PHOTOVOLTAIC ROOF MOUNT SYSTEM

112 MODULES-ROOF MOUNTED - 46.48 kWDC
1513 MASSACHUSETTS AVE, ARLINGTON, MA 02476

W) MODULES

THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS

A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 690-47 AND 250-50 THROUGH 60 250-166 SHALL BE PROVIDED PER NEC, GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO GREATER THAN #8 AWG COPPER AND BONDED TO THE EXISTING GROUNDING

EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE

PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING

ALL SIGNAGE WILL BE INSTALLED AS REQUIRED BY AND 2020 NEC.

HEIGHT OF INTEGRATED AC/DC DISCONNECT SHALL NOT EXCEED 6'

THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER NEC 250-64B. THE GROUNDING ELECTRODE CONDUCTOR

ALL EXTERIOR CONDUIT SHALL BE PAINTED TO MATCH ADJACENT

THE PV CONNECTION IN THE PANEL BOARD SHALL BE POSITIONED AT THE OPPOSITE (LOAD) END FROM THE INPUT FEEDER LOCATION

SITE CONDITIONS SHALL PREVAIL IF NO SCALE IS GIVEN. DRAWINGS ARE NOT NECESSARILY TO SCALE. ALL DIMENSIONS SHALL BE

DESIGN CRITERIA:

ROOF TYPE: - COMP SHINGLE
NUMBER OF LAYERS: - 01
ROOF FRAME: - 2"X6" TRUSS @24" O.C.
STORY: - TWO STORY
SNOW LOAD : - 40 PSF
WIND SPEED :- 127 MPH
WIND EXPOSURE:- C
EXPOSURE CATEGORY:- II
COORDINATES:- 42.425598, -71.191057

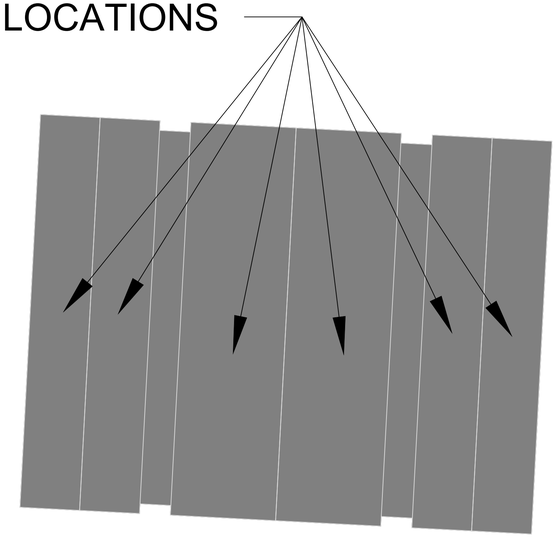
GOVERNING CODES:

2023 NATIONAL ELECTRICAL CODE (NEC)
2021 INTERNATIONAL FIRE CODE (IFC)
2021 INTERNATIONAL BUILDING CODE (IBC)
2021 INTERNATIONAL RESIDENTIAL CODE WITH MASSACHUSETTS AMENDMENTS(IRC)

SHEET INDEX

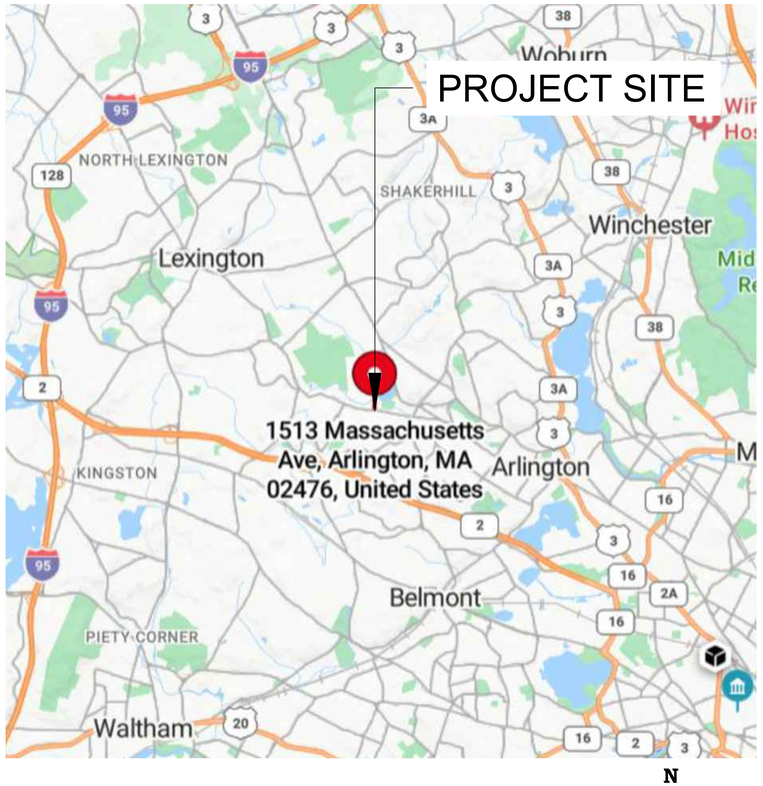
PV-0	COVER SHEET
PV-1	SITE PLAN WITH ROOF PLAN
PV-2	ROOF PLAN WITH MODULES
PV-3	ATTACHMENT DETAILS
PV-4+	EQUIPMENT SPEC SHEETS

ARRAY LOCATIONS



1 AERIAL PHOTO
PV-0 SCALE: NTS

PROJECT SITE



2 VICINITY MAP
PV-0 SCALE: NTS

N
W E
S

GREAT SKY SOLAR

3 BOW ST SUITE 3
LEXINGTON, MA 02420
PHONE NUMBER: 8889660726
EMAIL:office@greatskysolar.com

DRAWN BY
N.G.E.S

VERSION

DESCRIPTION	DATE	REV
INITIAL RELEASE	12/19/2024	UR

PROJECT NAME

ILYA ZVENIGORODSKIY
1513 MASSACHUSETTS AVE,
ARLINGTON, MA 02476
APN# N/A
UTILITY: EVERSOURCE
AHJ: MIDDLESEX COUNTY

SHEET NAME
COVER SHEET

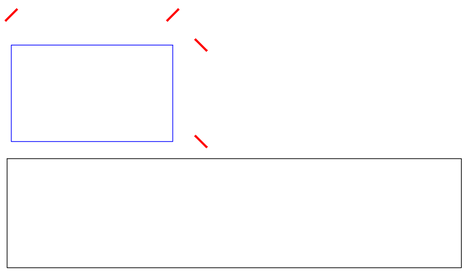
SHEET SIZE
24" X 36"

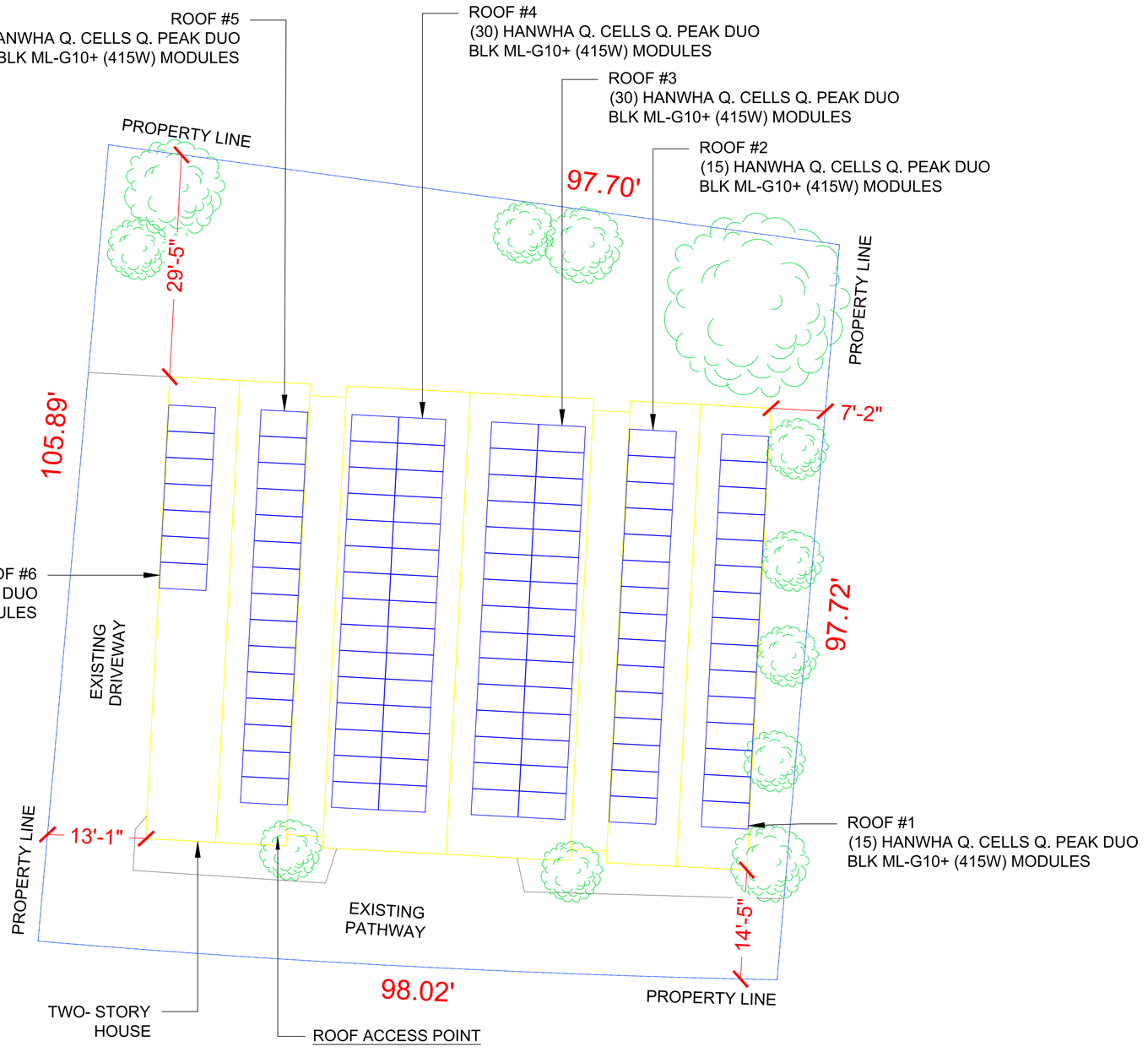
SHEET NUMBER
PV-0

● _____ SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD

_____

415W) MODULES





SITE PLAN WITH ROOF PLAN

1/8" = 1'-0"

NOTE:
INTERNATIONAL FIRE CODE SECTION 605.11.1.2 FOR RESIDENTIAL R-3 OCCUPANCIES AT LEAST THREE (3) FEET OF CLEARANCE ALONG THE EDGE (RAKE) OF THE ROOF TO A PANEL AND AT LEAST THREE (3) FEET FROM THE RIDGE OF THE ROOF TO A PANEL. PANELS SHALL BE AT LEAST ONE AND ONE-HALF (1-1/2) FEET FROM A VALLEY OR HIP. NO CLEARANCE IS REQUIRED AT THE EAVE. INTERNATIONAL FIRE CODE SECTION 605.11.1.2.4 ROOFS WITH HIPS AND VALLEYS - WHERE PANELS ARE TO BE LOCATED ON ONLY ONE SIDE OF A HIP OR VALLEY THAT IS OF EQUAL LENGTH, THE PANELS SHALL BE PERMITTED TO BE PLACED DIRECTLY ADJACENT TO THE HIP OR VALLEY. GAS METER LOCATED IN PROXIMITY OF THE PV INSTALLATION, LOAD CENTER, AND/OR DISCONNECTS. DISCONNECTS SHALL BE LOCATED IN COMPLIANCE WITH UTILITY AND THE AHJ (AUTHORITY HAVING JURISDICTION). PV INSTALLATION SHALL COMPLY WITH ALL APPLICABLE CODES

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SOLAR

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1513 MASSACHUSETTS AVE,
ARLINGTON, MA 02476
APN# N/A
UTILITY: EVERSOURCE
AHJ: MIDDLESEX COUNTY

SHEET NAME
SITE PLAN WITH ROOF PLAN

SHEET SIZE
24" X 36"

SHEET NUMBER
PV-1

Q. PEAK DUO BLK ML-G10+ (415W) MODULES

ARRAY AREA & ROOF AREA CALC'S		
AREA OF NEW ARRAY (Sq. Ft.)	AREA OF ROOF(PLAN VIEW) (Sq. Ft.)	TOTAL ROOF AREA COVERED BY ARRAY %
2384.11	4738.10	50.32%

ROOF DESCRIPTION				
ROOF TYPE			COMP SHINGLE ROOF	
ROOF	ROOF TILT	AZIMUTH	TRUSS SIZE	TRUSS SPACING
#1	28°	93°	2"x6"	24" O.C.
#2	28°	273°	2"x6"	24" O.C.
#3	24°	93°	2"x6"	24" O.C.
#4	24°	273°	2"x6"	24" O.C.
#5	28°	93°	2"x6"	24" O.C.
#5	28°	273°	2"x6"	24" O.C.

NOTE: * 3/4" OR GREATER IMC, RMC, FMC, LFMC, PVC, HDPE, NUCC, RTRC, LFNC, FMT, ENT OREMT CONDUIT RUN EXPOSED CONDUIT RUN SHALL BE MIN. 7/8" ABOVE ROOF. * ROMEX RUN INSIDE ATTIC

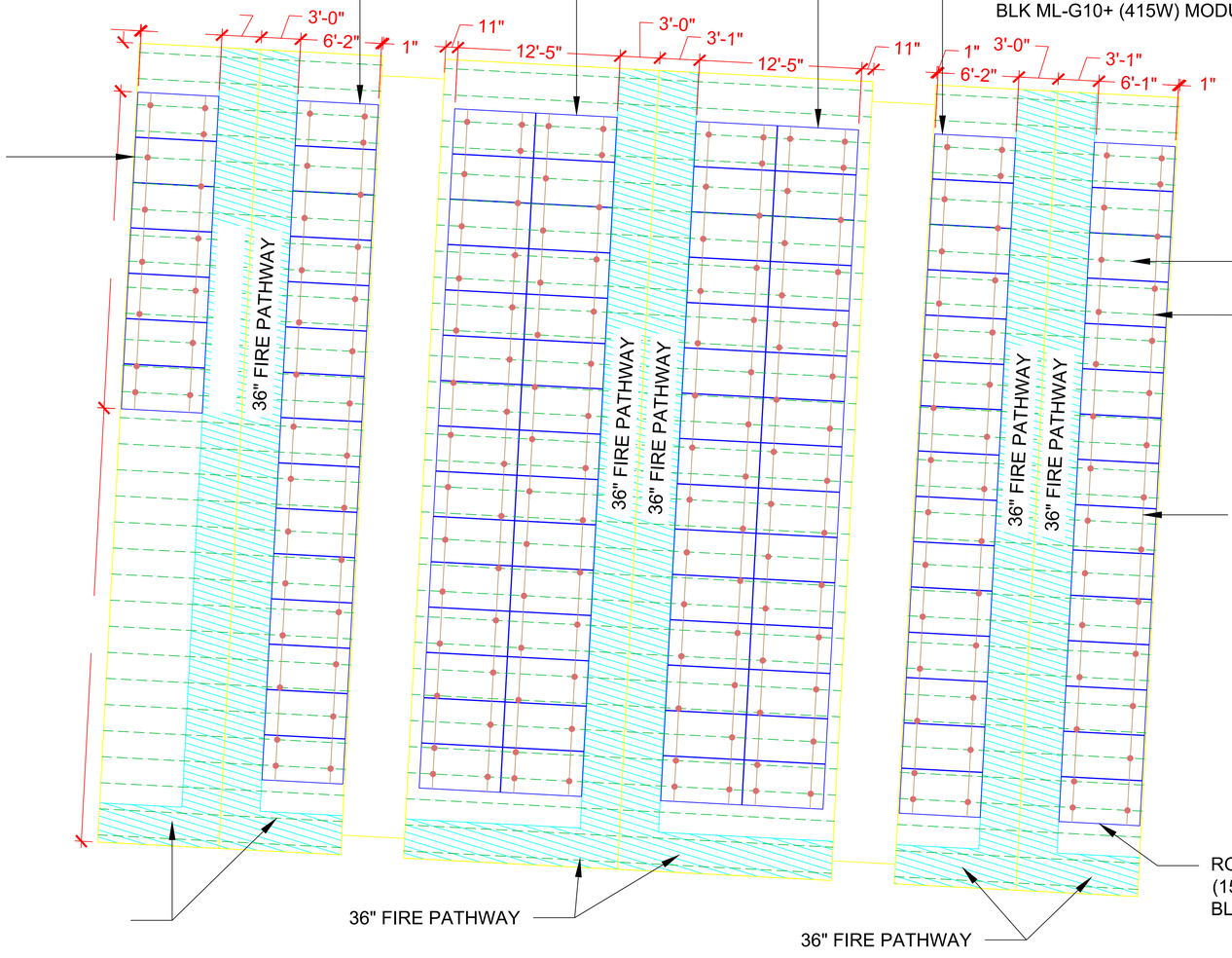
REAR YARD

ROOF #5
(15) HANWHA Q. CELLS Q. PEAK DUO BLK ML-G10+ (415W) MODULES

ROOF #4
(30) HANWHA Q. CELLS Q. PEAK DUO BLK ML-G10+ (415W) MODULES

ROOF #3
(30) HANWHA Q. CELLS Q. PEAK DUO BLK ML-G10+ (415W) MODULES

ROOF #2
(15) HANWHA Q. CELLS Q. PEAK DUO BLK ML-G10+ (415W) MODULES



(E) 2"X6" TRUSS @ 24" O.C. (TYP.)

(N) (210) SNAPNRACK L-FOOT ATTACHMENTS SPACED AT 72" O.C.

SNAPNRACK STANDARD RAIL

ROOF #1
(15) HANWHA Q. CELLS Q. PEAK DUO BLK ML-G10+ (415W) MODULES

FRONT YARD

MASSACHUSETTS AVE

LEGEND

- CHIMNEY
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
- ROOF ATTACHMENT
- TRUSS
- CONDUIT
- FIRE PATHWAY

NOTE:
"ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS."
-"A/C SURGE PROTECTIVE DEVICE TO BE INSTALLED ON INVERTER OUTPUT BEFORE BREAKER."

ROOF PLAN WITH MODULES

3/16" = 1'-0"

N

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VERSION		
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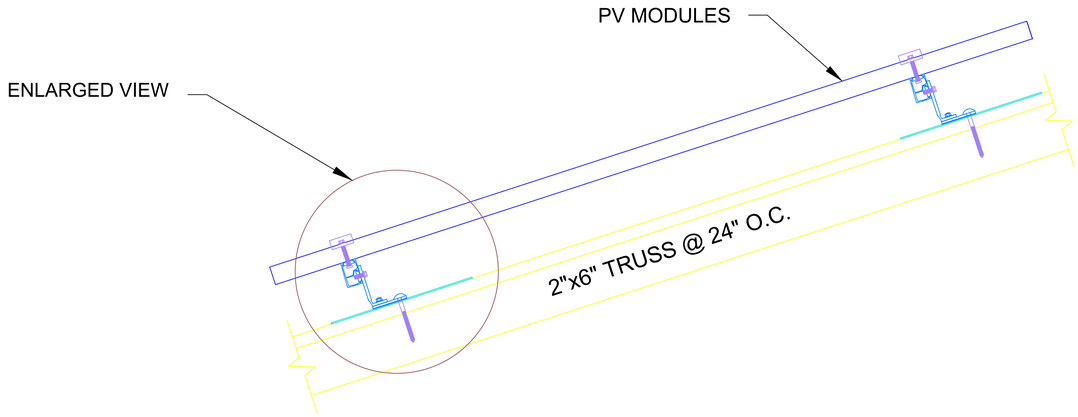
PROJECT NAME
ILYA ZVENIGORODSKIY
1513 MASSACHUSETTS AVE,
ARLINGTON, MA 02476
APN# N/A
UTILITY: EVERSOURCE
AHJ: MIDDLESEX COUNTY

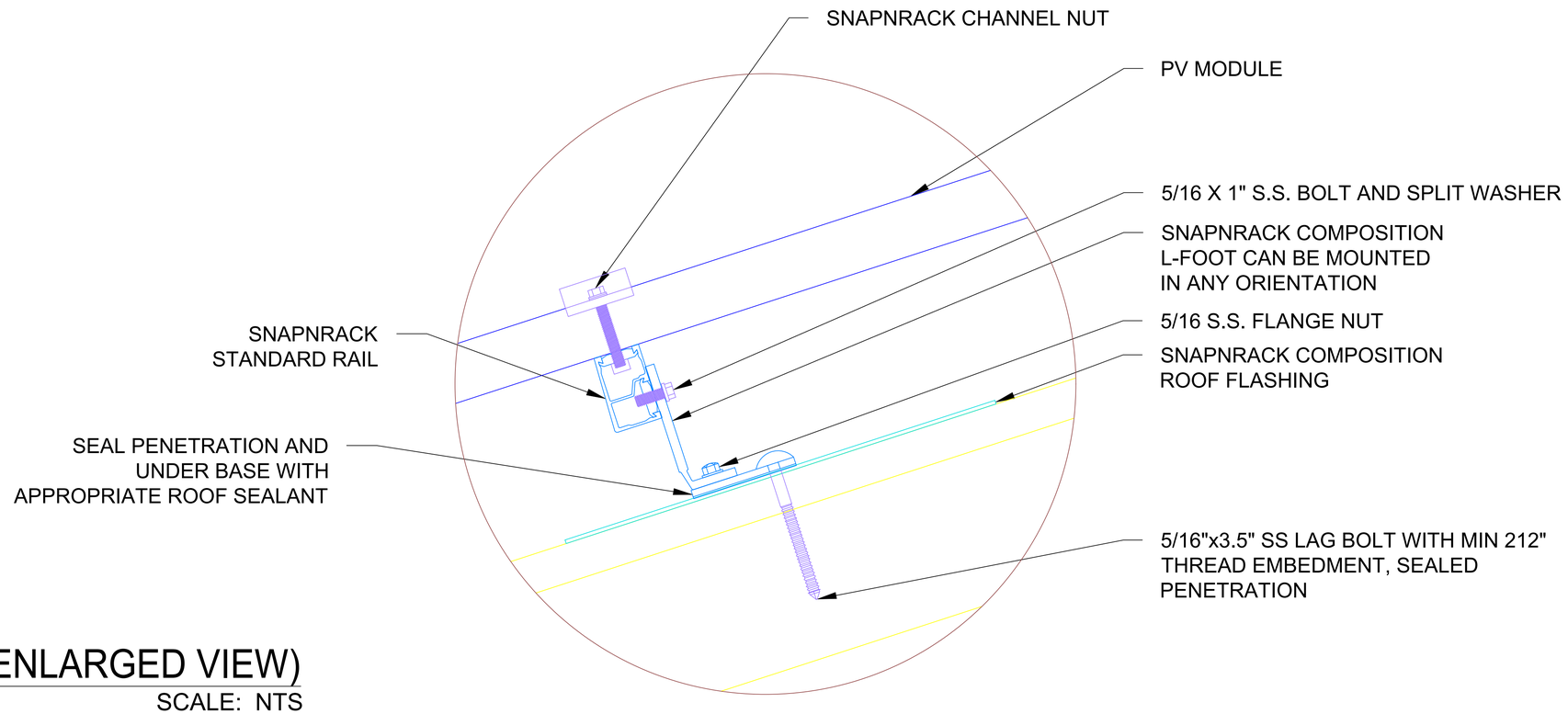
SHEET NAME
ROOF PLAN WITH MODULES

SHEET SIZE
24" X 36"

SHEET NUMBER
PV-2

NOTE: ACTUAL ROOF CONDITIONS AND RAFTERS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS





ATTACHMENT DETAIL (ENLARGED VIEW)

SCALE: NTS

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PROJECT NAME

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1513 MASSACHUSETTS AVE,
ARLINGTON, MA 02476
APN# N/A
UTILITY: EVERSOURCE
AHJ: MIDDLESEX COUNTY

SHEET NAME
ATTACHMENT DETAIL

SHEET SIZE
24" X 36"

SHEET NUMBER
PV-3

BLK ES

qcells

Breaking the 21% efficiency barrier

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 21.0%.

A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty[1].

Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology[2] and Hot-Spot Protect.

Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

The most thorough testing programme in the industry

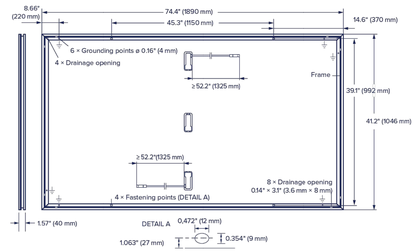
Qcells is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

[1] See data sheet on rear for further information.
[2] APT test conditions according to IEC/TS 62804-1:2015, method A (−1500 V, 96 h)

Q.PEAK DUO BLK ML-G10+ SERIES

Mechanical Specification

Format	74.4 in × 41.2 in × 1.57 in (including frame) (1890 mm × 1046 mm × 40 mm)
Weight	51.8 lbs (23.5 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥52.2 in (1325 mm), (−) ≥52.2 in (1325 mm)
Connector	Stäubli MC4; IP68

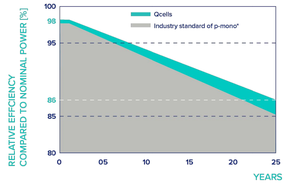


Electrical Characteristics

POWER CLASS			385	390	395	400	405	410	415
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W/−0 W)									
Minimum	Power at MPP[1]	P_{MPP} [W]	385	390	395	400	405	410	415
Minimum	Short Circuit Current[1]	I_{SC} [A]	11.04	11.07	11.10	11.14	11.17	11.20	11.23
Minimum	Open Circuit Voltage[1]	V_{OC} [V]	45.19	45.23	45.27	45.3	45.34	45.37	45.41
Minimum	Current at MPP	I_{MPP} [A]	10.59	10.65	10.71	10.77	10.83	10.89	10.95
Minimum	Voltage at MPP	V_{MPP} [V]	36.36	36.62	36.88	37.13	37.39	37.64	37.89
Minimum	Efficiency[1]	η [%]	≥19.5	≥19.7	≥20.0	≥20.2	≥20.5	≥20.7	≥21.0
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]									
Minimum	Power at MPP	P_{MPP} [W]	288.8	292.6	296.3	300.1	303.8	307.6	311.3
Minimum	Short Circuit Current	I_{SC} [A]	8.90	8.92	8.95	8.97	9.00	9.03	9.05
Minimum	Open Circuit Voltage	V_{OC} [V]	42.62	42.65	42.69	42.72	42.76	42.79	42.83
Minimum	Current at MPP	I_{MPP} [A]	8.35	8.41	8.46	8.51	8.57	8.62	8.68
Minimum	Voltage at MPP	V_{MPP} [V]	34.59	34.81	35.03	35.25	35.46	35.68	35.89

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

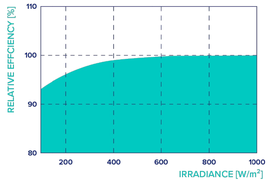


At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation of your respective country.

*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.34	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3 °C)

Properties for System Design

Maximum System Voltage	V_{SYS}	[V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating		[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push/Pull[3]		[lbs/ft²]	75 (3600 Pa)/75 (3600 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push/Pull[3]		[lbs/ft²]	112 (5400 Pa)/112 (5400 Pa)		

[3] See Installation Manual

Qualifications and Certificates

UL61730-1 & UL61730-2, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
IEC 61215:2016, IEC 61730:2016,
U.S. Patent No. 9,893,215 (solar cells),

www.tuv.com ID 1111220277

*Contact your Qcells Sales Representative for details regarding the module's eligibility to be Buy American Act (BAA) compliant.

Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.
Hanwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL hqc-inquiry@qcells.com | WEB www.qcells.com

qcells

Specifications subject to technical changes © Qcells Q.PEAK_DUO_BLK_ML-G10+_TS_DA_385-405_2024-04_Rev02_NA(without ZEP)

GREAT SKY SOLAR
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AHJ: MIDDLESEX COUNTY

SHEET NAME
SPEC SHEETS

SHEET SIZE
24" X 36"

SHEET NUMBER
PV-4

UR-40
UR-60

a Rail



e in Rooftop Solar

Mounts available for all roof types

All SnapNrack Module Clamps & Accessories are compatible with both rail profiles

Ultra Rail Today

onrack.com/resources
onrack.com/configurator
onrack.com/where-to-buy

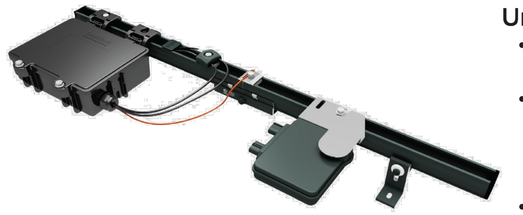
SnapNrack Ultra Rail System

A sleek, straightforward rail solution for mounting solar modules on all roof types. Ultra Rail features two rail profiles; UR-40 is a lightweight rail profile that is suitable for most geographic regions and maintains all the great features of SnapNrack rail, while UR-60 is a heavier duty rail profile that provides a larger rail channel and increased span capabilities. Both are compatible with all existing mounts, module clamps, and accessories for ease of install.

The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with all the SnapNrack Mid Clamps and End Clamps customers love
- Universal End Clamps and snap-in End Caps provide a clean look to the array edge





Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits, and Conduit Clamps
- System is fully bonded and listed to UL 2703 Standard

Heavy Duty UR-60 Rail

- UR-60 rail profile provides increased span capabilities for high wind speeds and snow loads
- Taller, stronger rail profile includes profile-specific rail splice and end cap
- All existing mounts, module clamps, and accessories are retained for the same great install experience



Quality. Innovative. Superior.

SnapNrack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety.

877-732-2860 **www.snapnrack.com** **contact@snapnrack.com**

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SOLAR

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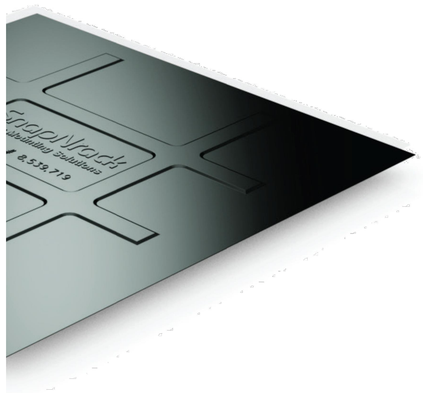
SHEET NAME
SPEC SHEETS

SHEET SIZE
24" X 36"

SHEET NUMBER
PV-5

Series 100

L Foot



eatherproof achment

Preassembled, snap-in hardware reduces installation time

Included in Series 100 UL 2703 Listing

lashed L Foot Today

nrack.com/resources
nrack.com/configurator
nrack.com/where-to-buy

SnapNrack Series 100 Flashed L Foot Kit

is an industry-leading, weatherproof solution for attaching to composition shingle roofs. The Flashed L Foot provides a fully flashed method for mounting the SnapNrack Series 100 system. The combination of Series 100 and the Flashed L foot is guaranteed to improve labor times and ensure the highest quality install possible.

Flashing

- Available in black galvanized steel or aluminum for enhanced corrosion resistance
- L Foot is attaches to bottom edge of flashing, removing the need for shingle cutting
- Innovative stamped features provide increased rigidity



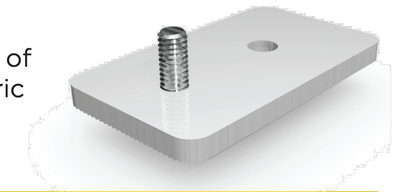


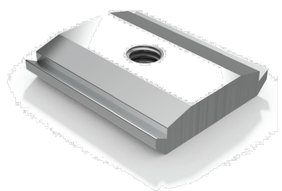
L Foot

- Engineered for maximum adjustability with the ability to orient in any direction
- Vertical adjustability up to 3” using available spacers

L Foot Base

- Provides a long lasting watertight seal over the life of the system that does not rely on rubber (elastomeric seals) that will degrade over time
- Easily installs with off-the-shelf lag screws





Channel Nut

- Provides snap-in installation to the rail channel with no drilling required
- Wide range of adjustability due to sliding ability in rail prior to final tightening

Quality. Performance. Innovation.

SnapNrack solutions are focused on simplifying the installation experience through intuitive products and the best wire management in the industry.

SnapNrack
Solar Mounting Solutions

877-732-2860 www.snapnrack.com contact@snapnrack.com

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AHJ: MIDDLESEX COUNTY

SHEET NAME
SPEC SHEETS

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SHEET NUMBER
PV-6