

# INTERCONNECTION APPLICATION SET



PHOTOVOLTAIC SYSTEM DESCRIPTION:	
INSTALLATION TYPE:	GROUND
RACK SYSTEM:	25° TILT
AC SYSTEM SIZE:	4.05 MW
DC SYSTEM SIZE:	4.85 MW
SITE ORIENTATION:	
ARRAY AZIMUTH:	180°
PROPOSED EQUIPMENT:	
MODULE:	(9,996) 485 WATT MODULE MANUFACTURER: HANWHA Q.CELLS MODEL: Q.PEAK DUO XL-G 10.3/BFG 485 (485W)
INVERTERS:	(18) 225 KW 3-PHASE STRING INVERTERS MANUFACTURER: YASKAWA SOLECTRIA MODEL: SGI 225-480
PRIMARY 15 KV CONDUCTOR :	
OVERHEAD:	4/0 COPPER
UNDERGROUND :	COPPER-3 # 350 TYPE MV-105 4.8KV EPR INSULATED SHIELDED, 1#3/0 G IN 4"RGS
DISTANCE:	
DISTANCE BETWEEN CUSTOMER OWNED STEP UP TRANSFORMER AND NEAREST INTERCONNECTION POINT IS APPROXIMATELY 2.55 MILE.	
UTILITY INTERCONNECTION POINT LOCATION DETAILS:	
FEEDER NOMINAL VOLTAGE: 4.8 KV	

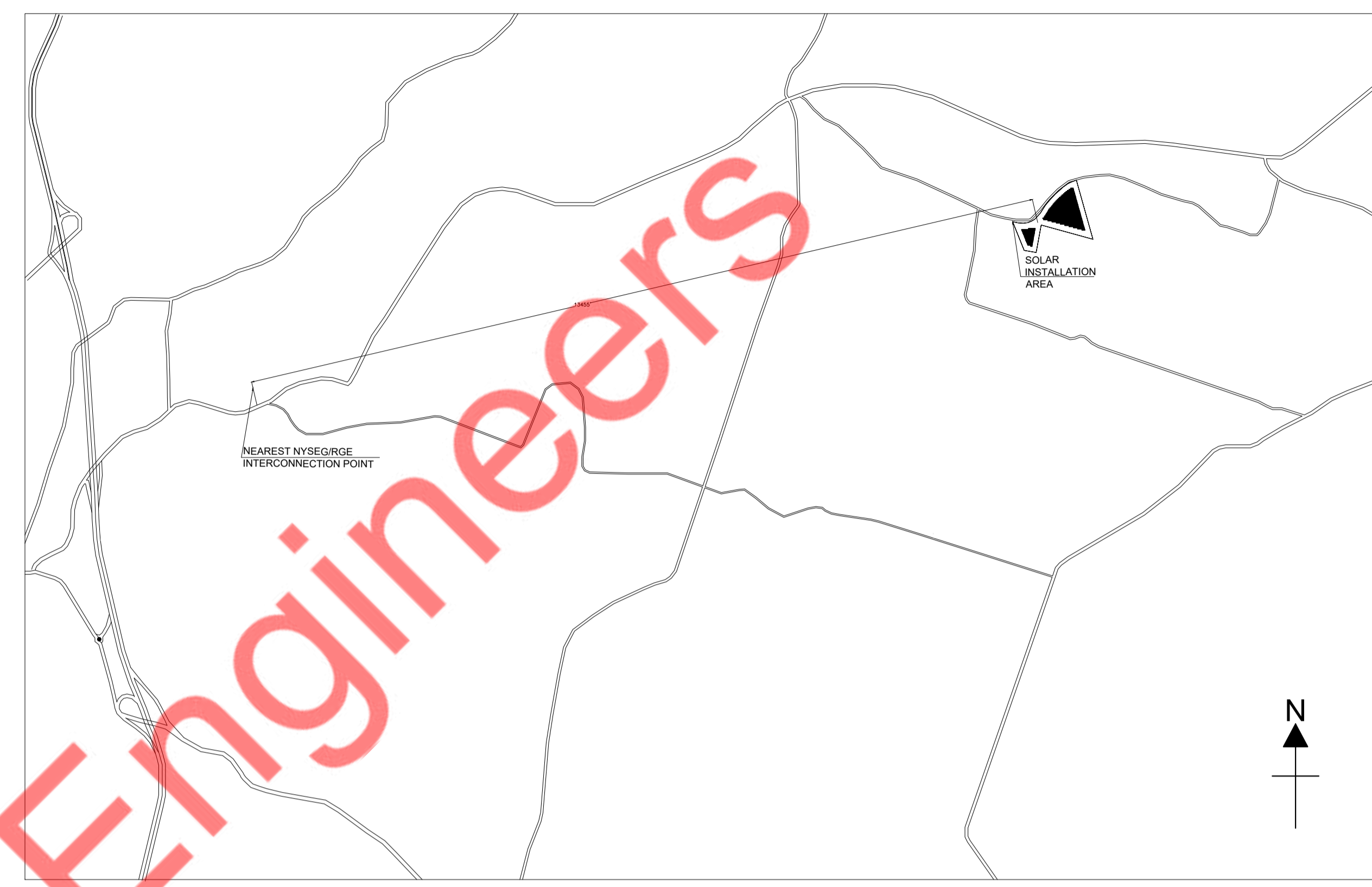
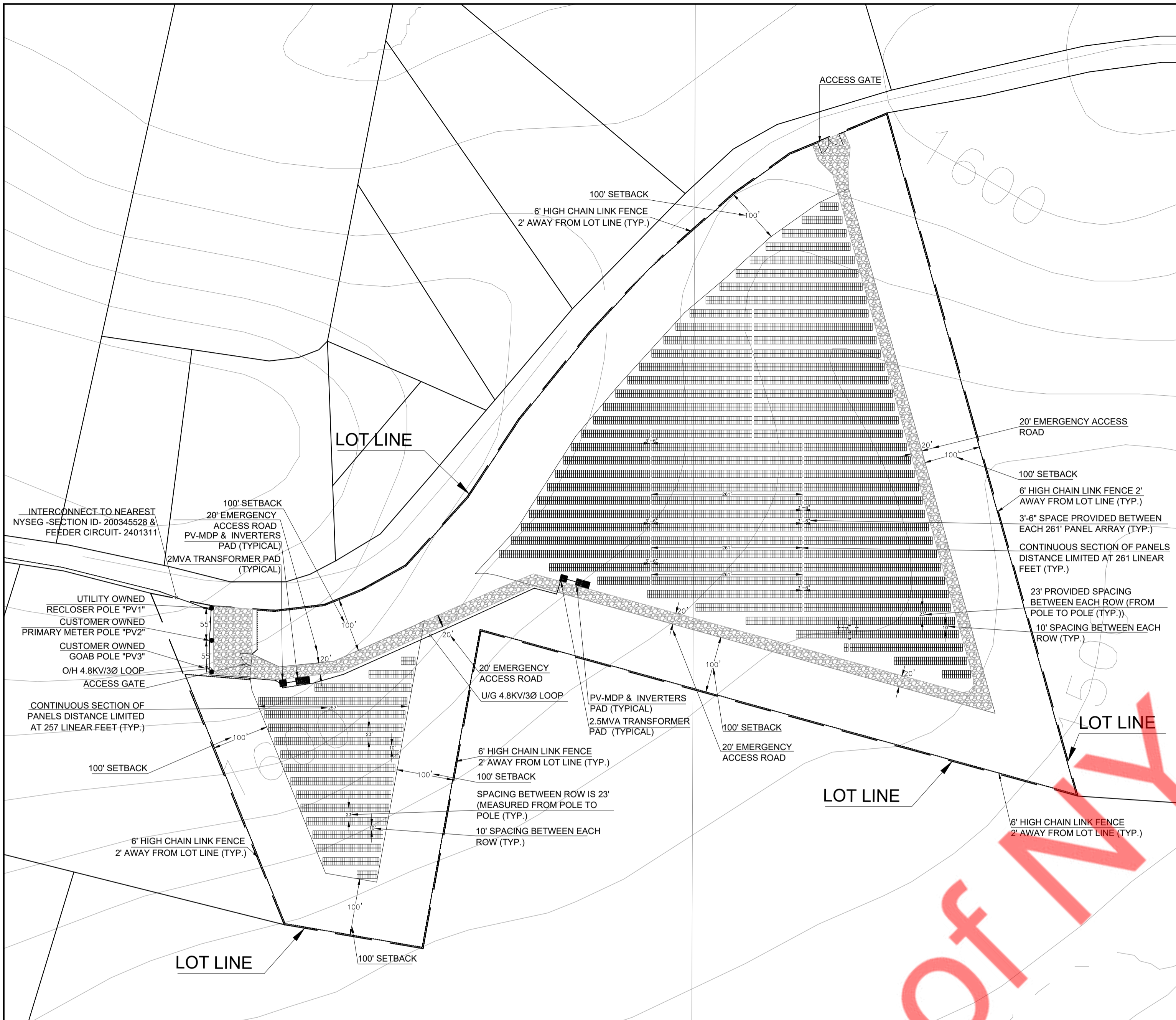
APPLICABLE PROJECT CODES :
2017 NATIONAL ELECTRICAL CODE (NFPA-70) 2020 BUILDING CODE OF NEW YORK STATE 2020 MECHANICAL CODE OF NEW YORK STATE 2020 FIRE CODE OF NEW YORK STATE ASHRAE / IESNA STANDARD90.1-2007 UL 1741 - PHOTOVOLTAIC INVERTERS UL 1703 - PHOTOVOLTAIC MODULES
IN ADDITION TO CODES LISTED ABOVE, THE ENTIRE INSTALLATION SHALL MEET THE REQUIREMENT OF THE LOCAL LAW / CODES AND AUTHORITY HAVING JURISDICTION.

PROJECT DRAWING LIST :	
SHEET	TITLE
PV-0.1	COVER SHEET
PV-1.0	SITE PLAN
PV-2.0	SINGLE LINE DIAGRAM
PV-2.1	THREE LINE DIAGRAM
PV-3.0	ELECTRICAL SPECIFICATION SHEET
PV-4.0	PV CELL MOUNTING & SECTION DETAILS

ELECTRICAL SYMBOL LIST	
	TRANSFORMER, RATING AS INDICATED
	CIRCUIT BREAKER, RATING AS INDICATED
	INVERTER, RATING AS INDICATED
	DISCONNECT SWITCH, RATING AS INDICATED
	ENERGY METER
	CURRENT TRANSFORMER
	MAJOR ELECTRICAL COMPONENT OR DEVICE. RATING AS INDICATED
	KEYED NOTE REFERENCE
	UNDERGROUND WIRING SYSTEM
	OVERHEAD WIRING SYSTEM
	FUSE, SIZE AS INDICATED

ELECTRICAL ABBREVIATION:							
A	AMPERES	°F	DEGREE FAHRENHEIT	PNL	PANEL	PVC	POLYVINYL CHLORIDE
AF	AMPERE FRAME/AMP FUSE	DISC	DISCONNECT	W	WATT	RGS	RIGID GALVANIZED STEEL
AS	AMP SWITCH	DP	DISTRIBUTION PANEL	W	WIRE	SPDT	SINGLE POLE DOUBLE THROW
AIC	AMPS INTERRUPTING CAPACITY	KCMIL	ONE THOUSAND CIRCULAR MILS	E	EXISTING	SPST	SINGLE POLE SINGLE THROW
AT	AMP TRIP	KV	KILOVOLT	EC	EMPTY CONDUIT/ ELECTRICAL CONTRACTOR	SPEC	SPECIFICATION
ATS	AUTOMATIC TRANSFER SWITCH	KVA	KILOVOLT-AMPERES	EMT	ELECTRICAL METALLIC TUBING	SW	SWITCH
AUTO	AUTOMATIC	KW	KILOWATTS	EQUIP	EQUIPMENT	TYP	TYPICAL
AWG	AMERICAN WIRE GAUGE	MCB	MAIN CIRCUIT BREAKER	FDR	FEEDER	U.O.N.	UNLESS OTHERWISE NOTED
C	CONDUIT	N	NEUTRAL	G	GROUND	V	VOLT/VOLTAGE
CB	CIRCUIT BREAKER	NIC	NOT IN CONTRACT	GFI	GROUND FAULT INTERRUPTER	VA	VOLT AMPERE
CKT	CIRCUIT	NTS	NOT TO SCALE	HZ	HERTZ	WP	WEATHERPROOF
CT	CURRENT TRANSFORMER	P	POLES	IC	INTERRUPTING CAPACITY	XFMR	TRANSFORMER
°C	DEGREE CELSIUS	∅	PHASE	PP	POWER PANEL		

- ELECTRICAL NOTES**
- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
  - CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
  - ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION.



2 SITE KEY PLAN  
SCALE: NTS

1 ELECTRICAL SITE PLAN  
SCALE: 1/128" = 1'-0"

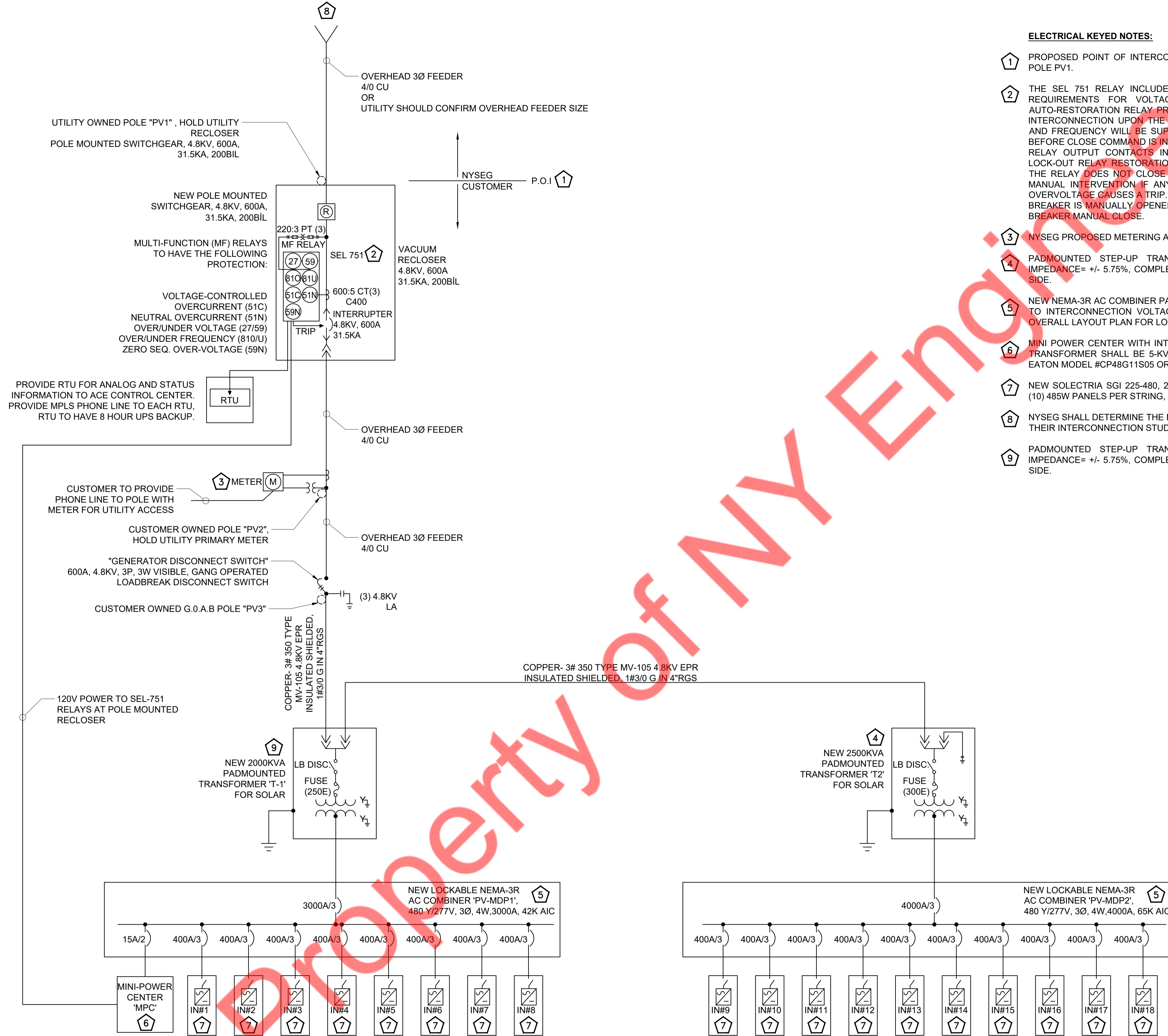
**PHOTOVOLTAIC SYSTEM DESCRIPTION:**

**INSTALLATION TYPE:** GROUND  
**RACK SYSTEM:** 25° TILT  
**INTER CONNECTION:** UTILITY-NYSEG/RGE  
**AC SYSTEM SIZE:** 4.05 MW  
**DC SYSTEM SIZE:** 4.85 MW  
**SITE ORIENTATION:**  
**ARRAY AZIMUTH:** 180°  
**PROPOSED EQUIPMENT:**  
**MODULE:** (9,996) 485 WATT MODULE  
 MANUFACTURER: HANWHA Q CELLS  
 MODEL: Q.PEAK DUO XL-G 10.3/BFG 485 (485W)  
**INVERTERS:** (18) 225 KW 3-PHASE STRING INVERTERS  
 MANUFACTURER: YASKAWA SOLECTRIA  
 MODEL: SGI 225-480

**PRIMARY 15 KV CONDUCTOR:**  
**OVERHEAD:** 4/0 COPPER  
**UNDERGROUND:** COPPER-3 # 350 TYPE MV-105 4.8KV EPR INSULATED SHIELDED,  
 1#3/0 G IN 4"RGS  
**DISTANCE:**  
 DISTANCE BETWEEN CUSTOMER OWNED STEP UP TRANSFORMER AND NEAREST  
 INTERCONNECTION POINT IS APPROXIMATELY 2.55 MILE.  
**UTILITY INTERCONNECTION POINT LOCATION DETAILS:**  
**FEEDER NOMINAL VOLTAGE:** 4.8 KV

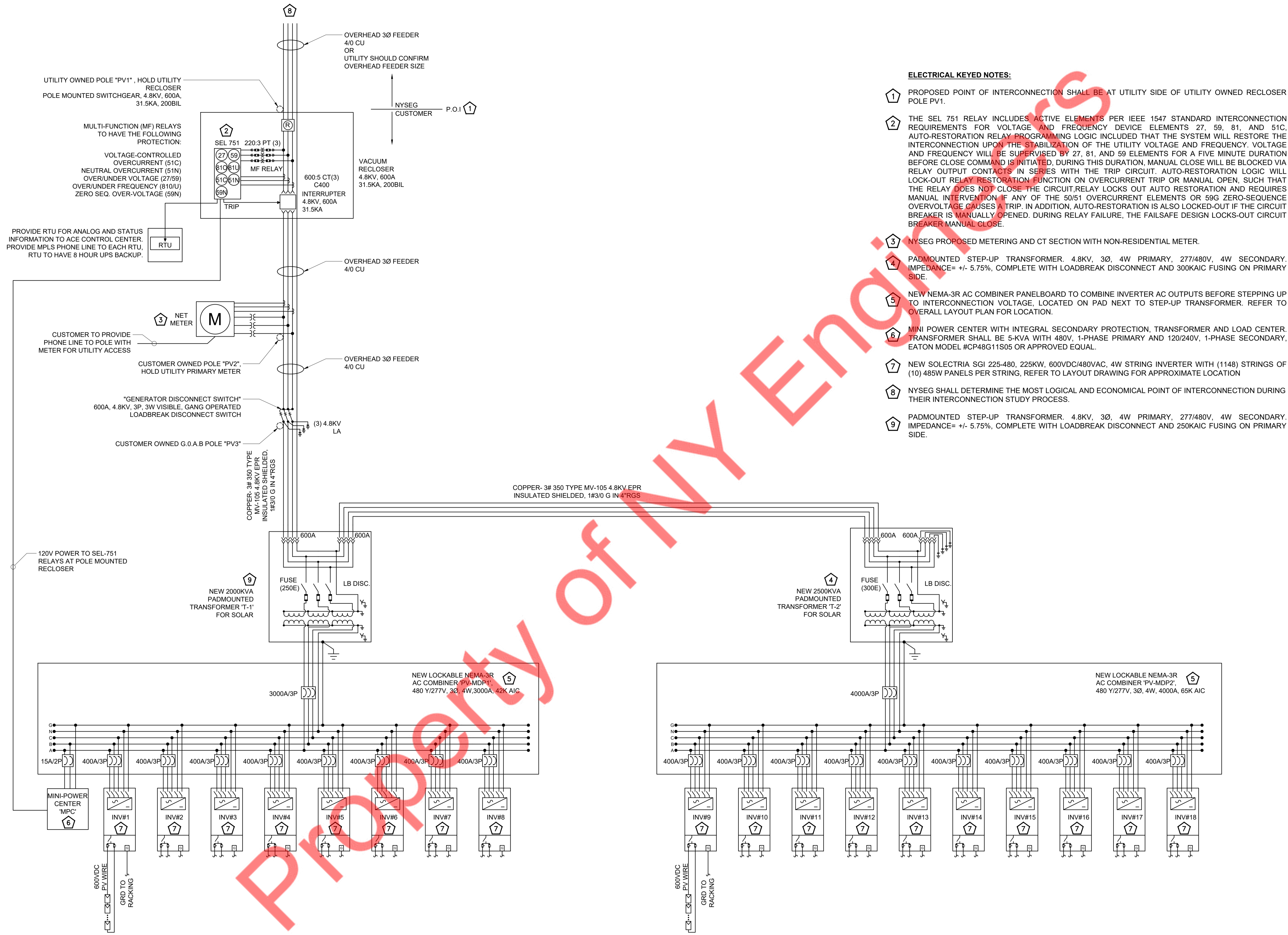
Property of NY Engineers

INTERCONNECT TO NEAREST NYSEG - SECTION  
ID- 200345528 & FEEDER CIRCUIT- 2401311  
FEEDER NOMINAL VOLTAGE: 4.8 KV



**ELECTRICAL KEYED NOTES:**

- 1 PROPOSED POINT OF INTERCONNECTION SHALL BE AT UTILITY SIDE OF UTILITY OWNED RECLOSER POLE PV1.
- 2 THE SEL 751 RELAY INCLUDES ACTIVE ELEMENTS PER IEEE 1547 STANDARD INTERCONNECTION REQUIREMENTS FOR VOLTAGE AND FREQUENCY DEVICE ELEMENTS 27, 59, 81, AND 51C. AUTO-RESTORATION RELAY PROGRAMMING LOGIC INCLUDED THAT THE SYSTEM WILL RESTORE THE INTERCONNECTION UPON THE STABILIZATION OF THE UTILITY VOLTAGE AND FREQUENCY. 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 VIA RELAY OUTPUT CONTACTS IN SERIES WITH THE TRIP CIRCUIT. AUTO-RESTORATION LOGIC WILL LOCK-OUT RELAY RESTORATION FUNCTION ON OVERCURRENT TRIP OR MANUAL OPEN, SUCH THAT THE RELAY DOES NOT CLOSE THE CIRCUIT. RELAY LOCKS OUT AUTO RESTORATION AND REQUIRES MANUAL INTERVENTION IF ANY OF THE 50/51 OVERCURRENT ELEMENTS OR 59G ZERO-SEQUENCE OVERVOLTAGE CAUSES A TRIP. IN ADDITION, AUTO-RESTORATION IS ALSO LOCKED-OUT IF THE CIRCUIT BREAKER IS MANUALLY OPENED. DURING RELAY FAILURE, THE FAILSAFE DESIGN LOCKS-OUT CIRCUIT BREAKER MANUAL CLOSE.
- 3 NYSEG PROPOSED METERING AND CT SECTION WITH NON-RESIDENTIAL METER.
- 4 PADMOUNTED STEP-UP TRANSFORMER. 4.8KV, 3Ø, 4W PRIMARY, 277/480V, 4W SECONDARY. IMPEDANCE= +/- 5.75%, COMPLETE WITH LOADBREAK DISCONNECT AND 300KAIC FUSING ON PRIMARY SIDE.
- 5 NEW NEMA-3R AC COMBINER PANELBOARD TO COMBINE INVERTER AC OUTPUTS BEFORE STEPPING UP TO INTERCONNECTION VOLTAGE. LOCATED ON PAD NEXT TO STEP-UP TRANSFORMER. REFER TO OVERALL LAYOUT PLAN FOR LOCATION.
- 6 MINI POWER CENTER WITH INTEGRAL SECONDARY PROTECTION, TRANSFORMER AND LOAD CENTER. TRANSFORMER SHALL BE 5-KVA WITH 480V, 1-PHASE PRIMARY AND 120/240V, 1-PHASE SECONDARY. EATON MODEL #CP48G11S05 OR APPROVED EQUAL.
- 7 NEW SOLECTRIA SGI 225-480, 225KW, 600VDC/480VAC, 4W STRING INVERTER WITH (1148) STRINGS OF (10) 485W PANELS PER STRING. REFER TO LAYOUT DRAWING FOR APPROXIMATE LOCATION
- 8 NYSEG SHALL DETERMINE THE MOST LOGICAL AND ECONOMICAL POINT OF INTERCONNECTION DURING THEIR INTERCONNECTION STUDY PROCESS.
- 9 PADMOUNTED STEP-UP TRANSFORMER. 4.8KV, 3Ø, 4W PRIMARY, 277/480V, 4W SECONDARY. IMPEDANCE= +/- 5.75%, COMPLETE WITH LOADBREAK DISCONNECT AND 250KAIC FUSING ON PRIMARY SIDE.

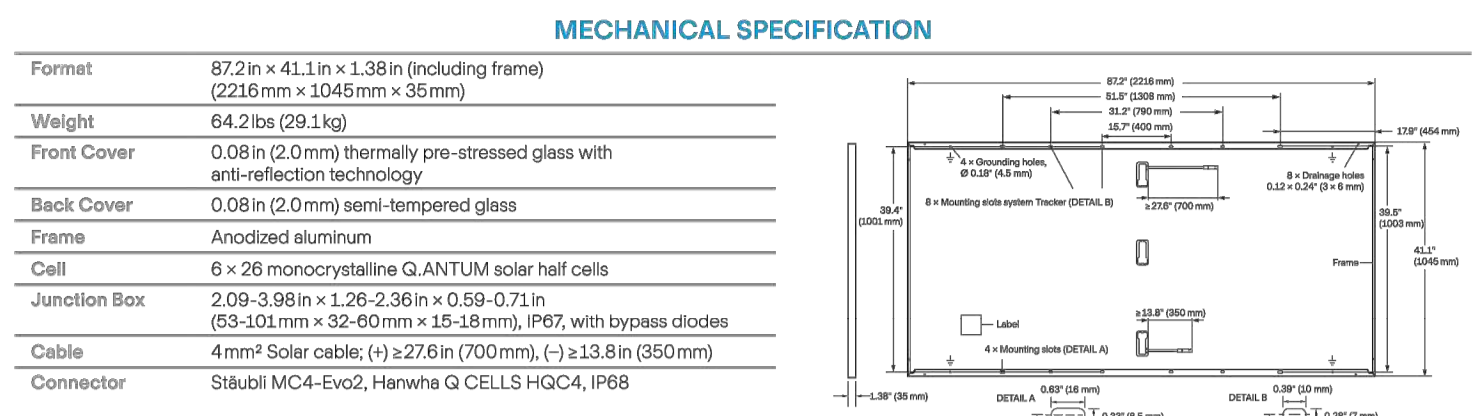


**ELECTRICAL KEYED NOTES:**

- 1 PROPOSED POINT OF INTERCONNECTION SHALL BE AT UTILITY SIDE OF UTILITY OWNED RECLOSER POLE PV1.
- 2 THE SEL 751 RELAY INCLUDES ACTIVE ELEMENTS PER IEEE 1547 STANDARD INTERCONNECTION REQUIREMENTS FOR VOLTAGE AND FREQUENCY DEVICE ELEMENTS 27, 59, 81, AND 51C. AUTO-RESTORATION RELAY PROGRAMMING LOGIC INCLUDED THAT THE SYSTEM WILL RESTORE THE INTERCONNECTION UPON THE STABILIZATION OF THE UTILITY VOLTAGE AND FREQUENCY. 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 VIA RELAY OUTPUT CONTACTS IN SERIES WITH THE TRIP CIRCUIT. AUTO-RESTORATION LOGIC WILL LOCK-OUT RELAY RESTORATION FUNCTION ON OVERCURRENT TRIP OR MANUAL OPEN, SUCH THAT THE RELAY DOES NOT CLOSE THE CIRCUIT, RELAY LOCKS OUT AUTO RESTORATION AND REQUIRES MANUAL INTERVENTION IF ANY OF THE 50/51 OVERCURRENT ELEMENTS OR 59G ZERO-SEQUENCE OVERVOLTAGE CAUSES A TRIP. IN ADDITION, AUTO-RESTORATION IS ALSO LOCKED-OUT IF THE CIRCUIT BREAKER IS MANUALLY OPENED. DURING RELAY FAILURE, THE FAILSAFE DESIGN LOCKS-OUT CIRCUIT BREAKER MANUAL CLOSE.
- 3 NYSEG PROPOSED METERING AND CT SECTION WITH NON-RESIDENTIAL METER.
- 4 PADMOUNTED STEP-UP TRANSFORMER. 4.8KV, 3Ø, 4W PRIMARY, 277/480V, 4W SECONDARY. IMPEDANCE= +/- 5.75%, COMPLETE WITH LOADBREAK DISCONNECT AND 300KAIC FUSING ON PRIMARY SIDE.
- 5 NEW NEMA-3R AC COMBINER PANELBOARD TO COMBINE INVERTER AC OUTPUTS BEFORE STEPPING UP TO INTERCONNECTION VOLTAGE. LOCATED ON PAD NEXT TO STEP-UP TRANSFORMER. REFER TO OVERALL LAYOUT PLAN FOR LOCATION.
- 6 MINI POWER CENTER WITH INTEGRAL SECONDARY PROTECTION, TRANSFORMER AND LOAD CENTER. TRANSFORMER SHALL BE 5-KVA WITH 480V, 1-PHASE PRIMARY AND 120/240V, 1-PHASE SECONDARY. EATON MODEL #CP48G11S05 OR APPROVED EQUAL.
- 7 NEW SOLECTRIA SGI 225-480, 225KW, 600VDC/480VAC, 4W STRING INVERTER WITH (1148) STRINGS OF (10) 485W PANELS PER STRING. REFER TO LAYOUT DRAWING FOR APPROXIMATE LOCATION
- 8 NYSEG SHALL DETERMINE THE MOST LOGICAL AND ECONOMICAL POINT OF INTERCONNECTION DURING THEIR INTERCONNECTION STUDY PROCESS.
- 9 PADMOUNTED STEP-UP TRANSFORMER. 4.8KV, 3Ø, 4W PRIMARY, 277/480V, 4W SECONDARY. IMPEDANCE= +/- 5.75%, COMPLETE WITH LOADBREAK DISCONNECT AND 250KAIC FUSING ON PRIMARY SIDE.

1 THREE LINE DIAGRAM  
 SCALE: NTS

SPECIFICATIONS	SGL 225	SGL 250	SGL 266	SGL 300	SGL 500	SGL 500PE
<b>DC Input</b>						
Absolute Maximum Input Voltage	600 VDC					
Max Power Input Voltage Range (MPP1)*	300-500 VDC					
Maximum Operating Input Current	768 A	853 A	908 A	1026 A	1721 A	1712 A
Maximum PV Power	331.5 kW	325 kW	345.8 kW	390 kW	650 kW	
Strike Voltage	390 V					
<b>AC Output</b>						
Nominal Output Voltage	480 VAC, 3Ø+/PE					
AC Voltage Range	-12%/+10%					
Continuous Output Power	225 kW	250 kW	266 kW	300 kW	500 kW	
Continuous Output Current	480 VAC 271 A	301 A	320 A	360 A	602 A	
Maximum Backfeed Current	0 A					
Nominal Output Frequency	60 Hz					
Output Frequency Range	57-60.5 Hz					
Power Factor	Adjustable 0.9 leading / 0.9 lagging, factory set at 1					
Fault Current Contribution (1 Cycle RMS)	325.2 A	361.2 A	384 A	432 A	722 A	
Total Harmonic Distortion (THD) @ Rated Load	≤3%					
<b>Performance</b>						
Peak Efficiency	98.0%					
CEC Efficiency (480 VAC)	97.5%					
Tare Loss	28 W					
Ambient Temperature Range (full power)	-40°F to +122°F (-40°C to +50°C)					
Storage Temperature Range	-40°F to +158°F (-40°C to +70°C)					
Relative Humidity (non-condensing)	5-95%					
Audible Noise	≤60 dBA @ 5 m					
Safety Listings & Certifications	UL 1741, IEEE 1547, CSA C22.2 107.1, FCC part 15 B					
Maintenance Outage Factor	0.1					
Testing Agency	ETL					
<b>Mechanical</b>						
Transformer	Standard, fully-integrated					
AC Breaker/DC Disconnect	Fully-integrated					
Dimensions (H x W x D)	79 in. x 109 in. x 41 in. (2007 mm x 2769 mm x 1042 mm)					
Shading Set Back	137 in. (3480 mm) at 30° solar elevation					
Weight	5170 lbs (2346 kg)	5650 lbs (2563 kg)	6980 lbs (3167 kg)	7107 lbs (3224 kg)		
Enclosure Rating	Type 3R					
Enclosure Finish	Polyester powder coated steel; optional 316 stainless steel					
<b>Subcombiner Options</b>						
Fuses or Breakers	6 positions, 225-400 A			8 positions, 225-400 A		
Fuses Only	12 positions, 110-200 A			16 positions, 110-200 A		
Fuses Only	24 positions, 70-100 A			32 positions, 70-100 A		
<b>Communication</b>						
Data Logger Hardware	Standard, integrated					
SolentView™ Monitoring Service	Optional					
Optional Revenue Grade Monitoring (Integrated)	400 A					
Optional SolZone™ Sub-Array Monitoring (DC Current)	6 zones					
Optional Cellular Communication	SolentView AIR					
Communication Interface	RS-485 SunSpec Modbus RTU					
<b>Warranty</b>						
Standard	5 year					
Optional	10, 15, 20 year; extended service agreement; uptime guarantee					

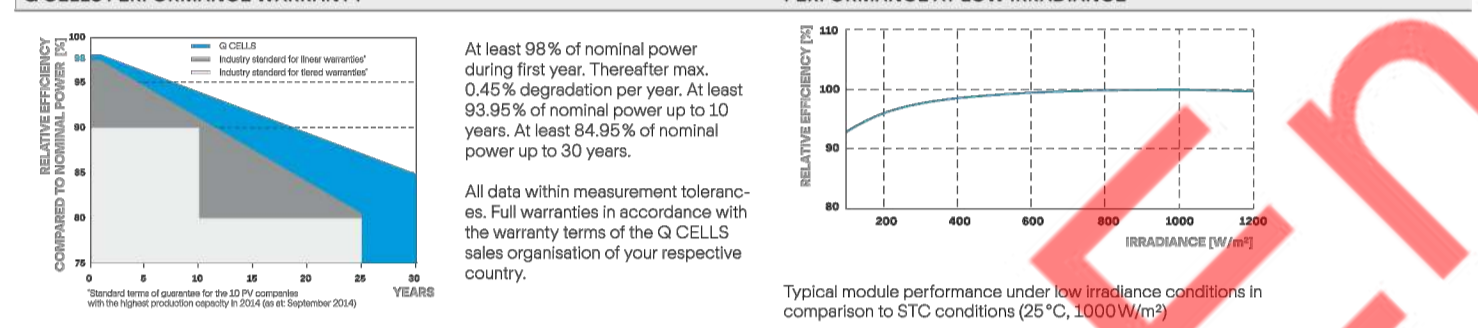


### ELECTRICAL CHARACTERISTICS

POWER CLASS	470	475	480	485					
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC* AND BSTC* (POWER TOLERANCE +5 W / -0 W)									
Power at MPP <sup>1</sup>	P <sub>MPP</sub> [W]	470	514.1	475	519.6	480	525.0	485	530.5
Short Circuit Current <sup>1</sup>	I <sub>SC</sub> [A]	11.04	12.08	11.08	12.12	11.12	12.17	11.16	12.21
Open Circuit Voltage <sup>1</sup>	V <sub>OC</sub> [V]	52.91	53.10	53.15	53.34	53.39	53.58	53.63	53.82
Current at MPP	I <sub>MPP</sub> [A]	10.51	11.50	10.55	11.54	10.59	11.58	10.63	11.63
Voltage at MPP	V <sub>MPP</sub> [V]	44.73	44.72	45.03	45.02	45.33	45.32	45.63	45.62
Efficiency <sup>1</sup>	η [%]	≥20.3	≥22.2	≥20.5	≥22.4	≥20.7	≥22.7	≥20.9	≥22.9

**MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT<sup>2</sup>**

POWER CLASS	470	475	480	485	
Power at MPP	P <sub>MPP</sub> [W]	353.8	357.6	361.4	365.1
Short Circuit Current	I <sub>SC</sub> [A]	8.89	8.92	8.96	8.99
Open Circuit Voltage	V <sub>OC</sub> [V]	50.04	50.27	50.49	50.72
Current at MPP	I <sub>MPP</sub> [A]	8.27	8.30	8.34	8.37
Voltage at MPP	V <sub>MPP</sub> [V]	42.77	43.06	43.35	43.63



### TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [%/K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	108 ± 5.4 (42 ± 3°C)

### PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V <sub>max</sub> [V]	1500	PV module classification	Class II
Maximum Series Fuse Rating [A DC]	20	Per Rating based on ANSI/UL 61730	TYPE 29†
Max. Design Load, Push/Pull <sup>‡</sup> [lbs/ft <sup>2</sup> ]	75 (3600 Pa)/33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push/Pull <sup>‡</sup> [lbs/ft <sup>2</sup> ]	113 (5400 Pa)/50 (2400 Pa)		

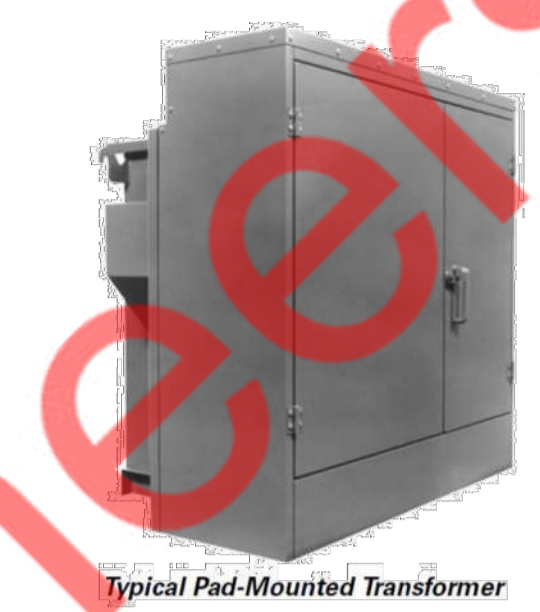
†New Type is similar to Type 3 but with metallic frame

### QUALIFICATIONS AND CERTIFICATES

UL 61730, CE compliant, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 8,883,215 (sole cell), Certification in process.

**Hanwha Q CELLS Americas Inc.**  
 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL: +1 949 748 59 96 | EMAIL: inquiry@us.q-cells.com | WEB: www.q-cells.us

### Three-Phase Pad-Mounted Transformers



### Ratings

- 45-10,000 kVA
- High voltages (primary): 4160 Grd. Y/2400 through 43,800 GY/25,300 Grd. Y/19,920
- HV Taps: 2-2-1/2% above and below normal, or 4-2-1/2% below normal
- Standard BIL levels: 12 kV Class

kVA	%Z
45	2.70-5.75
75	2.7-5.75
112-1/2	3.1-5.75
150	3.1-5.75
225	3.1-5.75
300	3.1-5.75
500	4.35-5.75
750	5.75
1000	5.75
1500	5.75
2000	5.75
3000	5.75
3750	5.75
5000-10,000	6.0-6.5

Note: Subject to NEMA/IEEE ±7.5% Impedance tolerances.  
 Note: Non-standard design impedance may be obtained by contacting Eaton.

### Layout Dimensions

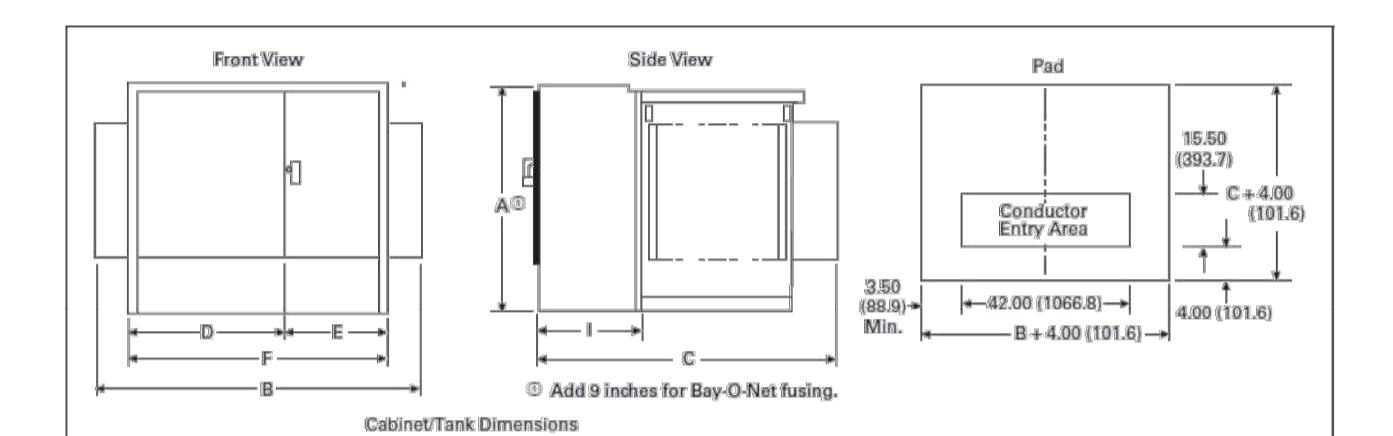


Figure 17.0-12. Pad-Mounted Transformer—Dimensions in Inches (mm)

### Table 17.0-13. Dimensions with DOE Efficiency at 65 Degree AWR

kVA	A	B	C	D	E	F	I	Gallons	Approximate Weight	DOE 2016 Efficiency
45	50	68	39	42	26	68	20	115	2150	98.92%
75	50	68	39	42	26	68	20	125	2350	99.03%
112.5	50	68	39	42	26	68	20	135	2600	99.11%
150	50	68	49	42	26	68	20	150	2900	99.16%
225	50	72	53	42	30	72	20	170	3400	99.23%
300	50	72	55	42	30	72	20	190	3950	99.27%
500	50	72	61	42	30	72	20	240	5300	99.35%
750	64	72	63	42	30	72	20	300	7150	99.40%
1000	64	72	64	42	30	72	20	350	8550	99.43%
1500	73	89	71	42	30	72	24	400	11,450	99.48%
2000	73	101	75	42	30	72	24	525	13,800	99.51%
2500	73	101	99	42	30	72	24	600	16,750	99.53%

Note: The reference dimensions in this table cover the following: livefront and deadfront configurations, loop feed and radial feed, mineral oil and FR3 filled units.

### Dimensional Variations

- Add 9.00 inches (228.6 mm) to the height when using bayonet fusing on all kVA ratings.
- Less flammable natural ester fluid requires deeper tanks on some transformer ratings.
  - Add 2.00 inches (50.8 mm) to the depth of kVA ratings 75-1500. Add 8.00 inches (203.2 mm) to the depth of kVA ratings 2000 and 2500.

### 1 THREE PHASE STRING INVERTER SPECIFICATION

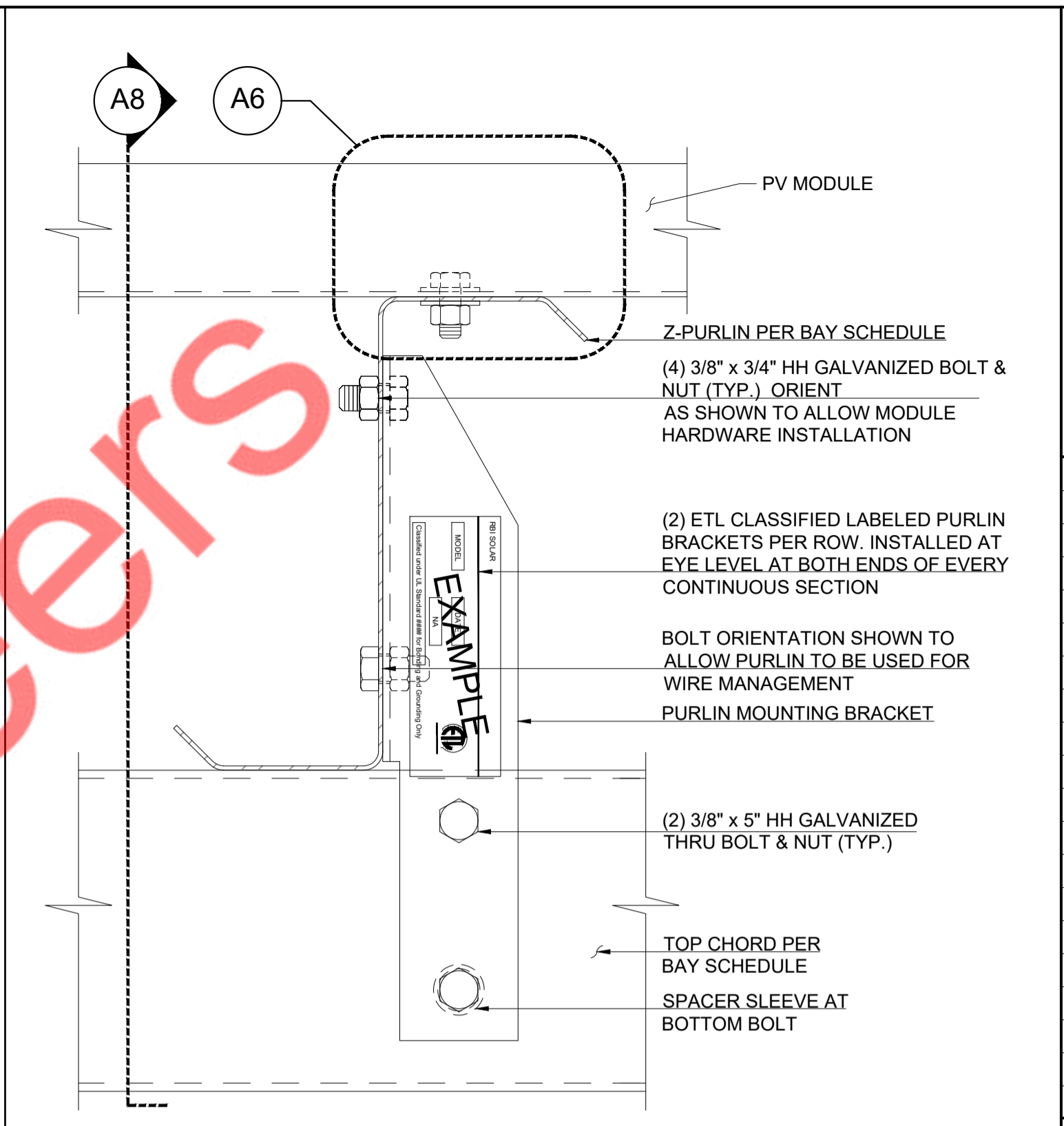
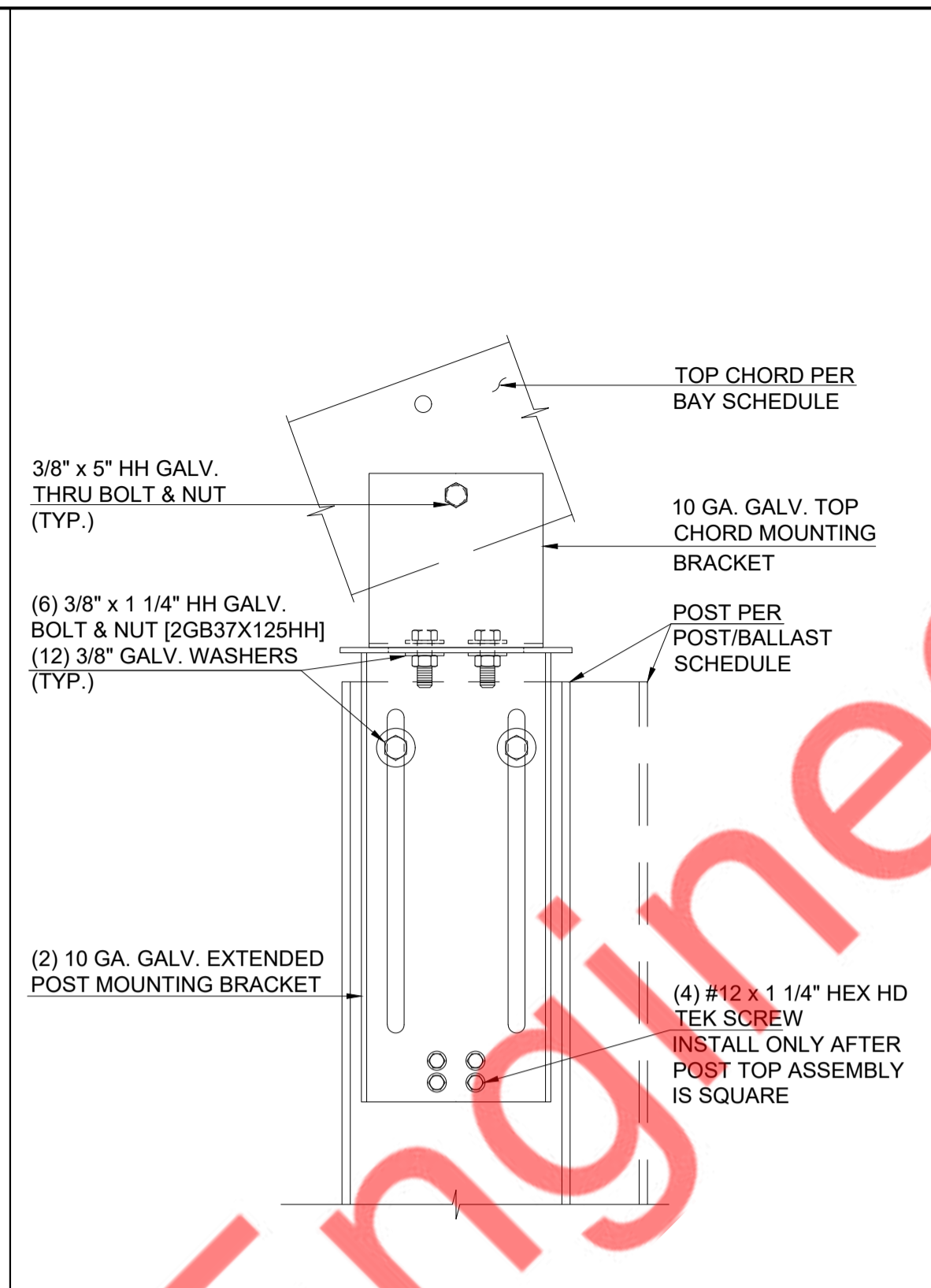
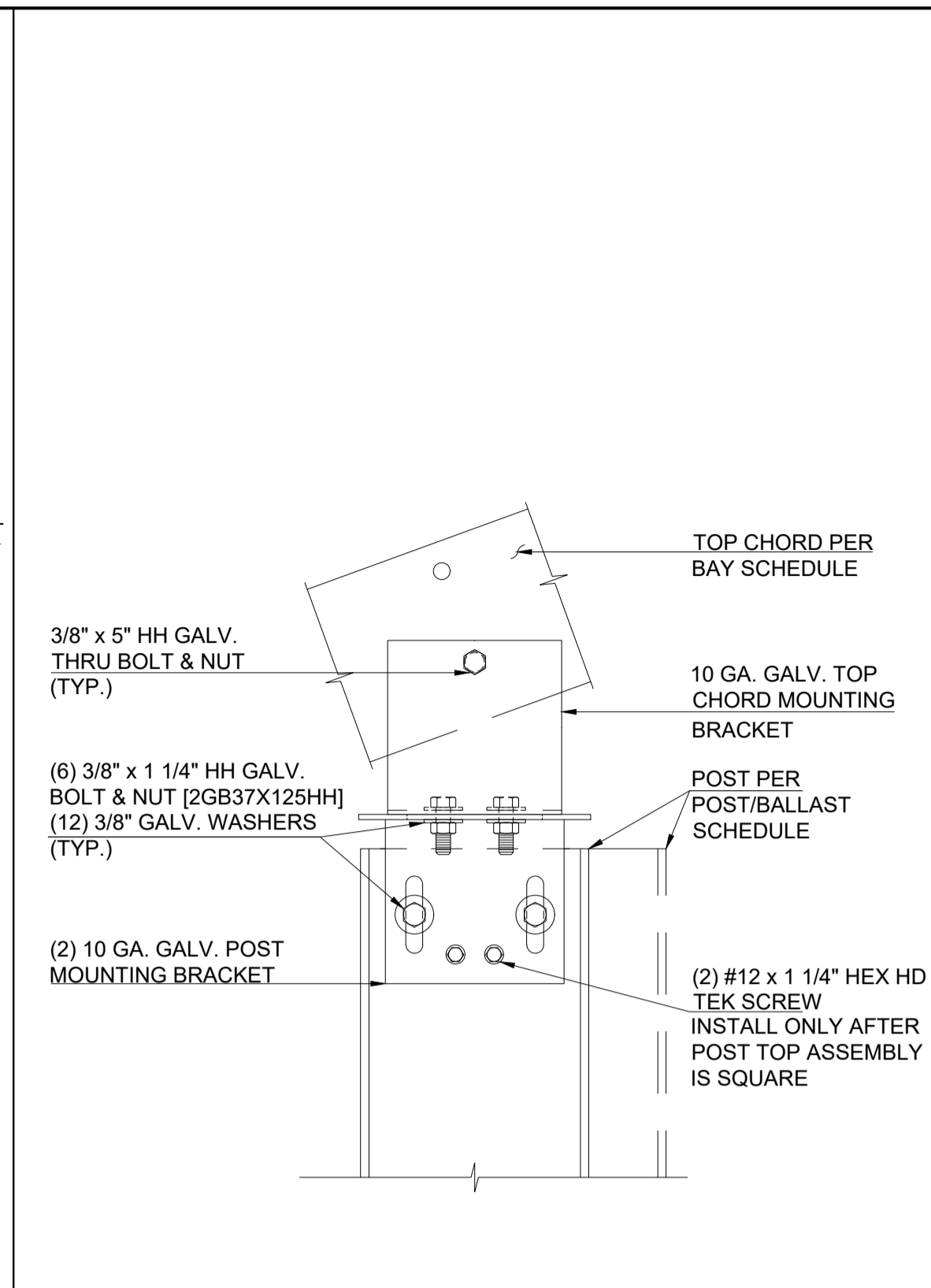
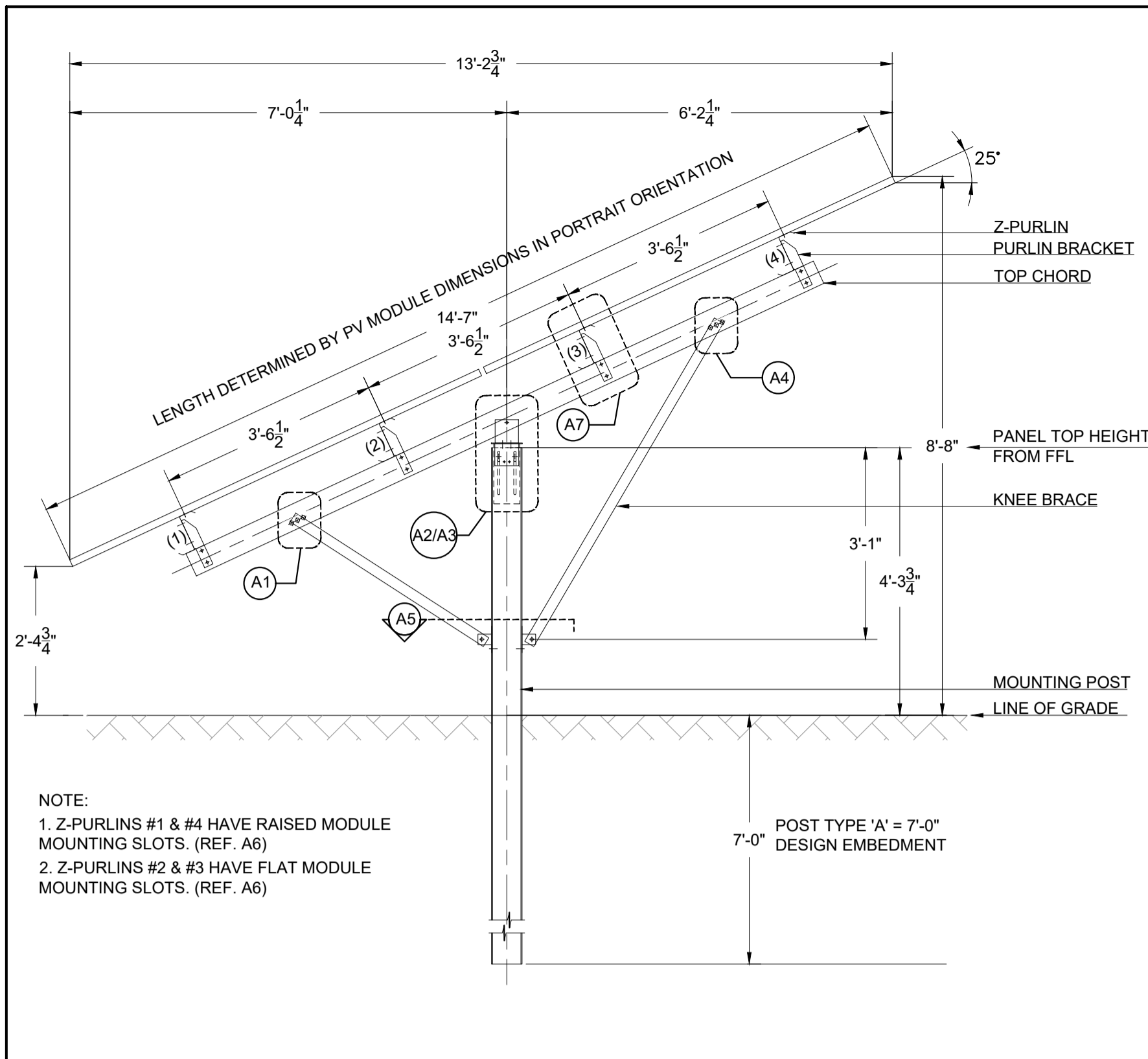
SCALE: NTS

### 2 485W PV MODULE SPECIFICATION

SCALE: NTS

### 3 PAD MOUNTED TRANSFORMER SPECIFICATION

SCALE: NTS

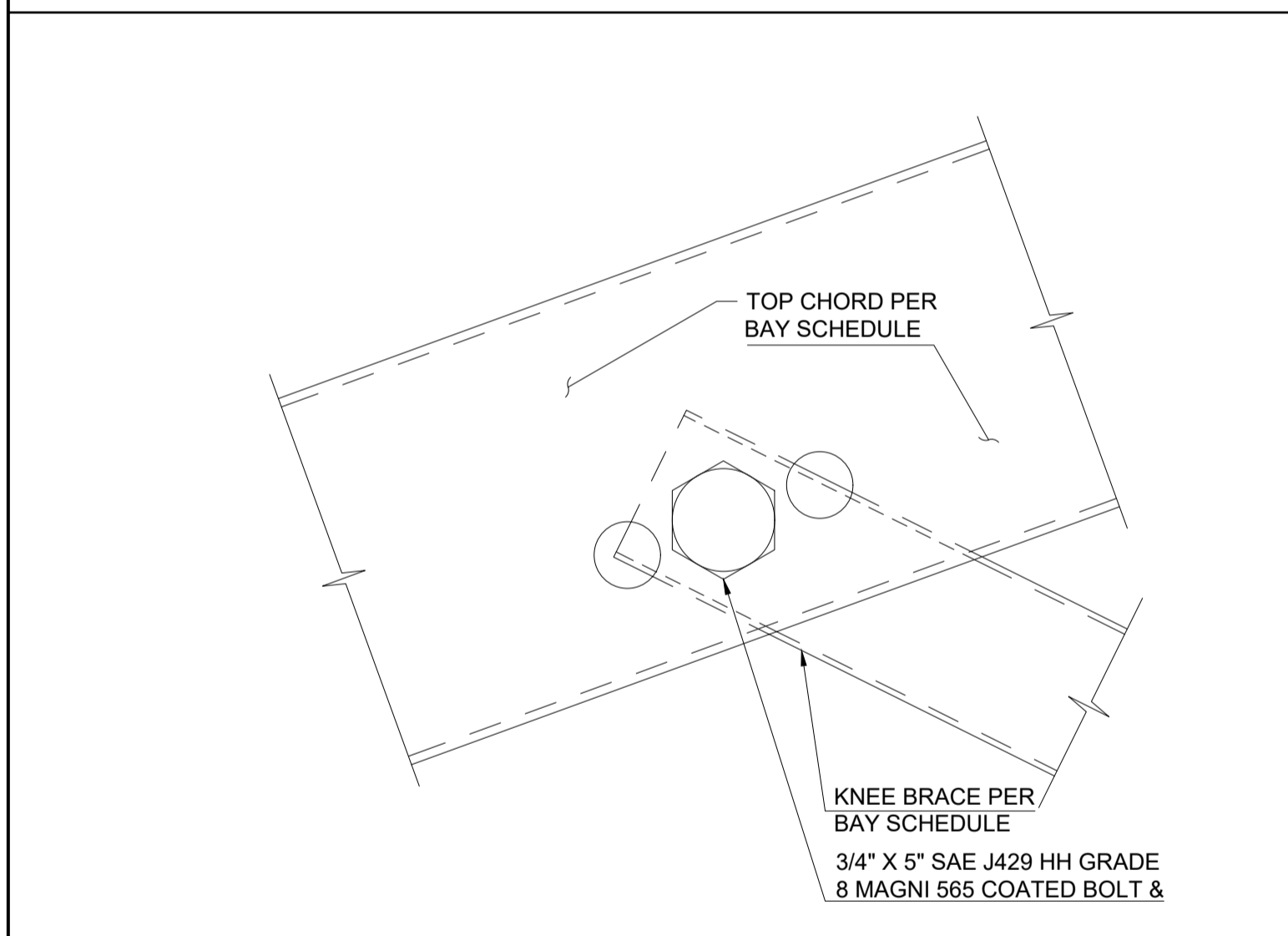


**1** DESIGN RACK SECTION  
SCALE: 1/2" = 1'-0"

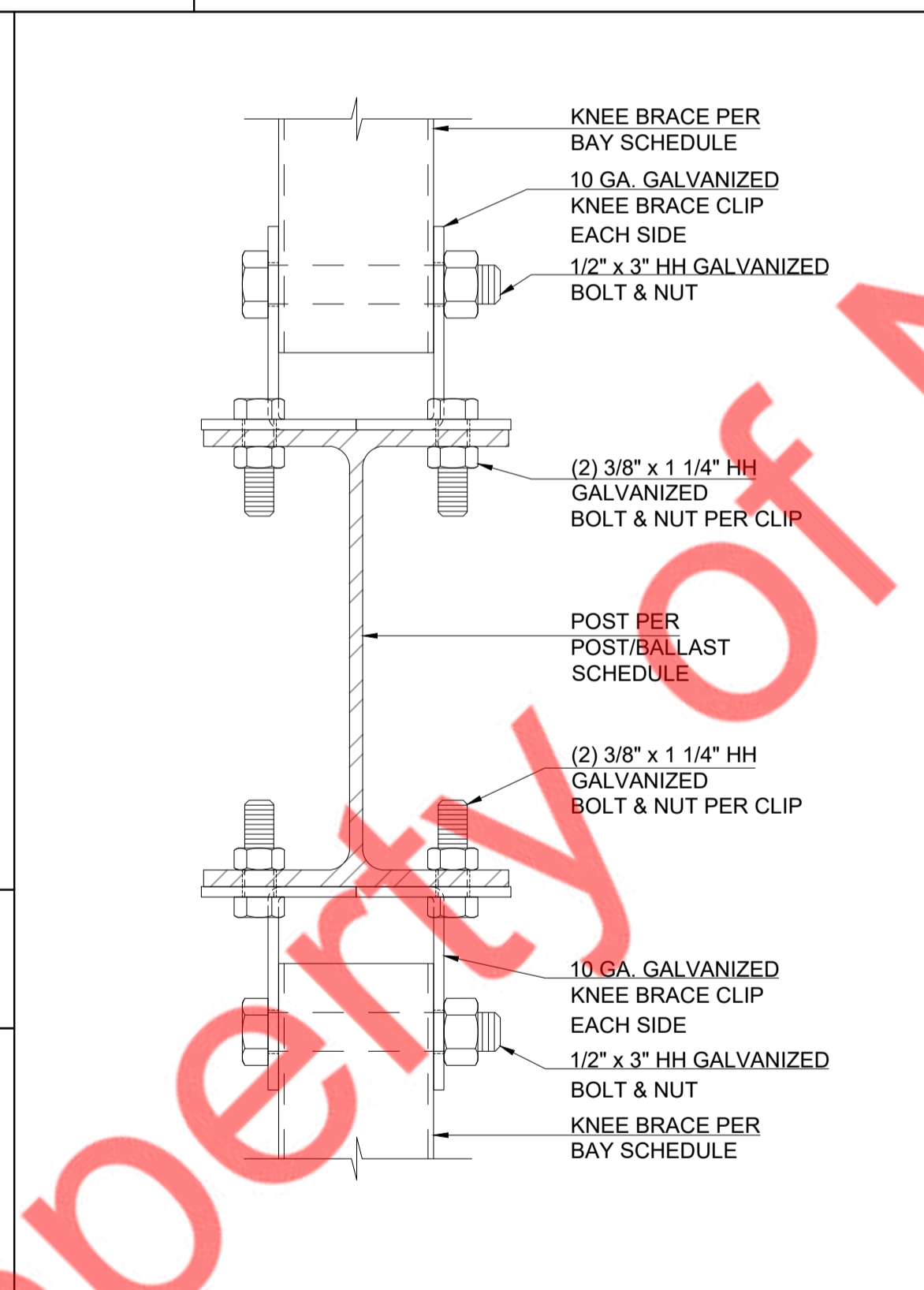
**A2** TOP CHORD TO POST CONN. DETAIL  
SCALE: NTS

**A3** TOP CHORD CONN. DETAIL (EXTENDED)  
SCALE: NTS

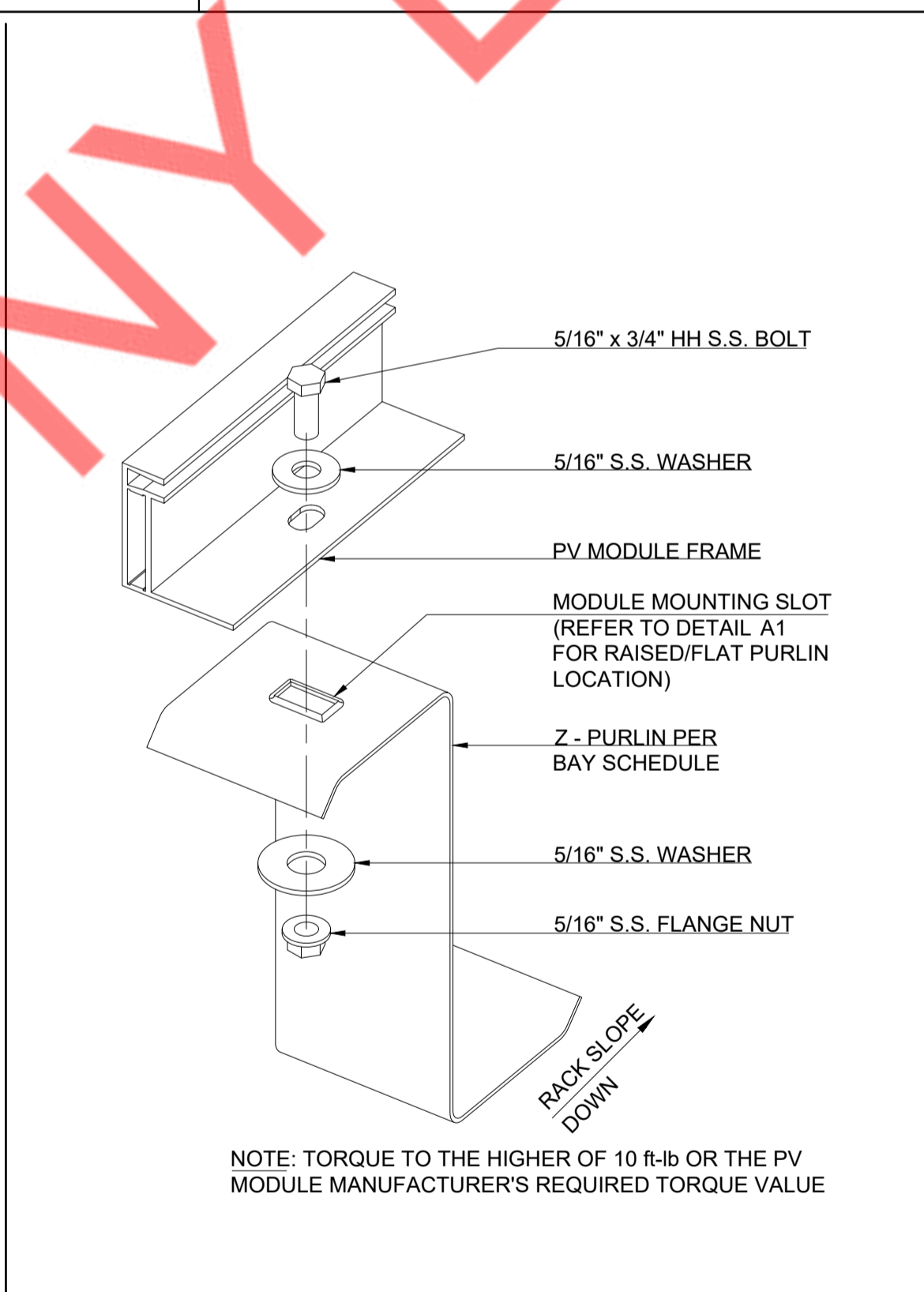
**A7** TRANSVERSE PURLIN CONN. DETAIL  
SCALE: NTS



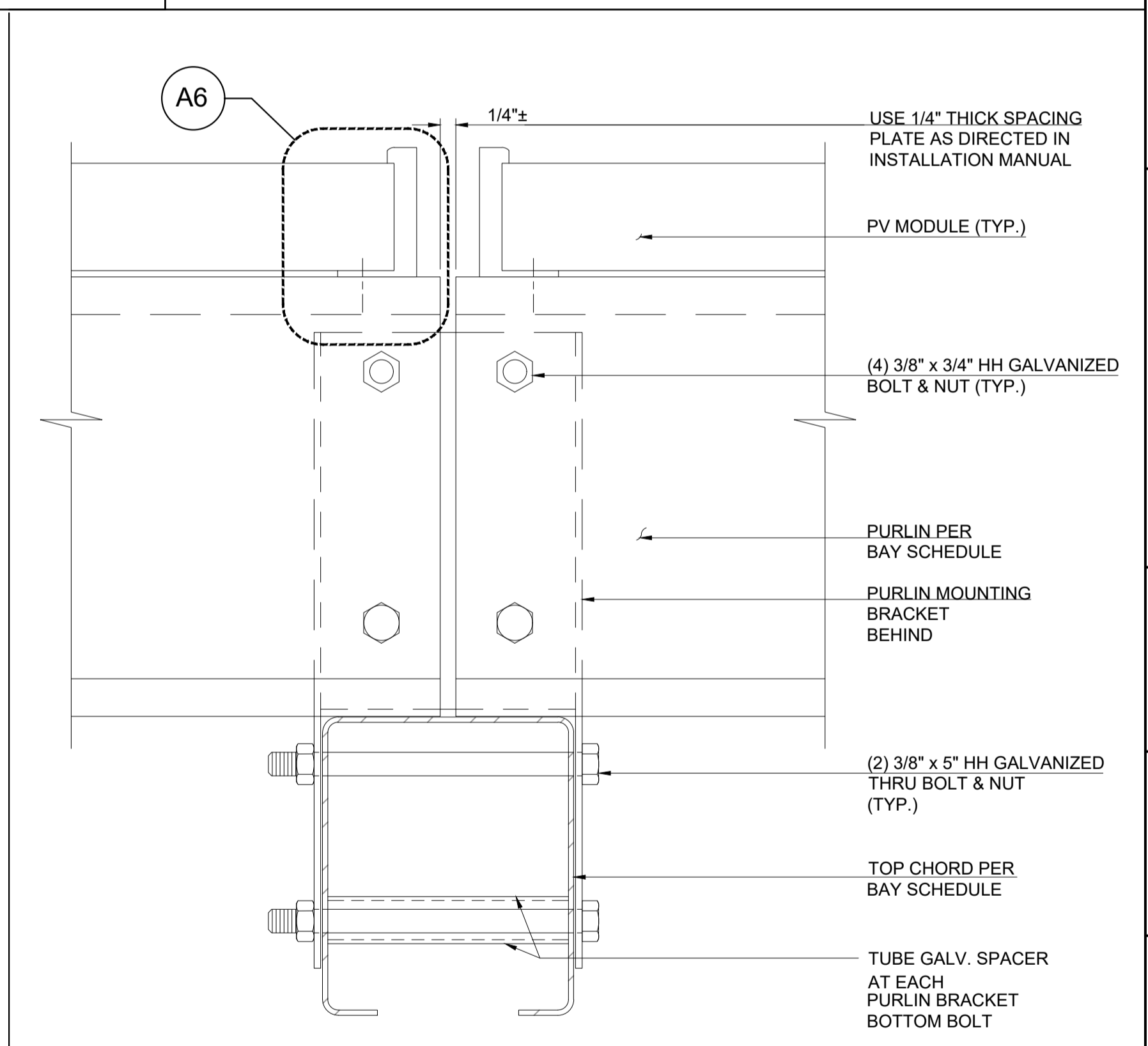
**A1** LOWER KNEE BRACE TO TOP CHORD CONN. DETAIL  
SCALE: NTS



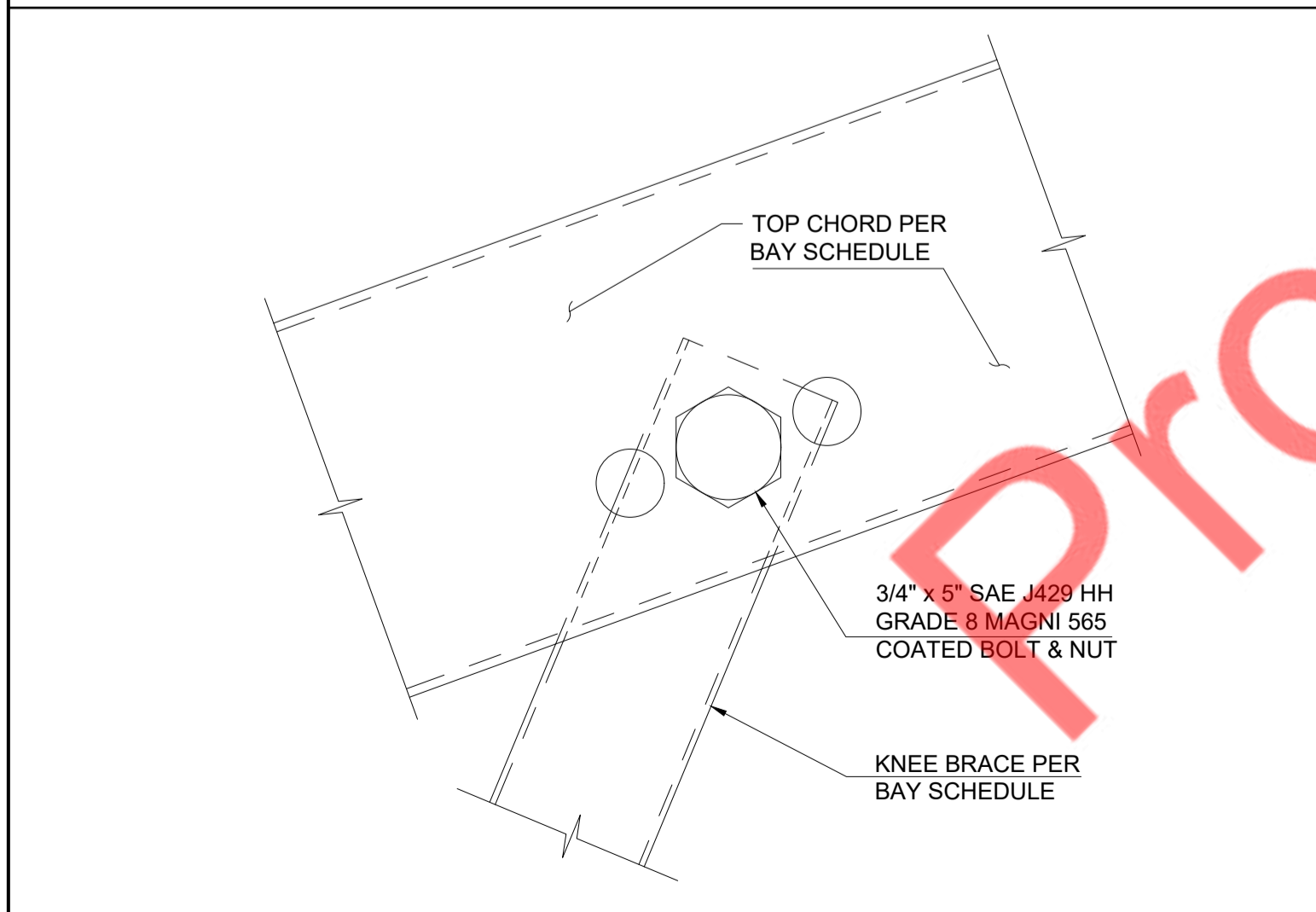
**A5** KNEE BRACE TO POST CONN. DETAIL  
SCALE: NTS



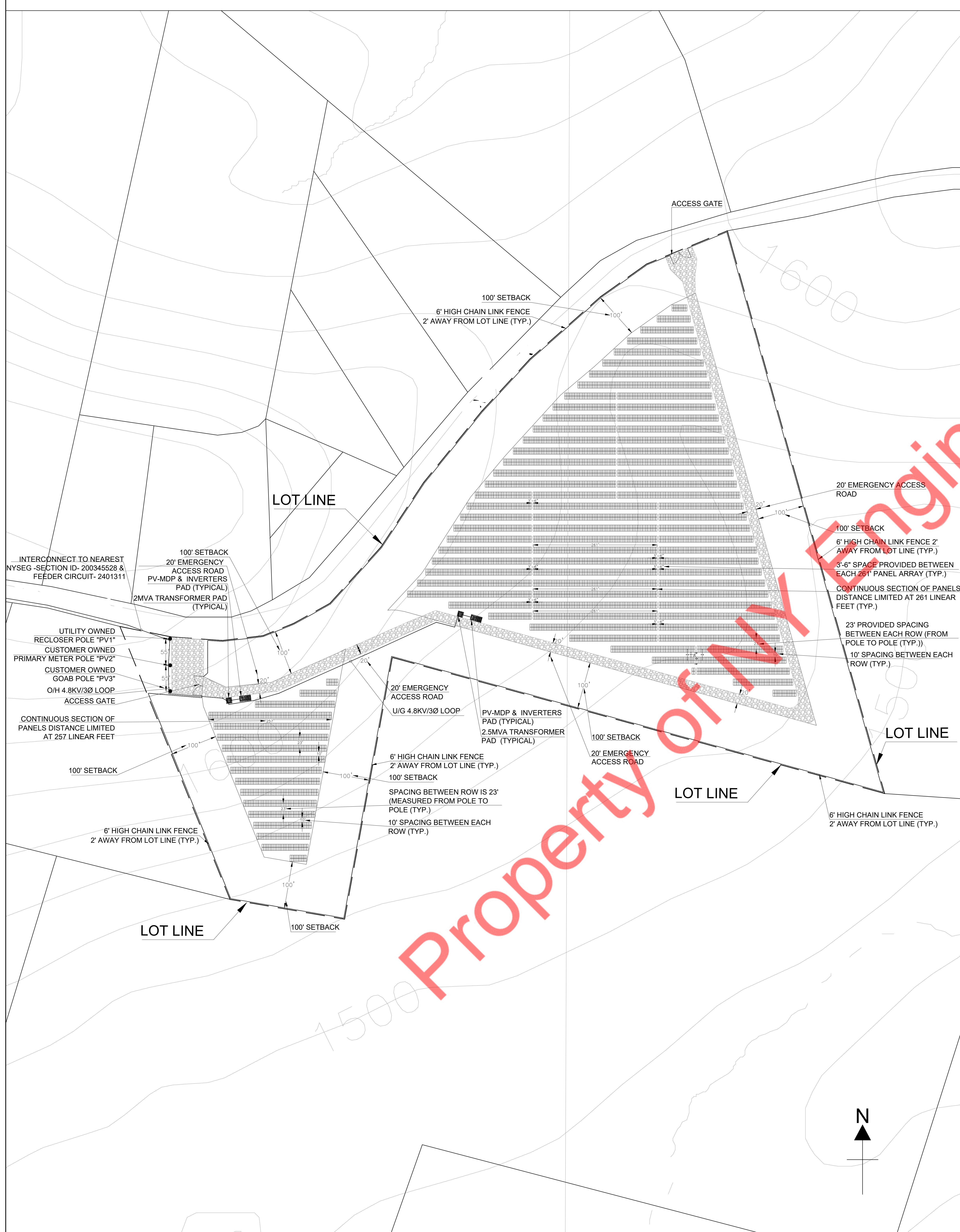
**A6** PV MODULE TO PURLIN CONN. DETAIL  
SCALE: NTS



**A8** LONGITUDINAL PURLIN CONN. DETAIL  
SCALE: NTS



**A4** UPPER KNEE BRACE TO TOP CHORD CONN. DETAIL  
SCALE: NTS



Property of NY Engineers

**BULK REQUIREMENTS:**

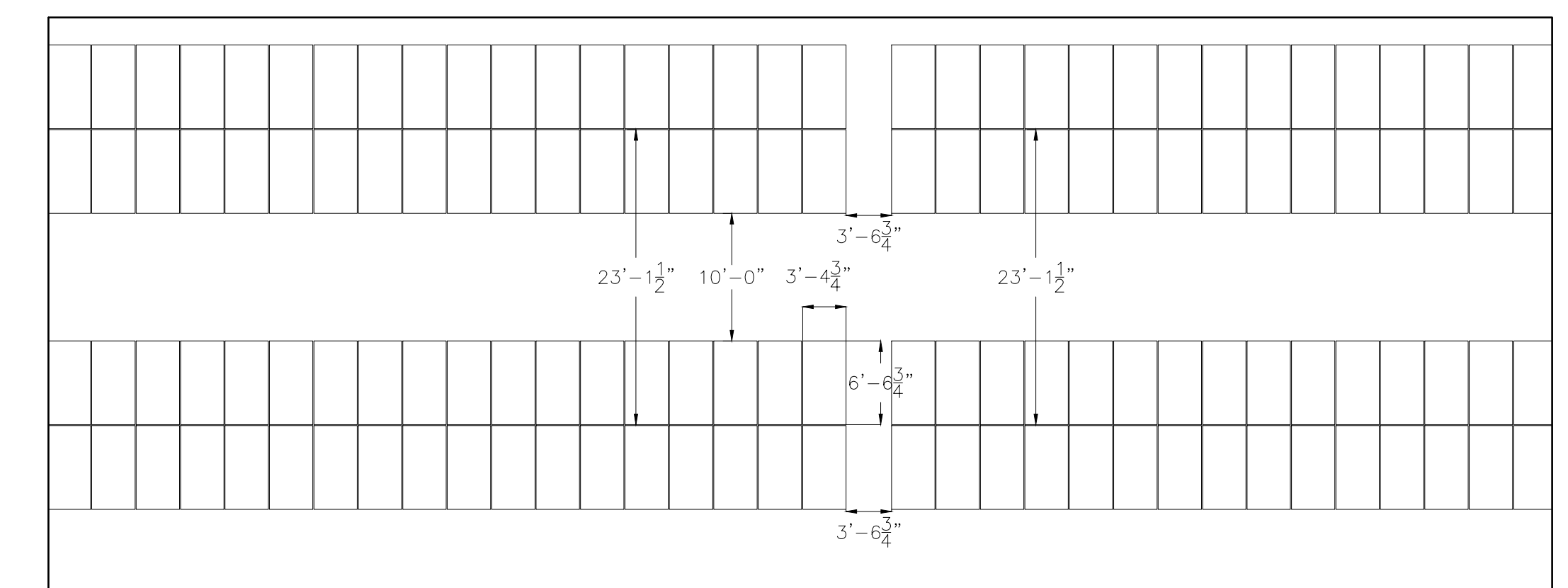
§310-6.3 (S) SOLAR ENERGY SYSTEM, LARGE SCALE.

MINIMUM BUILDING REQUIREMENTS	REQUIRED	PROPOSED
HEIGHT:	MAX. 15 FEET	8.8 FEET
SETBACK:	MIN. 100 FEET	100 FEET
LOT SIZE:	---	22 ACRES
LOT COVERAGE:	---	5.11 ACRES (Note-1)

**NOTE-1**

ONE SOLAR PANEL AREA = 22.28 SQ. FEET  
 TOTAL 9,996 SOLAR PANEL COVERAGE AREA=222710 SQ.FEET = 5.11 ACRES

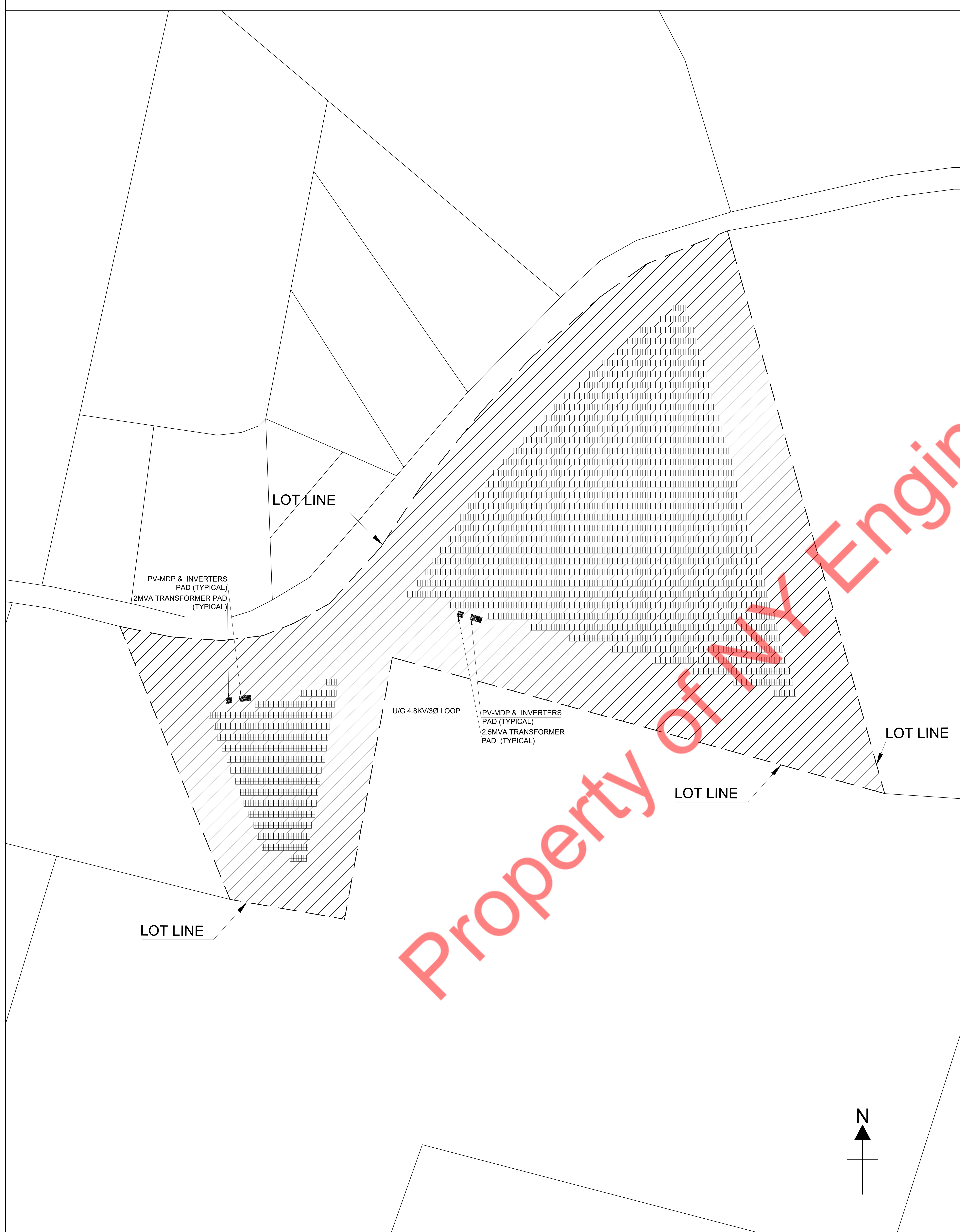
LOT TOTAL AREA= 22 ACRES  
 TOTAL SOLAR PANEL COVERAGE AREA= 5.11 ACRES= 23% LOT COVER BY SOLAR PANELS.



**3 ENLARGE VIEW OF PV CELL INSTALLTION**  
 SCALE: 3/32" = 1'-0"

**NOTE:**

3'-6" SPACE PROVIDED BETWEEN TWO 261' LONG SOLAR PANEL ARRAY .



**BULK REQUIREMENTS:**

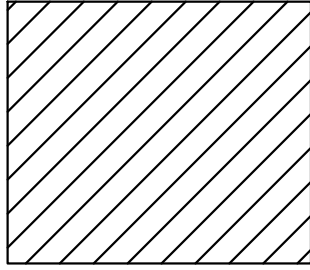
§310-6.3 (S) SOLAR ENERGY SYSTEM, LARGE SCALE.

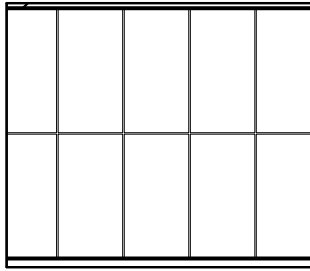
MINIMUM BUILDING REQUIREMENTS	REQUIRED	PROPOSED
HEIGHT:	MAX. 15 FEET	8.8 FEET
SETBACK:	MIN. 100 FEET	100 FEET
LOT SIZE:	---	22 ACRES
LOT COVERAGE:	---	5.11 ACRES (Note-1)

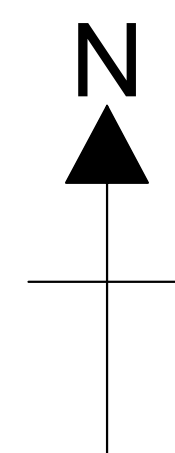
**NOTE-1**

ONE SOLAR PANEL AREA = 22.28 SQ. FEET  
 TOTAL 9,996 SOLAR PANEL COVERAGE AREA=222710 SQ.FEET = 5.11 ACRES

LOT TOTAL AREA= 22 ACRES  
 TOTAL SOLAR PANEL COVERAGE AREA= 5.11 ACRES= 23% LOT COVER BY SOLAR PANELS.

 TOTAL OPEN LOT AREA = 16.89 ACRES

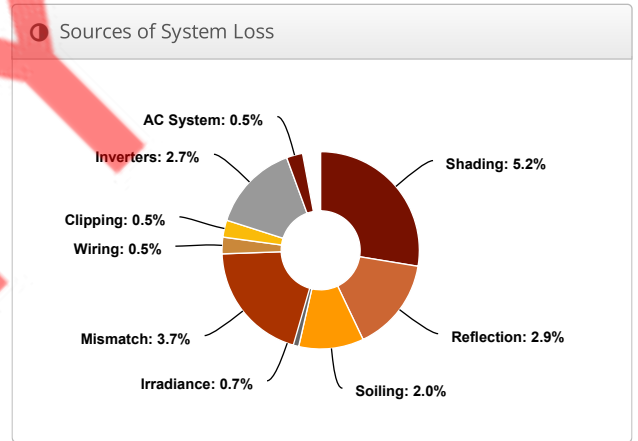
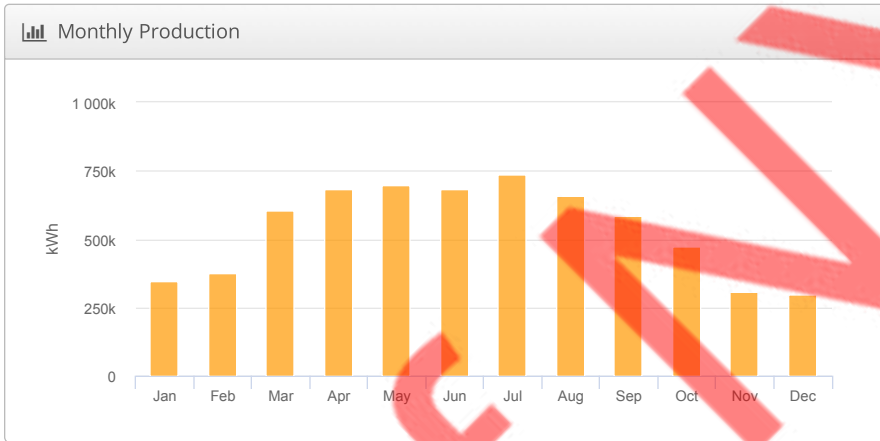
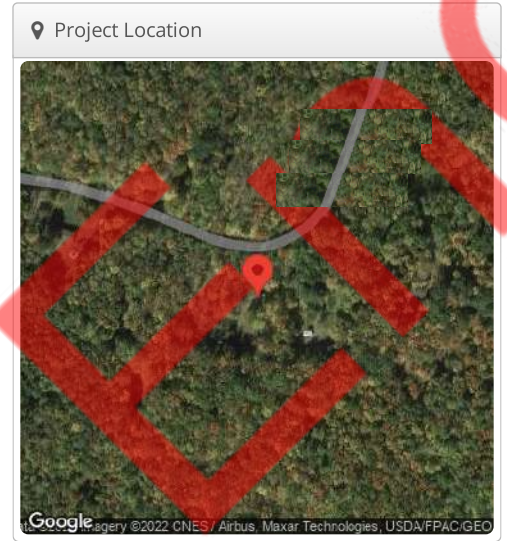
 TOTAL SOLAR SYSTEM LOT COVERAGE AREA = 5.11 ACRES





# Helioscope Generation Report

System Metrics	
Design	Design
Module DC Nameplate	4.85 MW
Inverter AC Nameplate	4.05 MW Load Ratio: 1.20
Annual Production	6.452 GWh
Performance Ratio	83.1%
kWh/kWp	1,330.8
Weather Dataset	TMY, 10km Grid (41.85,-74.65), NREL (prospector)
Simulator Version	7bc164c6bd-486a11c216-860e0a4a9c-dc595c7126



⚡ Annual Production			
	Description	Output	% Delta
Irradiance (kWh/m <sup>2</sup> )	Annual Global Horizontal Irradiance	1,390.5	
	POA Irradiance	1,601.7	15.2%
	Shaded Irradiance	1,518.7	-5.2%
	Irradiance after Reflection	1,475.0	-2.9%
	Irradiance after Soiling	1,445.5	-2.0%
	<b>Total Collector Irradiance</b>	<b>1,445.5</b>	<b>0.0%</b>
Energy (kWh)	Nameplate	7,008,646.1	
	Output at Irradiance Levels	6,958,290.2	-0.7%
	Output at Cell Temperature Derate	6,996,565.8	0.6%
	Output After Mismatch	6,734,420.8	-3.7%
	Optimal DC Output	6,700,112.0	-0.5%
	Constrained DC Output	6,665,023.9	-0.5%
	Inverter Output	6,484,049.4	-2.7%
	<b>Energy to Grid</b>	<b>6,451,629.0</b>	<b>-0.5%</b>
Temperature Metrics			
	Avg. Operating Ambient Temp		8.9 °C
	Avg. Operating Cell Temp		15.9 °C
Simulation Metrics			
	Operating Hours	4693	
	Solved Hours	4693	

☁ Condition Set												
Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (41.85,-74.65), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module							Uploaded By		Characterization		
	Q.Peak DUO XL-G10.3/BFG 485 (Hanwha Q Cells)							HelioScope		Spec Sheet Characterization, PAN		
Component Characterizations	Device		Uploaded By					Characterization				

📦 Components		
Component	Name	Count
Inverters	SGI 225-480 (Solectria)	18 (4.05 MW)
Strings	10 AWG (Copper)	1,044 (339,649.7 ft)
Module	Hanwha Q Cells, Q.Peak DUO XL-G10.3/BFG 485 (485W)	9,996 (4.85 MW)

🏠 Wiring Zones			
Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	7-10	Along Racking

🏠 Field Segments									
Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Portrait (Vertical)	25°	180°	10.0 ft	2x0	N/A	9,996	4.85 MW

