WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE
Scott E. Wyssling, PE
Coleman D. Larsen, SE, PE
Gregory T. Elvestad, PE

76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

May 17, 2023

Current Insight
2852 W. Amini Way
South Jordan, UT 84095

Re: Engineering Services
Lynch Residence
44 Gold Court, Broadway, NC
5.265 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

A. Site Assessment Information

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

B. Description of Structure:

Roof Framing:	Prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.
Roof Material:	Composite Asphalt Shingles
Roof Slope:	22 degrees
Attic Access:	Accessible
Foundation:	Permanent

C. Loading Criteria Used

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 10 psf
- **Wind Load** based on ASCE 7-10
  - Ultimate Wind Speed = 115 mph (based on Risk Category II)
  - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 North Carolina Residential Code*, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.*

D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent IronRidge installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a $^{5}/_{16}$" lag screw is 229 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 2½", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using one $^{5}/_{16}$" diameter lag screw with a minimum of 2½" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2018 North Carolina Residential Code, current industry standards, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License No. 46546
North Carolina COA P-2308

CONOR LYNCH RESIDENCE

NEW PHOTOVOLTAIC SYSTEM PROJECT - 5.265 KW DC / 4.537KW AC

SHEET #	SHEET NAME
T-1	COVER SHEET
T-2	PLAN NOTES
PV-1	SITE PLAN LAYOUT
PV-2	ATTACHMENT DETAILS
PV-3	MOUNTING DETAILS
E-1	ELECTRICAL DIAGRAM
E-2	WARNING LABELS
S-1	SPEC SHEET
S-2	SPEC SHEET
S-3	SPEC SHEET
S-4	SPEC SHEET

PROJECT INFORMATION

PROPERTY OWNER

NAME: CONOR LYNCH
PHONE: -

CONTRACTOR

NAME: BYLD
PHONE:

DESIGN SPECIFICATIONS

OCCUPANCY: R-3
CONSTRUCTION TYPE: SINGLE FAMILY RESIDENCE
ZONING: RESIDENTIAL
WIND EXPOSURE: C

APPLICABLE CODES & STANDARDS

INTERNATIONAL RESIDENTIAL CODE 2018 (IRC 2018)
INTERNATIONAL BUILDING CODE 2018 (IBC 2018)
NATIONAL ELECTRICAL CODE, NEC 2017 CODE BOOK, NFPA 70
INTERNATIONAL FIRE CODE 2018 (IFC 2018)

TYPE OF INTERCONNECTION: BACKFEED BREAKER IN THE SSP

SCOPE OF WORK

SYSTEM SIZE: STC: 13 X 405W = 5.265kW
PTC: 13 X 376.9W = 4.900kW
(13) MITREX SOLAR M405-I3H (405W) SOLAR MODULES
(13) ENPHASE IQ 8A-72-2-US MICROINVERTER
(1) 30A KNIFE AC DISCONNECT
(1) 125A ENPHASE IQ COMBINER 4/4C BOX

MSP UPGRADE: NO
MAIN BREAKER DERATE: NO

RACKING & MOUNTING

PV ATTACHMENT TYPE: IRONRIDGE FLASHVUE FOR COMP SHINGLE ROOF

RACKING TYPE: IRONRIDGE XR10 RAIL ROOF MOUNT RACKING HARDWARE

NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 5/17/2023

COORDINATES:
35.326859, -79.021568

AERIAL VIEW

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
T-1
COVER SHEET

1.1. PROJECT NOTES:

1.2. THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC) ARTICLE 690, ALL MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.

1.3. THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION

1.4. GROUND FAULT DETECTION AND INTERRUPTION (GFDI) DEVICE IS INTEGRATED WITH THE MICROINVERTER IN ACCORDANCE WITH NEC 690.5(A)

1.5. ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC 690.4 & NEC 690.60: PV MODULES: UL1703, IEC61730, AND IEC61215, AND NFPA 70 CLASS C FIRE INVERTERS: UL 1741 CERTIFIED, IEEE 1547, 929, 519 COMBINER BOX(ES): UL 1703 OR UL 1741 ACCESSORY

1.6. MAX DC VOLTAGE CALCULATED USING MANUFACTURER PROVIDED TEMP COEFFICIENT FOR VOC. IF UNAVAILABLE, MAX DC VOLTAGE CALCULATED ACCORDING TO NEC 690.7.

1.7. ALL INVERTERS, PHOTOVOLTAIC MODULES, PHOTOVOLTAIC PANELS, AND SOURCE CIRCUIT COMBINERS INTENDED FOR USE IN A PHOTOVOLTAIC POWER SYSTEM WILL BE IDENTIFIED AND LISTED FOR THE APPLICATION PER 690.4 (D). SHALL BE INSTALLED ACCORDING TO ANY INSTRUCTIONS FROM LISTING OR LABELING [NEC 110.3].

1.8. ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

1.9. SCOPE OF WORK:

1.10. PRIME CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM RETROFIT. PRIME CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTING EXISTING ONSITE REQUIREMENTS TO DESIGN, SPECIFY, AND INSTALL THE EXTERIOR ROOF-MOUNTED PORTION OF THE PHOTOVOLTAIC SYSTEMS DETAILED IN THIS DOCUMENT.

1.11. WORK INCLUDES:

1.12. PV ROOF ATTACHMENTS - IRONRIDGE FLASHVUE FOR COMP SHINGLE

1.13. PV RACKING SYSTEM INSTALLATION - IRONRIDGE XR10 RAIL ROOF MOUNT RACKING HARDWARE

1.14. PV MODULE AND INVERTER INSTALLATION - MITREX SOLAR M405-I3H (405W) MODULES/ ENPHASE IQ 8A-72-2-US MICROINVERTERS

1.15. EQUIPMENT GROUNDING

1.16. PV SYSTEM WIRING TO A ROOF-MOUNTED JUNCTION BOX

1.17. PV LOAD CENTERS (IF INCLUDED)

1.18. PV METERING/MONITORING (IF INCLUDED)

1.19. PV DISCONNECTS

1.20. PV GROUNDING ELECTRODE & BONDING TO (E) GEC

1.21. PV FINAL COMMISSIONING

1.22. (E) ELECTRICAL EQUIPMENT RETROFIT FOR PV

1.23. SIGNAGE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE

1.24. SITE NOTES:

1.25. A LADDER WILL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.

1.26. THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.

1.27. THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.

1.28. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED AS PER SECTION NEC 110.26.

1.29. ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

1.30. EQUIPMENT LOCATIONS:

1.31. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY NEC 110.26.

1.32. WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C)

1.33. JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES ACCORDING TO NEC 690.34.

1.34. ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.

1.35. ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL ACCORDING TO NEC APPLICABLE CODES.

1.36. ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

1.37. STRUCTURAL NOTES:

1.38. RACKING SYSTEM

1.39. PV ARRAY WILL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND

1.40. A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, ACCORDING TO RAI MANUFACTURER'S INSTRUCTIONS.

1.41. JUNCTION BOX WILL BE INSTALLED PER MANUFACTURERS' SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED SEALED PER LOCAL REQUIREMENTS.

1.42. ROOFTOP PENETRATIONS FOR PV RACEWAY WILL BE COMPLETED AND SEALED W/ APPROVED CHEMICAL SEALANT PER CODE BY A LICENSED CONTRACTOR.

1.43. ALL PV RELATED ROOF ATTACHMENTS TO BE SPACED NO GREATER THAN THE SPAN DISTANCE SPECIFIED BY THE RACKING MANUFACTURER.

1.44. WHEN POSSIBLE, ALL PV RELATED RACKING ATTACHMENTS WILL BE STAGGERED AMONGST THE ROOF FRAMING MEMBERS.

1.45. WIRING & CONDUIT NOTES:

1.46. ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.

1.47. CONDUCTORS SIZED ACCORDING TO NEC 690.8, NEC 690.7.

1.48. VOLTAGE DROP LIMITED TO 1.5%.

1.49. DC WIRING LIMITED TO MODULE FOOTPRINT. MICROINVERTER WIRING SYSTEMS SHALL BE LOCATED AND SECURED UNDER THE ARRAY W/ SUITABLE WIRING CLIPS.

1.50. AC CONDUCTORS COLORED OR MARKED AS FOLLOWS: PHASE A OR L1- BLACK PHASE B OR L2- RED, OR OTHER CONVENTION IF THREE PHASE PHASE C OR L3- BLUE, YELLOW, ORANGE**, OR OTHER CONVENTION NEUTRAL- WHITE OR GREY IN 4-WIRE DELTA CONNECTED SYSTEMS THE PHASE WITH HIGHER VOLTAGE TO BE MARKED ORANGE [NEC 110.15

1.51. GROUNDING NOTES:

1.52. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVISES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.

1.53. PV EQUIPMENT SHALL BE GROUNDED ACCORDING TO NEC 690.43 AND MINIMUM NEC TABLE 250.122.

1.54. METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORD WITH 250.134 AND 250.136(A).

1.55. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45 AND MICROINVERTER MANUFACTURER'S INSTRUCTIONS.

1.56. EACH MODULE WILL BE GROUNDED USING WEEB GROUNDING CLIPS AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ. IF WEEBS ARE NOT USED, MODULE GROUNDING LUGS MUST BE INSTALLED AT THE SPECIFIED GROUNDING LUG HOLES PER THE MANUFACTURER'S INSTALLATION REQUIREMENTS.

1.57. THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.

1.58. GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER [NEC 250.119]

1.59. THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED ACCORDING TO NEC 250, NEC 690.47 AND AHJ.

1.60. GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.5 IN GENERAL AND NEC 690.5 (A)(1) SPECIFICALLY.

1.61. DISCONNECTION AND OVER-CURRENT PROTECTION NOTES:

1.62. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS).

1.63. DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH

1.64. RAPID SHUTDOWN OF ENERGIZED CONDUCTORS BEYOND 10 FT OF PV ARRAY OR 5 FT INSIDE A BUILDING WITHIN 10 SECONDS. CONTROLLED CONDUCTORS ≤30V AND ≤240VA [NEC 690.12]. LOCATION OF LABEL ACCORDING TO AHJ

1.65. ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.

1.66. MICROINVERTER BRANCHES CONNECTED TO A SINGLE BREAKER OR GROUPED FUSES IN ACCORDANCE WITH NEC 110.3(B).

1.67. IF REQUIRED BY AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION ACCORDING TO NEC 690.11 AND UL1699B.

1.68. INTERCONNECTION NOTES:

1.69. LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH [NEC 690.64 (B)]

1.70. THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS INPUT MAY NOT EXCEED 120% OF BUSBAR RATING [NEC 705.12(D)(2)(3)].

1.71. WHEN SUM OF THE PV SOURCES EQUALS >100% OF BUSBAR RATING, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD [NEC 705.12(D)(2)(3)].

1.72. AT MULTIPLE PV OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE COMBINED OVERCURRENT DEVICE MAY BE EXCLUDED ACCORDING TO NEC 705.12 (D)(2)(3)(C).

1.73. [illegible] TAP INTERCONNECTION (LOAD SIDE) ACCORDING TO NEC 705.12 (D)(CA)

SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12 (A) WITH CONDUCTORS IN ACCORDANCE WITH NEC 230.42

[illegible] BACKFED BREAKER FOR UTILITY-INTERACTIVE INVERTER OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING [NEC 705.12 (D)(5)].

NORTH CAROLINA PROFESSIONAL SEAL 040546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Signed 5/17/2023

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

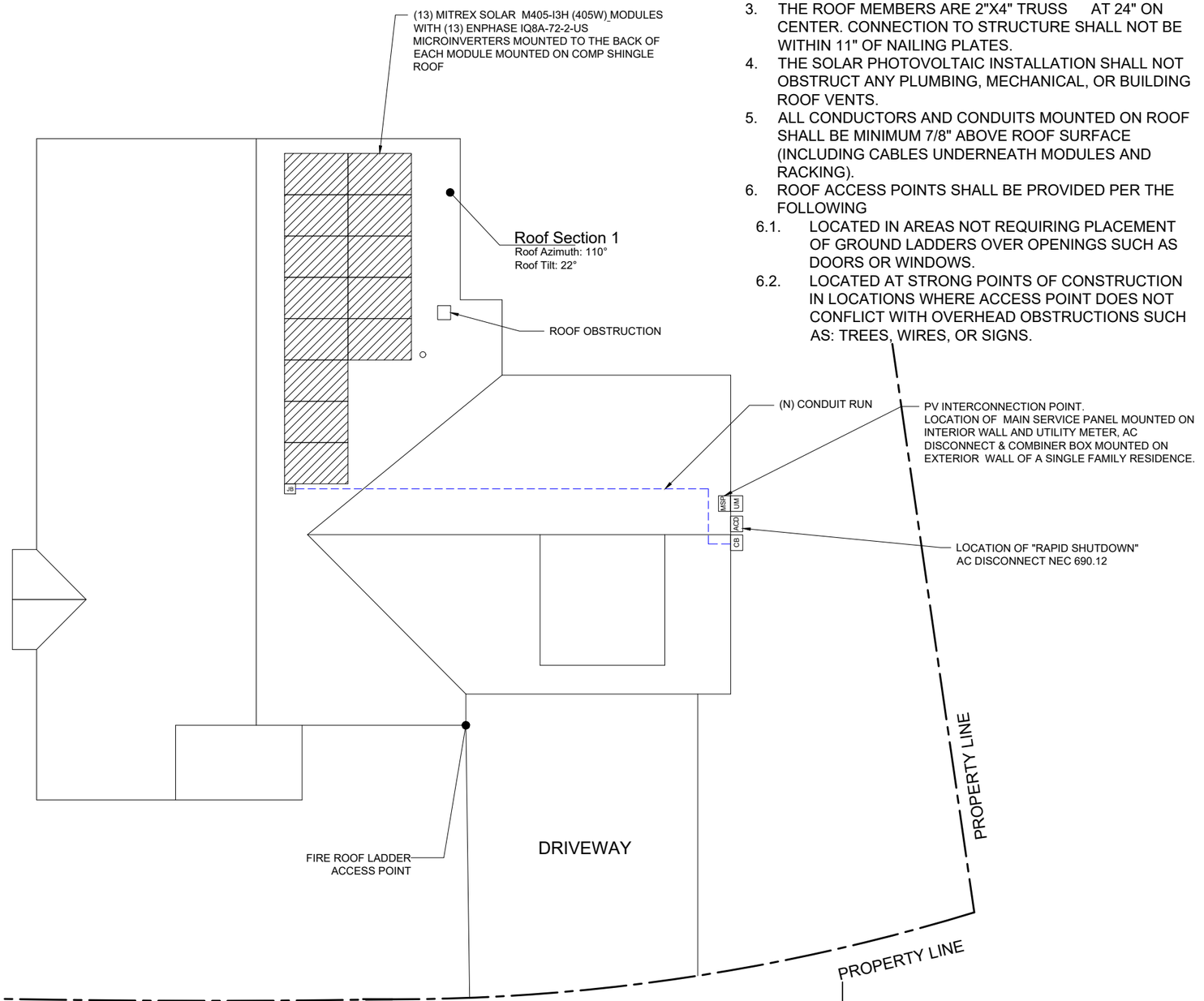
CompleteSolar
A Brighter Way.

SHEET
T-2
PLAN NOTES

N

PV SYSTEM SIZE:
5.265 kW DC

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 5/17/2023



CONSTRUCTION NOTES

1. SOLAR PHOTOVOLTAIC SYSTEM TO BE INSTALLED ON RESIDENTIAL STRUCTURE.
2. THIS PROJECT HAS BEEN DESIGNED IN COMPLIANCE WITH THE IBC SECTION 1609 TO WITHSTAND A BASIC, WIND EXPOSURE C.
3. THE ROOF MEMBERS ARE 2"X4" TRUSS AT 24" ON CENTER. CONNECTION TO STRUCTURE SHALL NOT BE WITHIN 11" OF NAILING PLATES.
4. THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
5. ALL CONDUCTORS AND CONDUITS MOUNTED ON ROOF SHALL BE MINIMUM 7/8" ABOVE ROOF SURFACE (INCLUDING CABLES UNDERNEATH MODULES AND RACKING).
6. ROOF ACCESS POINTS SHALL BE PROVIDED PER THE FOLLOWING
   - 6.1. LOCATED IN AREAS NOT REQUIRING PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS DOORS OR WINDOWS.
   - 6.2. LOCATED AT STRONG POINTS OF CONSTRUCTION IN LOCATIONS WHERE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS: TREES, WIRES, OR SIGNS.

LEGEND	
	NEW SOLAR PANELS
UM	UTILITY METER
ACD	AC DISCONNECT
MSP	MAIN SERVICE PANEL
CB	COMBINER BOX

44 GOLD CT

PV SYSTEM SITE PLAN

SCALE: 3/32" = 1'-0"

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

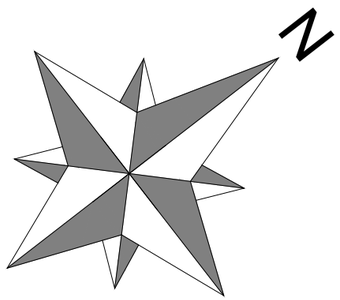
DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

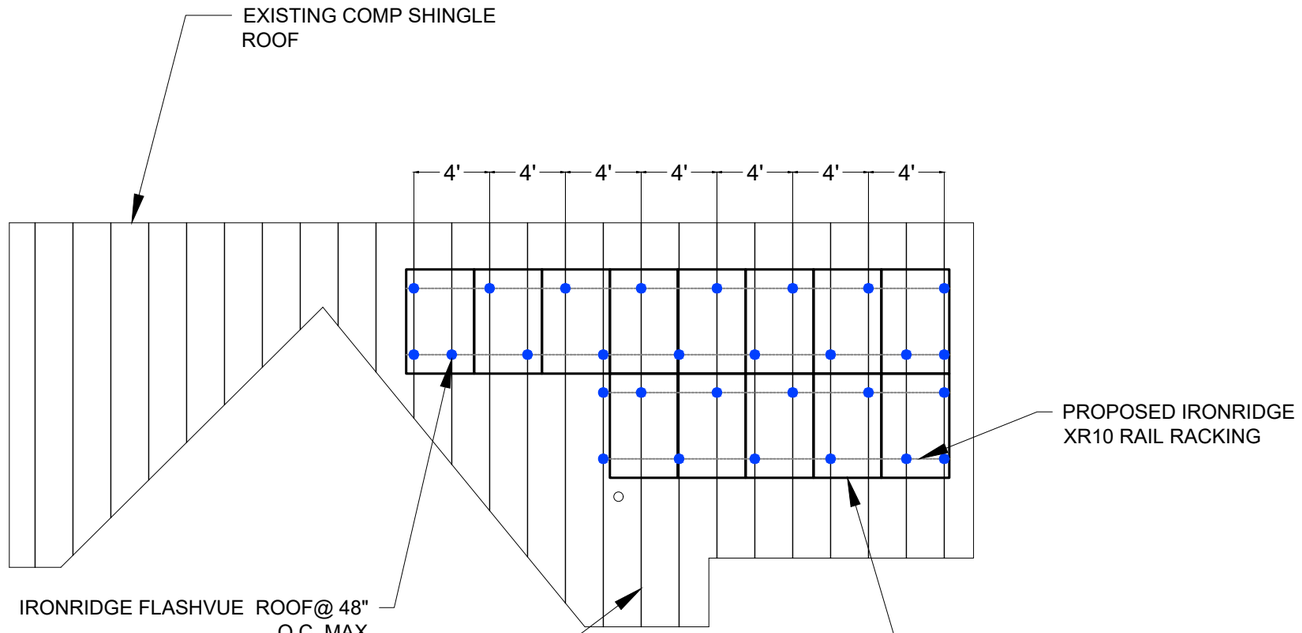
SHEET
PV-1
SITE PLAN LAYOUT



Roof Section 1

Roof Azimuth: 110°

Roof Tilt: 22°



Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 5/17/2023

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

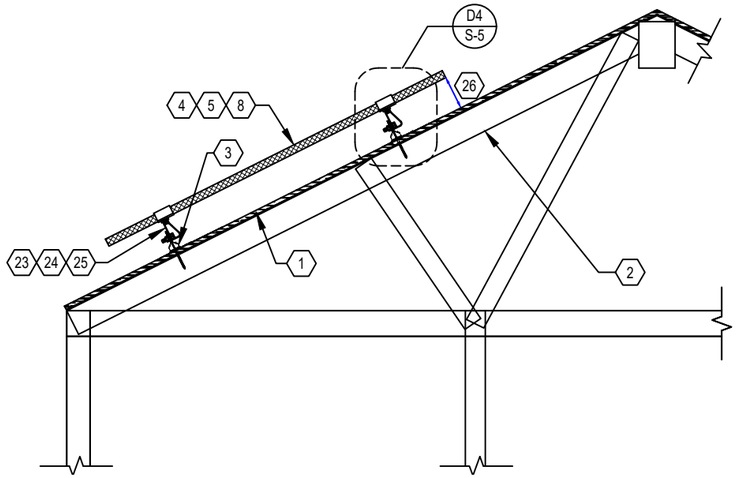
DESIGN BY

CompleteSolar
A Brighter Way.

PV SYSTEM MOUNTING DETAILS

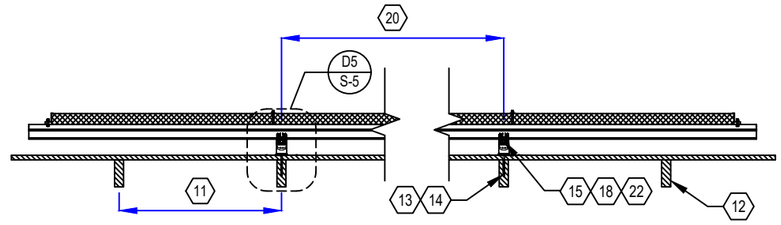
SCALE: 1/8" = 1'-0"

SHEET
PV-2
ATTACHMENT DETAILS



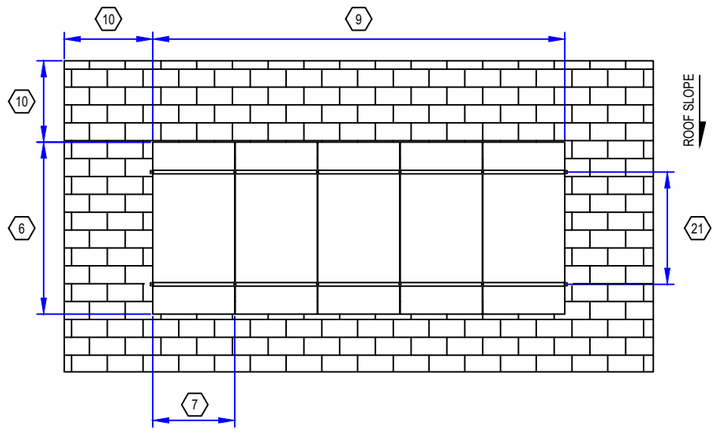
D1 RACKING DETAIL (TRANSVERSE)

NOT TO SCALE



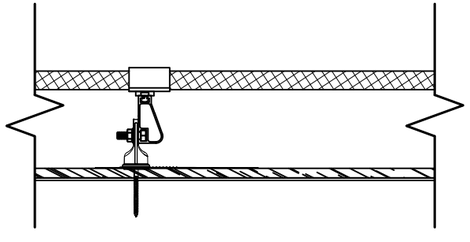
D2 RACKING DETAIL (LONGITUDINAL)

NOT TO SCALE



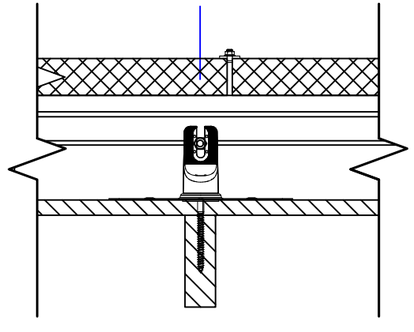
D3 RACKING DETAIL (TOP)

NOT TO SCALE



D4 DETAIL (TRANSVERSE)

NOT TO SCALE



D5 DETAIL (LONGITUDINAL)

NOT TO SCALE

1. ROOF MATERIAL: COMP SHINGLE
2. ROOF STRUCTURE: TRUSS
3. ATTACHMENT TYPE: IRONRIDGE FLASHVUE
4. MODULE MANUFACTURER: MITREX SOLAR
5. MODULE MODEL: M405-I3H (405W)
6. MODULE LENGTH: 67.8"
7. MODULE WIDTH: 44.6"
8. MODULE WEIGHT: 45.2 LBS.
9. SEE SHEET S-1 FOR DIMENSION(S)
10. MIN. FIRE OFFSET: 18"
11. TRUSS SPACING: 24" O.C.
12. TRUSS SIZE: 2"X4" NOMINAL
13. LAG BOLT DIAMETER: 5/16 IN.
14. LAG BOLT EMBEDMENT: 2.5 IN.
15. TOTAL # OF ATTACHMENTS: 29
16. TOTAL AREA: 272.99 SQ. FT.
17. TOTAL WEIGHT: 587.60LBS.
18. WEIGHT PER ATTACHMENT: 20.26 LBS.
19. DISTRIBUTED LOAD: 2.15 PSF
20. MAX. HORIZONTAL STANDOFF: 48 IN.
21. MAX. VERTICAL STANDOFF: LANDSCAPE: 26 IN., PORTRAIT: 43 IN.
22. STANDOFF STAGGERING: YES
23. RAIL MANUFACTURER AND MODEL (OR EQUIV.):IRONRIDGE XR10 RAIL
24. RAIL WEIGHT: 0.436 PLF.
25. MAX. RAFTERS SPAN: 12 FT.
26. MODULE CLEARANCE: 3 IN. MIN., 6 IN. MAX.

NORTH CAROLINA PROFESSIONAL SEAL 046548 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308
Signed 5/17/2023

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
PV-3
MOUNTING DETAILS

PV Module Ratings @ STC

Module Make/Model	MITREX SOLAR M405-I3H (405W)
Max Power-Point Current (Imp)	13.02A
Max Power-Point Voltage (Vmp)	31.11V
Open-Circuit Voltage (Voc)	37.55V
Short-Circuit Current (Isc)	13.73A
Max Series Fuse (OCPD)	25A
Nominal Maximum Power at STC (Pmax)	405W
Maximum System Voltage	1500V
Voc Temperature Coefficient	-0.262 %/K

SYSTEM SUMMARY

	BRANCH #1	BRANCH #2
INVERTERS PER BRANCH	7	6
MAX AC CURRENT	10.15A	8.70A
MAX AC OUTPUT POWER	2443W	2094W
ARRAY STC POWER		5265W
ARRAY PTC POWER		4899.7W
MAX AC CURRENT		18.85A
MAX AC POWER		4537W
DERATED (CEC) AC POWER		4752.70W

Inverter Ratings

Inverter Make/Model	ENPHASE IQ 8A-72-2-US
Max DC Volt Rating	60V
Peak Output Power	349W
Max Nominal Voltage	240V
Max AC Current	1.45A
Max OCPD Rating	20A

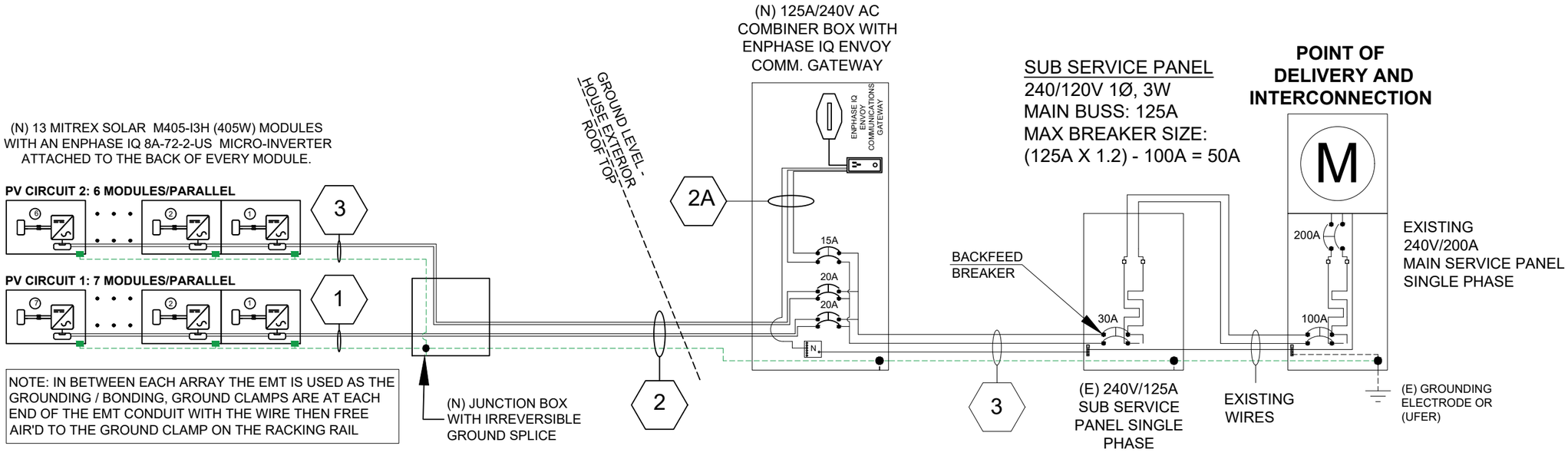
DESIGN TEMPERATURES

ASHRAE EXTREME LOW	-10°C
ASHRAE 2% HIGH	38°C

Conduit and Conductor Schedule

Tag	Description	Wire Gauge	# of Conductors	Conduit Type	Conduit Size
1	Enphase Q Cable-THWN-2	10 AWG	2	N/A - Free Air	N/A - Free Air
1	Bare Copper Ground (EGC/GEC)	6 AWG	1	N/A - Free Air	N/A - Free Air
2	THWN-2	10 AWG	4	EMT	3/4"
2	THWN-2 - Ground	10 AWG	1	EMT	3/4"
2A	THWN-2	10 AWG	3	N/A -Free Air	N/A -Free air
3	THWN-2	10 AWG	3	EMT	3/4"
3	THWN-2 - Ground	10 AWG	1	EMT	3/4"

METER # 325501186



BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
E-1
ELECTRICAL DIAGRAM

WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION:
INVERTER(S), AC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE).
PER CODE(S): NEC : 690.13(B), NEC : 690.17(E), NEC : 690.17(4)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL LOCATION:
UTILITY SERVICE ENTRANCE/METER, INVERTER/DC DISCONNECT IF REQUIRED BY LOCAL AHJ, OR OTHER LOCATIONS AS REQUIRED BY LOCAL AHJ.
PER CODE(S): NEC : 690.56(C)(3), NEC : 690.12, NEC 690.56, IFC 605.11.1, IFC : 1204.5.3

WARNING

POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER (IF APPLICABLE).
PER CODE(S): NEC : 705.12(B)(3)(2), NEC : 705.12(B)(2)(3)(b), NEC : 705.12(D)(2)(3)(b)

WARNING

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

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): NEC : 690.54, NEC : 690.54, NEC : 690.54

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL LOCATION: PV SYSTEM DISCONNECT
PER CODE(S): NEC 690.13(B)

WARNING

DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

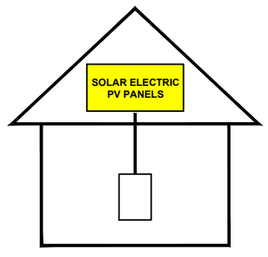
LABEL LOCATION:
MAIN SERVICE PANEL (IF APPLICABLE).
PER CODE(S): NEC : 705.12(C) & 690.59

GENERATION DISCONNECT SWITCH
MAXIMUM AC OPERATING CURRENT: 18.85 AMPS
NOMINAL OPERATING AC VOLTAGE: 240.0 VAC

LABEL LOCATION:
AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): NEC : 690.54

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

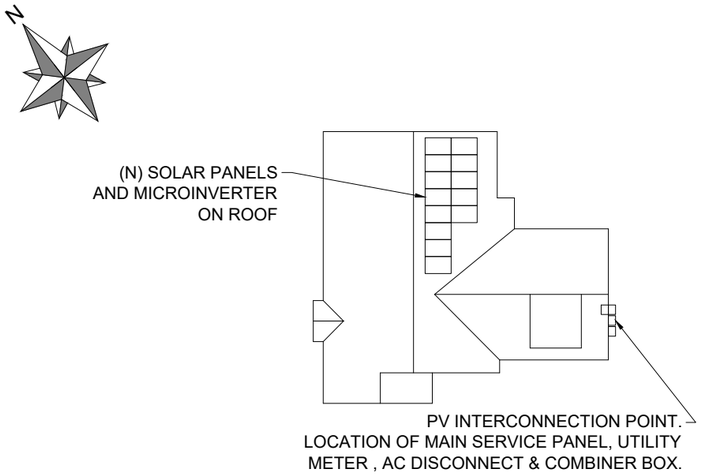
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY.



LABEL LOCATION:
ON OR NO MORE THAT 3 M (10 FT) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED.
PER CODE(S): NEC : 690.56(C)(1)(a)

CAUTION:

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS AS SHOWN



44 GOLD CT

PERMANENT SIGNAGE NOTES:

1. NOT ALL PLACARDS SHOWN MAY BE REQUIRED BY LOCAL AHJ. CONTRACTOR TO VERIFY PLACARD REQUIREMENTS WITH LOCAL AHJ BEFORE INSTALLATION.
2. ALL PLAQUES AND SIGNAGE REQUIRED BY THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE
3. ALTERNATE POWER SOURCE PLACARD SHALL BE METALLIC OR MACHINE PRINTED LETTERS IN A CONTRASTING COLOR TO THE PLAQUE. THIS PLAQUE WILL BE ATTCHED BY POP RIVETS OR SCREWS OR OTHER APPROVED METHOD.
4. DIRECTORY PLACARD MARKING CONTENT AND FORMAT: RED BACKGROUND, WHITE LETTERING, MINIMUM 3/8" LETTER HIEGHT, ALL CAPITAL LETTERS, ARIAL OR SIMILAR FONT, NON BOLD, REFLECTIVE WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT.

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
E-2
WARNING LABELS

HIGH EFFICIENCY MONO PV MODULE

NORTH AMERICAN MANUFACTURER

Mitrex is a world-leading manufacturer of standard solar and BIPV products based in Canada. With over 20 years of experience, Mitrex guarantees high-quality, fully-automated manufacturing and continuous innovation in solar technology.

QUALITY, DURABILITY & PERFORMANCE

Mitrex panels are engineered with the highest quality- featuring wide-ranging compatibility with racking and electrical components, advanced cell technology, ability to withstand high snow/wind load conditions, and high performing modules.

25-YEAR PRODUCT & PERFORMANCE WARRANTY

All our products come with an industry leading 25-year warranty for products and performance, ensuring the quality of the hardware, energy generation, and aesthetics are maintained.

MITREX™
BUILDING-INTEGRATED SOLAR TECHNOLOGY

THE WORLD'S LARGEST BIPV MANUFACTURER

M405-L3H
M405-I3H

PRODUCT PERFORMANCE 25 YEAR WARRANTY

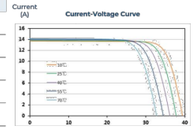
MANUFACTURING NORTH AMERICA

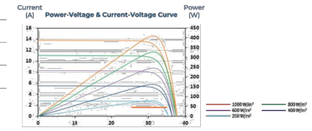
GUARANTEE HIGH EFFICIENCY

ELECTRICAL SPECIFICATIONS	SOLAR PANEL M405-L3H / M405-I3H
Test Conditions	**STC**
Module Power (Pmax)	405W
Maximum Power Voltage (Vpmax)	31.11V
Maximum Power Current (Ipmax)	13.02A
Open Circuit Voltage (Voc)	37.55V
Short Circuit Current (Isc)	13.73A
Module Efficiency	21%
Maximum System Voltage (VDC)	1500V (IEC/UL)
Series Fuse Rating	25A
Power & Other Electrical Specification Tolerance	5%
Application Classification	Class A

Measurement Conditions: STC 1000 W/m² - AM 1.5 - Temperature 25°C

I-V CURVES



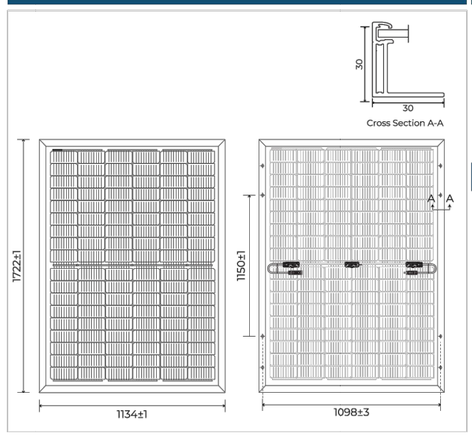


MECHANICAL PROPERTIES	METRIC	IMPERIAL
Module Weight	20.5 ± 1 kg	45.2 ± 2.2 lbs
Dimensions (H x L x D)	1722 x 1134 x 30mm	67.8 x 44.6 x 1.2in
Maximum Surface Load (Wind / Snow)	5400Pa rear load / 5400Pa front load	112.8psf rear load / 112.8psf front load
Hail Impact Resistance	ø 25mm at 83 km/h	ø 1in at 51.6 mph
Cells	108 [(6x9)x2] Mono-crystalline half cell (182 x 182mm)	108 [(6x9)x2] Mono-crystalline (7.16 x 7.16in)
Glass	3.2mm tempered glass, high transmittance, anti-reflective coating	0.126in tempered glass, high transmittance, anti-reflective coating
Cables & Connectors (Refer to Installation Manual)	300mm - 4mm², 12 AWG (UL) MC4	11.8in - 0.16 in², 12 AWG (UL) MC4
Backsheet	High durability, UV resistant, PV backsheet	
Frame	Anodized aluminum alloy black frame	
Bypass Diodes	3 diodes	
Junction Box	IP68 rated, TUV and UL certified	
Fire Rating	Type I	

TEMPERATURE RATINGS	
Temperature Coefficient Isc	0.054% /°C
Temperature Coefficient Voc	-0.262% /°C
Temperature Coefficient Pmax	-0.341% /°C
Nominal Module Operating Temperature	42.5 ± 2°C
Operating Temperature	-40°C ~ +85°C

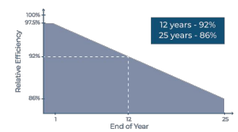
SHIPPING	
Modules Per Pallet	37
Pallets Per Truck	26
Modules Per Truck	962

ENGINEERING DRAWING



WARRANTY

Product Warranty: 25 years
Perfomance Warranty:
- ≥ 97.5% end of 1st year
- ≥ 92% end of 12th year
- ≥ 86% end of 25th year



CERTIFICATIONS

UL 61730-1/-2, UL 61215-1/-2, CEC Listed

- Datasheet is subjected to change without prior notice, always obtain the most recent version of the datasheet.
- Caution: For professional use only, the installation, handling, and cleaning of PV modules should only be performed by qualified professionals. Read the Installation Manual for mounting specifications before handling, installing and operating modules.

Learn More:
mitrex.com info@mitrex.com

Headquarters:
41 Racine Rd., Toronto, ON M9W 2Z4, Canada
+1 (855) 254 0214 (Toll Free)

West USA Location:
10880 Wilshire Blvd Suite 1101, Los Angeles, CA 90024, USA
+1 (323) 301 7978

East USA Location:
1 Rockefeller Plaza Fl 11, New York, NY 10020, USA
+1 (646) 583 4486

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
S-1
SPEC SHEET

ENPHASE.

DATA SHEET

IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

IQ8SE-DS-0001-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.
** IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US[1]
Commonly used module pairings[2]	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48	25 – 58				
Min/max start voltage	V	30 / 48	30 / 58				
Max input DC voltage	V	50	60				
Max DC current[3] [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)		**IQ8-60-2-US**	**IQ8PLUS-72-2-US**	**IQ8M-72-2-US**	**IQ8A-72-2-US**	**IQ8H-240-72-2-US**	**IQ8H-208-72-2-US[1]**
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range[4]	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2					4.4
Max units per 20 A (L-L) branch circuit[5]		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
Weight		1.08 kg (2.38 lbs)					
Cooling		Natural convection – no fans					
Approved for wet locations		Yes					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certificaticns		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2022-03-17

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
S-2
SPEC SHEET

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C

X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

To learn more about Enphase offerings, visit **enphase.com**

Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	**IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.**
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws.
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

ENPHASE

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
S-2
SPEC SHEET

Tech Brief

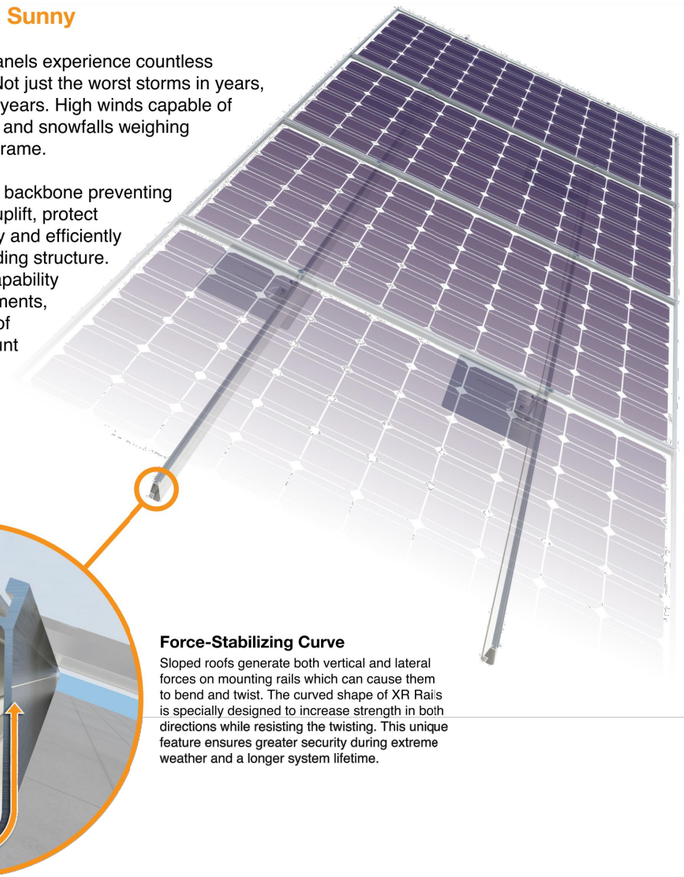
IRONRIDGE

XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available

XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

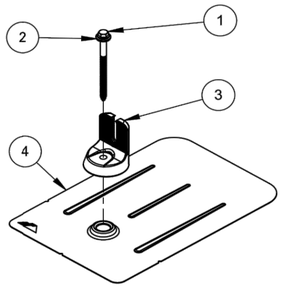
CompleteSolar
A Brighter Way.

SHEET
S-3
SPEC SHEET

Cut Sheet

IRONRIDGE

FlashVue

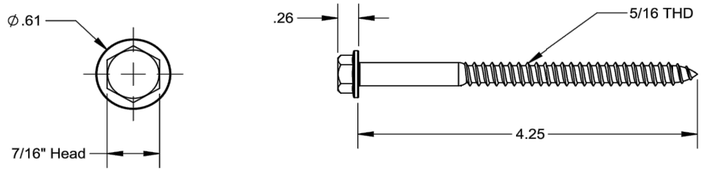


ITEM NO	DESCRIPTION	QTY IN KIT
1	BOLT, LAG 5/16 X 4.25"	1
2	WASHER, EPDM BACKED	1
3	FM FLASHING, MILL OR BLACK	1
4	GRIP CAP, MILL OR BLACK	1

FLASHVUE

PART NUMBER	DESCRIPTION
FV-01-M1	FLASHING, FLASHFOOT, MILL
FV-01-B1	FLASHING, FLASHFOOT, BLACK

1) BOLT, LAG 5/16 x 4.25"

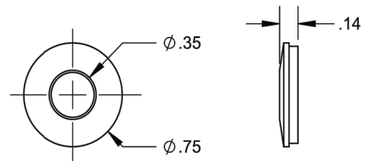


Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.0

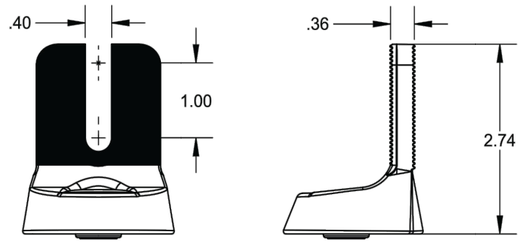
Cut Sheet

2) Washer, EPDM Backed



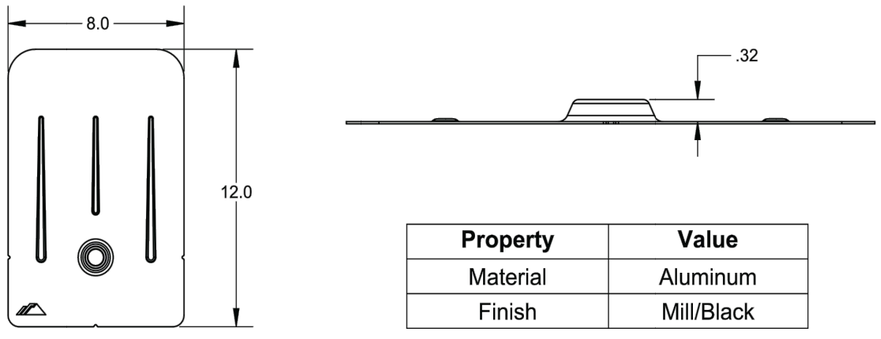
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

3) Grip Cap



Property	Value
Material	Aluminum
Finish	Mill/Black

4) FM Flashing



Property	Value
Material	Aluminum
Finish	Mill/Black

v1.0

BYLD BETTER

CONTRACTOR

BYLD

ADDRESS:1213W MOOREHEAD ST, STE500 CHARLOTTE, NC 28208
LICENSE #:

DESIGNER: OSG

CONOR LYNCH RESIDENCE

44 GOLD CT,
BROADWAY,
NC 27505

DATE:5/4/2023

APN: 039576008892

DESIGN BY

CompleteSolar
A Brighter Way.

SHEET
S-4
SPEC SHEET