NOTES:**  
 1.) BACKFILL WITH NATIVE MATERIAL IN COMPLIANCE WITH NEC 300.5(F). NATIVE MATERIAL SHALL BE APPROVED BY THE OWNERS REP. PRIOR TO USE. IF NOT ACCEPTABLE, USE FINE GRANULAR MATERIAL FOR BEDDING AND SIDE/TOP COVER.  
 2.) ASPHALT TO BE SAWCUT PRIOR TO TRENCHING. PAVEMENT SHALL BE REPLACED IN KIND.  
 3.) UNPAVED SURFACES SHALL BE RESTORED IN KIND TO MATCH EXISTING CONDITIONS.  
 4.) DETECTABLE WARNING TAPE SHALL BE INSTALLED 12" BELOW GRADE.  
 5.) REFER TO ELECTRICAL DRAWINGS FOR SIZE AND TYPE OF CONDUIT.  
 6.) NOTIFY UTILITY COMPANY PRIOR TO DIGGING PER 'DIG SAFE' REQUIREMENTS.



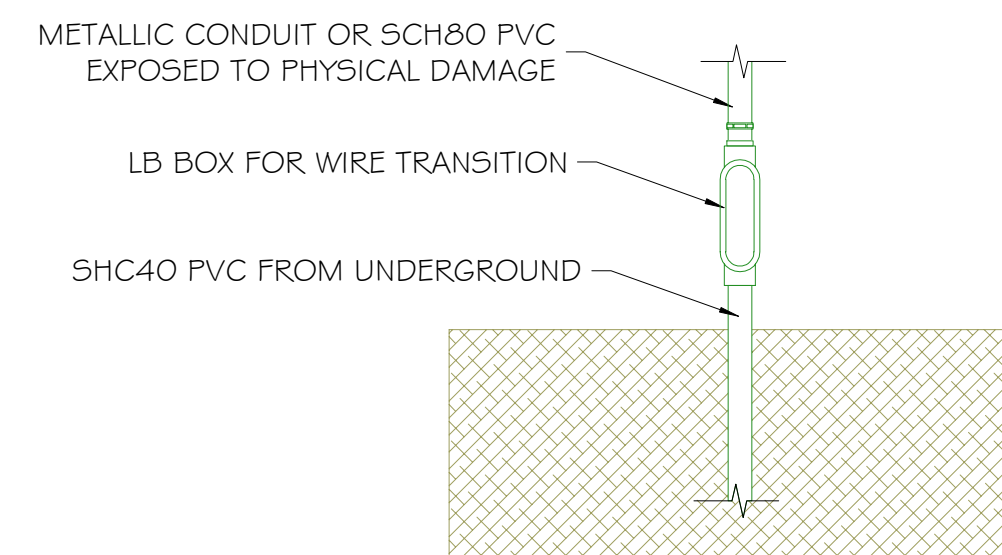
TRENCH CROSS-SECTION  
SCALE: NTS

**NOTE:**  
 1.) CONDUCTORS SHALL BE ROUTED TO ENSURE ISOLATION OF THE EGC/GEC FROM DISSIMILAR METALS.  
 2.) CONDUCTORS SHALL BE PROTECTED FROM AREAS WHERE THEY ARE LIKELY TO COME IN CONTACT WITH SHARP EDGES.  
 3.) CONDUIT SHALL BE ATTACHED TO STRUCTURE VIA PIPE CLAMPS & STRUT WHERE NECESSARY.

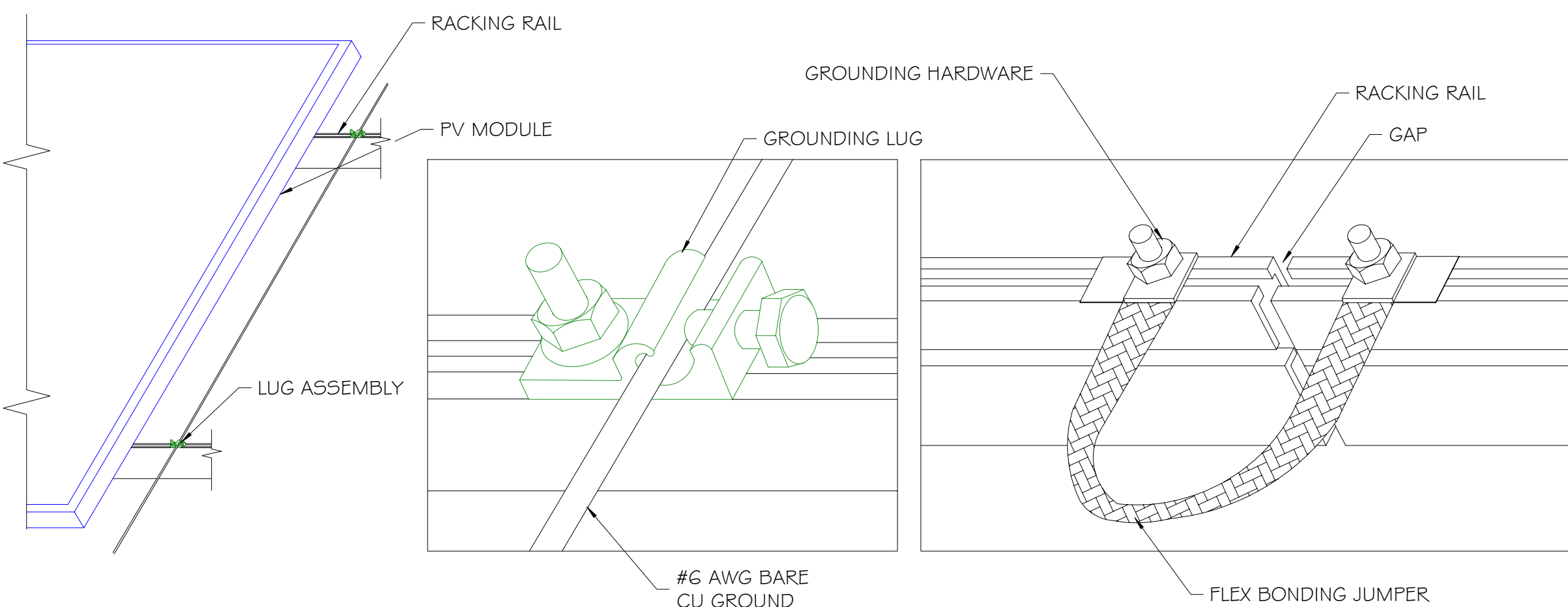


CONDUIT CABLE ENTRY  
SCALE: NTS

**NOTES:**  
 1.) CONDUIT SHALL BE INSTALLED WHERE 1000V CONDUCTORS ARE RAN IN AN ACCESSIBLE LOCATION.  
 2.) WHERE EXPOSED TO PHYSICAL DAMAGE, SCH40 PVC SHALL TRANSITION TO AN APPROVED METALLIC CONDUIT OR SCH80 PVC WITHIN A REASONABLE DISTANCE FROM WHERE THE CONDUIT EXITS THE EARTH.  
 3.) SCH80 PVC IS PERMITTED WHERE EXPOSED TO PHYSICAL DAMAGE.

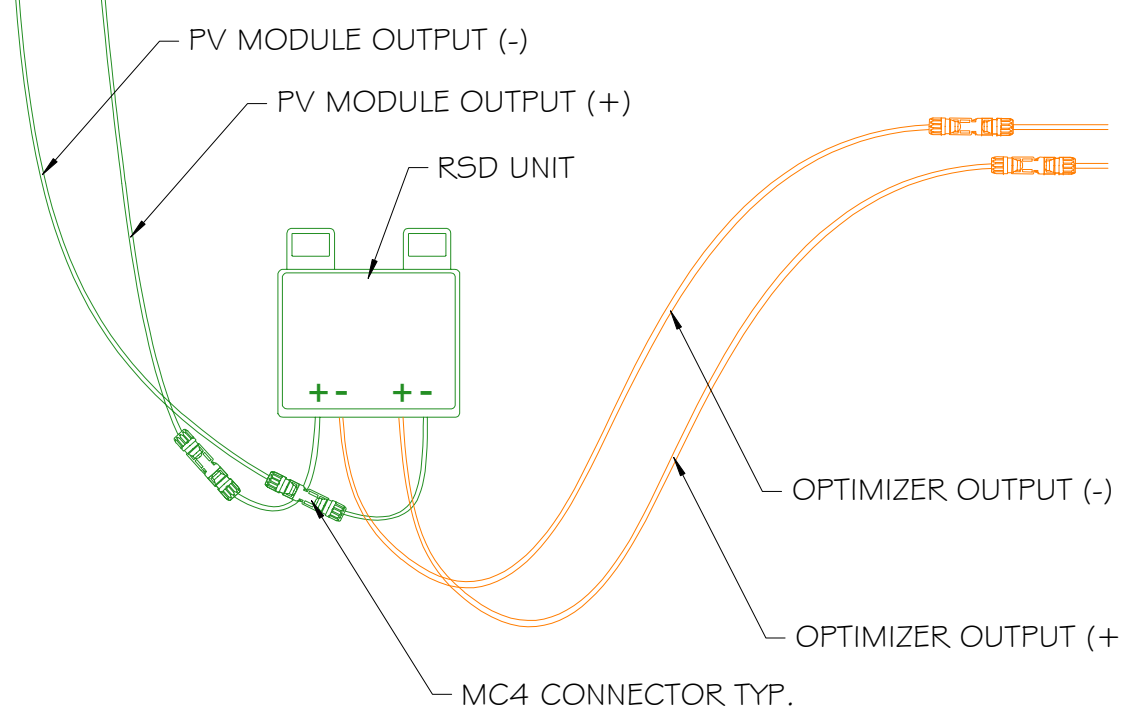


CONDUIT BODY TRANSITION  
SCALE: NTS



RACKING GROUNDING  
SCALE: NTS

**NOTE:**  
 1.) RSD UNIT SHALL PROVIDE MODULE-LEVEL RAPID SHUTDOWN FUNCTIONALITY PER NEC 690.12 WHEN INSTALLED PER MANUFACTURER INSTRUCTIONS.  
 2.) DEVICE SHALL BE CONTROLLED BY MANUFACTURER-APPROVED METHODS.



RSD DETAIL  
SCALE: NTS

Developer:

Contractor:

Project:

Project Details:  
716.40 kWetc, 532.0 kW AC

Engineering Approval:

**REVISIONS**

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
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PERMIT SET	12/23/2021	A

Sheet Title:

DETAILS

Sheet Number:

E1.4

Sheet Size:

ARCH D - 36" x 24"

Design & Drafting by:

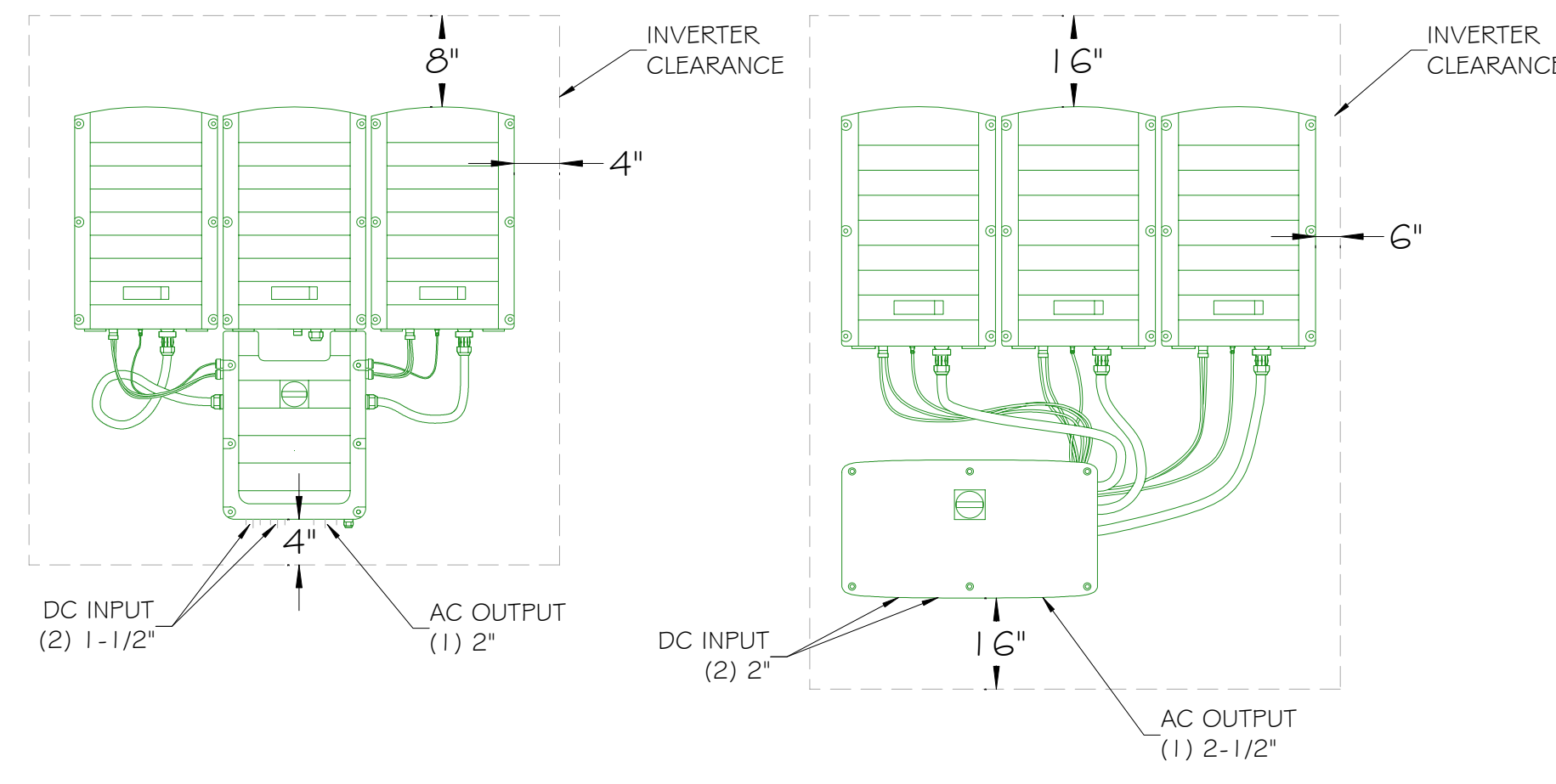
RICHARD DOBBINS  
# PV-103216-011268

"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."  
- Douglas Adams

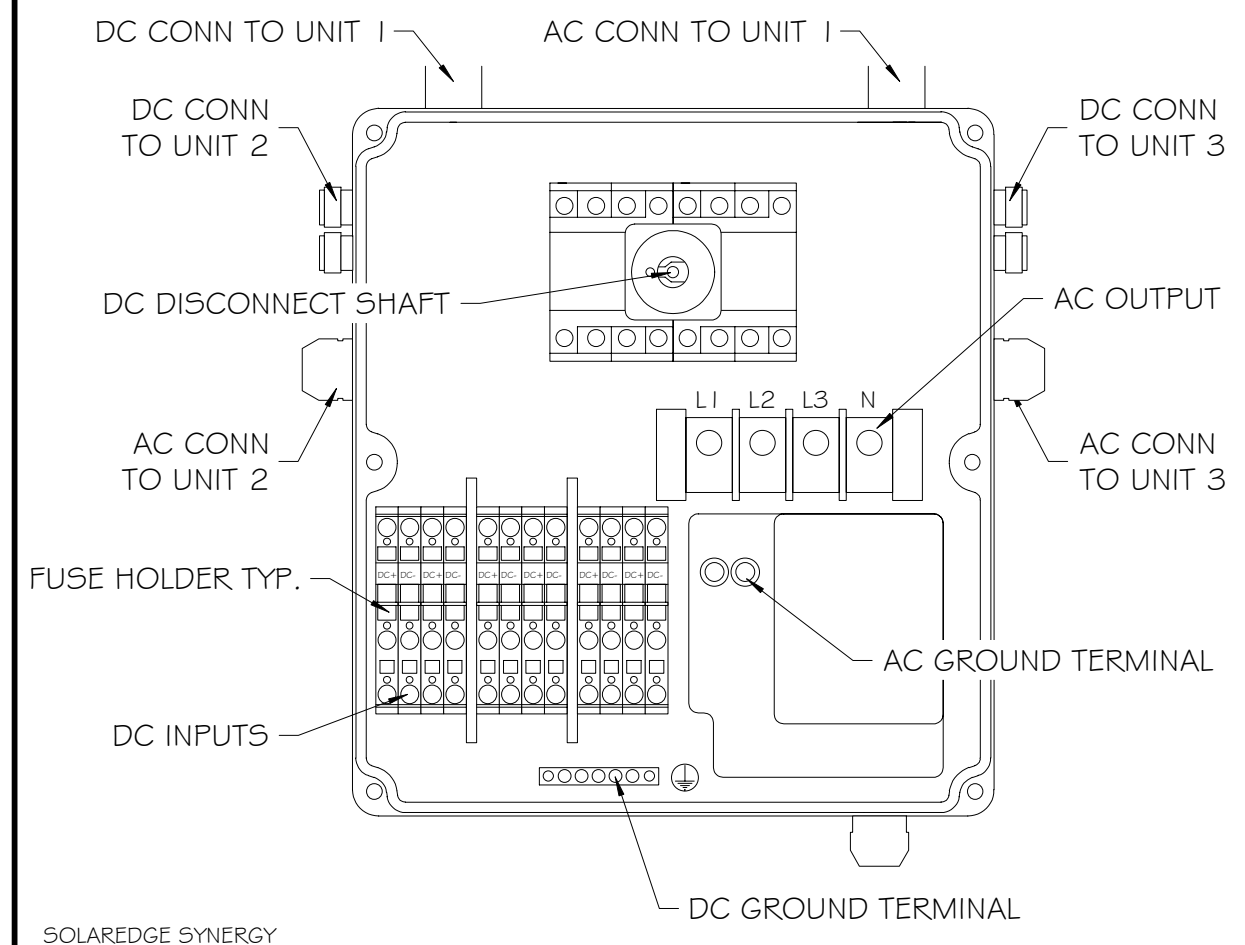
Reviewed & Approved by:

RD

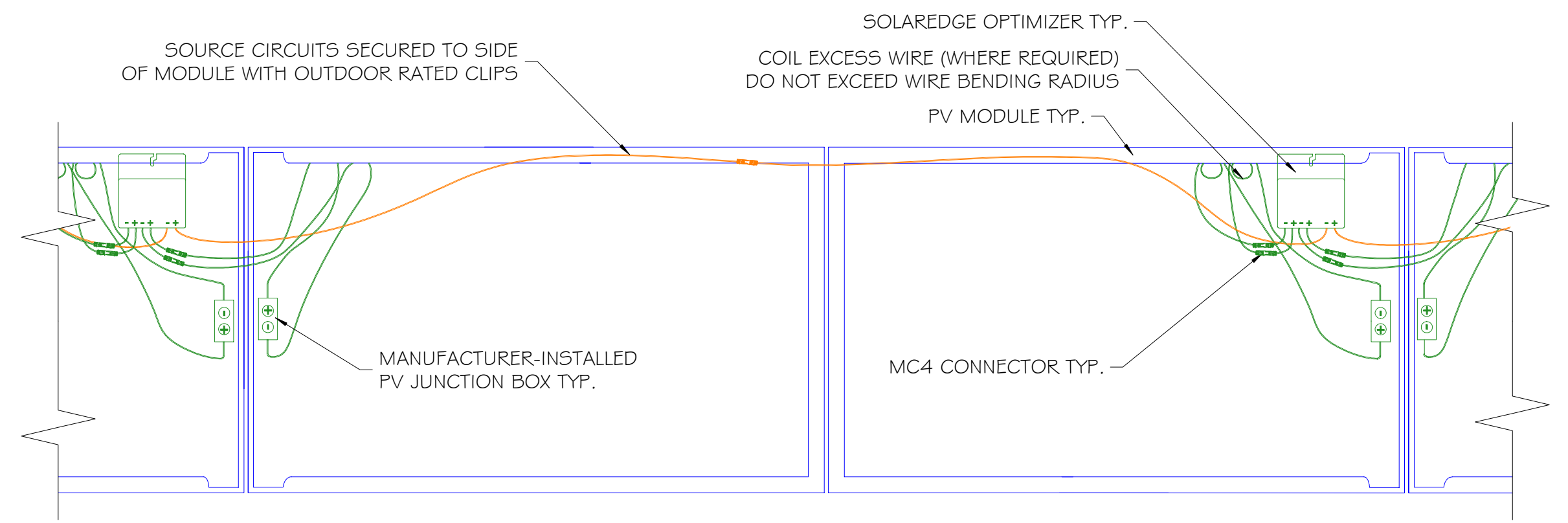
NOTE:  
WHEN INSTALLED OUTSIDE,  
MINIMUM SIDE CLEARANCE BETWEEN  
INVERTERS IS ALLOWED TO BE 2'



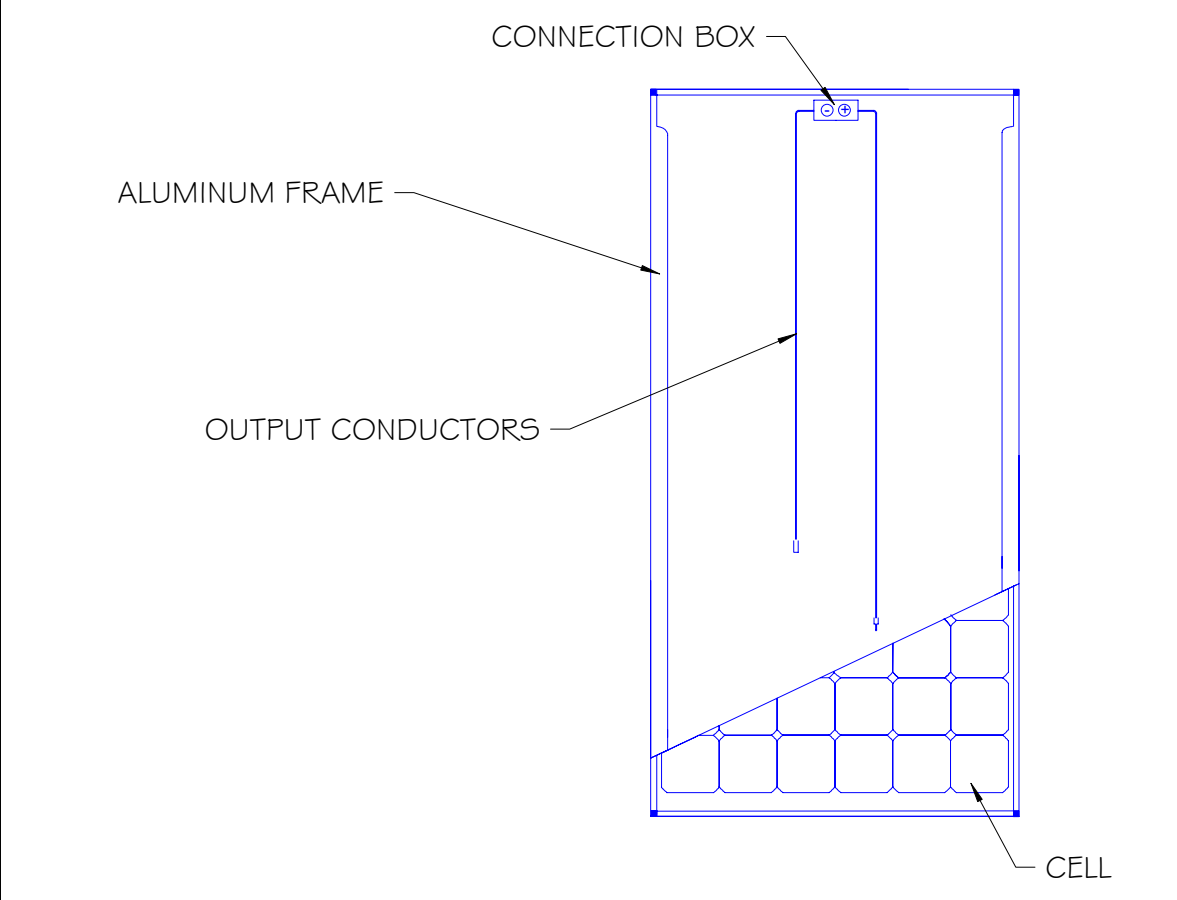
SOLAREEDGE INVERTER  
SCALE: NTS 1



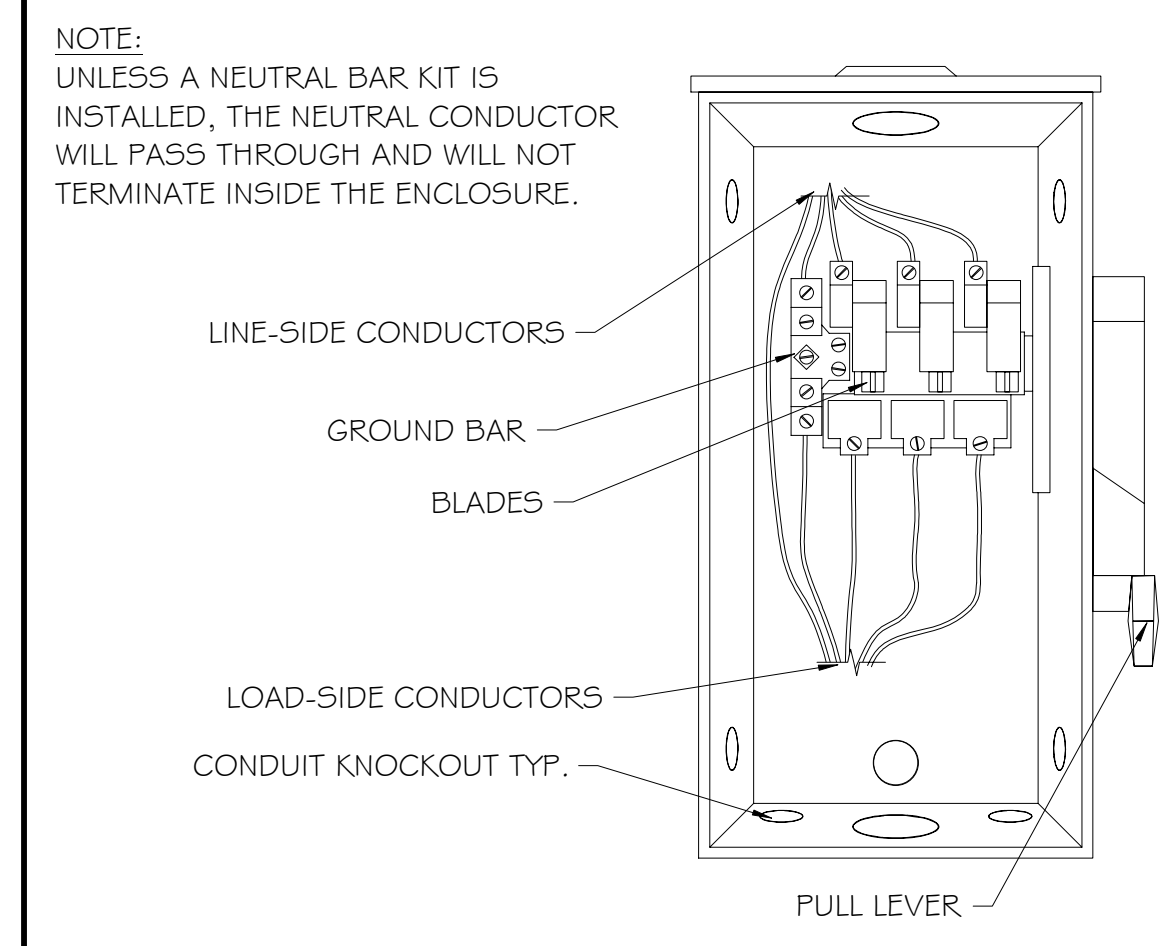
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DISCONNECT/COMBINER  
SCALE: NTS 2



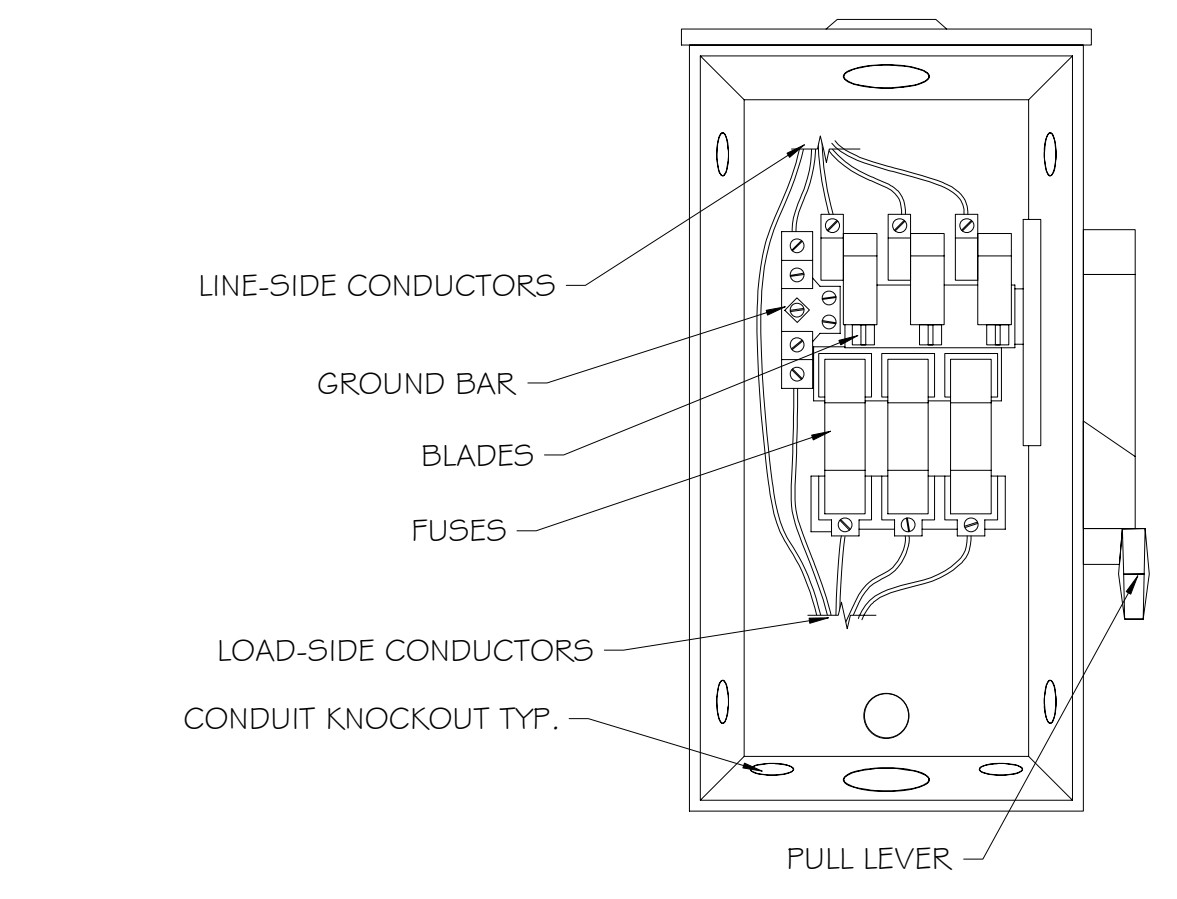
SOLAREEDGE DUAL OPTIMIZER  
SCALE: NTS 3D



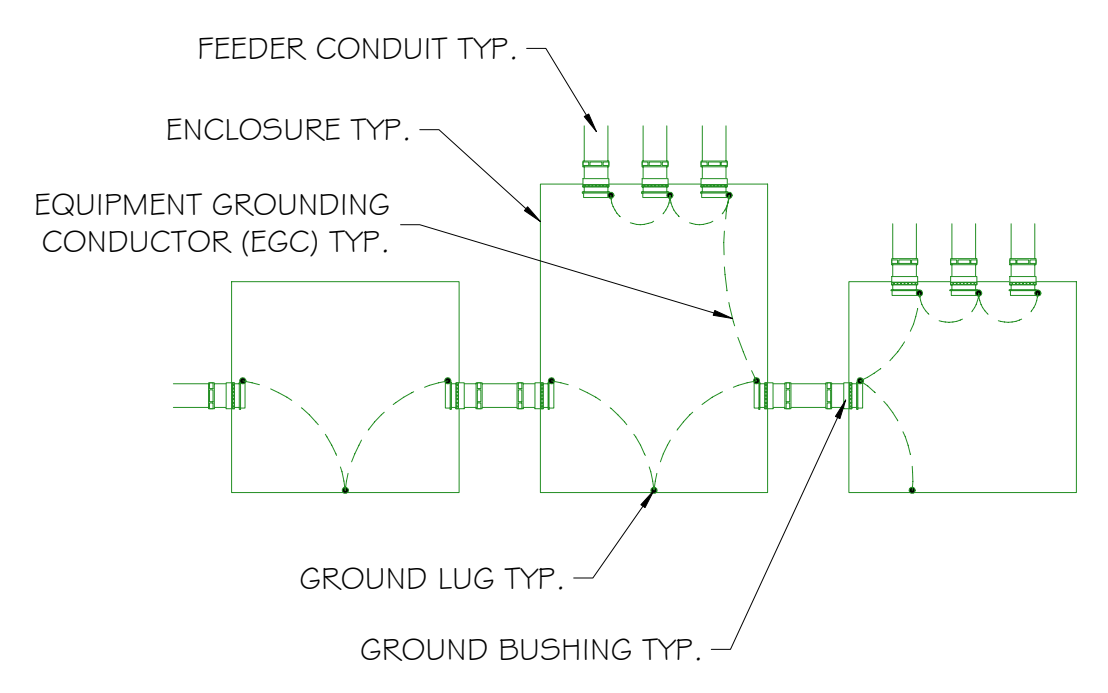
MODULE DETAIL  
SCALE: NTS 4



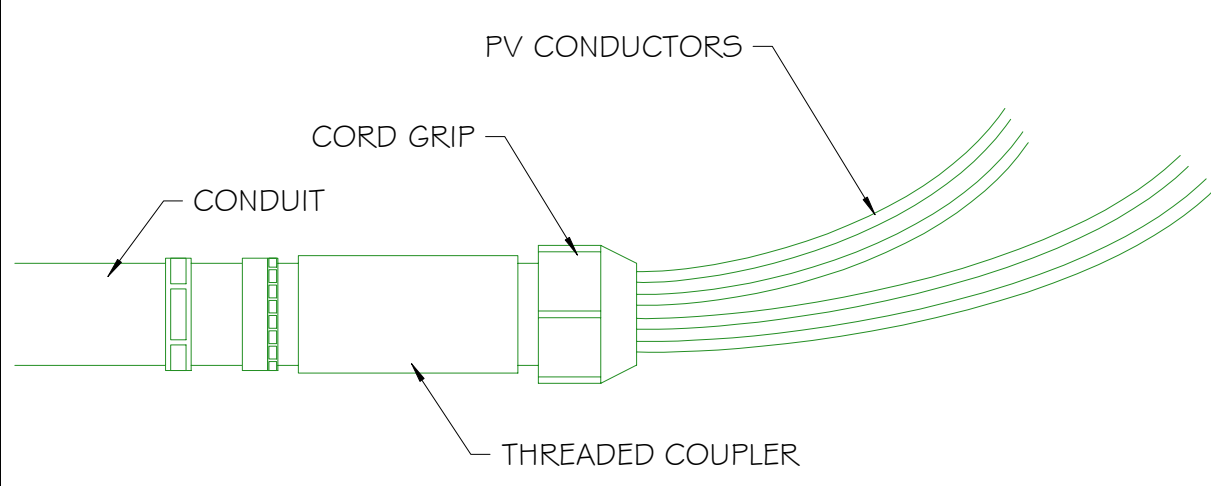
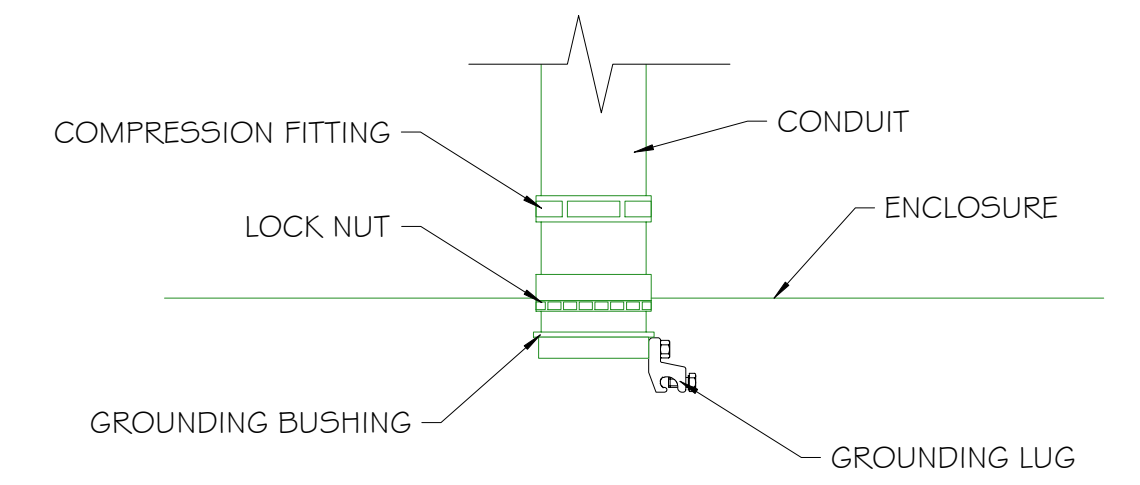
AC DISCONNECT  
SCALE: NTS 5B



EQUIPMENT GROUNDING  
SCALE: NTS 6



CONDUIT GROUNDING  
SCALE: NTS 7



CONDUIT CORD CONNECTOR  
SCALE: NTS 8

**SOLAR AC DISCONNECT**

REQD BY: NEC 690.13(B)  
APPLY TO:  
AC DISCONNECT SWITCHES 1

**SOLAR DC DISCONNECT**

REQD BY: NEC 690.13(B)  
APPLY TO:  
DC DISCONNECT SWITCHES 2

**WARNING**  
ELECTRIC SHOCK HAZARD  
TERMINALS ON THE LINE AND  
LOAD SIDES MAY BE ENERGIZED  
IN THE OPEN POSITION

REQD BY: NEC 690.13(B)  
APPLY TO:  
DISCONNECTS, FUSES, CIRCUIT BREAKERS 3

**WARNING: PHOTOVOLTAIC  
POWER SOURCE**

REQD BY: NEC 690.31 & CRC R33.1.2  
APPLY TO:  
JUNCTION BOXES, RACEWAYS, CABLE TRAYS,  
CONDUIT BODIES WITH AVAILABLE OPENINGS,  
EVERY 10', WITHIN 1' OF TURNS/PENETRATIONS 4

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

REQD BY: NEC 705.12(B)(3)  
APPLY TO:  
ANY/ALL ELECTRICAL PANELS  
CONNECTED TO MULTIPLE POWER SOURCES 5

**WARNING**  
POWER SOURCE  
OUTPUT CONNECTION  
DO NOT RELOCATE THIS  
OVERCURRENT DEVICE

REQD BY: NEC 705.12(B)(2)(3)(b)  
APPLY TO:  
PV BACKFED CIRCUIT BREAKER(S) 6

**WARNING**  
THIS EQUIPMENT FED BY MULTIPLE  
SOURCES. TOTAL RATING OF ALL  
OVERCURRENT DEVICES,  
EXCLUDING MAIN SUPPLY  
OVERCURRENT DEVICE, SHALL NOT  
EXCEED AMPACITY OF BUSBAR

REQD BY: NEC 705.12(B)(2)(3)(c)  
APPLY TO:  
AC COMBINER PANEL 7

**SIGNAGE REQUIREMENTS**  
1.) RED BACKGROUND W/ WHITE LETTERING, OR:  
2.) WHITE BACKGROUND W/ BLACK LETTERING  
3.) MIN. 3/8" LETTER HEIGHT  
4.) ALL CAPITAL LETTERS  
5.) ARIAL OR SIMILAR FONT  
6.) WEATHER RESISTANT  
MATERIAL, PER UL 969

**CAUTION**  
DO NOT INSTALL ADDITIONAL  
LOADS IN THIS PANEL

REQD BY: NEC 705.12(B)(2)(3)(c)  
APPLY TO:  
AC COMBINER PANEL 8

**WARNING**  
ARC FLASH HAZARD  
APPROPRIATE PPE REQUIRED.  
FAILURE TO COMPLY CAN  
RESULT IN INJURY OR DEATH.  
REFER TO NFPA 70E.

REQD BY: NEC 110.16, NFPA 70E  
APPLY TO:  
AC COMBINER PANEL 9

**PHOTOVOLTAIC SYSTEM  
DISCONNECT**  
AC CURRENT: 799 A  
VOLTAGE: 480 VAC

REQD BY: NEC 690.54  
APPLY TO:  
POINT OF INTERCONNECTION 10

**GRID-TIED PHOTOVOLTAIC  
POWER SOURCE**  
MAX SYSTEM VOLTAGE: 1000 V  
MAX SYSTEM CURRENT: 54 A  
MAX RATED OUTPUT CURRENT OF  
THE DC/DC CONVERTER: 18 A  
MAX INVERTER OUTPUT:  
100 kW, 120 A, 480 VAC

REQD BY: NEC 690.53  
APPLY TO:  
INVERTER #1 - #3 11

**GRID-TIED PHOTOVOLTAIC  
POWER SOURCE**  
MAX SYSTEM VOLTAGE: 1000 V  
MAX SYSTEM CURRENT: 54 A  
MAX RATED OUTPUT CURRENT OF  
THE DC/DC CONVERTER: 18 A  
MAX INVERTER OUTPUT:  
116 kW, 139.5 A, 480 VAC

REQD BY: NEC 690.53  
APPLY TO:  
INVERTER #4 - #5 12

**SOLAR PV SYSTEM  
EQUIPPED WITH  
RAPID SHUTDOWN**

**TURN RAPID SHUTDOWN SWITCH TO  
THE "OFF" POSITION TO SHUT DOWN  
PV SYSTEM AND REDUCE  
SHOCK HAZARD IN THE ARRAY**

REQD BY: NEC 690.12 & 690.56(C)  
APPLY TO:  
RAPID SHUTDOWN INITIATION SWITCH 13

**CAUTION**  
POWER FROM THIS BUILDING IS ALSO SUPPLIED  
FROM THE FOLLOWING POWER SOURCES WITH  
DISCONNECTS LOCATED AS SHOWN

**SERVICE BY QUALIFIED PERSONNEL ONLY**

REQD BY: NEC 690.56  
APPLY TO:  
UTILITY METER 14

Developer:  
Contractor:  
Project:  
SURGICAL  
Project Details:  
716.40 kWetc, 532.0 kW AC  
Engineering Approval:

**REVISIONS**

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:  
**DETAILS &  
SAFETY PLACARDS**

Sheet Number:  
**E1.5**

Sheet Size:  
**ARCH D - 36" x 24"**

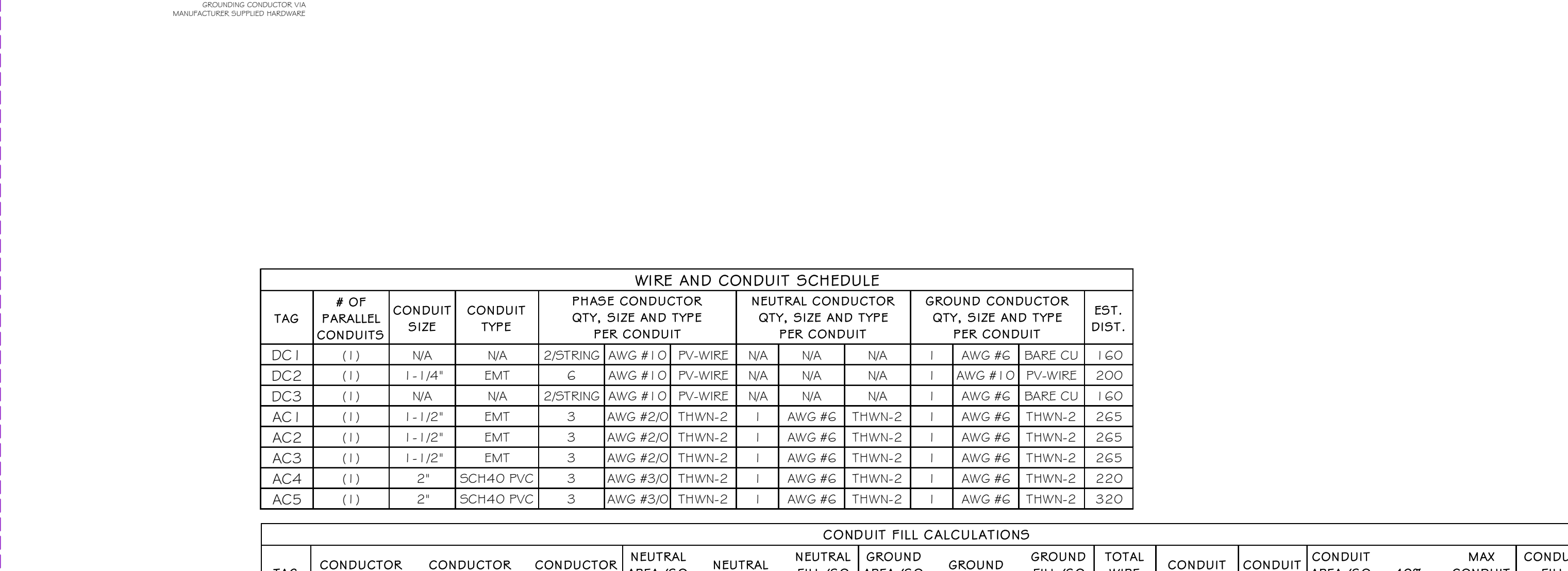
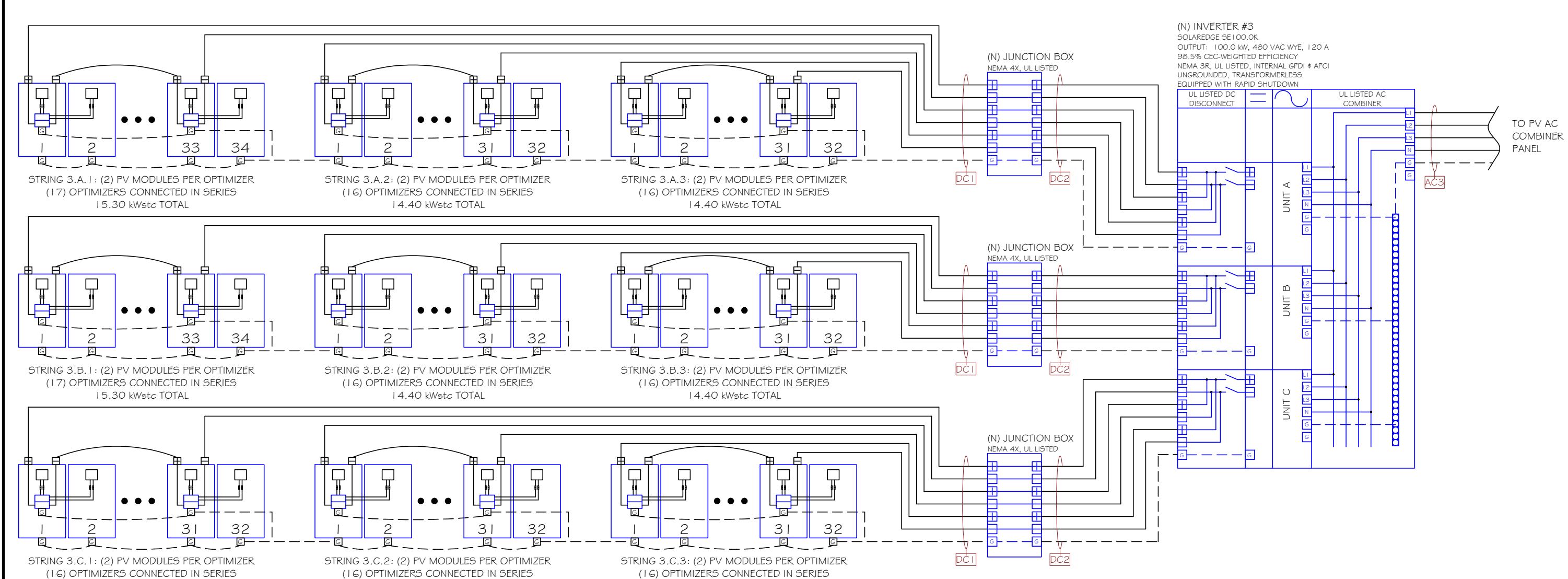
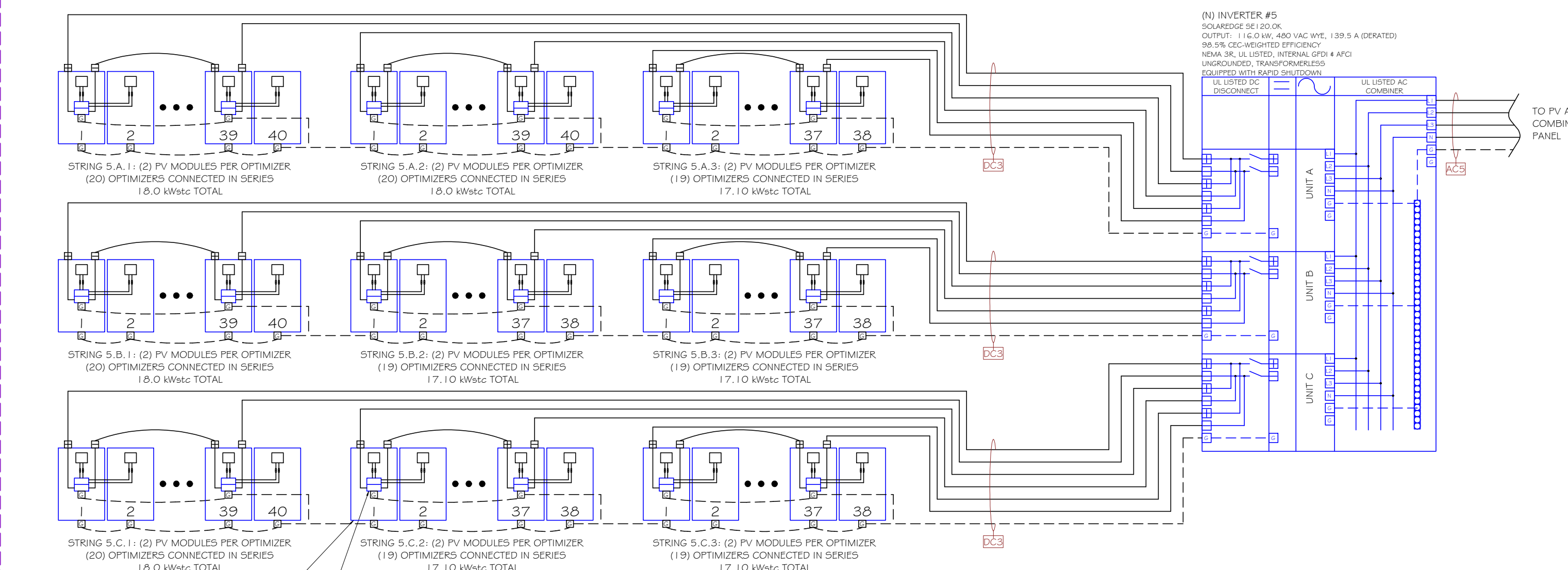
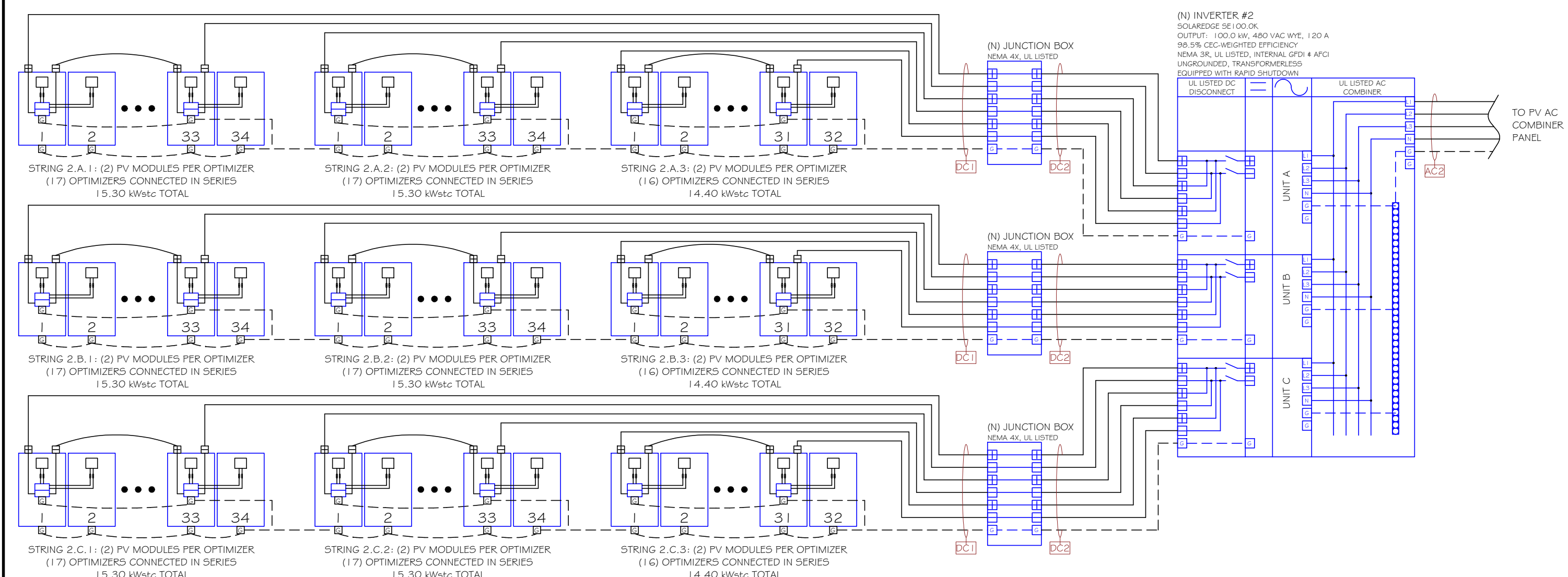
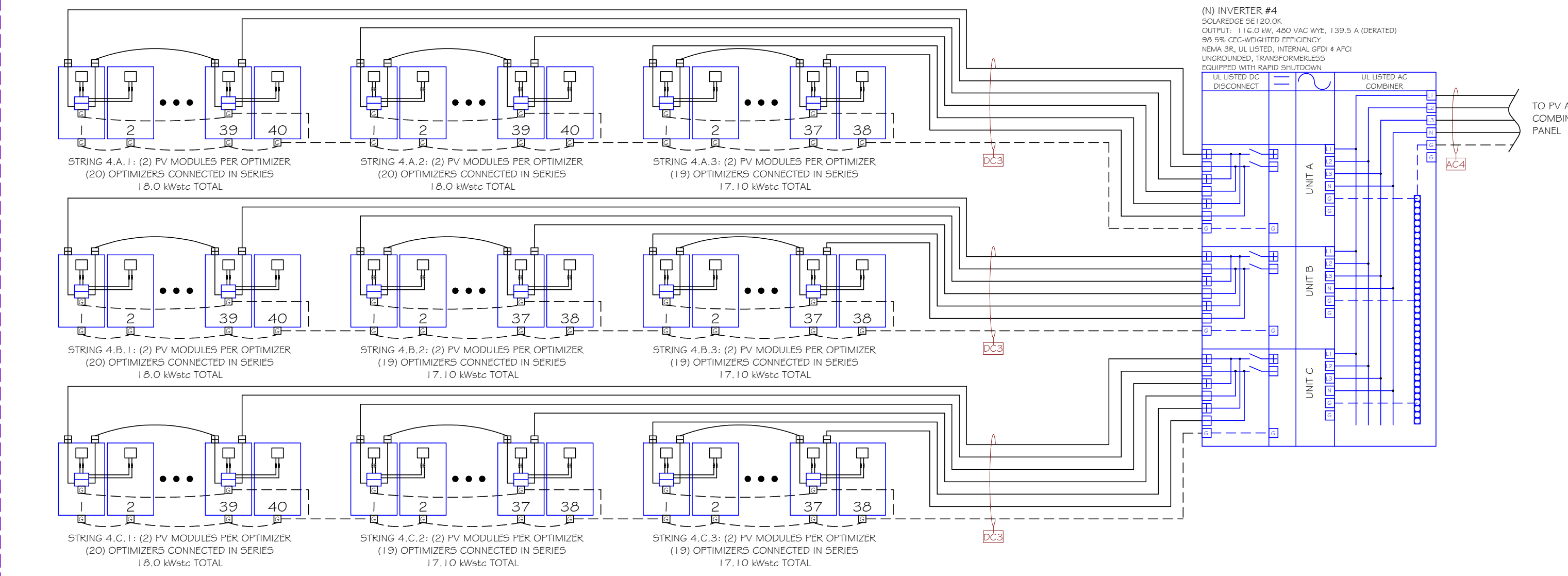
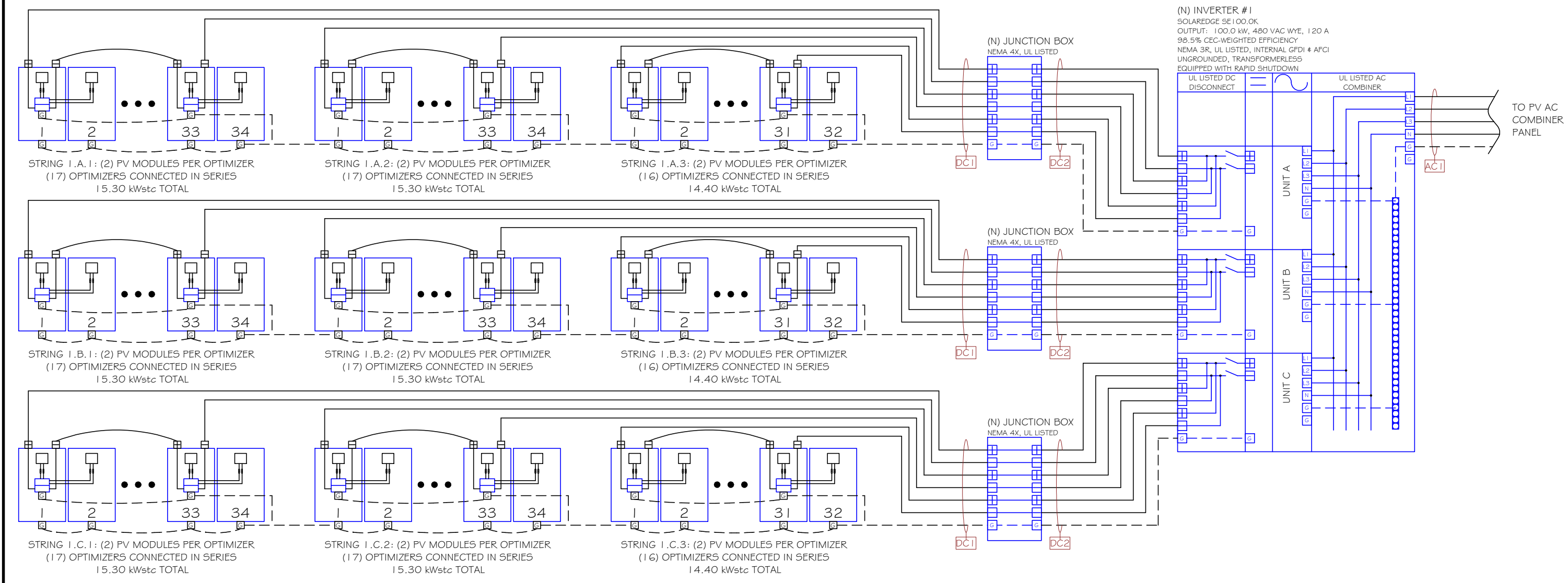
Design & Drafting by:  
RICHARD DOBBINS  
PV-102216-011268

"In the beginning the Universe was created.  
This has made a lot of people very angry,  
and been widely regarded as a bad move."  
- Douglas Adams

Reviewed & Approved by:  
RD

480V --- = EQUIP. GROUNDING CONDUCTOR --- = CIRCUIT CONDUCTOR --- = FUSE --- = CIRCUIT BREAKER (N) = NEW EQUIP. (E) = EXISTING EQUIP. L1 = LINE 1 (BROWN) L2 = LINE 2 (ORANGE) L3 = LINE 3 (YELLOW) N = NEUTRAL (WHITE) G = GROUND (GREEN) + = POSITIVE (RED) - = NEGATIVE (BLACK)

Developer:



Contractor:

Project: SURGICAL

Project Details: 716.40 kWac, 532.0 kW AC

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
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60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	12/23/2021	A

Sheet Title:

ELECTRICAL DIAGRAM

Sheet Number: E2.0

Sheet Size: ARCH D - 36" x 24"

Design & Drafting by: RICHARD DOBBINS  
PV-102216-011265  
*In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move.*  
- Douglas Adams

Reviewed & Approved by: RD

WIRE AND CONDUIT SCHEDULE									
TAG	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	EST. DIST.		
DC1	(1)	N/A	N/A	2/STRING AWG #10 PV-WIRE	N/A	N/A	160	1	AWG #6 BARE CU
DC2	(1)	1-1/4"	EMT	6 AWG #10 PV-WIRE	N/A	N/A	200	1	AWG #10 PV-WIRE
DC3	(1)	N/A	N/A	2/STRING AWG #10 PV-WIRE	N/A	N/A	160	1	AWG #6 BARE CU
AC1	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265	1	AWG #6 THWN-2
AC2	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265	1	AWG #6 THWN-2
AC3	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265	1	AWG #6 THWN-2
AC4	(1)	2"	SCH40 PVC	3 AWG #3/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	220	1	AWG #6 THWN-2
AC5	(1)	2"	SCH40 PVC	3 AWG #3/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	320	1	AWG #6 THWN-2

CONDUIT FILL CALCULATIONS											
TAG	CONDUCTOR AREA (SQ IN) x QTY	CONDUCTOR FILL (SQ IN)	NEUTRAL AREA (SQ IN) x QTY	NEUTRAL FILL (SQ IN)	GROUND AREA (SQ IN) x QTY	GROUND FILL (SQ IN)	TOTAL WIRE FILL	CONDUIT TYPE	CONDUIT SIZE	CONDUIT AREA (SQ IN) x 40% = MAX CONDUIT FILL	CONDUIT FILL PERCENT
DC1	0.0531 x N/A = N/A	N/A	N/A x 0 = 0.0000	0.0206 x 1 = 0.0206	N/A	N/A	N/A	N/A	N/A	N/A x .4 = N/A	N/A
DC2	0.0531 x 6 = 0.3186	0.3186	N/A x 0 = 0.0000	0.0531 x 1 = 0.0531	0.0206 x 1 = 0.0206	0.3717	0.3717	EMT	1-1/4"	1.496 x .4 = 0.5984	24.8%
DC3	0.0531 x N/A = N/A	N/A	N/A x 0 = 0.0000	0.0206 x 1 = 0.0206	N/A	N/A	N/A	N/A	N/A	N/A x .4 = N/A	N/A
AC1	0.2223 x 3 = 0.6669	0.6669	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.7683	0.7683	EMT	1-1/2"	2.036 x .4 = 0.8144	37.7%
AC2	0.2223 x 3 = 0.6669	0.6669	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.7683	0.7683	EMT	1-1/2"	2.036 x .4 = 0.8144	37.7%
AC3	0.2223 x 3 = 0.6669	0.6669	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.7683	0.7683	EMT	1-1/2"	2.036 x .4 = 0.8144	37.7%
AC4	0.2679 x 3 = 0.8037	0.8037	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.9051	0.9051	SCH40 PVC	2"	3.291 x .4 = 1.3164	27.5%
AC5	0.2679 x 3 = 0.8037	0.8037	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.0507 x 1 = 0.0507	0.9051	0.9051	SCH40 PVC	2"	3.291 x .4 = 1.3164	27.5%

480V --- = EQUIP. GROUNDING CONDUCTOR --- = CIRCUIT CONDUCTOR --- = FUSE --- = CIRCUIT BREAKER (N) = NEW EQUIP. (E) = EXISTING EQUIP. L1 = LINE 1 (BROWN) L2 = LINE 2 (ORANGE) L3 = LINE 3 (YELLOW) N = NEUTRAL (WHITE) G = GROUND (GREEN) + = POSITIVE (RED) - = NEGATIVE (BLACK)

### Array Configuration

System: 716.4 kWstc, 532 kW AC  
Total PV Module Qty: 1592

Inverter I.D.#	Inv #1A/B/C	Inv #2A/B/C	Inv #3A/B/C	Inv #4A/B/C	Inv #5A/B/C
Inverter AC Power (kW):	100.0	100.0	100.0	116.0	116.0
PV Power (kWstc):	45.00	45.00	45.00	44.10	43.20
Inverter DC/AC Ratio:	1.35	1.35	1.35	1.32	1.30
Module Total Qty:	100	100	100	98	96
String Qty:	1	1	1	1	1
String Length:	34	34	34	34	32
Max Open Circuit Voltage:	1000	1000	1000	1000	1000
Operating Voltage:	850	850	850	850	850
Max Short Circuit Current:	18.0	18.0	18.0	18.0	18.0
Operating Current:	18.0	18.0	18.0	16.9	16.9

### PV System Maximum Voltage Calculation per NEC 690.7(A)

Local Record Low Temp: -1 °C Data Source: ONTARIO

Voc Temp Coefficient x Record Low Temp + 1 = Correction Factor = 1.078

1.078 x 49.1 x 1 = 52.9 volts DC

### CEC Rating Calculation

Module PTC Rating (W) x No. of Modules x Average Inverter CEC Efficiency = CEC System Size

419.5 W x 1592 x 98.5% = 657.83 kW AC

### 120% Rule Calculation per NEC 705.12(B)(2)(3)(b)

Main Busbar Rating: 2000 Amps  
Main Service Breaker Rating: 2000 Amps  
PV Backfeeding Current: 400 Amps

BUSBAR x 120% - MAIN BREAKER = MAX ALLOWABLE PV CURRENT

2400 - 2000 = 400

### AC System Summary

NOMINAL SYSTEM VOLTAGE: 480 Volts AC  
MAX CURRENT PER 690.8(A): 639 Amps  
MAX CURRENT PER 690.8(B): 799 Amps

### Inverter Type A Specifications

Model Number: SolarEdge SE100KUS [S11-JUN20]  
Nominal Power (kW AC): 100.00  
Nominal AC Voltage (V): 480 (3/N/PE)  
Max Output Current (A): 120.0  
CEC Weighted Efficiency: 98.5%  
Maximum DC Voltage (V): 1000  
Operating DC Voltage (V): 850

### Inverter Type B Specifications

Model Number: SolarEdge SE120KUS [S11-JUN20]  
Nominal Power (kW AC): 116.00  
Nominal AC Voltage (V): 480 (3/N/PE)  
Max Output Current (A): 139.5 (DERATED)  
CEC Weighted Efficiency: 98.5%  
Maximum DC Voltage (V): 1000  
Operating DC Voltage (V): 850

### Power Optimizer Specifications

Model Number: SolarEdge P960  
Max Input Power (W): 960  
Max Input Voc (VDC): 60  
Max Input Isc (A): 23.2  
Output Current (A): 18  
Output Voltage (VDC): 80  
Min String Length: 27 Modules  
Max String Length: 60 Modules  
Max String Power (W): 20300  
Optimizer Quantity: 804

### PV Module Specifications

Model Number: PHONO P540M4H-24/TH  
Weight (lbs): 54.0  
Dimensions (in): 82.8 x 40.9 x 1.4  
Power @ STC (W): 450  
Voc (VDC): 49.1  
Vmp (VDC): 41.4  
Voc Temp Coeff (%/°C): -0.30  
Isc (A): 11.33  
Imp (A): 10.87  
Max Voltage (VDC): 1,000  
Module Quantity: 1,592

### WIRE AND CONDUIT SCHEDULE

TAG	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	PHASE CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	NEUTRAL CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	GROUND CONDUCTOR QTY, SIZE AND TYPE PER CONDUIT	EST. DIST.
DC1	(1)	N/A	N/A	2/STRING AWG #10 PV-WIRE	N/A	N/A	1.0
DC2	(1)	1-1/4"	EMT	6 AWG #10 PV-WIRE	N/A	N/A	200
DC3	(1)	N/A	N/A	2/STRING AWG #10 PV-WIRE	N/A	N/A	1.0
AC1	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265
AC2	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265
AC3	(1)	1-1/2"	EMT	3 AWG #2/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	265
AC4	(1)	2"	SCH40 PVC	3 AWG #3/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	220
AC5	(1)	2"	SCH40 PVC	3 AWG #3/0 THWN-2	1 AWG #6 THWN-2	1 AWG #6 THWN-2	320
AC6	(4)	2"	EMT	3 AWG #3/0 THWN-2	1 AWG #1/0 THWN-2	1 AWG #1/0 THWN-2	80
AC7	(4)	2"	EMT	3 AWG #3/0 THWN-2	1 AWG #3/0 THWN-2	1 AWG #1/0 THWN-2	50
AC8	(4)	2-1/2"	EMT	3 AWG #4/0 THWN-2	1 AWG #4/0 THWN-2	1 AWG #1/0 THWN-2	15
AC9	(4)	2-1/2"	EMT	3 AWG #4/0 THWN-2	1 AWG #4/0 THWN-2	1 AWG #1/0 THWN-2	95
AC10	(4)	2-1/2"	EMT	3 AWG #4/0 THWN-2	1 AWG #4/0 THWN-2	1 AWG #1/0 THWN-2	35

### CONDUIT FILL CALCULATIONS

TAG	CONDUCTOR AREA (SQ IN)	CONDUCTOR QTY	CONDUCTOR FILL (SQ IN)	NEUTRAL AREA (SQ IN)	NEUTRAL QTY	NEUTRAL FILL (SQ IN)	GROUND AREA (SQ IN)	GROUND QTY	GROUND FILL (SQ IN)	TOTAL WIRE FILL	CONDUIT TYPE	CONDUIT SIZE	CONDUIT AREA (SQ IN)	MAX CONDUIT FILL	CONDUIT FILL PERCENT	
DC1	0.0531	x	N/A	N/A	x	0.0000	0.0206	x	0.0206	N/A	N/A	N/A	N/A	x	N/A	
DC2	0.0531	x	6	0.3186	N/A	0.0000	0.0531	x	0.0531	0.3717	EMT	1-1/4"	1.496	x	0.5984	24.8%
DC3	0.0531	x	N/A	N/A	x	0.0000	0.0206	x	0.0206	N/A	N/A	N/A	N/A	x	N/A	
AC1	0.2223	x	3	0.6669	0.0507	x	0.0507	x	0.0507	0.7683	EMT	1-1/2"	2.036	x	0.8144	37.7%
AC2	0.2223	x	3	0.6669	0.0507	x	0.0507	x	0.0507	0.7683	EMT	1-1/2"	2.036	x	0.8144	37.7%
AC3	0.2223	x	3	0.6669	0.0507	x	0.0507	x	0.0507	0.7683	EMT	1-1/2"	2.036	x	0.8144	37.7%
AC4	0.2679	x	3	0.8037	0.0507	x	0.0507	x	0.0507	0.9051	SCH40 PVC	2"	3.291	x	1.3164	27.5%
AC5	0.2679	x	3	0.8037	0.0507	x	0.0507	x	0.0507	0.9051	SCH40 PVC	2"	3.291	x	1.3164	27.5%
AC6	0.2679	x	3	0.8037	0.1855	x	0.1855	x	0.1855	1.1747	EMT	2"	3.356	x	1.3424	35.0%
AC7	0.2679	x	3	0.8037	0.2679	x	0.1855	x	0.1855	1.2571	EMT	2"	3.356	x	1.3424	37.5%
AC8	0.3237	x	3	0.9711	0.3237	x	0.1855	x	0.1855	1.4803	EMT	2-1/2"	5.858	x	2.3432	25.3%
AC9	0.3237	x	3	0.9711	0.3237	x	0.1855	x	0.1855	1.4803	EMT	2-1/2"	5.858	x	2.3432	25.3%
AC10	0.3237	x	3	0.9711	0.3237	x	0.1855	x	0.1855	1.4803	EMT	2-1/2"	5.858	x	2.3432	25.3%

### CONDUCTOR TEMPERATURE DERATING

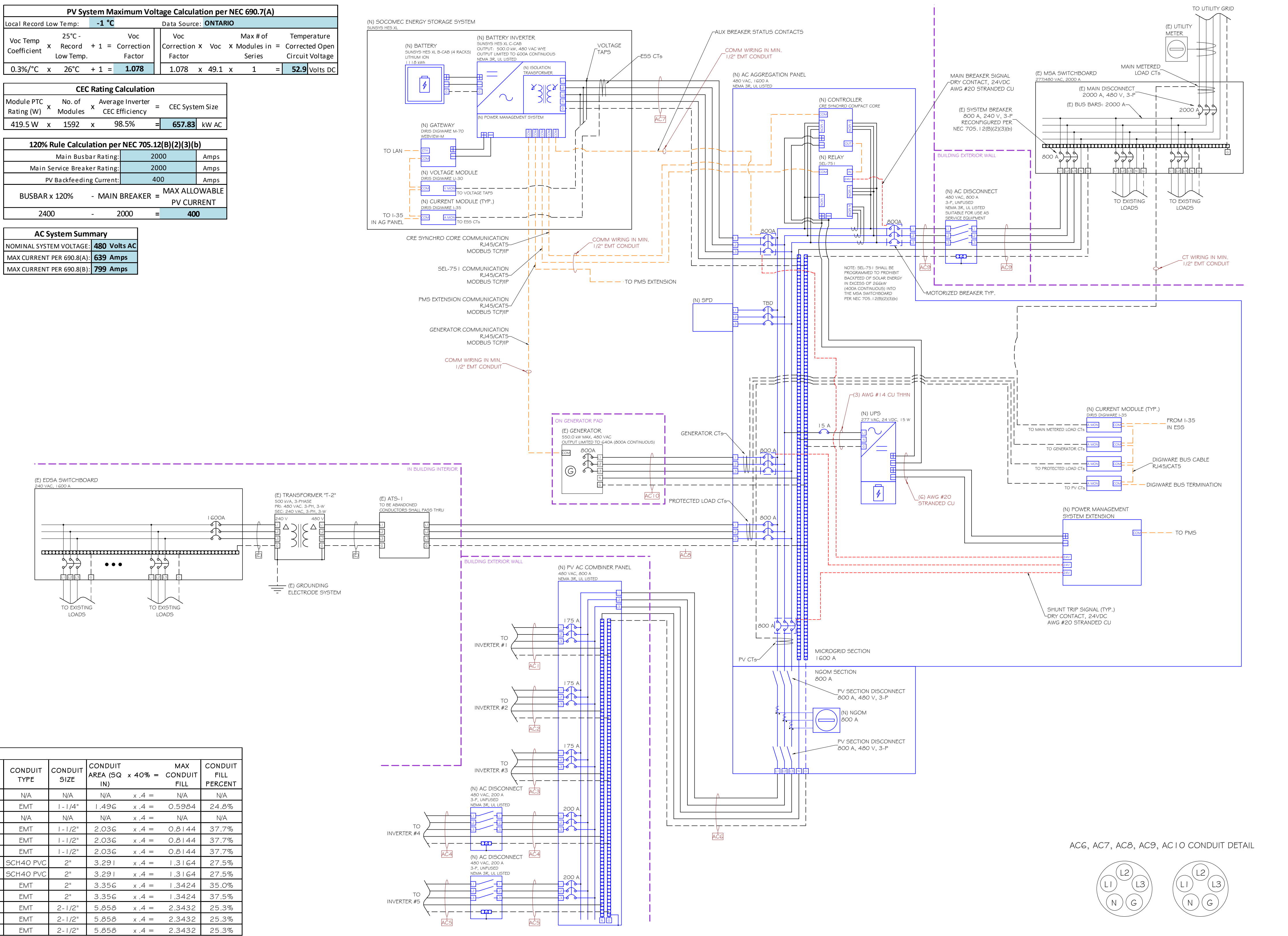
TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS	REQUIRED CONDUCTOR AMPACITY	AMPCITY CHECK #1	CONDUCTOR TEMPERATURE DERATING	CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION	AMPCITY CHECK #2	VOLTAGE DROP
DC1	PV STRING	JUNCTION BOX	COPPER 90°C AWG #10	55 Amps	18.0 x 1 = 18.0 Amps	1.25 = 22.5 Amps	22.5 Amps < 55.0 Amps	37	1.00	160 ft 0.85%
DC2	JUNCTION BOX	INVERTER #1 - #3	COPPER 75°C AWG #10	35 Amps	18.0 x 1 = 18.0 Amps	1.25 = 22.5 Amps	22.5 Amps < 35.0 Amps	37	0.91	200 ft 1.02%
DC3	PV STRING	INVERTER #4 - #5	COPPER 90°C AWG #10	55 Amps	18.0 x 1 = 18.0 Amps	1.25 = 22.5 Amps	22.5 Amps < 55.0 Amps	37	0.76	160 ft 0.85%

### CONDUCTOR TEMPERATURE DERATING

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS	REQUIRED CONDUCTOR AMPACITY	AMPCITY CHECK #1	CONDUCTOR TEMPERATURE DERATING	CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION	AMPCITY CHECK #2	VOLTAGE DROP
AC1	INVERTER #1	AC COMBINER PANEL	COPPER 75°C AWG #2/0	175 Amps	120.0 x 1 = 120.0 Amps	1.25 = 150.0 Amps	150.0 Amps < 175 Amps	37	0.71	265 ft 1.11%
AC2	INVERTER #2	AC COMBINER PANEL	COPPER 75°C AWG #2/0	175 Amps	120.0 x 1 = 120.0 Amps	1.25 = 150.0 Amps	150.0 Amps < 175 Amps	37	0.71	265 ft 1.11%
AC3	INVERTER #3	AC COMBINER PANEL	COPPER 75°C AWG #2/0	175 Amps	120.0 x 1 = 120.0 Amps	1.25 = 150.0 Amps	150.0 Amps < 175 Amps	37	0.71	265 ft 1.11%
AC4	INVERTER #4	AC COMBINER PANEL	COPPER 75°C AWG #3/0	200 Amps	139.5 x 1 = 139.5 Amps	1.25 = 174.4 Amps	174.4 Amps < 200 Amps	37	0.76	220 ft 0.85%
AC5	INVERTER #5	AC COMBINER PANEL	COPPER 75°C AWG #3/0	200 Amps	139.5 x 1 = 139.5 Amps	1.25 = 174.4 Amps	174.4 Amps < 200 Amps	37	0.76	320 ft 1.24%
AC6	AC COMBINER PANEL	AC AGGREGATION PANEL	COPPER 75°C AWG #3/0	800 Amps	(120 x 3) + (139.5 x 2) = 639.0 Amps	1.25 = 798.8 Amps	798.8 Amps < 800 Amps	37	0.76	80 ft 0.35%
AC7	BATTERY INVERTER	AC AGGREGATION PANEL	COPPER 75°C AWG #3/0	800 Amps	600.0 x 1 = 600.0 Amps	1.25 = 750.0 Amps	750.0 Amps < 800 Amps	37	0.76	50 ft 0.21%

### CONDUCTOR TEMPERATURE DERATING

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS	REQUIRED CONDUCTOR AMPACITY	AMPCITY CHECK #1	CONDUCTOR TEMPERATURE DERATING	CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION	AMPCITY CHECK #2	VOLTAGE DROP
AC8	ATS-1 & T-2	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps	75 ft 1.52%
AC9	MSA SWITCHBOARD	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps	95 ft 1.92%
AC10	GENERATOR	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps	35 ft 0.71%



### CONDUIT FILL DERATING

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS	REQUIRED CONDUCTOR AMPACITY	AMPCITY CHECK #1	CONDUIT FILL DERATING	CORRECTED AMPACITY CALCULATION	AMPCITY CHECK #2	VOLTAGE DROP
AC8	ATS-1 & T-2	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps
AC9	MSA SWITCHBOARD	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps
AC10	GENERATOR	AC AGGREGATION PANEL	COPPER 75°C AWG #4/0	920 Amps	37	52	0.76	790.4 Amps	700 Amps < 790.4 Amps

Developer: \_\_\_\_\_  
Contractor: \_\_\_\_\_  
Project: SURGICAL \_\_\_\_\_  
Project Details: 716.40 kWstc, 532.0 kW AC \_\_\_\_\_  
Engineering Approval: \_\_\_\_\_

### REVISIONS

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	1/23/2021	A

Sheet Title: **ELECTRICAL DIAGRAM**

Sheet Number: **E2.1**

Sheet Size: **ARCH D - 36" x 24"**

Design & Drafting by: RICHARD DOBINS  
PV-10221-G-011265  
"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move." - Douglas Adams

Reviewed & Approved by: RD

Phono<sup>®</sup> Solar

# TWINPLUS MODULE SERIES

HIGH EFFICIENCY MONO-PERC M4-9B-R

## 430-450W

144 CELLS



### OUTSTANDING PRODUCT PERFORMANCE

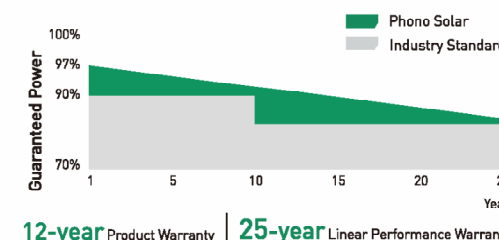
- Competitive high-temperature performance with ameliorated temperature coefficient
- Minimized power loss in cell connection
- Better performance under shading effect
- Decreased nominal operating cell temperature to 43 ± 2°C
- Higher power generation with multi-busbar and half-cut technology

### TRUSTWORTHY QUALITY AND RELIABILITY

- Guaranteed 0-+5W positive tolerance secures reliable power output
- 5400Pa maximum snow load, 2400Pa maximum wind load
- Optimized electrical design lowers hot spot risk and operating current

### PID RESISTANT

- Industry-leading cell processing technology and electrical design ensure solid PID resistance



### MANAGEMENT SYSTEM CERTIFICATES

- IEC 61215, IEC 61730
- ISO 9001:2015 / Quality management system
- ISO 14001:2015 / Standards for environmental management system
- OHSAS 18001:2007 / International standards for occupational health & safety
- IEC TS 62941:2016 Terrestrial photovoltaic (PV) modules-guidelines for increased confidence in PV module design qualification and type approval



BL-EN-Warner 2020.05.26 © Phono Solar Co., Ltd All Rights Reserved | www.phonosolar.com | info@phonosolar.com

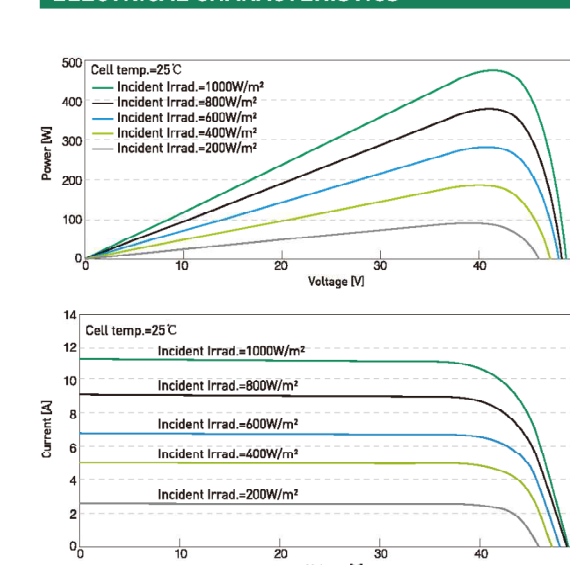
### ELECTRICAL TYPICAL VALUES

Model	PS430M4-24/TH		PS439M4H-24/TH		PS440M4-24/TH		PS445M4-24/TH		PS450M4-24/TH	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (P <sub>mp</sub> )	430	318	435	322	440	325	445	329	450	333
Rated Current (I <sub>mp</sub> )	10.59	8.56	10.66	8.61	10.73	8.67	10.80	8.73	10.87	8.78
Rated Voltage (V <sub>mp</sub> )	40.61	37.15	40.81	37.33	41.01	37.51	41.21	37.70	41.40	37.87
Short Circuit Current (I <sub>sc</sub> )	11.09	9.96	11.15	9.91	11.21	9.96	11.27	9.91	11.30	9.95
Open Circuit Voltage (V <sub>oc</sub> )	48.85	44.69	48.92	44.75	48.99	44.82	49.06	44.88	49.13	44.94
Module Efficiency (%)	19.45		19.88		20.11		20.34		20.57	
STC (Standard Test Conditions) Irradiance 1000W/m <sup>2</sup> , AM 1.5, Cell Temperature 25°C										
NOCT (Nominal Operation Cell Temperature) Irradiance 800W/m <sup>2</sup> , Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/s										

### MECHANICAL CHARACTERISTICS

Cell Type	Monocrystalline 166mm x 83mm
Length (L)	2103mm (82.79 inch)
Width (W)	1040mm (40.94 inch)
Height (H)	35mm (1.38 inch)
Weight	24.5kg (54.01 lbs)
Front Glass	3.2mm Toughened Glass
Frame	Anodized Aluminium Alloy
Cable	4mm <sup>2</sup> (IEC), Length: 350mm (vertical) 1250mm (horizontal) or Customized Length
Junction Box	IP 68 Rated

### ELECTRICAL CHARACTERISTICS



### TEMPERATURE RATINGS

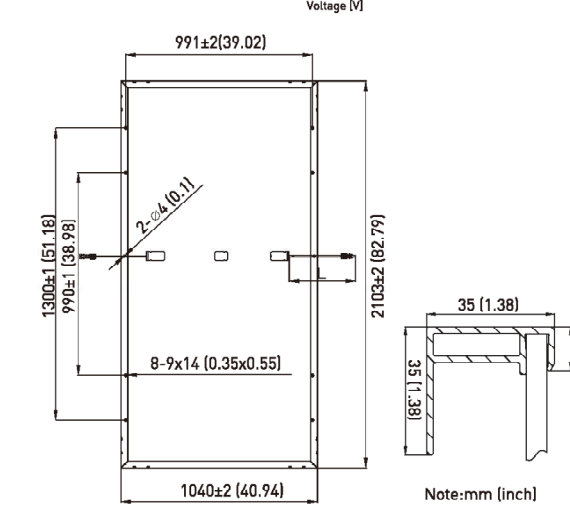
Voltage Temperature Coefficient	-0.30%/°C
Current Temperature Coefficient	+0.05%/°C
Power Temperature Coefficient	-0.36%/°C
Tolerance	0-+5W
NOCT	43±2°C

### ABSOLUTE MAXIMUM RATING

Operating Temperature	From -40 to +85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	20A
PV Module Classification	IIA
Module Fire Performance (UL 7203)	Type 4
Maximum System Voltage	DC 1500V/1000V

### PACKING CONFIGURATION

Container	20' GP	40' HQ
Pieces/Container	255	682



PHONO SOLAR TECHNOLOGY CO., LTD reserves the right to make necessary adjustments to the information described herein at any time without further notice. The specifications and certificates contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Please be sure to use the most recent version of data.

# Three Phase Inverter with Synergy Technology

For the 277/480V Grid for North America

SE80KUS / SE100KUS / SE120KUS



12-20 YEARS WARRANTY

### Powered by unique pre-commissioning process for rapid system installation

- Pre-commissioning feature for automated validation of system components and wiring during the site installation process and prior to grid connection
- Easy 2-person installation with lightweight, modular design (each inverter consists of 2 or 3 Synergy units and one Synergy Manager)
- Independent operation of each Synergy unit enables higher uptime and easy serviceability
- Built-in thermal sensors detect faulty wiring ensuring enhanced protection and safety
- Built-in arc fault protection and rapid shutdown
- Built-in PID mitigation for maximized system performance
- Monitored\* and field-replaceable surge protection devices, to better withstand surges caused by lightning or other events
- Built-in module-level monitoring with Ethernet or cellular communication for full system visibility

\*Applicable only for DC and AC SPDs

solaredge.com



# Three Phase Inverter with Synergy Technology

For the 277/480V Grid for North America

SE66.6KUS / SE80KUS / SE100KUS / SE120KUS

Applicable to inverter with Part Numbers	SE80KUS	SE100KUS	SE120KUS
<b>OUTPUT</b>			
Utility AC Active Output Power	80000	100000	120000
Maximum AC Apparent Output Power	80000	100000	120000
AC Output Line Connections	1W + PE, 4W + PE		
Supported Grids	WYE: TN-C, TN-S, TN-C-S, IT, IT1, IT15kV, IT1		
AC Output Voltage Minimum Nominal Maximum (V, N)	244-277-305		
AC Output Voltage Minimum Nominal Maximum (V, L)	422-480-520		
AC Frequency Min-Nom-Max*	50-60-60.5		
Maximum Continuous Output Current (per Phase, PF=1)	96.5	120	145
GFI Threshold	1		
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes		
Total Harmonic Distortion	≤ 3		
Power Factor Range	+/- 0.2 to 1		
<b>INPUT</b>			
Maximum DC Power Module (11C) Inverter / Synergy Unit	120000 / 60000	160000 / 80000	180000 / 90000
Transformerless, Ungrounded	Yes		
Maximum Input Voltage DC + to DC-	1000		
Operating Voltage Range	850-1000		
Maximum Input Current	2 x 48.25	3 x 40	3 x 48.25
Reverse-Polarity Protection	Yes		
Ground-Fault isolation Detection	Yes (AC) optionally per Synergy Unit*		
DC Weighted Efficiency	98.5		
Nighttime Power Consumption	< 8	< 10	
<b>ADDITIONAL FEATURES</b>	2 x RS-485, Ethernet, Wi-Fi (optional), Cellular (optional)		
Smart Energy Management	Export Limitation		
Transformer Commissioning	With the SolarEdge mobile application using built-in Wi-Fi access point for local connection		
Arc Fault Protection	Built-in, User Configurable (According to UL 1699B)		
Photovoltaic Rapid Shutdown System	NEC 2014, 2017 and 2020, Built-in		
PID Releaser	Nighttime, built-in		
RS485 Surge Protection (ports 1+2)	Type II, field replaceable, integrated		
AC DC Surge Protection	Type II, field replaceable, integrated		
DC Fuse (Single Pole)	2SA, integrated		
<b>DC SAFETY SWITCH</b>	Built-in		
DC Disconnect	Built-in		
<b>STANDARD COMPLIANCE</b>			
Safety	UL 1699B, CSA C22.2 #107.1, Canadian APC (according to T.L.L. M-07)		
Grid Connection Standards	IEEE 1547, IEEE 1547.2, IEEE 1547.4		
Emissions	FCC part 15 class A		

\* For other regional ratings please contact SolarEdge support  
 \* When permitted by local regulations  
 \* For specifications of the optional communication systems, visit <https://www.solaredge.com/products/communication> or the Reseller's Library webpage: <https://www.solaredge.com/learn/learn#4>, to download the relevant product datasheet

# Power Optimizer For North America

P860 / P960



25 YEAR WARRANTY

POWER OPTIMIZER

### PV power optimization at the module-level

The most cost-effective solution for commercial and large field installations

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Balance of System cost reduction; 50% less cables, fuses and combiner boxes, over 2x longer string lengths possible
- Fast installation with a single bolt
- Advanced maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety
- Meets NEC requirements for arc fault protection (AFCT) and Photovoltaic Rapid Shutdown System (PVRSS)
- Use with two PV modules connected in parallel

solaredge.com



# Power Optimizer For North America

P860 / P960

Power Optimizer Model (Typical Module Compatibility)	P860 (for 2 x 72 cell modules)	P960 (for 2 x 72 cell modules)
<b>INPUT</b>		
Rated Input DC Power*	860	960
Connection Method	Dual input for independently connected modules*	
Absolute Maximum Input Voltage (Voc at lowest temperature)	60	
MPPT Operating Range	12.5-60	12.5-60
Maximum Short Circuit Current (I <sub>sc</sub> )	23	23.2
Maximum Short Circuit Current per input (I <sub>sc</sub> )	11	11.6
Maximum Efficiency	99.5	99.6
Weighted Efficiency	99.6	99.6
Chemistry Category	Monocrystalline	
<b>OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREGE INVERTER)</b>		
Maximum Output Current	18	18
Maximum Output Voltage	85	85
<b>OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREGE INVERTER OR SOLAREGE INVERTER OFF)</b>		
Stall Current Voltage per Power Optimizer	1 ± 0.1	
<b>STANDARD COMPLIANCE</b>		
Photovoltaic Rapid Shutdown System	Compliant with NEC 2014, 2017*, 2020*	
EMC	FCC Part 15 Class A, IEC61000-6-2, IEC61000-6-3	
Safety	IEC62109-1 (Class II safety), UL 1741	
Material	UL94 V-0, UV resistant	
RoHS	Yes	
<b>INSTALLATION SPECIFICATIONS</b>		
Compatible SolarEdge Inverters	Three phase inverters	
Maximum Allowed System Voltage	1000	
Dimensions (W x L x H)	104 x 168 x 159 / 4.1 x 6.61 x 6.27	
Weight	3664 / 2.34	
Input Connector	MC4*	
Input Wire Length Options	Input #1	Input #2
1	(+1) 0.16 / 0.52, (+) 0.16 / 0.52	(+1) 0.16 / 0.52, (+) 0.16 / 0.52
2	(+1) 1.6 / 5.2, (+) 1.6 / 5.2	(+1) 0.16 / 0.52, (+) 1.6 / 5.2
3	(+1) 1.6 / 5.2, (+) 1.6 / 5.2	(+1) 1.6 / 5.2, (+) 1.6 / 5.2
Output Wire Type / Connector	Double Insulated, MC4	
Output Wire Length	2.2 / 7.2	2.3 / 7.5
Operating Temperature Range**	-40 to +85 / -40 to +185	
Protection Rating	IP68 / NEMA6P	
Relative Humidity	0 - 100	

PV System Design Using a SolarEdge Inverter**	208V Grid 347V AC	208V Grid 347V AC	277/480V Grid 208V, 19kV	277/480V Grid 347V AC, 34.9kV
Compatible Power Optimizers	P860, P960	P860, P960	P860, P960	P860, P960
Minimum String Length	8	9	14	14
Maximum String Length	15	17	27	27
Minimum String Length	80	80	80	80
Maximum String Length	60	60	60	60
Maximum Continuous Power per String	7000	8740	15300	15300
Maximum Allowed Connected Power per String** (permitted only when the difference in connected power between strings is up to 200W for the 277/480V grid, or 1000W for the 208V grid)	1 string - 8400	1 string - 9930	1 string - 17350	2 strings or more - 17350
Parallel Strings of Different Lengths or Orientations	2 strings or more - 9000	2 strings or more - 10300	2 strings or more - 20300	3 strings or more - 20300

\* The same rule apply for Synergy units of equivalent power ratings, that are part of the modular Synergy Technology Inverter  
 \*\* 1800V/950 can be used in one string only with 1800V/950  
 \*\* 1800V/950 design with three phase 208V Inverter is limited. Use the SolarEdge Designer for verification  
 \*\* To connect more 11C power per string, design your project using SolarEdge Designer

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# Three Phase Inverter with Synergy Technology

For the 277/480V Grid for North America

SE66.6KUS / SE80KUS / SE100KUS / SE120KUS

Applicable to inverter with Part Numbers	SE80KUS	SE100KUS	SE120KUS
<b>INSTALLATION SPECIFICATIONS</b>			
Number of Synergy Units per inverter	2	3	3
AC Max Conduit Size	2 3/8"		
Max AWG Line / PE	4/0 / 1/0		
DC Max Conduit Size	1 x 2" / 2 x 4"		
DC Input Inverter / Synergy Unit	8 / 4 pairs 6-12 AWG	12 / 4 pairs 6-12 AWG	
Dimensions (H x W x D)	Synergy Unit: 22 x 10 x 10.7 / 5.9 x 4.0 x 4.23 Synergy Manager: 14.57 x 2.62 x 4.116 / 5.80 x 1.04 x 1.05		
Weight	Synergy Unit: 70.4 / 32 Synergy Manager: 38.6 / 18		
Operating Temperature Range	-40 to +185 / -40 to +185**		
Cooling	Fan (user replaceable)		
Noise	< 67		
Protection Rating	NEMA 4X		
Mounting	Brackets provided		

\*\* For power derating information refer to <https://www.solaredge.com/learn/learn#4> for temperature derating notes

Developer:

Contractor:

Project:

SURGICAL

Project Details:

716.40 kW, 532.0 kW AC

Engineering Approval:

### REVISIONS

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	1/21/2022	4
PERMIT SET	1/23/2021	A

Sheet Title:

EQUIPMENT DATA SHEETS

Sheet Number:

D1.0

Sheet Size:

ARCH D - 36" x 24"

Design & Drafting by:

RICHARD DOBBINS  
 # PV-103216.01.1268

"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."  
 - Douglas Adams

Reviewed & Approved by:

RD

# EcoFoot5D™

The New High Density 5° Racking System

## Small Footprint. Big Power.

Now you can build more powerful rooftop solar systems faster and easier than ever before with the new high density EcoFoot5D™ Racking System.



Built on the Industry-Preferred EcoFoot® Platform, with More than 200MW Installed.



### 18.4% More Power

Small 7"x16.7" roof-friendly modular Base and dense 9.9" inter-row spacing enables a tightly packed solar array that delivers 18.4% more power than 10° systems. Whether your roof is small or large, EcoFoot5D provides more power, lowering cost-per-watt.

### Elegantly Simple Installation

EcoFoot5D delivers preassembled parts and in-out-of-the-box, ready-to-go installation that is unlike any other flat-roof racking. The result delivers 18.4% more power than 10° systems. Whether your roof is small or large, EcoFoot5D provides more power, lowering cost-per-watt.

### Cost-Saving Logistics & Support

Stackable bases enable a huge pallet shipping capacity. Fewer pallets are required, minimizing shipping, storage and onsite crane use. Dedicated engineering support prevents issues before they happen and provides quick solutions if obstacles arise.



Contact: 740.249.1877 | sales@ecolibrumsolar.com | www.ecolibrumsolar.com

# The Simplest Way to Max Out Your Roof



# Unbeatable EcoFoot5D



Built on the Industry Preferred, Innovative EcoFoot Modular Platform.

## Elegant Installation, Right Out of the Box.

**Organized Work Flow and Preassembled Parts**  
When you're on the roof, you need ready-to-go components and a simple install. That's why installers prefer the EcoFoot Modular Platform. Bases self-align and parts are preassembled so no PV panel preparation is required, which enables non-stop installation from box to roof.

### Only with EcoFoot Modular

Now, EcoFoot5D delivers the elegant installation process only EcoFoot modular systems provide and packs the array with 18.4% more power than a 10° system. Installer-centric design provides unsurpassed advantages:

- Simple, preassembled parts
- Self-aligning Bases fall in line as modules are placed
- Low-effort roof layout, just two chalk lines required
- No PV panel prep, non-stop install from box to roof
- Six simple installation steps
- No training required - 5-minute learning curve

## 290kW of Bases Delivered on 1 Standard Pallet.

### Efficient Logistics On and Off the Roof Increase Your Bottom Line

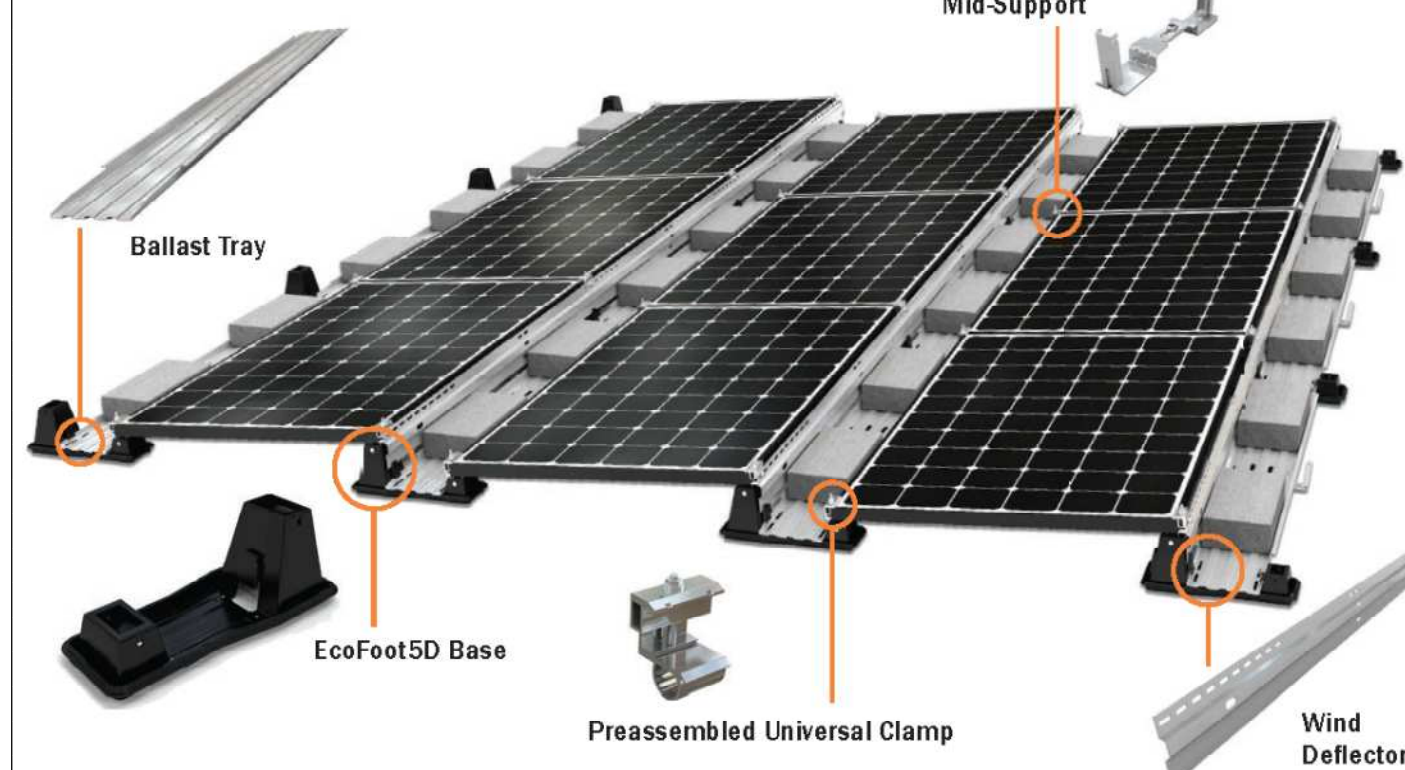
From shipping to deployment, the EcoFoot5D System reduces your shipping, storage and roof-loading needs significantly. The result? More profit per job.

- Stackable Bases and low part count streamline logistics
- 290kW of Bases delivered on 1 standard pallet
- Small footprint minimizes contact with roof
- Slip sheet costs are low, drainage is excellent
- Lightweight and roof-friendly
- Ideal for residential and commercial flat roofs
- Suited for mild or extreme roof undulations



Streamline logistics with up to 290kW of Bases per pallet.

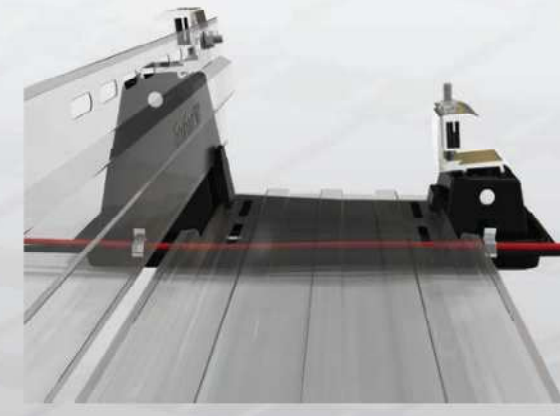
## 5 Simple Components. 1 Sweet System.



### Wire Management in a Snap.

**Accessible & Protected**  
Simply snap wire clips into Base to route wires between rows.

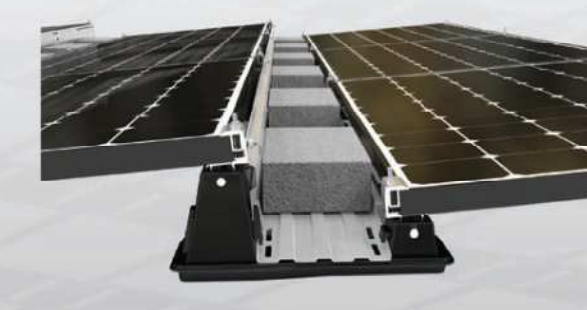
- No UV exposure, row-to-row wires covered by Ballast Tray
- Easy access to wires during install and throughout the life of the system with removable Wind Deflector and in-row ballast placement



### Ballast Placement that Beats All.

**Ergonomic, Cost-Saving and Fast**  
Place ballasts between rows for easy reach.

- No awkward under-module access
- Rapid Ballast Tray install, sliding into Base retention clips
- Ballast Tray strong enough to walk on, even when loaded with ballast blocks
- Minimal roof contact means smaller slip sheets, lowering costs



## 6 Simple Installation Steps.

**Step 1**  
Install Clamps in Bases - No Tools Required.

Drop preassembled Clamps into Base, push in Clevis Pins, Base is ready to install.

**Step 2**  
Only Two Chalk Lines Needed.

Measure & mark 2 chalk lines. Bases self-align as modules drop into place.

**Step 3**  
Secure PV modules onto Bases.

Space modules using alignment marks on Clamps, torque Nut provided to 24 ft-lbs.

**Step 4**  
Install Mid-Support.

Press the Upper and Lower Mid-Supports onto the module frame.

**Step 5**  
Install Ballast Tray and place ballast blocks.

Slide Tray into retention clips on Base, east/west. Place ballast blocks without reaching using sturdy, walk-on tray.

**Step 6**  
Install Wind Deflector.

Place Wind Deflector into slot on Base, attach using Rocker Nut provided.

## Technical Specifications.

**Low Slope System:** Ballasted, attached, or hybrid  
**Clamping range:** 30-50mm  
**Dimensions:** 16.7" L x 7" W x 6.2" H  
**Typical system weight:** 2.4-7.7 psf  
**Module orientation:** Landscape  
**Tilt angle:** 5° Landscape

**Module inter-row spacing:** 9.9"  
**Roof pitch:** 0° - 7°  
**Ballast requirements:** 4" x 8" x 16"  
**Wind tunnel tested:** 150 mph  
**Warranty:** 25 years  
**Slip sheets:** not required by EcoFoot5D. If required by roofer, use 10"x20" under Base; 6"x16" under Mid-Support.

## Validation Summary.

- Certified to UL2703 Fire Class A for Type I and II modules
- Certified to UL2703 Grounding and Bonding
- SEAC seismic compliant

## Get the EcoFoot5D Advantage.

EcoFoot5D provides engineering support for your project from concept to completion. Contact us for a specific project bid, to schedule a product demo, or to learn more about simple, fast and cost-effective EcoFoot5D High Density 5° Racking.

Call 740.249.1877 or email Sales@ecolibrumsolar.com



740.249.1877 | sales@ecolibrumsolar.com | www.ecolibrumsolar.com | Boulder, CO | Athens, OH  
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## SUNSYS HES XL

Outdoor Energy Storage System  
500 kVA/1118 kWh and 500 kVA/2236 kWh systems



SUNSYS HES XL is an all-in-one range of outdoor Energy Storage Systems available in a variety of sizes and features for on-grid and off-grid applications.

Socomec has partnered with CATL and selected the CATL EnerOne liquid cooled LFP battery system as the optimum battery for SUNSYS Hybrid Energy Storage.

### Safety certified

The system is designed using the best of conversion and battery technologies, mainly for safety. The C-Cab uses a safe conversion technology to limit the Common Mode Noise effect and the B-Cab is made of a stable chemistry of Lithium Iron Phosphate (LFP) that doesn't burn during thermal runaway. The complete system is safety certified to UL9540-2020.

### Fast and safe installation

All cabinets present in our system are shipped completely assembled, for maximum quality and minimum transportation cost and installation time. To add quality and save additional time, our system also includes all DC cables needed to connect B-Cabs to C-Cabs.

### Top quality components

"Powered by Socomec, Energized by CATL"  
The system is co-developed by both teams, working together to ensure that Batteries and Converters work together as one Energy Storage System. The Socomec C-Cab control and supports the CATL Battery Cabinets, and provides one point of connection for higher-level control software. Modular power conversion enables maximum AC/AC system round trip efficiency of up to 90%.

### Intelligent EMS

SUNSYS HES XL is integrated with Energy Toolbase. This optional Energy Management Software suite includes: ETD Developer, to select the ideal system size and to predict ROI/NPV. Acumen EMS to operate the system for maximum economic returns. ETD Monitor for remote system monitoring.

### The solution for

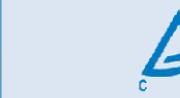
- Commercial and Industrial buildings
- EV charging infrastructures
- Isolated microgrids
- Resilient microgrids
- Renewal energy integration: Solar + Storage

### Strong points

- Safety certified
- Fast and safe installation
- Intelligent EMS
- Top quality components

### Conformity to standard

- Safety: UL 9540-2020; UL 9540A
  - EMC: FCC part 15 Level A
  - Environment: RoHS; REACH
  - Communication protocol: Modbus TCP; SunSpec 2.0
  - Grid code: UL1741 SA; IEEE 1547-2018; CA Rule 21; HECO Rule 14H
- Please consult us for additional ones.



### Expert Services

- Socomec Expert Services teams in North America provide:
- On-site startup and commissioning
- Prompt service response in the unlikely event unscheduled service may be required
- Scheduled maintenance for warranty compliance

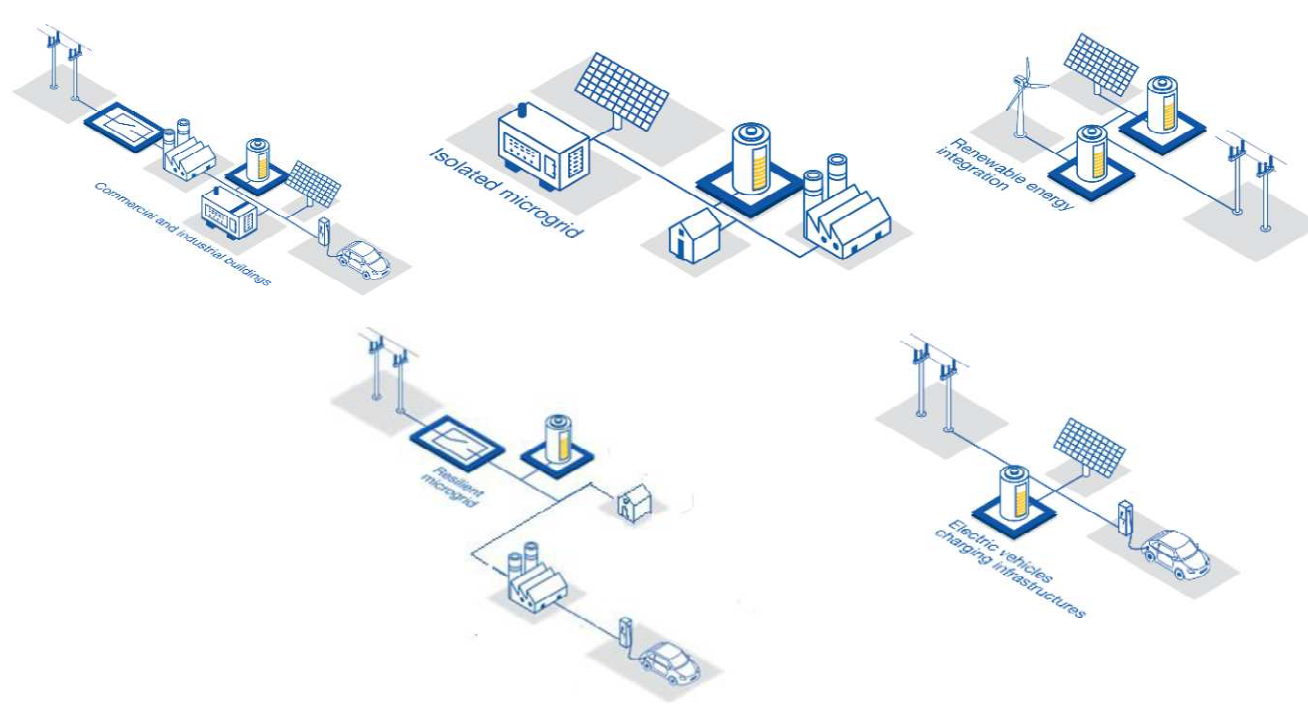


### Multi-MWh systems

Please consider our larger energy storage range, SUNSYS HES XL range.



## Suitable for all following applications



## 2 standard units for maximum flexibility

**C-Cab**  
500 kVA  
4 450 kg / 9 750 lbs

2 391 mm  
94.1 in

1 575 mm  
62 in

2 023 mm  
80 in

**Set C Cab/T Cab/DC Cab**

- > EPC Bidirectional power converter > 500 kVA / cabinet
- > Automation functions
- > AC/DC distribution and protections
- > Battery management system
- > IoT Ready
- > Isolation transformer
- > DC combiner cabinet

**B-Cab**  
279 kWh  
2 900 kg / 6 393 lbs

2 280 mm  
89.8 in

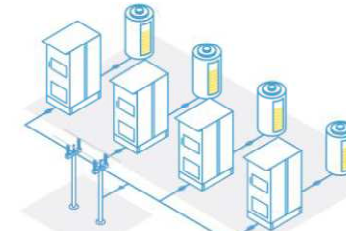
1 300 mm  
51.2 in

1 300 mm  
51.2 in

**B Cab**

- > Lithium Iron Phosphate - LFP technology
- > 279 kWh / rack
- > Liquid cooling thermal management
- > Fire suppression system integrated

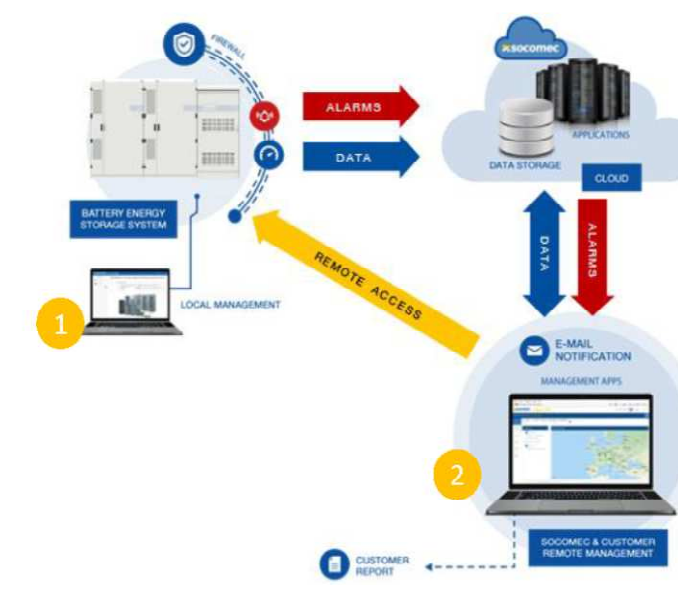
## Higher Power / Energy configurations can be made available by systems paralleling



Hours	Battery Cabinets kWh											
C-Cabs kW	4	8	12	16	20	24	32	40	48			
	1118	2236	3354	4473	5591	6709	8945	11,182	13,418			
1	500	2	4									
2	1000	2	4	4								
3	1500		2	4	4							
4	2000		2	4	4	4						
5	2500			2	4	4	4					
6	3000				2	4	4					

## Local management and Remote monitoring

- LOCAL MANAGEMENT**  
SUNSYS HES XL includes a modular and adaptive platform to be the brain of our system. This open platform, integrated in the C-Cab, gives access to:
  - Energy shifting, self-consumption, fuel saving...
  - Autonomous Microgrid management, including distributed generation from multiple sources.
  - Compatibility with third-party supervision systems (EMS, SCADA...) for additional functions.
- REMOTE MONITORING**  
In addition to this the C-Cab also integrates some IoT devices that makes it possible to continuously monitor the system remotely. These devices enable the following functionalities:
  - Web dashboard for on-line monitoring.
  - Web access to the system KPIs.
  - Smartphone application.
  - Data collection for battery warranty.
  - Maintenance information: scheduled visits, remote firmware upgrade.

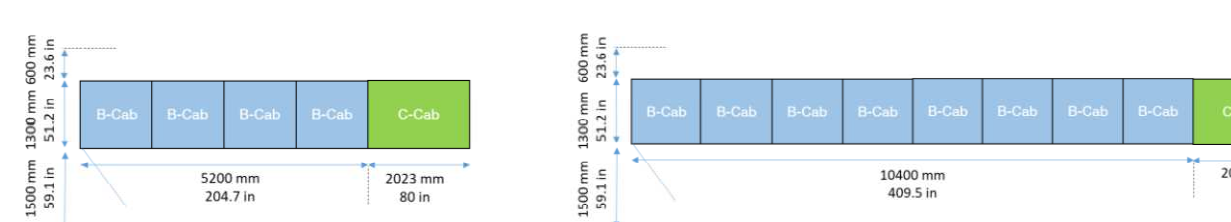


## Technical Data

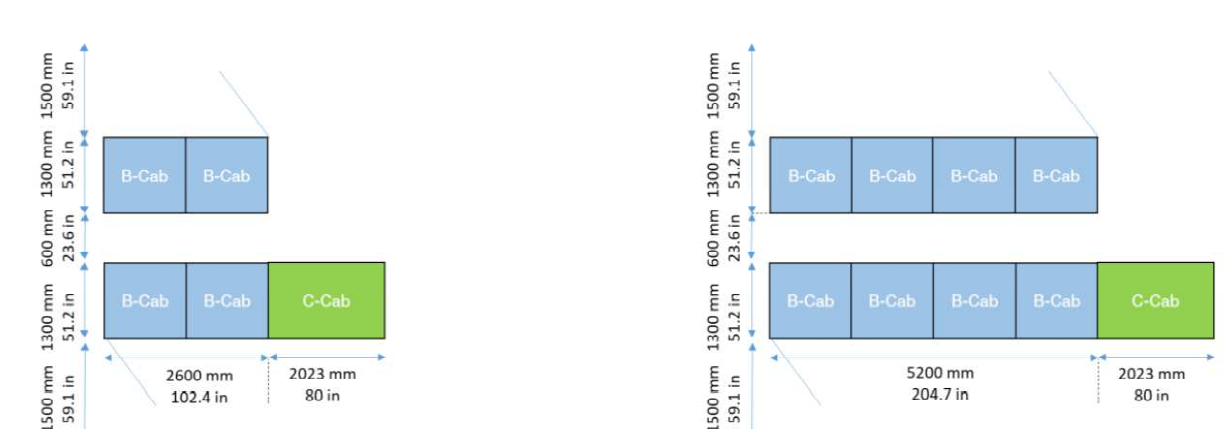
	500 kVA / 1118 kWh	500 kVA / 2236 kWh
<b>System information</b>		
Symmetrical overload	110% during 10 min - 125% during 10 s	
Chemistry	LFP - Lithium Iron Phosphate	
Energy Nameplate	279 kWh per cabinet	
C-rate	0.5 C	0.25 C
Maximum current	750 A	
Rated voltage (Un)	480 Vac (3pH+N) +10% / - 12%	
Rated frequency	50 Hz - 60 Hz	
Fire protection	Smoke and heat detectors, aerosol fire suppression systems	
<b>Environment</b>		
Degree of protection	IP 54 / NEMA 3R (Outdoor)	
Operation temperature	-20 to +45 C° / -4 to +113°F without derating	
Storage temperature	-20 to +45 C° / -4 to +113°F	
Relative humidity	4 to 100%	
Acoustic level at 1 m	< 70 dB	
Altitude max.	2 000 m / 6562 ft. without derating (above consult us)	

## Two ways of installing the systems according to the space available on you site

### In-line configurations



### Back-to-back configurations



Developer:

Contractor:

Project:

SURGICAL

Project Details:

716.40 kWdc, 532.0 kW AC

Engineering Approval:

## REVISIONS

DESCRIPTION	DATE	REV
PRELIMINARY LAYOUT	8/5/2021	1
30% DELIVERABLE	8/31/2021	2
60% DELIVERABLE	9/24/2021	3
90% DELIVERABLE	12/10/2021	4
PERMIT SET	1/23/2021	A

Sheet Title:

EQUIPMENT DATA SHEETS

Sheet Number:

D.I.I

Sheet Size:

ARCH D - 36" x 24"

Design & Drafting by:

RICHARD DOBBINS  
PV-103216.01.126

"In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."  
- Douglas Adams

Reviewed & Approved by:

RD