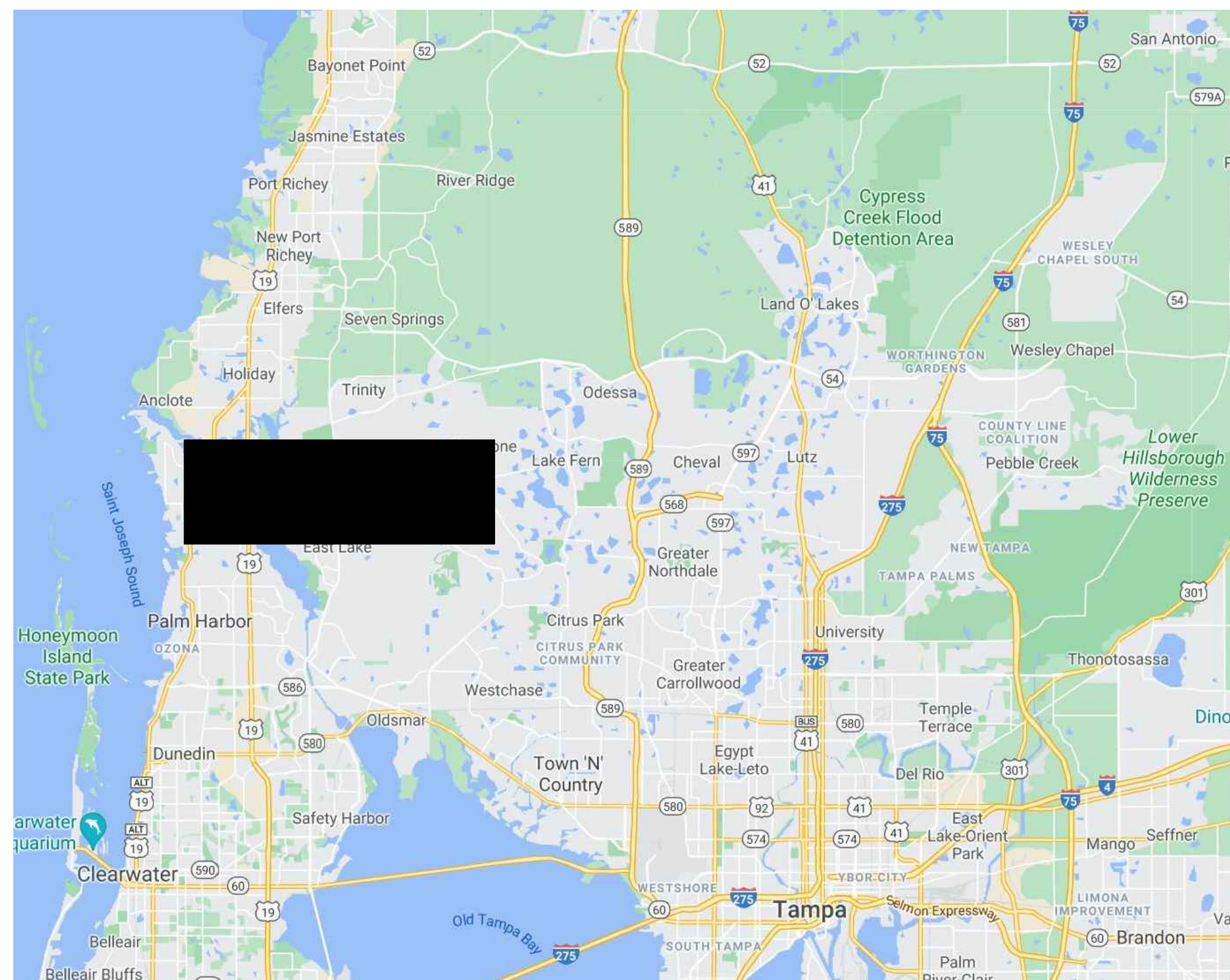


PV PROJECT - 70.4kWdc

Project Type - Photovoltaic

CONTRACTOR

SUB CONTRACTOR



1 PROJECT LOCATION - MAP VIEW
Scale: NTS



2 PROJECT LOCATION - AERIAL VIEW
Scale: NTS

SCOPE OF WORK
THESE PLANS ARE FOR THE INSTALLATION OF A ROOF MOUNTED PHOTOVOLTAIC (PV) SYSTEM. THE PV SYSTEM WILL BE INTERCONNECTED WITH THE DUKE UTILITY GRID THROUGH EXISTING ELECTRICAL EQUIPMENT AND WILL OPERATE IN PARALLEL VIA SUPPLY (LST) SIDE CONNECTION WITH NET ENERGY METER.

- GOVERNING BUILDING CODES**
- 2020 FLORIDA BUILDING CODE, 7TH EDITION
 - 2017 NATIONAL ELECTRICAL CODE, NEC
 - 2020 FLORIDA FIRE PREVENTION CODE 7TH EDITION
 - UL STANDARDS
- RACKING - UL 2703
 - PV MODULE - UL 1703
 - INVERTER - UL 1741

- DESIGN SPECIFICATIONS**
- AHJ - Tarpon Springs Building Department
 - UTILITY - DUKE
 - BUILDING RISK CATEGORY II
 - DESIGN WIND SPEED (ULT) - 150MPH
 - DESIGN SNOW LOAD - 0 PSF
 - EXPOSURE CATEGORY - C
 - MEAN ROOF HEIGHT - 20FT
 - ROOF SLOPE - 0°

- INSTALLATION NOTES**
- THE EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS.
 - THE ACTUAL LOCATION OF THE ARRAY AND PLACEMENT OF THE MECHANICAL ANCHORS ARE SUBJECT TO VARIANCES DEPENDING ON SITE CONDITIONS AND/OR ROOF OBSTRUCTIONS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SPECIFICATIONS BEFORE COMMENCING.
 - ALL OUTDOOR EQUIPMENT SHALL BE RAIN TIGHT WITH MINIMUM NEMA3-R RATING.
 - ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.
 - ALL WORK SHALL COMPLY WITH THE BUILDING CODES SET FORTH BY THE GOVERNING JURISDICTION.
 - ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY THE NATIONAL FIRE CODE, NFC AND THE NATIONAL ELECTRICAL CODE, NEC.

- ABBREVIATIONS**
- (E) - EXISTING
 - (N) - NEW
 - TYP - TYPICAL
 - NTS - NOT TO SCALE
 - MIN - MINIMUM
 - MAX - MAXIMUM
 - AC - ALTERNATING CURRENT
 - DC - DIRECT CURRENT
 - PV - PHOTOVOLTAIC
 - MOD - PV MODULE
 - INV - DC/AC PV INVERTER
 - POC - POINT OF CONNECTION(PV)
 - RSD - RAPID SHUTDOWN BOX
 - CB - CIRCUIT BREAKER (EX. 20A/2P CB - 20AMP 2-POLE CIRCUIT BREAKER)
 - C - CONDUIT
 - OC - OVERCURRENT PROTECTION
 - OCPD - OVERCURRENT PROTECTION DEVICE
 - MSD - MAIN SERVICE DISCONNECT
 - DISC - DISCONNECT
 - MSP - MAIN SERVICE PANEL
 - SP - SUB PANEL
 - PLP - PROTECTED LOADS PANEL
 - MLO - MAIN LUG ONLY
 - MB - MAIN BREAKER
 - EGC - EQUIPMENT GROUNDING CONDUCTOR
 - GEC - GROUNDING ELECTRODE CONDUCTOR
 - GES - GROUNDING ELECTRODE SYSTEM

- ELECTRICAL NOTES**
- INSTALLATION TO BE COMPLIANT WITH NFPA 1 & NFPA70 (NATIONAL ELECTRICAL CODE)
 - THE INVERTER HAS INTEGRATED GROUND AND NO DC GEC IS REQUIRED. THE DC CIRCUIT IS ISOLATED AND INSULATED FROM GROUND AND MEETS THE REQUIREMENTS OF 690.35 (UNGROUNDING PHOTOVOLTAIC POWER SYSTEMS)
 - THE EXACT LOCATION OF NEW ELECTRICAL EQUIPMENT AND CONDUIT RUN RELATING TO THIS PROJECT IS SUBJECT TO CHANGE AND WILL BE DETERMINED ON SITE BY THE CONTRACTOR
 - ALL EQUIPMENT TO BE LISTED OR LABELED FOR ITS APPLICATION(UL OR OTHER APPROVED LISTINGS)
 - PV MODULE - UL1703
 - INVERTER - UL1741
 - RACKING SYSTEM - UL2703
 - GROUNDING
 - ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690
 - MODULE BONDING METHOD SHALL BE INTEGRATED GROUNDING MID CLAMPS. REFER TO MANUFACTURERS SPECIFIC INSTRUCTIONS FOR PROPER BONDING TECHNIQUES.
 - GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES SHALL BE RATED FOR DIRECT BURIAL
 - EGC SHALL BE SIZED IN ACCORDANCE WITH 250.122 AND ARRAY EGC'S SMALLER THAN 6AWG SHALL COMPLY WITH 250.120(C)
 - ALL CONDUCTORS ARE COPPER, UNLESS SPECIFIED OTHERWISE
 - ALL CONDUIT, RACEWAYS, AND JUNCTION BOXES SHALL BE SIZED ACCORDING TO THE APPLICABLE CODE IF THE SIZE IS NOT SPECIFIED. SIGNAGE SHALL BE APPLIED ACCORDING TO GOVERNING BUILDING CODES AND LOCAL JURISDICTIONS SPECIFIC REQUIREMENTS.
 - EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC.
 - CALCULATION OF MAXIMUM CIRCUIT CURRENT FOR THE SPECIFIC CIRCUIT SHALL BE CALCULATED IN ACCORDANCE WITH 690.8(A)(1) THROUGH (A)(5). CONDUCTOR AMPACITY SHALL BE SIZED TO NOT CARRY LESS THAN THE LARGER OF 690.(B)(1) OR (2)
 - DC PV SOURCE AND DC OUTPUT CURRENT CIRCUITS ON OR INSIDE A BUILDING SHALL BE CONTAINED IN METAL RACEWAYS, TYPE MC METAL-CLAD CABLE THAT COMPLIES WITH 250.118(10), OR METAL ENCLOSURES FROM THE POINT OF PENETRATION OF THE SURFACE OF THE BUILDING OR STRUCTURE TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS.(690.31(G))
 - ACCESS TO BOXES, JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES OR PANELS SHALL BE SO INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE(S) SECURED BY REMOVABLE FASTENERS AND CONNECTED BY FLEXIBLE WIRING SYSTEM.(690.34)
 - PV POINT OF CONNECTION. THE OUTPUT OF AN INTERCONNECTED ELECTRIC POWER SOURCE SHALL BE CONNECTED AS SPECIFIED IN 705.12(A),(B),(C), OR (D).



3 ARCHITECTURAL SITE PLAN
Scale: NTS

- PV SYSTEM SPECIFICATIONS**
- PV MODULE: 160 X LR4-7ZHPH-440M; 70.4kWdc
 - INVERTER: SE66KUS
 - RACKING: Unirac Lite_S5
 - AZIMUTH: 182°
 - TILT: 0°

File Name:
01_STORQUEST_TS_COVER.DWG

Sheet Number and Title:
PV01 - COVER

Sheet Size:
ARCH full bleed D (36.00 x 24.00 Inches)

Drawing history

no.	drawn by	revision	date
01	DCG	----	----

Design Engineer

PV01

Sheet Number	Sheet Title
PV01	COVER
PV02	SITE PLAN
PV03	AC LINE
PV04	SITE LAYOUT
PV05	ATTACH PLAN
R01	DATASHEETS

1 2 3 4 5 6 7 8 9 10 11

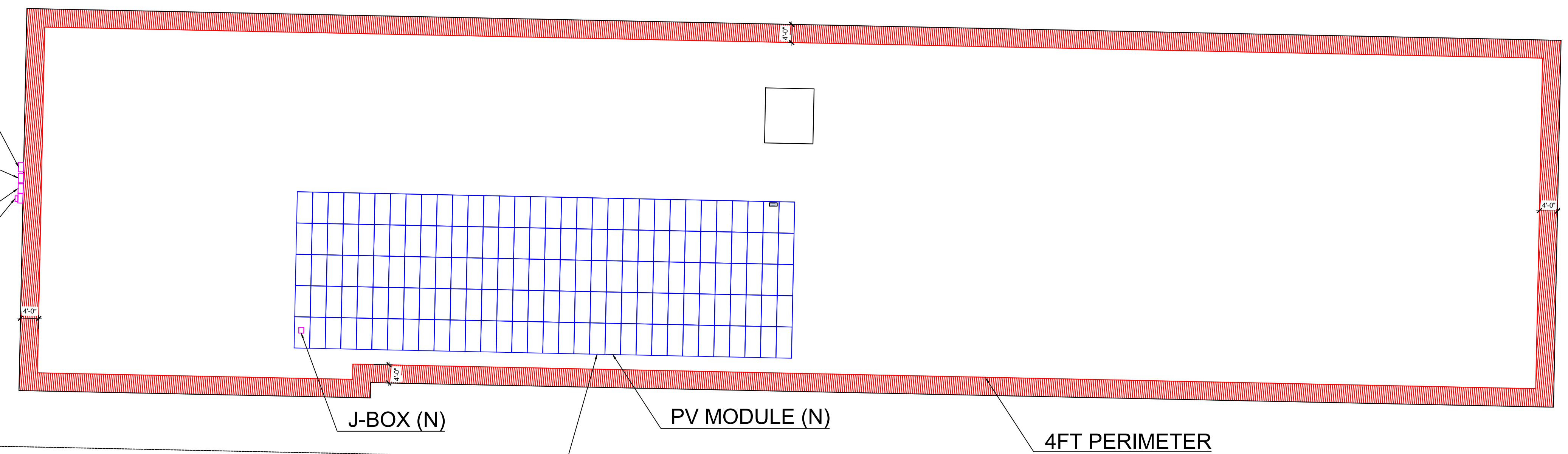
Project Type - Photovoltaic

CONTRACTOR

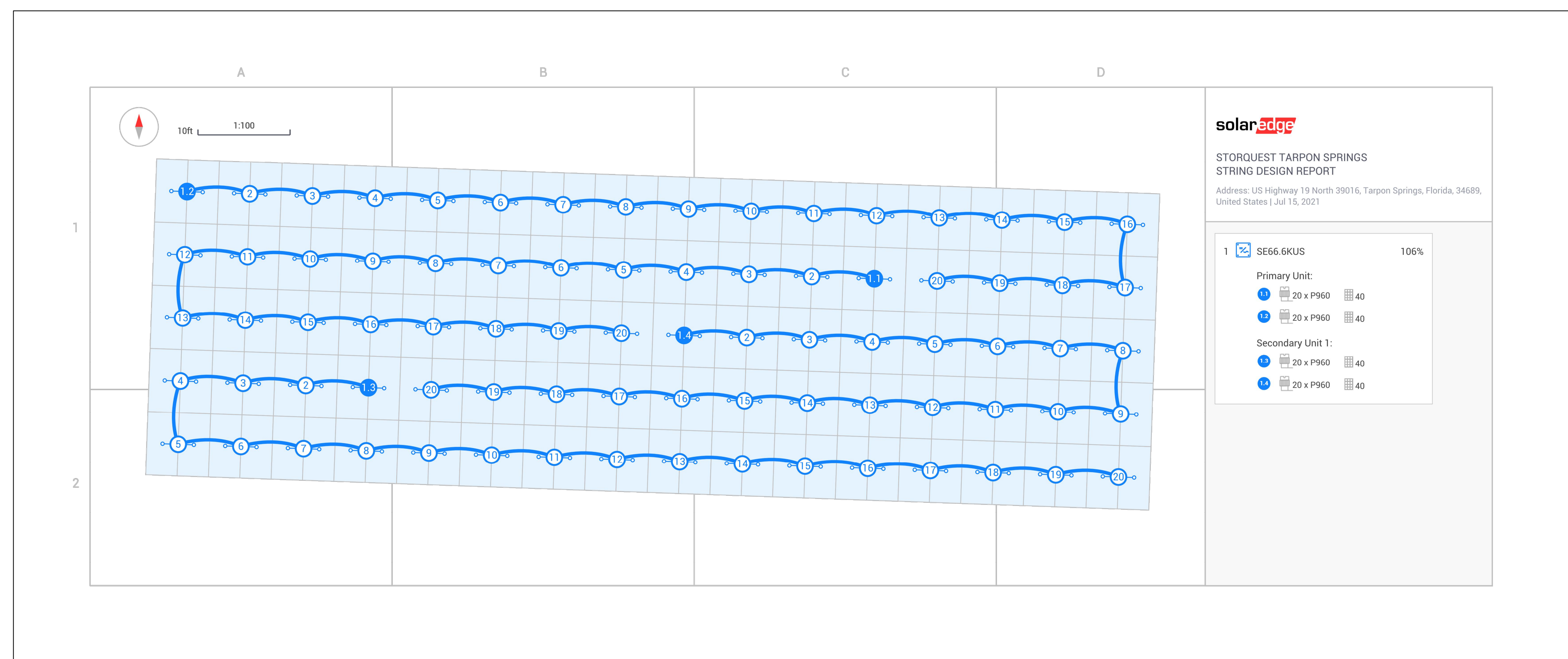
SUB CONTRACTOR

DRIVEWAY

PV DC/AC INVERTER(N)
W/ INTEGRATED DC DISCO
AND EQUIPPED WITH
RAPID SHUTDOWN
PV AC DISCONNECT (N)
100A FUSED/OCP
MAIN SERVICE PANEL (E)
UTILITY METER (E)



ARRAY 1 - 70.4kWdc
160 x 440 W MODULES
MODULE TILT: FLUSH
ROOF PITCH :0°
AZIMUTH : 182°



solaredge

STORQUEST TARPON SPRINGS
STRING DESIGN REPORT

Address: US Highway 19 North 39016, Tarpon Springs, Florida, 34689,
United States | Jul 15, 2021

1 SE66.6KUS 106%

Primary Unit:
1 20 x P960 40
2 20 x P960 40

Secondary Unit 1:
3 20 x P960 40
4 20 x P960 40

PV SYSTEM SPECIFICATIONS
1. PV MODULE: 160 x 440 W PH-440M; 70.4kWdc
2. INVERTER: SE66KUS
3. RACKING: Unirac Lite_S5
4. AZIMUTH: 182°
5. TILT: 0°

File Name:
02_STORQUEST TS_SITE PLAN.DWG

Sheet Number and Title:
PV02 - SITE PLAN

Sheet Size:
ARCH full bleed D (36.00 x 24.00 Inches)

Drawing history

no.	drawn by	revision	date
01	DCG	----	---

Design Engineer

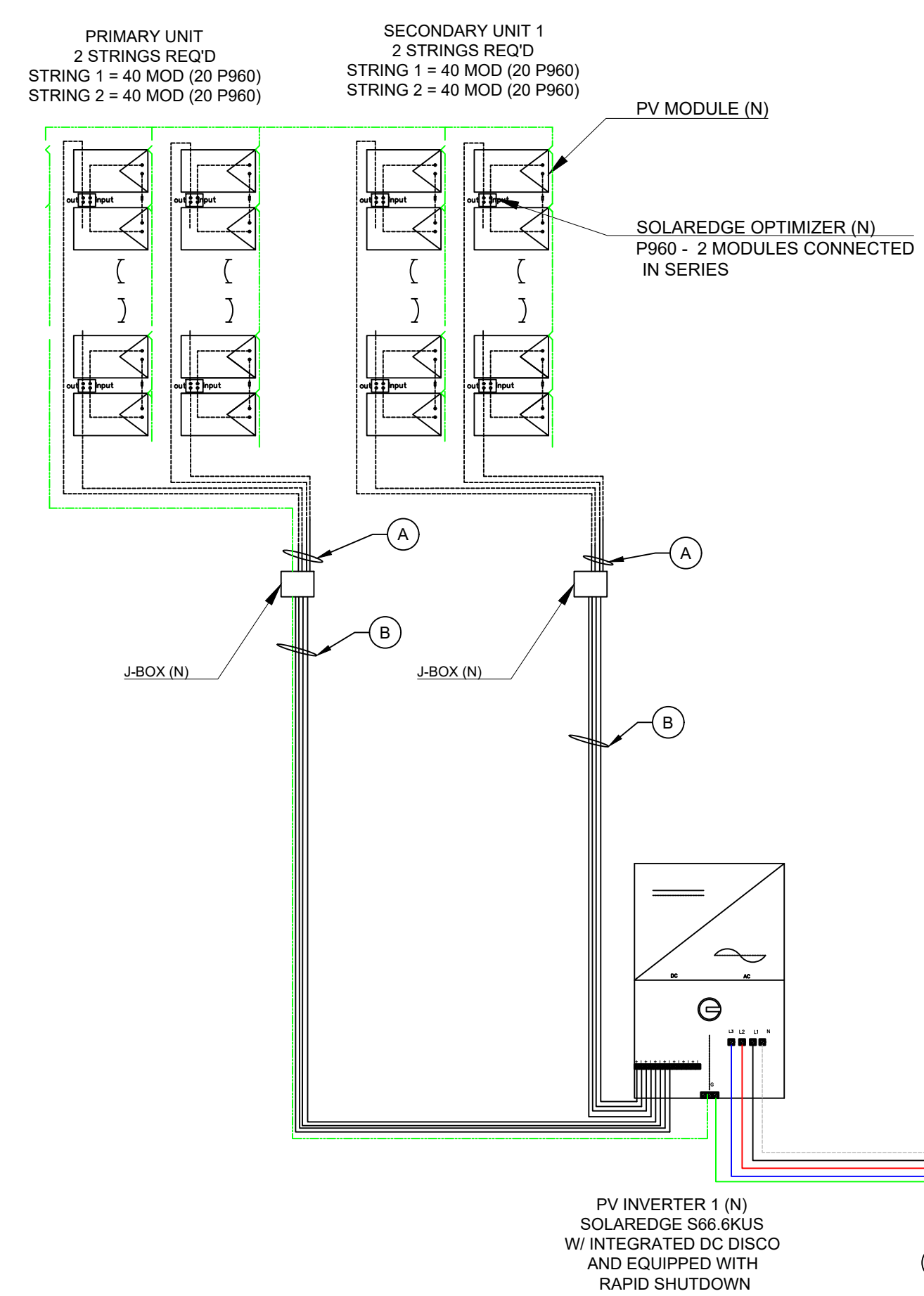
4 SITE PLAN W/ PV Scale: 1/16" = 1'-0"

Electrical Calculations - Photovoltaic System											
Project Details			PV Module Data			SolarEdge Inverter Data			Optimizer Data		
Project Name			Model Number			Model Number			Optimizer		
Project Location			LR4-72HPH-440M			SE66.6KUS			P960		
Module -	160	Longi	LR4-72HPH-440M	Nominal Output @ STC, Pmp	440	Wdc	66000	Wdc	DC Input Power	960	Wdc
Inverter -	1	SolarEdge	SE66.6KUS	Open Circuit Voltage, Voc	48.9	Vdc	1000	Vdc	Max Input Voltage	60	Vdc
Utility -	480	Vac		Max Power Point, Vmp	41.1	Vdc	2 x 40	A	MPPT Range	12.5-60	Vdc
DC Rating	70.4	kW		Short Circuit Current, Isc	11.46	A	66600	Wac	Max DC Input Current	23	A
AC Rating	40.8	kW		Max Power Point Current, Imp	10.71	A	480	Vac	Max Output Current	18	A
Min. Ambient Temp, °C	0		32 °F	VOC Temp Coeff	-0.27	%/°C	80	A	Max Output Voltage	480	Vdc
Max. Ambient Temp, °C	35		95 °F	Dimensions, LxWxH (in)	82.44 x 40.87 x 1.38		98.5	%	Min. # of Opt's/String	14	
				Weight	51.8	lbs			Max # of Opt's/String	30	
									Max Watts/String	15300	

Project Type - Photovoltaic

CONTRACTOR

SUB CONTRACTOR



Conductor Schedule and Calculations																	
Tag	Circuit Description	Location Description	Max Circuit Current 690.8(A)	Min. Cond. Ampacity	Conductor Material	Ampacity Check				Voltage Drop							
						Conductor AWG	Temp. rating of Cond.	Allowable Ampacity	Ampacity Check #1 690.8(B)(1)	Adjusted Temp Range	Amb. Temp Corr. Factor	# of Current Carr. Cond.	Raceway Fill Adj. Factor	Ampacity Check #2 690.8(B)(2)	Phase	One way Length(ft)	%Vd
A	PV Source	Module to DC/DC Converter	14.33	17.9	CU	12	90°C	30	17.9A * 125% = 22.4A < 30A, Ok	123-131	0.76	<4	1	30A * 0.76 * 1 = 22.8 > 17.9A OK	DC	50	0.61%
B	DC to DC Converter Output	Array to Inverter	18	18.0	CU	10	90°C	40	18A * 125% = 22.5A < 40A, Ok	123-131	0.76	4-6	0.8	40A * 0.76 * 0.8 = 24.32 > 18A OK	DC	100	0.97%
C	Inverter Output	Inverter A to OCP	80	80.0	CU	2	90°C	130	80A * 125% = 100A < 130A, Ok	96-104	0.91	<4	1	130A * 0.91 * 1 = 118.3 > 80A OK	3ph	30	0.17%

Conduit and Conductor Schedule						
Tag	Description and Conductor Type	Min. Conductor Gauge	Number of Conductors	Typical Conduit Type	Min. Conduit Size	Max one way length (ft)
A	Mods to j-box, 1k PV Wire	12AWG	2 x (+, -)	FREE AIR	MFG CABLE	50
B	j-box to Inv., 1k PV Wire	10AWG	2 x (+, -), G	PVC, EMT, or FMC	1"	100
C	Inv. to POC., THWN-2	2AWG	L1, L2, L3, N, (#8G)	PVC, EMT, or FMC	1 1/2"	30

Notes: *MC Cable can be EMT or FMC
(G) can be #8AWG THWN-2
For Conduit sizing refer to Chapter 9 Tables, NEC
NEC 690.45-46, Table 250.66, Table 250.122

9 ELECTRICAL LINE DIAGRAM Scale: NTS

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

LABEL 1 - NEC 690.13(B)
APPLY TO DISCONNECTING MEANS WHERE THE LINE AND LOAD TERMINALS MAY BE ENERGIZED IN THE OPEN POSITION

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL 2 - NEC 690.31(G)(4)
APPLY TO EXPOSED RACEWAYS, CABLE TRAYS, OTHER WIRING METHODS, COVERS, ENCLOSURES OF PULL BOXES, AND J-BOXES. SPACING BETWEEN LABELS OR MARKINGS SHALL NOT BE MORE THAN 10FT APART.

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.

LABEL 3 - NEC 690.56(C)(1)(a)
APPLY TO LABEL ON OR NO MORE THAN 3FT FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION

PHOTOVOLTAIC SYSTEM ! DC DISCONNECT !
MAX SYSTEM VOLTAGE: 480VDC
MAX CIRCUIT CURRENT: 12A
MAX OUT CURRENT(DC TO DC CONV.): 15A

LABEL 4 - 690.53
APPLY TO DC DISCONNECT/INVERTER

PHOTOVOLTAIC SYSTEM ! AC DISCONNECT !
RATED AC OUTPUT CURRENT: 80A
NOMINAL OPERATING VOLTAGE: 480VAC

LABEL 5 - NEC 690.54
APPLY TO MAIN PV AC DISCONNECT

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

LABEL 6 - NEC 705.12(B)(3)
APPLY TO MSP

! WARNING !
POWER SOURCE OUTPUT CONNECTION: DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL 7 - NEC 705.12(B)(2)(3)(b)
APPLY TO BACK-FED BREAKER, IF APPLICABLE

UTILITY PHOTOVOLTAIC DISCONNECT OR (SOLAR SYSTEM UTILITY AC DISCONNECT)

UTILITY LABEL - IF REQUIRED
APPLY TO PV AC DISCONNECT

PHOTOVOLTAIC SYSTEM CONNECTED

UTILITY LABEL - IF REQUIRED
APPLY TO UTILITY METER

PLAQUE 8 - NEC 705.10 DIRECTORY OR PLAQUE
APPLY TO LOCATION APPROVED BY AHJ. DIRECTORY OR PLAQUE PROVIDING LOCATION OF MSD AND PV DISCONNECT

8 EQUIPMENT SIGNAGE AND WARNING LABELS Scale: NTS

- PV SYSTEM SPECIFICATIONS
- PV MODULE: 160 X LR4-72HPH-440M; 70.4kWdc
 - INVERTER: SE66KUS
 - RACKING: Unirac Lite_S5
 - AZIMUTH: 182°
 - TILT: 0°

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Sheet Number and Title: PV03 - AC LINE

Sheet Size: ARCH full bleed D (36.00 x 24.00 Inches)

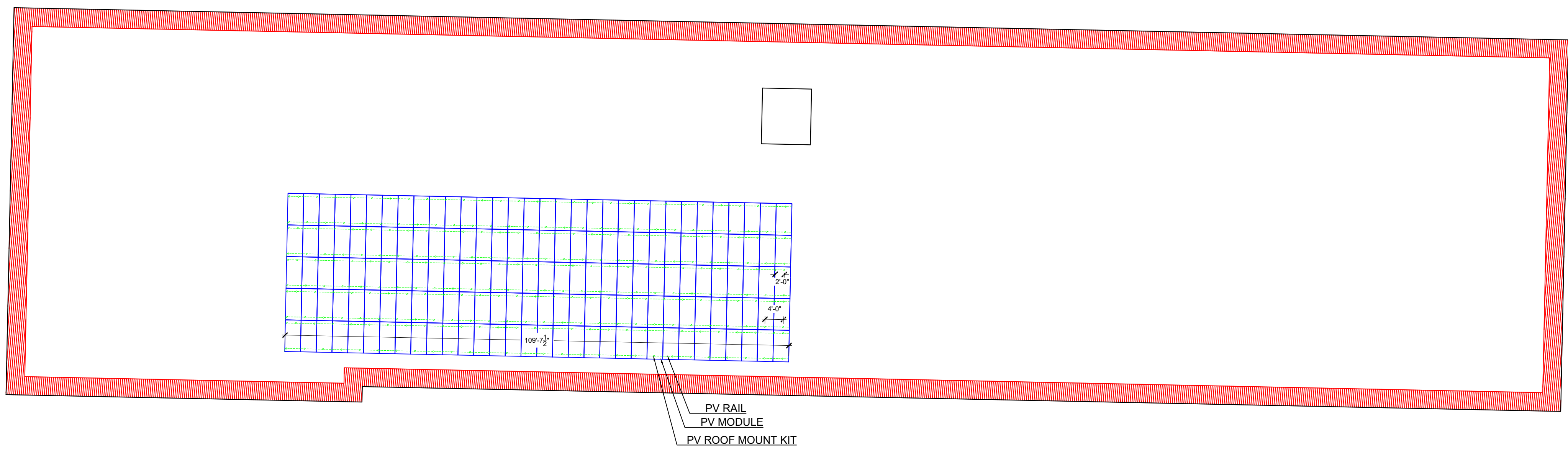
Drawing history

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01	DCG	----	----

Design Engineer

1 2 3 4 5 6 7 8 9 10 11

A
B
C
D
E
F
G



Project Type - Photovoltaic

CONTRACTOR

SUB CONTRACTOR

STORQUEST TARPON SPRINGS

- PV SYSTEM SPECIFICATIONS
1. PV MODULE: 160 x LR4-72HPH-440M; 70.4kWdc
 2. INVERTER: SE66KUS
 3. RACKING: Unirac Lite_S5
 4. AZIMUTH: 182°
 5. TILT: 0°

File Name:
05_STORQUEST_TS_ATTACH_PLAN_ARCH
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Sheet Number and Title:
PV04 - SITE LAYOUT

Sheet Size:
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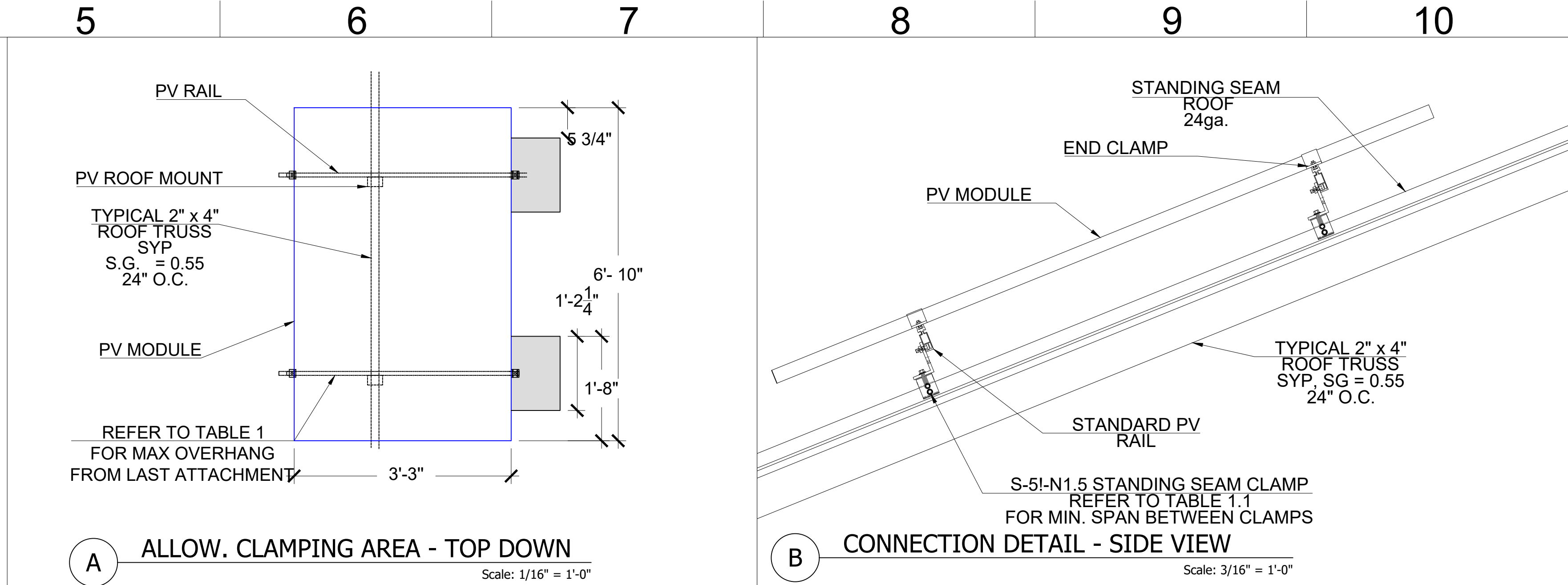
Drawing history

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Design Engineer

PV Dead Load				Module and Racking Specs			
# of Modules		160		Module Model Number	LR4-72HPH-440M		
Module	W_{mod}	52	lbs	Dimensions, LxWxH (in)	82.44 x 40.87 x 1.38		
Array	W_{mods}	8288	lbs	Width	40.87	in	
Micro/optimizer	W_{mic}	640	lbs	Height	82.44	in	
PV Rail	$W_{PV rail}$	1112	lbs	Module Area	23.40	ft ²	
Total Weight	W_{total}	10040	lbs	PV Racking	Unirac Lite_S5		
Total Area	A_T	3743.69	ft ²	Rail, Clamps, Mounts	1	plf	
Dead Load	D_{PV}	2.68	psf	Total Rail Length, L	1112	ft	
				Micro/opt, W	4	lbs per	

PV Attachment Summary			
Max Allowable Spacing	4	ft	
# of attachment points	285		
Weight/attachment	35.2	lbs	



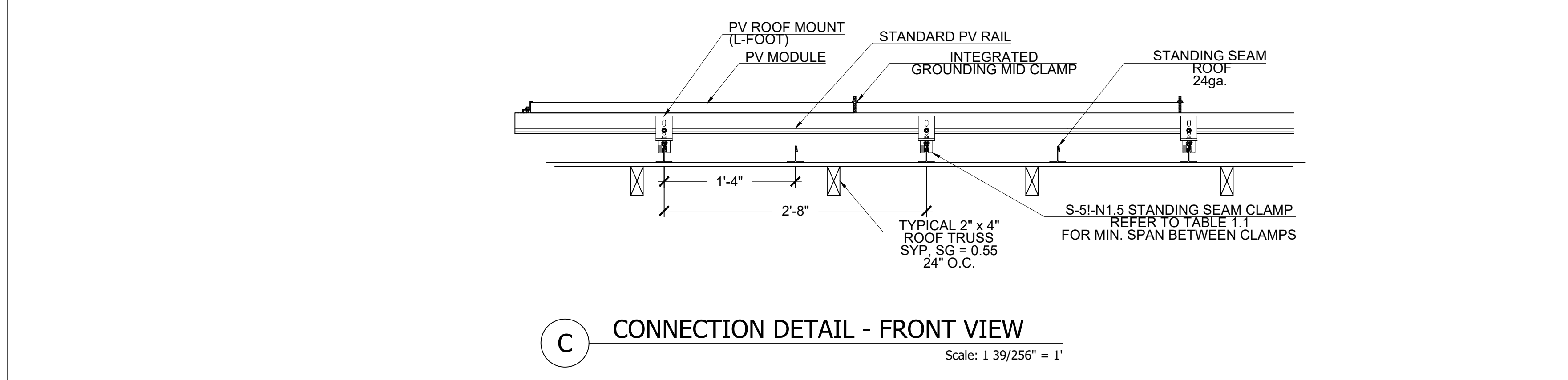
Project Type - Photovoltaic

CONTRACTOR

SUB CONTRACTOR

ASCE 7-16 CHAPTER 29 WIND LOADS - Rooftop Solar Panels Minimum Design Loads - Part 1: Enclosed, $h < 60ft, 0^\circ < \theta < 7^\circ$

Risk Category	II	Table 1.5-1	Load Types	Load, Psf
Basic Wind Speed (Ult)	150	Figure 26.5-1B	Dead Load, D	2.68
Wind Speed (asd)	116	IBC 1609.3.1	Weight of Ice, D _i	0
Roof Angle	0		Earthquake, E	0
Effective Wind Area	23.40	ft ² 26.20	Fluid, F	n/a
Wind Load Parameters			Flood Load, F _s	n/a
Wind Directionality	K_d 0.85	Table 26.6-1	Lateral Earth psi, H	n/a
Exposure Cat.	B, C, or D C	Section 26.7	Live Load, L	n/a
Topographic factor	K_{zt} 1.00	26.8 or 26.8.2	Roof Live, L _r	n/a
Ground Elevation Factor	K_e 1.00	Table 26.9-1	Rain, R	n/a
Velocity Exposure Coefficient	K_z 0.85	Table 26.10-1	Snow, S	0
Array Edge Factor	γ_e 1.00	29.4.4	Self-Straining, T	n/a
Solar Panel Equalization Factor	γ_a 0.65	Fig. 29.4-8	Wind, W	see calc
Velocity Pressure	q_p 24.97	psf $q_h = 0.00256 K_z K_{zt} K_e V^2$	Wind-on-Ice, W _i	n/a
Mean Roof Height	h 20.00	ft		
	0.4h 8.00	ft		
least horizontal dim	528	in		
10% of least horizontal dim	4.40	ft		
Roof Zone Set Back	a 4.40	ft		



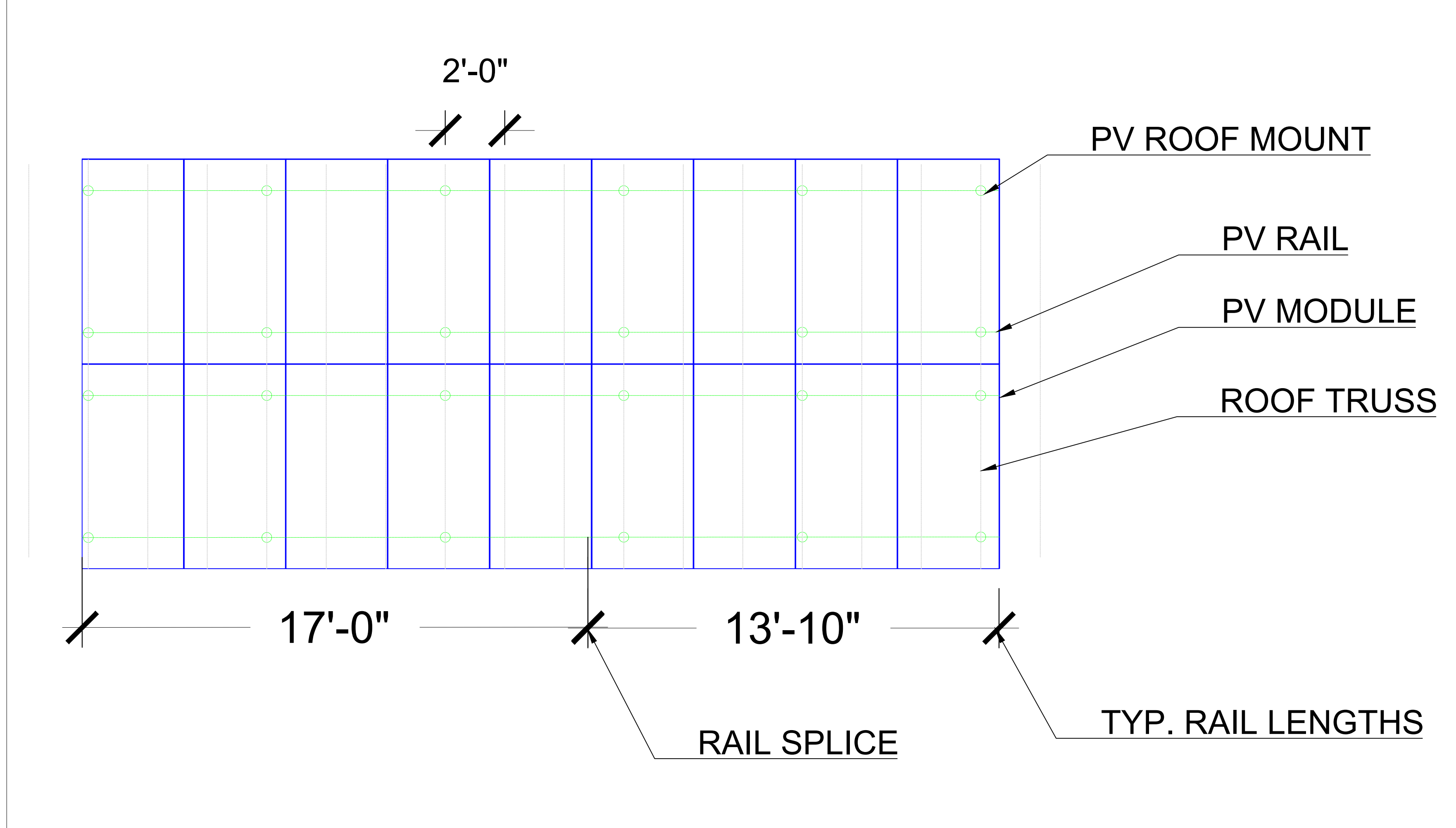
PV SYSTEM SPECIFICATIONS

- PV MODULE: 160 x LR4-72HPH-440M; 70.4kWdc
- INVERTER: SE66KUS
- RACKING: Unirac Lite_S5
- AZIMUTH: 182°
- TILT: 0°

Figure 30.3-2G (Hip roof, $h < 60ft, 7^\circ < \theta < 20^\circ$)

Zone				
	1'	1	2	3
GC_p	-0.90	-1.70	-2.30	-3.20
GC_e	0.30	0.30	0.30	0.30
$p = q_h(GC_p)(\gamma_e)(\gamma_a)$	-14.66	-27.69	-37.46	-52.12
	psf	uplift		29.4-7
$p = q_h(GC_e)(\gamma_e)(\gamma_a)$	4.89	4.89	4.89	4.89
	psf	downward		29.4-7

Design Calculations for the Use of Attachment					
Module Length	C	6.87			ft
Module Width	B	3.41			ft
Module Area	A	23.40			ft ²
Total Design Load (Uplift)	P_{design}	-11.98	-25.01	-34.78	-49.44
		psf			
Total Design Load (Downforce)	P_{design}	4.89	4.89	4.89	4.89
		psf			
Design Load per Module	T_{up}	-280.30	-585.19	-813.86	-1156.87
		lbs			$T_{up} = A * P_{design}$
Design Load per Module	T_{down}	114.33	114.33	114.33	114.33
		lbs			$T_{dn} = A * P_{design}$
Distributed Load (Uplift)	$P_{dist. Up}$	-41.15	-85.91	-119.48	-169.84
		plf			$T_{up} / B * 2$
Distributed Load (Down)	$P_{dist. Down}$	16.79	16.79	16.79	16.79
		plf			$T_{dn} / B * 2$
Railspan Between Anchor Points	L	4.00	4.00	4.00	2.00
		ft			
Point Load per Mount (Uplift)	R	-164.60	-343.64	-477.92	-339.67
		lbs			
Point Load per Mount (Down)	R	33.57	33.57	33.57	16.79
		lbs			2.00



File Name: 05_STORQUEST_TS_ATTACH PLAN (2).DWG

Sheet Number and Title: PV05 - ATTACH PLAN

Sheet Size: ARCH full bleed D (36.00 x 24.00 Inches)

Drawing history			
no.	drawn by	revision	date
01	DCG	----	----

Design Engineer

Table 1.1 - Pullout Value for 4 x Metal to Metal Screws

	W	2r	2e	3
Ultimate Pullout	1266	1266	1266	1266
Design Pullout Value per Mount	633	633	633	633
DESIGN CHECK SF	3.85	1.84	1.32	1.86
	1'	1	2	3

Maximum Cantilever from Last attachment					
Max Cantilever	M	16	16	16	8
		in			Max rail span * 33%

D MODULE ATTACHMENT PLAN W/ RAIL LENGTHS Scale: 3/8" = 1'-0"

LR4-72HPH 425~455M

Hi-MO 4m

NEW

**High Efficiency
Low LID Mono PERC with
MBB & Half-cut Technology**

12-year Warranty for Materials and Processing;
25-year Warranty for Extra Linear Power Output

+0.55%
25-year Power
Warranty Annual
Power Attenuation
+0.55%

+4.10%
Additional Gain from LONGI Solar's Linear Warranty
+4.10%

Standard Module Linear Power Warranty
+3.35%

Complete System and Product Certifications

IEC 62121, IEC 61730, UL 61730
ISO 9001:2008, ISO Quality Management System
ISO 14001:2004, ISO Environment Management System
OHSAS 18001:2007 Occupational Health and Safety



* Specifications subject to technical changes and tech.
LONGI Solar reserves the right of interpretation.

Positive power tolerance (0 ~ +5W) guaranteed

High module conversion efficiency (up to 20.9%)

Slower power degradation enabled by Low LID Mono PERC technology; first year <2%, 0.55% year 2-25

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

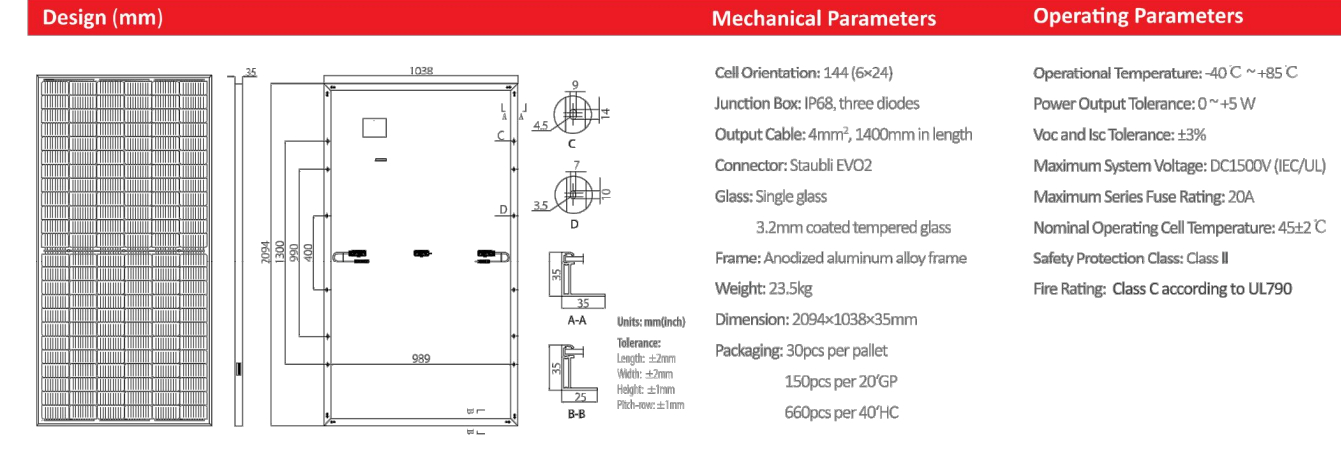
LONGI Green Energy Technology Co., Ltd.

Address: Level 8 / 124 Walker Street North Sydney NSW 2060 Australia
Tel: +61 2 8484 5806. E-mail: info@longi-solar.com.au. Website: www.longi-solar.com.au

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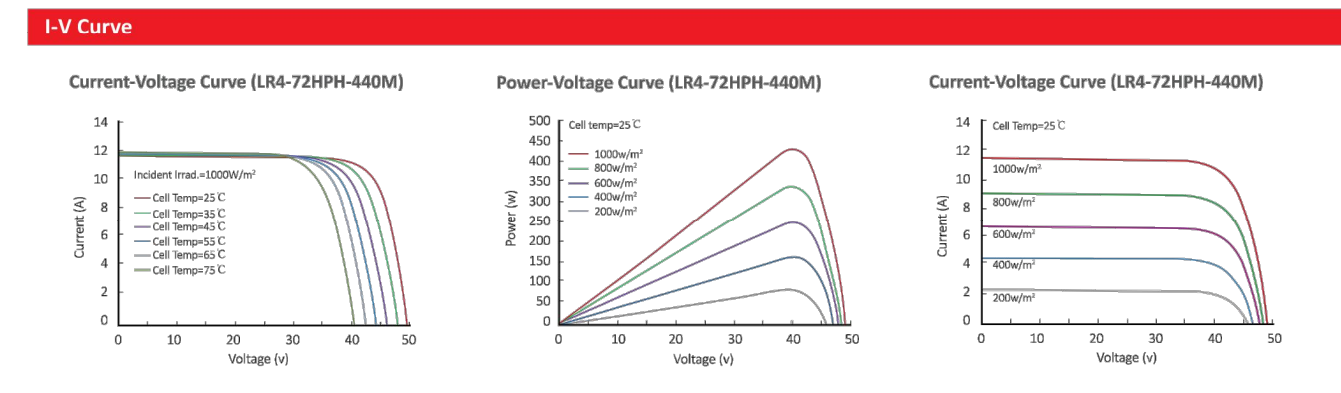
Made in China, Malaysia or Vietnam 20230428V1_2.U

LR4-72HPH 425~455M



Design (mm)	Mechanical Parameters	Operating Parameters
Cell Orientation: 144 (6x4) Junction Box: IP68, three diodes Output Cable: 4mm ² , 1400mm in length Connector: Staubli (V22) Glass: Single glass Frame: Anodized aluminum alloy frame Weight: 23.5kg Packaging: 150pcs per 20'GP 600pcs per 40'HC	Cell Orientation: 144 (6x4) Junction Box: IP68, three diodes Output Cable: 4mm ² , 1400mm in length Connector: Staubli (V22) Glass: Single glass Frame: Anodized aluminum alloy frame Weight: 23.5kg Packaging: 150pcs per 20'GP 600pcs per 40'HC	Operational Temperature: -40°C ~ +85°C Power Output Tolerance: 0 ~ +5W Voc and Isc Tolerance: ±3% Maximum System Voltage: DC1500V (IEC64) Maximum Series Fuse Rating: 32A Nominal Operating Cell Temperature: 45°C Safety Protection Class: Class II Fire Rating: Class C according to UL790

Electrical Characteristics		Temperature Ratings (STC)		Mechanical Loading	
Model Number	LR4-72HPH-425M LR4-72HPH-430M LR4-72HPH-435M LR4-72HPH-440M LR4-72HPH-445M LR4-72HPH-450M LR4-72HPH-455M	Temperature Coefficient of Isc	+0.046%/C	Front Side Maximum Static Loading	5400Pa
Testing Condition	STC NOCT STC NOCT STC NOCT STC NOCT STC NOCT STC NOCT	Temperature Coefficient of Voc	-0.70%/C	Rear Side Maximum Static Loading	2400Pa
Maximum Power (Pmax/W)	425 430 435 440 445 450 455	Temperature Coefficient of Pmax	-0.350%/C	Hailstone Test	25mm Hailstone at the speed of 23m/s
Open Circuit Voltage (Voc/V)	48.3 48.5 48.7 48.9 49.1 49.3 49.5				
Short Circuit Current (Isc/A)	11.23 11.31 11.39 11.47 11.55 11.63 11.71				
Voltage at Maximum Power (Vmp/V)	40.5 40.7 40.9 41.1 41.3 41.5 41.8				
Current at Maximum Power (Imp/A)	10.50 10.57 10.64 10.71 10.78 10.85 10.92				
Module Efficiency(%)	19.6 19.8 20.0 20.2 20.5 20.7 20.9				
STC (Standard Testing Conditions): Irradiance 1000W/m ² , Cell Temperature 25°C, Spectra at AM1.5					
NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m ² , Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/s					



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Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly, LONGI have the sole right to make such modification at anytime without further notice. Demanding party shall request for the latest datasheet for such as contract need, and make it a consulting and binding part of lawful documentation duly signed by both parties.

Made in China, Malaysia or Vietnam 20230428V1_1.U

Power Optimizer For North America

P860 / P960

25 YEAR WARRANTY

POWER OPTIMIZER

PV power optimization at the module-level
The most cost-effective solution for commercial and large field installations

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

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Power Optimizer For North America
P860 / P960

Power Optimizer Model (Typical Module Compatibility)	P860 (for 2 x 72 cell modules)	P960 (for 2 x 72 cell modules)
INPUT	Dual input for independently connected modules ⁽¹⁾	
Rated Input DC Power ⁽¹⁾	860	960
Connection Method	W	
Absolute Maximum Input Voltage (Vec at lowest temperature)	60	
MPPT Operating Range	12.5 ~ 60	
Maximum Short Circuit Current (Isc)	22	23
Maximum Short Circuit Current per Input (Isc)	11	11.5
Maximum Efficiency	99.5	99.5
Weighted Efficiency	99.6	99.6
Ovenvoltage Category	II	
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREdge INVERTER)		
Maximum Output Current	18	
Maximum Output Voltage	60	
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREdge INVERTER OR SOLAREdge INVERTER OFF)		
Safety Output Voltage per Power Optimizer	1 ± 0.1	
STANDARD COMPLIANCE		
Photovoltaic Rapid Shutdown System	Compliant with NEC 2014, 2017 ⁽³⁾ , 2020	
EMC	FCC Part 15 Class A, IEC61000-6-2, IEC61000-6-3	
Safety	IEC62109-1 (Class II safety), UL1741	
Material	UL94 V-0, UV resistant	
RoHS	Yes	
INSTALLATION SPECIFICATIONS		
Compatible SolarEdge Inverters	Three phase inverters	
Maximum Allowed System Voltage	1000	
Dimensions (W x L x H)	129 x 98 x 59 / 5.1 x 6.61 x 2.32	
Weight	1064 / 2.34	
Input Connector	MC4 ⁽⁴⁾	
Input Wire Length Options	Input #1 1 (-) 0.16 / 0.52, (+) 0.16 / 0.52 2 (-) 1.16 / 5.2, (+) 0.16 / 0.52 3 (-) 1.16 / 5.2, (+) 1.16 / 5.2	Input #2 1 (-) 0.16 / 0.52, (+) 0.16 / 0.52 2 (-) 1.16 / 5.2, (+) 0.16 / 0.52 3 (-) 1.16 / 5.2, (+) 1.16 / 5.2
Output Wire Type / Connector	Double insulated, MC4	
Output Wire Length	2.2 / 7.2	
Operating Temperature Range ⁽⁵⁾	-40 to +85 / -40 to +85	
Protection Rating	IP68 / NEMA4P	
Relative Humidity	0 ~ 100	

PV System Design Using a SolarEdge Inverter⁽¹⁾

	Three Phase for 208V Grid ⁽²⁾		Three Phase for 277/480V Grid	
	P860	P960	P860	P960
Minimum String Length	8	15	4	8
Maximum String Length	30	60	30	60
Maximum Power per String	7200W ⁽⁶⁾	15300W ⁽⁶⁾		

GET OFF THE ROOF FASTER THAN EVER BEFORE

OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER

SOLARMOUNT UNIRAC

SOLARMOUNT defined the standard in solar racking. New enhancements are designed to get installers off the roof faster than ever before. Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

LOSE ALL OF THE COPPER & LUGS
System grounding through Enphase microinverters and trunk cables

SM SMALL IS THE NEXT NEW BIG THING
Light Rail is Fully Compatible with all SM Components

UNIRAC ENHANCED DESIGN & LAYOUT TOOLS
Now Featuring Google Map Capabilities within U-Builder

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SOLARMOUNT UNIRAC

OPTIMIZED COMPONENTS
INTEGRATED BONDING & PRE-ASSEMBLED PARTS
Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

VERSATILITY
ONE PRODUCT - MANY APPLICATIONS
Quickly get modules fixed to the roof or at a desired tilt angle. Change module orientation in portrait or landscape while securing a large variety of framed modules in flat, low slope or steep pitched roofs. Available in roll, clear and dark smooth finishes to help perform your projects financial and aesthetic objectives.

AUTOMATED DESIGN TOOL
DESIGN PLATFORM AT YOUR SERVICE
Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a racking compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.

UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT

UL2703 LISTED
BONDING & GROUNDING, MECHANICAL LOADING, SYSTEMS CLASSIFICATION

UNIRAC TECHNICAL SUPPORT
Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

UNIRAC CERTIFIED QUALITY PROVIDER
Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

UNIRAC BANKABLE WARRANTY
As a Hilti Group Company, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a 10 year limited product warranty and a 5 year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

Three Phase Inverters with Synergy Technology for the 277/480V Grid

SE66.6K / SE100K

12-20 YEAR WARRANTY

INVERTERS

Specifically designed to work with power optimizers

- Easy two-person installation – each unit mounted separately, equipped with cables for simple connection between units
- Fixed voltage inverter for superior efficiency (98.1%) and longer strings
- Balance of System and labor reduction compared to using multiple smaller string inverters
- Integrated Connection Unit with optional integrated DC Safety Switch – eliminates the need for external DC Isolators
- Independent operation of each unit enables higher uptime and easy serviceability
- Advanced safety features - integrated arc fault protection and rapid shutdown
- 150% DC oversizing, enabling higher energy production

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Three Phase Inverters for the 277/480V Grid⁽¹⁾ for North America

SE20KUS / SE30KUS / SE33.3KUS / SE40KUS

MODEL NUMBER	SE20KUS	SE30KUS	SE33.3KUS	SE40KUS
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXX-USXXXXXX	SEXXX-US3XXXXX		
OUTPUT				
Rated AC Power Output	20000	30000	33300	40000
Maximum apparent AC output power	20000	30000	33300	40000
AC Output Line Connections	4W + PE			
AC Output Voltage Minimum-Nominal-Maximum ⁽¹⁾ (L-N)	244 - 277 - 305			
AC Output Voltage Minimum-Nominal-Maximum ⁽¹⁾ (L-L)	422.5 - 480 - 529			
AC Frequency Min-Nom-Max ⁽²⁾	59.3 - 60 - 60.5			
Maximum Continuous Output Current (per Phase)	24	36.25	40	48.25
GFPE Threshold	1			
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes			
Total Harmonic Distortion	≤ 3			
Power Factor Range	+/- 0.85 to 1			
INPUT				
Maximum DC Power (Module STC)	27000	45000	50000	60000
Transformer-less, Ungrounded	Yes			
Maximum Input Voltage DC- to DC-	1000			
Nominal Input Voltage DC- to DC-	850			
Maximum Input Current	26.5	36.25	40	48.25
Maximum Input Short Circuit Current	33		55	
Reverse-Polarity Protection	Yes			
Ground-Fault Isolation Detection	1MD Sensitivity	167kV Sensitivity ⁽⁴⁾		
DC Weighted Efficiency	98	98.5		
Night-time Power Consumption	< 3	< 4		
ADDITIONAL FEATURES				
Supported Communication Interfaces	2 x RS485, Ethernet, Cellular (optional)			
Inverter Commissioning	With the SetApp mobile application using built-in access point for local connection			
Arc Fault Protection	Integrated, User Configurable (According to UL1699B)			
Rapid Shutdown	NEC2014, NEC2017 and NEC2020 compliant/verified			
RS485 Surge Protection Plug-in	Supplied with the inverter, Built-in			
DC Surge Protection	Type II, field replaceable, optional	Type II, field replaceable, Built-in		
DC Fuses (Single Pole)	-	Type II, field replaceable, Built-in		
Smart Energy Management	2SA, Built-in			
DC SAFETY SWITCH				
DC Disconnect	Export Limitation			
STANDARD COMPLIANCE				
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T1L M-07			
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (H)			
Emissions	FCC part15 class A			
INSTALLATION SPECIFICATIONS				
AC output conduit size / AWG range	3/4" minimum / 12-6 AWG		¾" or 1" / 6 - 10 AWG	
DC input conduit size / AWG range	1½" or 1" / 6 - 12 AWG		1½" or 1" / 6 - 12 AWG	
Number of DC inputs pairs	2		4	
Dimensions with Safety Switch (H x W x D)	30.5 x 12.5 x 10.5 / 775 x 315 x 260		31.8 x 12.5 x 11.8 / 808 x 317 x 300	
Weight with Safety Switch	74.2 / 33.7		78.2 / 35.5	
Cooling	Fans (user replaceable)			
Noise	< 50			
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽³⁾			
Protection Rating	NEMA 3R			
Mounting	Bracket provided			

(1) For 120/208V inverters refer to: <https://www.solaredge.com/sites/default/files/se-three-phase-us-inverter-208v-setup-datasheet.pdf>
(2) For other regional settings please contact SolarEdge support
(3) Where permitted by local regulations
(4) For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-de-rating-note-np.pdf>

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