80 South 8th Street, Suite 900
Minneapolis, MN 55402
Phone: 612.326.1500
E-mail: steve.broyer@ecosrenewable.com
August 15, 2024

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition No. 1395A –Development & Management Plan Update

Dear Executive Director Melanie Bachman:

On June 17th, 2021, the Connecticut Siting Council ("Council") ruled that Petition 1395A for a declaratory ruling, submitted by Windham Solar LLC ("Windham") for construction, maintenance, and operation of one 1.0 megawatt (MW) and one 0.99MW solar photovoltaic generating facilities located at 31 Benz Street, Ansonia, Connecticut met the air and water quality standards of the Department of Energy and Environmental Protection, and would not have a substantial adverse environmental effect. Pursuant to Connecticut General Statues §4-176 and §16-50k, the Council determined the proposal would not require a Certificate of Environmental Compatibility and Public Need and recommended that the Petitioner revise the decommissioning memorandum and consult with The United Illuminating Company to reduce the visual impact of the interconnection.

On July 29th, 2021 the Council approved the Partial Development and Management ("D&M") Plan submitted for the facilities. The D&M plan approval requires that Windham

1) submit a copy of the letter required by the Department of Energy and Environmental Protection Stormwater Permit for connection to the city's stormwater system

Exhibit A – Benz Solar – Ansonia Stormwater Letter.;

2) provide detail of the landscaping vegetation

The contractor is planning on Installing 245 – 6 foot to 8 foot high at the time of planting Dark American Arborvitae 10' on center, around the solar facility fencing, per the design materials.

3) conduct no blasting on-site;

Sitework for the facility began in July 2024, no blasting has occurred on site, and all major site excavations and rock removal operations have taken place at this time.

4) perform rock processing during approved weekday work hours;

A majority of the rock removal from the facility has simply been exported off site. All construction and rock processing for the facility has occurred during the approved weekday work hours.

and

5) submit specific requests for Sunday work hours as necessary.

No Sunday work hours are necessary for the construction of the facility at this time.

In addition the Council recommended clarification of the swale detail and wood chip berm detail shown in the D&M Site Plans.

Wood chip berms have proved to be a superior alternative to silt fence. Wood chip berms, provide sediment control similar to silt fence, and improve runoff water quality by filtering runoff that travels through the berms. The swales illustrated on sheet 4 of the D&M Site Plans are to direct perimeter stormwater to the infiltration basins constructed on site to ensure all runoff from the solar facility is appropriately treated by these water quality facilities.

On June 28, 2024 the Council granted Windham's request for an extension of time to complete the construction of the facility until June 21, 2025. Since the issuance of the extension, the petitioner has mobilized the civil contractor to the site and full sitework for the facility is underway. The Petition No. 1395A –Development & Management Plan Update shall serve to provide an update to the current partial Development and Management Plan for the Benz Solar facility and requests the issuance of a complete Development and Management Plan for the Electrical and mechanical construction of the Facility.

To ensure ongoing DEEP general permit compliance for the facility, the petitioner has attached a letter based on the latest site inspection from CLA Engineers, Inc. attesting that they have performed monthly site inspections since clearing activities began in April 2022 and that the project is in compliance with the approved Stormwater Pollution Control Plan and the construction sequencing outlined within that plan. ***Exhibit B – Benz Solar – CLA Letter***.

When Petition 1395A was submitted to the Council for the declaratory ruling, Petitioner was estimating the facility sizes based off the Renewable Energy Credit contracts for the site. Since the approval of the D&M plan Windham has completed electrical design and has selected a new higher-wattage module to utilize in both facilities. The Canadian Solar modules utilized in both facilities will not contain PFAS and will not be characterized as hazardous waste through applicable TCLP testing. Please find attached the Canadian Solar module cut sheets as ***[Exhibit C – Benz Solar – Module Cut Sheet.pdf]***.

The (1) one 1.0 megawatt (MW) and one (1) 0.99MW solar photovoltaic generating facilities are Benz Solar 1 and Benz Solar 2. Each project contains (988) 680W modules and (988) 685w modules, for a DC size of 1,348.6kW, at a 1.35 AC/DC ratio. The projects are utilizing eight Siemens Kaco Blue Planet 125 kW string inverters per facility. Additional information pertaining to the final electrical design of those projects is attached for the Council's review as ***[Exhibit D – Benz Solar - Electrical.pdf]***. Additionally the finalized racking design documents for the facilities, stamped by a Professional Engineer duly licensed in the State of Connecticut, are attached as ***[Exhibit E – Benz Solar - Racking.pdf]***

The Petitioner is continuing to work with the United Illuminating Company to finalize project interconnection with an anticipated energization to occur in Q1 of 2025. The petitioner has attempted to reduce the visual impacts of the interconnection of the project along Benz Street as recommended by the Council by pad mounting the individual projects Reclosers and meters.

An updated DEEP NDDB application for the facilities was submitted prior to commencement of construction - please find attached as [***Exhibit F – DEEP Updated NDDB determination Letter].*** Also attached is Petitioner's General Permit Registration for the Discharge of Stormwater and Dewatering from the CT DEEP ***[Exhibit G – DEEP General Permit]***

Upon completion of construction of the projects, Windham solar will submit a vegetative maintenance plan. Until construction completion, the site groundcover and maintenance will be maintained under the requirements of the Construction General permit, and the SWPCP.

Please consider this updated information and review and respond to the request for a full Development & Management plan approval to accompany the granted approvals of Petition 1395A, and contact me if the Council has any questions related to this submission.

Thank you,

Steven J. Broyer

All exhibits may also be found in the following link:
https://ecosenergy.box.com/s/liz4q36fjd7keyzu7ykvmnot296pq335

D'Amico Associates

PLANNING • ENGINEERING • SURVEYING CONSULTANTS
9 PARK ROAD
OXFORD, CONNECTICUT 06478
Phone: (203) 881-3184
Fax: (203) 881-0248
damicoassociates@gmail.com

January 18, 2024

Thomas Melone
Allco Renewable Energy Limited
157 Church Street
19th Floor
New Haven, CT 06510

Re: 31 Benz Street
Ansonia, CT

The applicant is approved to tie into Ansonia's existing storm water system in Benz Street.

The proposed tie in is the overflow from an existing detention pond, therefore there is a decrease in runoff proposed for the post construction.

If you have any questions please feel free to contact me

Sincerely,

Fred D'Amico P.E., L.S.

CLA Engineers, Inc.
Civil • Structural • Survey

317 MAIN STREET • NORWICH, CT 06360 • (860) 886-1966 • (860) 886-9165 FAX

July 31, 2024

Rodney A. Galton, PE, CPESC
Ecos Energy
80 South 8th Street, #900
Minneapolis, MN 55402
Via Email: rodney.galton@ecosenergy.com

RE: Benz Street Solar
31 Benz Street
Ansonia, CT 06401
Site Inspections and CTDEEP Compliance Review

Dear Mr. Galton,

CLA Engineers (CLA) has been performing monthly site inspections of the above referenced site since April 2022. The most recent inspection and report was performed on July 12, 2024; no corrective actions were necessary as part of that inspection. Additionally, Robert Russo a Certified Soil Scientist from this office inspected that site on July 26, 2024. In our professional opinion the project is in compliance with the approved Stormwater Pollution Control Plan (SWPCP), and the construction sequencing outlined on the plans.

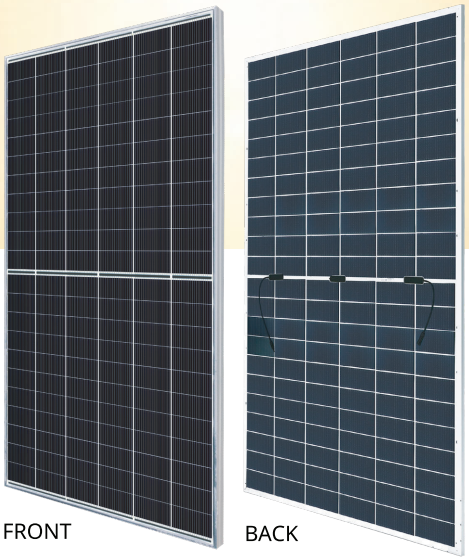
Please feel free to call me at our office or email me at khaubert@claengineers.com with any questions or comments.

Very truly yours,
CLA Engineers, Inc.

Kyle Haubert, P.E.

NEW

CanadianSolar



TOPBiHiKu7

N-type Bifacial TOPCon Technology

675 W ~ 705 W

CS7N-675|680|685|690|695|705TB-AG

MORE POWER

- 705 W — Module power up to 705 W, Module efficiency up to 22.7 %
- EXTRA POWER — Up to 85% Power Bifaciality, more power from the back side
- Excellent anti-LeTID & anti-PID performance. Low power degradation, high energy yield
- Lower temperature coefficient (Pmax): -0.29%/°C, increases energy yield in hot climate
- Lower LCOE & system cost

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

12 Years **Enhanced Product Warranty on Materials and Workmanship***

30 Years **Linear Power Performance Warranty***

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001: 2015 / Quality management system
ISO 14001: 2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC 62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / INMETRO / MCS / UKCA / CGC
CEC listed (US California) / FSEC (US Florida)
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68
Take-e-way

* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

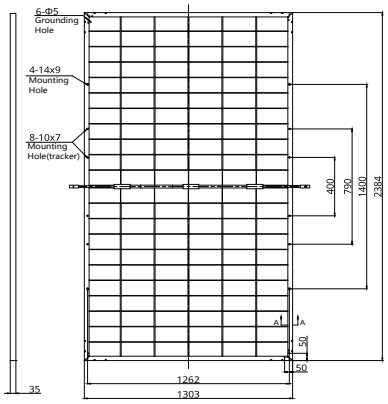
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 22 years, it has successfully delivered around 100 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

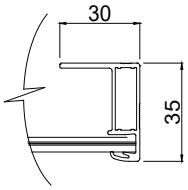
Canadian Solar (USA) Inc.
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | www.csisolar.com/na | support.ca@csisolar.com

ENGINEERING DRAWING (mm)

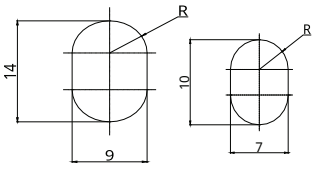
Rear View



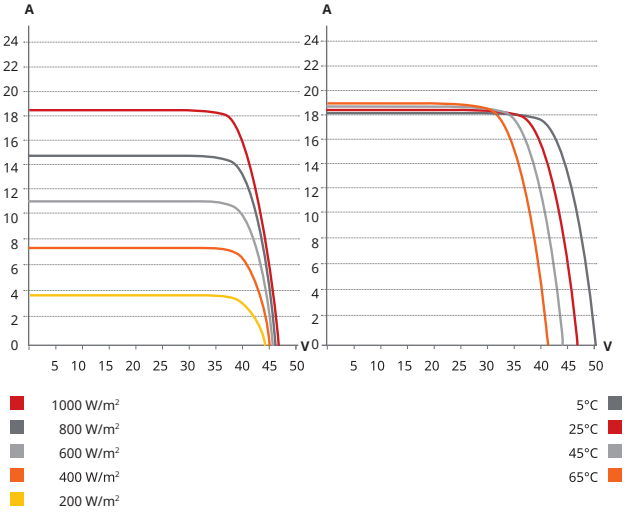
Frame Cross Section A-A



Mounting Hole



CS7N-680TB-AG / I-V CURVES



ELECTRICAL DATA | STC*

	Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)	Module Efficiency
CS7N-675TB-AG	675 W	39.0 V	17.31 A	46.9 V	18.24 A	21.7%
Bifacial Gain** 5%	709 W	39.0 V	18.19 A	46.9 V	19.15 A	22.8%
Bifacial Gain** 10%	743 W	39.0 V	19.04 A	46.9 V	20.06 A	23.9%
Bifacial Gain** 20%	810 W	39.0 V	20.77 A	46.9 V	21.89 A	26.1%
CS7N-680TB-AG	680 W	39.2 V	17.35 A	47.1 V	18.29 A	21.9%
Bifacial Gain** 5%	714 W	39.2 V	18.22 A	47.1 V	19.20 A	23.0%
Bifacial Gain** 10%	748 W	39.2 V	19.09 A	47.1 V	20.12 A	24.1%
Bifacial Gain** 20%	816 W	39.2 V	20.82 A	47.1 V	21.95 A	26.3%
CS7N-685TB-AG	685 W	39.4 V	17.39 A	47.3 V	18.34 A	22.1%
Bifacial Gain** 5%	719 W	39.4 V	18.26 A	47.3 V	19.26 A	23.1%
Bifacial Gain** 10%	754 W	39.4 V	19.14 A	47.3 V	20.17 A	24.3%
Bifacial Gain** 20%	822 W	39.4 V	20.87 A	47.3 V	22.01 A	26.5%
CS7N-690TB-AG	690 W	39.6 V	17.43 A	47.5 V	18.39 A	22.2%
Bifacial Gain** 5%	725 W	39.6 V	18.31 A	47.5 V	19.31 A	23.3%
Bifacial Gain** 10%	759 W	39.6 V	19.17 A	47.5 V	20.23 A	24.4%
Bifacial Gain** 20%	828 W	39.6 V	20.92 A	47.5 V	22.07 A	26.7%
CS7N-695TB-AG	695 W	39.8 V	17.47 A	47.7 V	18.44 A	22.4%
Bifacial Gain** 5%	730 W	39.8 V	18.34 A	47.7 V	19.36 A	23.5%
Bifacial Gain** 10%	765 W	39.8 V	20.18 A	47.7 V	20.28 A	24.6%
Bifacial Gain** 20%	834 W	39.8 V	20.96 A	47.7 V	22.13 A	26.8%
CS7N-700TB-AG	700 W	40.0 V	17.51 A	47.9 V	18.49 A	22.5%
Bifacial Gain** 5%	735 W	40.0 V	18.39 A	47.9 V	19.41 A	23.7%
Bifacial Gain** 10%	770 W	40.0 V	20.22 A	47.9 V	20.34 A	24.8%
Bifacial Gain** 20%	840 W	40.0 V	21.01 A	47.9 V	22.19 A	27.0%
CS7N-705TB-AG	705 W	40.2 V	17.55 A	48.1 V	18.54 A	22.7%
Bifacial Gain** 5%	740 W	40.2 V	18.43 A	48.1 V	19.47 A	23.8%
Bifacial Gain** 10%	776 W	40.2 V	20.27 A	48.1 V	20.39 A	25.0%
Bifacial Gain** 20%	846 W	40.2 V	21.06 A	48.1 V	22.25 A	27.2%

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.
** Bifacial Gain: The additional gain from the back side compared to the power of the front side at the standard test condition. It depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

ELECTRICAL DATA | NMOT*

	Nominal Max. Power (Pmax)	Opt. Operating Voltage (Vmp)	Opt. Operating Current (Imp)	Open Circuit Voltage (Voc)	Short Circuit Current (Isc)
CS7N-675TB-AG	510 W	36.9 V	13.84 A	44.4 V	14.71 A
CS7N-680TB-AG	514 W	37.1 V	13.88 A	44.6 V	14.75 A
CS7N-685TB-AG	518 W	37.2 V	13.91 A	44.8 V	14.79 A
CS7N-690TB-AG	522 W	37.4 V	13.94 A	45.0 V	14.83 A
CS7N-695TB-AG	526 W	37.6 V	13.97 A	45.2 V	14.87 A
CS7N-700TB-AG	529 W	37.8 V	14.00 A	45.4 V	14.91 A
CS7N-705TB-AG	533 W	38.0 V	14.03 A	45.5 V	14.95 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m² spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	132 [2 x (11 x 6)]
Dimensions	2384 × 1303 × 35 mm (93.9 × 51.3 × 1.38 in)
Weight	37.9 kg (83.6 lbs)
Front Glass	2.0 mm heat strengthened glass with anti-reflective coating
Back Glass	2.0 mm heat strengthened glass
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4.0 mm² (IEC), 12 AWG (UL)
Cable Length (Including Connector)	410 mm (16.1 in) (+) / 250 mm (9.8 in) (-) or 2000 mm (78.7 in) (+) / 1400 mm (55.1 in) (-)
Connector	T6 or MC4 series
Per Pallet	31 pieces
Per Container (40' HQ)	558 pieces or 496 pieces (only for US & Canada)

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

ELECTRICAL DATA

Operating Temperature	-40°C ~ +85°C
Max. System Voltage	1500 V (IEC/UL) or 1000 V (IEC/UL)
Module Fire Performance	TYPE 29 (UL 61730) or CLASS C (IEC61730)
Max. Series Fuse Rating	35 A
Application Classification	Class A
Power Tolerance	0 ~ + 10 W
Power Bifaciality*	80 %

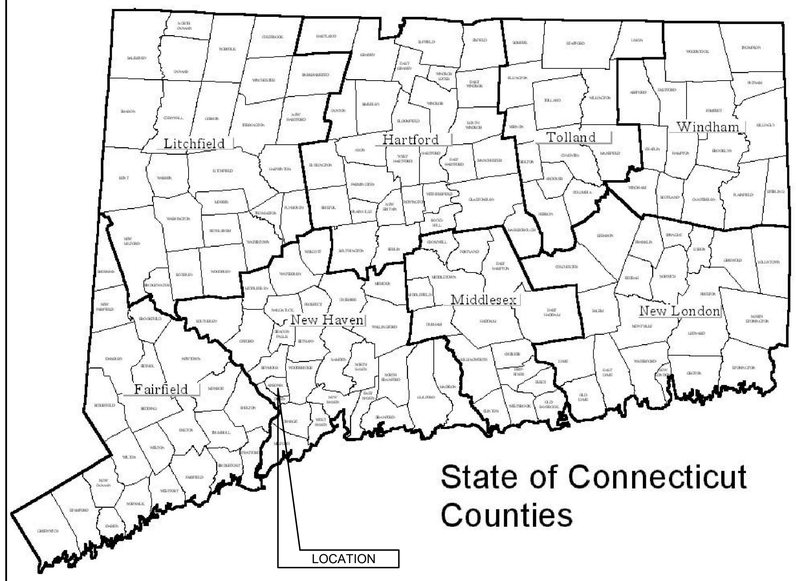
* Power Bifaciality = $Pmax_{rear}$ / $Pmax_{front}$, both $Pmax_{rear}$ and $Pmax_{front}$ are tested under STC, Bifaciality Tolerance: ± 5 %

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice.
Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	41 ± 3°C

PARTNER SECTION



LOCATION MAP

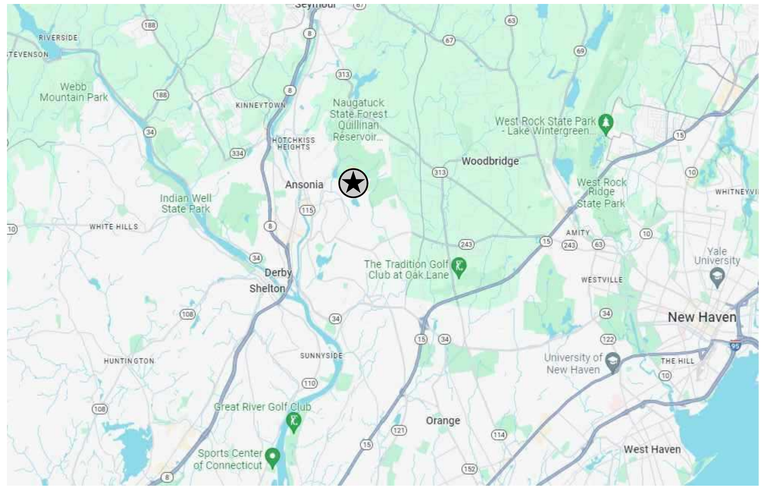
SCALE: N.T.S.

GROUND MOUNTED PV ARRAY INSTALLATION AT:

BENZ SOLAR

31 BENZ STREET

ANSONIA, CT 06041



VICINITY MAP

SCALE: N.T.S.

APPLICABLE CODES

NATIONAL ELECTRIC CODE - 2020
ARTICLE 230 - SERVICES
ARTICLE 240 - OVERCURRENT PROTECTION
ARTICLE 250 - GROUNDING AND BONDING
ARTICLE 300 - WIRING METHODS
ARTICLE 310 - CONDUCTORS
ARTICLE 690 - SOLAR PHOTOVOLTAIC SYSTEMS
ARTICLE 705 - INTERCONNECTED ELECTRIC POWER PRODUCTION SOURCES

PV SYSTEM #1 INFORMATION

SYSTEM SIZE (DC):	1,348.620 kW STC + BIFACIAL GAIN
SYSTEM SIZE (AC):	999.000 kW
INVERTER QUANTITY:	8
INVERTER TYPE:	(7) KACO 125TL3 (125 KW) (1) KACO 125TL3 (124 KW / CURTAILED)
MODULE QUANTITY:	1,976
MODULE TYPE:	(988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL (680W STC) & (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL (685W STC)
RACKING MANUFACTURER:	APA

PV SYSTEM #2 INFORMATION

SYSTEM SIZE (DC):	1,348.620 kW STC + BIFACIAL GAIN
SYSTEM SIZE (AC):	999.000 kW
INVERTER QUANTITY:	8
INVERTER TYPE:	(7) KACO 125TL3 (125 KW) (1) KACO 125TL3 (124 KW / CURTAILED)
MODULE QUANTITY:	1,976
MODULE TYPE:	(988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL (680W STC) & (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL (685W STC)
RACKING MANUFACTURER:	APA

UTILITY INFORMATION

COMPANY:	UNITED ILLUMINATING
ACCOUNT NUMBER:	T.B.D. (NEW ACCOUNT)
METER NUMBERS:	T.B.D. (NEW METERS)
ZREC NUMBER	#ZL22227 (SYSTEM #1) & #ZL22229 (SYSTEM #2)

PROJECT DESCRIPTION

THIS INSTALLATION CONSISTS OF TWO UTILITY INTERACTIVE SOLAR PHOTOVOLTAIC SYSTEMS ON GROUND MOUNTED STRUCTURES, LOCATED IN ANSONIA, CONNECTICUT. THE SYSTEMS ARE COMPRISED OF MODULES MOUNTED TO GROUND MOUNTED RACKING STRUCTURES. THE INVERTERS ARE POWERED BY PARALLEL STRINGS OF MODULES IN SERIES FED THROUGH DC STRING COMBINER BOXES AND DC DISCONNECT SWITCHES. THE AC INVERTER OUTPUTS ARE COMBINED IN TWO PAD MOUNTED AC COMBINER SWITCHBOARDS. FROM EACH AC COMBINER SWITCHBOARD, POWER IS FED THROUGH A TRANSFORMER, CUSTOMER OWNED RECLOSER & PRIMARY METERING CABINET. FROM EACH METERING CABINET, POWER IS FED UNDERGROUND TO THE UTILITY COMPANY POLE SYSTEM.

DRAWING LIST

N/A	COVER SHEET
PV-1A	THREE-LINE DIAGRAM (PART 1 OF 3)
PV-1B	THREE-LINE DIAGRAM (PART 2 OF 3)
PV-1C	THREE-LINE DIAGRAM (PART 3 OF 3)
PV-2	ENLARGED EQUIPMENT AREA PLAN
PV-3	OVERALL SITE ELECTRICAL PLAN
PV-4A, B, C, D	DETAILED ARRAY PLANS (AREAS 'A' THROUGH 'D')
PV-5	SPECIFICATIONS
PV-6	DC STRING WIRE AND CONDUIT SCHEDULES
PV-7	DETAILS
PV-8	NOTES, DETAILS & ABBREVIATIONS
PV-9	EQUIPMENT DATA SHEETS & DETAILS
PV-10	LABELS & SIGNAGE
PV-11	CUSTOMER OWNED RECLOSER DATA SHEETS
PV-12	PRIMARY METERING ENCLOSURE DATA SHEETS
PV-13	EQUIPMENT DATA SHEETS

OTHER DRAWINGS

RACKING MANUFACTURER DRAWINGS
CIVIL ENGINEERING DRAWINGS

REVISIONS:

03-03-2023:	INTERCONNECTION APPLICATION SET
03-15-2024:	INTERCONNECTION APPLICATION REV #1
04-30-2024:	PROGRESS SET - FOR REVIEW

PREPARED FOR:

ecos ENERGY

ecosrenewable.com

PREPARED BY:

SG ENGINEERING LLC

sgedesign.com

CUSTOMER OWNED RECLOSER RELAY SETTINGS

VNOM - 13800V, IMAX - 41.8A, 60Hz
PT=66.4:1; CT=500:1

ANSI #	PICKUP				TOTAL (CLEARING TIME) / TIME DIAL			SETTING (CLEARING TIME) / TIME DIAL	
	V (P.U. / PERCENTAGE)	V PRIMARY	V SECONDARY		CYCLES	SECONDS		CYCLES	SECONDS
27	0.50/50	3983.7	60.0		66	1.10		63	1.05
27	0.88/88	7011.3	105.6		120	2.00		117	1.95
59	1.10/110	8764.2	132.0		120	2.00		117	1.95
59	1.20/120	9560.9	144.0		9.6	0.16		6.6	0.11
		FREQUENCY							
81/U		58.5HZ			18000	300.00		17820	297
81/U		56.5HZ			9.6	0.16		6.6	0.11
81/O		61.2HZ			18000	300.00		17820	297
81/O		62.0HZ			9.6	0.16		6.6	0.11
	FUNCTION	I PRIMARY	RELAY SETTING						
51	AC INVERSE TIME OVERCURRENT	t.b.d.	t.b.d.						
	FUNCTION	RELAY SETTING							
79	RECLOSE FUNCTION	MINIMUM 5 MINUTE DELAY							
51G	RESIDUAL TIME OVERCURRENT	t.b.d.							
50/51P	PHASE INSTANTANEOUS / TIME OVER CURRENT	t.b.d.							
59N	NEUTRAL OVERVOLTAGE RELAY	t.b.d.							
50N	NEUTRAL INSTANTANEOUS OVERCURRENT	t.b.d.							

RELAY NOTES:

1. TOTAL CLEARING TIME INCLUDES 3 CYCLES ESTIMATED OPENING TIME (0.05 SEC).
2. THE RELAY WILL BE PROGRAMMED TO TRIP THE MAIN DISCONNECT WITHIN 2-SEC WHEN THE BATTERY TEST FAILS OR WHEN THERE IS A RELAY HARDWARE FAILURE.
3. AUTO-RESTORATION SCHEME: RELAY PROGRAMMING LOGIC INCLUDED SUCH THAT THE SYSTEM WILL RESTORE THE INTERCONNECTION UPON THE STABILIZATION OF THE UTILITY VOLTAGE AND FREQUENCY AS WELL AS WITHOUT ANY LOCKOUT CONDITIONS. VOLTAGE AND FREQUENCY WILL BE SUPERVISED BY 27, 81, AND 59 ELEMENTS FOR A FIVE-MINUTE DURATION BEFORE CLOSE COMMAND IS INITIATED. DURING THIS DURATION, MANUAL CLOSE WILL BE BLOCKED.
4. LOCKOUT SCHEME: AUTO-RESTORATION IS LOCKED OUT IF THE CIRCUIT BREAKER IS MANUALLY OPENED OR IF THE BATTERY ALARM IS ASSERTED.

REFER TO REPORT FROM CRISTINO & ASSOCIATES, INC. FOR FINAL RELAY SETTINGS AND WITNESS TEST PLAN

EQUIPMENT SCHEDULE

DESIGNATION	ITEM	MAKE & MODEL #	NOTES	FURNISHED BY UTILITY COMPANY?
C1	CUSTOMER OWNED TRANSFORMER 'TX-1'	ABB	1000 KVA, DEAD FRONT, PAD MOUNTED, MINERAL OIL FILLED, 13.8KV GROUNDED WYE HV, 600V GROUNDED WYE LV, 60HZ, 95KV BIL, 6.04%Z, 65°C RISE, SUITABLE FOR REVERSE FEED, FUSING PER MANUFACTURER	NO
C2	CUSTOMER OWNED TRANSFORMER 'TX-2'	JCL ENERGY	1000 KVA, DEAD FRONT, PAD MOUNTED, MINERAL OIL FILLED, 13.8KV GROUNDED WYE HV, 600V GROUNDED WYE LV, 60HZ, 95KV BIL, %Z TBD, 65°C RISE, SUITABLE FOR REVERSE FEED, FUSING PER MANUFACTURER	NO
H1 & H2	REC METER SOCKETS	MILBANK #S3390-FB-XL-C7	BASE METER ENCLOSURE, 2 POSITION, 28"W X 11"D X 34-11/16"H, 'A' BASE	NO
K1 & K2	NET REVENUE METER SOCKETS	MILBANK #S3390-FB-XL-C7	BASE METER ENCLOSURE, 2 POSITION, 28"W X 11"D X 34-11/16"H, 'A' BASE	NO
L1 & L2	NET REVENUE METERS	T.B.D.	FURNISHED & INSTALLED BY U.I.	YES
N1 & N2	REC METERS	T.B.D.	FURNISHED & INSTALLED BY U.I.	YES
P1 & P2	PRIMARY METER CURRENT TRANSFORMERS	ABB KON-11ER, CAT#E-923A427G10	200:5 RATIO, 3.0 RATING FACTOR @ 30°C, 0.15 B-0.1 TO B-0.5 ACCURACY	NO
Q1 & Q2	PRIMARY METER POTENTIAL TRANSFORMERS	ABB VIZ-11 CAT #7525A68G07	70:1 RATIO, 0.3Z ACCURACY, SUPPLIED WITH 0.5E PRIMARY FUSE	NO
R1 & R2	CUSTOMER OWNED VACUUM INTERRUPTERS / RECLOSERS	G&W VIPER-ST VIP378ER-12-1-ST	PAD MOUNTED, 15.5KV RATED, VACUUM INTERRUPTER, 110KV BIL, 12.5KA INTERRUPT RATING, 800A CONTINUOUS RATING, 200A BUSHING WELLS, SINGLE OR THREE-PHASE MANUAL OPERATION, INTEGRAL SEL-651R2 RELAY WITH 8-HOUR BATTERY BACKUP, WEATHERPROOF ENCLOSURE, RELAY SETTINGS TO BE COORDINATED WITH U.I.	NO
T1 & T2	PRIMARY METERING ENCLOSURES	SWITCHGEAR POWER SYSTEMS S.O.#4078, SERIAL #206754, P.O. #BENZ-006	PAD MOUNTED, 15KV CLASS, 200A RATED CONTINUOUS CURRENT, 95KV BIL, NEMA 3R, DEADFRONT, 120V STRIP HEATERS	NO

KEY NOTES (#)

1. CONNECT SYSTEM TO EXISTING POLE #1342 ON THE EAST SIDE OF BENZ STREET, FED FROM U.I. CIRCUIT #3676, SUBSTATION "ANSONIA".
2. NEW PAD MOUNTED CUSTOMER OWNED TRANSFORMER (13.8KV GROUNDED WYE PRIMARY, 600V/347V GROUNDED WYE SECONDARY). PROVIDE TRANSFORMER VAULT/PAD & GROUNDING PER DETAILS ON DRAWING PV-9. FUSE SIZING PER MANUFACTURER'S REQUIREMENTS.
3. CUSTOMER OWNED PAD MOUNTED RECLOSER WITH SEL RELAY, VACUUM INTERRUPTER, MANUALLY OPERABLE. SEL RELAY WILL BE PROVIDED WITH 8-HOUR BATTERY BACKUP AND WILL PROVIDE OVER/UNDER VOLTAGE AND OVER/UNDER FREQUENCY PROTECTION PER TABLE ON PV-1A. REFER TO CRISTINO & ASSOC REPORT FOR FINAL RELAY SETTINGS AND WITNESS TEST PLAN. CONNECT G&W PROVIDED 32-PIN PT CABLE & WIRING PER G&W INSTRUCTIONS. POWER SEL RELAY FROM UTILITY SIDE OF THE RECLOSER.
4. PAD MOUNTED PRIMARY METERING ENCLOSURE. CUSTOMER WILL FURNISH CABINET, PAD, CT'S, PT'S AND H-CHANNEL UNISTRUT FOR MOUNTING OF METERS. U.I. WILL INSTALL, OWN AND MAINTAIN THE CT'S AND PT'S. SEE DETAILS 7/PV-8 AND DRAWING PV-12 FOR REQUIREMENTS.
5. INSTALL GROUNDING WIRE ON AC SIDE OF INVERTER AND CONNECT BACK TO GROUNDING ELECTRODE OF THE EXISTING MAIN ELECTRICAL SERVICE. REFER TO DETAIL 2 ON PV-8.
6. SEE SEPARATE DRAWING SET FOR REC #LL25280 (HILL STREET SOLAR).
7. PROVIDE RIGID GALVANIZED CONDUIT SWEEPS AT BASE OF RISER POLE. SEE DETAIL 2/PV-7 FOR ADDITIONAL REQUIREMENTS.
8. MOUNT METEOROLOGICAL STATION (MET ENCLOSURE) IN LOCATION INDICATED ON PV-2. PROVIDE AND CONNECT ALL SENSORS, INCLUDING WEATHER, PYRANOMETER AND BACK OF MODULE SENSORS. SEE NORCAL WIRING DIAGRAMS FOR REQUIREMENTS.
9. INSTALL CELLULAR ANTENNA AND COAX CABLE TO DAS CONTROL PANEL. SEE NORCAL WIRING DIAGRAMS FOR REQUIREMENTS.
10. PROVIDE RS485 COMMUNICATION WIRING TO SYSTEM OWNER'S METER PER MANUFACTURER'S INSTRUCTIONS. DAISY CHAIN BETWEEN INVERTERS. SEE NORCAL WIRING DIAGRAMS.
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12. INSTALL INVERTER AS INDICATED IN THE EQUIPMENT SCHEDULE ON THIS DRAWING. REFER TO THE "INVERTER DATA" TABLE ON THIS DRAWING FOR ADDITIONAL INFORMATION. PROVIDE NARROW TONGUE LUGS FOR INVERTER AC TERMINATIONS.
13. INSTALL #6 EQUIPMENT GROUNDING CONDUCTOR AND BOND TO ALL PV ARRAY FRAMES, RACKING, AND MODULE FRAMES. CONNECT CONDUCTOR BACK TO DC GROUNDING BAR INSIDE INVERTER. REFER TO DETAIL 2 ON PV-8.
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15. U.I. APPROVED METER SOCKET WITH TEST SWITCHES, MOUNTED TO H-FRAME UNISTRUT. THE METER & TEST SWITCH WILL BE FURNISHED AND INSTALLED BY UNITED ILLUMINATING. CONDUIT BETWEEN METER AND METERING CABINET WILL NOT EXCEED 125'. SEE DETAILS 5/PV-7 & 3/PV-13.
16. PROVIDE (2) 4" SCHEDULE 80 PVC CONDUITS UNDERGROUND AS NOTED. CONDUIT AND TRENCH SHALL BE INSTALLED PER U.I. STANDARDS. SEE DRAWING PV-7 FOR TRENCH DETAILS. U.I. WILL PROVIDE PRIMARY CABLING AS NOTED, ON A BILLABLE BASIS.
17. U.I. WILL PROVIDE A NEW POLE WITH AN AIR BREAK SWITCH AND TRANSITION FROM AERIAL CABLE TO OPEN WIRE. SEE DRAWING PV-3 FOR LOCATION.
18. U.I. WILL PROVIDE A NEW POLE WITH A UTILITY RECLOSER. SEE DRAWING PV-3 FOR LOCATION.
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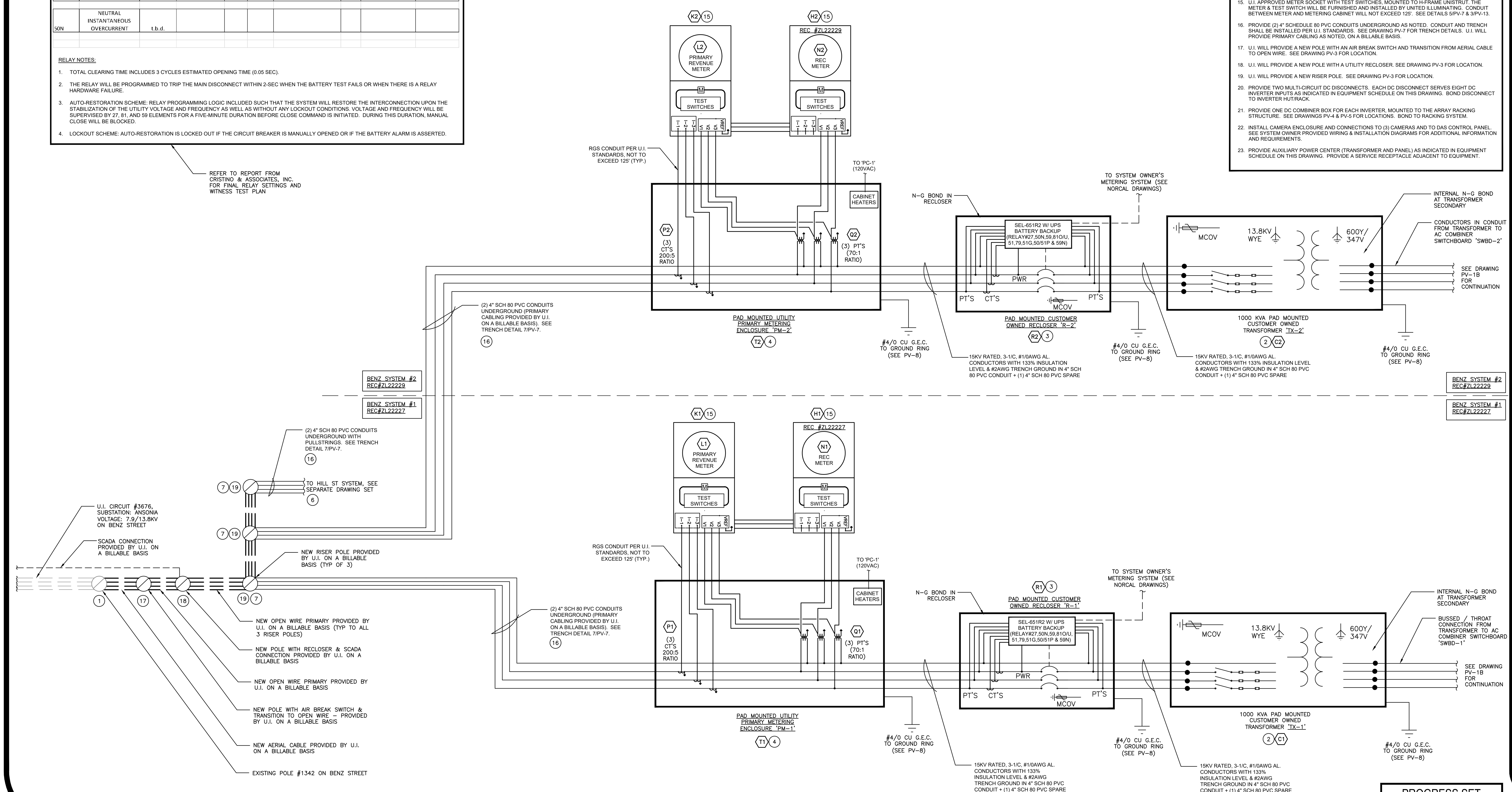
21. PROVIDE ONE DC COMBINER BOX FOR EACH INVERTER, MOUNTED TO THE ARRAY RACKING STRUCTURE. SEE DRAWINGS PV-4 & PV-5 FOR LOCATIONS. BOND TO RACKING SYSTEM.
22. INSTALL CAMERA ENCLOSURE AND CONNECTIONS TO (3) CAMERAS AND TO DAS CONTROL PANEL. SEE SYSTEM OWNER PROVIDED WIRING & INSTALLATION DIAGRAMS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
23. PROVIDE AUXILIARY POWER CENTER (TRANSFORMER AND PANEL) AS INDICATED IN EQUIPMENT SCHEDULE ON THIS DRAWING. PROVIDE A SERVICE RECEPTACLE ADJACENT TO EQUIPMENT.



PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENDREAU · No. 27497 · LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

THREE-LINE DIAGRAM
(PART 1 OF 3)

Project	Sheet
	PV-1A
Date: APRIL 30, 2024	
Scale: NTS	

EQUIPMENT SCHEDULE

DESIGNATION	ITEM	MAKE & MODEL #	NOTES	FURNISHED BY UTILITY COMPANY?
A1 & A2	AC COMBINER SWITCHBOARDS	QT / SIEMENS OR EQUAL	600VAC, 3PH, 4W, 1200A RATED, 65KAIC, NEMA 3R, BREAKER SIZES & QUANTITIES AS INDICATED, GFP MAIN BREAKER, ARC ENERGY REDUCTION SWITCH	NO
Z	AUXILIARY POWER CENTER WITH TRANSFORMER	SIEMENS OR EQUAL	POWER CENTER WITH 7500KVA TRANSFORMER (600VAC, 1-PH TO 240/120V, 1-PH), 40A-2P MCB, BRANCH BREAKERS AS INDICATED	NO

AC FEEDER SCHEDULE

LOCATION	LENGTH	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	CONDUCTORS	NEUTRAL	GND	CONDUCTOR MATERIAL	CONDUCTOR TYPE	MIN CONDUCTOR RATING	FILL FACTOR	VOLTAGE DROP
SWBD-1 TO INVERTER 1	40'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-1 TO INVERTER 2	35'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-1 TO INVERTER 3	25'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.1%
SWBD-1 TO INVERTER 4	20'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.1%
SWBD-1 TO INVERTER 5	20'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-1 TO INVERTER 6	25'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-1 TO INVERTER 7	35'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-1 TO INVERTER 8	40'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.2%
SWBD-2 TO INVERTER 9	55'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 10	60'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 11	65'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 12	70'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.4%
SWBD-2 TO INVERTER 13	55'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 14	60'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 15	65'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.3%
SWBD-2 TO INVERTER 16	70'	1	2"	PVC	3 #3/0	N/A	1 #4	ALUMINUM	XHHW-2	600VAC	25.7%	0.4%
SWBD-1 TO PC-1	15'	1	0.75"	PVC	2#12	N/A	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.1%
PC-1 TO SYSTEM OWNER'S METER	10'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.2%
PC-1 TO SERVICE RECEPTACLES	10'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.2%
PC-1 TO PRIMARY METER CABINET PM-1 HEATERS	40'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.3%
PC-1 TO MET ENCLOSURE	10'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.2%
PC-1 TO CAMERA ENCLOSURE	10'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.2%
PC-1 TO PRIMARY METER CABINET PM-2 HEATERS	55'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.4%
TX-2 TO SWBD-2	15'	3	4"	PVC	3 #600	1 #600	1 #3/0	COPPER	XHHW-2	600VAC	28.7%	0.1%
PM-1 TO R-1	20'	1	4"	PVC	3 #1/0	1 #1/0	1 #2	ALUMINUM	MV-105	15KV	30.1%	0.0%
R-1 TO TX-1	15'	1	4"	PVC	3 #1/0	1 #1/0	1 #2	ALUMINUM	MV-105	15KV	30.1%	0.0%
PM-2 TO R-2	20'	1	4"	PVC	3 #1/0	1 #1/0	1 #2	ALUMINUM	MV-105	15KV	30.1%	0.0%
R-2 TO TX-2	30'	1	4"	PVC	3 #1/0	1 #1/0	1 #2	ALUMINUM	MV-105	15KV	30.1%	0.0%
PC-1 TO PRIMARY METER CABINET PM-3 HEATERS (FUTURE)	75'	1	0.75"	PVC	1#12	1 #12	1 #12	COPPER	XHHW-2	600VAC	12.2%	0.6%

NOTE - ONE WAY LENGTHS OF RUN INDICATED IN THIS TABLE ARE FOR VOLTAGE DROP CALCULATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY EXACT LENGTHS.

KEY NOTES

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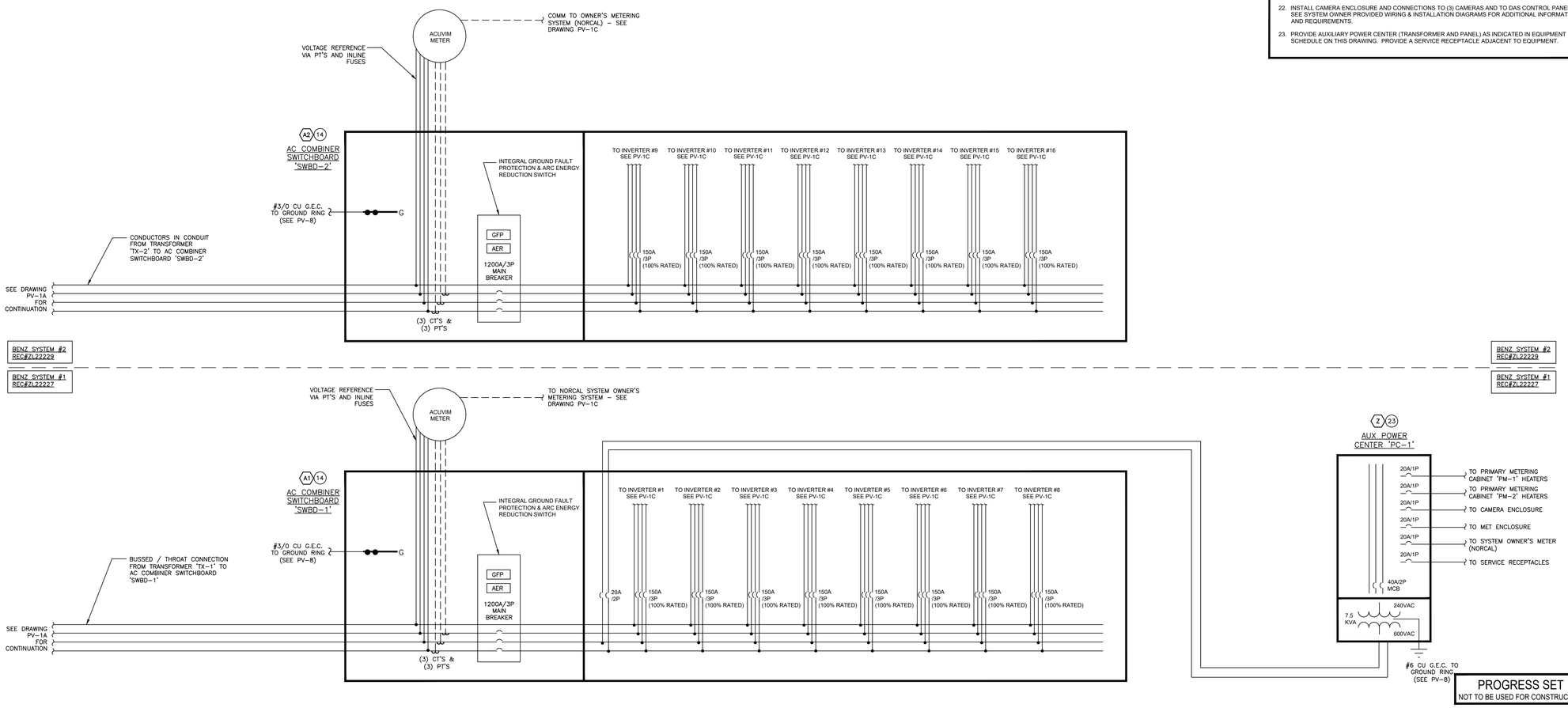

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
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TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

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REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

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STATE OF CONNECTICUT · STEPHEN GEORGE · LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

THREE-LINE DIAGRAM
(PART 2 OF 3)

Project	Sheet
Date: APRIL 30, 2024	PV-1B
Scale: NTS	

KEY NOTES

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14. INSTALL AC COMBINER SWITCHBOARD AS INDICATED IN EQUIPMENT SCHEDULE ON THIS DRAWING. SEE QT CORPORATION DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
15. U.I. APPROVED METER SOCKET WITH TEST SWITCHES, MOUNTED TO H-FRAME UNISTRUT. THE METER & TEST SWITCH WILL BE FURNISHED AND INSTALLED BY UNITED ILLUMINATING. CONDUIT BETWEEN METER AND METERING CABINET WILL NOT EXCEED 125'. SEE DETAILS 5/PV-7 & 3/PV-13.
16. PROVIDE (2) 4" SCHEDULE 80 PVC CONDUITS UNDERGROUND AS NOTED. CONDUIT AND TRENCH SHALL BE INSTALLED PER U.I. STANDARDS. SEE DRAWING PV-7 FOR TRENCH DETAILS. U.I. WILL PROVIDE PRIMARY CABLING AS NOTED, ON A BILLABLE BASIS.
17. U.I. WILL PROVIDE A NEW POLE WITH AN AIR BREAK SWITCH AND TRANSITION FROM AERIAL CABLE TO OPEN WIRE. SEE DRAWING PV-3 FOR LOCATION.
18. U.I. WILL PROVIDE A NEW POLE WITH A UTILITY RECLOSER. SEE DRAWING PV-3 FOR LOCATION.
19. U.I. WILL PROVIDE A NEW RISER POLE. SEE DRAWING PV-3 FOR LOCATION.
20. PROVIDE TWO MULTI-CIRCUIT DC DISCONNECTS. EACH DC DISCONNECT SERVES EIGHT DC INVERTER INPUTS AS INDICATED IN EQUIPMENT SCHEDULE ON THIS DRAWING. BOND DISCONNECT TO INVERTER HUT/RACK.
21. PROVIDE ONE DC COMBINER BOX FOR EACH INVERTER, MOUNTED TO THE ARRAY RACKING STRUCTURE. SEE DRAWINGS PV-4 & PV-5 FOR LOCATIONS. BOND TO RACKING SYSTEM.
22. INSTALL CAMERA ENCLOSURE AND CONNECTIONS TO (3) CAMERAS AND TO DAS CONTROL PANEL. SEE SYSTEM OWNER PROVIDED WIRING & INSTALLATION DIAGRAMS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
23. PROVIDE AUXILIARY POWER CENTER (TRANSFORMER AND PANEL) AS INDICATED IN EQUIPMENT SCHEDULE ON THIS DRAWING. PROVIDE A SERVICE RECEPTACLE ADJACENT TO EQUIPMENT.

INVERTER RELAY SETTINGS (UL1741 SA)

Shall Trip Function	Required Settings: Voltage (p.u. of nominal voltage)	Required Settings: Clearing Time(s)
OV2	1.20	0.16
OV1	1.10	2.0
UV1	0.88	2.0
UV2	0.50	1.1

TABLE I: INVERTERS' VOLTAGE TRIP SETTINGS

Shall Trip Function	Required Settings: Frequency (Hz)	Required Settings: Clearing Time(s)
OF2	62.0	0.16
OF1	61.2	300.0
UF1	58.5	300.0
UF2	56.5	0.16

TABLE II: INVERTERS' FREQUENCY TRIP SETTINGS

Voltage Range (p.u.)	Operating Mode/ Response	Minimum Ride-through Time(s) (design criteria)	Maximum Response Time(s) (design criteria)
V > 1.20	Cease to Energize	N/A	0.16
1.175 < V ≤ 1.20	Permissive Operation	0.2	N/A
1.15 < V ≤ 1.175	Permissive Operation	0.5	N/A
1.10 < V ≤ 1.15	Permissive Operation	1	N/A
0.88 ≤ V ≤ 1.10	Continuous Operation	infinite	N/A
0.65 ≤ V < 0.88	Mandatory Operation	Linear slope of 8.7 s/1 p.u. voltage starting at 3 s @ 0.65 p.u.: $T_{VRT} = 3\,s + \frac{8.7\,s}{1\,p.u.}(V - 0.65\,p.u.)$	N/A
0.45 ≤ V < 0.65	Permissive Operation[a,b]	0.32	N/A
0.30 ≤ V < 0.45	Permissive Operation[b]	0.16	N/A
V < 0.30	Cease to Energize	N/A	0.16

The following additional operational requirements shall apply for all inverters:
a. In the Permissive Operation region above 0.5 p.u., inverters shall ride-through in Mandatory Operation mode, and
b. In the Permissive Operation region below 0.5 p.u., inverters shall ride-through in Momentary Cessation mode with a maximum response time of 0.083 seconds.

TABLE III: INVERTERS' VOLTAGE RIDE-THROUGH CAPABILITY & OPERATIONAL REQUIREMENTS

Frequency Range (Hz)	Operating Mode	Minimum Time(s) (design criteria)
f > 62.0	No ride-through requirements apply to this range	
61.2 < f ≤ 61.8	Mandatory Operation	299
58.8 ≤ f ≤ 61.2	Continuous Operation	Infinite
57.0 ≤ f < 58.8	Mandatory Operation	299
f < 57.0	No ride-through requirements apply to this range	

TABLE IV: INVERTERS' FREQUENCY RIDE-THROUGH CAPABILITY

Function	Default Activation State
SPF, Specified Power Factor	OFF[2]
Q(V), Volt-Var Function with Watt or Var Priority	OFF
SS, Soft-Start Ramp Rate	ON Default value: 2% of maximum current output per second
FW, Freq-Watt Function OFF	OFF

TABLE V: GRID SUPPORT UTILITY INTERACTIVE INVERTER FUNCTIONS STATUS

NOTE - INVERTERS TO BE SET TO ISO NE COUNTRY CODE TO COMPLY WITH GRID PROTECTION SETTINGS

EQUIPMENT SCHEDULE

DESIGNATION	ITEM	MAKE & MODEL #	NOTES	FURNISHED BY UTILITY COMPANY?
B	DC COMBINER BOX (TYP)	TERRASMART OR EQUAL	2-POLE OUTPUT, 320A CONTINUOUS RATED, 1500VDC DISCONNECT, 100% LOAD BREAK RATED, INTEGRAL SURGE SUPPRESSION, NEMA 4X ENCLOSURE, 10 STRING CAPACITY	NO
D	OWNER'S PRODUCTION METER	NOR-CAL CONTROLS	DAS	NO
E1	PYRANOMETER (TYP)	HUKSEFLUX SR30	PROVIDE WIRING TO MET ENCLOSURE	NO
E2	BACK OF MODULE SENSOR (TYP)	MANUFACTURER T.B.D.	PROVIDE WIRING TO MET ENCLOSURE	NO
E3	WEATHER SENSOR (TYP)	LUFFT WS600	PROVIDE WIRING TO MET ENCLOSURE	NO
F1	INVERTER TYPE 'F1' (TYP)	KACO 125TL3	SEE INVERTER INFO ON THIS SHEET	NO
F2	INVERTER TYPE 'F2' (TYP)	KACO 125TL3 CURTAILED TO 124KWAC	SEE INVERTER INFO ON THIS SHEET, CURTAILED TO 124KWAC	NO
G	PV MODULES (TYP)	CANADIAN SOLAR CS7N-680TB-AG (680 WATTS) & CS7N-685TB-AG (685 WATTS), BIFACIAL, 1500VDC MAX	SEE DATA SHEETS ON PV-9, SEE TABLE ON DRAWING PV-6 FOR WHICH MODULES ARE USED ON EACH STRING	NO
M1 & M2	DC DISCONNECT SWITCHES	TERRASMART OR EQUAL	16-POLE, 320A CONTINUOUS RATED, 1500VDC RATED, NON-LOAD BREAK TYPE, NEMA 4X ENCLOSURE	NO

INVERTER DATA

	INVERTER TYPE 'F1'	INVERTER TYPE 'F2'
MANUFACTURER	KACO	KACO
MODEL #	125TL3	125TL3
STRINGS PER INVERTER	SEE PV-6	SEE PV-6
MODULES / STRING	SEE PV-6	SEE PV-6
MODULE QUANTITY	SEE PV-6	SEE PV-6
MODULE WATTS (W)	SEE PV-6	SEE PV-6
PANEL SC CURRENT (A)	18.29 / 18.34	18.29 / 18.34
STRING FUSE SIZE	35A	35A
COMBINER BOX WATTS	######	######
INTEGRAL AFCI?	TBD	TBD
INTEGRAL GFCI?	TBD	TBD
MAX DC VOLTAGE (V)	1500	1500
MAX DC CURRENT (A)	160	160
AC OUTPUT POWER (KW)	125	124
AC OUTPUT VOLTAGE (V)	600	600
AC OUTPUT CURRENT (A)	120.3	119.3
WYE OR DELTA?	DELTA	DELTA
UL 1741 SA CERTIFIED?	YES	YES

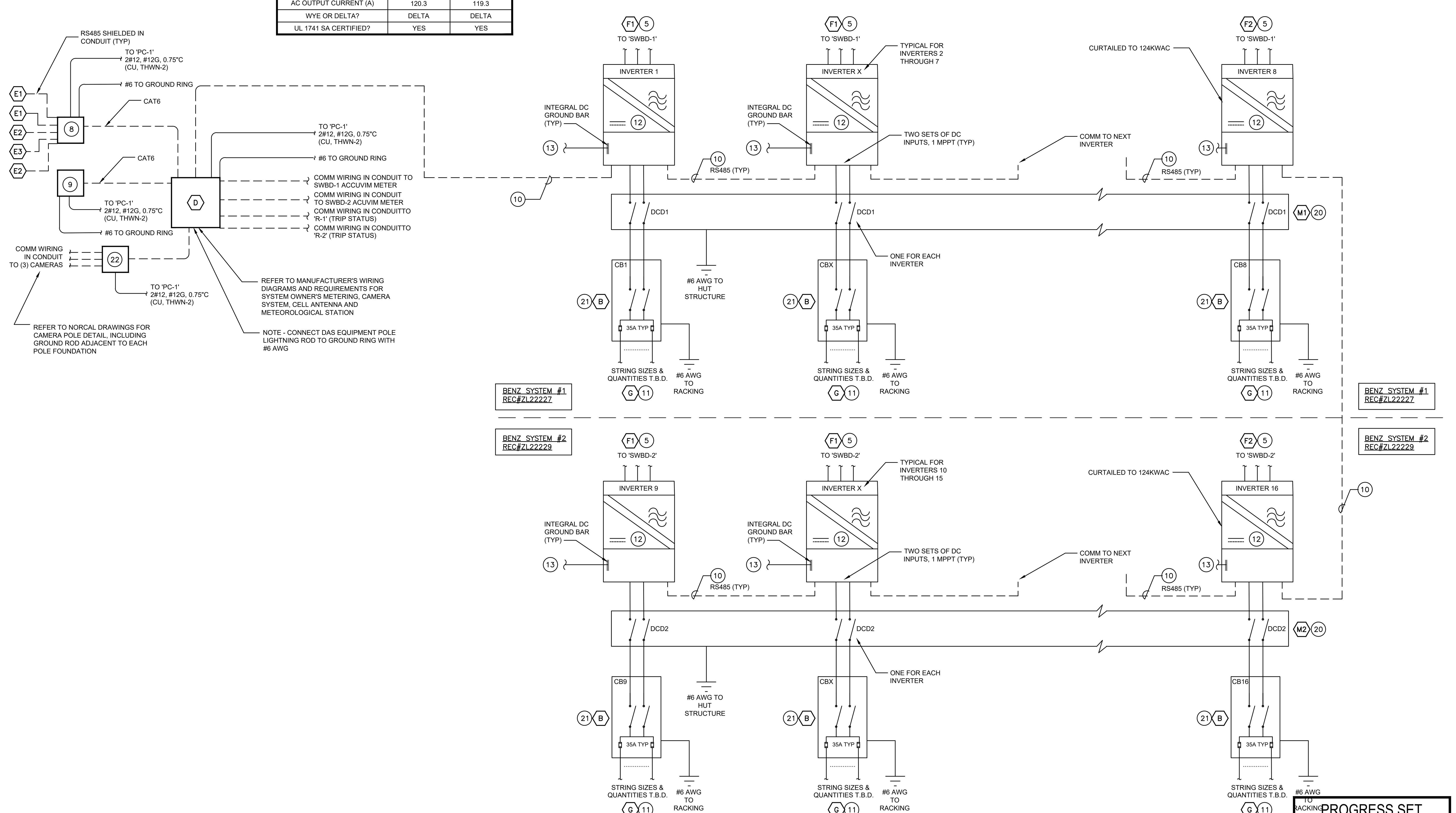
STATED VALUES ARE STC , NOT INCLUDING BIFACIAL GAIN

INVERTER TYPE 'F2' IS CURTAILED TO 124KWAC

DC FEEDER SCHEDULE

LOCATION	LENGTH (FEET)	# OF PARALLEL CONDUITS	CONDUIT SIZE	CONDUIT TYPE	CONDUCTORS PER CONDUIT	GND PER CONDUIT	CONDUCTOR MATERIAL	CONDUCTOR TYPE	CONDUCTOR RATING	FILL FACTOR	VOLTAGE DROP
CB-1 TO DCD1	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD1 TO INVERTER 1	20	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-2 TO DCD1	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD1 TO INVERTER 2	15	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.1%
CB-3 TO DCD1	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD1 TO INVERTER 3	10	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-4 TO DCD1	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD1 TO INVERTER 4	5	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-5 TO DCD1	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD1 TO INVERTER 5	5	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
CB-6 TO DCD1	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD1 TO INVERTER 6	10	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.1%
CB-7 TO DCD1	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD1 TO INVERTER 7	15	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-8 TO DCD1	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD1 TO INVERTER 8	20	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.2%
CB-9 TO DCD2	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD2 TO INVERTER 9	5	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-10 TO DCD2	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD2 TO INVERTER 10	10	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.1%
CB-11 TO DCD2	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD2 TO INVERTER 11	15	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-12 TO DCD2	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD2 TO INVERTER 12	20	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-13 TO DCD2	0	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
DCD2 TO INVERTER 13	5	1	3"	PVC	2#500	1 #1	ALUMINUM	PV WIRE	2000V	26.4%	0.0%
CB-14 TO DCD2	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD2 TO INVERTER 14	10	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.1%
CB-15 TO DCD2	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD2 TO INVERTER 15	15	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.1%
CB-16 TO DCD2	0	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.0%
DCD2 TO INVERTER 16	20	1	4"	PVC	2#750	1 #1	ALUMINUM	PV WIRE	2000V	21.6%	0.2%

NOTE - ONE WAY LENGTHS OF RUN INDICATED IN THIS TABLE ARE FOR VOLTAGE DROP CALCULATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY EXACT LENGTHS.



PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

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TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

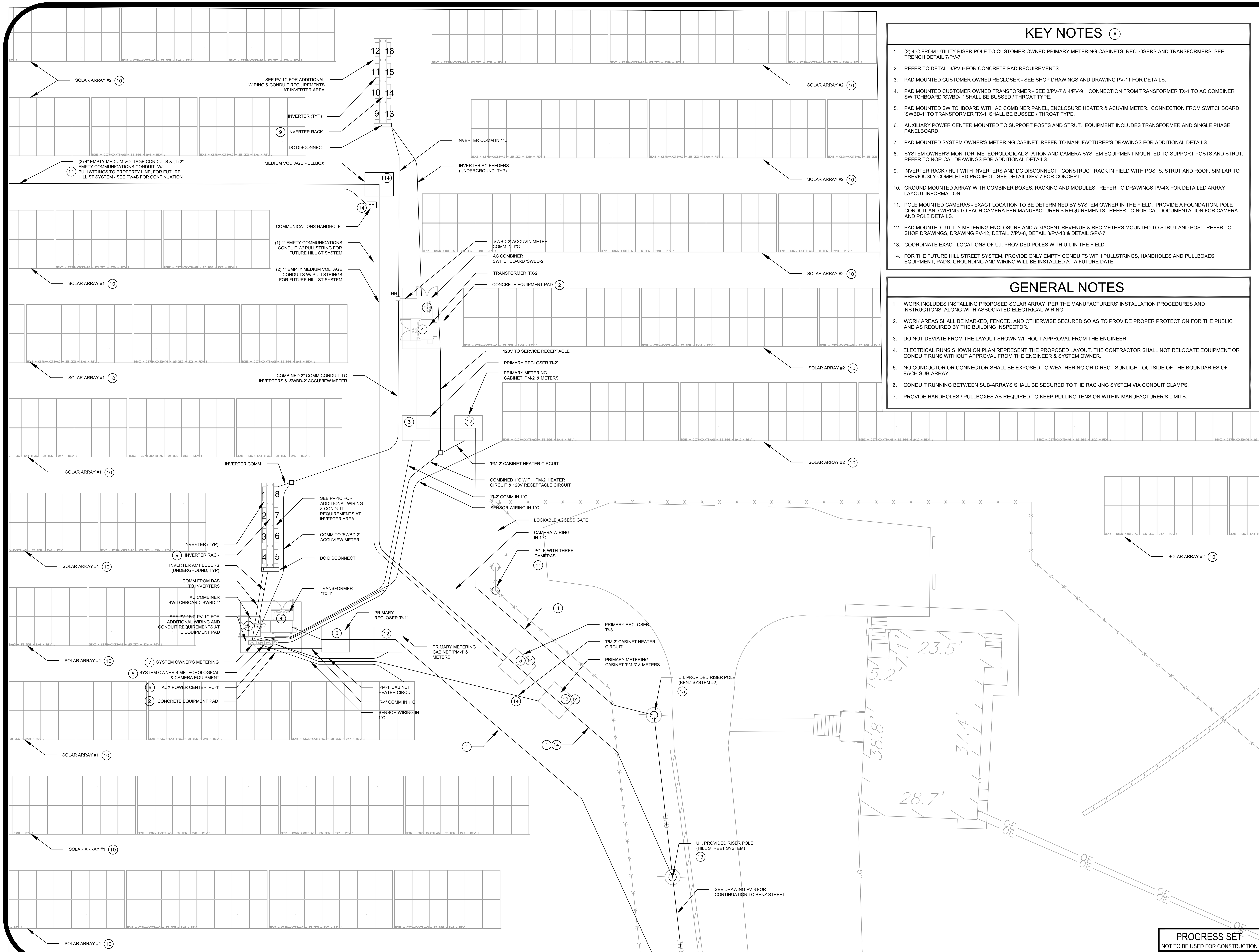
No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

THREE-LINE DIAGRAM
(PART 3 OF 3)

Project	Sheet
Date APRIL 30, 2024	PV-1C
Scale NTS	



KEY NOTES (#)

1. (2) 4"C FROM UTILITY RISER POLE TO CUSTOMER OWNED PRIMARY METERING CABINETS, RECLOSERS AND TRANSFORMERS. SEE TRENCH DETAIL 7/PV-7
2. REFER TO DETAIL 3/PV-9 FOR CONCRETE PAD REQUIREMENTS.
3. PAD MOUNTED CUSTOMER OWNED RECLOSER - SEE SHOP DRAWINGS AND DRAWING PV-11 FOR DETAILS.
4. PAD MOUNTED CUSTOMER OWNED TRANSFORMER - SEE 3/PV-7 & 4/PV-9 . CONNECTION FROM TRANSFORMER TX-1 TO AC COMBINER SWITCHBOARD 'SWBD-1' SHALL BE BUSSED / THROAT TYPE.
5. PAD MOUNTED SWITCHBOARD WITH AC COMBINER PANEL, ENCLOSURE HEATER & ACUVIM METER. CONNECTION FROM SWITCHBOARD 'SWBD-1' TO TRANSFORMER 'TX-1' SHALL BE BUSSED / THROAT TYPE.
6. AUXILIARY POWER CENTER MOUNTED TO SUPPORT POSTS AND STRUT. EQUIPMENT INCLUDES TRANSFORMER AND SINGLE PHASE PANELBOARD.
7. PAD MOUNTED SYSTEM OWNER'S METERING CABINET. REFER TO MANUFACTURER'S DRAWINGS FOR ADDITIONAL DETAILS.
8. SYSTEM OWNER'S MONITOR, METEOROLOGICAL STATION AND CAMERA SYSTEM EQUIPMENT MOUNTED TO SUPPORT POSTS AND STRUT. REFER TO NOR-CAL DRAWINGS FOR ADDITIONAL DETAILS.
9. INVERTER RACK / HUT WITH INVERTERS AND DC DISCONNECT. CONSTRUCT RACK IN FIELD WITH POSTS, STRUT AND ROOF, SIMILAR TO PREVIOUSLY COMPLETED PROJECT. SEE DETAIL 6/PV-7 FOR CONCEPT.
10. GROUND MOUNTED ARRAY WITH COMBINER BOXES, RACKING AND MODULES. REFER TO DRAWINGS PV-4X FOR DETAILED ARRAY LAYOUT INFORMATION.
11. POLE MOUNTED CAMERAS - EXACT LOCATION TO BE DETERMINED BY SYSTEM OWNER IN THE FIELD. PROVIDE A FOUNDATION, POLE CONDUIT AND WIRING TO EACH CAMERA PER MANUFACTURER'S REQUIREMENTS. REFER TO NOR-CAL DOCUMENTATION FOR CAMERA AND POLE DETAILS.
12. PAD MOUNTED UTILITY METERING ENCLOSURE AND ADJACENT REVENUE & REC METERS MOUNTED TO STRUT AND POST. REFER TO SHOP DRAWINGS, DRAWING PV-12, DETAIL 7/PV-8, DETAIL 3/PV-13 & DETAIL 5/PV-7
13. COORDINATE EXACT LOCATIONS OF U.I. PROVIDED POLES WITH U.I. IN THE FIELD.
14. FOR THE FUTURE HILL STREET SYSTEM, PROVIDE ONLY EMPTY CONDUITS WITH PULLSTRINGS, HANDHOLES AND PULLBOXES. EQUIPMENT, PADS, GROUNDING AND WIRING WILL BE INSTALLED AT A FUTURE DATE.

GENERAL NOTES

1. WORK INCLUDES INSTALLING PROPOSED SOLAR ARRAY PER THE MANUFACTURERS' INSTALLATION PROCEDURES AND INSTRUCTIONS, ALONG WITH ASSOCIATED ELECTRICAL WIRING.
2. WORK AREAS SHALL BE MARKED, FENCED, AND OTHERWISE SECURED SO AS TO PROVIDE PROPER PROTECTION FOR THE PUBLIC AND AS REQUIRED BY THE BUILDING INSPECTOR.
3. DO NOT DEVIATE FROM THE LAYOUT SHOWN WITHOUT APPROVAL FROM THE ENGINEER.
4. ELECTRICAL RUNS SHOWN ON PLAN REPRESENT THE PROPOSED LAYOUT. THE CONTRACTOR SHALL NOT RELOCATE EQUIPMENT OR CONDUIT RUNS WITHOUT APPROVAL FROM THE ENGINEER & SYSTEM OWNER.
5. NO CONDUCTOR OR CONNECTOR SHALL BE EXPOSED TO WEATHERING OR DIRECT SUNLIGHT OUTSIDE OF THE BOUNDARIES OF EACH SUB-ARRAY.
6. CONDUIT RUNNING BETWEEN SUB-ARRAYS SHALL BE SECURED TO THE RACKING SYSTEM VIA CONDUIT CLAMPS.
7. PROVIDE HANDHOLES / PULLBOXES AS REQUIRED TO KEEP PULLING TENSION WITHIN MANUFACTURER'S LIMITS.

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

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REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT STEPHEN GENDREAU LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

ENLARGED EQUIPMENT AREA PLAN

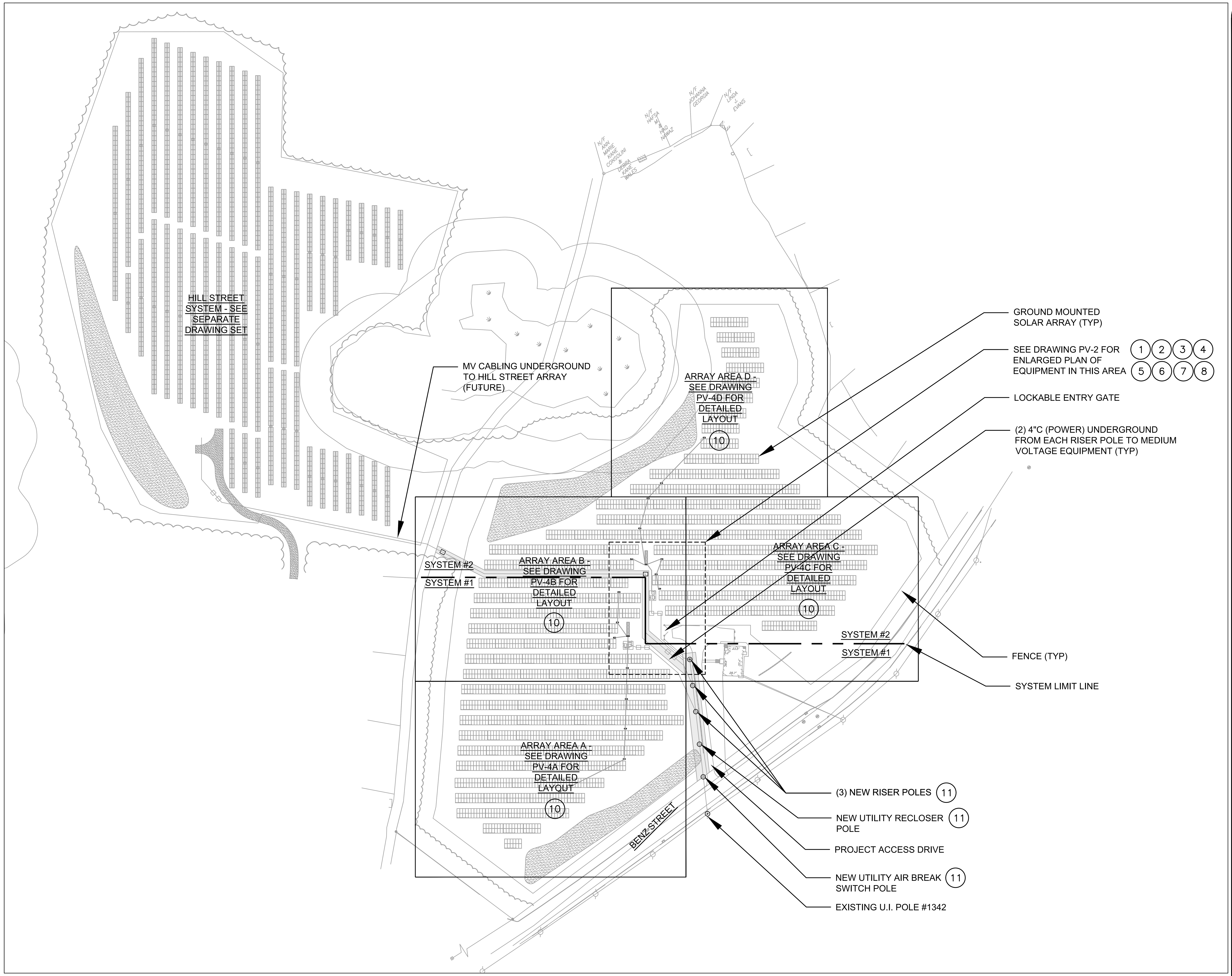
Project	Sheet
Date APRIL 30, 2024	PV-2
Scale NTS	

GENERAL NOTES

1. WORK INCLUDES INSTALLING PROPOSED SOLAR PANEL ARRAY PER THE MANUFACTURERS' INSTALLATION PROCEDURES AND INSTRUCTIONS, ALONG WITH ASSOCIATED ELECTRICAL WIRING.
2. WORK AREAS SHALL BE MARKED, FENCED, AND OTHERWISE SECURED SO AS TO PROVIDE PROPER PROTECTION FOR THE PUBLIC AND AS REQUIRED BY THE BUILDING INSPECTOR.
3. THE CONTRACTOR SHALL NOT DEVIATE FROM THE LAYOUT SHOWN WITHOUT APPROVAL FROM THE ENGINEER.
4. ELECTRICAL RUNS SHOWN ON PLAN REPRESENT THE PROPOSED LAYOUT. THE CONTRACTOR SHALL NOT RELOCATE EQUIPMENT WITHOUT APPROVAL FROM THE ENGINEER & SYSTEM OWNER.
5. NO CONDUCTOR OR CONNECTOR SHALL BE EXPOSED TO WEATHERING OR DIRECT SUNLIGHT OUTSIDE OF THE BOUNDARIES OF EACH SUB-ARRAY.
6. CONDUIT RUNNING BETWEEN SUB-ARRAYS SHALL BE SECURED TO THE RACKING SYSTEM VIA CONDUIT CLAMPS.
7. PROVIDE HANDHOLES / PULLBOXES PER CODE.

KEY NOTES (#)

1. DC DISCONNECTS MOUNTED TO STRUT AT EACH INVERTER RACK / HUT.
2. PAD MOUNTED CUSTOMER OWNED RECLOSERS.
3. INVERTERS 1 THROUGH 16 MOUNTED TO STRUT RACKS / HUTS.
4. PAD MOUNTED SWITCHBOARDS WITH AC COMBINERS.
5. PAD MOUNTED UTILITY COMPANY PRIMARY METERING ENCLOSURES WITH ADJACENT STRUT MOUNTED UTILITY REVENUE METERS & REC METERS.
6. PAD MOUNTED CUSTOMER OWNED TRANSFORMERS.
7. AUXILIARY POWER CENTER MOUNTED TO STRUT RACK.
8. SYSTEM OWNER'S METERING & MONITORING SYSTEMS (MULTIPLE COMPONENTS) MOUNTED TO STRUT RACKS.
9. NOT USED.
10. DC COMBINER BOXES MOUNTED TO ARRAY RACKING STRUCTURES - SEE PV-4X DRAWINGS5 FOR EXACT LOCATIONS.
11. COORDINATE EXACT LOCATIONS OF UTILITY POLES WITH U.I. IN THE FIELD.



1 / PV-3 OVERALL SITE ELECTRICAL PLAN
1" = 80'-0"

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REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

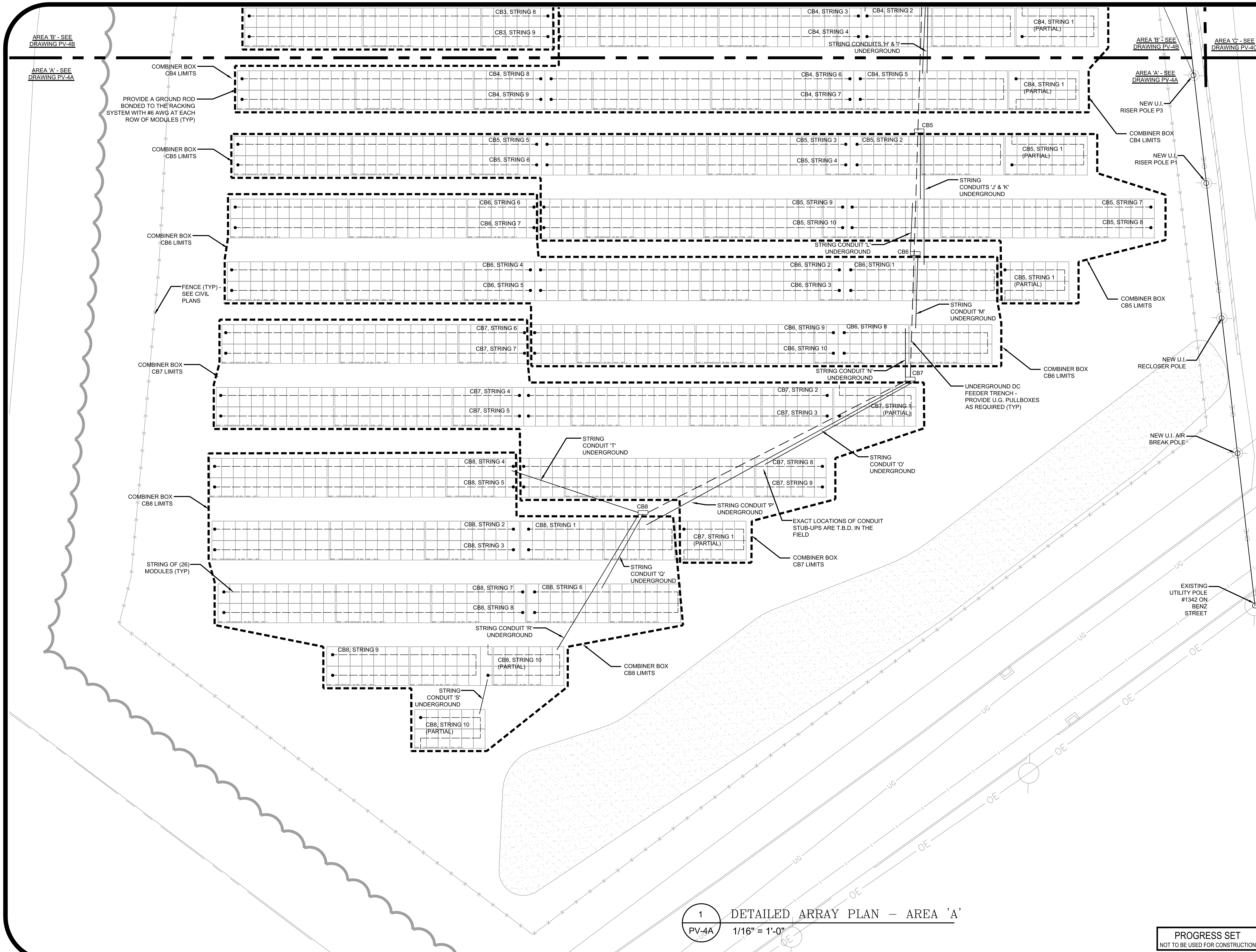
BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

OVERALL SITE ELECTRICAL PLAN

Project	Sheet
Date APRIL 30, 2024	PV-3
Scale 1" = 80'-0"	

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION



1 PV-4A DETAILED ARRAY PLAN – AREA 'A'
1/16" = 1'-0"

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

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REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENDREAU · LICENSED PROFESSIONAL ENGINEER

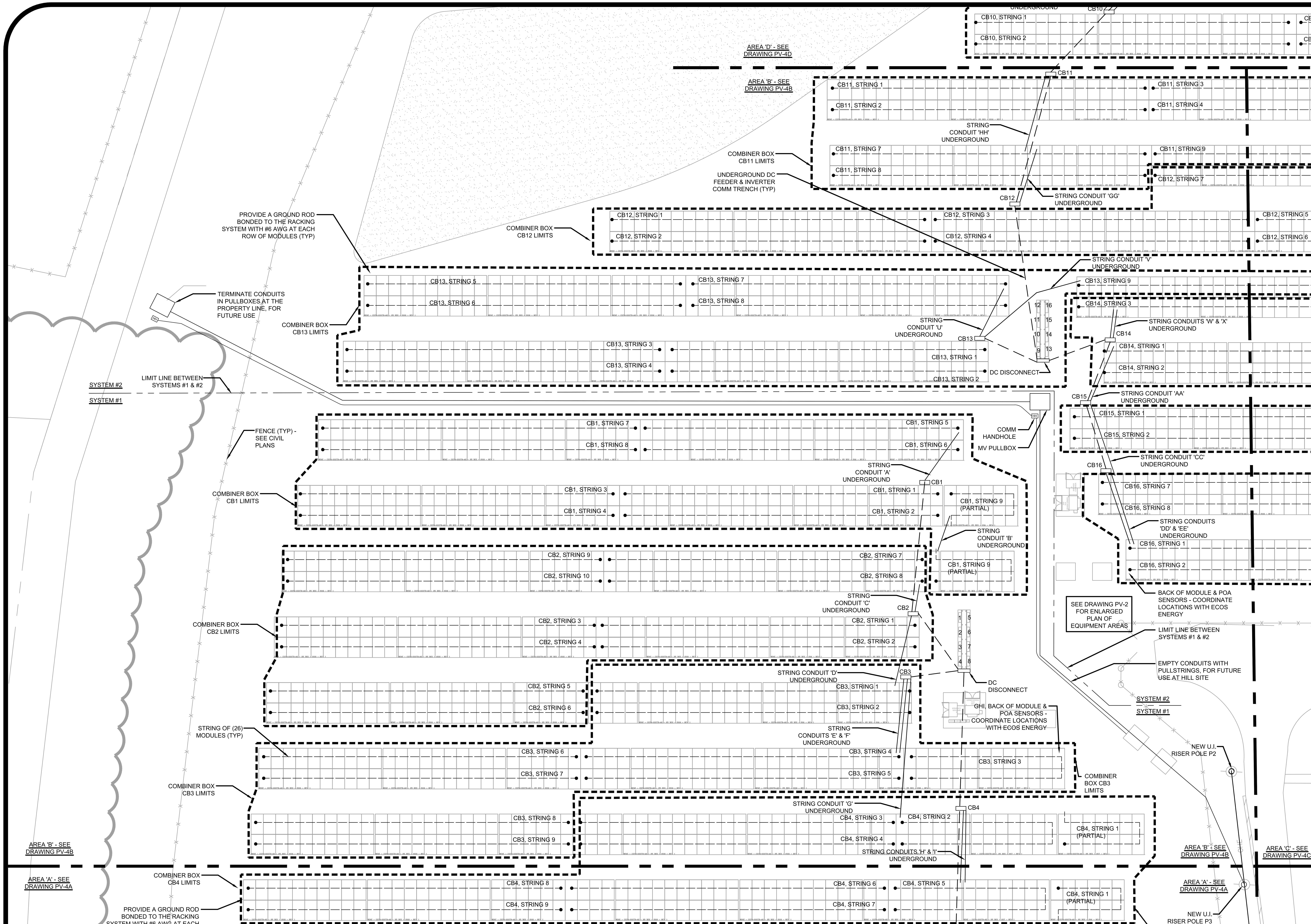
No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DETAILED ARRAY PLAN - AREA A

Project	Sheet
Date: APRIL 30, 2024	PV-4A
Scale: 1/16" = 1'-0"	



1 PV-4B DETAILED ARRAY PLAN – AREA 'B'
1/16" = 1'-0"

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENDREAU · LICENSED PROFESSIONAL ENGINEER

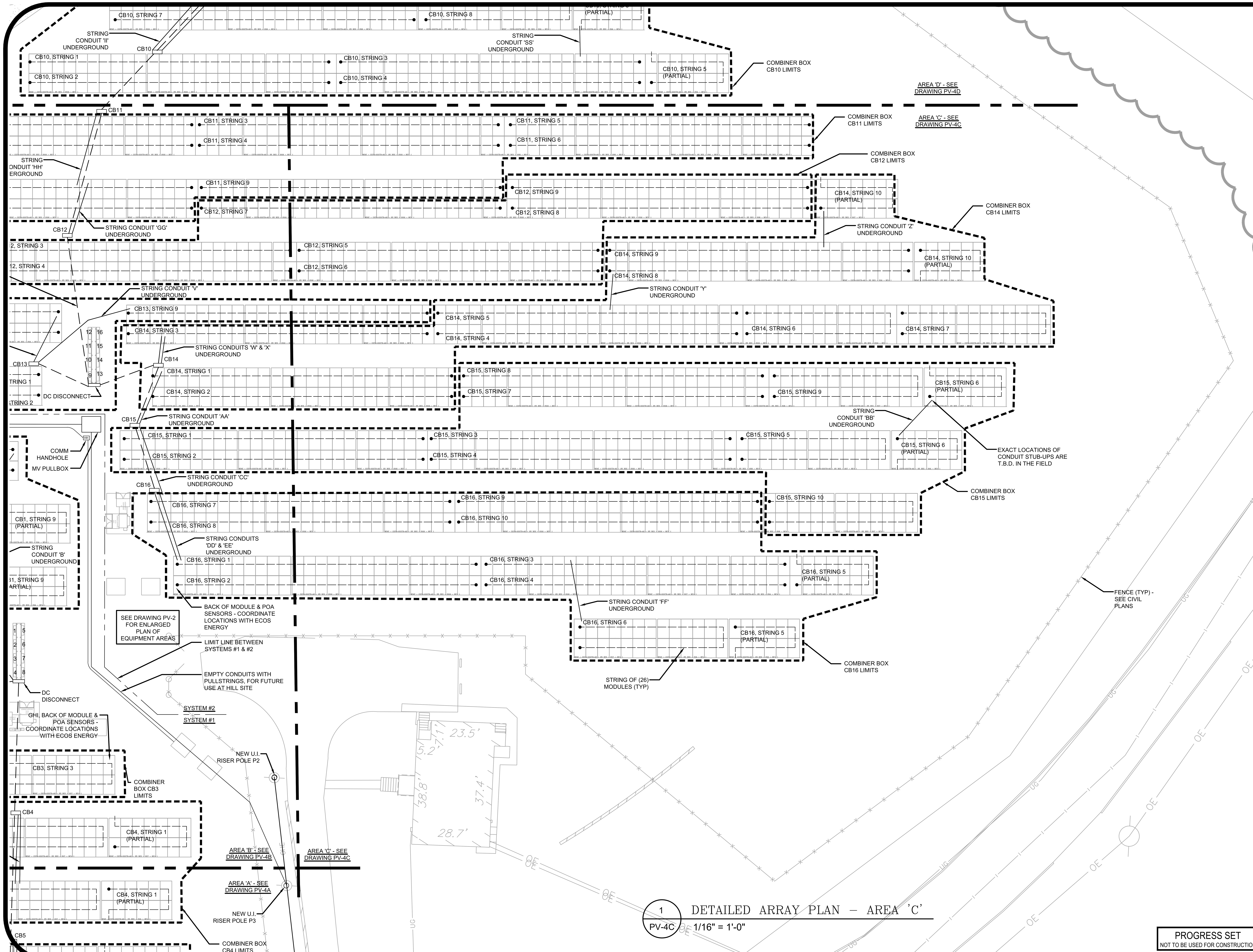
No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DETAILED ARRAY PLAN - AREA B

Project
Date: APRIL 30, 2024
Scale: 1/16" = 1'-0"
Sheet: PV-4B



1
PV-4C
DETAILED ARRAY PLAN – AREA 'C'
1/16" = 1'-0"

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

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REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER

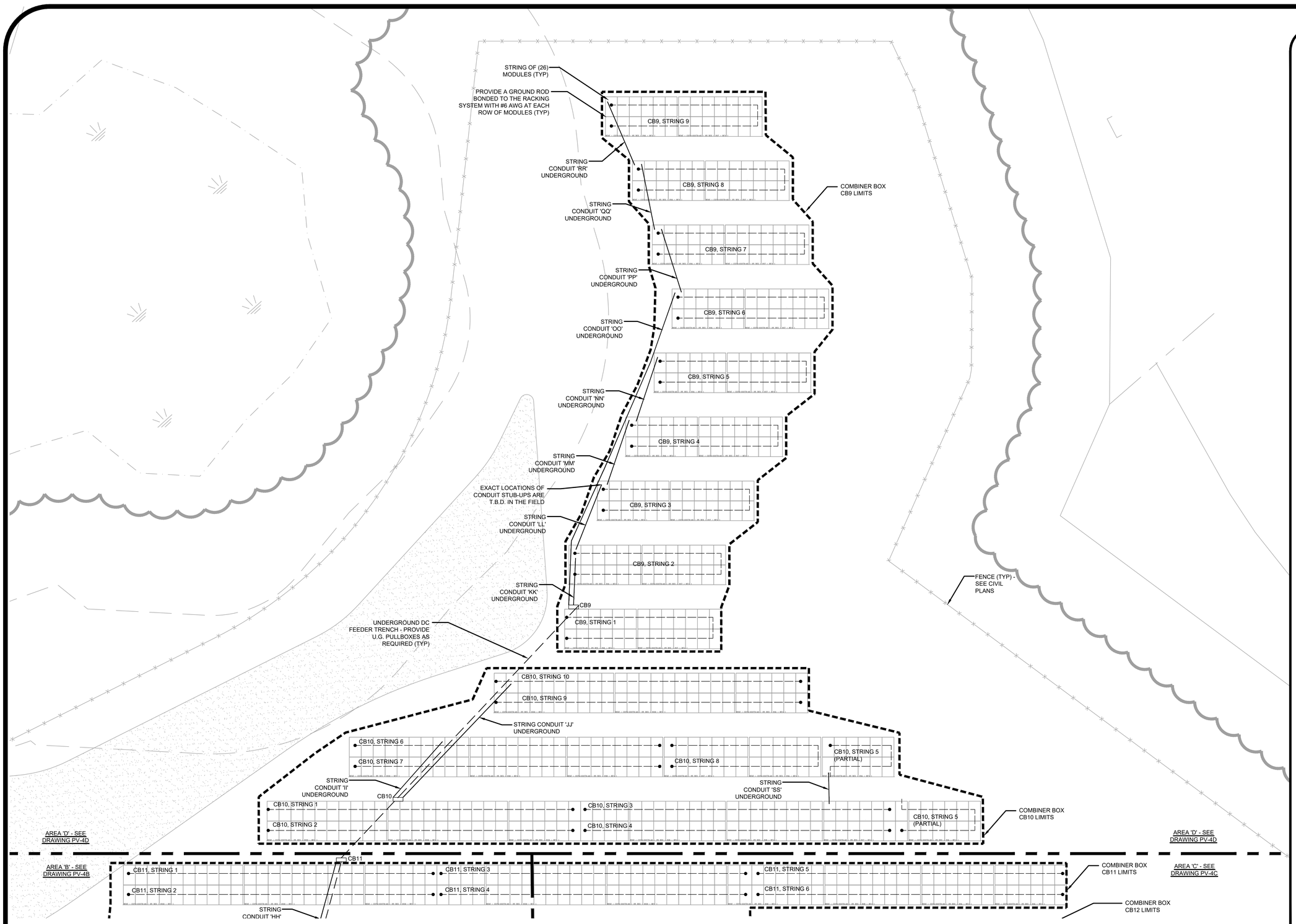
No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DETAILED ARRAY PLAN - AREA C

Project
Date: APRIL 30, 2024
Scale: 1/16" = 1'-0"
Sheet: PV-4C



1 PV-4D — DETAILED ARRAY PLAN – AREA 'D'
1/16" = 1'-0"

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

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TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

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- 999.000 KW / KVA AC
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- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENDREAU · LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DETAILED ARRAY PLAN - AREA D

Project	Sheet
Date: APRIL 30, 2024	PV-4D
Scale: 1/16" = 1'-0"	

SECTION 16010 - GENERAL PROVISIONS - ELECTRICAL

A. The work included under Division 16 shall consist of furnishing labor and materials necessary for the complete installation of lighting, power, and photovoltaic systems shown on the drawings. All work shall be complete and left in operating condition at completion of Contract.

B. Include minor items that are obviously and reasonably necessary to complete the installation and usually included in similar work. Such items include bolts, nuts, anchors, brackets, sleeves, and minor offsets in conduit, junction boxes, etc

C. Some equipment and materials provided under other divisions may require composite work crews because of trade jurisdiction. It is the Contractor's or Subcontractor's responsibility to review all Contract Documents to determine where these composite crews are required.

D. All temporary and permanent permits and licenses required in connection with this Division's work shall be the responsibility of the Contractor awarded that work.

E. Installation shall meet or exceed current applicable codes, ordinances and regulations in effect at the site. If a Contractor or Subcontractor observes that the Contract Documents are at variance with governing codes and regulations, they shall promptly notify the Engineer in writing, who will respond to such variances in writing. If the Contractor performs work knowing it is not compliant with applicable codes, and does not notify the Engineer, the Contractor shall assume full responsibility and bear all costs attributable to correcting the non-complying work.

F. The reference to Codes and Standards shall not permit a lower grade of construction where Contract Documents call for workmanship and/or materials in excess of those references.

G. Where the terms "provide" or "shall be" are used in this Division or on the drawings, they shall be taken to mean "The Contractor shall furnish and install".

H. If equipment or materials other than those specified in the design of this project are proposed to be used on this project, the Contractor and supplier shall check it for dimensional differences, electrical requirements and any other potential variances. This comparison shall be made for manufacturers specified as well as those proposed prior to requesting approval. The Contractor shall be responsible for any extra costs incurred as a result of Substitutions, including those of other contractors, such as might be due to (but not limited to) different electrical, mechanical and architectural requirements.

I. Shop Drawings:
   1. Carefully examine all shop drawings noting capacity, arrangement and physical dimensions and mark the drawings as being reviewed and approved prior to submitting to the Engineer. Where catalog data is submitted which includes items which do not apply to this project, those items shall be clearly marked out or relevant items clearly noted. Any deviations from the documents shall be so noted by the Contractor or equipment supplier. The intent and requirements of the drawings and specifications shall be adhered to at all times and are not waived or superseded in any way by the shop drawing submittal or review.
   2. Submit a minimum (1) electronic copy of shop drawings for review and approval. Contractor shall retain a final approved copy for incorporation in the Operation and Maintenance Manuals.
   3. If returned shop drawings are marked "NO EXCEPTIONS TAKEN", no additional submittal is required. If the shop drawing is marked "MAKE CORRECTIONS NOTED", the changes noted on the shop drawings are to be incorporated, with no further resubmittal required. If marked "REVISE AND RESUBMIT", changes noted on the shop drawings are to be made and the drawings resubmitted for review. If marked "REJECTED", the equipment submitted is unacceptable and different equipment or materials need to be submitted.

J. No asbestos or PCB containing materials of any type shall be used on this Project.

K. Consult the Contract Drawings and Specifications of all other Divisions and other trades for correlating information and layout work so that it will not interfere with other trades. Verify all dimensions and conditions. If conflicts occur such that resolution is not possible by the affected trades on the job, the Engineer shall be notified and a resolution will be worked out.

L. Electrical equipment enclosures (switchboards, panelboards, transformers, relay cabinets, systems racks/cabinets, combiner boxes, etc.) shall be vacuumed and wiped clean prior to energizing and again at substantial completion.

M. Install material and equipment in accordance with Manufacturers' recommendations, instructions, and current N.E.C.A. standards.

N. Install equipment and materials to provide required access for servicing and maintenance. Coordinate final equipment location with required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.

O. Record Drawings: As work progresses, in a neat and legible manner, record all changes or deviations from the contract drawings. Submit Record Drawings to Engineer for review at completion of Work. The Record Drawings will become part of the Operation and Maintenance Manual package submitted to the Owner after the completion of the project.

SECTION 16050 - BASIC MATERIALS AND METHODS

A. All materials shall be new, as specified or approved, and in original packaging. Catalog numbers specified shall be verified with vendors prior to ordering material.

B. All materials shall be listed by a NRTL (i.e. UL, ETL, etc.) and have an associated label unless special fabrication of material is required. Special fabricated material shall be fabricated using listed components and procedures.

C. Where the word "provide" is used, it shall require the electrical subcontractor to furnish and install material complete to a workable system.

D. All work shall be tested in accordance with industry accepted standards. Before testing, a thorough visual inspection shall be made to detect connection problems, damaged components, poor workmanship, inappropriate overcurrent protection, debris, etc. Testing apparatus shall be certified or demonstrated to be accurate within reasonable limits. Competent personnel familiar with the test equipment shall perform all tests. If testing procedures employed are not satisfactory to the Engineer, outside testing will be done at the electrical subcontractor's expense.

E. Electrical subcontractor to identify all electrical equipment with engraved 1/4" white letters on black plates. Inscriptions shall indicate the name, voltage, phase, wires, feeder size, feeder source and location of source, and the device number.

F. All low voltage cables shall be bundled and labeled as to their function within terminal cabinets, wireways and cable trays.

G. Branch circuitry shall match circuit numbers as shown on the drawings and as scheduled. Any required deviation shall be indicated on the as-built drawings.

H. All opening into equipment shall be sealed to prevent entry of insects and rodents.

SECTION 16110 - RACEWAYS

A. Construction shall be as per Underwriter's Laboratories Standard UL 870 for wireways, auxiliary gutters and associated fittings.

B. Wireways shall be painted steel with hinged removable cover, which can be used as either a hinged cover or set screw cover. Shall be fabricated such that the entire length of wireway and fittings permit lay-in wiring application. Cross sectional area shall be 6" x 6" minimum unless otherwise noted. Raintight wireway shall be NEMA 3R construction with gaskets and a corrosion resistant finish.

C. Where required, provide cable strain relief, grounding connectors, expansion fittings.

D. Schedule 40 PVC shall be used for all raceways where not restricted by this section or specifically noted otherwise. Schedule 80 PVC shall be used where above ground or transitions where emerging from ground and exposed to physical damage.

E. PVC conduit used above grade shall be UV resistant type.

F. Flexible liquid tight conduit shall be used on all motor, moving, and vibrating equipment connections. Use minimum 1/2" size with grounding type fittings and provide grounding conductor.

G. Conduit shall not be mounted on mechanical or other equipment which vibrates except at connection points.

H. Installations of underground wiring shall be in trench, duct or conduit or by plowing in place as specified on plans.

I. Underground raceways shall be installed to meet the following requirements:
   1. Spacing between exterior surfaces of underground conduits, shall be not less than the following:
      a. 2 inches between communications (copper) conduits,
      b. 2 inches between AC conduits, operating at not over 1000 volts
      c. 6 inches between a communications conduit, and any power conduit/cable (AC or DC not over 100V) in the same trench
      d. 12 inches between a communications conduit and any power conduit, (AC or DC over 1000V) in the same trench, unless noted otherwise
      e. 6 inches between AC conduits, operating at over 1000 volts
      f. 6 inches between AC power conduits and DC power conduits/cables.
      g. 6 inches between armored fiber optic cable or in metallic conduit and power conduits/cables (AC or DC)
   2. Where crossing perpendicular, spacing between exterior surface of underground conduits shall be not less than the following:
      a. 6 inches between AC and DC power conduits operating at any voltage.
      b. 12 inches between conduits/cables containing AC and DC power conduits operating at any voltage and communications (copper) conduits.

J. All underground raceways when specified in excavated trenches shall have backfill compacted. Refer to compaction requirements in trench compaction details. Backfill immediately **around conduits/conductors to be a minimum of 3" native soil free from debris and organic material.** Thermal conductivity of imported backfill shall be tested in accordance with ASTM D5334-08 to confirm the thermal resistively is equal to or less than that of the native soil or, if applicable, the specific requirements on these plans.

K. Underground conduit shall be installed to allow drainage into manholes/handholes a minimum of 4 inches per 100 feet of horizontal run. Where conduits or ducts enter a manhole, handhole, or above grade cabinet, each shall be permanently identified by means of plastic fiber, laminated plastic or non-corrosive metal tags to indicate origination point.

L. When non-metallic conduit requires field bending, utilize a hot-bending appliance. Use of torches to bend conduit is unacceptable.

M. Where conduits terminate in handholes/vaults or in pad mounted equipment, terminate conduits a minimum of 4 inches above bedding or slab. Conduits shall use bell ends. Where routed through slabs, provide sleeves to allow settling/heaving of slab.

N. Where HDPE innerduct is used, Schedule 40 PVC or Schedule 80 PVC (where subject to damage) conduit shall be used for transitions to above grade.

SECTION 16120 - WIRING AND CABLE

A. Building Wire:
   1. Description: Single conductor insulated wire.
   2. Conductor: 98% Commercially pure copper conductors or AA-8000 series aluminum alloy compact stranded conductors
   3. Insulation Voltage Rating: 600 volts and 2000 volts
   4. **Insulation: ANSI/NFPA 70, 90° C Type** THHN-2, **THWN-2, XHHW-2, RHW-2, USE-2, and PV**
   5. Exposed PV module wiring and combiner box feeders shall be 2000 volt tray rated PV type.
   6. 600V AC wiring installed below grade shall be type XHHW-2, RHW-2, or USE-2.

C. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

D. Neatly trim and lace wiring inside boxes, equipment, and panelboards.

E. Clean conductor surfaces before installing lugs and connectors.

F. Make splices, taps and terminations to carry full ampacity of conductors with no perceptible temperature rise.

G. Parallel 3-phase feeder runs in conduit shall have all three phase conductors (including neutral and ground where required) installed in each conduit. Grouping a single phase (or two phases) in a single conduit is not permitted.

H. Identification
   1. Control wiring shall be marked at both ends as to its function.
   2. Spare conductors shall be identified as such.

SECTION 16125 - MEDIUM VOLTAGE CABLES

B. Cables for the 13.8KV system shall be UD 15 KV MV-105 Listed single conductor, insulated, shielded and jacketed medium voltage type power cable with 100% insulation level, 105° C continuous operation rating, 130° C emergency rating, 250° C short circuit rating.

C. Cable shall have ASTM B-609 aluminum conductors with Class B stranding in accordance with ASTM B-231, moisture blocked strands, an extruded semi-conducting shield layer (40 mil min.) over the conductor for stress control, direct-burial XLPE insulation (345 mils min.), a concentric copper neutral, and moisture/chemical/oil/flame resistant PVC jacket.

D. Cables shall be Manufactured by Okonite, Prysmian, Southwire, General Cable, WTEC, or approved equal.

E. All MV cables must use cable termination kit manufactured by 3M, TE Connectivity, Eaton/Cooper, or Richards.

F. Complete installation shall be per National Electrical Code Articles 310 and 328. Do not exceed manufacturer's published maximum pulling tension or sidewall pressure. Provide sufficient slack in cable, ground and drain wires to permit elbow connectors to be moved to their respective parking stands.

G. All cables shall be labeled at each end at an accessible location for viewing. Label shall indicate circuit, phase, and destination/origination. Labels shall be black phenolic with white lettering and secured with a minimum of (2) UV-resistant zip ties.

H. Splices and terminations shall be made by an experienced journeyman whose qualifications are subject to approval by the Engineer. No splices shall be allowed unless specifically noted. No underground splices are permitted. Fiberglass splice boxes are not permitted unless approved by owner. All splices to be approved by owner.

I. Arrange phases at termination points, A-B-C from left to right or top to bottom as viewed from the front.

J. Test all cables according to IEEE Standard 400. Each power cable over 1000V shall be given a continuity test, and each medium voltage cable shall be given a continuity and a VLF test after installation and after terminations having been made. All single conductor cables shall be tested between conductors and ground with metallic shield and the other two conductors grounded to the same ground. Each conductor shall be successively tested in the same manner. Direct current voltages shall be applied with negative polarity to the cable conductor. See testing procedures as required.

K. No cable shall be permanently energized until a copy of its test record is approved by the Engineer.

L. In addition to any testing specified herein, perform testing consistent with the requirements of the applicable codes, NETA Acceptance Testing criteria, and the manufacturers' current quality assurance program.

SECTION 16130 - BOXES

A. Pull and junction boxes shall be code gauge, gasketed, painted, galvanized steel, PVC, or fiberglass. Covers shall be secured with screws.

B. Outlet boxes shall be cast malleable iron with threaded hubs or PVC and be of high conductive metal to maintain maximum electric continuity.

C. All outlets shall be equipped with outlet boxes approved for the use.

D. Covers or plates for boxes shall conform substantially to the outlet of the boxes with no projecting edges or corners.

E. Conduit fittings ("LB", "C", "T") or types approved for the location may be employed as required to facilitate pulling in conductors.

F. Provide pull and above ground junction boxes to facilitate pulling or splicing of conductors.

G. Mount boxes to allow for maximum flexibility.

H. Install grounding bushings with bonding conductor on all metallic feeder conduits entering box. Ground bushings and bonding conductors are not required on branch circuit conduits.

SECTION 16340 - MEDIUM VOLTAGE SECTIONALIZING CABINETS/MEDIUM VOLTAGE JUNCTION BOXES

A. Sectionalizing cabinets shall be designed for burial with the junction modules mounted above the ground line. Pedestals shall be in complete conformance with ANSI C57.12.28, Pad-mounted Equipment Enclosure Integrity Standard.

B. Sectionalizing cabinets shall be Manufactured by Nordic, Cooper, Hubbell, G&W, Power Design Inc., Highline, Federal Pacific, Hoffman, S&C or approved equal.

C. Enlosure shall be 3/16" nominal thickness fire resistant, laminate, fiberglass, with munsell green gel coat finish or shall be 12 gauge galvanized steel, with munsell green polyester powder coat finish. Enclosure access doors shall utilize stainless steel hinges and shall have provisions for padlocking. Doors shall have provisions for securing in the open position.

D. Provide junction panels with bushings to accommodate the size and quantity of dead break elbows indicated on drawings.

E. Provide ground bar in unit for bonding of ground conductors and concentric neutrals.

F. **Provide fiberglass ground sleeve extending 36" below cabinet installed on a 6" pea rock base** to allow drainage.

SECTION 16440 - DISCONNECT SWITCHES

A. All disconnect switches shall be NEMA heavy duty Type H.D., horsepower rated, and U.L. listed. Disconnects shall be Eaton, GE, Square D, Siemens or approved equal.

B. Provide auxiliary disconnect contacts for control circuits when supplied from an independent source.

C. Switch Interior - All switches shall have switch blades which are fully visible in the off position when the door is open. Switches shall be of dead-front construction with permanently attached arc suppressors hinged or otherwise attached to permit easy access to line-side lugs without removal of the arc suppressor. Lugs shall be UL listed for copper and/or aluminum cables and front removable. All current carrying parts shall be plated by electrolytic processes.

D. Switch Mechanism - Switches shall have a quick-make and quick-break operating handle and mechanism which shall be an integral part of the box, not the cover. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door in the ON position or closing of the switch mechanism with the door open. Switches shall provisions for locking the switch in both the ON and the OFF positions by padlock.

E. Enclosures shall be NEMA 3R enclosures unless otherwise specified. Raintight covers shall be securable in the open position. Enclosures shall be code gauge (UL 98) galvanized steel (NEMA 3R). They shall be treated with a rust-inhibiting phosphate and finished in gray baked enamel.

F. Install disconnect switches in an accessible location as convenient as possible to equipment served.

G. Switches shall be rated for the voltage and system type they are used for.

SECTION 16450 - GROUNDING

A. Provide complete grounding systems as described herein and as shown on the drawings.

B. All grounding components shall be listed for the purpose they are installed for. Components shall be Manufactured by AMPACT, Burndy, CADWELD, ITT Blackburn, Ilsco, or Lyncole.

C. Ground rods shall be 3/4 inch diameter by 10 feet long copper clad steel. Connecting cables shall be copper as indicated on drawings. All ground conductors exposed to the elements or in direct contact with the earth shall be tin coated or bare copper.

D. All metallic conduits, supports, cabinets, non-current carrying parts of equipment, and metallic structures shall be solidly grounded to form a continuous permanent and effective grounded system.

E. All wireways, metal enclosures, cable trays and similar parts of the electrical installation described herein shall be grounded.

F. UFER grounds shall be via exothermically weld connection to a minimum **of (2) continuous 20'-0" sections of rebar encased in the concrete footings/piers with a minimum of 2" of concrete cover. Rebar shall be a minimum of a #4 and shall NOT be epoxy coated.** If **multiple pieces of rebar are required to provide the 20'-0" lengths, they shall be welded together** to provide a continuous ground path.

G. The special attention of the Contractor is called to metallic building components and mechanical piping which must be grounded in an approved manner according to the NEC.

H. Provide a continuous grounding conductor for each feeder serving several panelboards. Connect this ground conductor to each related cabinet ground bar.

I. For LVAC circuits less than 1000 VAC not supplied by cables a with integral ground wire, provide a separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit with a three phase protective device. Install the required grounding conductor in the common conduit with the related phase/hot and neutral conductors. Where parallel feeders are installed in more than one raceway, provide a green insulated equipment grounding conductor in each raceway.

J. Single Phase Branch Circuits for Lighting, Receptacles, Motors and Other Similar Equipment: Provide single phase branch circuits serving lighting, receptacles, motors, and other similar equipment consisting of phase, neutral, and green insulated equipment ground conductor installed in a common conduit.

K. Single Phase Branch Circuits for Special Equipment: Provide single phase branch circuits serving special equipment, and all branch circuits installed in nonmetallic or flexible conduits with a separate grounding conductor.

L. All transformers shall be bonded to the grounding electrode system as well as building steel (where applicable).

M. Bond all cable tray and equipment racks to ground with a minimum 4/0 AWG ground conductor or as noted on plans.

N. Connections to the PV modules shall be installed such that removal of a module from the string does not interrupt the grounded conductor to another string. Sets of modules connected in series rated at 50 volts or more with or without blocking diodes, and having a single overcurrent device shall be considered a string.

O. When required by the testing plan, the resistance to earth shall be measured using a 3-point fall of potential test with the inverter station ground grid isolated. Results shall be compared to grounding model/study to verify field measured earth resistance is within the same order of magnitude as the grounding model/study.

SECTION 16475 - FUSES

A. DC fuses for PV string circuits shall be 1500Vdc rated HP15M as Manufactured by Mersen.

B. DC fuses for PV feeders shall be Class J or gPV type as Manufactured by Bussman, Mersen, or Littelfuse.

C. Fuses in switchboard, 601A and larger shall be Class L type and be Bussman Class L, Limitron KTU (or Hi Cap KRP-C), CEFCO Class L, CLL, Ferraz Shawmut Class L, Amp Trap A4BY, or Littelfuse Class L, KLP-C.

D. Fuses for feeder circuits 600A and less shall be Class RK1 and be Bussman Low Peak LPN-RK (250V) or LPS-RK (600V); CEFCO Lo-Ip LON-RK (250V) or LOS-RK (600V); Ferraz Shawmut Amp-Trap II A2D-R (250V) or A6D-R (600 V); or Littelfuse Little Peak LLN-RK (250V) or LLS-RK (600V).

E. Fuses for motor circuits shall be Class RK5 type and be Bussman Fusetron FRN-R (250V) or FRS-R (600 V); CEFCO CEFCON CRN-R (250V) or CRS-R (600V); Ferraz Shawmut Trionic TR-R (250 V) or TRS-R (600 V); or Littelfuse Slo-Blo FLN-RL (250V) or FLS-R (600V).

F. For in-line fuses and weatherproof assembly, provide Bussman Tron Type HEB fuse holder and Type KTK fuse with 1A0513 boot or equal.

G. For protection of control circuit transformers, provide Bussman Type FNQ time delay fuses or equal.

H. **Install fuses to allow viewing of "Blown-Fuse" indicators through viewing windows in gear, where** provided.

I. Provide label inside each switch and motor starter cover stating type of fuse required for replacement.

SECTION 16630 - COMBINER BOXES

A. Provide 1500V combiner box(s) Listed to UL 1741, complete with circuitry as necessary to protect the equipment including disconnect switch with finger-safe fuse holders having all necessary fusing. Combiner boxes shall be Eaton/Cooper, Shoals, SolarBos, Amtec, Teal, Bentek, WTEC, or approved equal.

B. A finger-safe, non-fused load break disconnect is required and it shall be interlocked to prevent the opening of the cover when the switch is in the ON position. Interlock shall be defeatable for testing purposes. Handle must be lockable in OFF position.

C. All fuse holders shall be finger-safe.

D. The combiner box shall be arranged to have a minimum number of input circuits and fuse sizes as indicated on the combiner box schedules for a negatively grounded system. Input fuse holders shall be rated to hold 32A fuses.

E. Enclosures shall be a minimum of NEMA 3/IP54 with seamless door gaskets and an integral disconnect rated as indicated on the combiner box schedules.

F. **All wire terminations/lugs shall be Listed for 90°C field terminations.**

G. Combiner boxes including disconnect and fuses shall be Listed for continuous operation at 100% of its collector bus/disconnect rating.

H. Provide units with integral DC surge protection devices rated for 40kA discharge current (8/20 μs) and maximum continuous operating voltage of 1500Vdc

I. Equipment shall have a nameplate installed and mounted to the front cover and indicate, at a minimum: number of input circuits, ampere rating of input circuits, voltage rating, short-circuit current rating, and integrated disconnect ampere rating.

J. Combiner box Manufacturer shall review combiner box schedules and verify combiner boxes enclosures are large enough and configured to allow termination of the size and quantity of string and feeder conductors/conduits indicated on the schedules.

K. Provide typed PV string directory inside cover to denote strings and their associated fuse/terminal number.

L. All combiner box components shall be pre-wired before arriving to site.

M. Provide a directory of combiner boxes at each inverter to facilitate location and shut down of DC sources.

SPEC IS FROM SIMILAR ECOS ENERGY PROJECT

SOLAR PV GENERAL NOTES

1. INSTALL A COMPLETE AND OPERATIONAL SOLAR PHOTOVOLTAIC SYSTEM.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL LOCATION AND ARRANGEMENT OF THE SOLAR PV SYSTEM. THEY DO NOT SHOW ALL MATERIALS NEEDED. CONTRACTOR IS REQUIRED TO PROVIDE ANY AND ALL CONDUITS, CONNECTORS, SWEEPS, SUPPORTS, BENDS, FITTINGS, HANGERS, COVER PLATES, AND ADDITIONAL PULL AND JUNCTION BOXES WHICH THE CONTRACTOR MUST PROVIDE TO COMPLETE THE SOLAR PV SYSTEM IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC).
3. THE DEFINITION OF ELECTRICAL TERMS USED SHALL BE AS DEFINED IN THE STATES' ADOPTED EDITION OF THE NEC.
4. THE TERM "SIZE" SHALL MEAN ONE OR MORE OF THE FOLLOWING: "LENGTH, CURRENT AND VOLTAGE RATING, NUMBER OF POLES, NEMA SIZE, AND OTHER SIMILAR ELECTRICAL CHARACTERISTICS".
5. CONTRACTOR IS REQUIRED TO SURVEY AND INSPECT ALL AREAS PRIOR TO PERFORMING SERVICES TO ENSURE CLEARANCES CAN BE MET AND NO INTERFERENCES EXIST. NO CUTTING OR DRILLING IS TO BE PERFORMED PRIOR TO LOCATING EXISTING STRUCTURAL MEMBERS AND UTILITIES.
6. SERVICE ENTRANCE RATED EQUIPMENT, C/T CABINETS, AND METER SOCKETS ARE TO BE APPROVED FOR USE BY THE LOCAL UTILITY COMPANY.
7. ELECTRICAL EQUIPMENT INSTALLED MUST BE LABELED, UL LISTED, AND INSTALLED ACCORDINGLY.
8. REQUIRED PERMITS AND INSPECTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE COORDINATED WITH THE AUTHORITY HAVING JURISDICTION (AHJ).
9. ALL WORK IS TO BE PERFORMED BY LICENSED & QUALIFIED WORKERS AND COMPLETED IN ACCORDANCE WITH THE STATES' ADOPTED NEC.
10. THE SOLAR PV SYSTEM EQUIPMENT ON THE DC SIDE IS RATED FOR 1500V AND IS IN COMPLIANCE WITH THE NEC. THE INVERTERS, MODULES, STRING FEEDERS, AND RELATED COMPONENTS ARE ALL RATED AND LABELED AS 1500V OR GREATER.
11. CONTRACTOR SHALL SUBMIT A FORMAL RFI (REQUEST FOR INFORMATION) FOR ANY CONFUSION OR DISCREPANCY ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ANY INSTALLATION DEVIATIONS WITHOUT APPROVAL FROM SYSTEM OWNER OR THE ENGINEER OF RECORD.
12. ALL SUPPORTS, BOLTS, STRAPS, AND SCREWS SHALL BE CORROSION RESISTANT.
13. APPLY AN ADHESIVE LABEL ON RACEWAYS ACCORDING TO THE DETAIL SHEET.
14. ALL METALLIC CONDUITS SHALL HAVE BOND BUSHINGS ON BOTH ENDS AND EQUIPMENT GROUNDING CONDUCTORS (EGC) ROUTED THROUGH CONDUIT.
15. BARE COPPER GROUND CONDUCTORS SHALL BE SIZED PER NEC. EQUIPMENT GROUNDING CONDUCTORS (EGC) SHALL BE INSTALLED IN CONDUIT PER NEC 690.43(C).
16. ALL CONDUCTORS SHALL BE LISTED FOR USE IN APPROPRIATE RACEWAY.
17. ALL BREAKERS AND EQUIPMENT INSTALLED AS PART OF THE NEW SOLAR PV SYSTEM MUST BE RATED FOR REVERSE FEED.
18. COMMUNICATIONS CABLES INSTALLED BETWEEN MONITORING EQUIPMENT AND NETWORK EQUIPMENT (SWITCHES, ROUTERS, SERVERS, ETC.) SHALL HAVE A GREEN OUTER JACKET. CABLES SHALL HAVE CABLE TAGS INSTALLED AT BOTH ENDS OF CABLE TO SHOW PROPER IDENTIFICATION.
19. CONTRACTOR SHALL TORQUE TEST ALL FIELD TERMINATED WIRES PER MANUFACTURER'S SPECS AND PROVIDE PERMANENT MARKINGS ACROSS THE BOLT AND WASHER INDICATING ACHIEVED TORQUE.
20. POLARIS SPLICES SHALL NOT BE USED ON THIS PROJECT.

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC
56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY
222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):
- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

SPECIFICATIONS

Project
Date: APRIL 30, 2024
Scale: NTS
Sheet: PV-5

STRING WIRE SCHEDULE

Inverter	String ID	Qty of Modules	Module (W-DC) STC	Total (kW-DC) STC	Approx 1-Way Length (ft)	Conductor Size (AWG) Type PV	Voltage Drop (%)
1	1-1	26	685	17.81	135	#10	0.71%
1	1-2	26	685	17.81	140	#10	0.74%
1	1-3	26	685	17.81	250	#10	1.32%
1	1-4	26	685	17.81	255	#10	1.35%
1	1-5	26	685	17.81	160	#10	0.85%
1	1-6	26	685	17.81	165	#10	0.87%
1	1-7	26	685	17.81	270	#10	1.43%
1	1-8	26	685	17.81	275	#10	1.45%
1	1-9	26	685	17.81	175	#10	0.92%
2	2-1	26	685	17.81	135	#10	0.71%
2	2-2	26	685	17.81	140	#10	0.74%
2	2-3	26	685	17.81	250	#10	1.32%
2	2-4	26	685	17.81	255	#10	1.35%
2	2-5	26	685	17.81	270	#10	1.43%
2	2-6	26	685	17.81	280	#10	1.48%
2	2-7	26	685	17.81	160	#10	0.85%
2	2-8	26	685	17.81	170	#10	0.90%
2	2-9	26	685	17.81	275	#10	1.45%
2	2-10	26	685	17.81	265	#10	1.40%
3	3-1	26	685	17.81	135	#10	0.71%
3	3-2	26	685	17.81	140	#10	0.74%
3	3-3	26	685	17.81	170	#10	0.90%
3	3-4	26	685	17.81	165	#10	0.87%
3	3-5	26	685	17.81	175	#10	0.92%
3	3-6	26	685	17.81	275	#10	1.45%
3	3-7	26	685	17.81	285	#10	1.51%
3	3-8	26	685	17.81	300	#10	1.58%
3	3-9	26	685	17.81	310	#10	1.64%
4	4-1	26	680	17.68	200	#10	1.05%
4	4-2	26	680	17.68	145	#10	0.76%
4	4-3	26	680	17.68	160	#10	0.84%
4	4-4	26	680	17.68	170	#10	0.90%
4	4-5	26	680	17.68	170	#10	0.90%
4	4-6	26	680	17.68	190	#10	1.00%
4	4-7	26	680	17.68	195	#10	1.03%
4	4-8	26	680	17.68	300	#10	1.58%
4	4-9	26	680	17.68	310	#10	1.63%
5	5-1	26	685	17.81	225	#10	1.19%
5	5-2	26	685	17.81	145	#10	0.77%
5	5-3	26	685	17.81	165	#10	0.87%
5	5-4	26	685	17.81	175	#10	0.92%
5	5-5	26	685	17.81	280	#10	1.48%
5	5-6	26	685	17.81	290	#10	1.53%
5	5-7	26	685	17.81	165	#10	0.87%
5	5-8	26	685	17.81	175	#10	0.92%
5	5-9	26	685	17.81	190	#10	1.00%
5	5-10	26	685	17.81	200	#10	1.06%
6	6-1	26	680	17.68	140	#10	0.74%
6	6-2	26	680	17.68	170	#10	0.90%
6	6-3	26	680	17.68	180	#10	0.95%
6	6-4	26	680	17.68	280	#10	1.48%
6	6-5	26	680	17.68	290	#10	1.53%
6	6-6	26	680	17.68	295	#10	1.55%
6	6-7	26	680	17.68	285	#10	1.50%
6	6-8	26	680	17.68	175	#10	0.92%
6	6-9	26	680	17.68	195	#10	1.03%
6	6-10	26	680	17.68	205	#10	1.08%
7	7-1	26	680	17.68	225	#10	1.19%
7	7-2	26	680	17.68	170	#10	0.90%
7	7-3	26	680	17.68	180	#10	0.95%
7	7-4	26	680	17.68	285	#10	1.50%
7	7-5	26	680	17.68	295	#10	1.55%
7	7-6	26	680	17.68	300	#10	1.58%
7	7-7	26	680	17.68	290	#10	1.53%
7	7-8	26	680	17.68	200	#10	1.05%
7	7-9	26	680	17.68	210	#10	1.11%
8	8-1	26	680	17.68	145	#10	0.76%
8	8-2	26	680	17.68	190	#10	1.00%
8	8-3	26	680	17.68	200	#10	1.05%
8	8-4	26	680	17.68	190	#10	1.00%
8	8-5	26	680	17.68	200	#10	1.05%
8	8-6	26	680	17.68	175	#10	0.92%
8	8-7	26	680	17.68	200	#10	1.05%
8	8-8	26	680	17.68	210	#10	1.11%
8	8-9	26	680	17.68	235	#10	1.24%
8	8-10	26	680	17.68	245	#10	1.29%

NOTE - ONE WAY LENGTHS OF RUN INDICATED IN THIS TABLE ARE FOR VOLTAGE DROP CALCULATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY EXACT LENGTHS. IF ACTUAL LENGTHS ARE LONGER THAN INDICATED IN THIS SCHEDULE, CONTACT SOLAR DEVELOPER FOR GUIDANCE REGARDING STRING SIZING.

STRING WIRE SCHEDULE

Inverter	String ID	Qty of Modules	Module (W-DC) STC	Total (kW-DC) STC	Approx 1-Way Length (ft)	Conductor Size (AWG) Type PV	Voltage Drop (%)
9	9-1	26	685	17.81	140	#10	0.74%
9	9-2	26	685	17.81	160	#10	0.85%
9	9-3	26	685	17.81	195	#10	1.03%
9	9-4	26	685	17.81	235	#10	1.24%
9	9-5	26	685	17.81	265	#10	1.40%
9	9-6	26	685	17.81	260	#10	1.37%
9	9-7	26	685	17.81	170	#10	0.90%
9	9-8	26	685	17.81	205	#10	1.08%
9	9-9	26	685	17.81	240	#10	1.27%
10	10-1	26	685	17.81	140	#10	0.74%
10	10-2	26	685	17.81	145	#10	0.77%
10	10-3	26	685	17.81	205	#10	1.08%
10	10-4	26	685	17.81	210	#10	1.11%
10	10-5	26	685	17.81	290	#10	1.53%
10	10-6	26	685	17.81	165	#10	0.87%
10	10-7	26	685	17.81	175	#10	0.92%
10	10-8	26	685	17.81	250	#10	1.32%
10	10-9	26	685	17.81	205	#10	1.08%
10	10-10	26	685	17.81	200	#10	1.06%
11	11-1	26	685	17.81	140	#10	0.74%
11	11-2	26	685	17.81	145	#10	0.77%
11	11-3	26	685	17.81	175	#10	0.92%
11	11-4	26	685	17.81	185	#10	0.98%
11	11-5	26	685	17.81	285	#10	1.51%
11	11-6	26	685	17.81	295	#10	1.56%
11	11-7	26	685	17.81	165	#10	0.87%
11	11-8	26	685	17.81	175	#10	0.92%
11	11-9	26	685	17.81	210	#10	1.11%
12	12-1	26	680	17.68	170	#10	0.90%
12	12-2	26	680	17.68	180	#10	0.95%
12	12-3	26	680	17.68	135	#10	0.71%
12	12-4	26	680	17.68	140	#10	0.74%
12	12-5	26	680	17.68	225	#10	1.19%
12	12-6	26	680	17.68	230	#10	1.21%
12	12-7	26	680	17.68	200	#10	1.05%
12	12-8	26	680	17.68	315	#10	1.66%
12	12-9	26	680	17.68	310	#10	1.63%
13	13-1	26	680	17.68	135	#10	0.71%
13	13-2	26	680	17.68	140	#10	0.74%
13	13-3	26	680	17.68	250	#10	1.32%
13	13-4	26	680	17.68	260	#10	1.37%
13	13-5	26	680	17.68	270	#10	1.42%
13	13-6	26	680	17.68	275	#10	1.45%
13	13-7	26	680	17.68	160	#10	0.84%
13	13-8	26	680	17.68	165	#10	0.87%
13	13-9	26	680	17.68	180	#10	0.95%
14	14-1	26	685	17.81	135	#10	0.71%
14	14-2	26	685	17.81	140	#10	0.74%
14	14-3	26	685	17.81	150	#10	0.79%
14	14-4	26	685	17.81	260	#10	1.37%
14	14-5	26	685	17.81	270	#10	1.43%
14	14-6	26	685	17.81	380	#10	2.01%
14	14-7	26	685	17.81	435	#10	2.30%
14	14-8	26	685	17.81	335	#10	1.77%
14	14-9	26	685	17.81	340	#10	1.80%
14	14-10	26	685	17.81	420	#10	2.22%
15	15-1	26	680	17.68	135	#10	0.71%
15	15-2	26	680	17.68	140	#10	0.74%
15	15-3	26	680	17.68	250	#10	1.32%
15	15-4	26	680	17.68	255	#10	1.34%
15	15-5	26	680	17.68	365	#10	1.92%
15	15-6	26	680	17.68	390	#10	2.06%
15	15-7	26	680	17.68	275	#10	1.45%
15	15-8	26	680	17.68	270	#10	1.42%
15	15-9	26	680	17.68	385	#10	2.03%
15	15-10	26	680	17.68	395	#10	2.08%
16	16-1	26	680	17.68	165	#10	0.87%
16	16-2	26	680	17.68	175	#10	0.92%
16	16-3	26	680	17.68	275	#10	1.45%
16	16-4	26	680	17.68	285	#10	1.50%
16	16-5	26	680	17.68	420	#10	2.21%
16	16-6	26	680	17.68	335	#10	1.77%
16	16-7	26	680	17.68	135	#10	0.71%
16	16-8	26	680	17.68	140	#10	0.74%
16	16-9	26	680	17.68	250	#10	1.32%
16	16-10	26	680	17.68	255	#10	1.34%
TOTAL		3952		2697.240			1.12%

NOTE - ONE WAY LENGTHS OF RUN INDICATED IN THIS TABLE ARE FOR VOLTAGE DROP CALCULATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY EXACT LENGTHS. IF ACTUAL LENGTHS ARE LONGER THAN INDICATED IN THIS SCHEDULE, CONTACT SOLAR DEVELOPER FOR GUIDANCE REGARDING STRING SIZING.

STRING CONDUIT SCHEDULE

LOCATION	CONDUIT SIZE	STRINGS CONTAINED
STRING CONDUIT A	1-1/2"	1-5 THRU 1-8
STRING CONDUIT B	1"	1-9
STRING CONDUIT C	1-1/2"	2-7 THRU 2-10
STRING CONDUIT D	1-1/4"	2-5 & 2-6
STRING CONDUIT E	1-1/2"	3-3 THRU 3-6
STRING CONDUIT F	1-1/4"	3-7 THRU 3-9
STRING CONDUIT G	1-1/4"	3-8 & 3-9
STRING CONDUIT H	1-1/4"	4-1, 4-5 & 4-6
STRING CONDUIT I	1-1/4"	4-7 THRU 4-9
STRING CONDUIT J	1-1/2"	5-7 THRU 5-10
STRING CONDUIT K	1"	5-1
STRING CONDUIT L	1-1/4"	6-6 & 6-7
STRING CONDUIT M	1-1/4"	6-8 THRU 6-10
STRING CONDUIT N	1-1/4"	7-6 & 7-7
STRING CONDUIT O	1-1/4"	7-8 & 7-9
STRING CONDUIT P	1"	7-1
STRING CONDUIT Q	1-1/4"	8-6 THRU 8-8
STRING CONDUIT R	1-1/4"	8-9 & 8-10
STRING CONDUIT S	1"	8-10
STRING CONDUIT T	1-1/4"	8-4 & 8-5
STRING CONDUIT U	1-1/2"	13-5 THRU 13-8
STRING CONDUIT V	1"	13-9
STRING CONDUIT W	1-1/2"	14-3 THRU 14-6
STRING CONDUIT X	1-1/2"	14-7 THRU 14-10
STRING CONDUIT Y	1-1/4"	14-8 THRU 14-10
STRING CONDUIT Z	1"	14-10
STRING CONDUIT AA	1-1/4"	15-7 THRU 15-9
STRING CONDUIT BB	1"	15-6
STRING CONDUIT CC	1"	15-10
STRING CONDUIT DD	1-1/4"	16-1 THRU 16-3
STRING CONDUIT EE	1-1/4"	16-4 THRU 16-6
STRING CONDUIT FF	1-1/4"	16-5 & 16-6
STRING CONDUIT GG	1-1/4"	12-7 THRU 12-9
STRING CONDUIT HH	1-1/4"	11-7 THRU 11-9
STRING CONDUIT II	1-1/4"	10-6 THRU 10-8
STRING CONDUIT JJ	1-1/4"	10-9 & 10-10
STRING CONDUIT KK	1-1/2"	9-2 THRU 9-5
STRING CONDUIT LL	1-1/4"	9-3 THRU 9-5
STRING CONDUIT MM	1-1/4"	9-4 & 9-5
STRING CONDUIT NN	1"	9-5
STRING CONDUIT OO	1-1/2"	9-6 THRU 9-9
STRING CONDUIT PP	1-1/4"	9-7 THRU 9-9
STRING CONDUIT QQ	1-1/4"	9-8 & 9-9
STRING CONDUIT RR	1"	9-9
STRING CONDUIT SS	1"	10-5

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENDREAU · LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

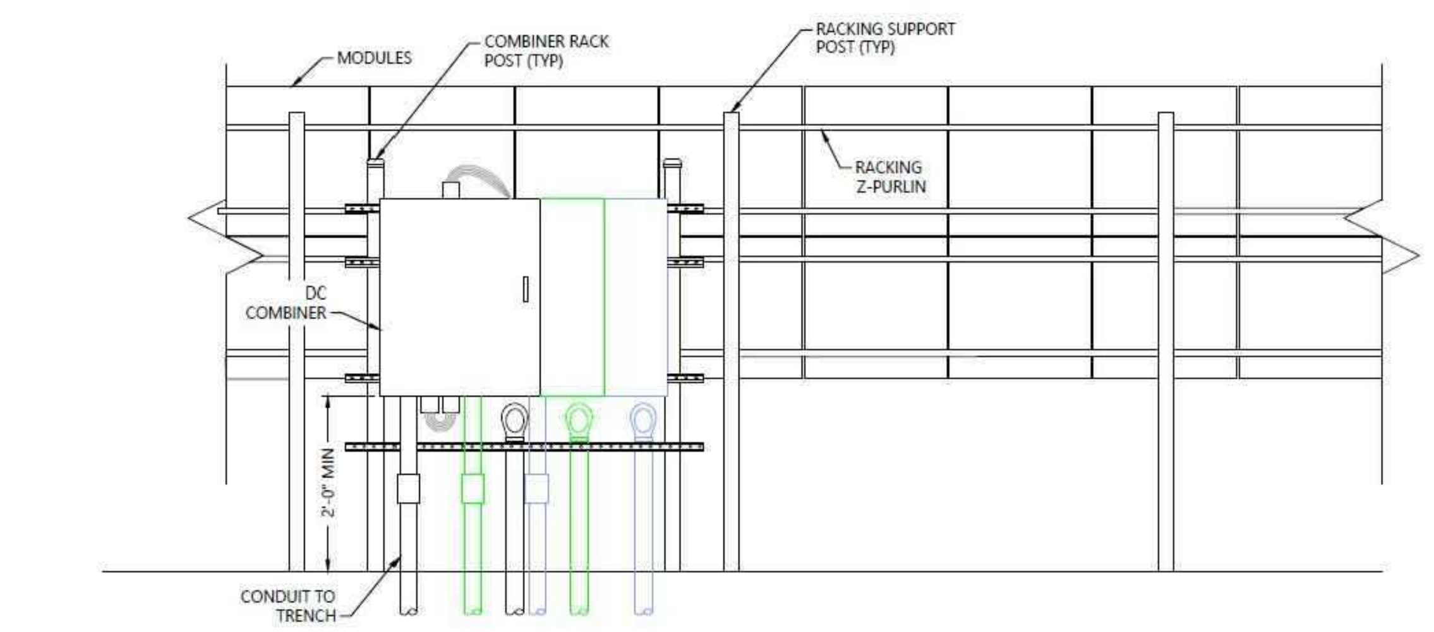
BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DC STRING WIRE & CONDUIT SCHEDULES

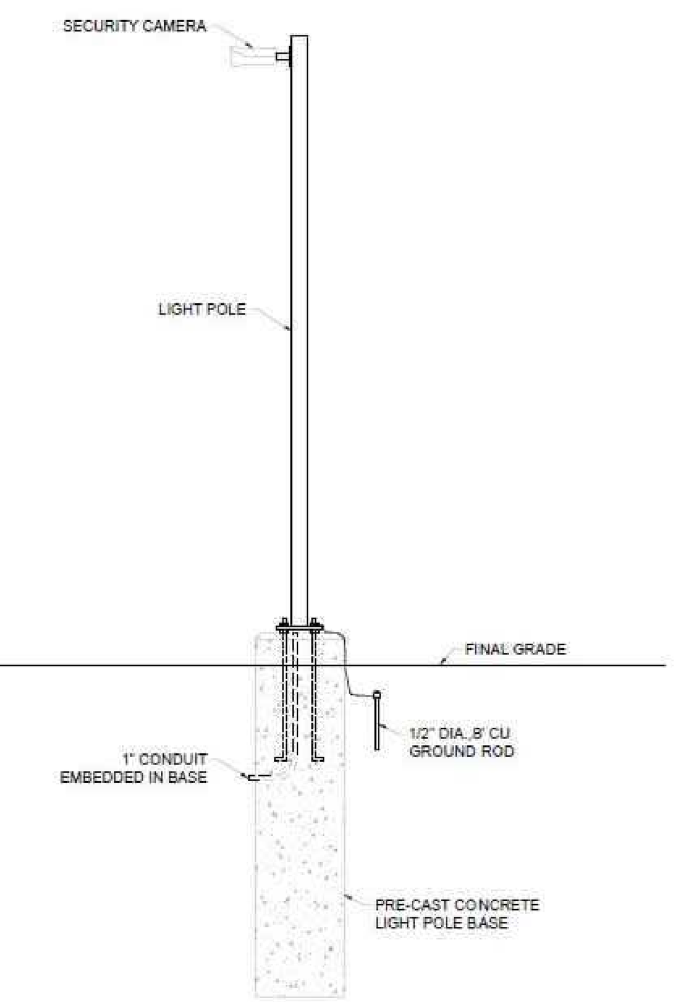
Project	Sheet
Date: APRIL 30, 2024	PV-6
Scale: 1/16" = 1'-0"	

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION



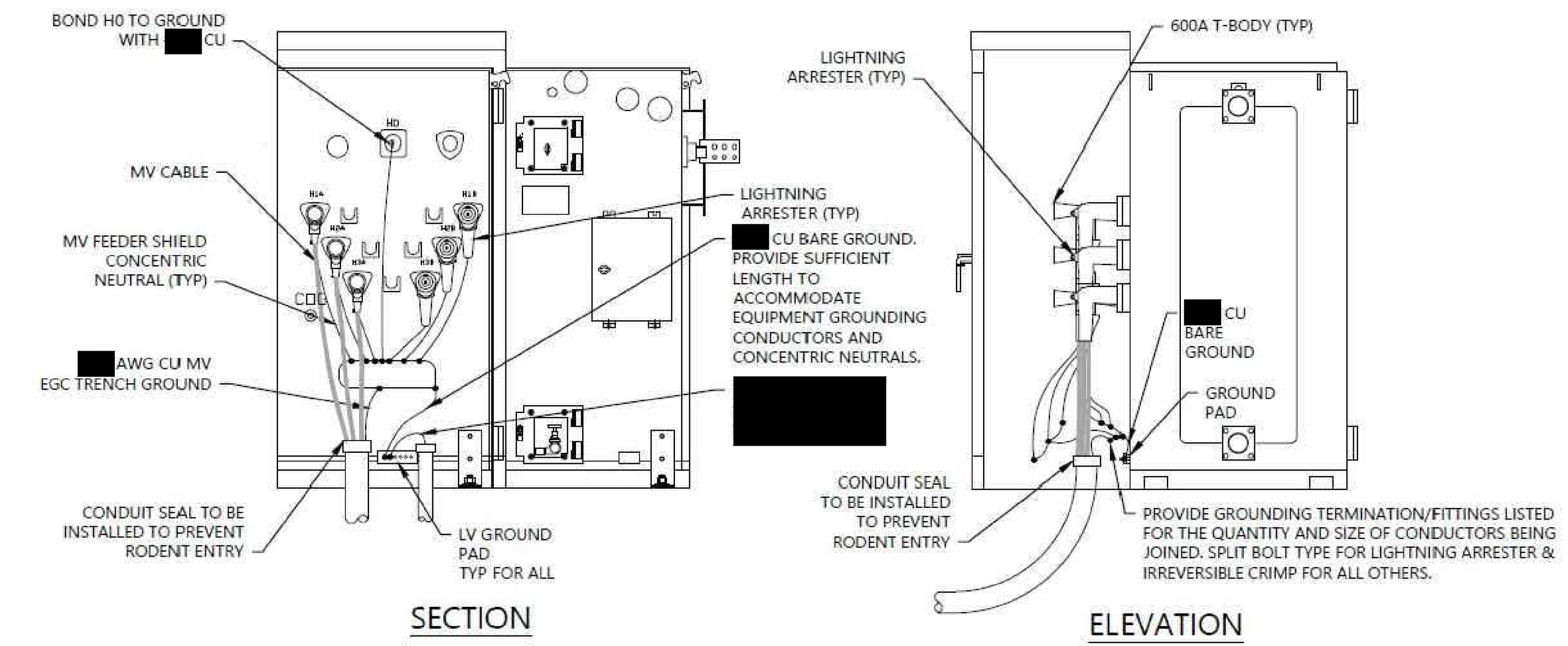
NOTES:
1. DETAIL IS FROM PREVIOUS ECOS ENERGY PROJECT, TO BE USED FOR DESIGN INTENT.

1 PV-7 DC STRING COMBINER BOX MOUNTING DETAIL
NOT TO SCALE



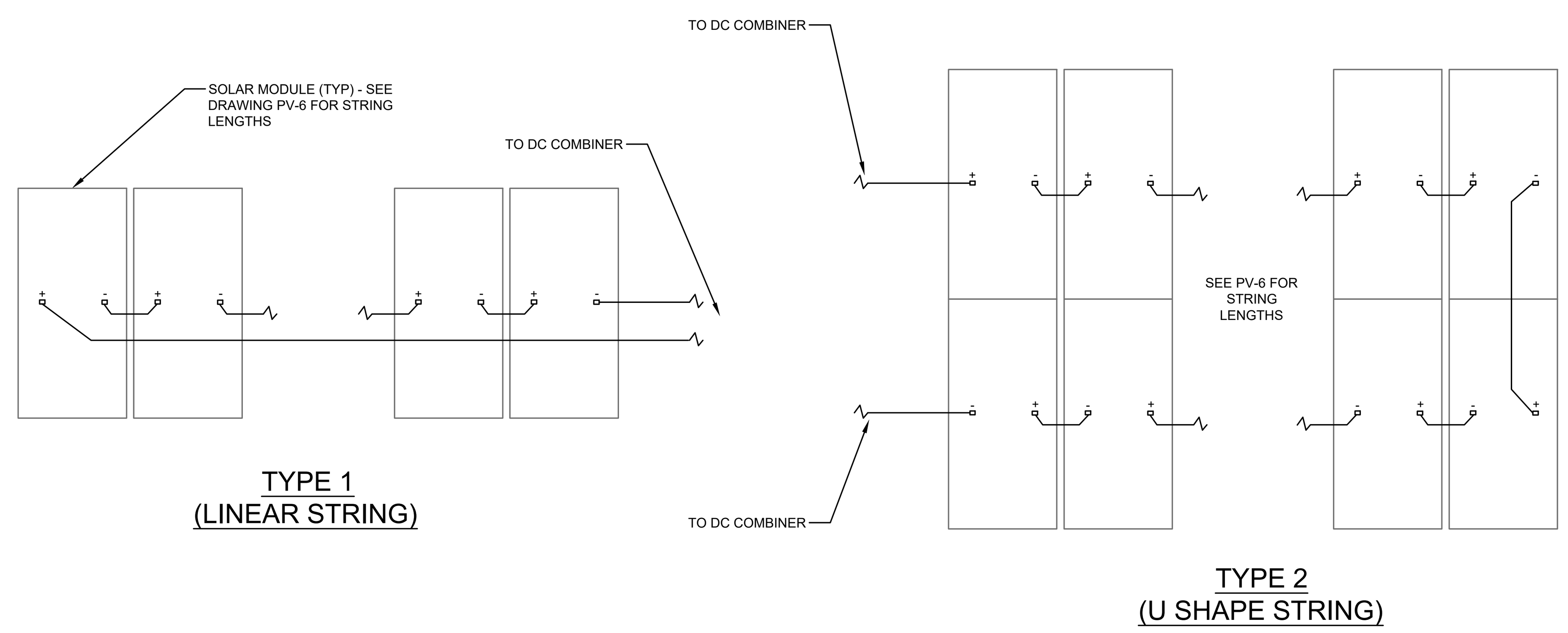
GENERAL NOTES:
1. REFER TO ARRAY PLAN FOR CAMERA LOCATIONS.
2. REFER TO NORCAL DRAWINGS FOR ADDITIONAL INFO ON CAMERA TYPE AND MOUNTING.
3. COORDINATE WITH OWNER ON HEIGHT OF LIGHT POLE TO BE USED.

8 PV-7 CAMERA POLE DETAIL
NOT TO SCALE

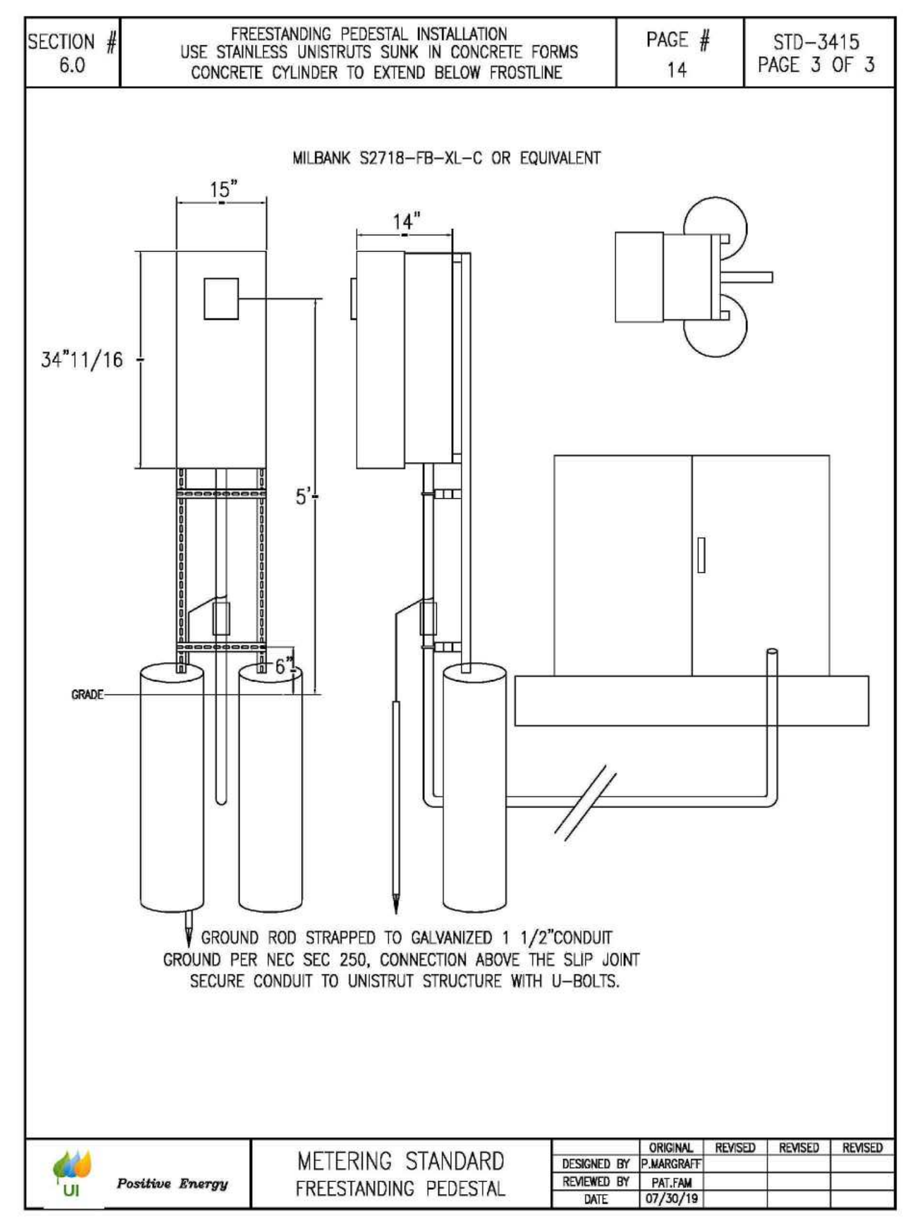


NOTES:
1. DETAIL IS FROM PREVIOUS ECOS ENERGY PROJECT, TO BE USED FOR DESIGN INTENT.

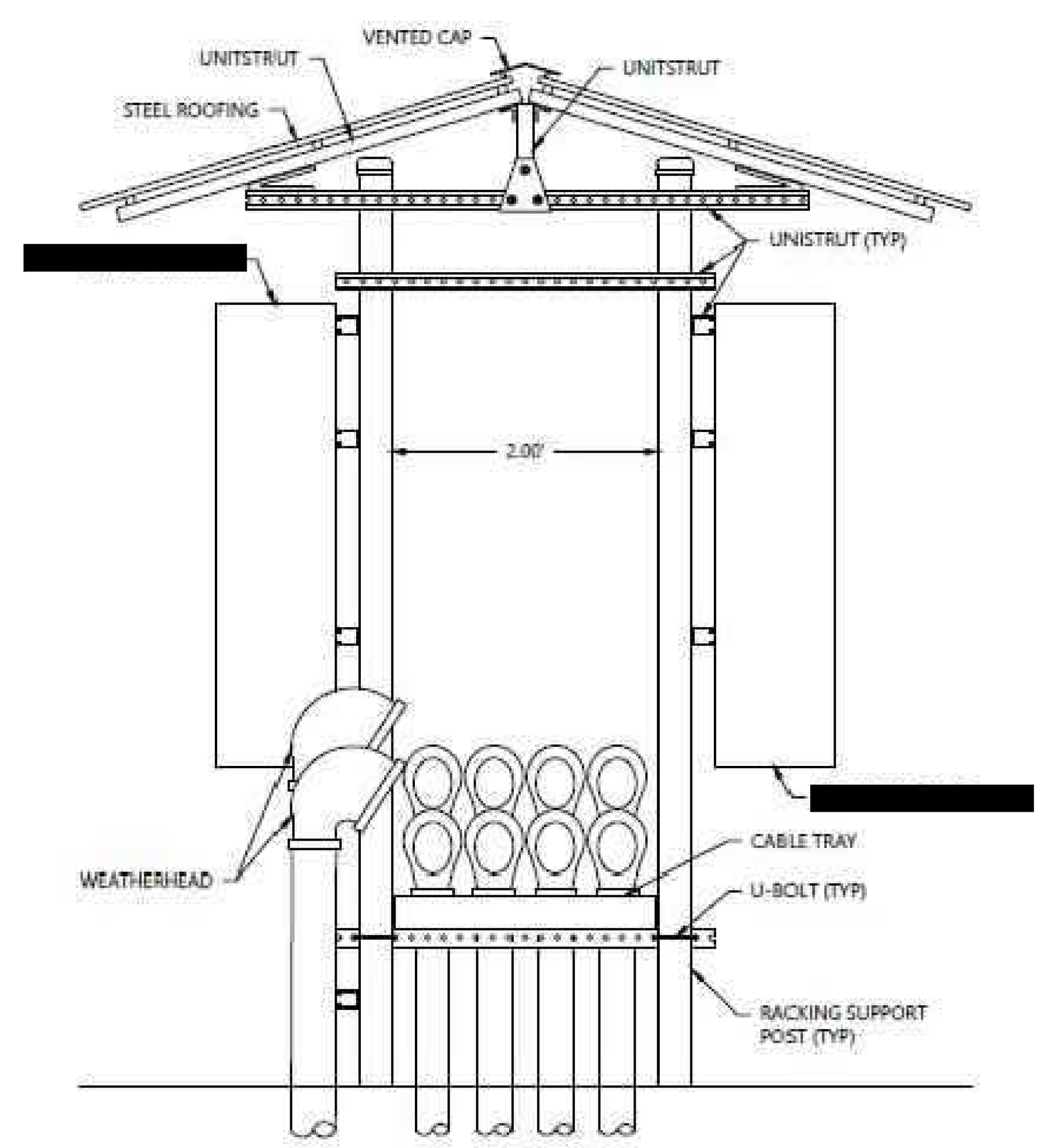
3 PV-7 CUSTOMER OWNED TRANSFORMER SUPPLY & GROUNDING DETAIL
NOT TO SCALE



4 PV-7 TYPICAL STRING WIRING DETAILS
NOT TO SCALE



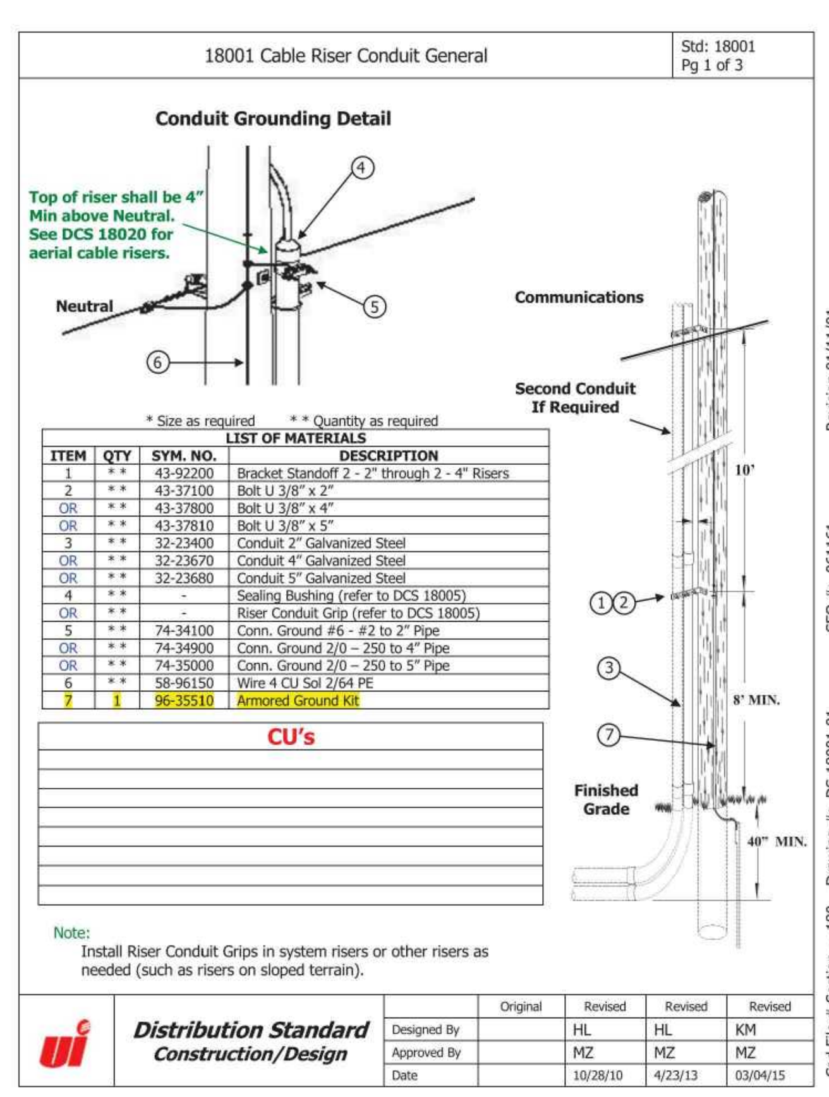
5 PV-7 PRIMARY METER PEDESTAL DETAIL
NOT TO SCALE

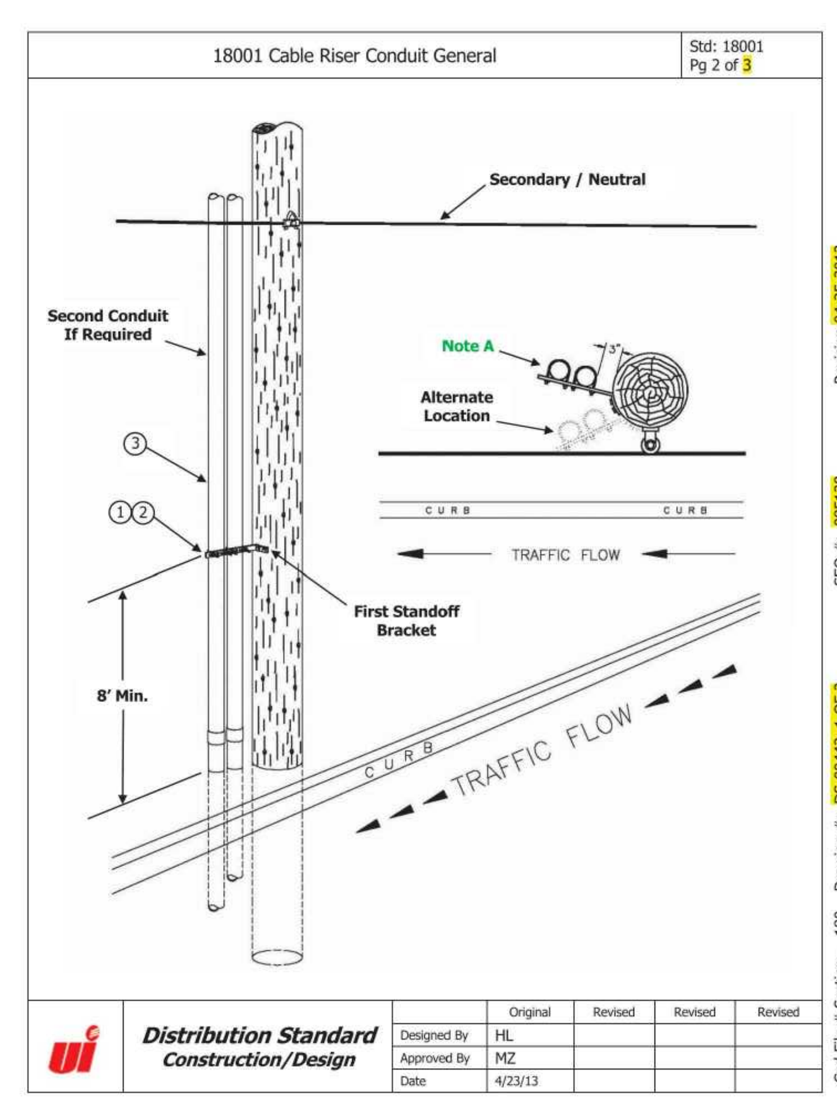


NOTES:
1. DETAIL IS FROM PREVIOUS ECOS ENERGY PROJECT, TO BE USED FOR DESIGN INTENT.

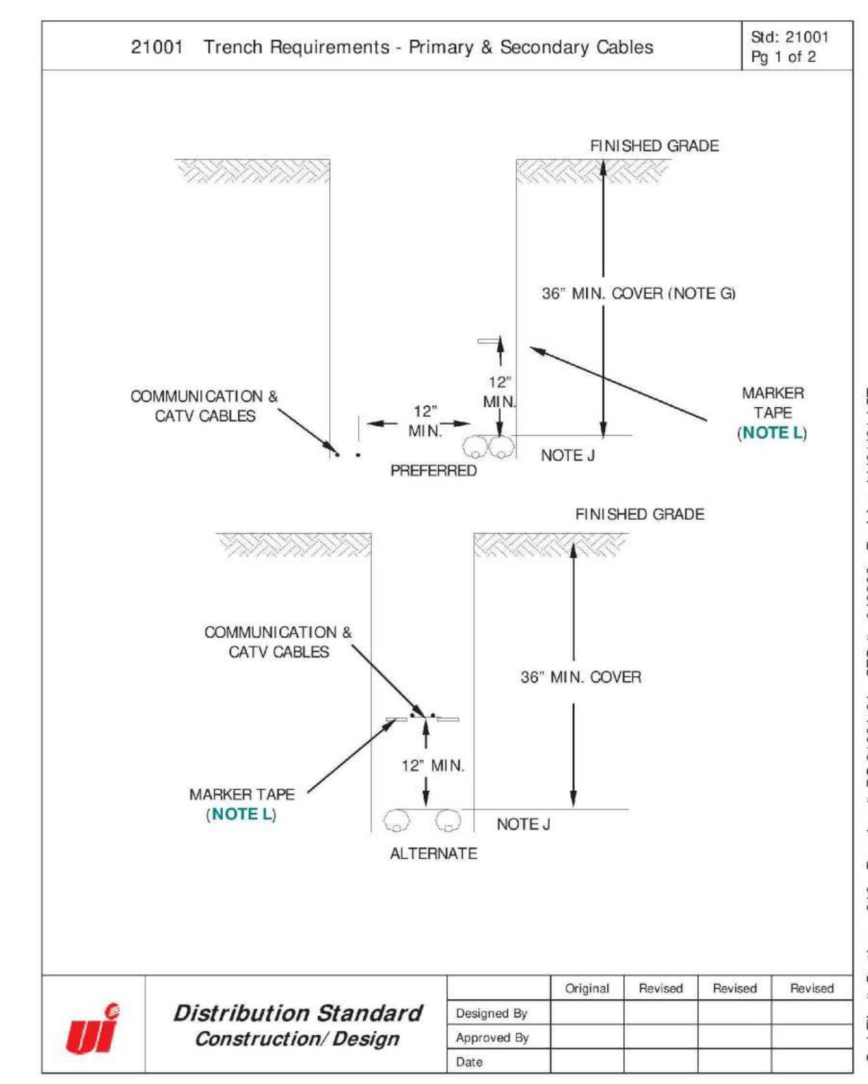
6 PV-7 INVERTER RACK / HUT DETAIL (DIAGRAMMATIC)
NOT TO SCALE

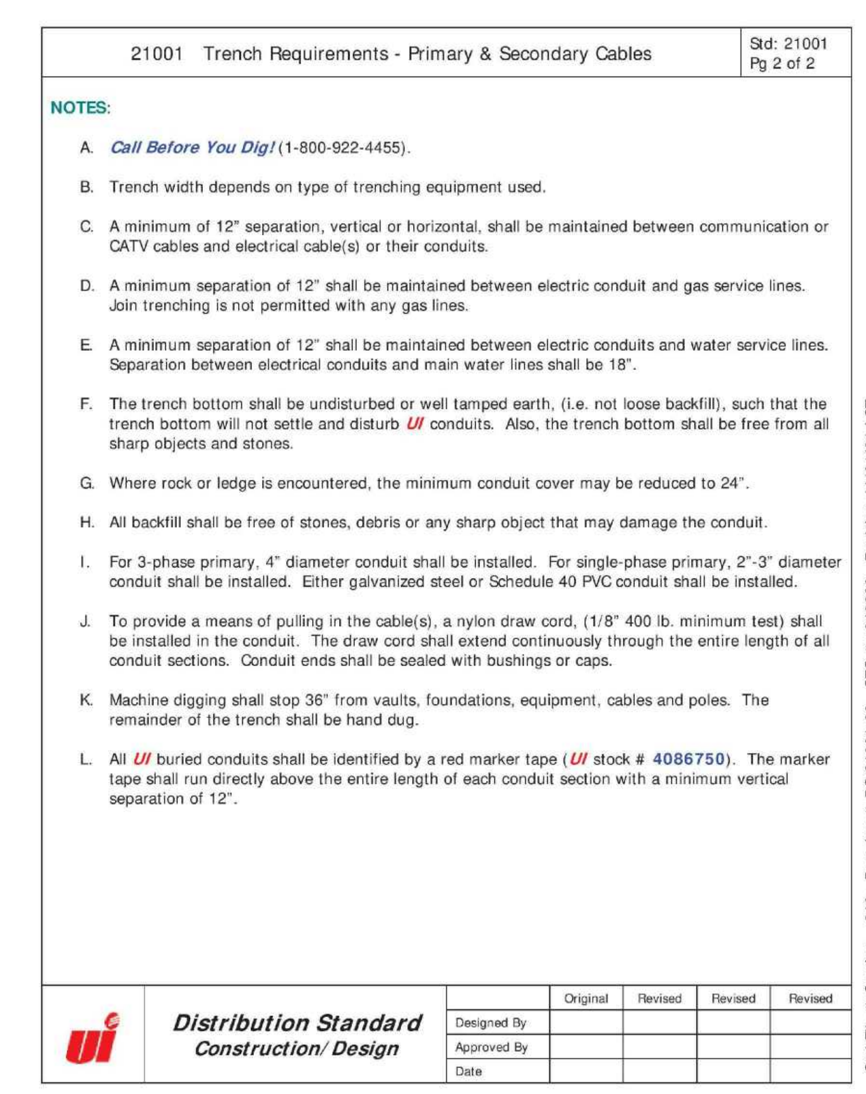
NOTE - INSTALL CONDUIT RISER ON FIELD SIDE OF POLE, OPPOSITE OF VEHICLE TRAFFIC. ONCE INSTALLED, SCHEDULE AN INSPECTION WITH THE UI DISTRIBUTION ENGINEER PRIOR TO BACKFILLING





2 PV-7 SUPPLY FROM OVERHEAD UTILITY POLE SYSTEM
NOT TO SCALE





21001 Trench Requirements - Primary & Secondary Cables — Std: 21001 Pg 2 of 2

NOTES:

A. *Call Before You Dig!* (1-800-922-4455).

B. Trench width depends on type of trenching equipment used.

C. A minimum of 12" separation, vertical or horizontal, shall be maintained between communication or CATV cables and electrical cable(s) or their conduits.

D. A minimum separation of 12" shall be maintained between electric conduit and gas service lines. Join trenching is not permitted with any gas lines.

E. A minimum separation of 12" shall be maintained between electric conduits and water service lines. Separation between electrical conduits and main water lines shall be 18".

F. The trench bottom shall be undisturbed or well tamped earth, (i.e. not loose backfill), such that the trench bottom will not settle and disturb *UI* conduits. Also, the trench bottom shall be free from all sharp objects and stones.

G. Where rock or ledge is encountered, the minimum conduit cover may be reduced to 24".

H. All backfill shall be free of stones, debris or any sharp object that may damage the conduit.

I. For 3-phase primary, 4" diameter conduit shall be installed. For single-phase primary, 2"-3" diameter conduit shall be installed. Either galvanized steel or Schedule 40 PVC conduit shall be installed.

J. To provide a means of pulling in the cable(s), a nylon draw cord, (1/8" 400 lb. minimum test) shall be installed in the conduit. The draw cord shall extend continuously through the entire length of all conduit sections. Conduit ends shall be sealed with bushings or caps.

K. Machine digging shall stop 36" from vaults, foundations, equipment, cables and poles. The remainder of the trench shall be hand dug.

L. All *UI* buried conduits shall be identified by a red marker tape (*UI* stock # 4086750). The marker tape shall run directly above the entire length of each conduit section with a minimum vertical separation of 12".

Distribution Standard Construction/Design

Section – 210 Drawing # DS-21001-02 SEQ #: 040989 Revision 11/01/01 LST

7 PV-7 UTILITY COMPANY TRENCH DETAIL
NOT TO SCALE

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):

- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

DETAILS

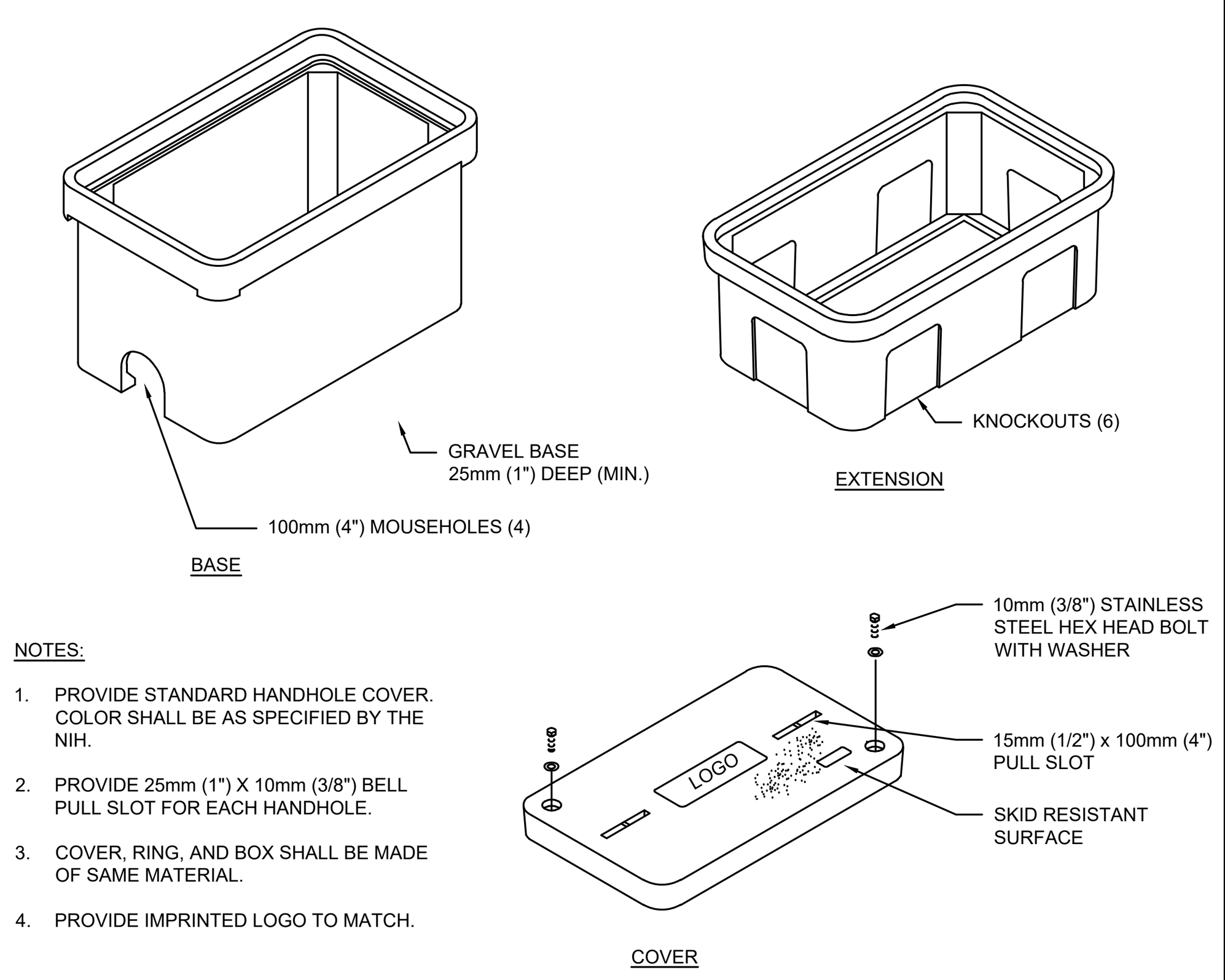
Project	Sheet
Date: APRIL 30, 2024	PV-7
Scale: NTS	

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL INTENT FOR THE PV SYSTEM. ITEMS SUCH AS CONDUIT FITTINGS, HANGERS, COVER PLATES, AND JUNCTION BOXES ARE NOT SHOWN BUT ARE REQUIRED AND SHALL BE PROVIDED BY THE CONTRACTOR AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL SYSTEM IN ACCORDANCE WITH THE NEC.
2. DEFINITIONS SHALL BE REFERENCED FROM THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE.
3. CONTRACTOR SHALL VISIT THE SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ENSURE COORDINATION OF THE WORK, INCLUDING AVOIDANCE OF OBSTRUCTIONS AND PRESENCE OF ADEQUATE SERVICE CLEARANCE. NO DESTRUCTIVE WORK MAY BE PERFORMED PRIOR TO LOCATING INTERFERENCES.
4. ELECTRICAL ROUTING SHOWN ON PLANS IS CONCEPTUAL AND IS BASED ON THE ENGINEER'S BEST JUDGEMENT. CONTRACTOR SHALL PLAN & COORDINATE ACTUAL ROUTING IN FIELD PRIOR TO INSTALLATION. DRAWINGS ARE NOT TO BE SCALED. NOTIFY ENGINEER OF ANY DISCREPANCIES.
5. SERVICE ENTRANCE RATED EQUIPMENT, C/T CABINETS AND METER SOCKETS ARE TO BE APPROVED FOR USE BY THE LOCAL UTILITY COMPANY. SEE COVER SHEET FOR UTILITY COMPANY INFORMATION.
6. ALL ELECTRICAL EQUIPMENT PROVIDED MUST BE LABELED, UL LISTED, AND INSTALLED ACCORDINGLY. INSTALL ALL EQUIPMENT AND COMPONENTS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
7. CONTRACTOR SHALL PAY FOR AND COORDINATE ALL REQUIRED PERMITS AND INSPECTIONS.
8. CONTRACTOR SHALL UTILIZE ONLY QUALIFIED WORKMEN LICENSED IN THE STATE WHERE WORK IS BEING PERFORMED AND SHALL FOLLOW ALL OSHA, NFPA 70E AND OWNER STANDARDS.
9. MAINTAIN FIRE RATINGS OF ALL PARTITIONS PENETRATED AS A RESULT OF THIS PROJECT, USING SEALANT OR OTHER ACCEPTABLE METHOD.
10. COMMUNICATION AND POWER CABLES AND CONDUCTORS SHALL NOT SHARE THE SAME RACEWAY.
11. JUNCTION BOXES SHALL BE NEMA 3R AND SIZED PER THE NEC.
12. PROVIDE ALL NEC REQUIRED SIGNAGE. REFER TO DRAWING PV-10 FOR LABEL AND SIGNAGE INFORMATION.
13. LABEL ALL EXPOSED RACEWAYS, CABLE TRAYS, COVERS/ENCLOSURES OF PULL OR JUNCTION BOXES AND CONDUIT BODIES CARRYING PV SYSTEM FEEDERS (AC AND DC). LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS OR FLOORS, NOT MORE THAN 10' APART.
14. CIRCUIT BREAKERS PROVIDED AS A PART OF THIS PROJECT SHALL BE RATED FOR REVERSE FEED WHERE SUBJECT TO REVERSE CURRENTS.
15. PROVIDE APPROPRIATE CONNECTORS FOR WIRE MATERIAL USED.
16. REFER TO RISER DIAGRAM ON PV-1 FOR ELECTRICAL EQUIPMENT & FEEDER SIZE, RATING, AND QUANTITY.
17. STRING WIRING SHALL BE COPPER (RATED 2KV) RHW-2 OR USE-2-UL SUBJECT 4703 RATED FOR 90°C.
18. FOR EXTERIOR CONDUIT, USE RGS IN EXTERIOR APPLICATIONS WHERE EXPOSED OR SUBJECT TO PHYSICAL DAMAGE. USE SCHEDULE 40 PVC FOR UNDERGROUND LOCATIONS. SCHEDULE 80 PVC SHALL BE PROVIDED IN EXTERIOR EXPOSED LOCATIONS WHEN RAIN-TIGHT CONNECTORS AND FITTINGS ARE USED, AND THE CONDUIT IS NOT EXPOSED TO ANY POTENTIAL PHYSICAL DAMAGE. ALL SUPPORTS, BOLTS, STRAPS, AND SCREWS SHALL BE CORROSION RESISTANT.
19. COLOR CODE WIRING FOR EACH VOLTAGE SYSTEM PER INDUSTRY STANDARD COLORING. DC WIRING SHALL BE COLOR CODED RED (+), BLACK (-) AND GREEN (GND).
20. AC AND DC CONDUCTORS SHALL HAVE ENOUGH SLACK TO ACCOMMODATE EXPANSION AND CONTRACTION.
21. PROVIDE EXPANSION FITTINGS WHERE CONDUITS EMERGE FROM UNDERGROUND TO ABOVE GROUND AND CONNECT TO RIGID EQUIPMENT OR SURFACES.

ABBREVIATIONS

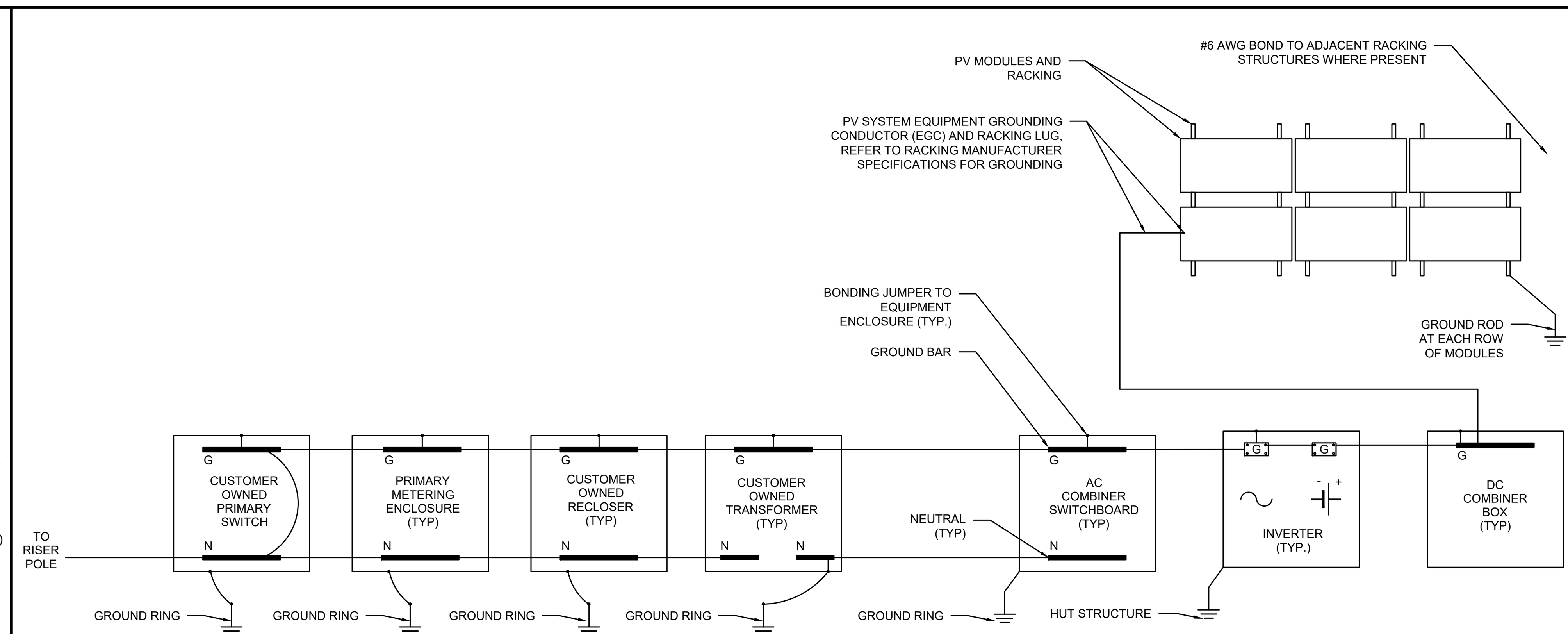
A	AMPERES	MULTI	MULTI-CONDUCTOR CABLE
AC	ALTERNATING CURRENT (60 HZ)	NEC	NATIONAL ELECTRIC CODE
AL	ALUMINUM	NTS	NOT TO SCALE
ATS	AUTOMATIC TRANSFER SWITCH	OF	OWNER FURNISHED
AWG	AMERICAN WIRE GAUGE	P	POLE
C	CONDUIT	PH	PHASE
CB	COMBINER BOX	PNL	PANELBOARD
COMM.	COMMUNICATION	PRI	PRIMARY
CF	CONTRACTOR FURNISHED	PSF	POUNDS PER SQUARE FOOT
CI	CONTRACTOR INSTALLED	PSI	POUNDS PER SQUARE INCH
C/T	CURRENT TRANSFORMER	P/T	POWER TRANSFORMER
CU	COPPER	PV	PHOTOVOLTAIC
DWG	DRAWING	PVC	POLYVINYL CHLORIDE
EMT	ELECTRICAL METALLIC TUBING	RGS	RIGID GALVANIZED STEEL CONDUIT
EQUIP	EQUIPMENT	SE	SERVICE EQUIPMENT
EX	EXISTING EQUIPMENT TO REMAIN	SEC	SECONDARY
FT	FEET	TX	TRANSFORMER
GFCI/GFI	GROUND-FAULT CIRCUIT-INTERRUPTER	TYP	TYPICAL
GRD	GROUND	UG	UNDERGROUND
IN	INCHES	UL	UNDERWRITER'S LABORATORY
J	JUNCTION	V	VOLTS
KAIC	AMPERE INTERRUPTING CAPACITY	VA	VOLT-AMPERES
KV	KILOVOLT	W	WATTS
KW	KILOWATT	WP	WEATHERPROOF
M	METER	WT	WATERTIGHT
MCB	MAIN CIRCUIT BREAKER	%	PERCENT
MDP	MAIN DISTRIBUTION PANELBOARD	#	NUMBER
MLO	MAIN LUG ONLY	'	FEET
		"	INCHES



NOTES:

1. PROVIDE STANDARD HANDHOLE COVER. COLOR SHALL BE AS SPECIFIED BY THE NIH.
2. PROVIDE 25mm (1") X 10mm (3/8") BELL PULL SLOT FOR EACH HANDHOLE.
3. COVER, RING, AND BOX SHALL BE MADE OF SAME MATERIAL.
4. PROVIDE IMPRINTED LOGO TO MATCH.

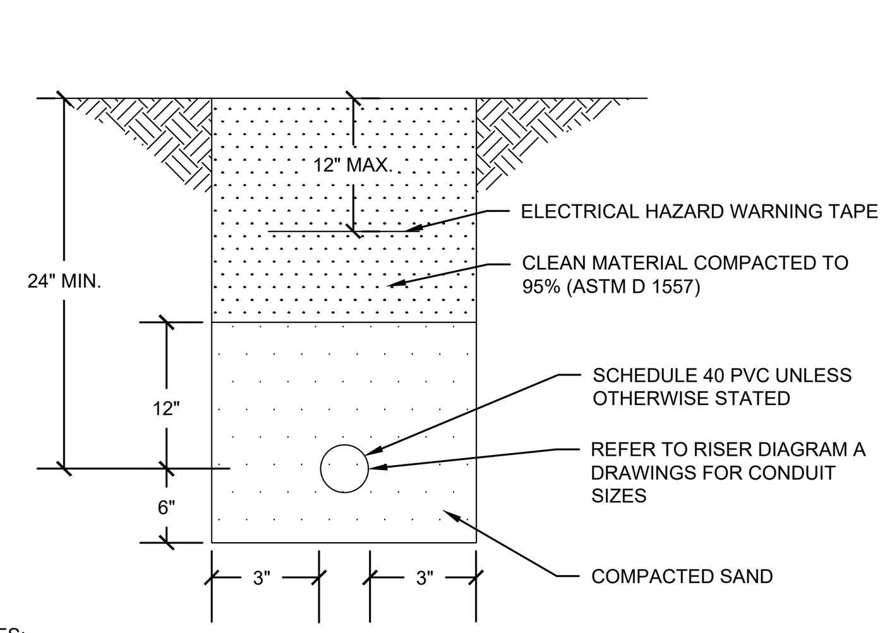
2 / PV-8 — BASIC PULLBOX / HANDHOLE DETAIL – DC & <600VAC
NOT TO SCALE



NOTES:

1. REFER TO RISER DIAGRAM ON PV-1 FOR NEUTRAL AND GROUND WIRE SIZES.
2. EQUIPMENT GROUND CONNECTIONS SHALL BE MADE AT EVERY SUB-ARRAY.
3. REFER TO EQUIPMENT MANUFACTURER'S SPECIFICATIONS FOR GROUNDING LOCATIONS AND RECOMMENDED CLIPS / LUGS.
4. SEE GROUND RING DETAIL ON DRAWING PV-8.
5. REFER TO EPEC DRAWINGS FOR AC COMBINER SWITCHBOARD GROUNDING REQUIREMENTS.

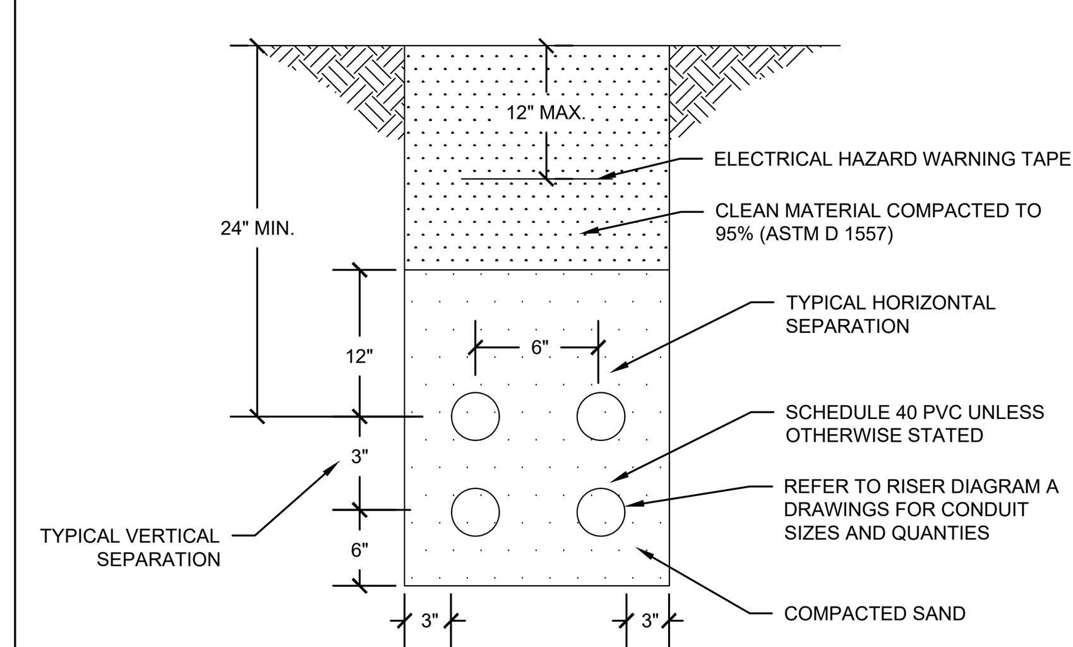
1 / PV-8 — TYPICAL GROUNDING DETAIL
NOT TO SCALE



NOTES:

1. CONFIRM LOCATION OF ANY EXISTING UNDERGROUND UTILITY PRIOR TO EXCAVATION. DIG BY HAND WHEN IN THE VICINITY OF EXISTING UTILITIES.
2. USE CLEAN FILL FREE OF STONES GREATER THAN 2" IN DIAMETER, FROZEN MATERIAL, SHARPS AND ANY OTHER DEBRIS.
3. WHERE CONDUIT TRAVELS BELOW A PATH SUBJECT TO VEHICULAR TRAFFIC USE CONCRETE ENCASED PVC OR RIGID GALVANIZED STEEL.

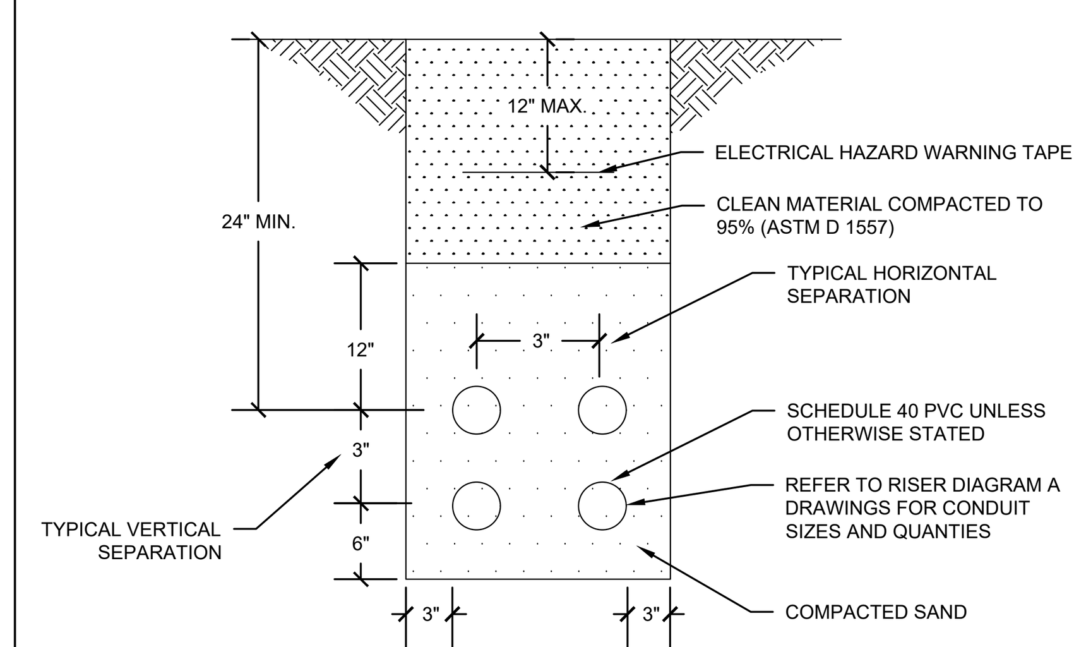
3 / PV-8 — SINGLE ELECTRICAL CONDUIT TRENCH DETAIL (LVDC & LVAC)
NOT TO SCALE



NOTES:

1. CONFIRM LOCATION OF ANY EXISTING UNDERGROUND UTILITY PRIOR TO EXCAVATION. DIG BY HAND WHEN IN THE VICINITY OF EXISTING UTILITIES.
2. USE CLEAN FILL FREE OF STONES GREATER THAN 2" IN DIAMETER, FROZEN MATERIAL, SHARPS AND ANY OTHER DEBRIS.
3. WHERE CONDUIT TRAVELS BELOW A PATH SUBJECT TO VEHICULAR TRAFFIC USE CONCRETE ENCASED PVC OR RIGID GALVANIZED STEEL.

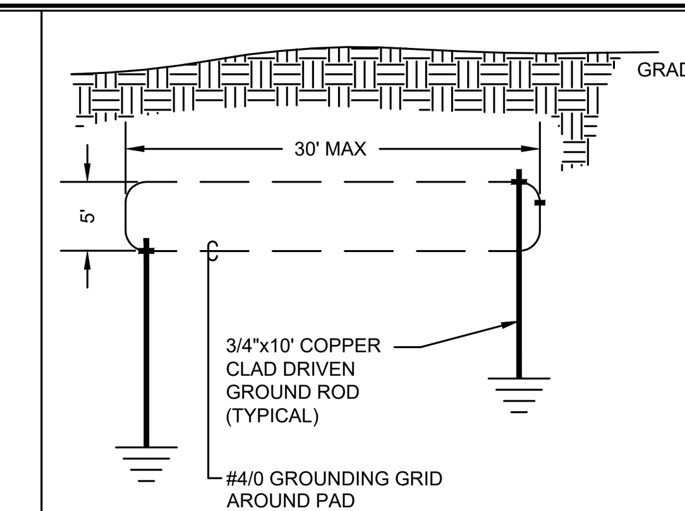
4 / PV-8 — MULTIPLE ELECTRICAL CONDUIT TRENCH DETAIL (AC, 600V & BELOW, STACKED)
NOT TO SCALE



NOTES:

1. CONFIRM LOCATION OF ANY EXISTING UNDERGROUND UTILITY PRIOR TO EXCAVATION. DIG BY HAND WHEN IN THE VICINITY OF EXISTING UTILITIES.
2. USE CLEAN FILL FREE OF STONES GREATER THAN 2" IN DIAMETER, FROZEN MATERIAL, SHARPS AND ANY OTHER DEBRIS.
3. WHERE CONDUIT TRAVELS BELOW A PATH SUBJECT TO VEHICULAR TRAFFIC USE CONCRETE ENCASED PVC OR RIGID GALVANIZED STEEL.

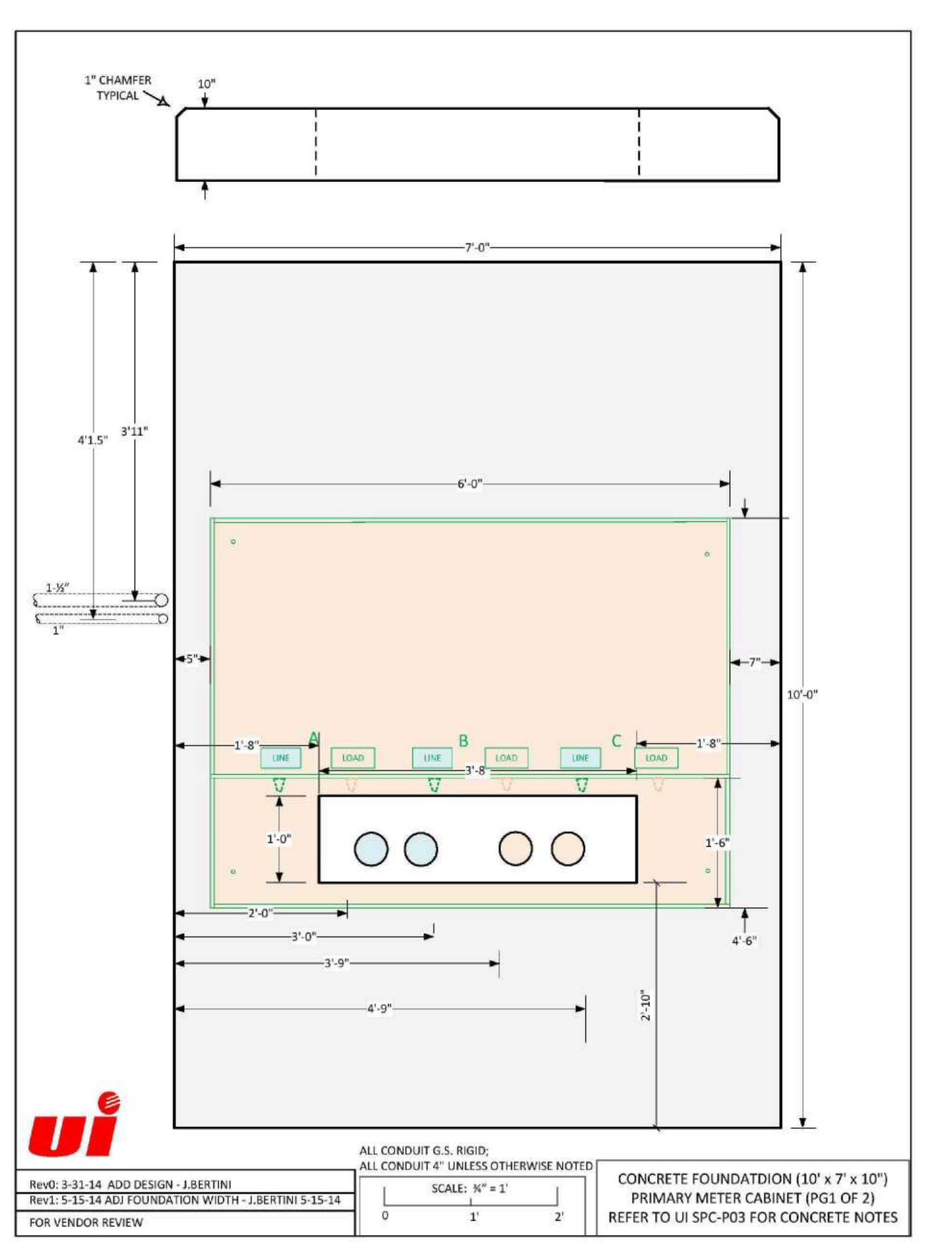
5 / PV-8 — MULTIPLE ELECTRICAL CONDUIT TRENCH DETAIL (ALL DC FEEDERS)
NOT TO SCALE

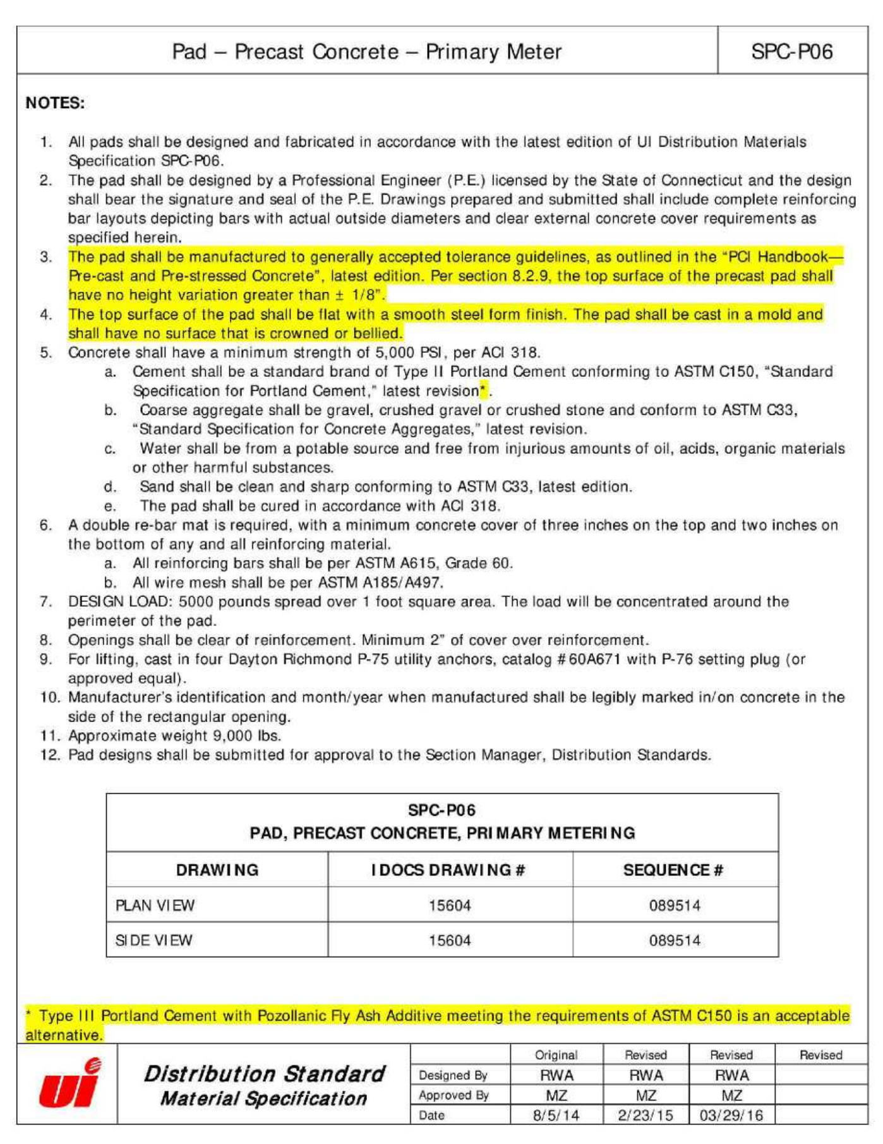


NOTES:

1. RING SHALL EXTEND AROUND EACH EQUIPMENT PAD AND INVERTER HUT.
2. THIS DIAGRAM IS FOR INFORMATIONAL PURPOSES ONLY. EXACT DETAILS OF GROUNDING SYSTEM MAY VARY.
3. ALL ASPECTS OF GROUNDING SYSTEM SHALL COMPLY FULLY WITH ARTICLE 250 OF N.E.C.
4. UTILIZE GROUNDING BUSHINGS AS REQUIRED.
5. PROVIDE ADDITIONAL RODS AS REQUIRED TO ACHIEVE 5 OHMS OR LESS GROUND RESISTANCE.
6. THE FOLLOWING EQUIPMENT SHALL BE CONNECTED TO A GROUND RING:
   - 6.1. PRIMARY METERING ENCLOSURE (DEDICATED RING, #4/0 AWG - SEE DETAIL 7/PV-8)
   - 6.2. PRIMARY RECLOSER (DEDICATED RING, #4/0 AWG)
   - 6.3. TX-1 (EQ PAD RING, #4/0 AWG)
   - 6.4. SWBD-1 (EQ PAD RING, #3/0 AWG)
   - 6.5. EQUIPMENT PAD UNCOATED REBAR (EQ PAD RING, #4/0 AWG, AT OPPOSITE CORNERS)
   - 6.6. AUX POWER PANEL TRANSFORMER (EQ PAD RING, #6 AWG)
   - 6.7. DAS CABINET, MET CABINET & CAM CABINET (EQ PAD RING, #6 AWG EA)
   - 6.8. MET EQUIPMENT POLE LIGHTNING ROD (EQ PAD RING, #6 AWG)
   - 6.9. TWO INVERTER HUT POSTS (EQ PAD RING, #2 AWG EA)

8 / PV-8 — GROUND RING DETAIL
NOT TO SCALE





Pad – Precast Concrete – Primary Meter | SPC-P06

NOTES:

1. All pads shall be designed and fabricated in accordance with the latest edition of UI Distribution Materials Specification SPC-P06.
2. The pad shall be designed by a Professional Engineer (P.E.) licensed by the State of Connecticut and the design shall bear the signature and seal of the P.E. Drawings prepared and submitted shall include complete reinforcing bar layouts depicting bars with actual outside diameters and clear external concrete cover requirements as specified herein.
3. The pad shall be manufactured to generally accepted tolerance guidelines, as outlined in the "PCI Handbook—Pre-cast and Pre-stressed Concrete", latest edition. Per section 8.2.9, the top surface of the precast pad shall have no height variation greater than ± 1/8".
4. The top surface of the pad shall be flat with a smooth steel form finish. The pad shall be cast in a mold and shall have no surface that is crowned or bellied.
5. Concrete shall have a minimum strength of 5,000 PSI, per ACI 318.
   a. Cement shall be a standard brand of Type II Portland Cement conforming to ASTM C150, "Standard Specification for Portland Cement," latest revision*.
   b. Coarse aggregate shall be gravel, crushed gravel or crushed stone and conform to ASTM C33, "Standard Specification for Concrete Aggregates," latest revision.
   c. Water shall be from a potable source and free from injurious amounts of oil, acids, organic materials or other harmful substances.
   d. Sand shall be clean and sharp conforming to ASTM C33, latest edition.
   e. The pad shall be cured in accordance with ACI 318.
6. A double re-bar mat is required, with a minimum concrete cover of three inches on the top and two inches on the bottom of any and all reinforcing material.
   a. All reinforcing bars shall be per ASTM A615, Grade 60.
   b. All wire mesh shall be per ASTM A185/A497.
7. DESIGN LOAD: 5000 pounds spread over 1 foot square area. The load will be concentrated around the perimeter of the pad.
8. Openings shall be clear of reinforcement. Minimum 2" of cover over reinforcement.
9. For lifting, cast in four Dayton Richmond P-75 utility anchors, catalog #60A671 with P-76 setting plug (or approved equal).
10. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the rectangular opening.
11. Approximate weight 9,000 lbs.
12. Pad designs shall be submitted for approval to the Section Manager, Distribution Standards.

SPC-P06
PAD, PRECAST CONCRETE, PRIMARY METERING

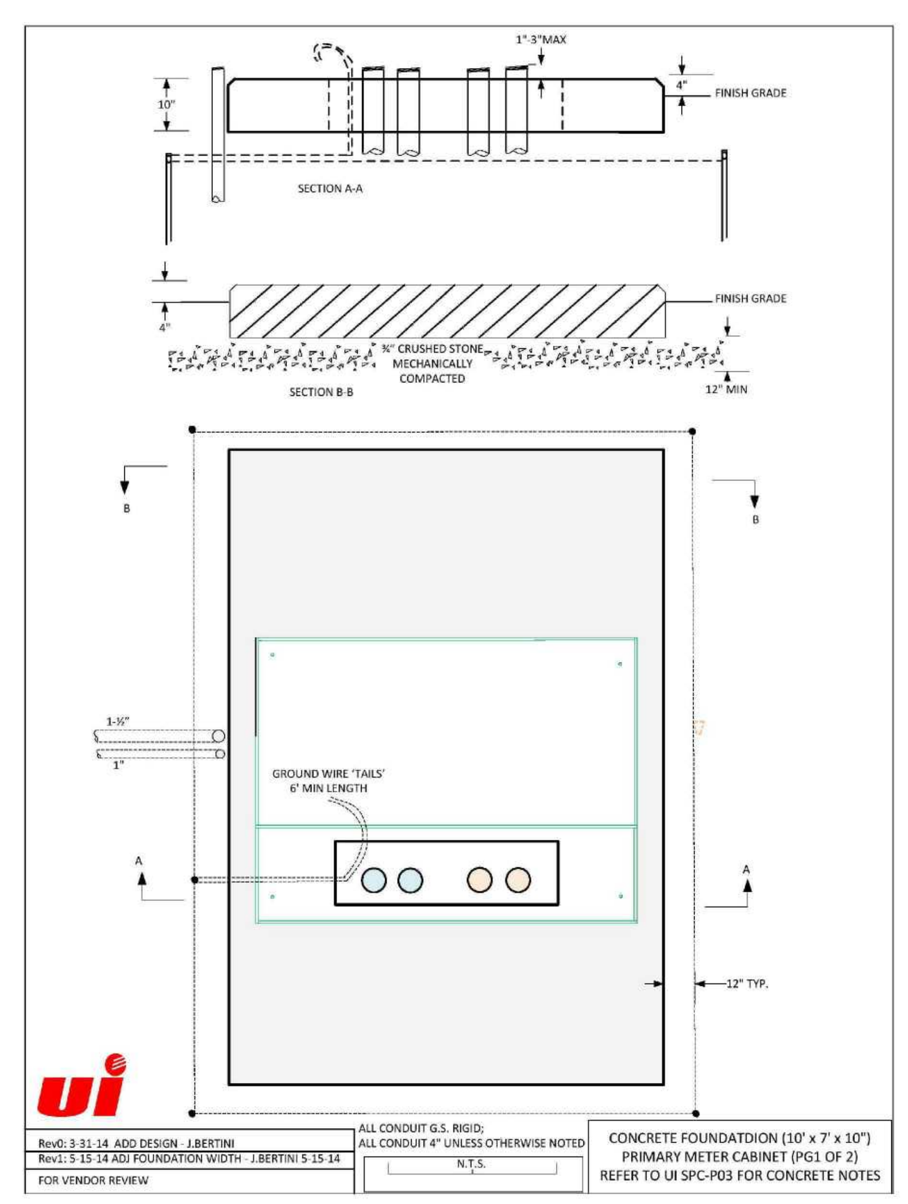
DRAWING	IDOCS DRAWING #	SEQUENCE #
PLAN VIEW	15604	089514
SIDE VIEW	15604	089514

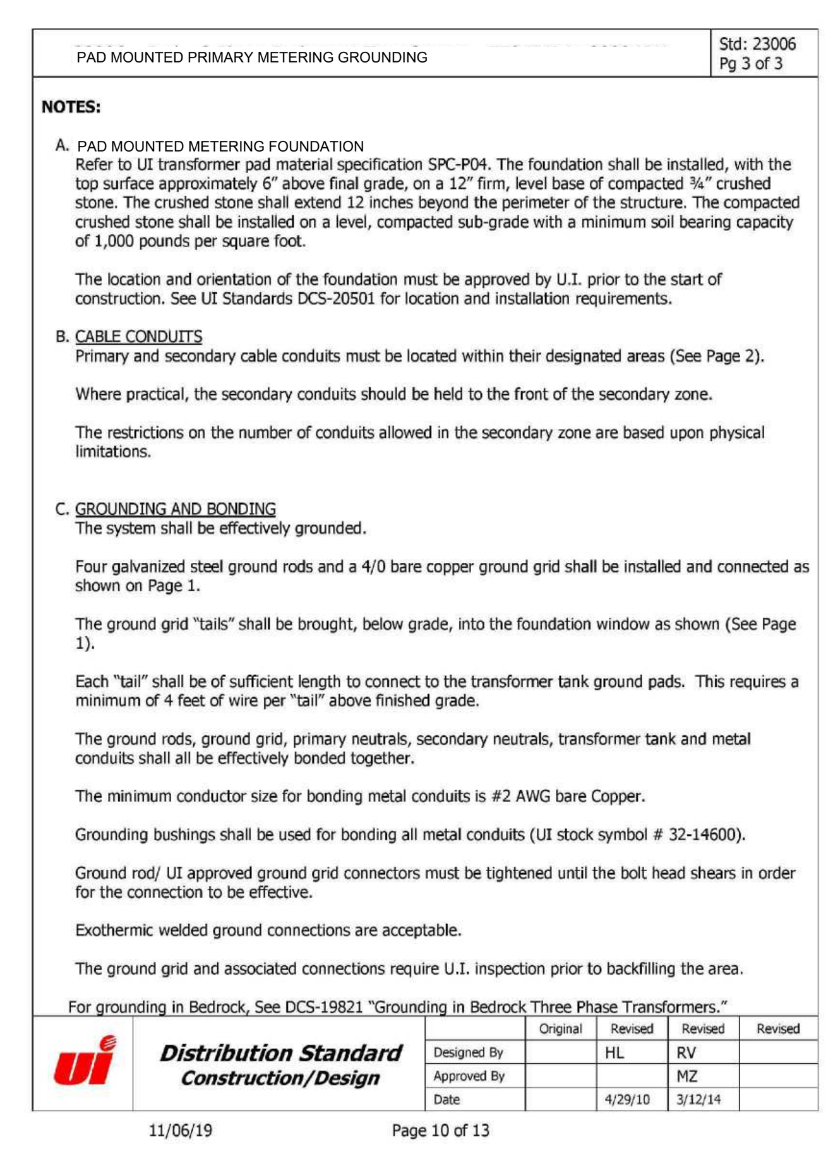
* Type III Portland Cement with Pozollanic Fly Ash Additive meeting the requirements of ASTM C150 is an acceptable alternative.

Distribution Standard Material Specification

	Original	Revised	Revised	Revised
Designed By	RWA	RWA	RWA	
Approved By	MZ	MZ	MZ	
Date	8/5/14	2/23/15	03/29/16	

Page 2 of 4





PAD MOUNTED PRIMARY METERING GROUNDING | Std: 23006 Pg 3 of 3

NOTES:

A. PAD MOUNTED METERING FOUNDATION
Refer to UI transformer pad material specification SPC-P04. The foundation shall be installed, with the top surface approximately 6" above final grade, on a 12" firm, level base of compacted ¾" crushed stone. The crushed stone shall extend 12 inches beyond the perimeter of the structure. The compacted crushed stone shall be installed on a level, compacted sub-grade with a minimum soil bearing capacity of 1,000 pounds per square foot.

The location and orientation of the foundation must be approved by U.I. prior to the start of construction. See UI Standards DCS-20501 for location and installation requirements.

B. CABLE CONDUITS
Primary and secondary cable conduits must be located within their designated areas (See Page 2).

Where practical, the secondary conduits should be held to the front of the secondary zone.

The restrictions on the number of conduits allowed in the secondary zone are based upon physical limitations.

C. GROUNDING AND BONDING
The system shall be effectively grounded.

Four galvanized steel ground rods and a 4/0 bare copper ground grid shall be installed and connected as shown on Page 1.

The ground grid "tails" shall be brought, below grade, into the foundation window as shown (See Page 1).

Each "tail" shall be of sufficient length to connect to the transformer tank ground pads. This requires a minimum of 4 feet of wire per "tail" above finished grade.

The ground rods, ground grid, primary neutrals, secondary neutrals, transformer tank and metal conduits shall all be effectively bonded together.

The minimum conductor size for bonding metal conduits is #2 AWG bare Copper.

Grounding bushings shall be used for bonding all metal conduits (UI stock symbol # 32-14600).

Ground rod/ UI approved ground grid connectors must be tightened until the bolt head shears in order for the connection to be effective.

Exothermic welded ground connections are acceptable.

The ground grid and associated connections require U.I. inspection prior to backfilling the area.

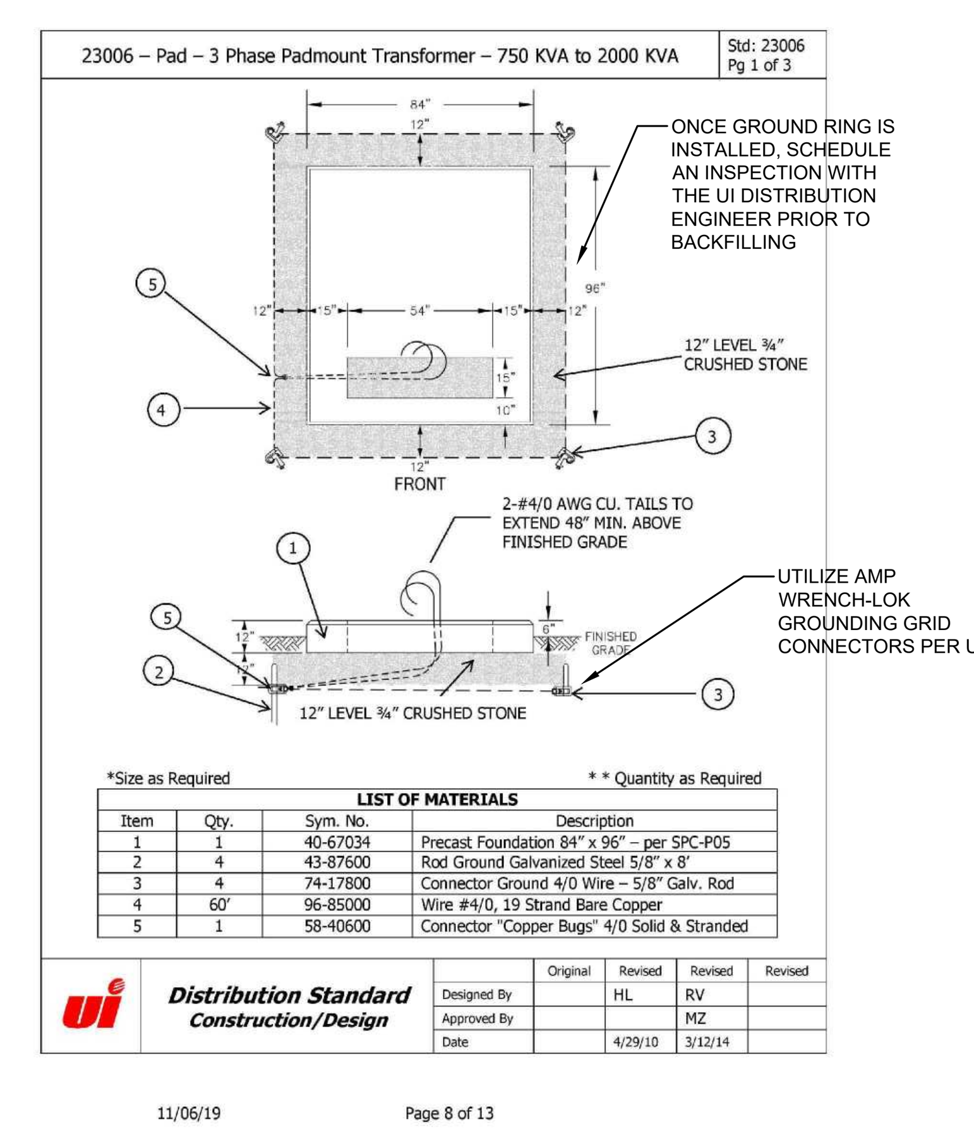
For grounding in Bedrock, See DCS-19821 "Grounding in Bedrock Three Phase Transformers."

Distribution Standard Construction/Design

	Original	Revised	Revised	Revised
Designed By		HL	RV	
Approved By			MZ	
Date		4/29/10	3/12/14	

11/06/19 Page 10 of 13

THIS PAGE REFERENCES A TRANSFORMER PAD, BUT IT IS TO BE USED FOR GROUNDING AT THE PRIMARY METERING ENCLOSURE PAD



23006 – Pad – 3 Phase Padmount Transformer – 750 KVA to 2000 KVA | Std: 23006 Pg 1 of 3

ONCE GROUND RING IS INSTALLED, SCHEDULE AN INSPECTION WITH THE UI DISTRIBUTION ENGINEER PRIOR TO BACKFILLING

UTILIZE AMP WRENCH-LOK GROUNDING GRID CONNECTORS PER U.I.

*Size as Required — * * Quantity as Required

LIST OF MATERIALS

Item	Qty.	Sym. No.	Description
1	1	40-67034	Precast Foundation 84" x 96" – per SPC-P05
2	4	43-87600	Rod Ground Galvanized Steel 5/8" x 8'
3	4	74-17800	Connector Ground 4/0 Wire – 5/8" Galv. Rod
4	60'	96-85000	Wire #4/0, 19 Strand Bare Copper
5	1	58-40600	Connector "Copper Bugs" 4/0 Solid & Stranded

Distribution Standard Construction/Design

	Original	Revised	Revised	Revised
Designed By		HL	RV	
Approved By			MZ	
Date		4/29/10	3/12/14	

11/06/19 Page 8 of 13

THIS PAGE REFERENCES A TRANSFORMER PAD, BUT IT IS TO BE USED FOR INFORMATION RELATED TO GROUNDING AT THE PRIMARY METERING ENCLOSURE PAD

7 / PV-8 — UTILITY COMPANY PRIMARY METERING ENCLOSURE PAD DETAILS
NOT TO SCALE

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:
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SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:
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MINNEAPOLIS, MN 55402
ECOSRENEWABLE.COM

TYPICAL SYSTEM INFO
(FOR EACH OF TWO SYSTEMS):
- 1,348.620 KW DC STC + BIFACIAL GAIN
- 999.000 KW / KVA AC
- (7) KACO 125TL3 INVERTERS
- (1) KACO 125TL3 INVERTER CURTAILED TO 124 KW AC
- (988) CANADIAN SOLAR CS7N-680TB-AG BIFACIAL MODULES (680W STC)
- (988) CANADIAN SOLAR CS7N-685TB-AG BIFACIAL MODULES (685W STC)

REC#ZL22227 (SYSTEM #1)
REC#ZL22229 (SYSTEM #2)

U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT — STEPHEN GENDREAU — No. 27497 — LICENSED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

NOTES, DETAILS & ABBREVIATIONS

Project	Sheet
Date: APRIL 30, 2024	PV-8
Scale: NTS	

INVERTER TYPE 'F2' IS CURTAILED TO 124KWAC

KACO new energy

blueplanet 125 TL3

Transformerless, three-phase string inverter.

Technical Data

The trendsetter among inverters.

Optimized for solar power plants with 1500 volt modules

Extensive grid management functions

Special properties for extreme climatic conditions

Farsighted technical features for future requirements

Lean commissioning and maintenance via remote services

www.kaco-newenergy.com

KACO new energy GmbH | Carl-Zeiss-Str. 1 | 74172 Neckarsulm | Germany

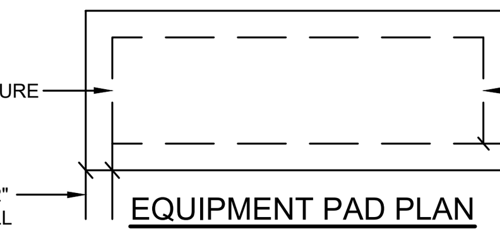
1 PV-9 INVERTER DATA SHEET
NOT TO SCALE

ENCLOSURE

CONTRACTOR TO COORDINATE CONDUIT ENTRY WITH SHOP DRAWING

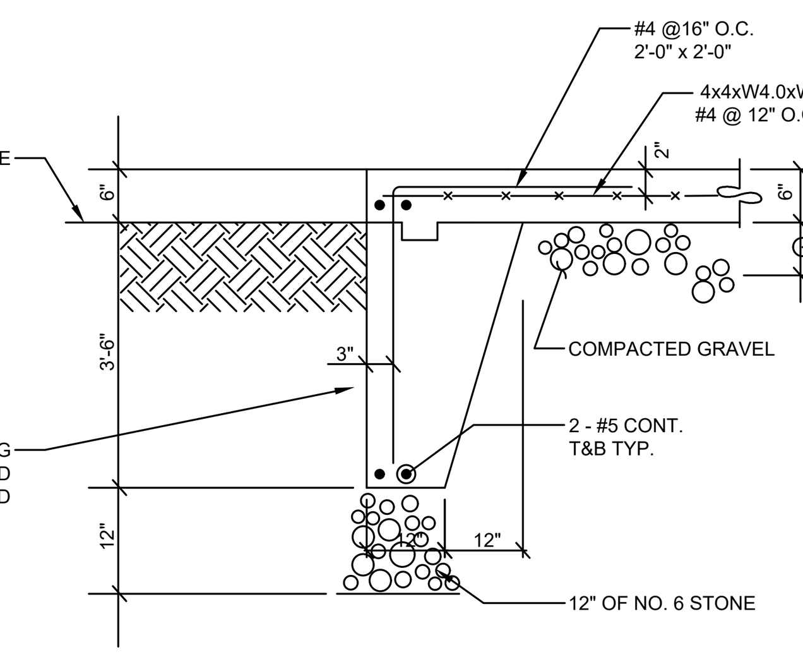
PAD SHALL BE SIZED 12" LARGER THAN OVER ALL DIMENSIONS OF EQUIPMENT

PAD SHALL BE SIZED 12" LARGER THAN OVERALL DIMENSIONS OF EQUIPMENT



EQUIPMENT PAD PLAN

SEE SITE PLAN FOR LOCATION
SCALE N.T.S



NOTES:

1. 4,000 PSI CONCRETE WITH 6% AIR ENTRAINMENT
2. ASTM A-615, 60,000 PSI REINFORCING STEEL
3. ASTM A-185 WELDED WIRE FABRIC
4. PROVIDE A SMOOTH BROOM FINISH
5. PROVIDE #4/0 FROM UNCOATED REBAR TO GROUND RING ON OPPOSITE CORNERS OF THE EQUIPMENT PAD - SEE DRAWING PV-8 FOR RING DETAIL.

3 PV-9 EQUIPMENT PAD DETAIL (TYPICAL)
NOT TO SCALE

BIFACIAL GAIN VARIES BASED ON GROUND CONDITIONS (E.G. HIGHER GAIN WITH SNOW ON THE GROUND)

NEW

Preliminary Technical Information Sheet

CanadianSolar

TOPBiHiKu7

BIFACIAL TOPCON
650 W ~ 720 W
CS7N-650|655|660|665|670|675|680|685|690|695|700|705|710|715|720TB-AG (IEC1000 V)
CS7N-650|655|660|665|670|675|680|685|690|695|700|705|710|715|720TB-AG (IEC1500 V)

MORE POWER

Module power up to 720 W
Module efficiency up to 23.2 %

Up to 85% Power Bifaciality, more power from the back side

Excellent anti-LeTID & anti-PID performance. Low power degradation, high energy yield

Lower temperature coefficient (Pmax): -0.30%/°C, increases energy yield in hot climate

Lower LCOE & system cost

MORE RELIABLE

Minimizes micro-crack impacts

Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

12 Years Enhanced Product Warranty on Materials and Workmanship*

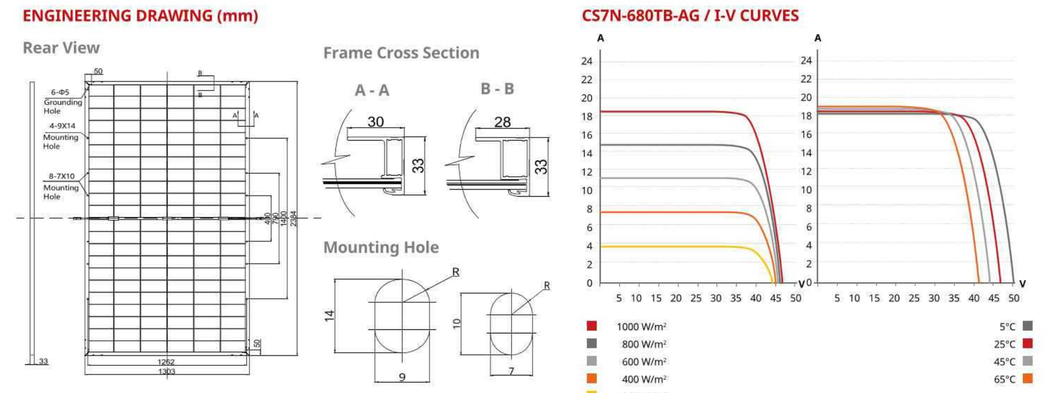
30 Years Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

MANAGEMENT SYSTEM CERTIFICATES*

PRODUCT CERTIFICATES*

CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers.



ENGINEERING DRAWING (mm)

CS7N-680TB-AG / I-V CURVES

ELECTRICAL DATA | STC*

ELECTRICAL DATA | NMOT*

MECHANICAL DATA

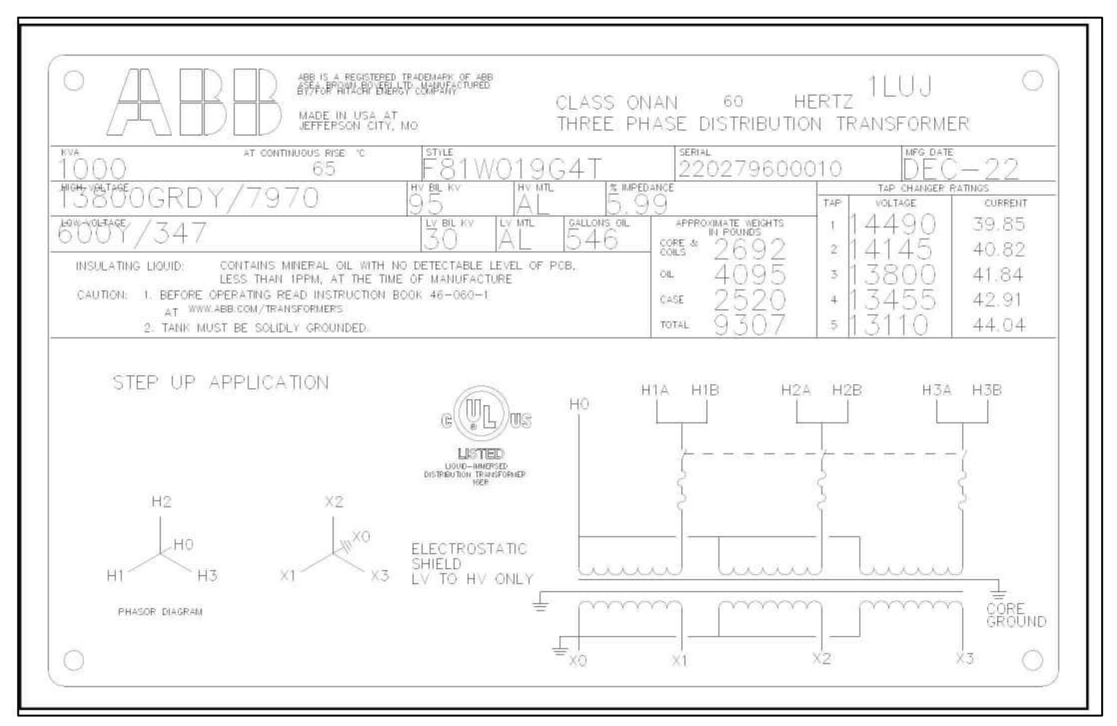
ELECTRICAL DATA

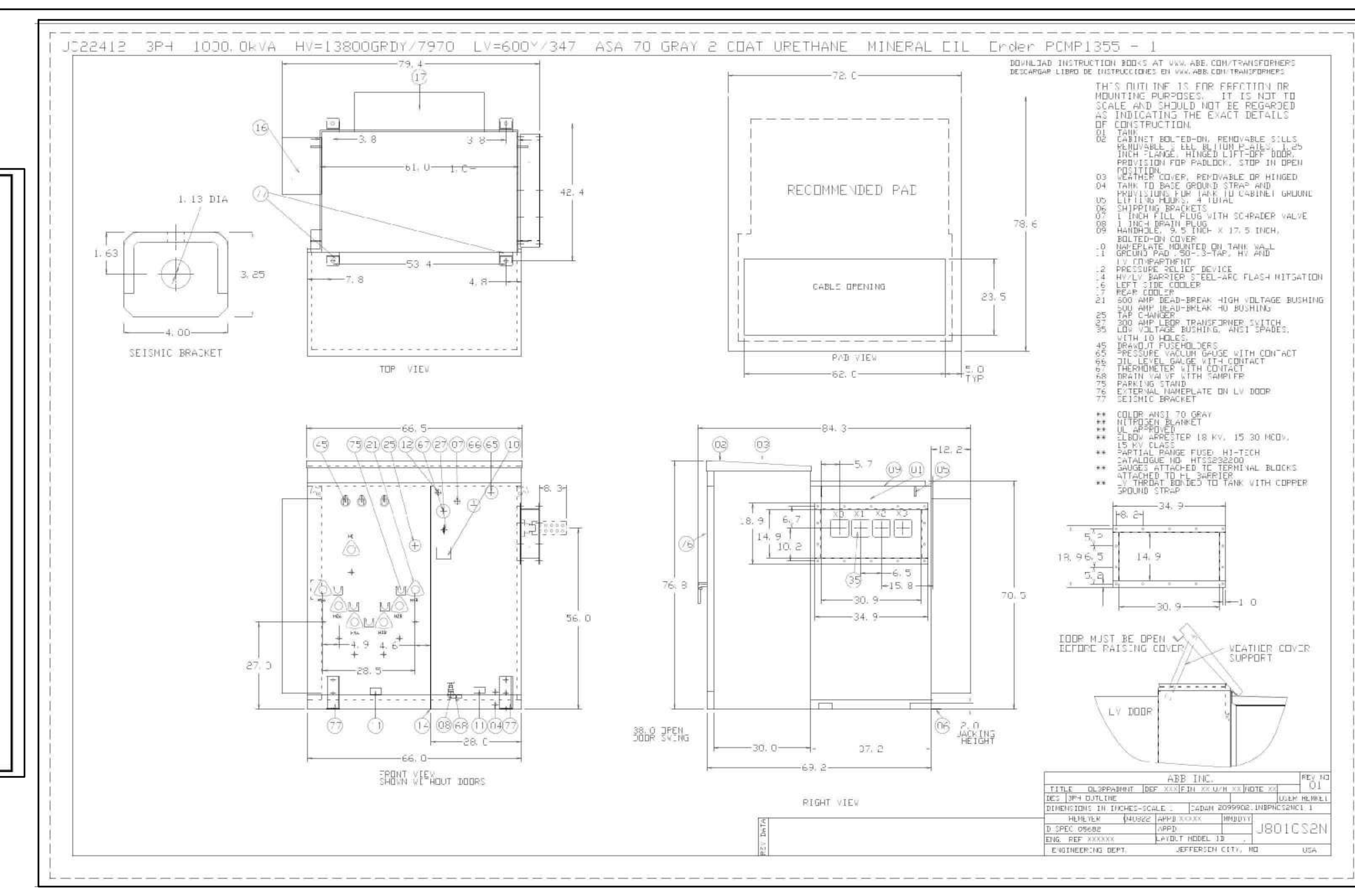
TEMPERATURE CHARACTERISTICS

PARTNER SECTION

Canadian Solar MSS (Australia) Pty Ltd.
333 Drummond Street, Carlton VIC 3053, Australia, sales.au@csisolar.com, www.csisolar.com/au

2 PV-9 MODULE DATA SHEET
NOT TO SCALE



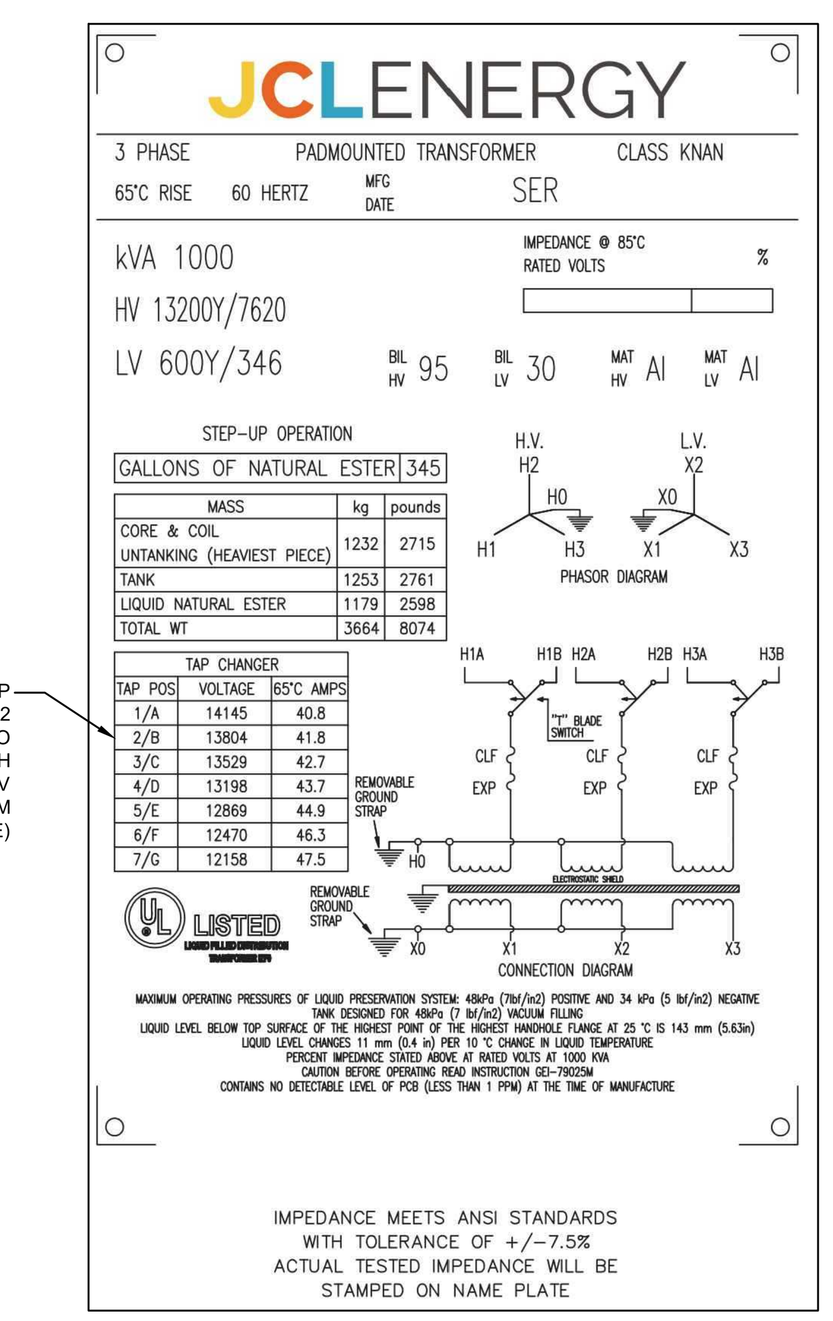


BENZ ST SYSTEM #1 TRANSFORMER

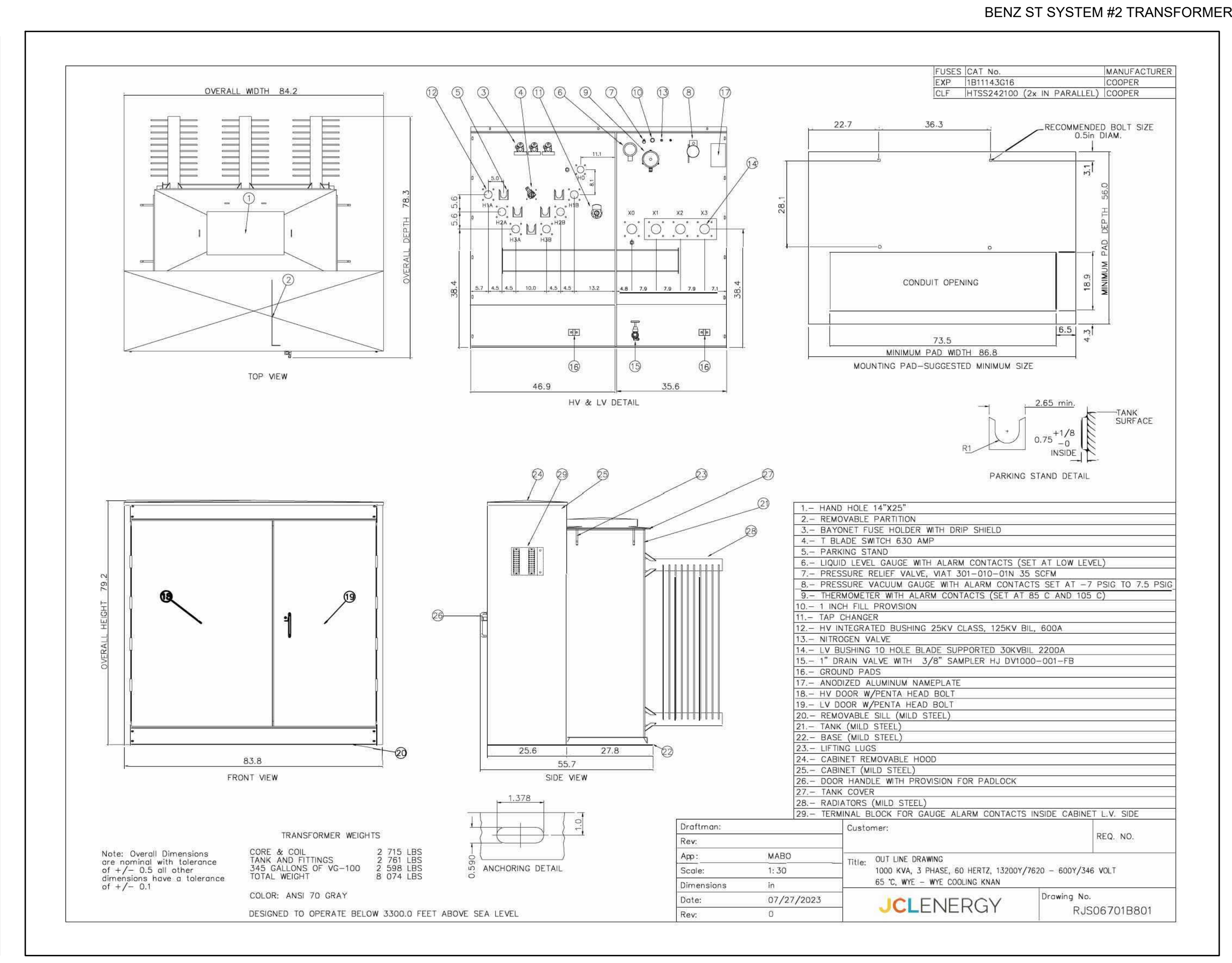
BENZ ST SYSTEM #2 TRANSFORMER

BENZ ST SYSTEM #1 TRANSFORMER

BENZ ST SYSTEM #2 TRANSFORMER



UTILIZE TAP POSITION 2 (13,804V TO BEST MATCH 13.8KV SYSTEM VOLTAGE)



4 PV-9 CUSTOMER OWNED TRANSFORMER DATA SHEETS
NOT TO SCALE

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

SG ENGINEERING LLC

56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

ecos ENERGY

222 S 9TH STREET, SUITE 1600
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REC#ZL22227 (SYSTEM #1)
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U.I. ACCT #TBD (NEW ACCOUNT)

No.	Revision/Issue	Date

BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

EQUIPMENT DATA SHEETS & DETAILS

Project	Sheet
Date: APRIL 30, 2024	PV-9
Scale: NTS	

#05-215 - ELECTRIC SHOCK HAZARD

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

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

#05-216 - POWER SOURCE OUTPUT

WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

#05-108 - THIS EQUIPMENT FED BY

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

#05-208 - DIRECT CURRENT

DIRECT CURRENT PHOTOVOLTAIC POWER SOURCE
MAXIMUM VOLTAGE 1470 VDC
MAX CIRCUIT CURRENT AMPS
SEE TABLE BELOW

#05-355 - PHOTOVOLTAIC SYSTEM

WARNING
PHOTOVOLTAIC SYSTEM COMBINER PANEL
DO NOT ADD LOADS

#05-326 - DO NOT DISCONNECT

WARNING
DO NOT DISCONNECT UNDER LOAD

#05-234 - DC DISCONNECT

DC DISCONNECT
WARNING
MAXIMUM DC VOLTAGE OF PV SYSTEM: 1470 VOLTS

#05-109 - PV SYSTEM DISCONNECT

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

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

#05-112 - SOLAR PV SYSTEM

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

#05-114 - SOLAR PV SYSTEM

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN THE ARRAY REMAIN ENERGIZED IN SUNLIGHT

#05-323 - 2020 NEC 690.4(B)

AC DISCONNECT

#03-306 - AC DISCONNECT

AC DISCONNECT
PHOTOVOLTAIC SYSTEM POWER SOURCE
RATED AC OUTPUT CURRENT 961.3 AMPS
NOMINAL OPERATING AC VOLTAGE 600 VOLTS

#03-308 - MAXIMUM VOLTAGE

MAXIMUM VOLTAGE 1470
MAXIMUM CIRCUIT CURRENT
MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED) N/A
SEE TABLE BELOW

#05-219 - AC JUNCTION BOX

AC JUNCTION BOX
WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
CAUTION SOLAR CIRCUIT

#05-232 - DC JUNCTION BOX

DC JUNCTION BOX
WARNING
ELECTRIC SHOCK HAZARD
DO NOT DISCONNECT UNDER LOAD
PHOTOVOLTAIC POWER SOURCE

DC JUNCTION BOX
WARNING
ELECTRIC SHOCK HAZARD
DO NOT DISCONNECT UNDER LOAD
PHOTOVOLTAIC POWER SOURCE

#05-411 DUAL SUPPLY

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

#05-372 - TURN OFF PHOTOVOLTAIC

WARNING
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

#05-341 - kWh METER

PV SYSTEM kWh METER

#03-303 - MAX DC VOLTAGE

MAXIMUM DC VOLTAGE OF PV SYSTEM
MAXIMUM DC VOLTAGE OF PV SYSTEM
MAXIMUM DC VOLTAGE OF PV SYSTEM

#05-330 - SOLAR CIRCUIT

CAUTION SOLAR CIRCUIT
CAUTION SOLAR CIRCUIT

#03-327 - PV SYSTEM DISCONNECT

PHOTOVOLTAIC SYSTEM DISCONNECT
PHOTOVOLTAIC SYSTEM DISCONNECT

#03-326 - DO NOT DISCONNECT

DO NOT DISCONNECT
UNDER LOAD

#05-217 - THE DISCONNECTION

WARNING
THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT

#03-309 - NOMINAL OPERATING AC VOLTAGE

NOMINAL OPERATING AC VOLTAGE V
NOMINAL OPERATING AC FREQUENCY Hz
MAXIMUM AC POWER kVA
MAXIMUM AC CURRENT A
MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION PER CIRCUIT A

#05-346 ELECTRIC SHOCK

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

#05-233 - DC COMBINER BOX

DC COMBINER BOX
WARNING
MAXIMUM DC VOLTAGE OF PV SYSTEM: 1470 VOLTS

#05-806, #05-805,

POSITIVE
POSITIVE
POSITIVE
POSITIVE
POSITIVE
NEGATIVE
NEGATIVE
NEGATIVE
NEGATIVE
NEGATIVE

#05-347, #05-342, #05-343, #05-345

WARNING
PHOTOVOLTAIC POWER SOURCE
WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFED
DO NOT RELOCATE THIS OVERCURRENT DEVICE
DO NOT RELOCATE THIS OVERCURRENT DEVICE
PHOTOVOLTAIC SOLAR BREAKER
PHOTOVOLTAIC SOLAR BREAKER

#05-809

ON
CLOSED
ON
CLOSED
ON
OFF
OPEN
OFF
OPEN
OFF

#05-235 - SOLAR INVERTER

SOLAR INVERTER
WARNING
MAXIMUM DC VOLTAGE OF PV SYSTEM: 1470 VOLTS

#05-322 - SOLAR ELECTRIC BREAKER

WARNING
SOLAR ELECTRIC BREAKER IS BACKFED

#05-324 - DC DISCONNECT

DC DISCONNECT

#03-313 - SOLAR PV DC CIRCUIT

SOLAR PV DC CIRCUIT
SOLAR PV DC CIRCUIT
SOLAR PV DC CIRCUIT
SOLAR PV DC CIRCUIT

#03-315 - PHOTOVOLTAIC POWER SOURCE

PHOTOVOLTAIC POWER SOURCE
PHOTOVOLTAIC POWER SOURCE
PHOTOVOLTAIC POWER SOURCE
PHOTOVOLTAIC POWER SOURCE

#05-307 MULTIPLE SOURCES

CAUTION
MULTIPLE SOURCES OF POWER
CAUTION
MULTIPLE SOURCES OF POWER

#02-316 - RAPID SHUTDOWN

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

#05-803 - CIRCUIT 1

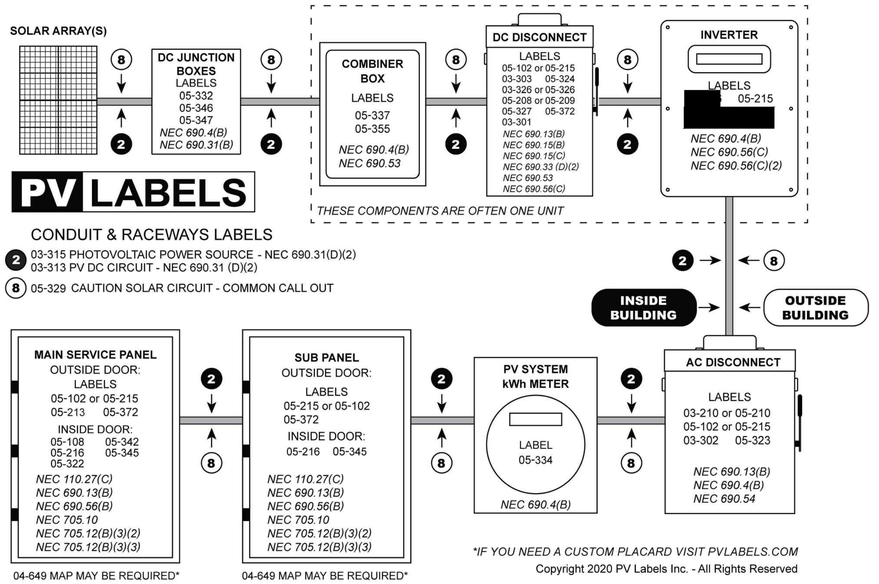
CIRCUIT 1	CIRCUIT 1	CIRCUIT 1
CIRCUIT 1	CIRCUIT 1	CIRCUIT 1
CIRCUIT 2	CIRCUIT 2	CIRCUIT 2
CIRCUIT 2	CIRCUIT 2	CIRCUIT 2
CIRCUIT 3	CIRCUIT 3	CIRCUIT 3
CIRCUIT 3	CIRCUIT 3	CIRCUIT 3
CIRCUIT 4	CIRCUIT 4	CIRCUIT 4
CIRCUIT 4	CIRCUIT 4	CIRCUIT 4
CIRCUIT 5	CIRCUIT 5	CIRCUIT 5
CIRCUIT 5	CIRCUIT 5	CIRCUIT 5

SOURCE: http://www.pvlabels.com

1 PV-10 LABELS

PHOTOVOLTAIC SOLAR SYSTEM MARKING - DC STRINGS

RECOMMENDATIONS BASED ON 2020 NEC, COMMON CALL OUTS AND PACKAGE CONTENTS



PV LABELS

CONDUIT & RACEWAYS LABELS

2 03-315 PHOTOVOLTAIC POWER SOURCE - NEC 690.31(D)(2)
03-313 PV DC CIRCUIT - NEC 690.31 (D)(2)

8 05-329 CAUTION SOLAR CIRCUIT - COMMON CALL OUT

*IF YOU NEED A CUSTOM PLACARD VISIT PVLABELS.COM

SOURCE: http://www.pvlabels.com/

2 PV-10 LABEL LOCATIONS

IDENTIFICATION LABEL (4"X6")

STRING NUMBER LABEL

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

PREPARED BY:

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56 FOXCROFT COURT
SOUTHINGTON, CT
SGEDESIGN.COM
sge@sgedesign.com

PREPARED FOR:

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U.I. METERS #TBD (NEW METERS)

U.I. ACCT #TBD (NEW ACCOUNT)

STATE OF CONNECTICUT · STEPHEN GENGEMBRE · LICENSED PROFESSIONAL ENGINEER

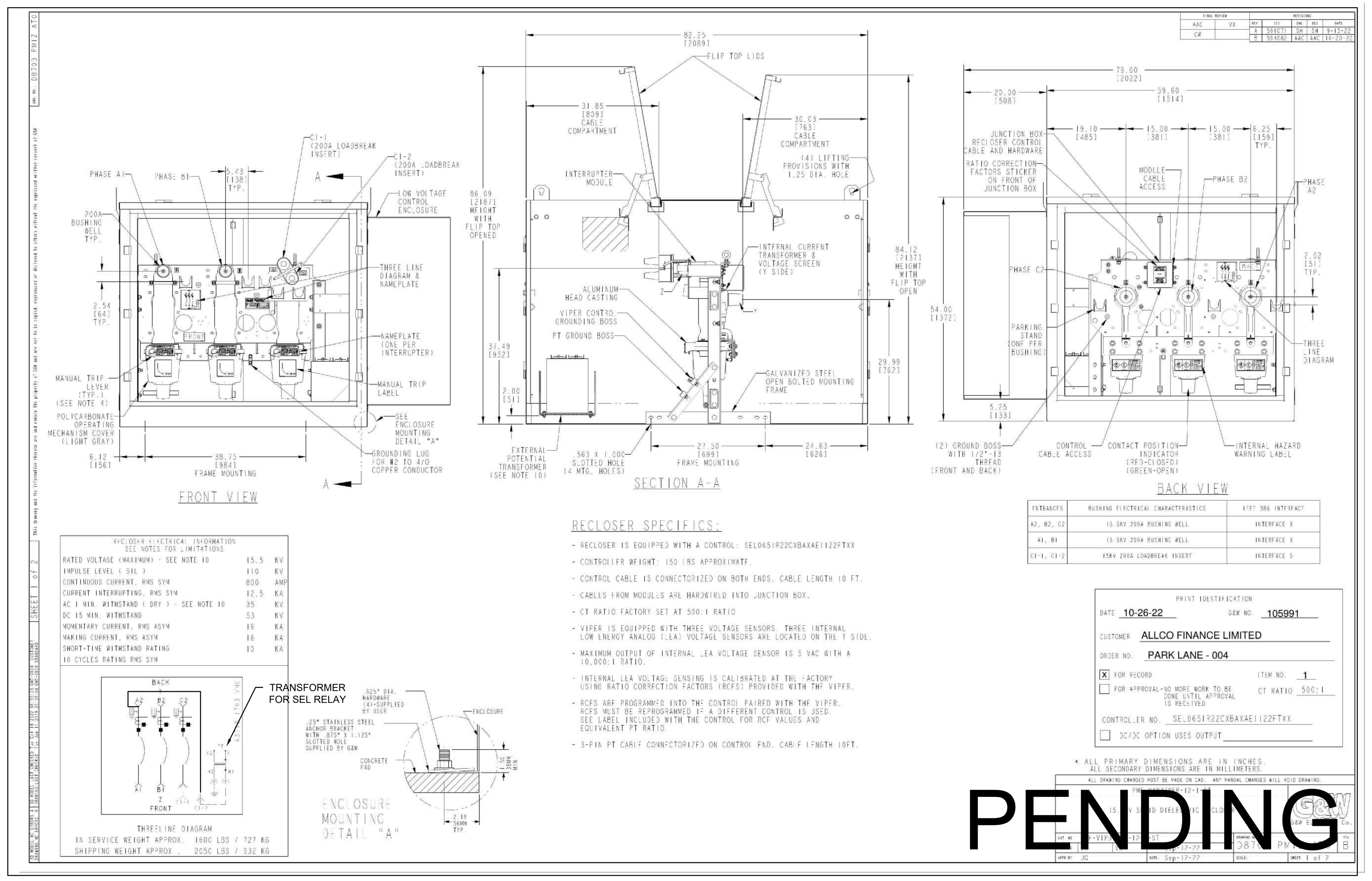
No.	Revision/Issue	Date

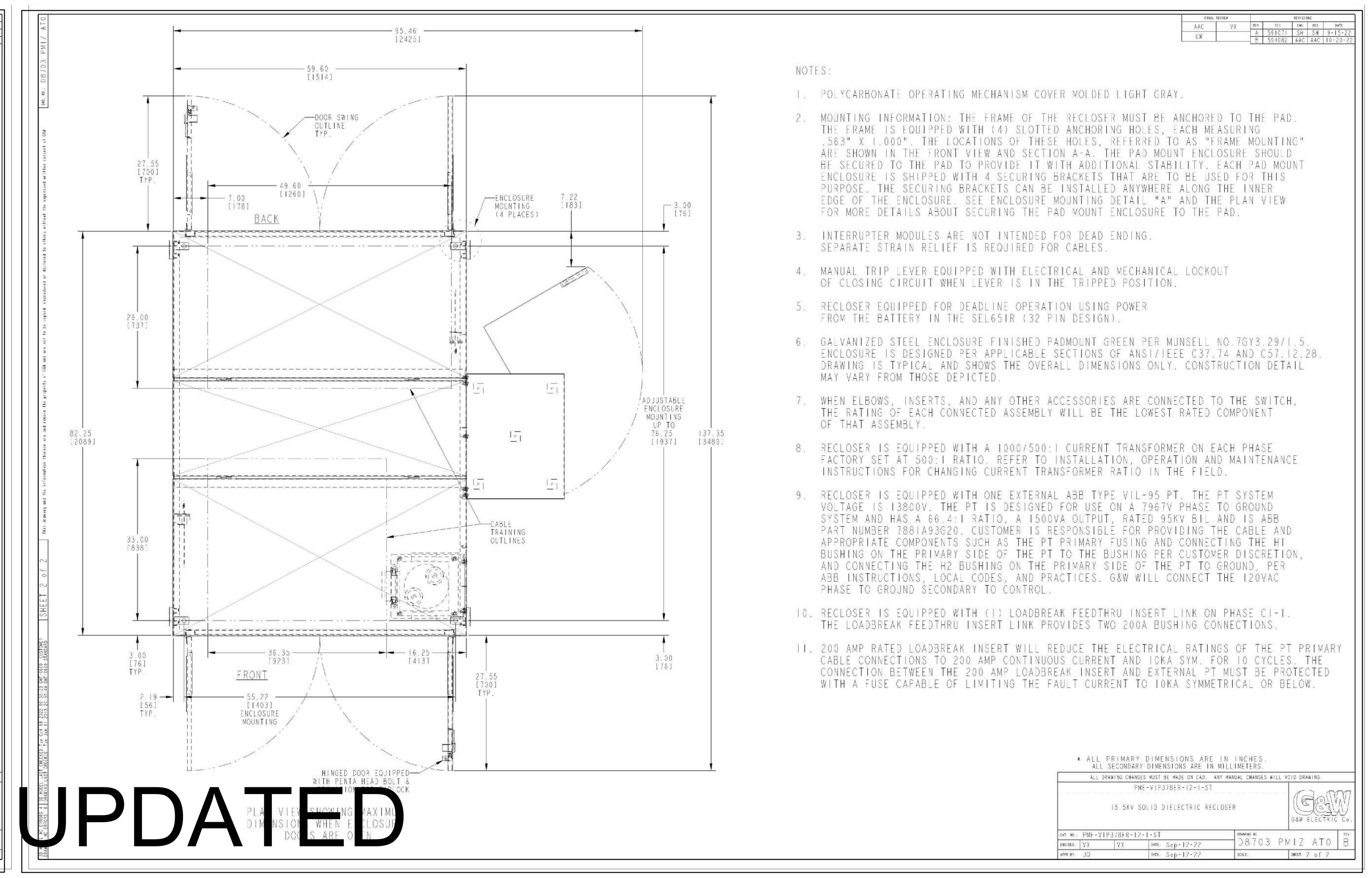
BENZ SOLAR
GROUND MOUNTED PV SYSTEM

31 BENZ STREET
ANSONIA, CT 06041

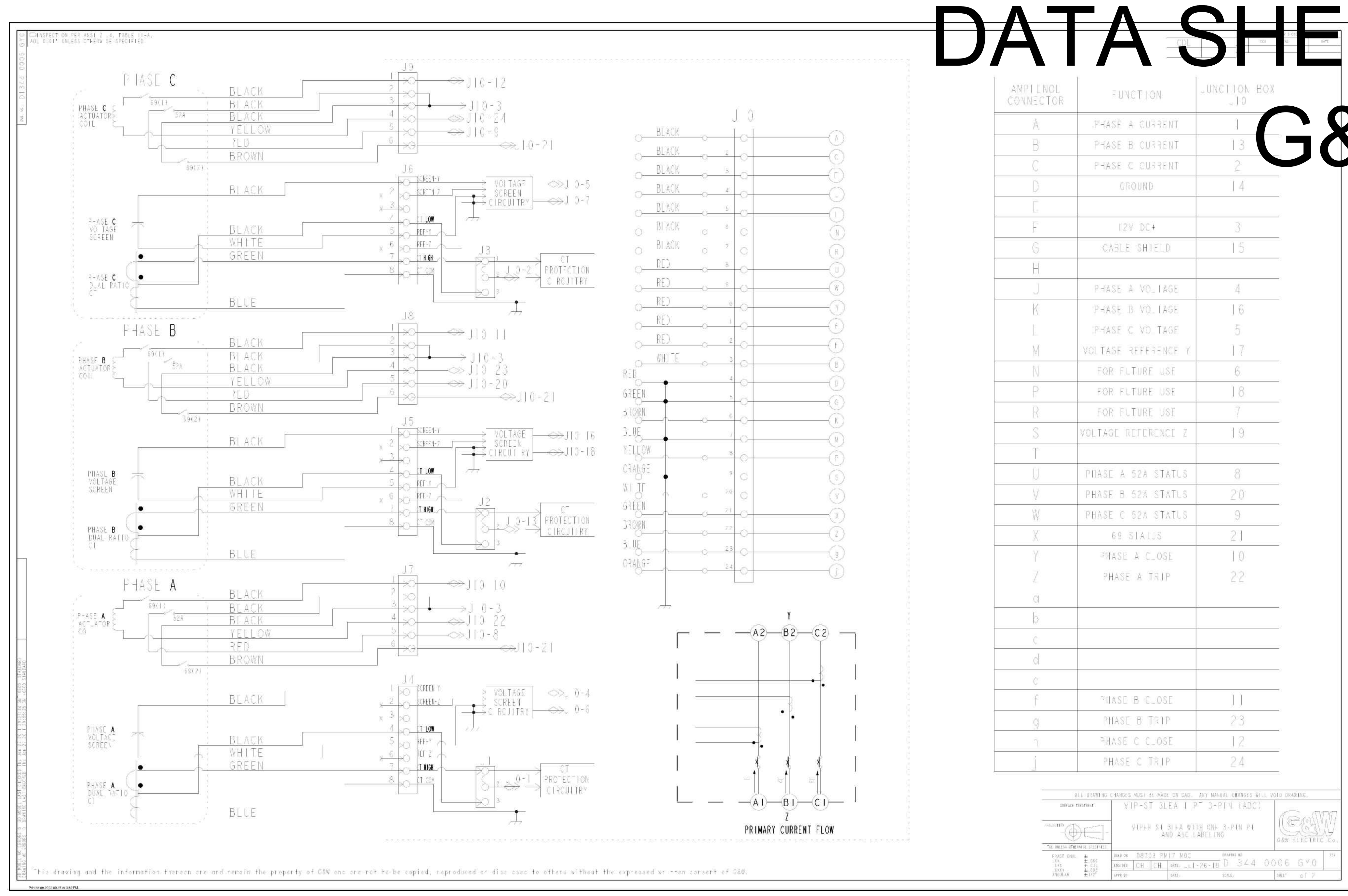
LABELS & SIGNAGE

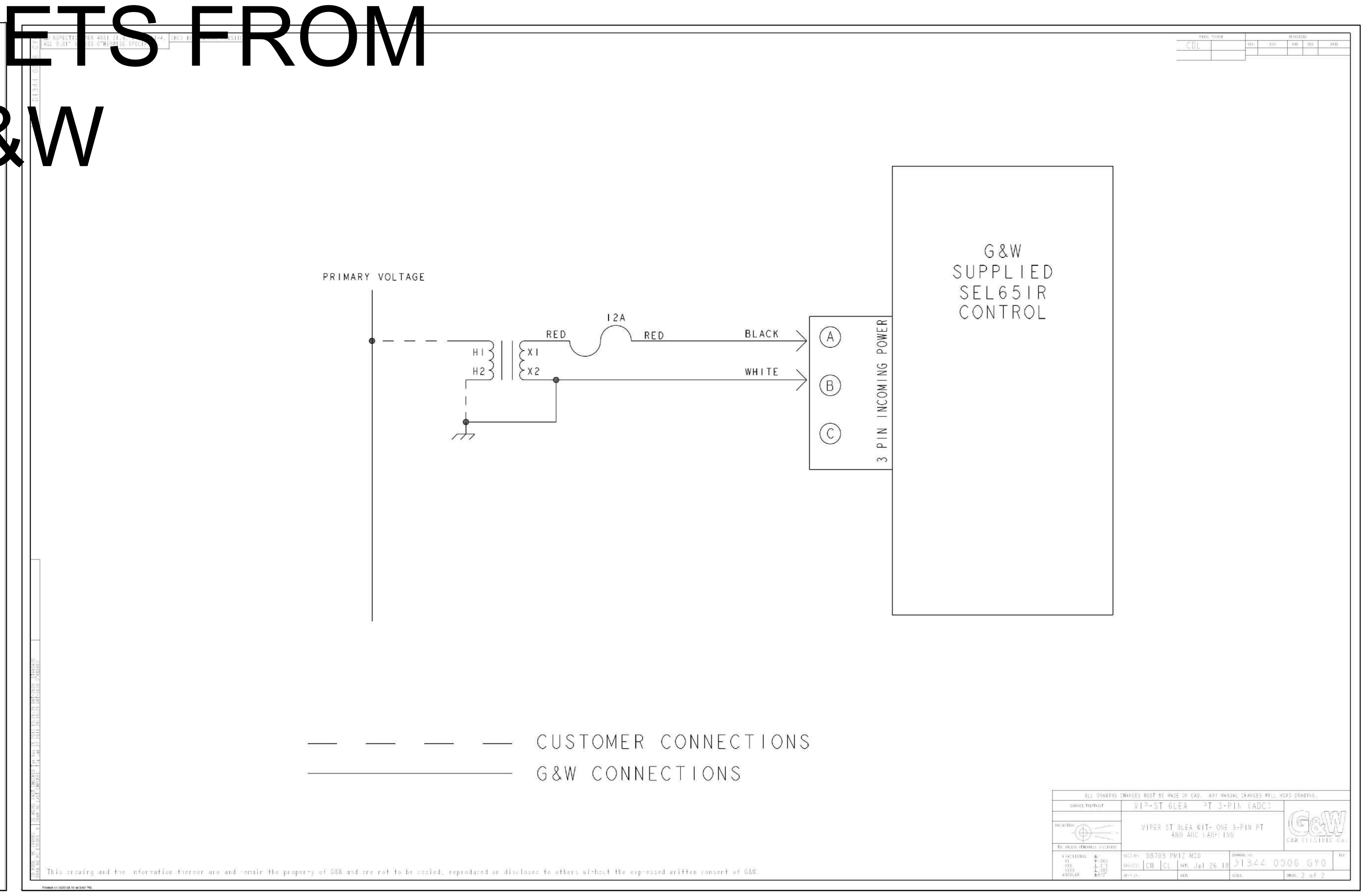
Project
Sheet
PV-10
Date
APRIL 30, 2024
Scale
NTS





PENDING UPDATED DATA SHEETS FROM G&W





1 PV-11 CUSTOMER OWNED RECLOSER DATA SHEETS
NOT TO SCALE

Project Info

PREPARED BY:

SG ENGINEERING LLC
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sge@sgedesign.com

PREPARED FOR:

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U.I. ACCT #TBD (NEW ACCOUNT)

No.	Revision/Issue	Date

BENZ SOLAR
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31 BENZ STREET
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CUSTOMER OWNED RECLOSER DATA SHEETS

Project

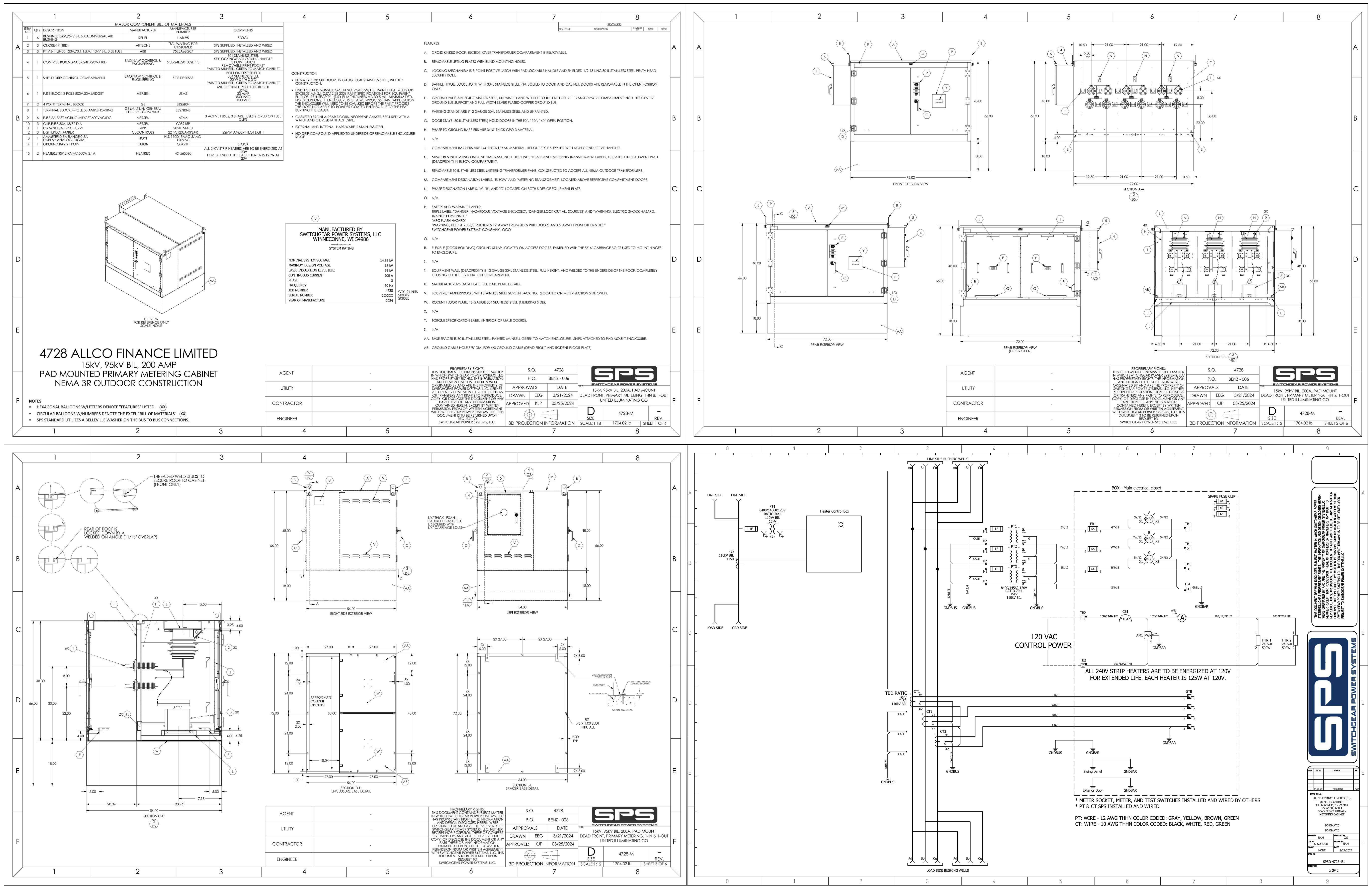
Date: APRIL 30, 2024

Scale: NTS

Sheet: PV-11

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

PENDING APPROVAL FROM U.I.



SEE SUBMITTAL FOR ADDITIONAL INFORMATION

1 PV-12 PRIMARY METERING CABINET DATA SHEETS
NOT TO SCALE

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

Project Info

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SG ENGINEERING LLC

56 FOXCROFT COURT
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SGEDESIGN.COM
sge@sgedesign.com

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BENZ SOLAR
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31 BENZ STREET
ANSONIA, CT 06041

PRIMARY METERING ENCLOSURE DATA SHEETS

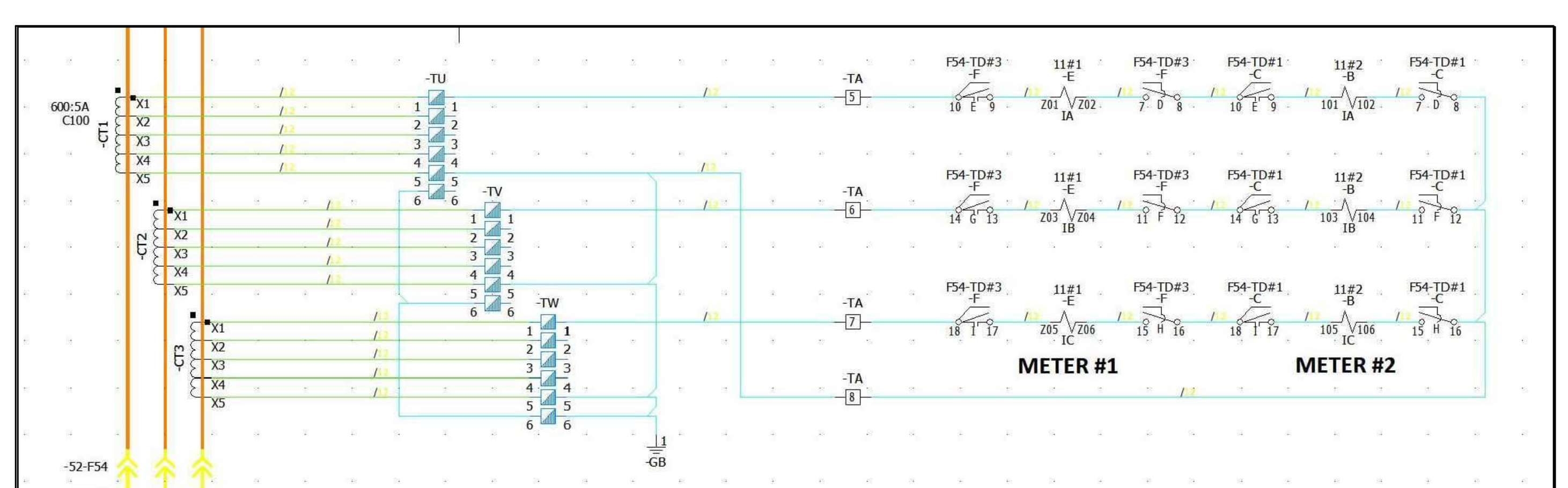
Project	Sheet
Date APRIL 30, 2024	PV-12
Scale NTS	

PENDING UPDATED
DATA SHEETS FROM
TERRASMART

1 PV-13 DC COMBINER BOX DATA SHEET
NOT TO SCALE

PENDING UPDATED
DATA SHEETS FROM
TERRASMART

2 PV-13 DC DISCONNECT SWITCH DATA SHEET
NOT TO SCALE



SAMPLE WIRING DIAGRAM
FROM SPS FOR TWO METERS
CONNECTED TO THE SAME
SET OF CT'S, IN SERIES

3 PV-13 ZREC & REVENUE METER WIRING DIAGRAM
NOT TO SCALE

PROGRESS SET
NOT TO BE USED FOR CONSTRUCTION

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EQUIPMENT DATA SHEETS

Project

Date
APRIL 30, 2024

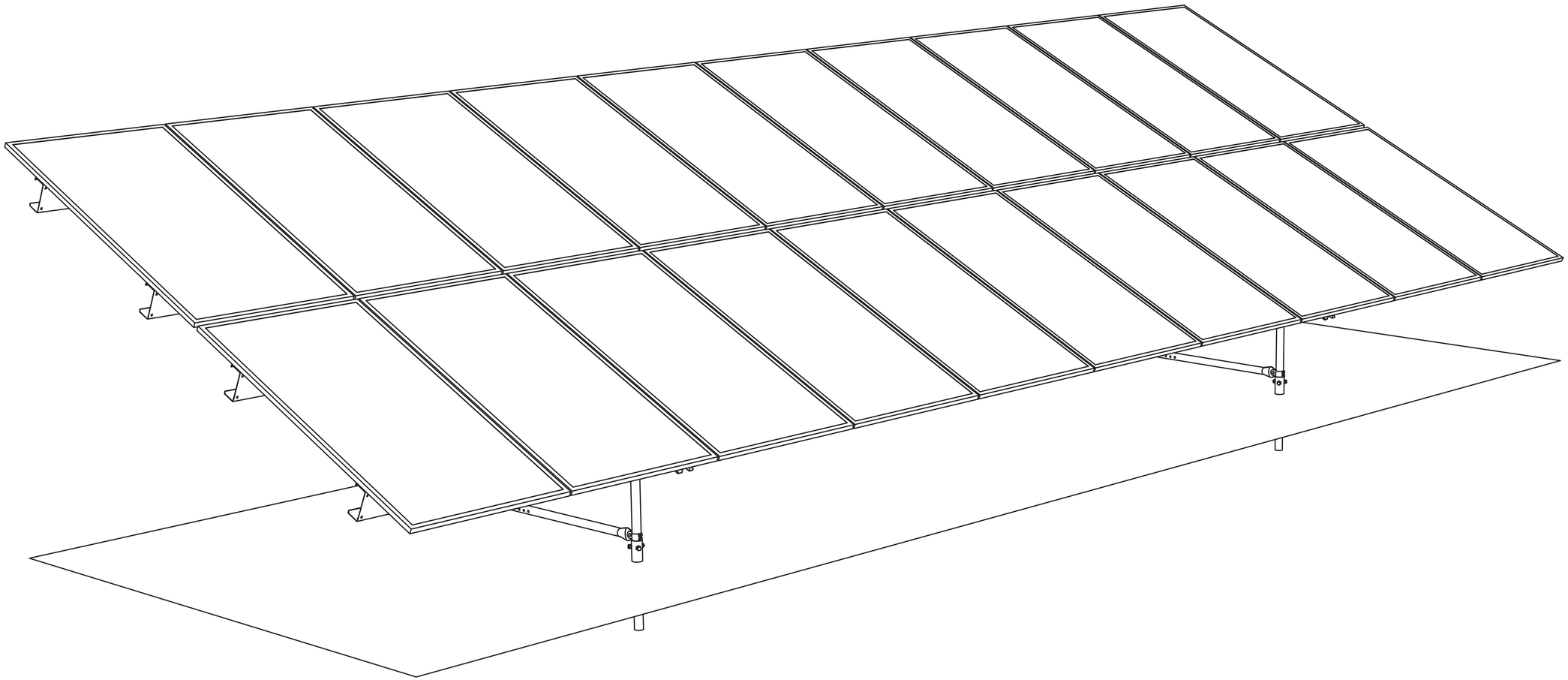
Scale
NTS

Sheet
PV-13

TERRAGLIDE RACKING ENGINEERING PLANS

ALLCO FINANCE LIMITED - BENZ

Terraglide Portrait - 25° RACK - CS7N-XXXTB-AG



DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

STATE OF CONNECTICUT · ZEYN B. UZMAN · No. 23151 · REGISTERED PROFESSIONAL ENGINEER

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X10
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 1 OF 18

TERRASMART
6715 STEGER DRIVE
CINCINNATI, OH 45237
P 239.362.0211 | F 239.676.1900
WWW.TERRASMART.COM

terrasmart

I. PERMITTING, CONSTRUCTION, AND ERECTION NOTES

1. FRAME AND FOUNDATION CONFORMS TO THE REQUIREMENTS OF THE International BUILDING CODE BASED UPON DESIGN CRITERIA AS OUTLINED ON THE COVER SHEET. TERRASMART MAKES NO REPRESENTATION AS TO THE ACCURACY OF THE DESIGN CRITERIA AS IT WAS SUPPLIED BY CLIENT. PLEASE REFER TO STRUCTURAL CALCULATIONS FOR FRAME AND FOUNDATION DESIGN.
2. THE STRUCTURAL INTEGRITY OF THE TERRAGLIDE RACK DEPENDS ON INTERACTION OF VARIOUS CONNECTED COMPONENTS. PROVIDE ADEQUATE BRACING, SHORING, AND OTHER TEMPORARY SUPPORTS AS REQUIRED TO SAFELY COMPLETE THE WORK.
3. FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL COORDINATE WITH THE ENGINEER IF ANY UNFORESEEN CONFLICTS ARISE, SUCH AS EXISTING UNDULATION THAT COULD POTENTIALLY CAUSE RACKING INSTALLATION ISSUES.
4. STRUCTURAL STEEL SHALL BE ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS, UNLESS OTHERWISE NOTED.
5. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
6. CROSS BRACING TO BE FIT ON SITE, PER INSTALLATION MANUAL.
7. COLD GALVANIZING COMPOUND SHALL BE USED PER MANUFACTURER'S DIRECTIONS AND IN ACCORDANCE WITH ASTM-A780 IN AREAS WHERE GALVANIZATION WAS REMOVED DURING TRANSPORTATION, OR ERECTION/INSTALLATION.
8. BOLTS TO BE TIGHTENED PER THE PROCEDURES DESCRIBED IN THE INSTALLATION MANUAL.
9. THIS STRUCTURAL DRAWING DOES NOT INCLUDE INFORMATION REGARDING ELECTRICAL CONNECTIONS, INCLUDING GROUNDING. REFER TO INSTALLATION MANUAL AND ELECTRICAL PLANS PREPARED BY OTHERS.
10. SHADING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE LAYOUT OF THE FOUNDATION. TERRASMART RECOMMENDS CONSULTING A SOLAR SHADING EXPERT PRIOR TO INSTALLATION TO AVOID POWER REDUCTION DUE TO SHADOWS.
11. SNOW BANKING ANALYSIS WAS NOT PERFORMED BY TERRASMART AND WAS NOT CONSIDERED IN THE STRUCTURAL DESIGN. THE FRONT EDGE CLEARANCE WAS SUPPLIED BY CLIENT AND IT IS ASSUMED THAT THE SYSTEM OWNER WILL REMOVE SNOW AS NEEDED TO MAINTAIN AN UNOBSTRUCTED FRONT EDGE. ADVERSE EFFECTS OF SNOW BANKING, INCLUDING SHADING OR OTHER STRUCTURAL CONSIDERATIONS ARE BEYOND TERRASMART'S SCOPE.
12. MINIMUM AND TYPICAL FRONT EDGE CLEARANCE SHOWN ON SIDE ELEVATION. MAXIMUM FRONT EDGE CLEARANCE DETERMINED PER FIELD CONDITIONS.
13. SOUTHERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
14. EASTERN AND WESTERN EDGES OF MODULES SHALL BE ALIGNED WITHIN 2" VERTICALLY AND HORIZONTALLY OF THE SOUTHERN EDGE OF MODULES OF THE ADJACENT RACK.
15. TILT ANGLE TOLERANCE: ± 2° FROM ANGLE SHOWN ON SIDE ELEVATION.
16. RACK SPACING TOLERANCE: 6" TYPICAL, 4" MINIMUM, FOR SECTIONS OF THE SITE THAT HAVE A RIDGE OR VALLEY, TERRASMART RECOMMENDS INCREASING THE TABLE SPACING TO 10 INCHES AS MEASURED BETWEEN THE CLOSEST MODULES EDGE BETWEEN ADJACENT RACKS. REFER TO CIVIL ENGINEERING PLANS FOR MORE INFORMATION AND FURTHER DETAIL.
17. AZIMUTH TOLERANCE: ± 2° FROM APPROVED CIVIL ENGINEERING PLANS.
18. TERRAGLIDE RACKING IS DESIGNED TO ACCOMMODATE A MAXIMUM EAST/WEST SLOPE OF 22%, A MAXIMUM NORTH FACING SLOPE OF 30%, AND A MAXIMUM SOUTH FACING SLOPE OF 22%. SLOPES WERE PROVIDED BY CLIENT.
19. PANEL SPACING TOLERANCE: MINIMUM 1/4" FOR N/S AND E/W SPACING DIMENSION, AS SHOWN ON SIDE ELEVATION AND REAR ELEVATION TO SUIT FIELD CONDITIONS.
20. FOR THE TERRASMART PROVIDED MODULE ATTACHMENT HARDWARE, PLEASE SEE PAGE 5 OF THE ENGINEERING PACKAGE. TERRASMART USES AND RELIES UPON THE CUSTOMER PROVIDED MODULE DATASHEET AND/OR INSTALLATION GUIDE TO SELECT THE HARDWARE STACK TO BE USED FOR MODULE MOUNTING AND ATTACHMENT (PLEASE SEE PAGE 5 OF THE ENGINEERING PACKAGE). TERRASMART IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS CONTAINED WITHIN THE CUSTOMER PROVIDED MODULE DATA SHEET AND/OR INSTALLATION GUIDE AND WILL NOT BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES CAUSED BY INCORRECT INFORMATION CONTAINED WITHIN THE CUSTOMER PROVIDED MODULE DATASHEET AND/OR INSTALLATION GUIDE. IF THE CUSTOMER FAILS TO PROVIDE TERRASMART WITH THE MODULE DATASHEET AND/OR INSTALLATION GUIDE PRIOR TO THE CHECK DATE OF THE TERRASMART ENGINEERING PACKAGE, THEN TERRASMART WILL NOT BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES THAT RESULT FROM A HARDWARE TO MODULE COMPATIBILITY ISSUE.

II. SITE PREPARATION

1. PRIOR TO COMMENCING WORK AND FOR THE DURATION OF THE PROJECT, GENERAL CONTRACTOR SHALL ENSURE THE SITE IS PREPARED AND MAINTAINED AS FOLLOWS (TO AVOID CHANGE ORDERS):
   A. ALL REQUIRED PERMITS SHALL BE OBTAINED AND CURRENT.
   B. LOCATE ALL UNDERGROUND UTILITIES AND ENSURE THAT THE PROPOSED INSTALLATION DOES NOT CONFLICT WITH ANY EXISTING INFRASTRUCTURE. MARKINGS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT.
   C. ALL REQUIRED EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND OPERATIONAL.
   D. GRASS SHALL BE MOWED WITH BLADES NO HIGHER THAN 3" TALL.
   E. ALL VEGETATION, INCLUDING TREES AND SHRUBS SHALL BE CLEARED AND ROOT SYSTEMS GRUBBED. ALL ORGANIC MATTER SHALL BE STRIPPED AND REMOVED FROM THE BUILDING ENVELOPE BEFORE EARTH WORK OCCURS, IF ANY.
   F. LOOSE SURFACE IMPEDIMENTS, INCLUDING ROCKS, COBBLES, BOULDERS, CONSTRUCTION DEBRIS, AND OTHER OBSTRUCTIONS SHALL BE REMOVED.
   G. SITE SHALL BE SAFE FOR OPERATING MACHINERY AND FOR PERSONNEL ON FOOT. SITE CONDITIONS SHALL NOT BE AN ENCUMBRANCE TO THE PERFORMANCE OF WORK.
   H. GROUND WATER, INCLUDING WATER TABLE AND PERCHED WATER, SHALL NOT ENCROACH BETWEEN THE GROUND SURFACE AND THE EMBEDMENT DEPTH OF THE GROUND SCREW. DEWATERING IS REQUIRED IF GROUND WATER IS ENCOUNTERED DURING PILOT HOLE DRILLING AND/OR GROUND SCREW INSTALLATION.
   I. SITE SHALL BE GRADED TO PROVIDE CONTROLLED POSITIVE DRAINAGE AWAY FROM FOUNDATIONS. STANDING WATER AND/OR WATER WITH SUFFICIENT VELOCITY TO ERODE SOIL IS NOT ALLOWED WITHIN 20 FEET OF THE FOUNDATION.
   J. NO FINISHED GRADE SOIL SHALL BE DISTURBED WITHIN 24" OF THE PROPOSED OR INSTALLED LOCATION OF A GROUND SCREW. SEE ADDITIONAL REQUIREMENTS FOR TRENCHES AND OTHER EXCAVATIONS IN SECTION II.3.
2. ALL EARTHWORK SHALL BE NOTED ON THE PLANS AND PROPERLY AS-BUILTED. CUT AREAS SHALL BE PROOF ROLLED AFTER REMOVAL OF SOIL. FILL AREAS SHALL BE STRIPPED OF ALL VEGETATION AND PROOF ROLLED PRIOR TO PLACING FILL MATERIAL.
3. TRENCHES AND OTHER EXCAVATIONS MAY BE CUT EITHER BEFORE OR AFTER GROUND SCREW INSTALLATION PROVIDED THEY MEET THE REQUIREMENTS OF II.1, II.5. IF THEY ARE CUT AFTER GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN THE GROUND SCREW AND THE EDGE OF THE EXCAVATION MUST BE GREATER THAN OR EQUAL TO THE VERTICAL DEPTH OF THE EXCAVATION (1:1 RATIO), PLUS 24". 2. IF THEY ARE CUT BEFORE GROUND SCREW INSTALLATION, THE HORIZONTAL DISTANCE BETWEEN EXCAVATION AND PROPOSED GROUND SCREW LOCATION SHOULD BE 24" OR GREATER.
4. IMPORTED GRANULAR FILL MATERIAL SHALL BE USED FOR EARTHWORK UNLESS ON-SITE SOILS MEET THE FOLLOWING REQUIREMENTS:
   A. FREE OF PARTICLES LARGER THAN 2" IN DIAMETER, ORGANIC MATTER, AND OTHER DELETERIOUS MATERIALS; AND
   B. CAN BE PROPERLY MOISTURE CONDITIONED.
5. GRANULAR ON-SITE SOILS OR IMPORTED GRANULAR MATERIAL MAY BE USED AS FILL AS LONG AS THEY MEET THE FOLLOWING REQUIREMENTS:
   A. WELL GRADED BETWEEN COARSE AND FINE SIZES;
   B. CONTAINING NO CLAY BALLS, ROOTS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS;
   C. MAXIMUM PARTICLE SIZE OF 2", WITH LESS THAN 12% PASSING THE U.S. NO. 200 SIEVE; AND
   D. IMPORTED FILL MATERIALS SHALL BE SAMPLED AND TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY PRIOR TO BEING TRANSPORTED TO THE SITE.
6. FILL SOILS SHALL BE COMPACTED AT MOISTURE CONTENTS THAT ARE NEAR OPTIMUM. THE OPTIMUM MOISTURE CONTENT VARIES WITH THE SOIL GRADATION AND SHALL BE EVALUATED DURING CONSTRUCTION. FILL MATERIAL THAT IS NOT NEAR OPTIMUM MOISTURECONTENT SHALL BE MOISTURE CONDITIONED. FILL MATERIAL SHALL BE PLACED IN UNIFORM, HORIZONTAL LIFTS, AND BE COMPACTED WITH APPROPRIATE EQUIPMENT TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY PER ASTM D1557. THE MAXIMUM LIFT THICKNESS WILL VARY DEPENDING ON THE MATERIAL AND COMPACTION EQUIPMENT USED, BUT SHALL NOT BE GREATER THAN 12" AND SHOULD BE CONSISTENT THROUGHOUT THE DEPTH OF THE COMPACTED SOIL.
7. TERRASMART REQUIRES THAT FILL COMPACTION BE TESTED BY A GEOTECHNICAL ENGINEER OR OTHER QUALIFIED SOIL TESTING AGENCY DURING THE PLACEMENT AND COMPACTION OF FILL TO VALIDATE THE WORK.
8. ROCK DRILLING SHALL BE PERFORMED IF REQUIRED BY PRESENCE OF UNDERGROUND ROCK. PILOT HOLE DIAMETER SHALL BE DETERMINED BY ONSITE TESTING AND APPROVED BY TERRASMART.

III. FOUNDATION NOTES

1. GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS BY A CERTIFIED INSTALLER TRAINED ON THIS TECHNOLOGY.
2. GROUND SCREW FOUNDATIONS SHALL BE INSTALLED IN UNDISTURBED, NATURAL SOIL, UNLESS OTHERWISE NOTED AND PROPERLY PREPARED AS DESCRIBED IN SECTION II. SITE PREPARATION.
3. FOUNDATION INSTALLATION SUB-CONTRACTOR SHALL DETERMINE DIAMETER AND DEPTH OF PRE-DRILLED PILOT HOLE AS REQUIRED BY SITE CONDITIONS.
4. SHOULD UNFORESEEN LOOSE SOIL CONDITIONS BE ENCOUNTERED ONSITE, CONCRETE OR OTHER ADDITIVES MAY BE USED TO STABILIZE THE SOIL AT CLIENTS EXPENSE. SHOULD UNDERGROUND WATER BE ENCOUNTERED, THE CLIENT SHALL REMEDIATE THE ISSUE.
5. THE USE OF WATER AS LUBRICANT IS ALLOWED.
6. TOLERANCES IN THE POSITION OF EACH SCREW ARE ± 2" LATERALLY (NORTH-SOUTH AND EAST-WEST) AND ± 3" VERTICALLY (UP-DOWN) WITH A TYPICAL 76.7" EMBEDMENT, AS MEASURED FROM GRADE.IN THE RARE CASE THAT A GROUND SETTLEMENT OCCURS, NO REMEDIATION IS REQUIRED IF THE SETTLEMENT RESULTS IN A RACKING CONFIGURATION THAT IS STILL WITHIN TOLERANCE OF THE PROJECT'S CONSTRUCTION PLANS OR INSTALLATION MANUAL AND DOES NOT OVER STRESS THE RACKING STRUCTURE.
7. MINIMUM REQUIRED TORQUE FOR GROUND SCREW INSTALLATION: 2000 N-m.
8. GROUND SCREW FOUNDATIONS HAVE BEEN DESIGNED BASED ON FIELD TESTING PERFORMED BY TERRASMART (REPORT DATED: -).
9. GROUND SCREW FOUNDATIONS HAVE BEEN DESIGNED BASED ON THE PROJECT GEOTECHNICAL REPORT PROVIDED BY THE CLIENT (-, REPORT NUMBER -, DATED -).

DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME
BENZ

PROJECT NUMBER
24-30984

CLIENT
ALLCO FINANCE LIMITED

ASCE	RISK CATEGORY
7-10	I
EXPOSURE CATEGORY	WIND SPEED
C	103.72858288 MPH
GROUND SNOW LOAD Pg	FLAT ROOF SNOW LOAD Pf
30 PSF	30 PSF
SITE CLASS	SEISMIC Sds
D	0.207

MODULE MODEL
CS7N-XXXTB-AG

MODULE LONG EDGE	MODULE SHORT EDGE	MODULE THICKNESS
2384 mm	1303 mm	35 mm
MODULE LONG EDGE BOLT SPACING	MODULE SHORT EDGE BOLT SPACING	
1400 mm	1262 mm	
MODULE LONG EDGE FLANGE WIDTH	MODULE SHORT EDGE FLANGE WIDTH	
30 mm	N/A	

GROUND SCREW
76 x 2100

PRODUCT CODE
2X10

ENGINEERING APPROVED BY
DH - 4/3/2024

DRAWN BY	REVISION - STATUS	SHEET NUMBER
TMC 4/3/2024	1 - Released	2 OF 18

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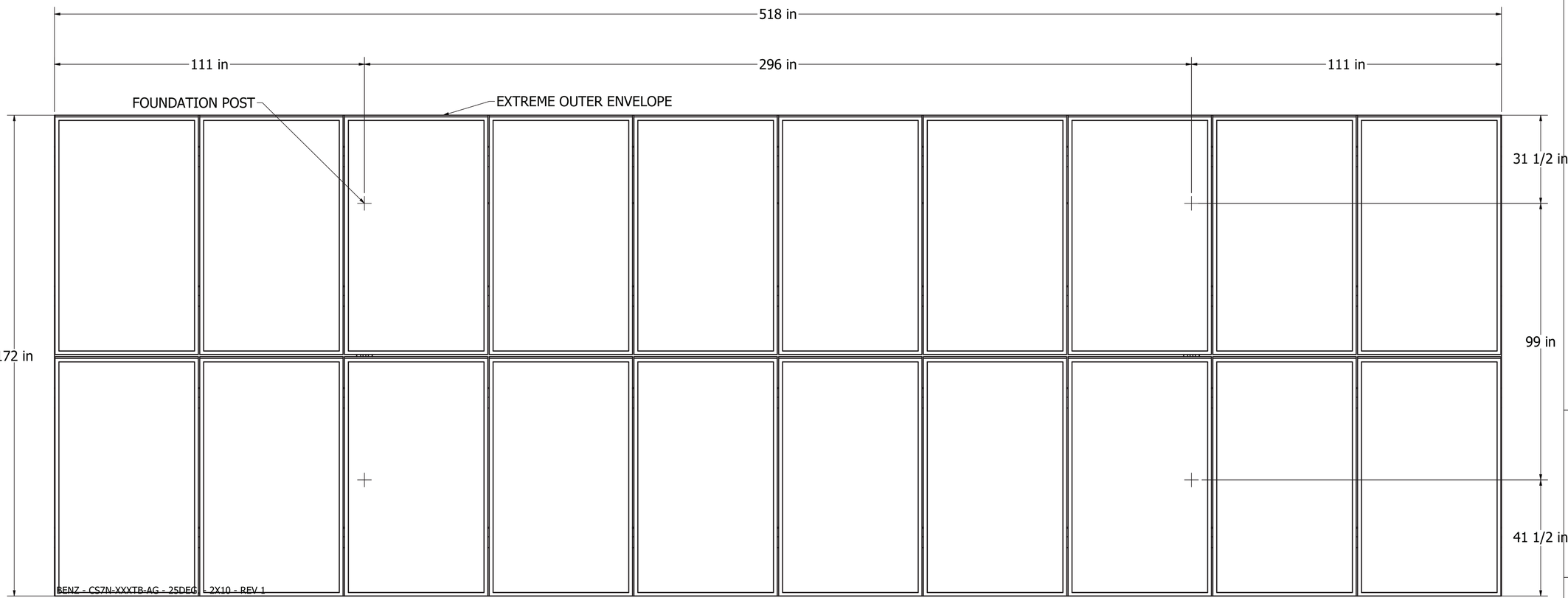

FLATTENED LAYOUT
SCALE 1/20

DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X10
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 3 OF 18

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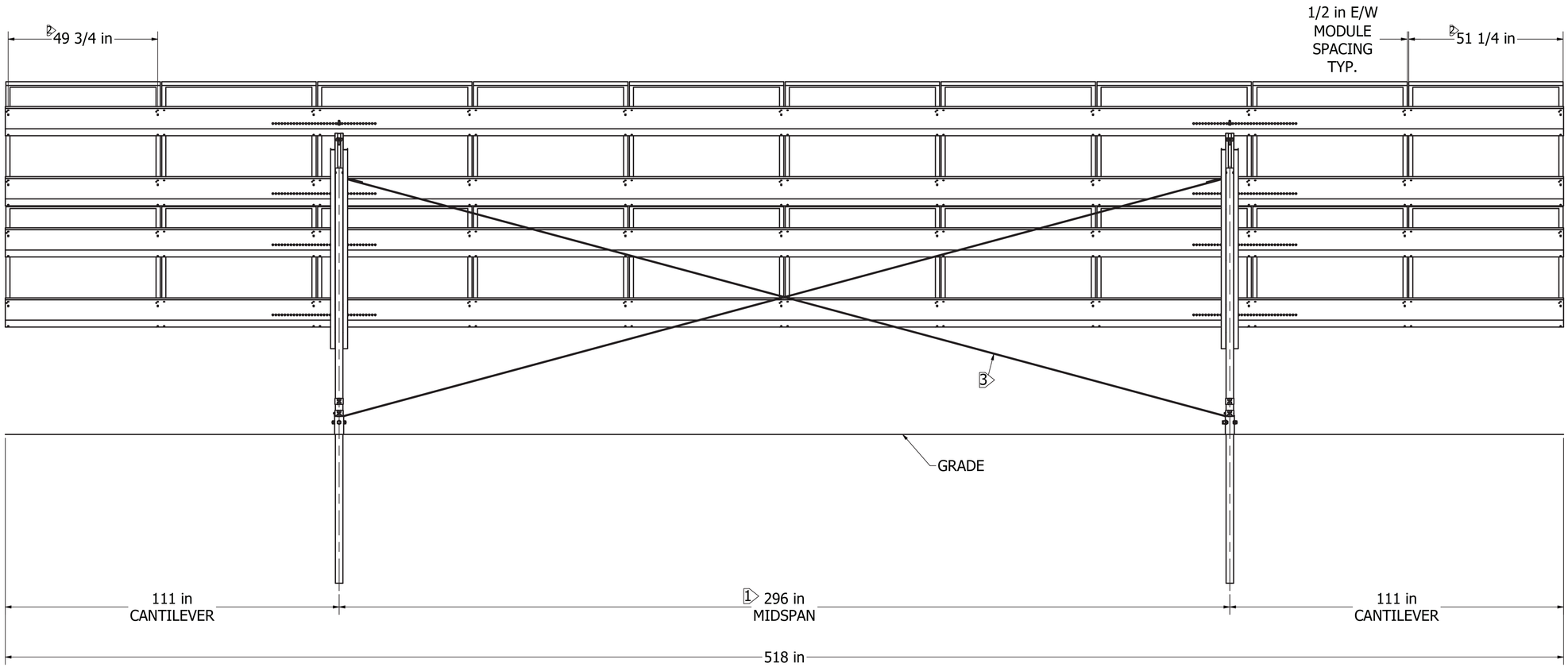

REAR ELEVATION VIEW
SCALE 1/20

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X10
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 4 OF 18

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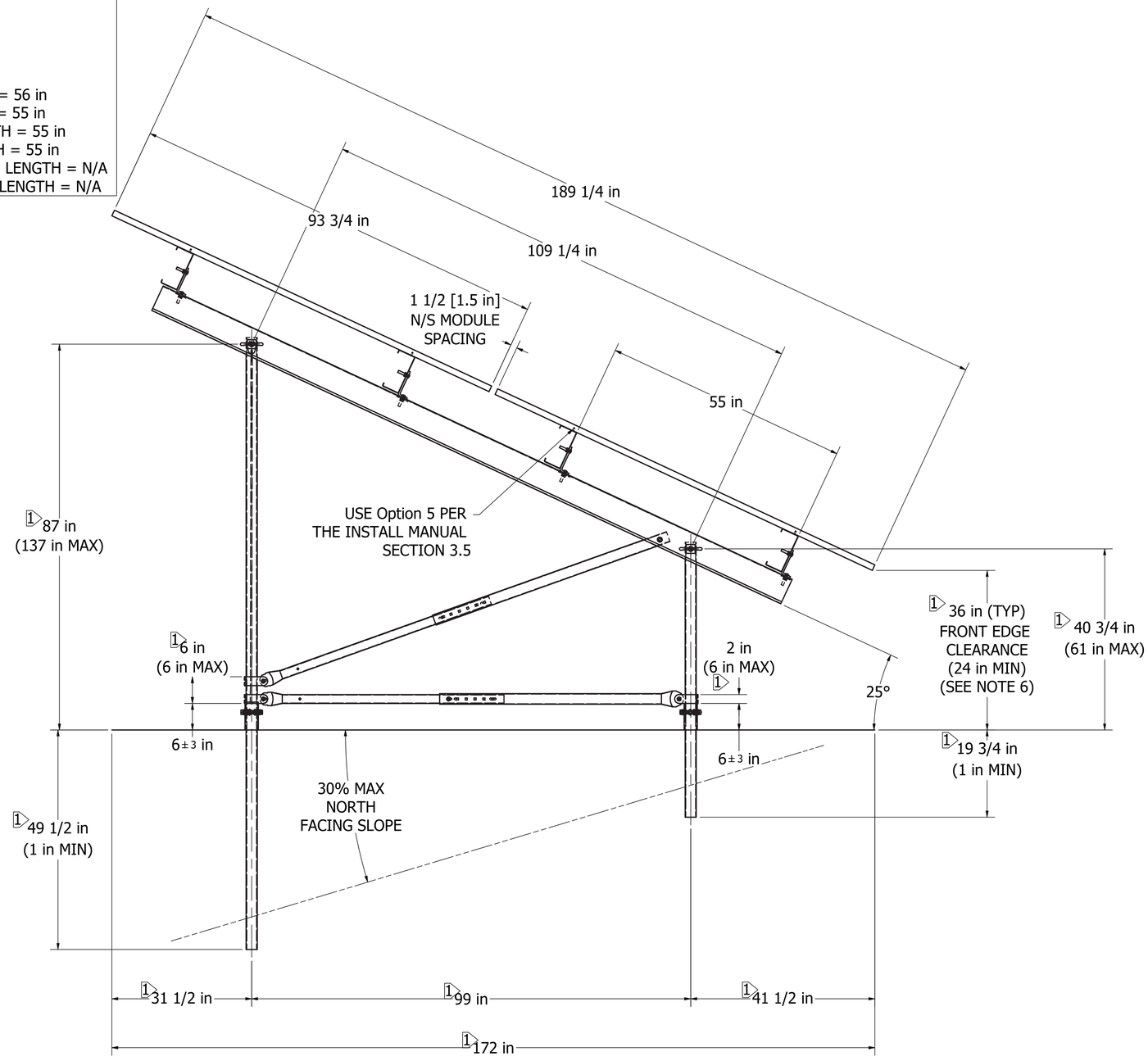
MEMBER PROPERTIES

SOUTH SCREW - 76 mm X 2100 mm
NORTH SCREW - 76 mm X 2100 mm
NORTH /SOUTH BEAM - RAFTER - LENGTH = 156.50 in
EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0820- LENGTH = 517.89 in
NORTH LEG - MECH2.375 x 9GA. - LENGTH = 138.00 in
SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 62.00 in
DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 56 in
DIAGONAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA. - LENGTH = 55 in
HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 55 in
HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = 55 in
UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A



SIDE ELEVATION VIEW
SCALE 1/14

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
5. ON NORTH FACING SLOPES LEGS CAN BE FULLY EXTENDED TO MEET MINIMUM FRONT EDGE REQUIREMENTS. ALL LEGS REQUIRE A MINIMUM OF 1 INCH EMBEDMENT BELOW GRADE. FULL EXTENSION OF LEGS MAY RESULT IN LATERAL BRACES NOT FITTING. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
6. TABLES CONSTRUCTED WITH A FRONT EDGE HEIGHT 48in OR GREATER REQUIRE SEISMIC BRACING ON THE FRONT LEGS, SEE INSTALLATION MANUAL.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X10
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 5 OF 18

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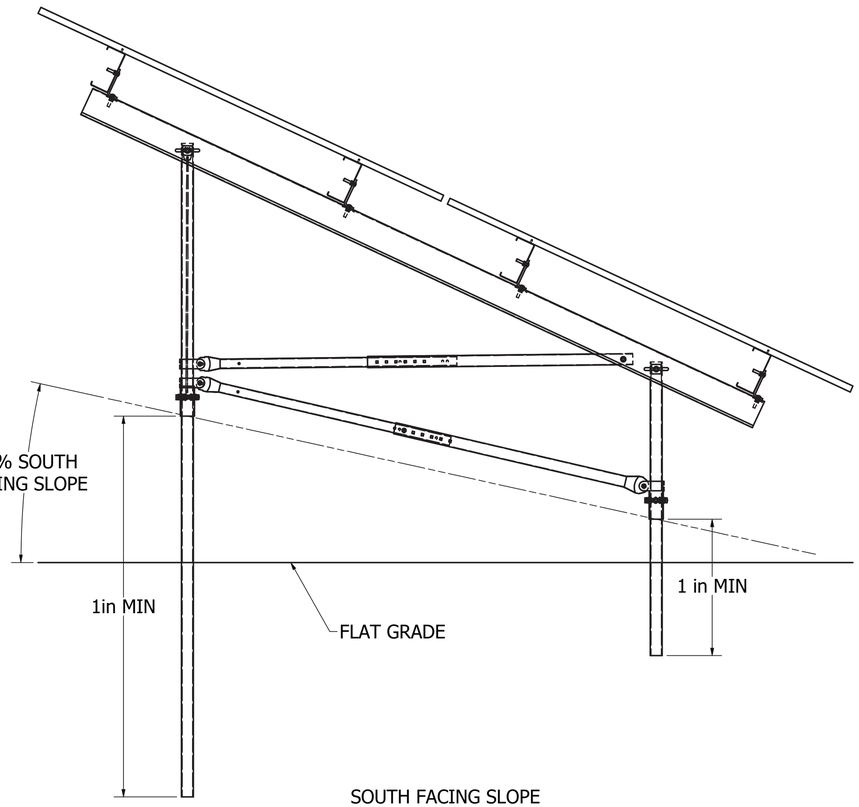
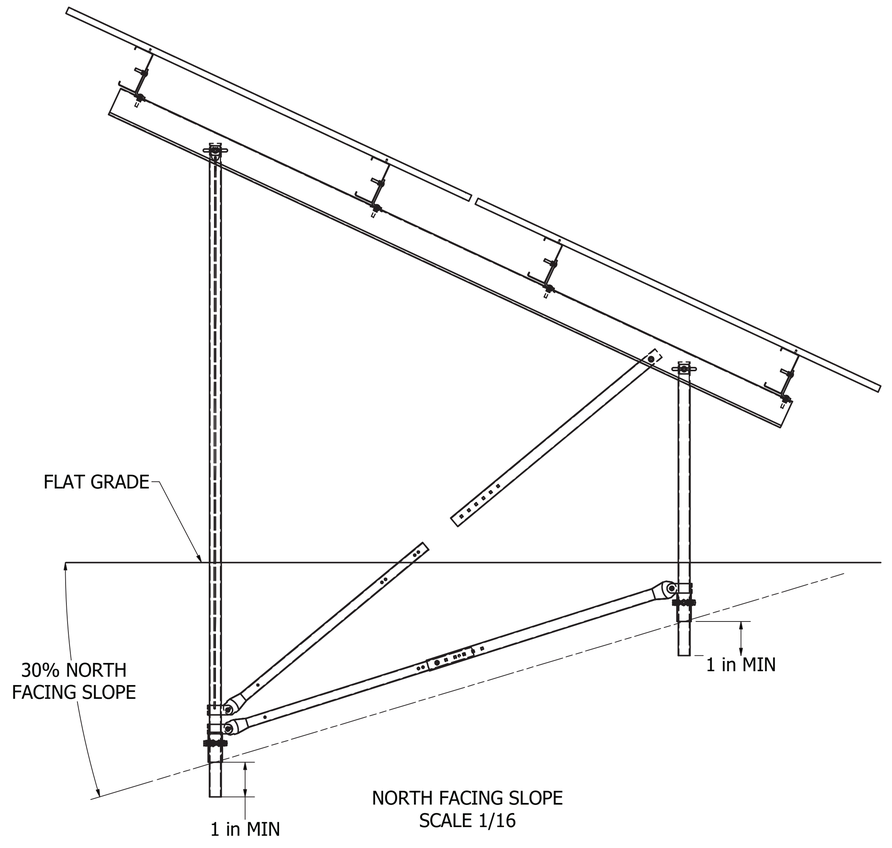


SOUTH FACING SLOPE
SCALE 1/16



NORTH FACING SLOPE
SCALE 1/16

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
5. ON NORTH FACING SLOPES LEGS CAN BE FULLY EXTENDED TO MEET MINIMUM FRONT EDGE REQUIREMENTS. ALL LEGS REQUIRE A MINIMUM OF 1 INCH EMBEDMENT BELOW GRADE. FULL EXTENSION OF LEGS MAY RESULT IN LATERAL BRACES NOT FITTING. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED

ASCE	RISK CATEGORY
7-10	I
EXPOSURE CATEGORY	WIND SPEED
C	103.72858288 MPH
GROUND SNOW LOAD Pg	FLAT ROOF SNOW LOAD Pf
30 PSF	30 PSF
SITE CLASS	SEISMIC Sds
D	0.207

MODULE MODEL		
CS7N-XXXTB-AG		
MODULE LONG EDGE	MODULE SHORT EDGE	MODULE THICKNESS
2384 mm	1303 mm	35 mm
MODULE LONG EDGE BOLT SPACING	MODULE SHORT EDGE BOLT SPACING	
1400 mm	1262 mm	
MODULE LONG EDGE FLANGE WIDTH	MODULE SHORT EDGE FLANGE WIDTH	
30 mm	N/A	
GROUND SCREW		
76 x 2100		
PRODUCT CODE		
2X10		
ENGINEERING APPROVED BY		
DH - 4/3/2024		

DRAWN BY	REVISION - STATUS	SHEET NUMBER
TMC 4/3/2024	1 - Released	6 OF 18

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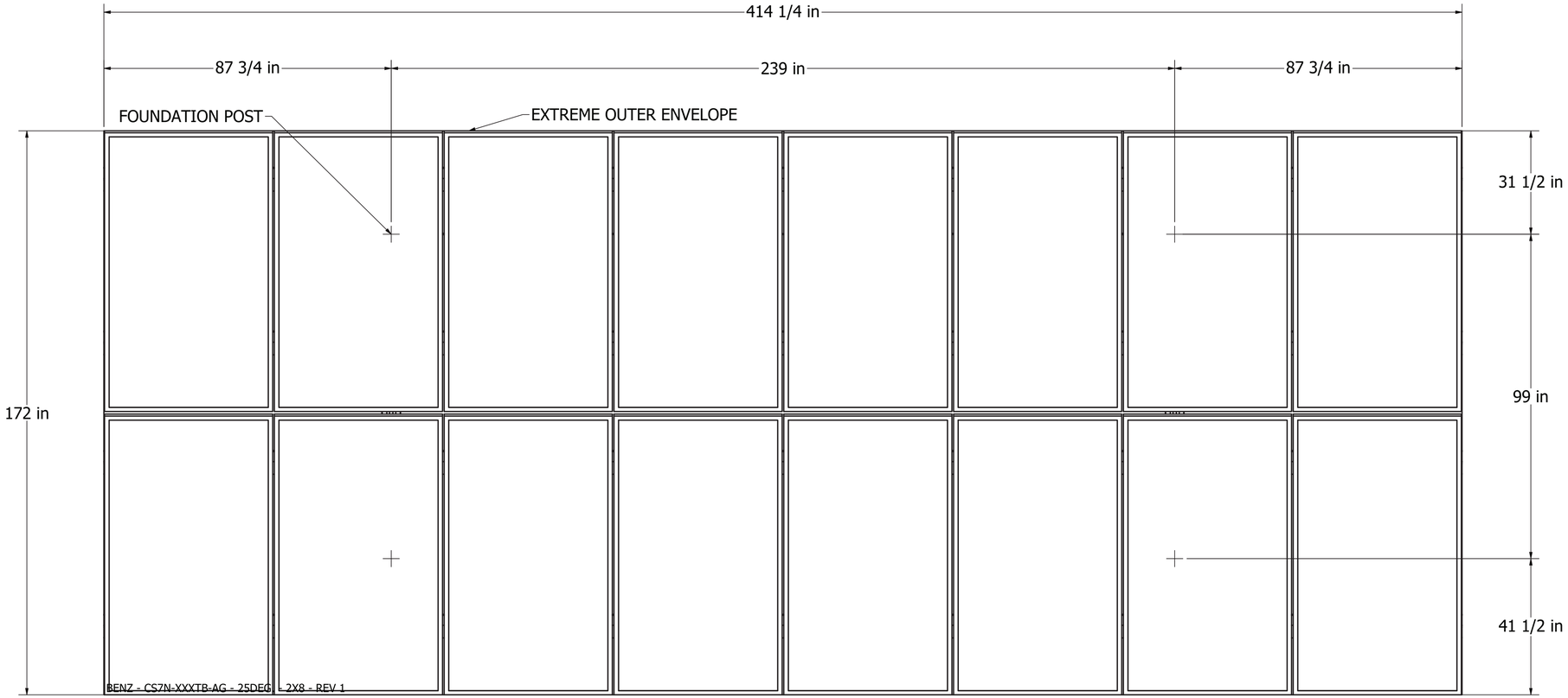

FLATTENED LAYOUT
SCALE 1/20

DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X8
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 7 OF 18

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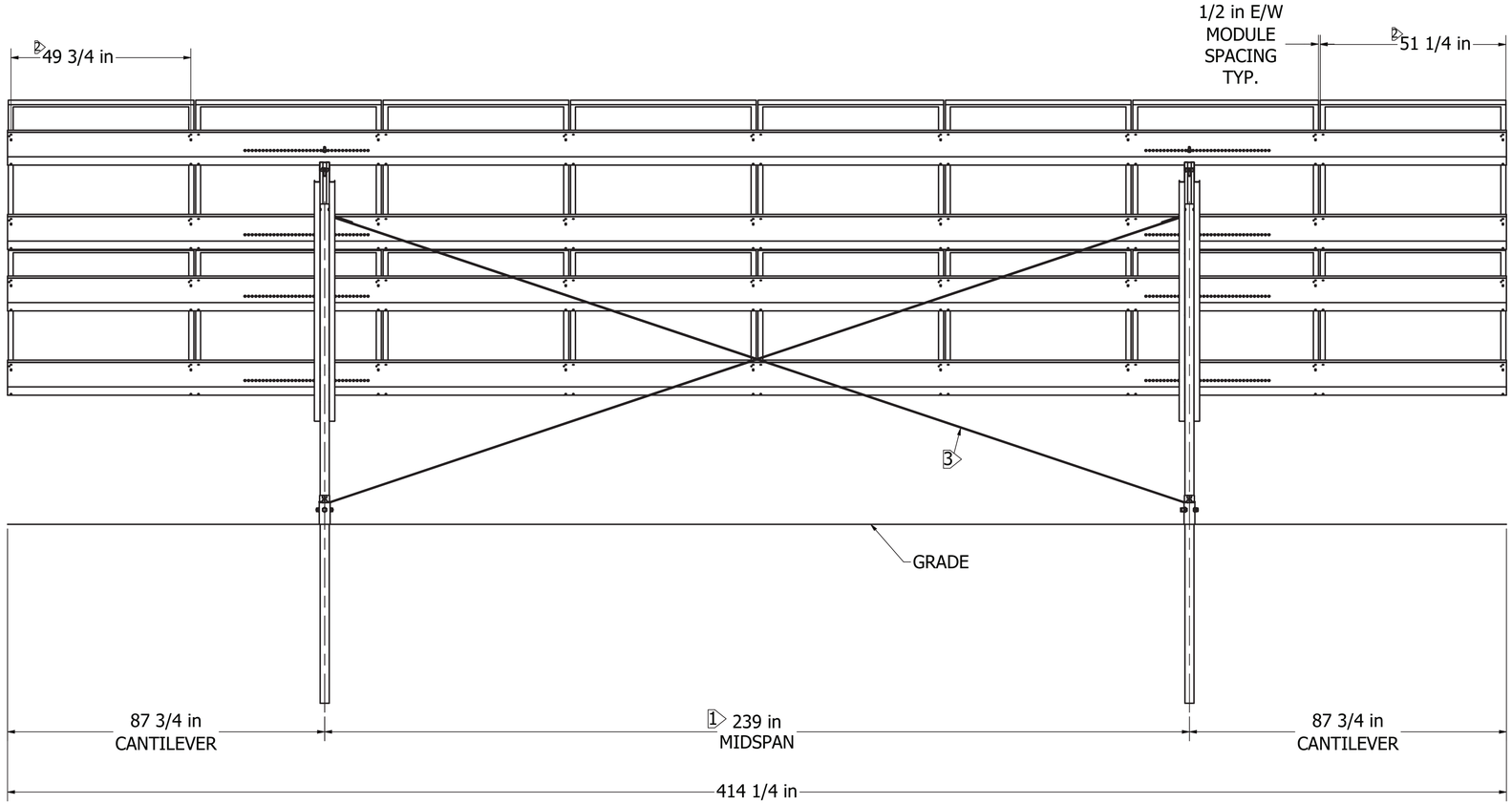

REAR ELEVATION VIEW
SCALE 1/20

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X8
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 8 OF 18

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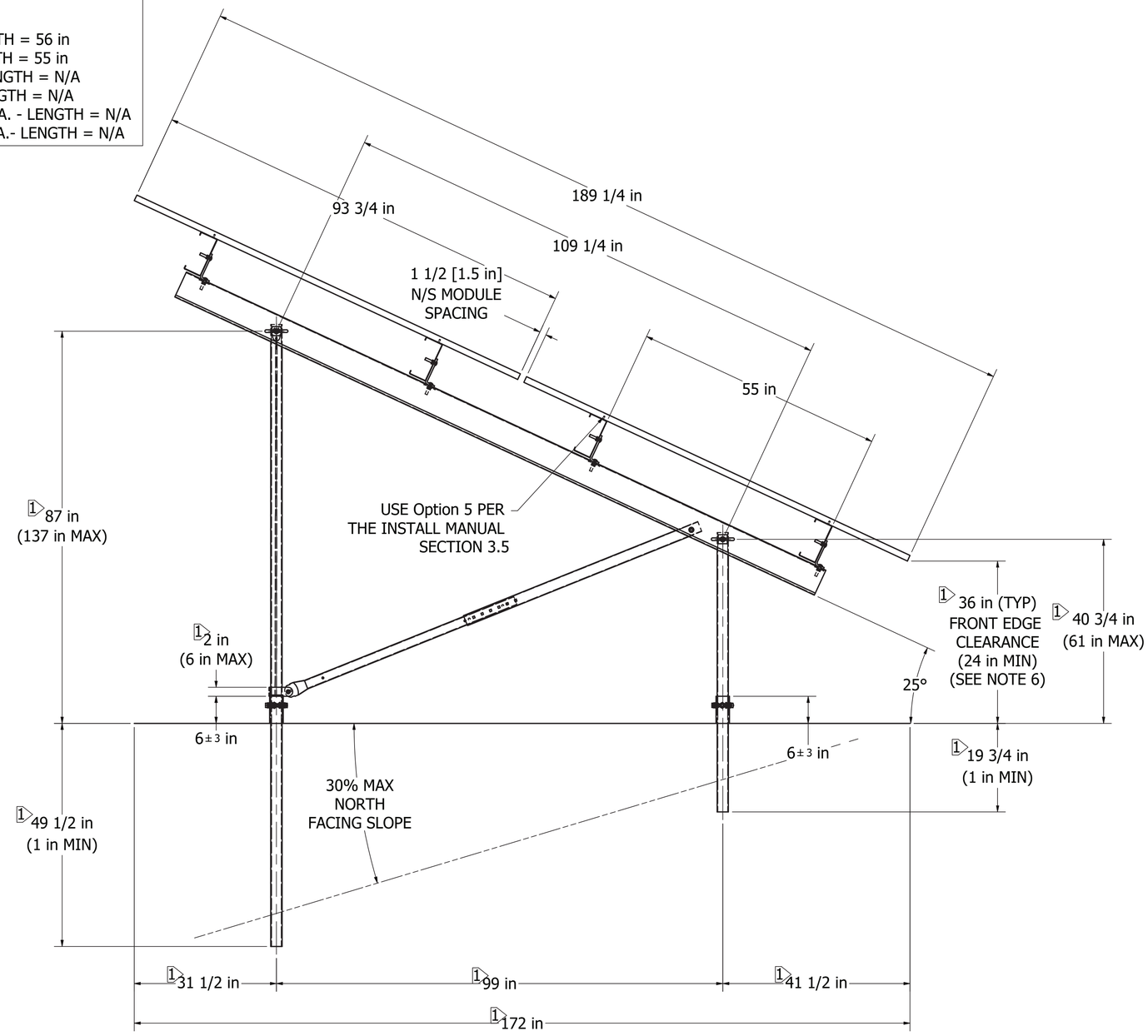
MEMBER PROPERTIES

SOUTH SCREW - 76 mm X 2100 mm
NORTH SCREW - 76 mm X 2100 mm
NORTH /SOUTH BEAM - RAFTER - LENGTH = 156.50 in
EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0970- LENGTH = 414.29 in
NORTH LEG - MECH2.375 x 9GA. - LENGTH = 138.00 in
SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 62.00 in
DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 56 in
DIAGONAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA. - LENGTH = 55 in
HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A
UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A



SIDE ELEVATION VIEW
SCALE 1/14

NOTES:
1 TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
5. ON NORTH FACING SLOPES LEGS CAN BE FULLY EXTENDED TO MEET MINIMUM FRONT EDGE REQUIREMENTS. ALL LEGS REQUIRE A MINIMUM OF 1 INCH EMBEDMENT BELOW GRADE. FULL EXTENSION OF LEGS MAY RESULT IN LATERAL BRACES NOT FITTING. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
6. TABLES CONSTRUCTED WITH A FRONT EDGE HEIGHT 48in OR GREATER REQUIRE SEISMIC BRACING ON THE FRONT LEGS, SEE INSTALLATION MANUAL.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X8
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 9 OF 18

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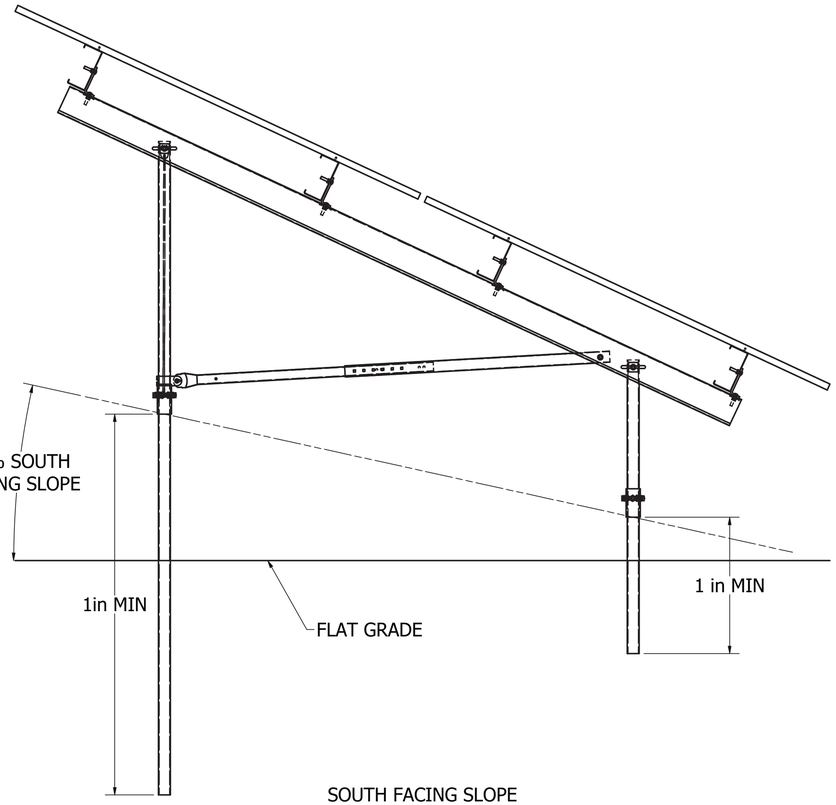
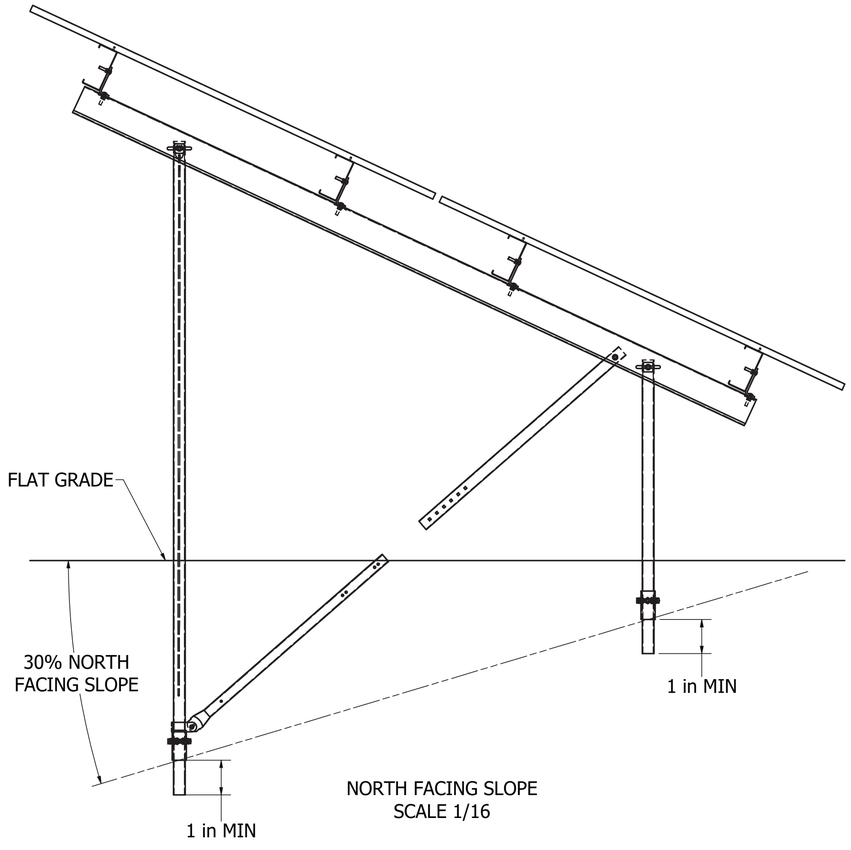


SOUTH FACING SLOPE
SCALE 1/16



NORTH FACING SLOPE
SCALE 1/16

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
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DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X8
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 10 OF 18

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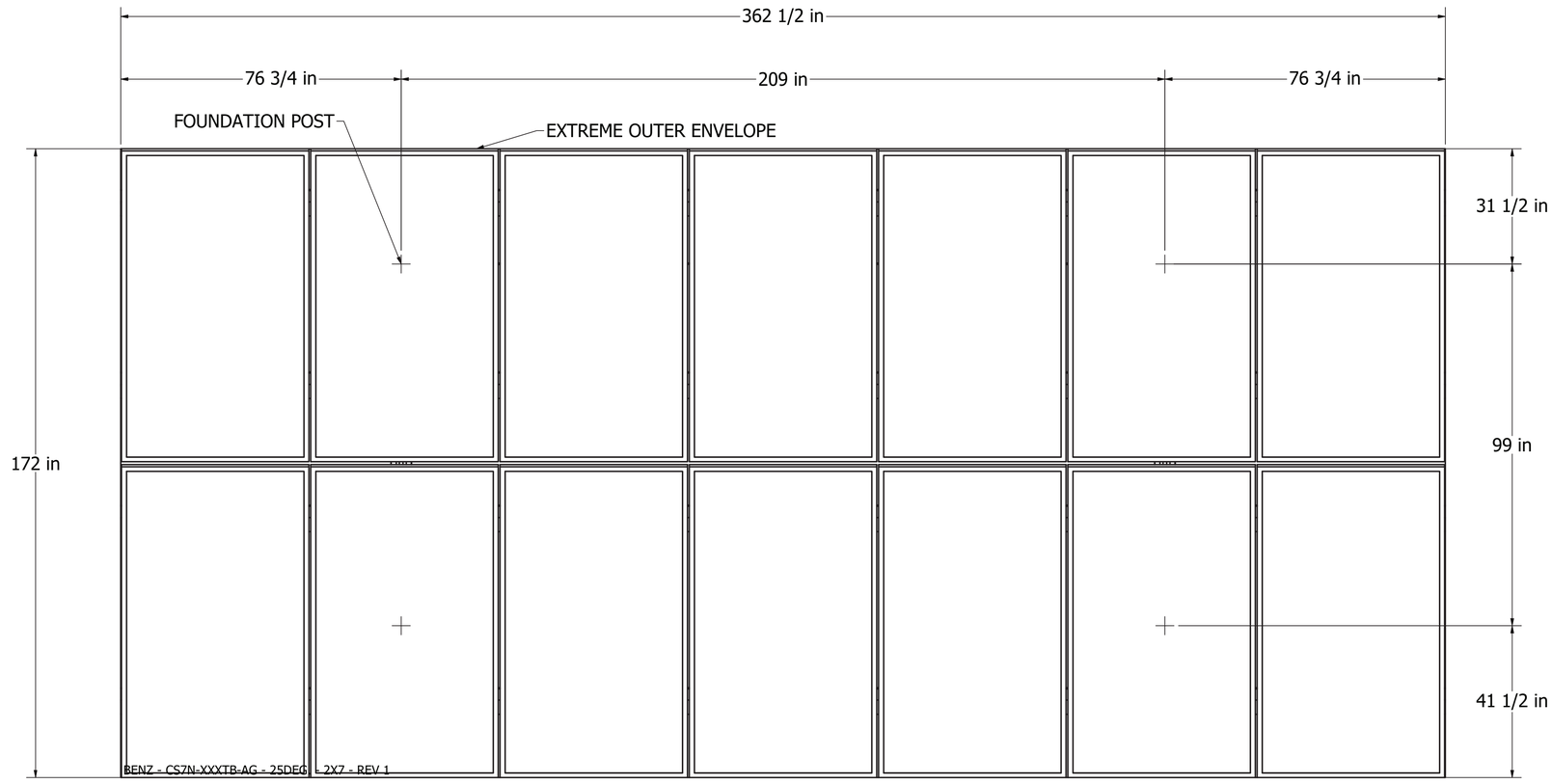

FLATTENED LAYOUT
SCALE 1/20

DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X7
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 11 OF 18

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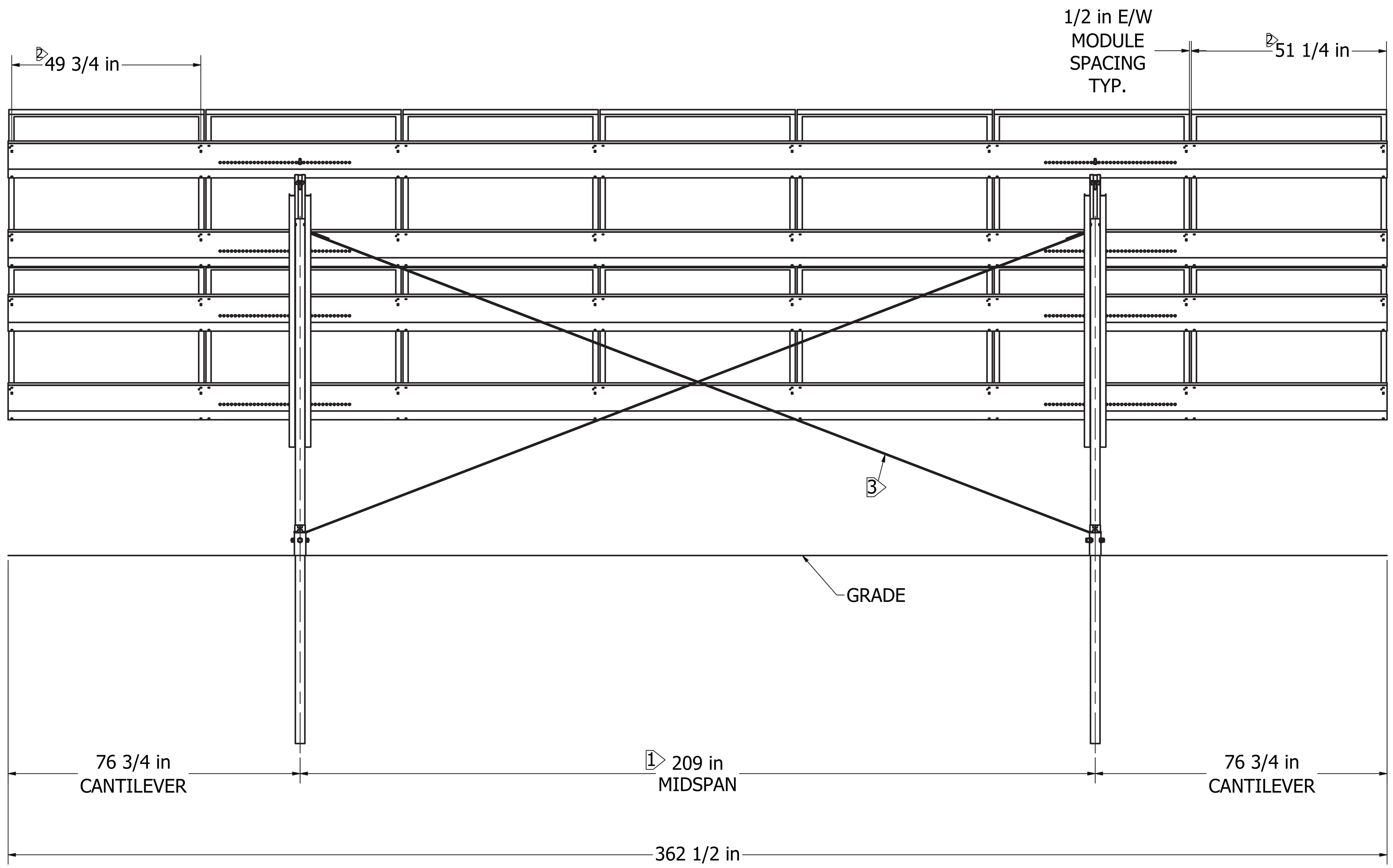
DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009



REAR ELEVATION VIEW
SCALE 1/20

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.
3. SEISMIC CROSS BRACING TO BE FIELD FIT.

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME: BENZ		
PROJECT NUMBER: 24-30984		
CLIENT: ALLCO FINANCE LIMITED		
ASCE: 7-10	RISK CATEGORY: I	
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH	
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF	
SITE CLASS: D	SEISMIC Sds: 0.207	
MODULE MODEL: CS7N-XXXTB-AG		
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm	MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm	
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A	
GROUND SCREW: 76 x 2100		
PRODUCT CODE: 2X7		
ENGINEERING APPROVED BY: DH - 4/3/2024		
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released	SHEET NUMBER: 12 OF 18

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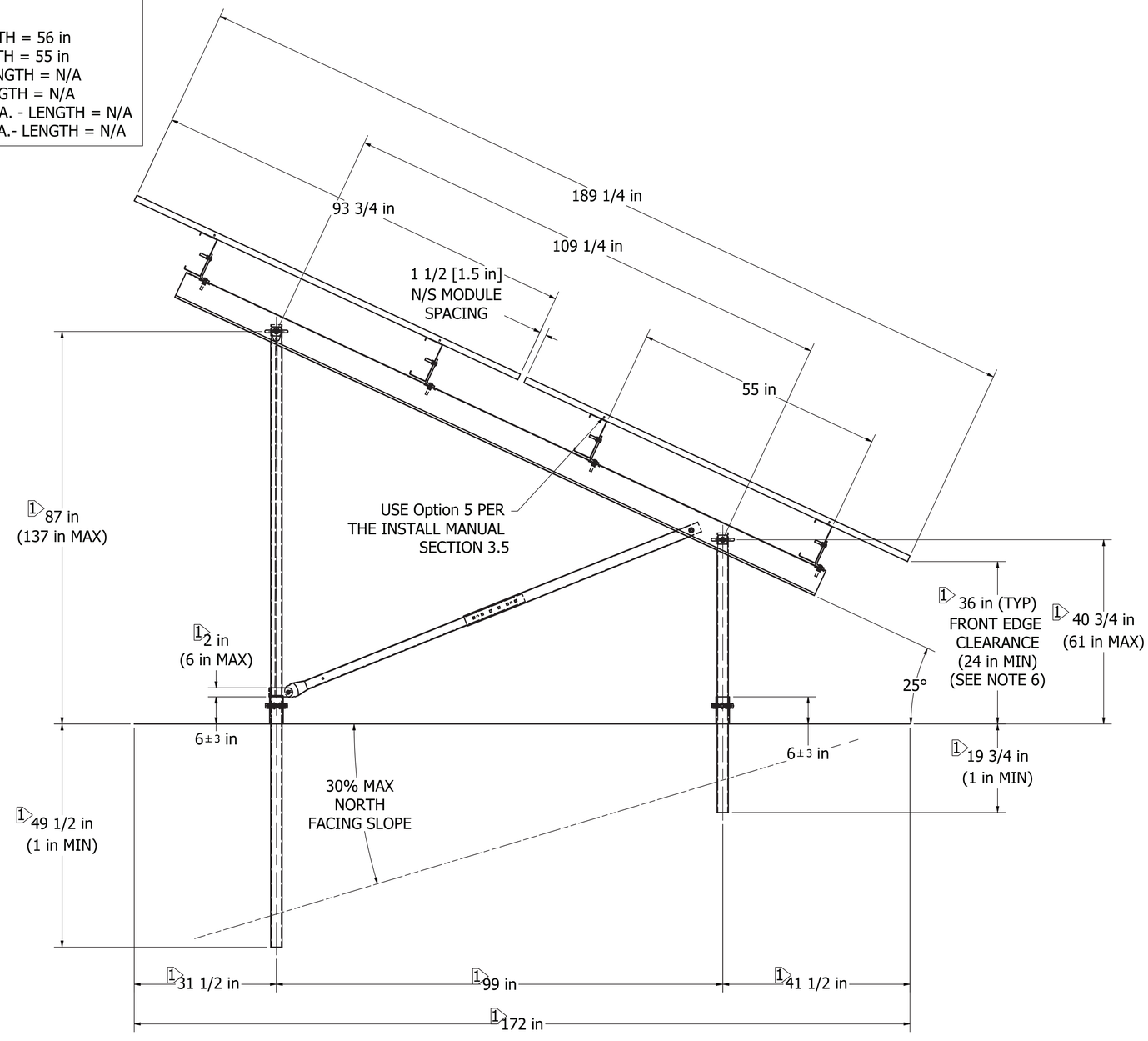
MEMBER PROPERTIES

SOUTH SCREW - 76 mm X 2100 mm
NORTH SCREW - 76 mm X 2100 mm
NORTH /SOUTH BEAM - RAFTER - LENGTH = 156.50 in
EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0820- LENGTH = 362.49 in
NORTH LEG - MECH2.375 x 9GA. - LENGTH = 138.00 in
SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 62.00 in
DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 56 in
DIAGONAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA. - LENGTH = 55 in
HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A
UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A



SIDE ELEVATION VIEW
SCALE 1/14

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
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DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X7
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 13 OF 18

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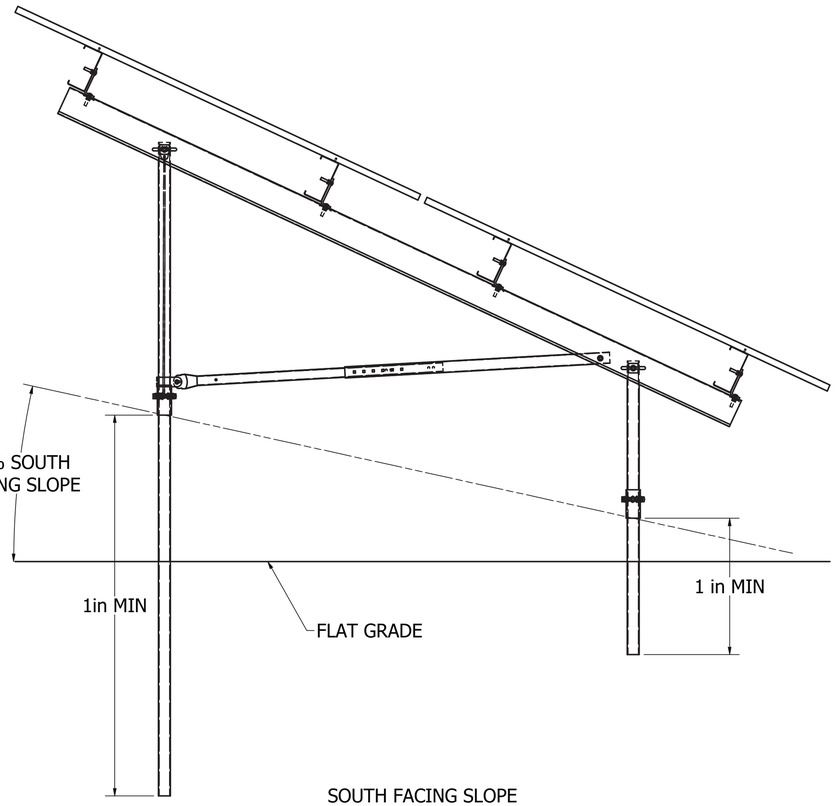
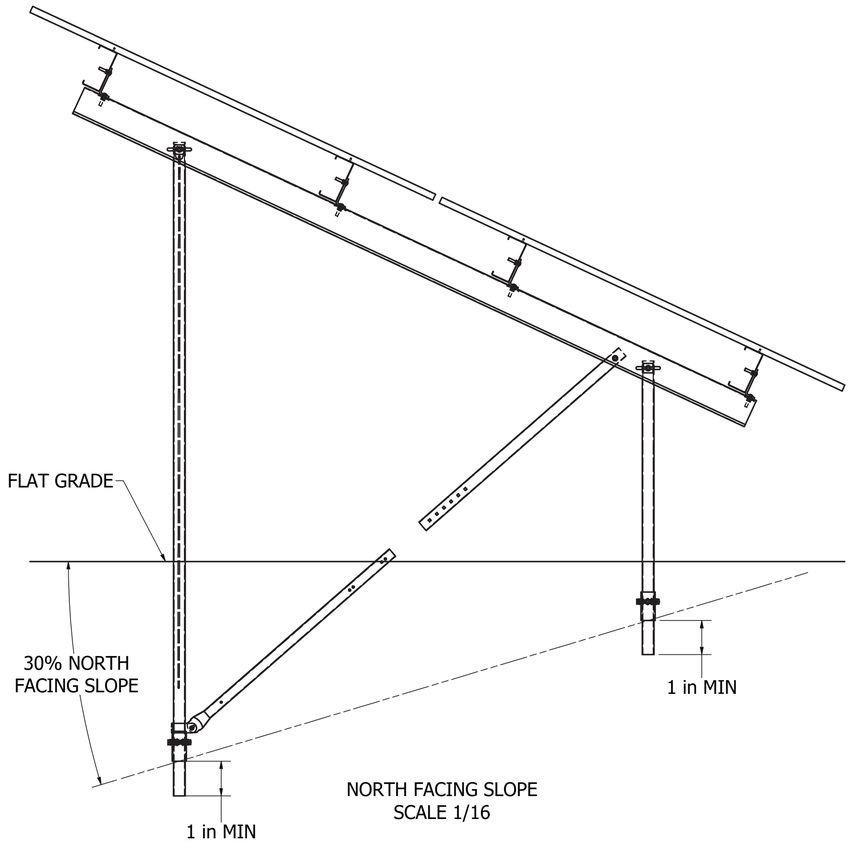


SOUTH FACING SLOPE
SCALE 1/16



NORTH FACING SLOPE
SCALE 1/16

NOTES:
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DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED

ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207

MODULE MODEL: CS7N-XXXTB-AG		
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm	MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm	
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A	
GROUND SCREW: 76 x 2100		
PRODUCT CODE: 2X7		
ENGINEERING APPROVED BY: DH - 4/3/2024		
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released	SHEET NUMBER: 14 OF 18

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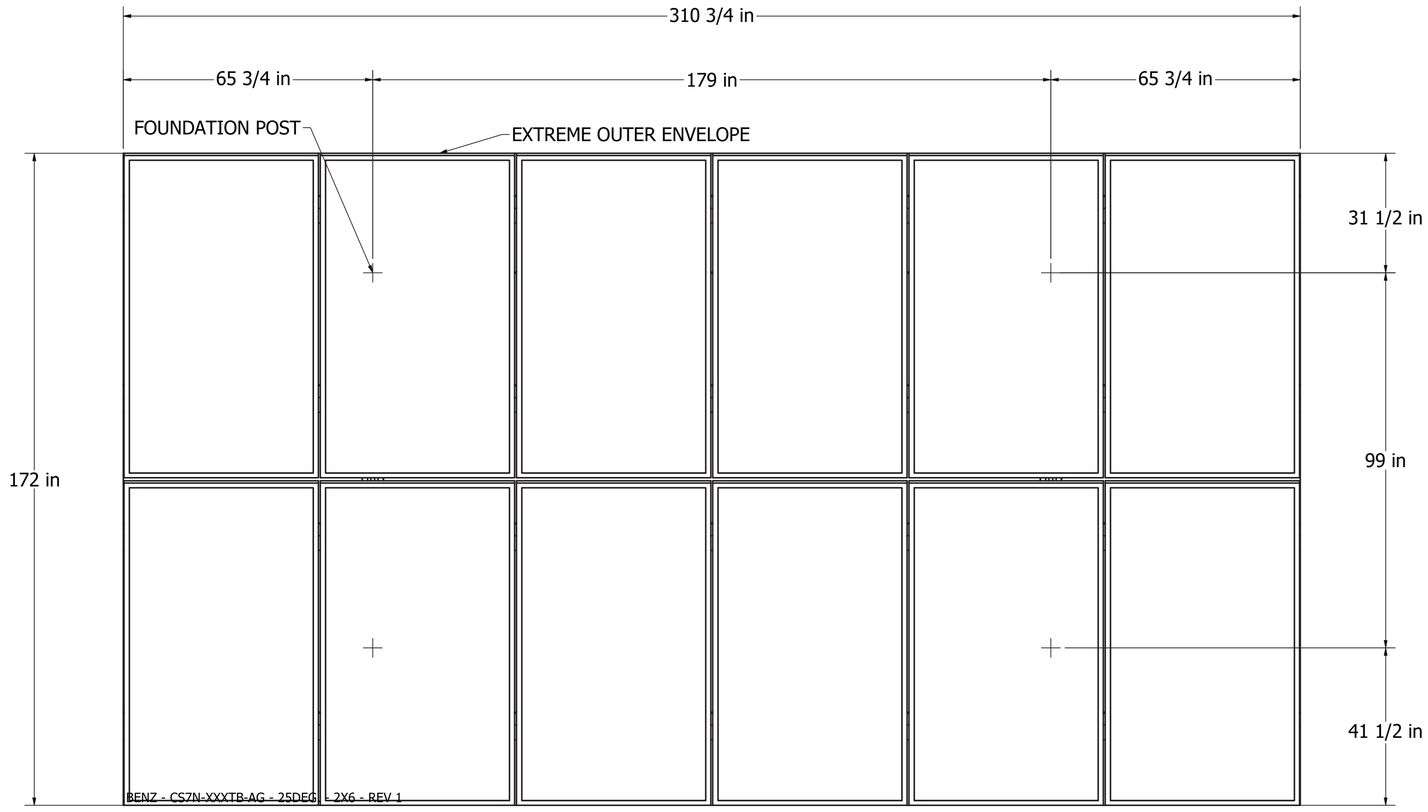

FLATTENED LAYOUT
SCALE 1/20

DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED

ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207

MODULE MODEL: CS7N-XXXTB-AG		
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm	MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm	
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A	
GROUND SCREW: 76 x 2100		
PRODUCT CODE: 2X6		
ENGINEERING APPROVED BY: DH - 4/3/2024		
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released	SHEET NUMBER: 15 OF 18

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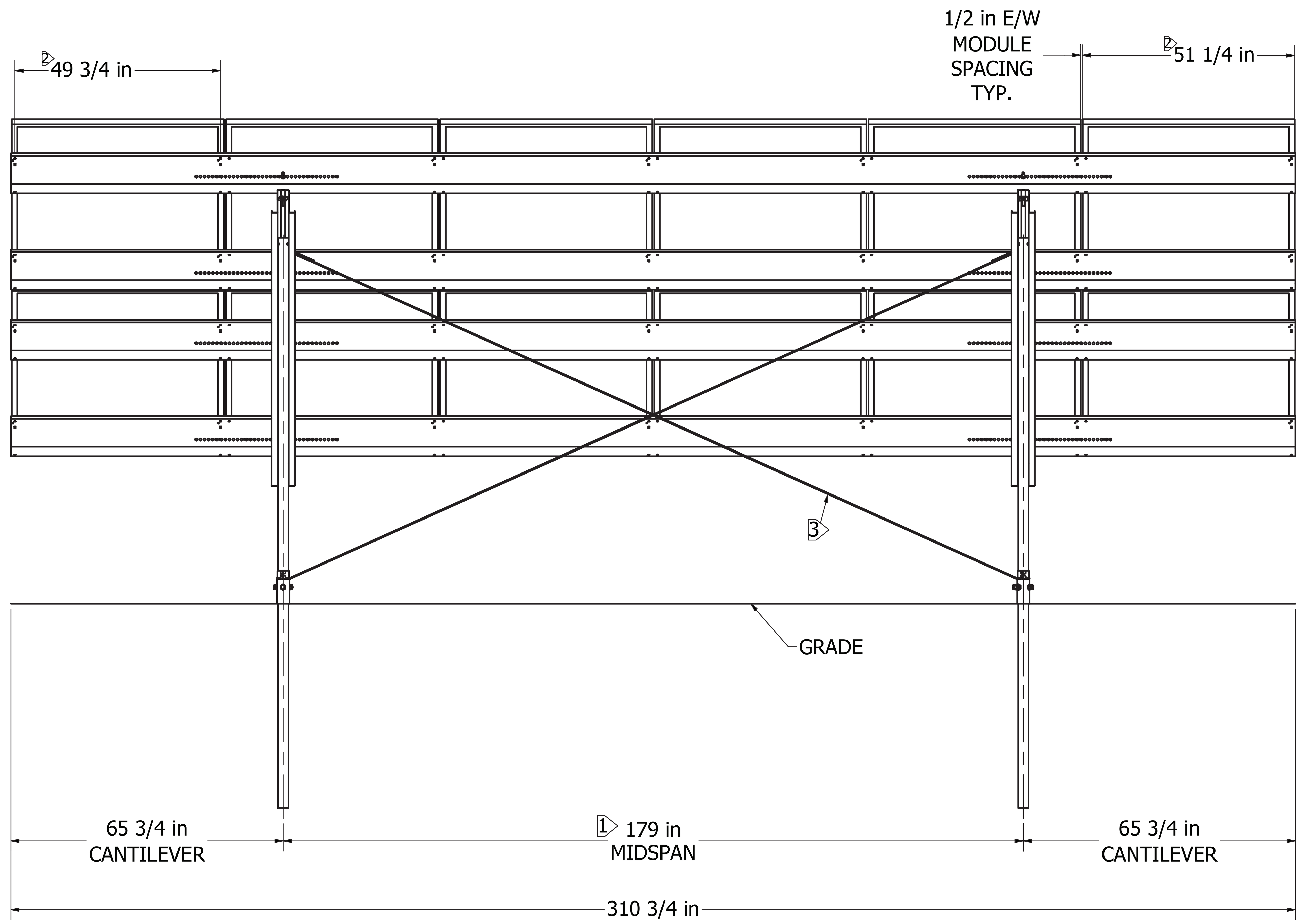
DRAWING NOTES

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009



REAR ELEVATION VIEW
SCALE 1/20

NOTES:

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2> PURLIN SPACING IS DEPENDENT ON MODULE SPECIFICATIONS, REFER TO PROJECT NOTES FOR MODULE SPECIFICATIONS.

3> SEISMIC CROSS BRACING TO BE FIELD FIT.

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME: BENZ		
PROJECT NUMBER: 24-30984		
CLIENT: ALLCO FINANCE LIMITED		
ASCE: 7-10	RISK CATEGORY: I	
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH	
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF	
SITE CLASS: D	SEISMIC Sds: 0.207	
MODULE MODEL: CS7N-XXXTB-AG		
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm	MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm	
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A	
GROUND SCREW: 76 x 2100		
PRODUCT CODE: 2X6		
ENGINEERING APPROVED BY: DH - 4/3/2024		
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released	SHEET NUMBER: 16 OF 18

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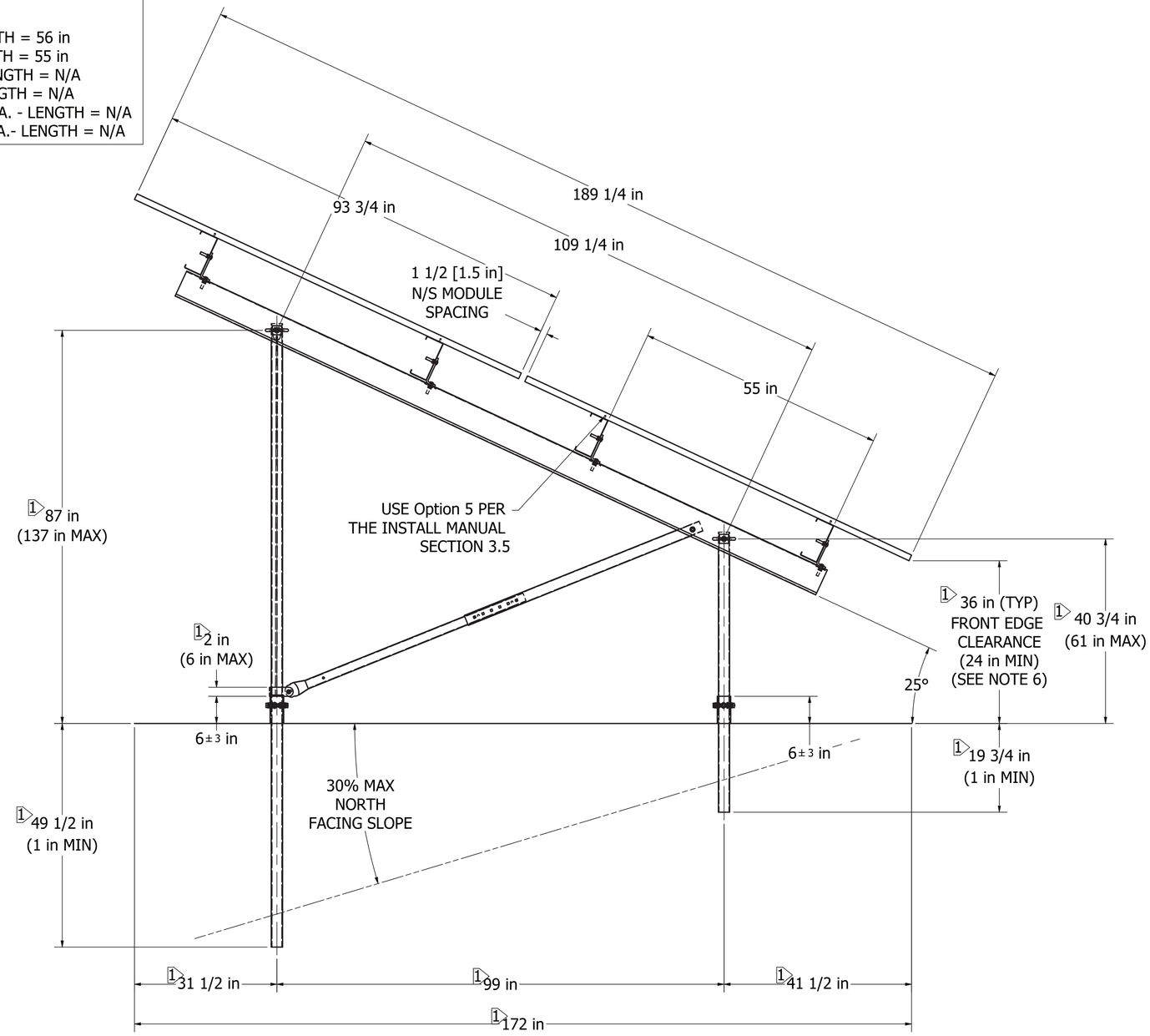
MEMBER PROPERTIES

SOUTH SCREW - 76 mm X 2100 mm
NORTH SCREW - 76 mm X 2100 mm
NORTH /SOUTH BEAM - RAFTER - LENGTH = 156.50 in
EAST/ WEST BEAM - C-BEAM 9.0x4.0x0.0820- LENGTH = 310.69 in
NORTH LEG - MECH2.375 x 9GA. - LENGTH = 138.00 in
SOUTH LEG - MECH2.375 x 9GA. - LENGTH = 62.00 in
DIAGONAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = 56 in
DIAGONAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA. - LENGTH = 55 in
HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A
UPPER HORIZONTAL EXTERNAL LATERAL BRACE - MECH2.360 x 13GA. - LENGTH = N/A
UPPER HORIZONTAL INTERNAL LATERAL BRACE - MECH2.000 x 12GA.- LENGTH = N/A



SIDE ELEVATION VIEW
SCALE 1/14

NOTES:
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6. TABLES CONSTRUCTED WITH A FRONT EDGE HEIGHT 48in OR GREATER REQUIRE SEISMIC BRACING ON THE FRONT LEGS, SEE INSTALLATION MANUAL.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X6
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 17 OF 18

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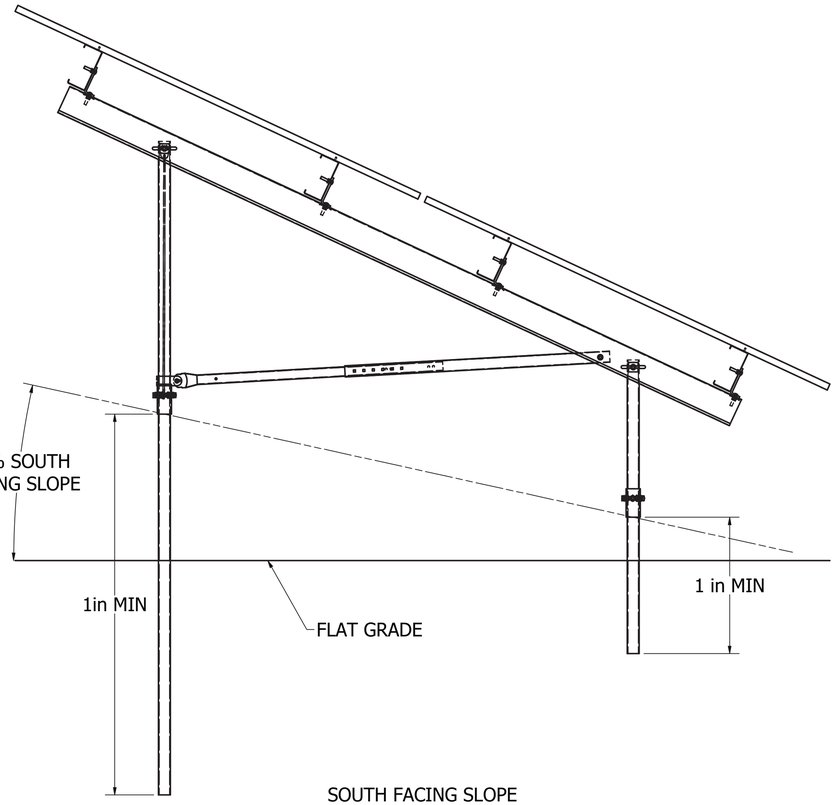
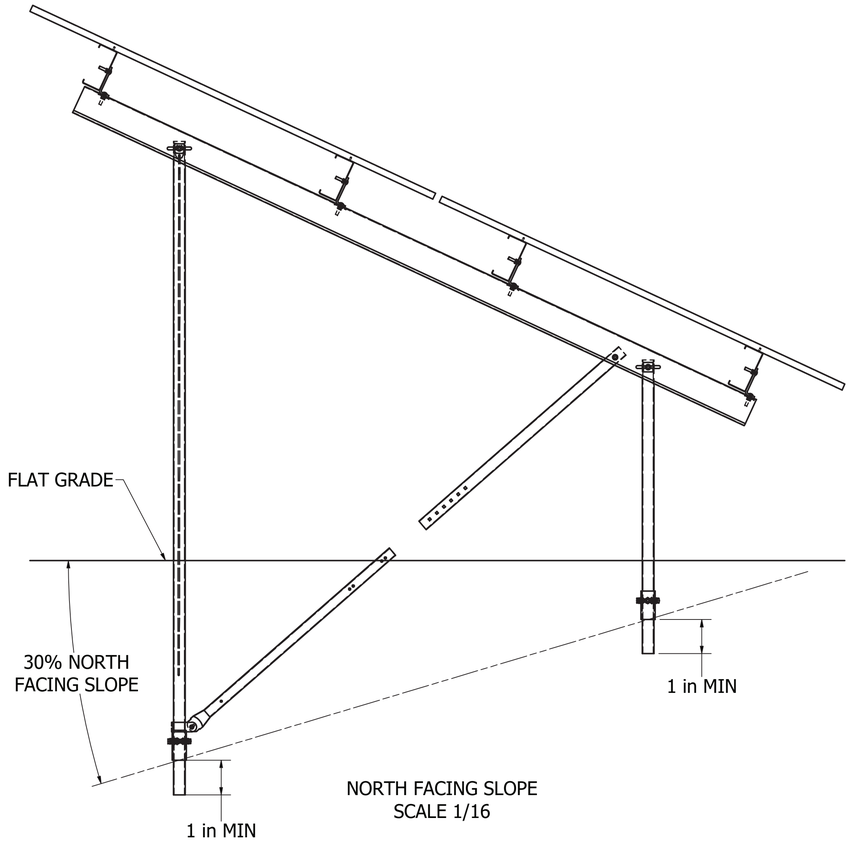


SOUTH FACING SLOPE
SCALE 1/16



NORTH FACING SLOPE
SCALE 1/16

NOTES:
1. TYPICAL INSTALLATION DIMENSIONS MAY BE ADJUSTED TO SUIT FIELD CONDITIONS WITHIN THE TOLERANCES PROVIDED.
2. LEGS SHALL BE INSTALLED PLUMB, IF MECHANICALLY POSSIBLE. MAXIMUM 3° OUT OF PLUMB.
3. LATERAL BRACES ARE DESIGNED TO ALLOW FOR 7" OF TOTAL ADJUSTMENT. IF FIELD CONDITIONS REQUIRE ADDITIONAL ADJUSTMENT AND LATERAL BRACES ARE TOO LONG, THEY MAY BE CUT DOWN AND DRILLED TO FIT BY THE RACK INSTALLER. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.
4. FOR SOUTH FACING SLOPES, THE DIAGONAL AND HORIZONTAL LATERAL BRACES CAN BE SWITCHED TO PROVIDE ADDITIONAL ADJUSTABILITY.
5. ON NORTH FACING SLOPES LEGS CAN BE FULLY EXTENDED TO MEET MINIMUM FRONT EDGE REQUIREMENTS. ALL LEGS REQUIRE A MINIMUM OF 1 INCH EMBEDMENT BELOW GRADE. FULL EXTENSION OF LEGS MAY RESULT IN LATERAL BRACES NOT FITTING. IF THEY ARE TOO SHORT, NEW LATERAL BRACES MAY BE ORDERED TO FIT AT THE PURCHASER'S EXPENSE.

DRAWING NOTES
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009

ZEYN B. UZMAN
PE #PEN.0023151 - CT

PROJECT NAME	BENZ
PROJECT NUMBER	24-30984
CLIENT	ALLCO FINANCE LIMITED
ASCE: 7-10	RISK CATEGORY: I
EXPOSURE CATEGORY: C	WIND SPEED: 103.72858288 MPH
GROUND SNOW LOAD Pg: 30 PSF	FLAT ROOF SNOW LOAD Pf: 30 PSF
SITE CLASS: D	SEISMIC Sds: 0.207
MODULE MODEL	CS7N-XXXTB-AG
MODULE LONG EDGE: 2384 mm	MODULE SHORT EDGE: 1303 mm / MODULE THICKNESS: 35 mm
MODULE LONG EDGE BOLT SPACING: 1400 mm	MODULE SHORT EDGE BOLT SPACING: 1262 mm
MODULE LONG EDGE FLANGE WIDTH: 30 mm	MODULE SHORT EDGE FLANGE WIDTH: N/A
GROUND SCREW	76 x 2100
PRODUCT CODE	2X6
ENGINEERING APPROVED BY	DH - 4/3/2024
DRAWN BY: TMC 4/3/2024	REVISION - STATUS: 1 - Released / SHEET NUMBER: 18 OF 18

TERRASMART
6715 STEGER DRIVE
CINCINNATI, OH 45237
P 239.362.0211 | F 239.676.1900
WWW.TERRASMART.COM

terrasmart

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Generated by eNDDB on:
6/7/2024

Blake Nicholson
VINEYARD SKY FARMS CORP
80 S 8th St
Minneapolis, MN 55402
blake.nicholson@ecosenergy.com

Subject: Benz Solar
Filing # 113811
NDDB – New Determination Number: 202407057
31 Benz St
Ansonia

Expiration Date: 6/7/2026

Based on current data maintained by the Natural Diversity Database (NDDB) and housed in the DEEP ezFile portal, no extant populations of Federal or State Endangered, Threatened or Special Concern species (RCSA Sec. 26-306) are known to occur within the project area delineated for the Energy and Utility Production Facilities and Distribution Infrastructure / Solar Energy, Benz Solar.

This NDDB – New determination may be utilized to fulfill the Endangered and Threatened Species requirements for state-issued permit applications, licenses, registration submissions, and authorizations. However, please be aware of the following limitations and conditions:

- This determination does not preclude the possibility that listed species may be encountered on site. Should this occur, a report must be submitted to the Natural Diversity Database promptly and additional action may be necessary to remain in compliance with certain state permits. Please fill out the appropriate survey form and follow the instructions for submittal.
- If your project involves preparing an Environmental Impact Assessment, this NDDB consultation and determination should not be substituted for conducting biological field surveys assessing on-site habitat and species presence.
- This determination applies only to the project as described in the submission and summarized at the end of this letter. Please re-submit an updated Request for Review if the project's scope of work and/or timeframe changes, including if work has not begun by 6/7/2026.

The NDDB – New determination for the Benz Solar at 31 Benz St, Ansonia as described in the submitted information and summarized at the end of this document is valid for two years from the date on this letter.

Natural Diversity Database information includes all information regarding listed species available to

us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, land owners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Database and accessed through the ezFile portal as it becomes available.

This letter is computer generated and carries no signature. If however, any clarification is needed, or if you have further questions, please contact the following:

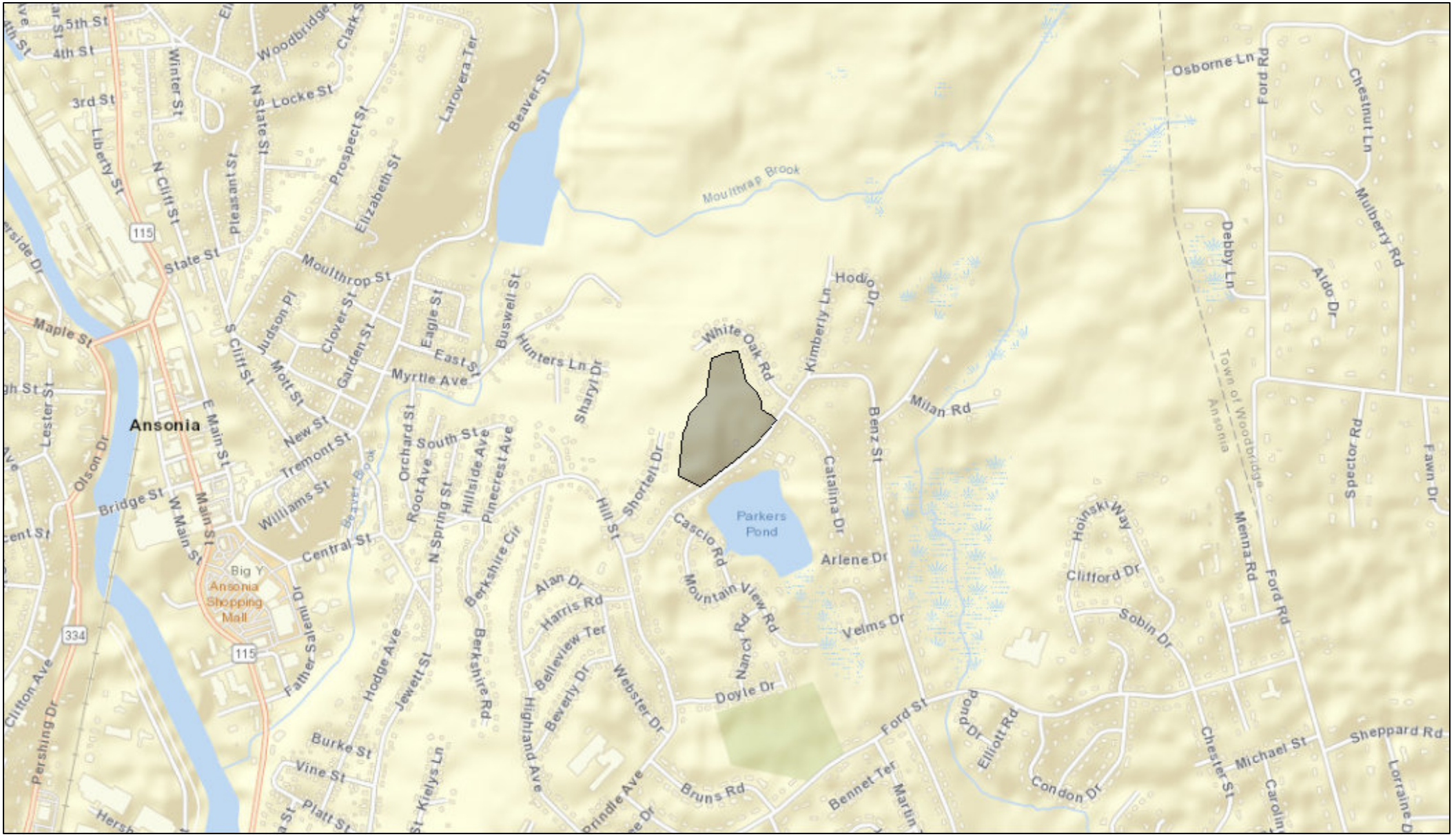
CT DEEP Bureau of Natural Resources
Wildlife Division
Natural Diversity Database
79 Elm Street, 6th floor
Hartford, CT 06106-5127
(860) 424-3011
deep.nddbrequest@ct.gov

Please reference the Determination Number provided in this letter when you e-mail or write. Thank you for submitting your project through DEEP's ezFile portal for Natural Diversity Database reviews.

Application Details:

Project involves federal funds or federal permit:	Yes
Project involves state funds, state agency action, or relates to CEPA request:	No
Project requires state permit, license, registration, or authorization:	Yes
DEEP enforcement action related to project:	
Project Type:	Energy and Utility Production Facilities and Distribution Infrastructure
Project Sub-type:	Solar Energy
Project Name:	Benz Solar
Project Description:	

Benz Solar Map



June 7, 2024

1:19,195

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Filing #113811 ezFile NDDB System

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Bureau of Materials Management and Compliance Assurance

Notice of Permit Authorization

June, 16 2021

Steven Broyer
JEFFERSON SOLAR LLC
222 S 9th St
Minneapolis, MN 55402-3382

Subject: General Permit Registration for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities
Application NO.: 202080118

Steven Broyer:

The Department of Energy and Environmental Protection, Water Permitting and Enforcement Division of the Bureau of Materials Management and Compliance Assurance, has completed the review of the Benz Street Solar (located at 31 Benz St, Ansonia) registration for the **General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 (general permit)** . The project is compliant with the requirements of the general permit and the discharge(s) associated with this project is (are) authorized to commence as of the date of this letter. Permit No. GSN003655 has been assigned to authorize the stormwater discharge(s) from this project.

Questions can be emailed to deep.stormwater@ct.gov.