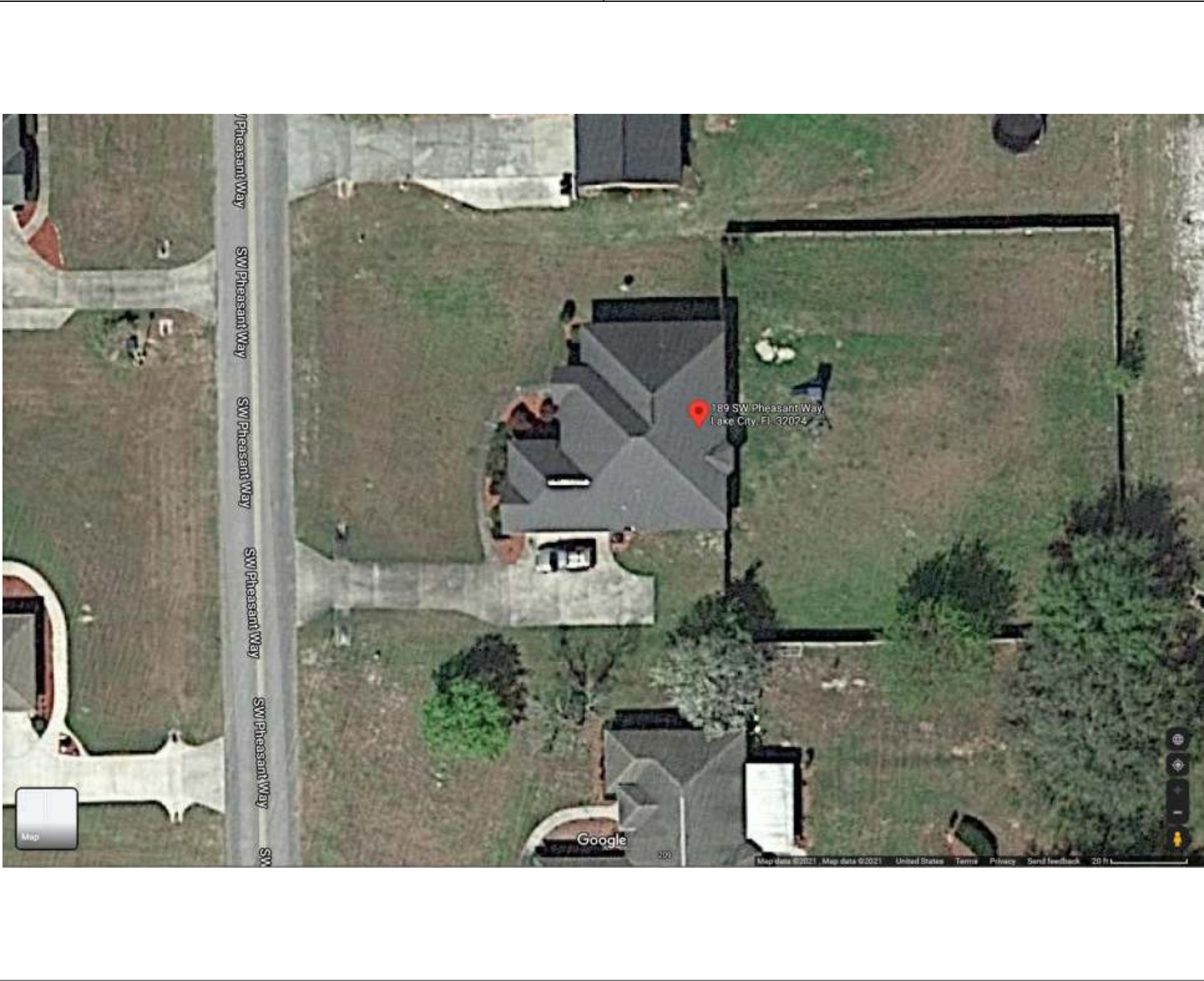


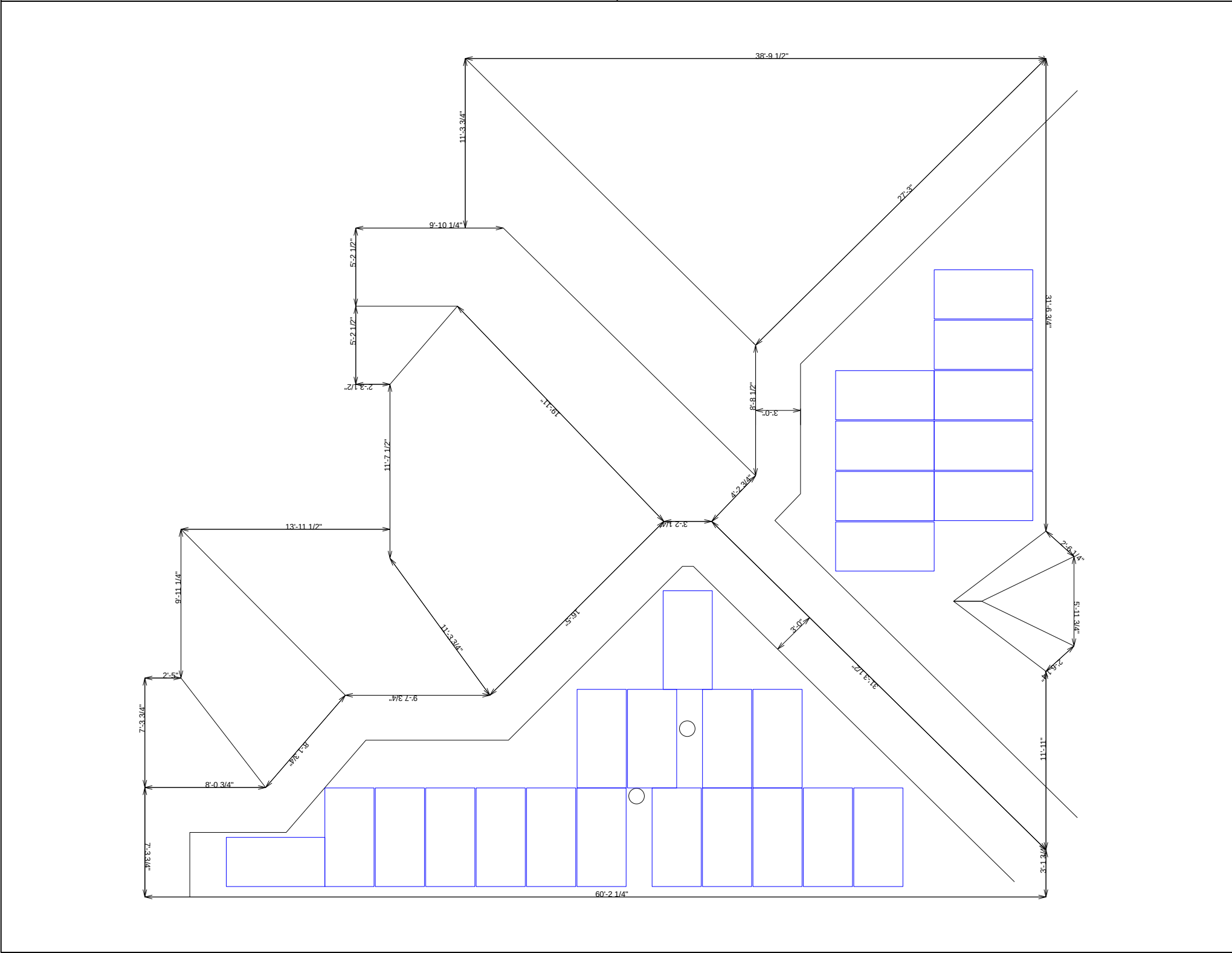
Location Map:



Aerial View:



Plan View:



Index:

- C-1: COVER
- E-1: ELECTRICAL DIAGRAM & CALCULATIONS
- S-1: STRUCTURAL DIAGRAMS
- S-2: STRUCTURAL CALCULATIONS

Permitting/Planning Notes:

SCOPE OF WORK:
INSTALLATION OF GRID-TIED PHOTOVOLTAIC SYSTEM



CODE SUMMARY		
STATE	BUILDING	ELECTRICAL
FLORIDA	2020 FBC, 7TH	2017 NEC

REVISIONS:

Project: De La Rosa, Randolfi

189 SW Pheasant Way,
Lake City, FL 32024

COVER

801 SE 6th Ave, Suite 206
Delray Beach, FL 33483
(800) 530-9597
CVC56962

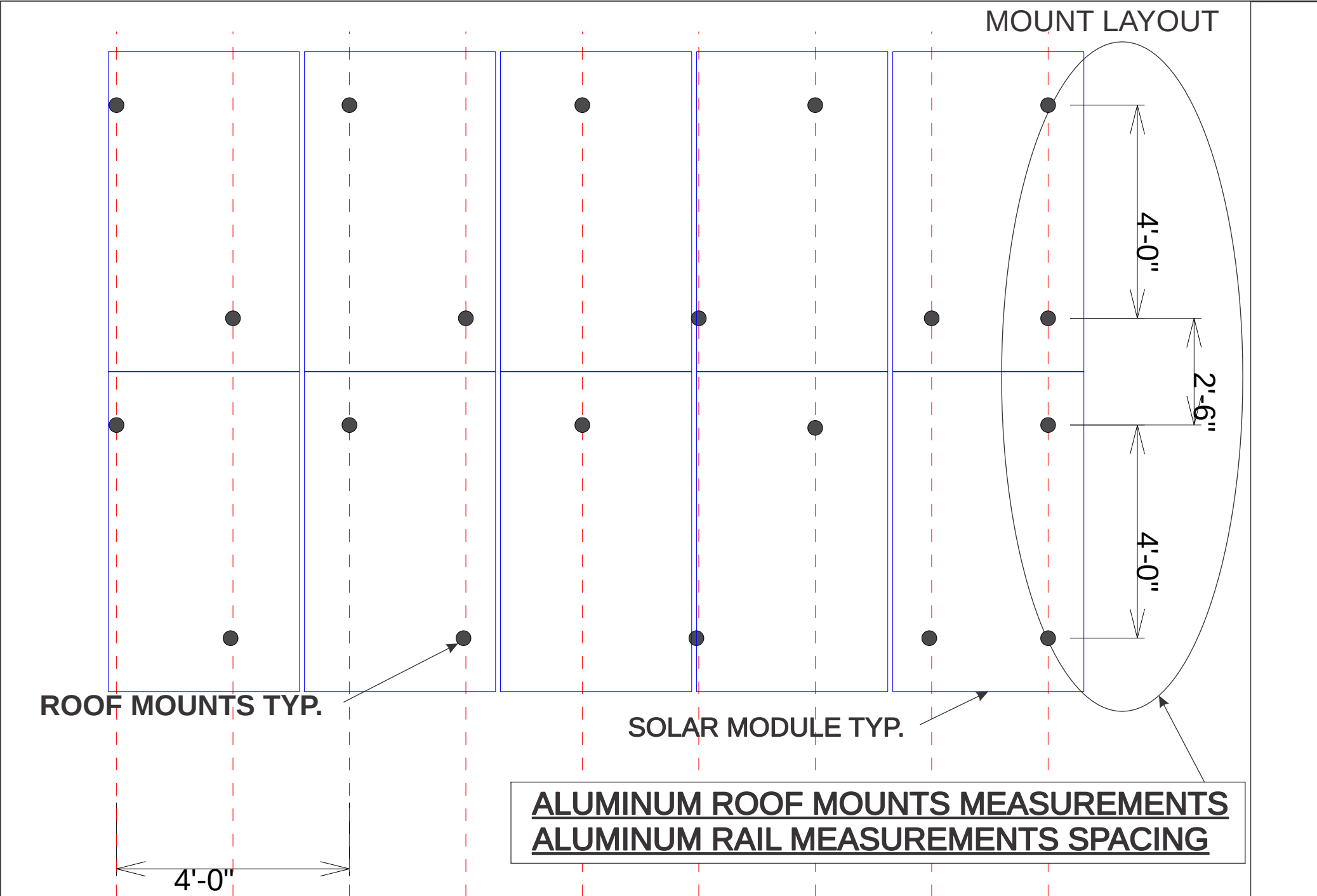
SEAL: MANUEL E. SIOUES
LICENSE
No. 20233
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

MANUEL E. SIOUES, P.E.
FLORIDA ENGINEER LICENSE # 20233
8331 SW 12TH TERRACE,
MIAMI, FL 33144.A, 33144
TEL (305) 586-4776
I CERTIFY THAT THIS PV SYSTEM
FULLY COMPLIES WITH THE
REQUIREMENTS OF NEC 690.

DATE: 6/14/2021
SCALE: NTS
DRAWN BY: J.B.

PAGE:

C-1



SAFETY LABELS

1 PHOTOVOLTAIC POWER SOURCE

AC OPERATING VOLTAGE 240VOLTS
AC OPERATING CURRENT AMPS

MICROINVERTERS LOCATED UNDERNEATH MODULES
FOR SERVICE CALL (PV COMPANY #)

LABEL FOR EACH J-BOX
LABEL SIZE: 4" x 2"

NOTE: INSTALLER MUST FILL IN AC OPERATING CURRENT
ON LABEL.

2 PHOTOVOLTAIC SYSTEM
COMBINER PANEL
DO NOT ADD LOADS

LABEL FOR SOLAR AC COMBINER BOX
LABEL SIZE: 4" x 2"

3 PHOTOVOLTAIC MICROINVERTERS
LOCATED UNDERNEATH
PV MODULE ON ROOFTOP ARRAY
FOR SERVICE PLEASE CALL (PV COMPANY#)

LABEL FOR SOLAR AC COMBINER BOX
LABEL SIZE: 5-1/2" x 2"

4 CAUTION

SOLAR POINT OF CONNECTION

LABEL FOR MAIN DISTRIBUTION PANEL
LABEL SIZE: 4" x 1"

5 PV SOLAR BREAKER
DO NOT RELOCATE
THIS OVERCURRENT
DEVICE

LABEL FOR SOLAR CIRCUIT BREAKER
INSTALLED IN MDP
LABEL SIZE: 2" x 1

6 WARNING

DUAL POWER SUPPLY
SOURCES: UTILITY AND
PV SOLAR ELECTRIC SYTEM

LABEL FOR MAIN DISCONNECT OR METER
LABEL SIZE: 4" x 2"

7 PHOTOVOLTAIC SYSTEM
AC DISCONNECT

AC OPERATING VOLTAGE VOLTS
AC OPERATING CURRENT AMPS

LABEL FOR SOLAR DISCONNECT
LABEL SIZE: 4" x 2"

NOTE: INSTALLER MUST FILL IN AC OPERATING CURRENT
ON LABEL.

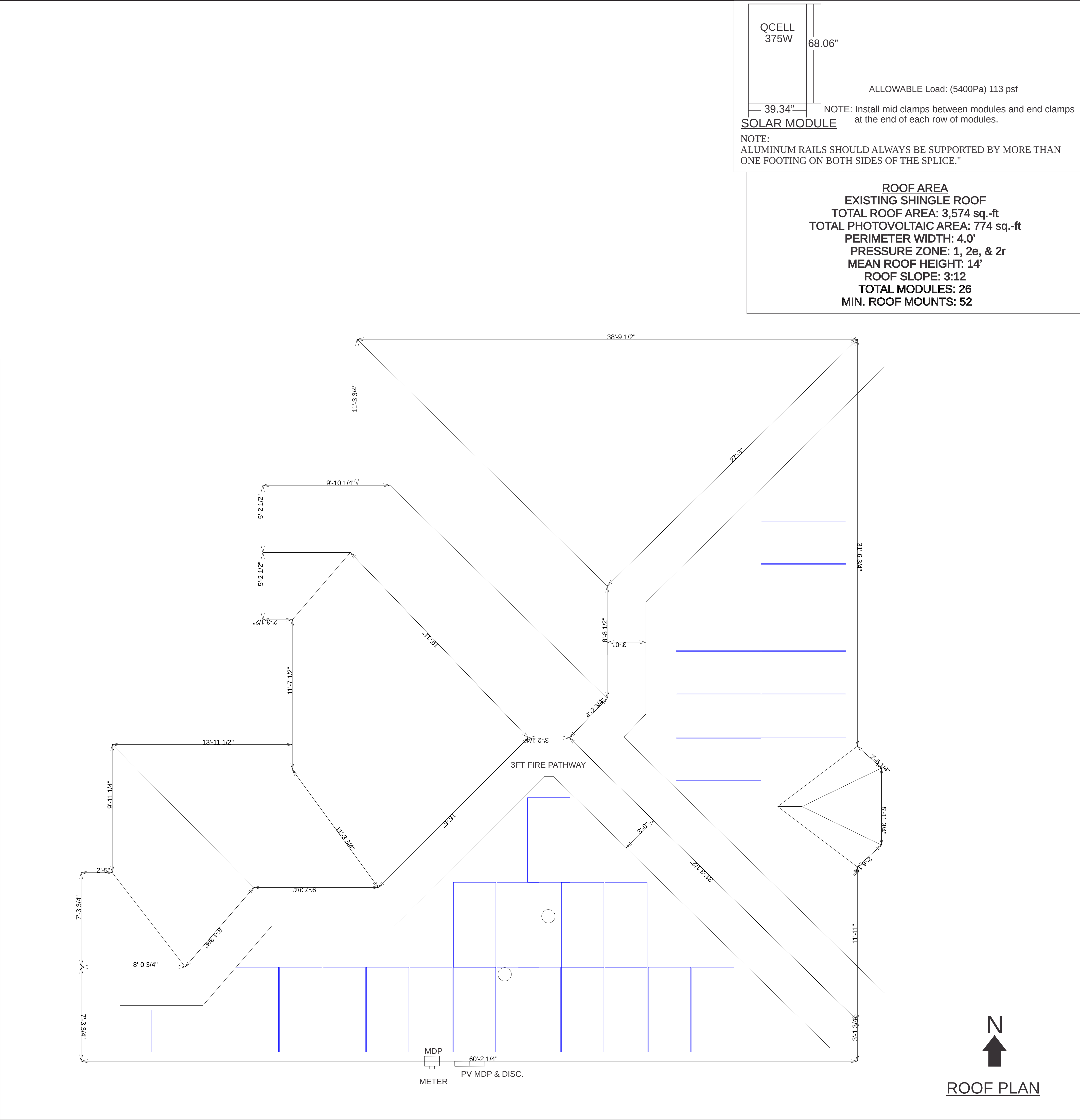
**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

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

SOLAR ELECTRIC
PV PANELS

6" X 3 1/2"

NOTE FOR ALL LABELS:
LABELS SHALL BE UV RESISTANT AND SHALL
HAVE WHITE LETTERS ON A RED BACKGROUND.
SHARPIE EXTREME OR EQUIVALENT UV RESISTANT
MARKERS SHALL BE USED FOR WRITING ON LABELS
REQUIRING INSTALLER-WRITTEN VALUES.



REVISIONS:

Project: De La Rosa, Randolfi	189 SW Pheasant Way, Lake City, FL 32024	SYSTEM LAYOUT
-------------------------------	---	---------------

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GOSOLAR

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DATE: 6/14/2021

SCALE: NTS

DRAWN BY: J.B

PAGE:
S-1

MecaWind v2375

Software Developer: Meca Enterprises Inc., www.meca.biz, Copyright © 2020

Calculations Prepared by:
Date: Feb 23, 2021

File Location : C:\Users\JB Solar Energy\Desktop\FBC 2020 wind calcs\GABLE 14FT.wnd

Basic Wind Parameters

Wind Load Standard = ASCE 7 - 16 Exposure Category = C
Wind Design Speed = 175.0 mph Risk Category = II
Structure Type = Other Other Structure Type = Solar Panels

General Wind Settings

Incl_LF = Include ASD Load Factor of 0.6 in Pressures = True
DynType = Dynamic Type of Structure = Rigid
NF = Natural Frequency of Structure (Mode 1) = 1.000 Hz
Zg = Altitude (Ground Elevation) above Sea Level = 0.000 ft
Bdist = Base Elevation of Structure = 0.000 ft
MWFRSType = MWFRS Method Selected = Ch 27 Pt 1

Topographic Factor per Fig 26.8 - 1

Topo = Topographic Feature = None
Kzt = Topographic Factor = 1.000

Building Inputs

hny : Gap between Panel & Roof (- Y) = 0.500 ft hpy : Gap between Panel & Roof (+Y) = 0.500 ft
Lp : Panel Chord Length = 6.800 ft Wp : Pane l Width = 3.300 ft
Nrows : Number of Rows = 1 Ncols : Number of Columns = 1
Sr : Spacing Between Rows = 0.100 ft Sc : Spacing Between Columns = 0.100 ft
Xstart: X distance to Corner = 20.000 ft Ystart: Y distance to Corner = 1.000 ft

Exposure Constants per Table 26.11 - 1:

Alpha: Table 26.11 - 1 Const = 9.500 - 1 Const = 9.500
At: Table 26.11 - 1 Const = 0.105 Bt: Table 26.11 - 1 Const = 1.000
Am: Table 26.11 - 1 Const = 0.154 Bm: Table 26.11 - 1 Const = 0.650
C: Table 26.11 - 1 Const = 0.200 Eps: Table 26.11 - 1 Const = 0.200

Gust Factor Calculation:

Gust Factor Category I Rigid Structures - Simplified Method
G1 = For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85
Gust Factor Category II Rigid Structures - Complete Analysis

Zm = 0.6 * Ht = 15.000 ft
Izm = Cc * (33 / Z) ^ m ^ 0.167 = 0.228
Lzm = L * (Zm / 33) ^ Epsilon = 427.057
Q = (1 / (1 + 0.63 * ((B + H) / Lzm)^0.63))^0.5 = 0.942
G2 = 0.925 * (1 + Izm^3.4 * Q) / ((1 + Izm^3.4 * Q)) = 0.895
Gust Factor Used in Analysis
G = Lessor Of G1 Or G2 = 0.850

Main Wind Force Resisting System (MWFRS) Calculations for Solar Panels per Ch 29:

LF = Load Factor based upon ASD Design = 0.60
hs = Overall height of structure = 13.333 ft
h = Mean Roof Height above grade = 13.333 ft
Kh = Z < 15 ft [4.572 m] -- > (2.01 * (15/zg)^(2/Alpha)) {Table 26.10 - 1} = 0.849
Kzt = Topographic Factor is 1 since no Topographic feature specified = 1.000
Kd = Wind Directionality Factor per Table 26.6 - 1 = 0.85
qh = (0.00256 * Kh * Kzt * Kd * Ke * V^2) * LF = 33.94 psf

Wind Loads on Solar Panel(s) Per Sec 29.4.4

h = Mean Roof Height = 13.333 ft
a = Width for Zone 2 and 3 determination (Per C&C Figure) = 4.000 ft
h/2 = Width used to determine if Exposed: h / 2 = 6.667 ft
h1 = Dist from Roof to Lower Panel Edge: Min(hny, hnp) = 0.500 ft
h2 = Dist from Roof to Upper Panel Edge: Max(hny, hnp) = 0.500 ft
d1_limit = d1 limit for adjacent panels: 4 ft [1.2 m] = 4.000 ft
hpt = Height of Parapet = 0.000 ft
w = Slope of panel relative to roof: ASIN(h2/h1) = 0.0 Deg
Gap_Min = Minimum gap between Panels: Min(Sr, Sc) = 1.2000 in
The Gap_Min is at least 0.25 in [6.4 mm] and so it is acceptable
Gap_Max = Maxim um gap between Panels: Max(Sr, Sc) = 0.100 ft
The Gap_Max can be no more than 6.7 ft [2.04 m] and so it is acceptable
1.5Lp = Distance from end considered exposed: 1.5 * Lp = 10.200 ft
LF = Load Factor based upon ASD Design = 0.60
Slope = Roof Slope = 18.43 Deg
A = Area of One Panel: Lp * Wp = 22.44 sq ft
Ga = Solar Panel Press Equalization Factor (Fig 29.4 - 8) = 0.660
The array shall be located 2*h2 (1.000 ft) from roof edge, a gable ridge, or a hip ridge.

Solar Panel Exposure Criteria:

Due to complex solar arrays, the software does not automatically determine if a panel is exposed. The following criteria must be used by the designer to determine if a panel is considered 'Exposed'. If any one of these criteria are met then the panel is considered Exposed:

- 1) The distance to adjacent solar array or bui lding edge 'd1' is > 4 ft [1.2 m]
- 2) The distance to adjacent panel 'd2' > 4 ft [1.2 m]

Wind Pressures for Solar Panel(s) per Sec 29.4.4

All wind pressures include a load factor of 0.6

Zone	Exposed	Ge	Ge	Gcp	Gcp_Neg	Gcp_Pos	Uplift	Down	p	p
									psf	psf
1	Yes	1.500	1.000	30.3	-2B	-1.893	0.453		-63.56	10.14
2e	Yes	1.500	1.000	30.3	-2B	-1.893	0.453		-63.56	10.14
2n	Yes	1.500	1.000	30.3	-2B	-2.498	0.453	453	-83.88	10.14
3e	Yes	1.500	1.000	30.3	-2B	-2.498	0.453		-83.88	10.14
3r	Yes	1.500	1.000	30.3	-2B	-2.498	0.453		-83.88	10.14
1	No	1.000	1.000	30.3	-2B	-1.893	0.453		-42.37	10.14
2e	No	1.000	1.000	30.3	-2B	-1.893	0.453		-42.37	10.14
2n	No	1.000	1.000	30.3	-2B	-2.498	0.453		-55.92	10.14
2r	No	1.000	1.000	30.3	-2B	-2.498	0.453		-55.92	10.14
3e	No	1.000	1.000	30.3	-2B	-2.498	0.453		-55.92	10.14
3r	No	1.000	1.000	30.3	-2B	-2.968	0.453		-66.45	10.14

Notes:

Zone = Zone based upon 'GCP Fig' Exposed = Exposed panel per Eqn 29.4 - 6
Ge = Factor per Eqn 29.4 - 6 GCrn_nom = Nominal press coeff per Fig 29.4 - 7
GCrn = Gp*Ge*Ge*GCrn_nom [Eqn 29.4 - 6] p = qh*GCrn [Eqn 29.4 - 5]
Area = Area of Zone is based upon area of one panel: 22.44 sq ft
+ Pressures Acting TOWARD Surface - Pressures Acting AWAY from Surface
Origin of X/Y system is at the geometric center of the build ing

The array shall be located 2*h2 (1.000 ft) from roof edge, a gable ridge, or a hip ridge.

The roof shall be designed for both of the following:

- 1) The case where solar collectors are present. Solar panel loads applied simultaneously with roof wind pressures per normal roof design without those roof pressures applied to sections of the roof where solar panels are not covering roof.
- 2) Case where solar arrays have been removed.

TRIBUTARY AREAS WIND LOAD CALCULATIONS

WIND PRESSURE ZONES	ZONE 1 & 2E	ZONE 2R & 2N	ZONE 3
MAX Area per ZONE (ft²)	9.3	9.3	0
MAX UPLIFT per ZONE (lbs.)	591	780	0

LAG BOLT PULL OUT CALCULATIONS

SOUTHERN PINE	per inch Thread Depth	297 lbs.
SS Lag Bolt 5/16"x4"	Min. Thread Depth	3"
Wood Strength x Thread Depth = Pull Out Strength		
297 lbs. x 3 in = 890 lbs.		
Allowable Pull Out Strength per Lag Bolt		890 lbs.
Max. Pull Out Strength Required per Lag Bolt		780.0
Lag Bolt Pull Out Strength Safety Factor		1.1

Design Method	Allowable Stress Design (ASD)
Connection Type	Withdrawal loading
Fastener Type	Lag Screw
Loading Scenario	N/A
Submit Initial Values	

Main Member Type	Southern Pine
Main Member Thickness	3.5 in.
Side Member Type	Oriented Strand Board (OSB)
Side Member Thickness	3/8 in.
Washer Thickness	1/8 in.
Nominal Diameter	5/16 in.
Length	3 in.
Load Duration Factor	C_D = 1.6
Wet Service Factor	C_M = 1.0
End Grain Factor	C_eg = 1.0
Temperature Factor	C_t = 1.0

Calculate Connection Capacity

Connection Yield Mode Descriptions	Limits of Use
Diaphragm Factor Help	Load Duration Factor Help
Technical Help	

Adjusted ASD Capacity 890 lbs.



Technical Data Sheet Polyether Technology CSI Section No. 07 92 13

CHEM LINK Construction & Maintenance
Telephone: 800-426-1661
Fax: 269-679-4448
353 E. Lyons Street
Schoelkopf, MI 49087
www.chemlink.com

Product Description
M-1® is a moisture curing, polyether adhesive/sealant designed for applications in damp, dry, or cold climates. M-1® is solvent free and contains no isocyanates. M-1® will not shrink upon curing, will not discolor when exposed to UV light, and can not "outgas", or bubble on damp surfaces as urethane sealants often do. M-1® is capable of joint movement in excess of 35% in both compression and extension. M-1® can be used effectively in many difficult construction site conditions such as wet or dry climates and at temperatures as low as 32°F (0°C).

Applicable Performance Standards
• ASTM C820, Type S, Grade NS, Class 35
• Uses NT, T, M, G, A & O
• ASTM E84, Class A
• Federal Specification TT-S-00220-C Type II, Class B
• Cons of Engineers CRD-C-841, Type II, Class B
• Canadian Standards Board CAN 19, 13-M82
• SWR Institute Validated (Sealant Waterproofing and Restoration)
• Miami Dade County, Florida, NOA No.: 19-0709.02
Expiration Date: 09/16/2024

Regulatory Compliance
• Conforms to DTC Rule for Sealants and Caulks
• Meets requirements of California Regs: CARB, SWAQMD and SCAGMD
• This product does not contain cancer causing chemicals listed in California Proposition 65.
• Conforms to USDA Requirements for Non-Food Contact

Green Standards:
• LEED 2.2 for New Construction and Major Renovations
• Low Emitting Materials (Section 4.1) 1 Point
• NAHB Model Green Home Building Guidelines: 5 Global Impact Points
• VOC Content: less than 17 grams / liter ASTM D2369 EPA Method 24 (tested at 240°F / 110°C)

Packaging
• 5 oz Squeeze Tube (148 ml)
36 tubes/carton, 40 cartons/pallet
• 10.1 oz (300 ml)
24 cartridges/carton, 45 cartons/pallet
• 20 oz (600 ml)
12 cartridges/carton, 40 cartons/pallet
• 28 oz (825 ml)
12 cartridges/carton, 40 cartons/pallet
White only - Other colors available by special order
• 2 and 5 gallon pails or 50 gallon drums available by special order

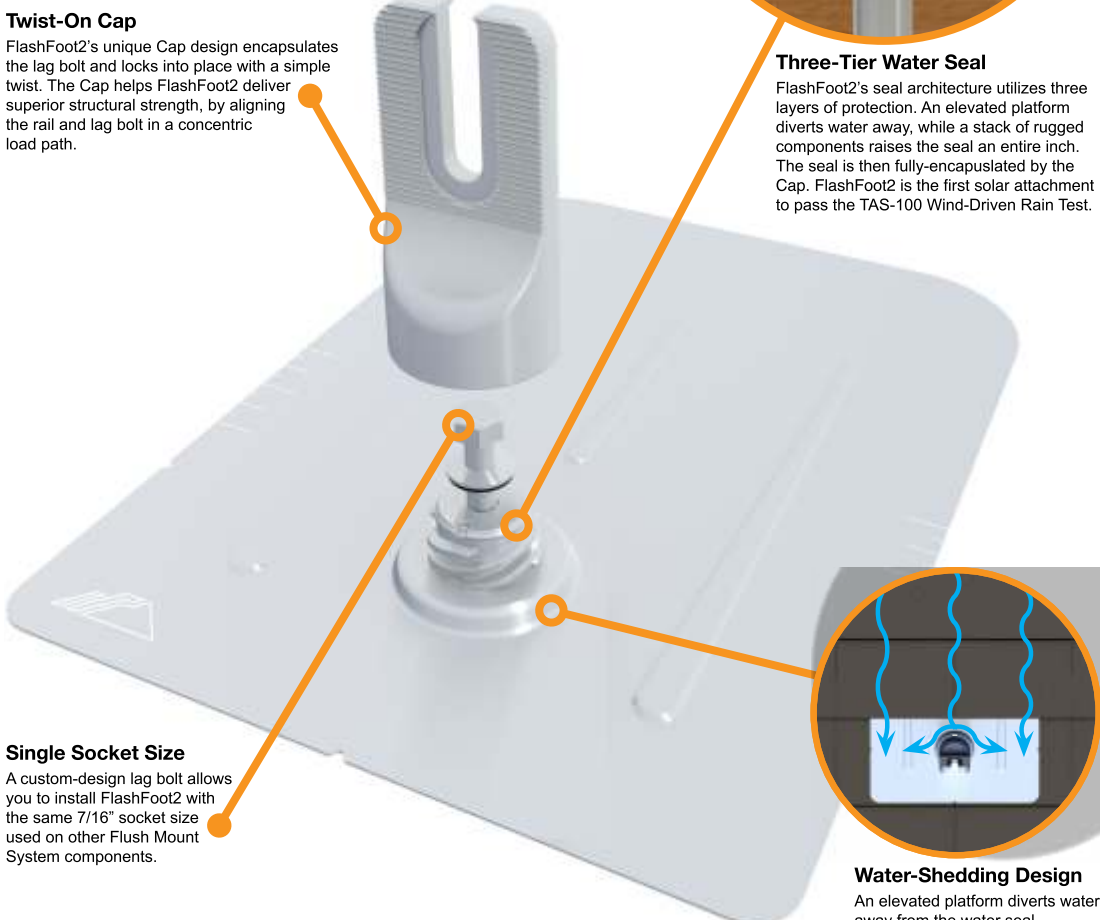
Colors
White, Gray, Tan, Limestone & Black
• Color matching is available in batch quantity only



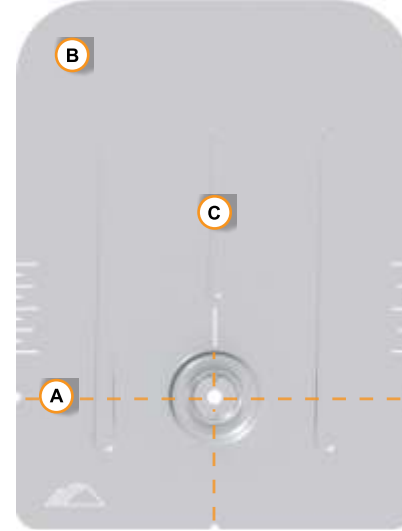
FlashFoot2

The Strongest Attachment in Solar

IronRidge FlashFoot2 raises the bar in solar roof protection. The unique water seal design is both elevated and encapsulated, delivering redundant layers of protection against water intrusion. In addition, the twist-on Cap perfectly aligns the rail attachment with the lag bolt to maximize mechanical strength.



Installation Features



Benefits of Concentric Loading

Traditional solar attachments have a horizontal offset between the rail and lag bolt, which introduces leverage on the lag bolt and decreases uplift capacity.

FlashFoot2 is the only product to align the rail and lag bolt. This concentric loading design results in a stronger attachment for the system.

Testing Certification

Designed and Certified for Compliance with the International Building Code (IBC) / ASCE 7-17.

Water Sealing Tested to UL 441 Section 27 "Rain Test" and TAS 100-95 "Wind Driven Rain Test" by Intertek. Ratings applicable for composition shingle roofs having slopes between 2:12 and 12:12.

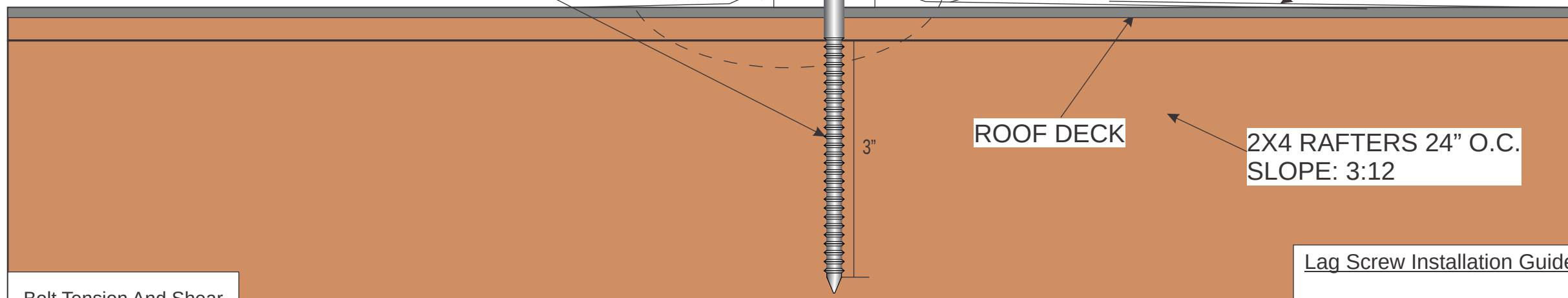
UL 270

Conforms to UL 270 Mechanical and Loading Requirements. See Flash Mount Install Manual for full ratings.

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SOLAR MODULE: 18.05 sq-ft
1/4" SS 18-8 BOLT
1/4" SS SERRATED FLANGE NUT
ALLOWABLE LOAD: 6,010 lbs.
DISTRIBUTED LOAD: 363.8 lbs
ALUMINUM END CLAMP & MID CLAMP
ALLOWABLE LOAD: 529 lbs
DISTRIBUTED LOAD: 363.8 lbs

3/8" SS 18-8 BOLT
3/8" SS SERRATED FLANGE NUT
ALLOWABLE LOAD: 11,930 lbs.
MAX. DISTRIBUTED LOAD: 780 lbs
5/16" SS LAG BOLT
5/16" SS FENDER WASHER
ALLOWABLE LOAD: 890 lbs.
MAX. DISTRIBUTED LOAD: 780 lbs



Bolt Tension And Shear Strength Chart
1/4" Stainless Steel Bolt Tension Strength(lb): 6,010 Shear Strength(lb): 5,300
3/8" Stainless Steel Bolt Tension Strength(lb): 14,830 Shear Strength(lb): 11,930

Notes: (1) Thread must be embedded in the side grain of a Trusses or other structural member integral with the building structure.
(2) Lag bolts must be located in the middle third of the structural member.
(3) These values are not valid for wet service.
(4) This table does not include shear capacities. If necessary, contact a local engineer to specify lag bolt size with regard to shear forces.
(5) Install lag bolts with head and washer flush to surface (no gap). Do not over-torque.
(6) Withdrawal design values for lag screw connections shall be multiplied by applicable adjustment factors if necessary. See Table 10.3.1 in the American Wood Council NDS for Wood Construction.

Lag Screw Installation Guidelines

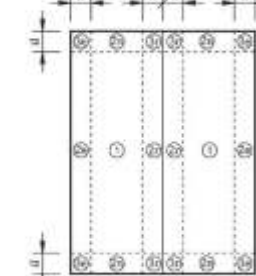
1. Determine location for the L-Bracket on roof by drilling through the center of truss from bottom with 5/32" drill bit.
2. Mark mounting holes for L-Bracket on underlayment. Mounting holes should be centered on the trusses.
3. Drill 15/64" pilot hole.
4. Apply sealant to bottom of L-Bracket.
5. Place L-Bracket over roof underlayment with holes in roof.
6. Apply sealant to bottom of L-Bracket, apply sealant to lag screws, and fasten L-Bracket securely to trusses.
7. Apply additional sealant to top assembly to be sure all penetrations are sealed.

* Rails, L-Foot, Mid-clamps & End-clamps are extruded using one of the following aluminum alloys: 6005-T5, 6105-T5, 6061-T6

NOTE:
AT THE END OF THE ARRAY
MOUNTS 2' OC

RAIL SPAN: 175MPH EXP: C	SNOW LOAD: 0						EXPOSED MOD.			EDGE MOD.		
	G1	G2	G3	G1	G2	G3	G1	G2	G3	G1	G2	G3
	175 mph	8-20	67	48	38	48	30	25	35	24	19	19
	21-27	78	61	49	64	36	27	48	28	19		
	28-45	75	68	60	58	48	35	39	35	25		

Grouping of ASCE 7-16 Roof Zones (Gable)						
Roof Slope	8° - 27°			28° - 45°		
Group	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
ASCE 7-16 Roof Zones	1 2e	2n 2r 3e	3r	1 2e 2r	2n 3r	3e



XR Rails

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear & black anod. finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear & black anod. finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Varying load capability
- Clear anodized finish

Internal Splices



All rails use internal splices for seamless connections.

- Self-tapping screws
- Varying versions for rails
- Grounding Straps offered

Attachments

FlashFoot



Anchor, flash, and mount with all-in-one attachments.

- Ships with all hardware
- IBC & IRC compliant
- Certified with XR Rails

Slotted L-Feet



Drop-in design for rapid rail attachment.

- High-friction serrated face
- Heavy-duty profile shape
- Clear & black anod. finish

Standoffs



Raise flush or tilted systems to various heights.

- Works with vent flashing
- Ships pre-assembled
- 4" and 7" Lengths

Tilt Legs



Tilt assembly to desired angle, up to 45 degrees.

- Attaches directly to rail
- Ships with all hardware
- Fixed and adjustable

Clamps & Grounding

End Clamps



Slide in clamps and secure modules at ends of rails.

- Mill finish & black anod.
- Sizes from 1.22" to 2.3"
- Optional Under Clamps

Grounding Mid Clamps



Attach and ground modules in the middle of the rails.

- Parallel bonding T-bolt
- Reusable up to 10 times
- Mill & black stainless

T-Bolt Grounding Lugs



Ground system using the rail's top slot.

- Easy top-slot mounting
- Eliminates pre-drilling
- Swivels in any direction

Accessories



Provide a finished and organized look for rails.

- Snap-in Wire Clips
- Perfected End Caps
- UV-protected polymer

Free Resources



Design Assistant
Go from rough layout to fully engineered system. For free.
Go to IronRidge.com/rm



NABCEP Certified Training
Earn free continuing education credits, while learning more about our systems.
Go to IronRidge.com/training

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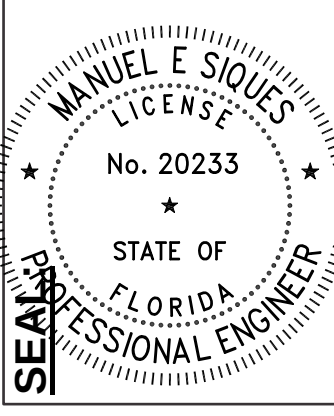
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Project: De La Rosa, Randolfi

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S-2