

## LEGEND:



CHIMNEY



PIPE VENT



MODULES

--- CONDUIT



SETBACK



AC DISCONNECT



JB JUNCTION BOX



INV INVERTER



MSP MAIN SERVICE PANEL

## PV SYSTEM

4.800 kW-DC

3.800 kW-AC

## TOTAL ROOF AREA RIDGE SETBACK CALCS:

TOTAL ROOF AREA: 1443.8 SQ FT

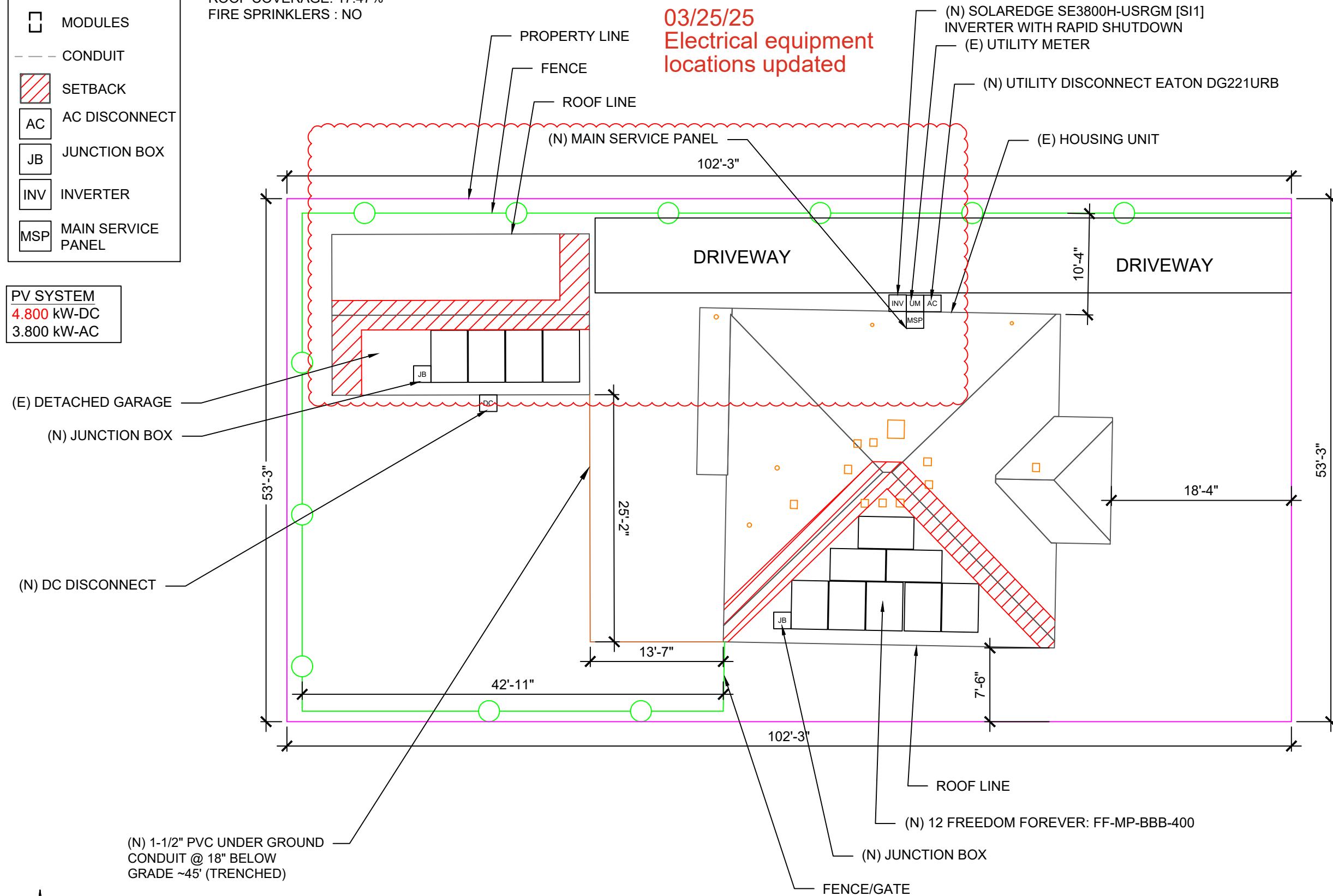
SINGLE MODULE AREA: 21.01937947 SQ FT

TOTAL NUMBER OF MODULES: 12

TOTAL AREA OF MODULES: 252.23 SQ FT

ROOF COVERAGE: 17.47%

FIRE SPRINKLERS : NO



City of Portland

Reviewed for  
Code ComplianceDate: 4/22/2025  
Permit #: 25-012890-REV-01-RS

EXPIRES: 12/31/2026

ROOF AREA: 1443.8 SQ FT

## CLIENT:

EMERY BLEM  
641 NE 70TH AVE, PORTLAND, OR 97213  
AHJ: CITY OF PORTLAND  
UTILITY: PGE - PORTLAND GENERAL  
ELECTRIC  
METER: 32647592IN  
APN: R193722  
EMAIL: EMERY.BLEM@GMAIL.COM  
FINANCE: MOSAIC

## SYSTEM:

SYSTEM SIZE (DC): 12 X 400 = 4.800 kW  
SYSTEM SIZE (AC): 3.800 kW @ 240V  
MODULES: 12 X FREEDOM FOREVER:  
FF-MP-BBB-400  
OPTIMIZERS: 12 X SOLAREdge S440  
INVERTER: SOLAREdge SE3800H-USRGM  
(PART/SKU: SE3800H-USRGM)

REVISIONS		
NO.	REVISED BY	DATE
1	N.B.	1/27/2025
2	P.P.	3/20/2025
3	K.N.	3/24/2025



FREEDOM FOREVER LLC  
43445 BUSINESS PARK DR #110, TEMECULA,  
CA 92590  
Tel: (888) 557-6431  
GREG ALBRIGHT

*Greg Albright*

CONTRACTOR LICENSE:  
SUPERVISING MASTER ELECTRICIAN 6576S

## SITE PLAN

JOB NO:	DATE:	DESIGNED BY:	SHEET:
526015	3/24/2025	K.N.	PV-2



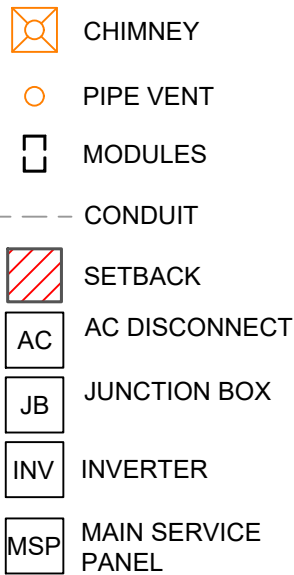
SITE PLAN  
SCALE: 3/32" = 1'-0"

1

AC DISCONNECT MUST BE WITH 10 FEET OF UTILITY METER



## LEGEND:



PV SYSTEM  
4.800 kW-DC  
3.800 kW-AC

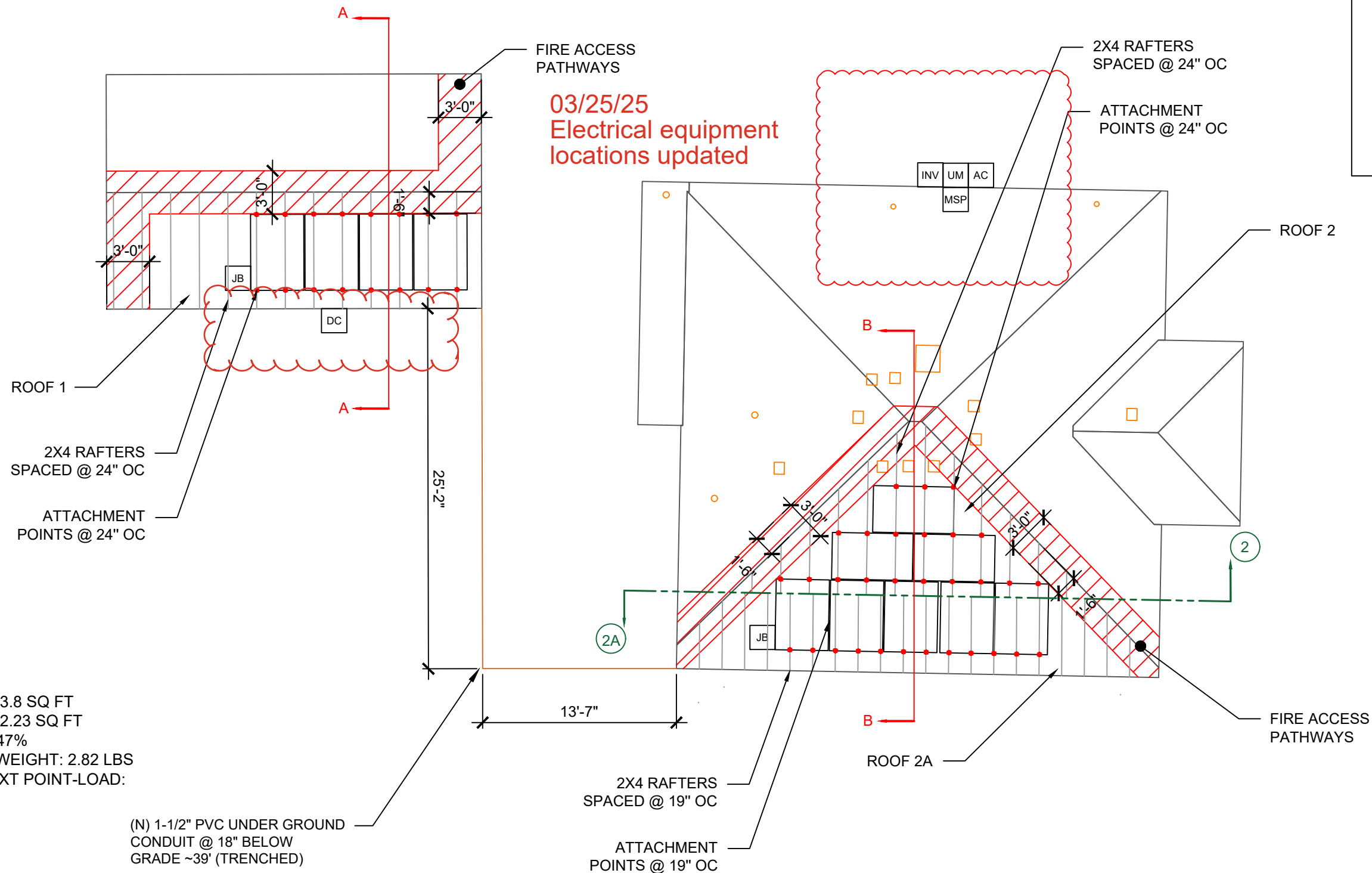
## MODIFIED SETBACKS PROPOSED AT RIDGE:

TOTAL ARRAY AREA = 252.23 SF

TOTAL ROOF AREA = 1443.8 SF

TOTAL ARRAY AREA AS A % TO ROOF AREA = 17.47%

17.47% &lt; 33%



TOTAL ROOF AREA: 1443.8 SQ FT  
TOTAL ARRAY AREA: 252.23 SQ FT  
ARRAY COVERAGE: 17.47%  
SYSTEM DISTRIBUTED WEIGHT: 2.82 LBS  
STRONGHOLD BUTYL NXT POINT-LOAD:  
12.99 LBS



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

1

## NOTES:

- EMT CONDUIT ATTACHED TO THE ROOF USING CONDUIT MOUNTS
- ATTACHED CLAMPS AT 25% FROM THE EDGE AND 50% FROM THE CENTER OF THE MODULES
- JUNCTION BOX IS MOUNTED TO THE RAIL.

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ROOF AREA: 1443.8 SQ FT

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SYSTEM SIZE (AC): 3.800 kW @ 240V  
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FF-MP-BBB-400  
OPTIMIZERS: 12 X SOLAREEDGE S440  
INVERTER: SOLAREEDGE SE3800H-USRGM  
(PART/SKU: SE3800H-USRGM)

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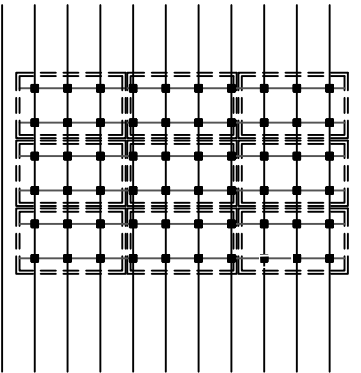
ROOF PLAN WITH MODULES LAYOUT

JOB NO:	DATE:	DESIGNED BY:	SHEET:
526015	3/24/2025	K.N.	PV-2A

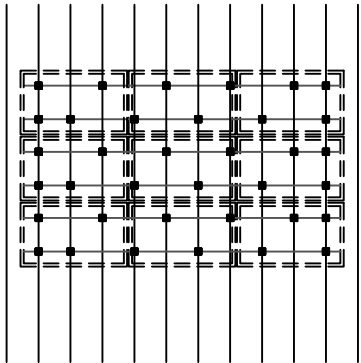


TABLE 1 – ARRAY INSTALLATION									
	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	FRAMING TYPE	MAX UNBRACED LENGTH(FT.)	STRUCTURAL ANALYSIS RESULT	PENETRATION PATTERN	MAX ATTACHMENT SPACING (IN.)	MAX RAIL OVERHANG(IN. N.)
ROOF 1	20	Comp Shingle	Unirac Stronghold w/ Butyl	2x4 @ 24” O.C.	9	PASS	STAGGERED	24	8
ROOF 2	29	Comp Shingle	Unirac Stronghold w/ Butyl	2x4 @ 24” O.C.	9	PASS WITH SPECIFIED UPGRADF	STAGGERED	24	8
ROOF 2A	22	Comp Shingle	Unirac Stronghold w/ Butyl	2x4 @ 19” O.C.	7	PASS	STAGGERED	19	6.33
1. CONTRACTOR TO VERIFY FRAMING TYPE AND MAX UNBRACED LENGTH PRIOR TO INSTALLATION. IF THE ABOVE INFORMATION DOES NOT MATCH FIELD CONDITIONS, NOTIFY ENGINEER OF RECORD IMMEDIATELY.									
2. WHERE COLLAR TIES OR RAFTER SUPPORTS EXIST, CONTRACTOR SHALL USE RAFTERS WITH COLLAR TIES AS ATTACHMENT POINTS.									

"PANELS WILL NOT BE MOUNTED MORE THAN 12"" FROM THE SURFACE OF THE ROOF."

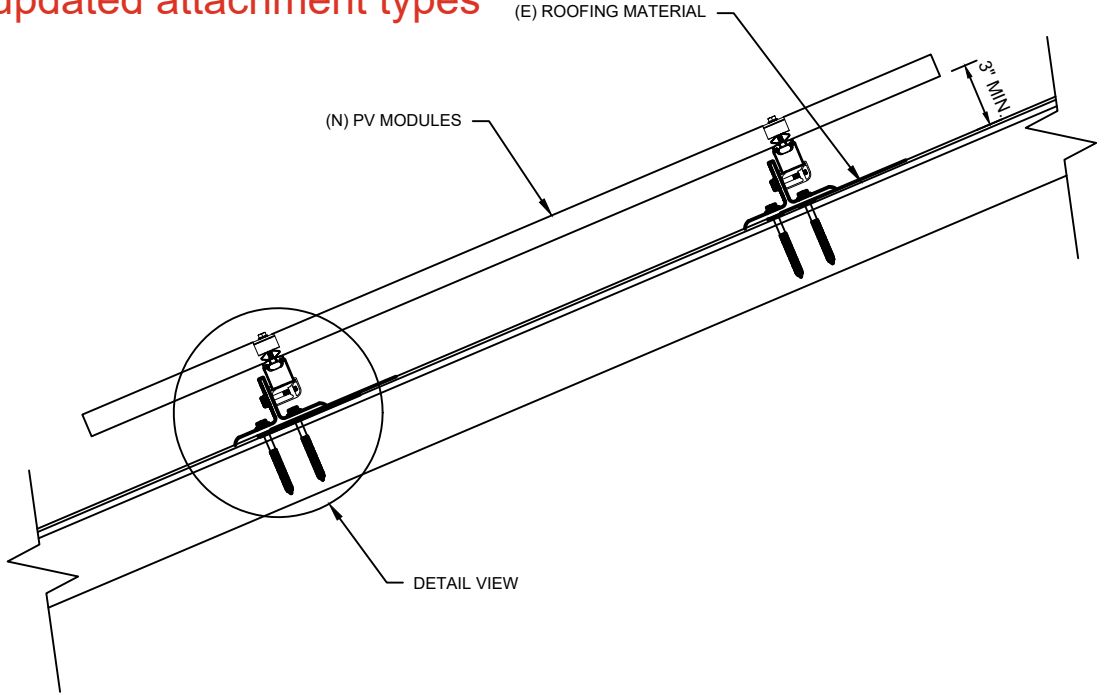


STACKED DETAIL  
For Illustration purposes only

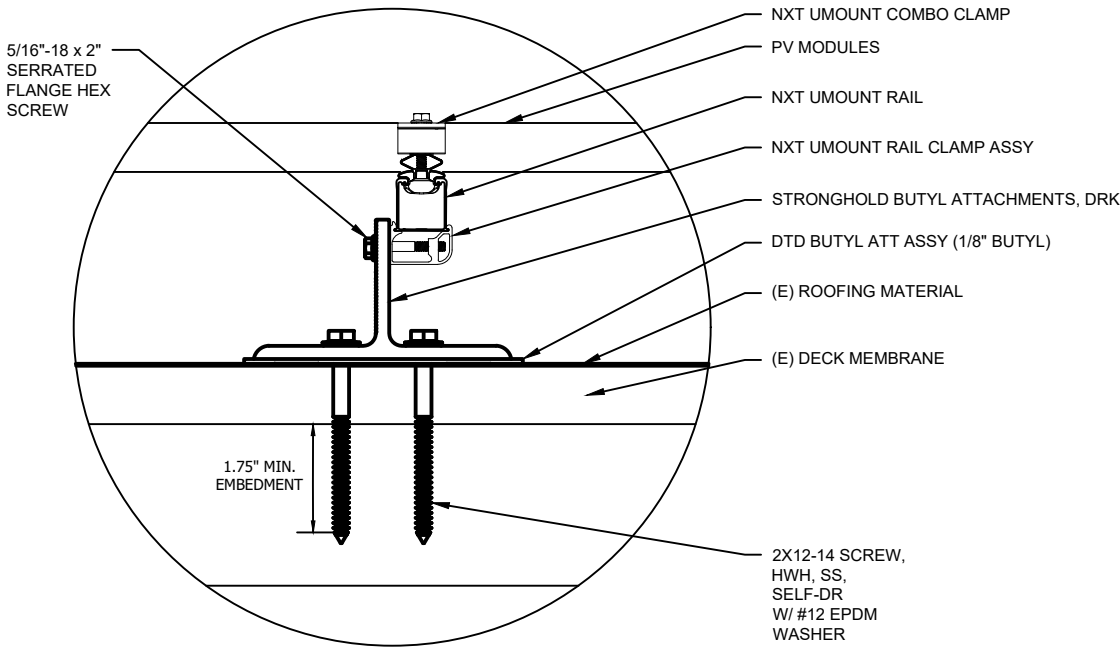


STAGGERED DETAIL  
For Illustration purposes only

03/25/25  
-removed some structural upgrades  
-updated attachment types



SOLAR PV ARRAY SECTION VIEW  
Scale: NTS



ATTACHMENT DETAIL  
Scale: NTS

City of Portland  
Reviewed for  
Code Compliance  
  
Date:4/22/2025  
Permit #: 25-012890-REV-01-RS

REGISTERED PROFESSIONAL  
ENGINEER  
93098PE  
OREGON  
MAY 10, 2022  
RYAN NGO  
  
EXPIRES: 12/31/2026

CLIENT:  
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641 NE 70TH AVE, PORTLAND, OR 97213  
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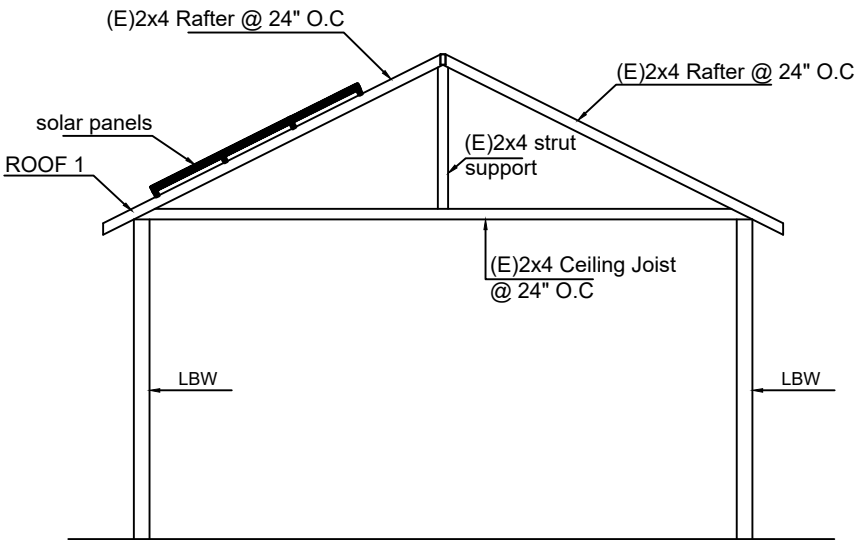
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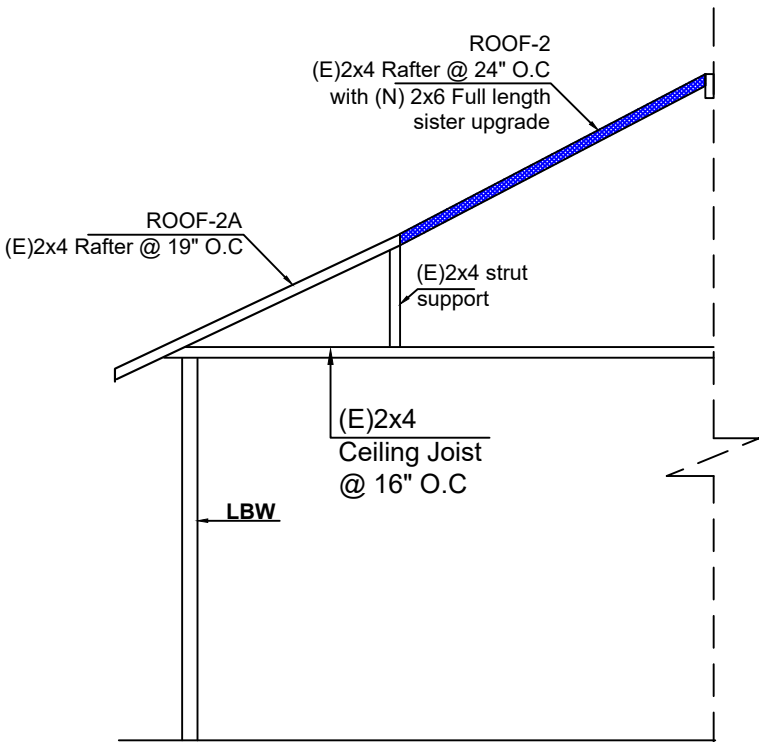
MOUNTING DETAILS			
JOB NO: 526015	DATE: 3/24/2025	DESIGNED BY: K.N.	SHEET: PV-3



03/25/25  
removed some structural upgrades



SECTION A-A



SECTION B-B

City of Portland  
Reviewed for  
Code Compliance

Date: 4/22/2025  
Permit #: 25-012890-REV-01-RS



EXPIRES: 12/31/2026

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EMERY BLEM  
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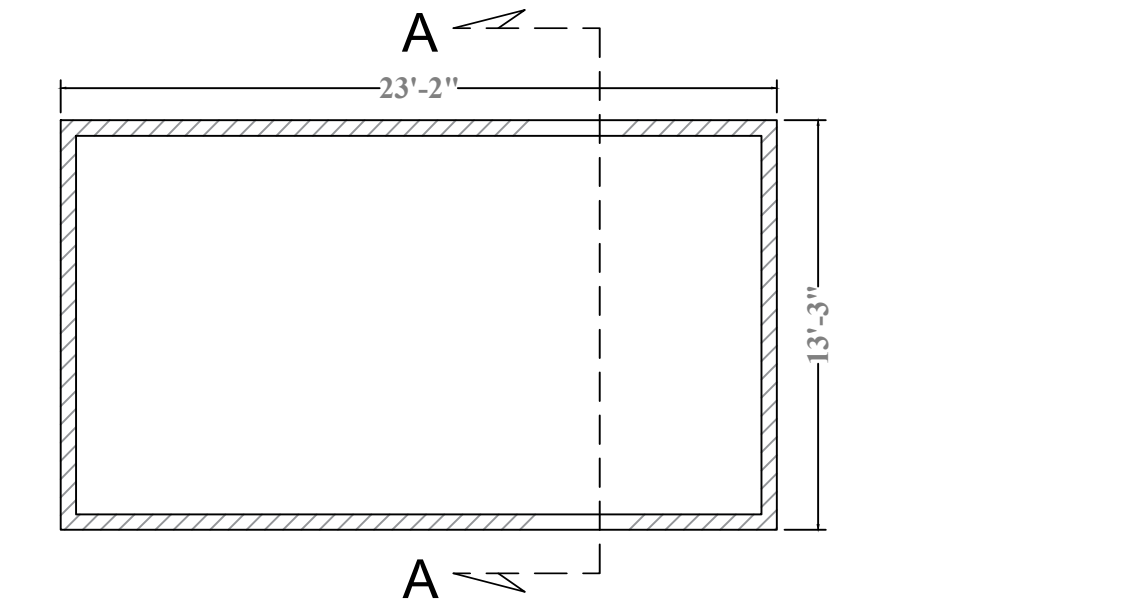
REVISIONS		
NO.	REVISED BY	DATE
1	N.B.	1/27/2025
2	P.P.	3/20/2025
3	K.N.	3/24/2025



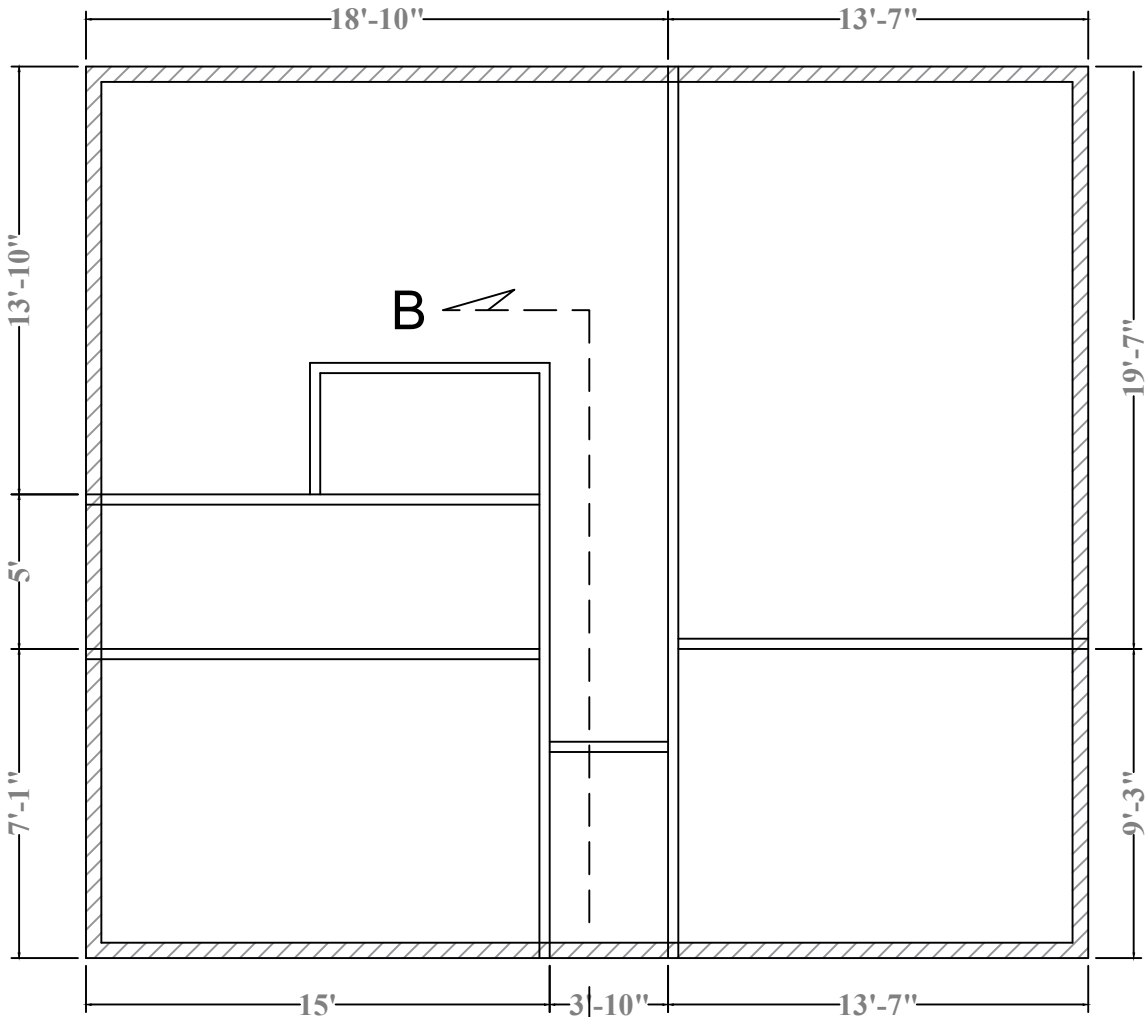
FREEDOM FOREVER LLC  
43445 BUSINESS PARK DR #110, TEMECULA,  
CA 92590  
Tel: (888) 557-6431  
GREG ALBRIGHT

CONTRACTOR LICENSE:  
SUPERVISING MASTER ELECTRICIAN 6576S

BUILDING ELEVATION			
JOB NO: 526015	DATE: 3/24/2025	DESIGNED BY: K.N.	SHEET: PV-5C



ROOF-1 LBW LAYOUT



ROOF-2 & 2a LBW LAYOUT



# STRONGHOLD™ | BUTYL



Unirac's **STRONGHOLD™ Butyl** is efficient, dependable, and optimized for UNIRAC's **NXT UMount™** system.

The pre-applied butyl pad removes the need for additional flashing. Just peel the liner, place the attachment, and fasten it to the roof. In addition, the butyl, used throughout the roofing and solar industries for its reliability, conforms to the screws and roof for a robust, dependable seal with no extra work! Couple this with the **NXT UMount™** system, and you have a highly reliable, easy-to-install system with integrated wire management.



#### KITTED WITH

- ONE (1) **STRONGHOLD™** Butyl direct-to-deck attachment with pre-applied butyl patch (Extra patches for shimming available.)
- TWO (2) screws for rafter installation (Additional screws for direct-to-deck applications available.)
- ONE (1) **NXT Rail Clamp**

# STRONGHOLD™ | BUTYL



#### SIMPLIFIED FLASHLESS SOLUTION

- One-step Butyl application
- Reliable waterproofing without messy sealant
- Eliminate roof disturbance
- Minimize labor

#### OPTIMIZED FOR NXT UMount, UNIRAC'S OPEN CHANNEL RAIL SYSTEM

- Open slot design for ease of rail connectivity with included **STRONGHOLD™ NXT** rail clamp
- **STRONGHOLD™** Butyl combined with the **NXT UMount** system make installation and wire management a breeze
- UL Certified with **NXT UMount**

#### DUAL MOUNTING OPTIONS

- Pre-attached butyl pad: Simply peel, stick, and fasten with the two (2) included screws for rafter mount
- For direct-to-deck applications, additional decking screws are available

#### ADDITIONAL BENEFITS

- Mill and Dark Finishes
- Option for extra cross-course butyl patches
- Competitively priced with standard rafter attachments

#### UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT



UNMATCHED  
EXPERIENCE



CERTIFIED  
QUALITY



ENGINEERING  
EXCELLENCE



BANKABLE  
WARRANTY



DESIGN  
TOOLS



PERMIT  
DOCUMENTATION

#### 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.

#### CERTIFIED QUALITY PROVIDER

UNIRAC is the only PV mounting vendor with ISO certifications for 9001:2015, 14001:2015 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.

#### BANKABLE WARRANTY

Don't leave your project to chance, 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. **STRONGHOLD™** products are covered by a twenty five (25) year limited product warranty.







December 12<sup>th</sup>, 2023

03/25/25 Added Page, changed attachment type

Unirac, Inc.  
1411 Broadway Boulevard NE  
Albuquerque, New Mexico 87102  
TEL: (505) 242-6411  
FAX: (505)242-6512

Re.: Innova Technologies No.: 123-099-1000  
**Unirac NXT U-Mount Design Tool – Oregon**

Attn: Engineering Services

Innova Technologies Inc. has reviewed Unirac's NXT U-Mount design tool and analysis, including the U-Builder online tool. NXT U-mount is a proprietary system to support Photovoltaic (PV) panels on a rooftop structure.

All analysis and information in the NXT design tool's formulas and tables comply with the following:

- 2009-2021 International Building Code, by International Code Council Inc. With SEAOC PV2 provisions.
- ASCE/SEI 7-05 through 7-16 Minimum Design Loads and Other Structures, by American Society of Civil Engineers.
- Oregon Structural Specialty Code (OSSC) 2022.
- Oregon Residential Specialty Code (ORSC) 2022.
- 2005 Aluminum Design Manual, 2010 Aluminum Design Manual, 2015 Aluminum Design Manual (ADM), 2017 Aluminum Design Manual & 2020 Aluminum Design Manual, by the Aluminum Association.

This letter certifies that the structural analysis of the racking members and their direct components comply with the above codes and methodologies. This Design tool does not review the existing roof structure, or the PV panels themselves.

The U-Builder tool should be used under the review of a registered design professional where required by the authority having jurisdiction.

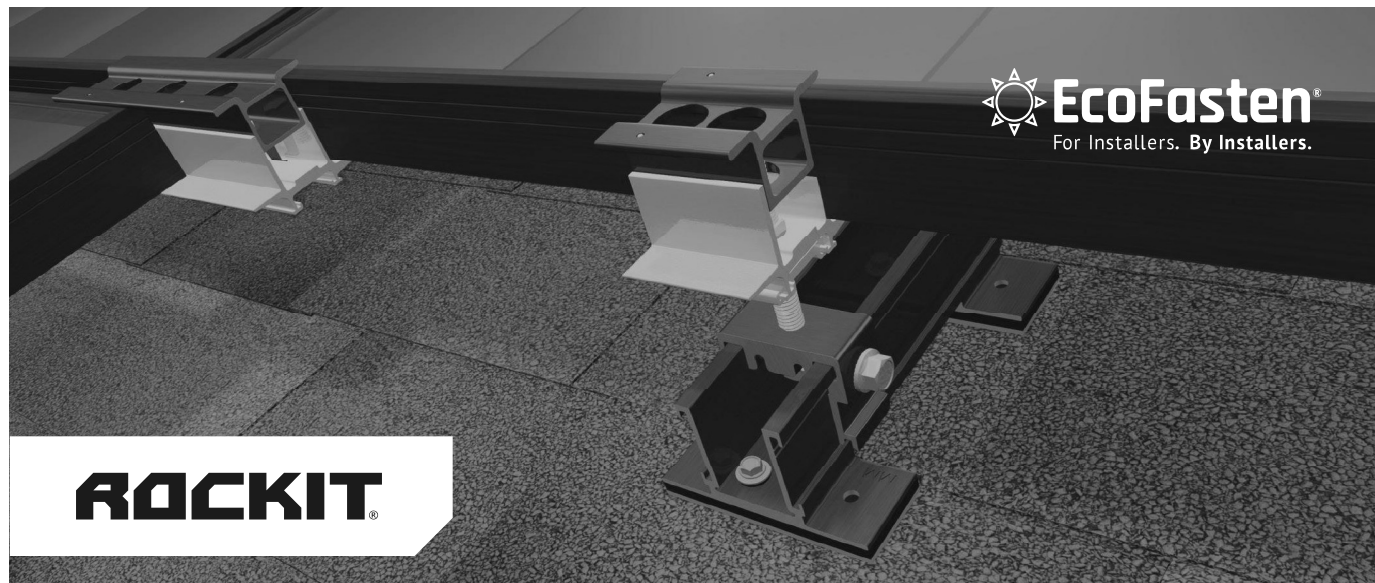
For more information, see the construction drawings, and manufacturer installation instructions.

Best Regards,

Carlos Banchik  
President & Principal  
Innova Technologies, Inc.







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## ROCKIT SMART SLIDE

### Integrated UltraGrip Technology™

Pre-installed sealing pads are compatible with all composition shingle roofs. The compression achieved when fastened to the roof creates a super strong watertight seal. In most cases, the slide can be mounted to the deck without the need for sealant. A layer of flexible foam provides cushioning, which allows the waterproofing sealant to embed deep into the granules of the shingle as well as to flexibly conform over the steps found on architectural-style shingles.



## INTRODUCING ROCKIT SMART SLIDE!

Introducing EcoFasten's patent pending RockIt Smart Slide, our simple solution for quickly installing the popular RockIt rail-less racking system to composition shingle roofs.

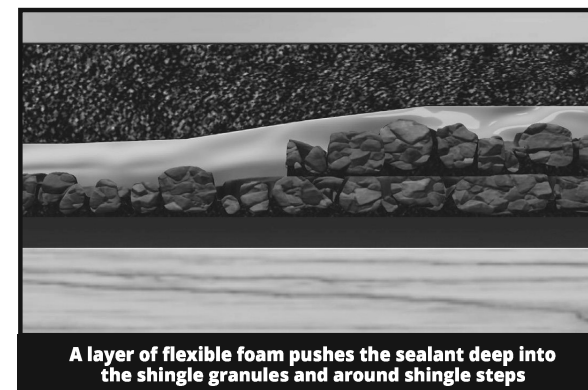
### Features & Benefits

- Eliminates the need to pry up shingle courses and install a metal flashing
- Multiple opportunities to find the rafter
- No need for additional material when architectural shingles are not level
- Longer 6.75" slide avoids overlaps in shingle courses
- Integrated flashing utilizes UltraGrip Technology™ to create a watertight seal

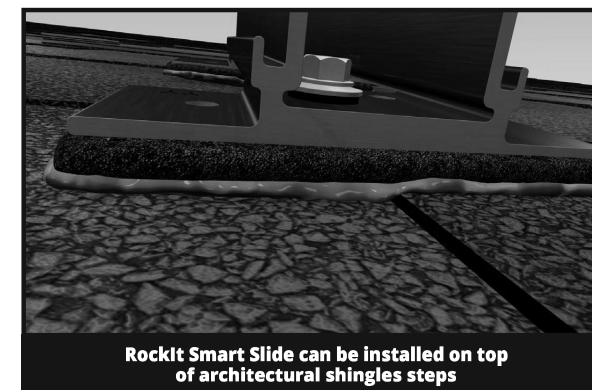


### Required Components:

Part Number:	Description:
2011024	RI SMART SLIDE BLK 6.75"
2011025	RI SMART SCRW #12X3" W/BW



A layer of flexible foam pushes the sealant deep into the shingle granules and around shingle steps



RockIt Smart Slide can be installed on top of architectural shingles steps

### Testing & Documentation

- [UL441 Rain Report](#)
- [TAS 100 \(A\)-95 Wind and Wind Driven Rain Resistance](#)
- [Mechanical Load Test/Structural Capacity Certification](#)
- [Florida Product Approval](#)
- [RockIt Installation Manual](#)
- [RockIt CutSheets](#)





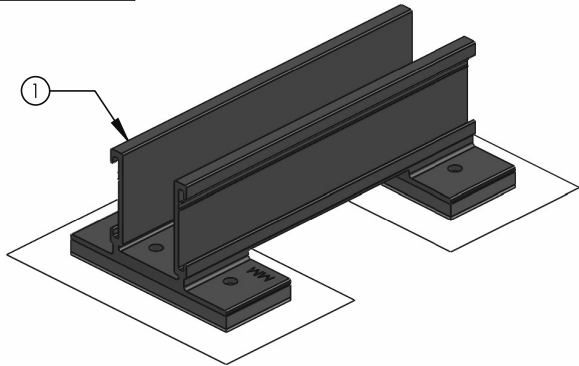
PRODUCT CUT SHEET



RI SMART SLIDE BLK 6.75"

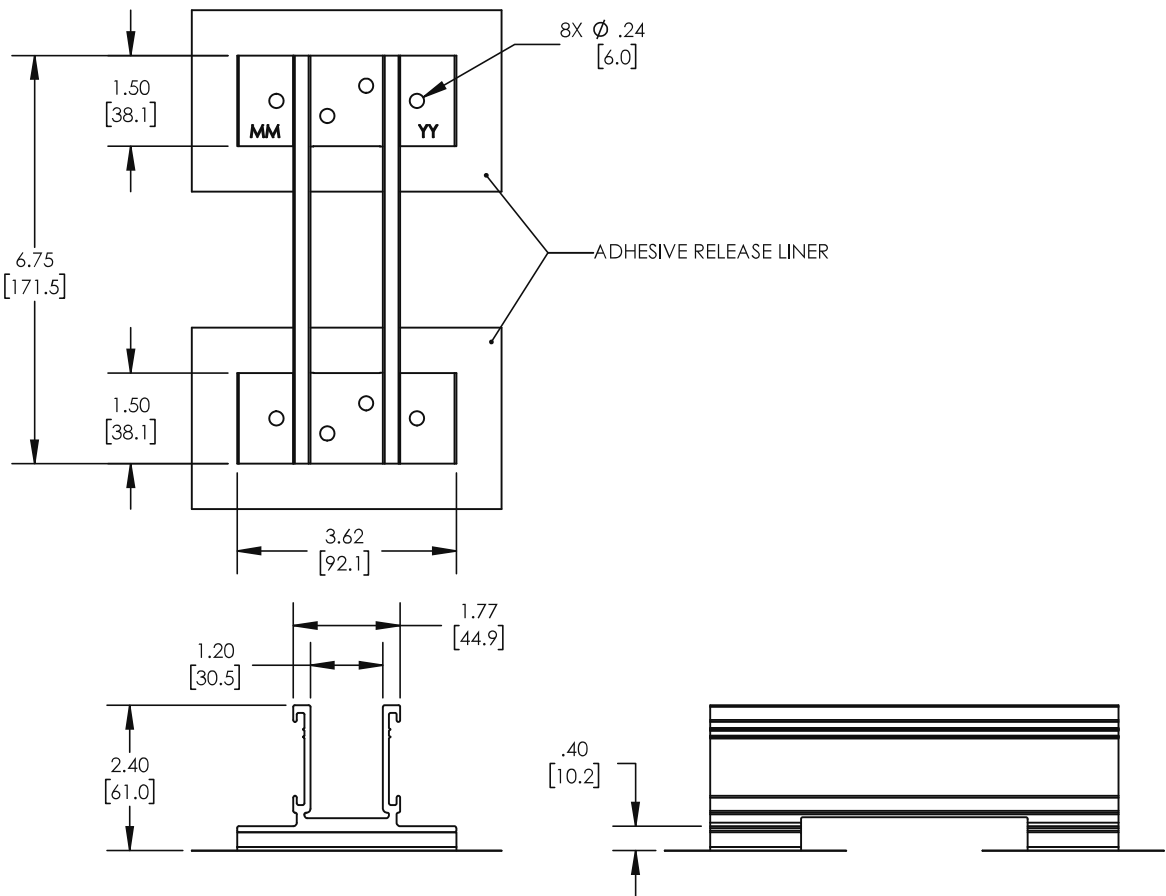
PART NUMBER	DESCRIPTION
2011024	RI SMART SLIDE BLK 6.75"

03/25/25 Removed Page, changed attachment type



ITEM NO.	DESCRIPTION
1	ROCKIT SMART SLIDE ASSEMBLY

1) ROCKIT FLASHLESS SLIDE ASSEMBLY



MATERIAL	ALUMINUM, EPDM, ADHESIVE, TREATED PAPER
FINISH	BLACK

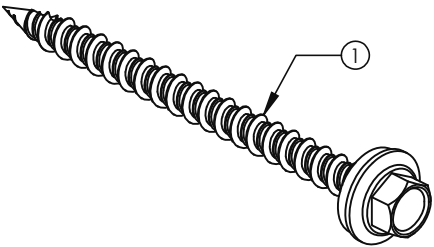
Rev: CS-3

PRODUCT CUT SHEET

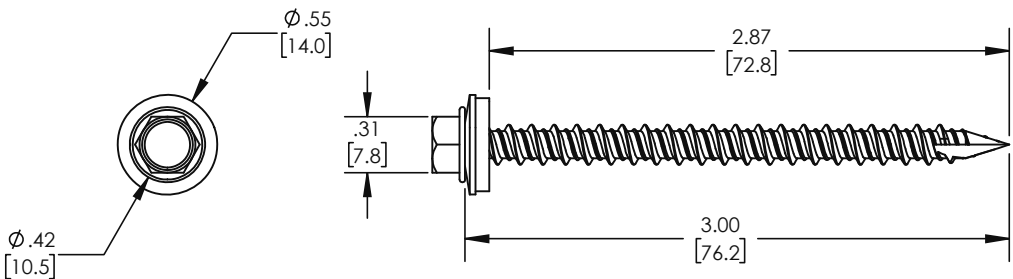


RI SMART SCREW #12X3" W/BW

PART NUMBER	DESCRIPTION
2011025	RI SMART SCREW #12X3" W/BW



ITEM NO.	DESCRIPTION
1	SELF TAPPING SCREW #12 WITH SEALING WASHER ASSEMBLY



MATERIAL	STAINLESS STEEL, EPDM RUBBER
FINISH	MILL, BLACK

Rev: CS-2





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COMPLETE RAIL-LESS RACKING SYSTEM

The RockIt system is the industry's premier rail-less PV racking system for composition shingle, tile, and metal roofs. Designed in conjunction with the needs of installers, RockIt quickly & easily installs with a single tool. Featuring an easy-to-position alignment slide and a top-down leveling system, RockIt is logistically intelligent with no need to ship or transport long rails. Components are available in a black finish that complements both commercial and residential applications. Conforms to UL 2703.

FEATURES & BENEFITS

- Patented watertight technology
- Fully integrated bonding
- Top-down leveling system
- North-South adjustability
- Single tool install
- Florida Product Approved for composition shingle roofs

STREAMLINED INSTALLATION WITH MINIMAL ROOF PENETRATIONS

Composition Shingle, Tile, Metal

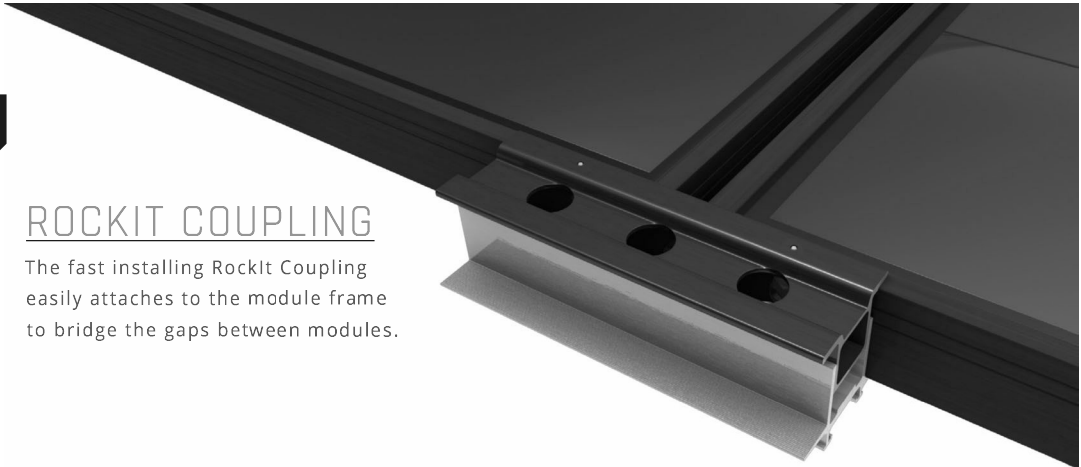
Rail-Less

Structural-Attach Direct-Attach



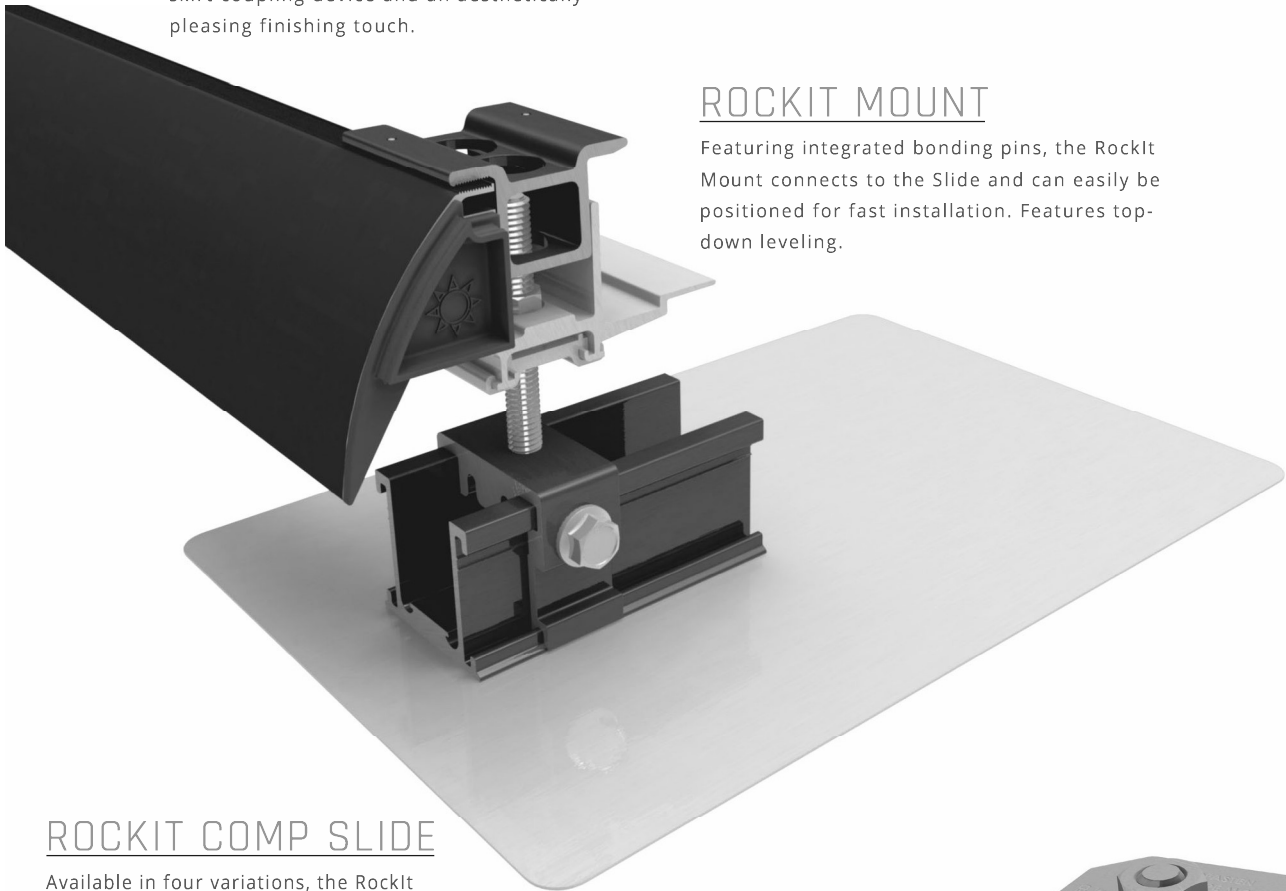
ROCKIT COUPLING

The fast installing RockIt Coupling easily attaches to the module frame to bridge the gaps between modules.



SKIRT

The sleek black Skirt installs first and acts as an alignment guide for the entire array. The Skirt End Cap does double duty as a skirt coupling device and an aesthetically-pleasing finishing touch.



ROCKIT MOUNT

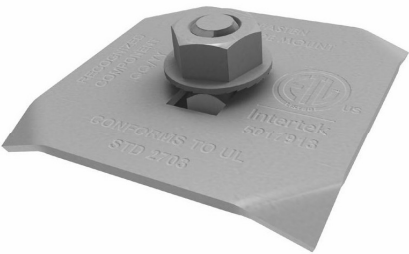
Featuring integrated bonding pins, the RockIt Mount connects to the Slide and can easily be positioned for fast installation. Features top-down leveling.

ROCKIT COMP SLIDE

Available in four variations, the RockIt Slide allows installation on composition shingle, tile, and metal roofs.

FRAME MLPE MOUNT

Attaches and fully bonds MLPE's (Module Level Power Electronics) to the module frame with a single bolt clip.





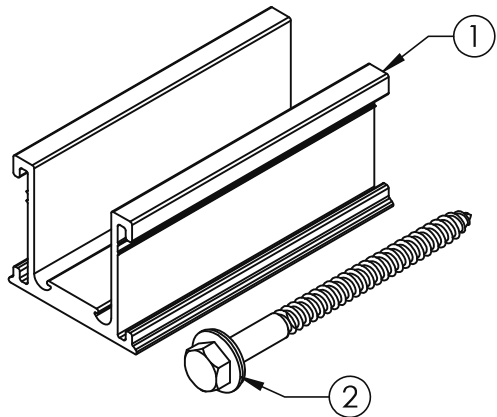
PRODUCT CUT SHEET



RI COMP SLIDE AL BLK

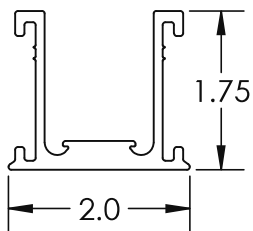
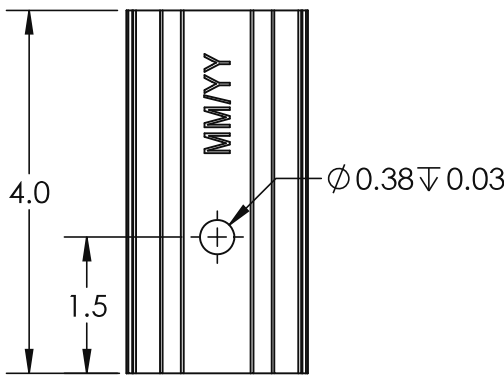
PART NUMBER	DESCRIPTION
2011013	RI COMP SLIDE AL BLK

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ITEM NO.	DESCRIPTION
1	ROCKIT V3 SLIDECOMP
2	LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER

1) ROCKIT V3 SLIDECOMP



Material	Aluminum
Finish	Black

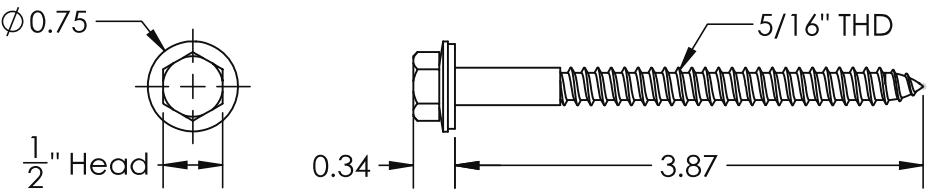
REV.- CS1

PRODUCT CUT SHEET



RI COMP SLIDE AL BLK

2) LAG SCREW, 5/16-4", THREAD 3", EPDM BACKED WASHER



Material	Stainless Steel
Finish	Mill

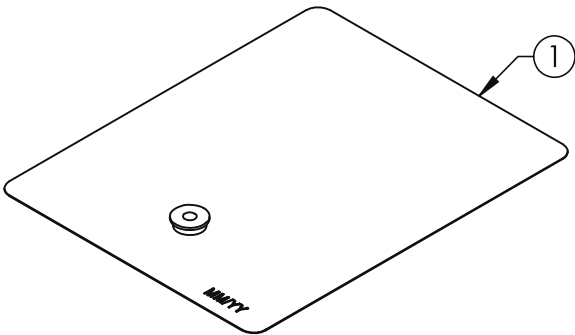
REV.- CS1



GF-1 FLASHING GLV BLK 8X10"

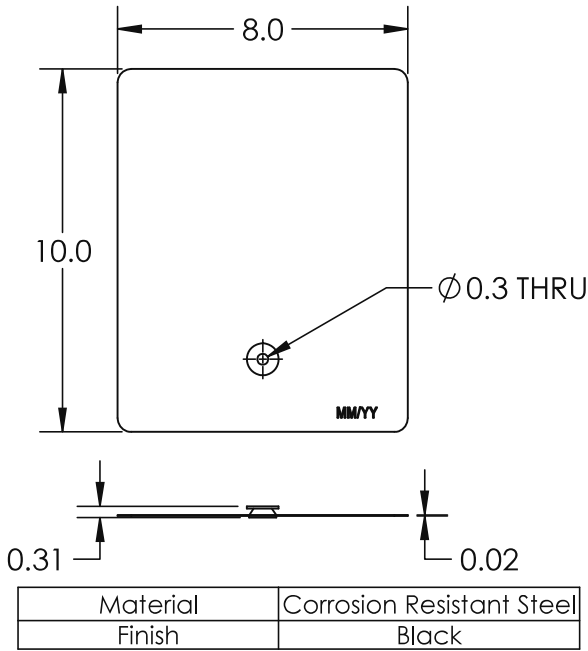
PART NUMBER	DESCRIPTION
3012020	GF-1 FLASHING GLV BLK 8X10"

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ITEM NO.	DESCRIPTION
1	GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY

1) GF1M-GAL-BLK-810 W/O WASHER ASSEMBLY







US Headquarters | 4141 W. Van Buren St., Ste. 2 | Phoenix, AZ 85009  
US Branch | 976 Brady Ave., Ste. 100 | Atlanta, GA 30318

December 11, 2023

EcoFasten  
4141 West Van Buren St.  
Phoenix, AZ 85009

03/25/25 Removed Page, changed attachment type

Attn.: EcoFasten Solar Engineering Department

**Re:** EcoFasten *RockIt System, with Comp Slide or Smart Slide*, Engineering Certification for Gable and Hip roofs.

This letter addresses the structural performance and code compliance of EcoFasten’s RockIt Flush Mount System. The contents of the letter shall be reviewed in its entirety before application to any project design. The RockIt System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum RockIt Mount assemblies which are connected to a RockIt roof attachment, either the RockIt Comp Slide or RockIt Smart Slide, which is attached directly to the roof structure. Assembly details of a typical RockIt system and its core components are shown in Exhibit ECO 1.0. The RockIt Comp Slide assembly is shown in drawing EX-1 and the RockIt Smart Slide assembly is shown in drawing 850076. The EcoFasten RockIt System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16
- 2022 Oregon Structural Specialty Code Based on 2021 International Building Code
- 2021 International Residential Code, by the International Code Council, Inc.
- SEAOC (Structural Engineer Association of California) report PV2-2017 Wind Design for Solar Arrays
- Aluminum Design Manual 2015, by The Aluminum Association, Inc.
- NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

The span tables provided in this letter are certified based on the structural performance of EcoFasten RockIt System in conjunction with RockIt Comp Slide or Smart Slide only, with no consideration of the structural adequacy of the PV modules, or the underlying roof supporting members. The certified capacities in these tables shall be used when all EcoFasten provided components are installed with no generic replacement parts. These tables are intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the system components regarding the applied or resultant loads of any chosen array configuration.

Sincerely,



Matthew S Kuzila, PE      EXPIRES: 06/30/2025

Digitally Sealed 12.11.2023