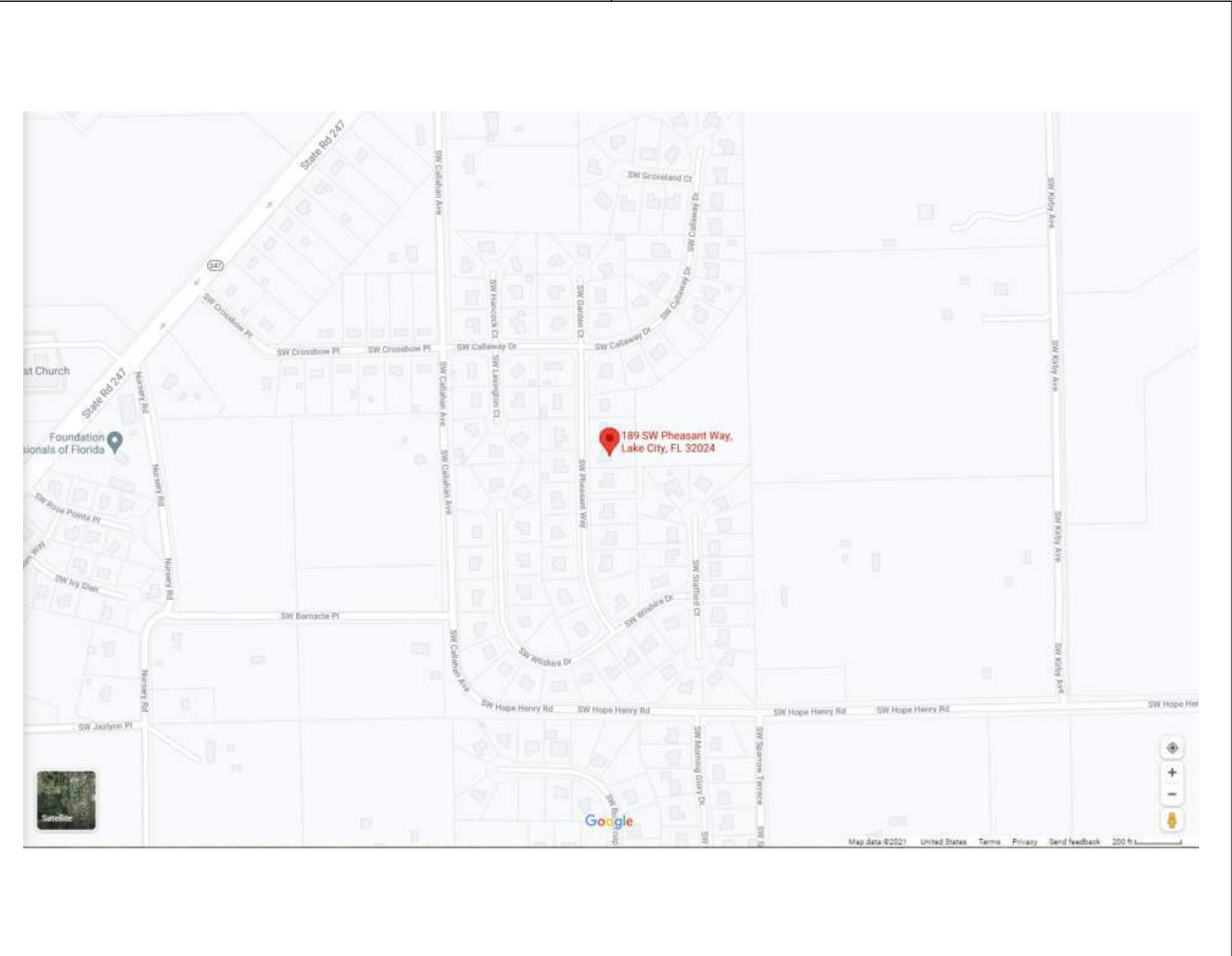
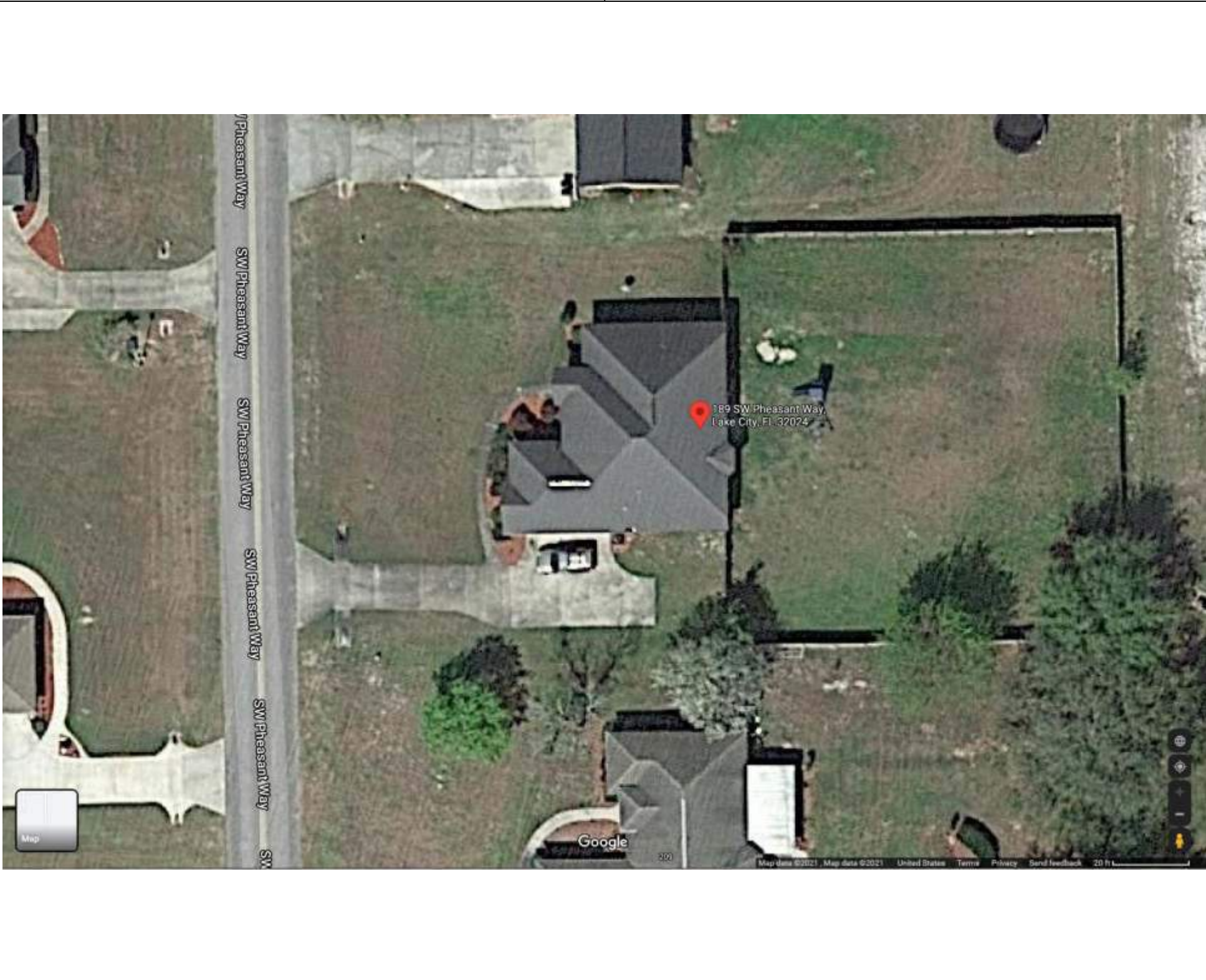


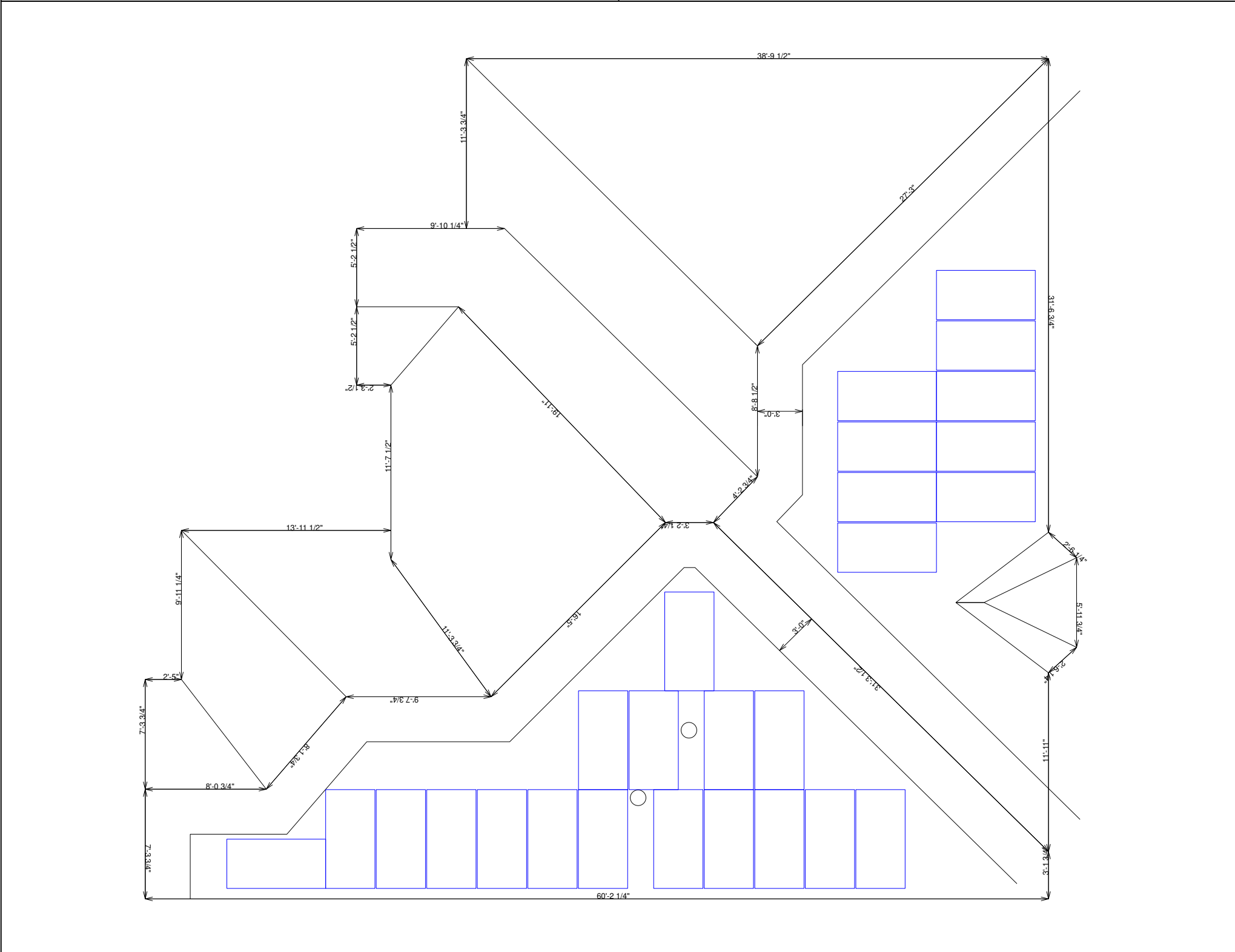
Location Map:



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

MANUEL E. SIQUES  
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.

MANUEL E. SIQUES  
LICENSE  
No. 20233  
STATE OF  
FLORIDA  
PROFESSIONAL ENGINEER

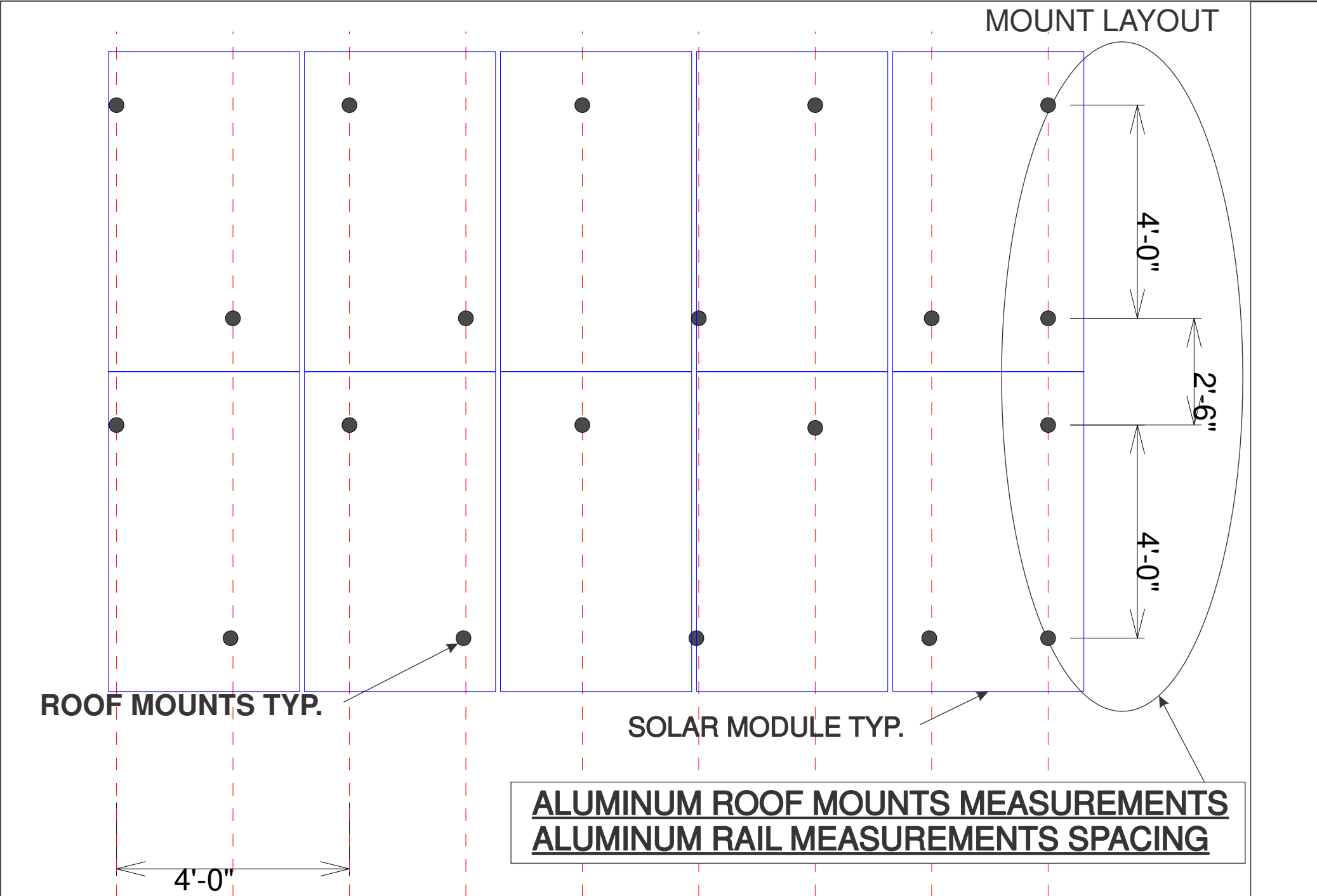
DATE: 6/14/2021

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.

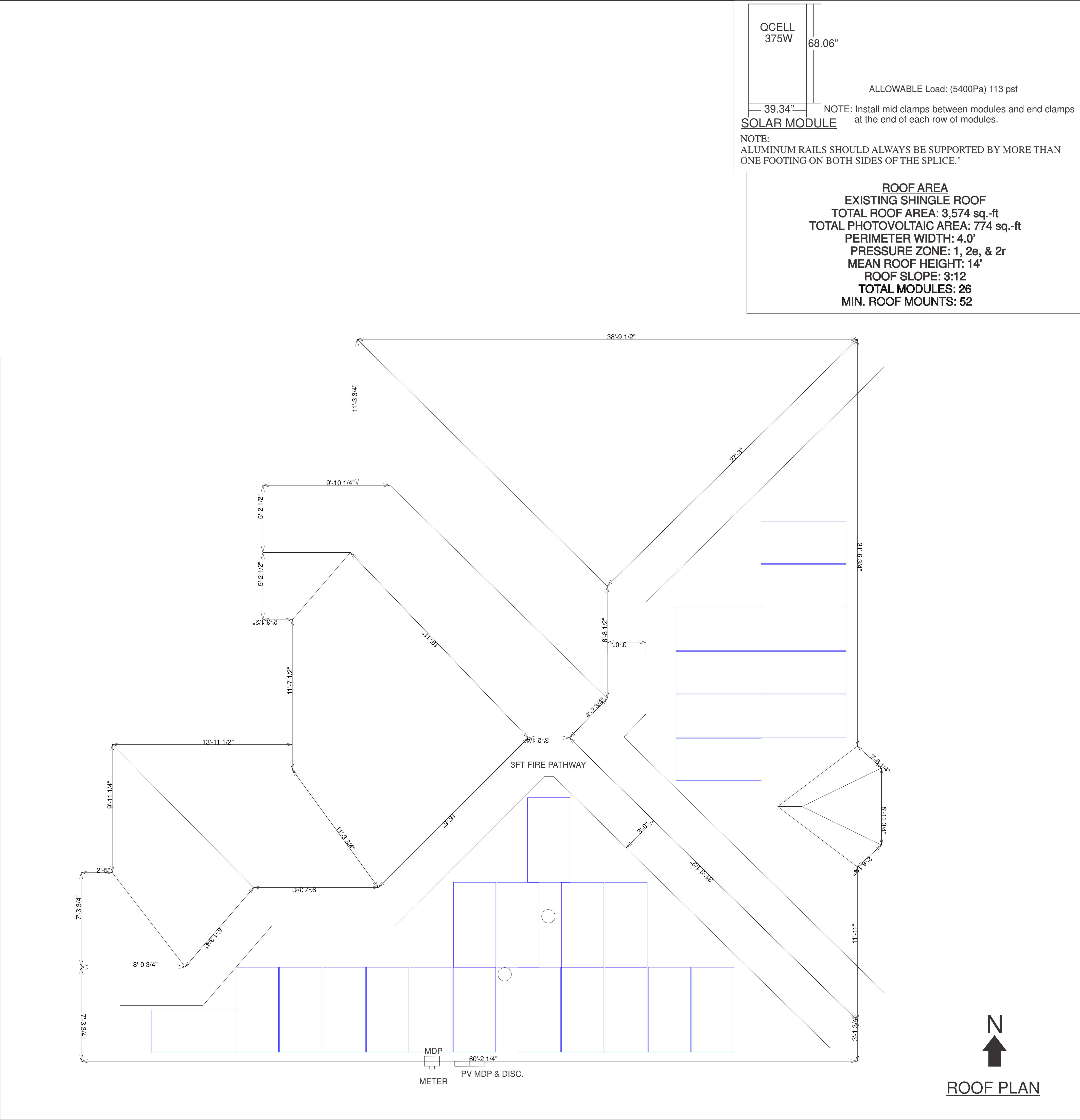
**SOLAR PV SYSTEM EQUIPPED  
WITH RAPID SHUTDOWN**

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:**

NO.	DESCRIPTION	DATE

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

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

**GOSOLAR**

MANUEL E. SQUES, P.E.  
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SCALE: NTS  
DRAWN BY: J.B.  
PAGE: S-1

## MecaWind v2375

Software Developer: Meca Enterprises Inc., [www.meca.biz](http://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 Zg: Table 26.11 - 1 Const = 900.000 ft  
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 = 0.850  
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  
GI = For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Zm = 0.6 \* H = 15.000 ft  
Izm = Co \* (33 / Z) ^ m ^ 0.167 = 427.057 = 0.228  
Lzm = L \* (Zm / 33) ^ Epsilon = 0.942  
Q = (1 / (1 + 0.63 \* ((B + H) / Lzm)^0.63))^0.5 = 0.895  
G2 = 0.925 \* (1 + 1.7 \* Izm \* 3.4 \* Q) / (1 + 1.7 \* 3.4 \* Izm) = 0.850  
Gust Factor Used in Analysis  
G = Lessor Of GI 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)/Lp) = 0.0 Deg  
Gap\_Min = Minimum gap between Panels: Min(Sr, Sc) = 1.200 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 building 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
				Fig	Uplift	Down			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	-2.968	0.453		-99.68	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  
GCP = Gp \* 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 building

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:

- 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.
- 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" x 4"	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		1.11

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 <sub>D</sub> = 1.6
Wet Service Factor	C <sub>M</sub> = 1.0
End Grain Factor	C <sub>eg</sub> = 1.0
Temperature Factor	C <sub>t</sub> = 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  
Schoolcraft, MI 49087  
[www.chemlink.com](http://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 E881, Class A  
• Federal Specification TT-S-0020-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 / 115°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

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• 2 and 5 gallon pails or 50 gallon drums available by special order

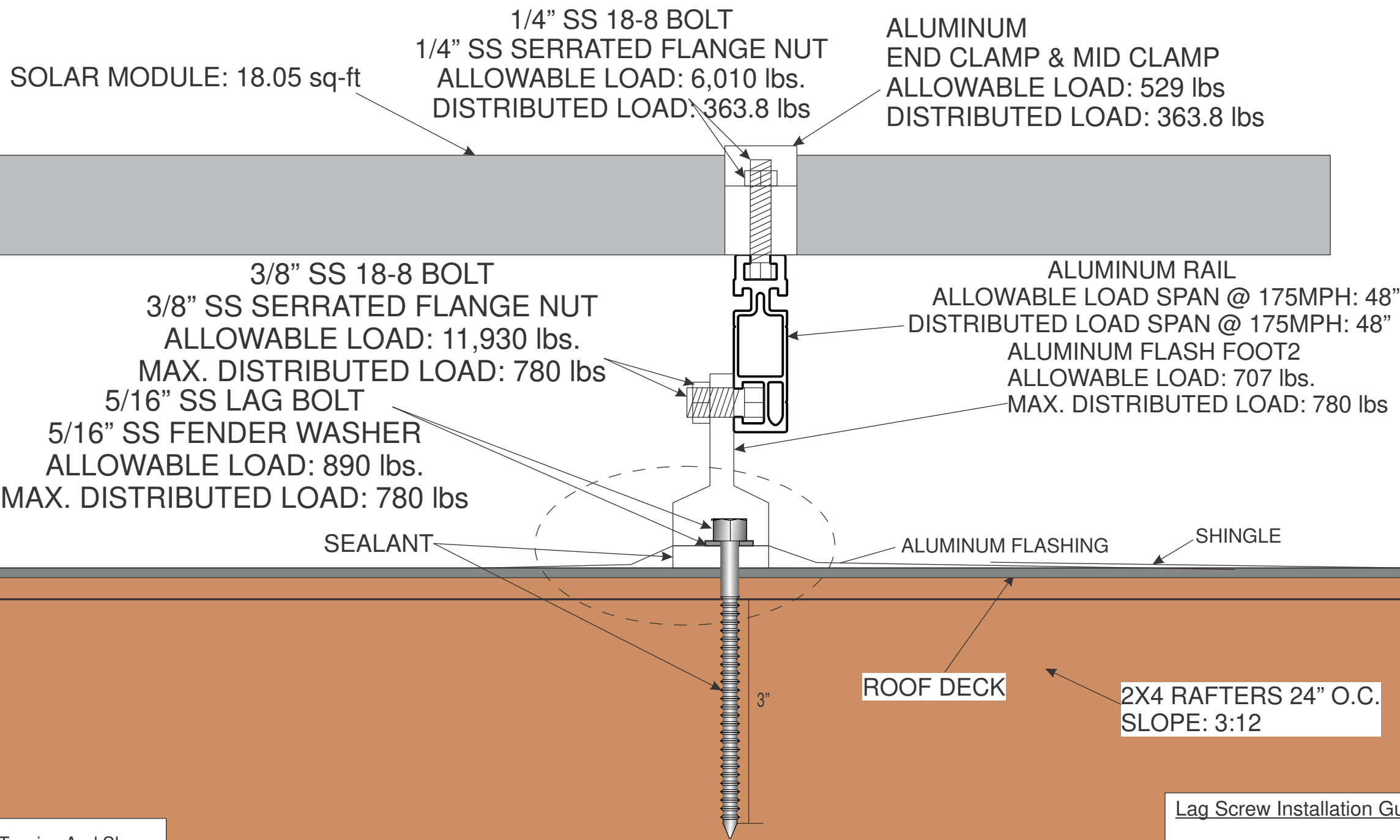
**Colors**  
White, Gray, Tan, Limestone & Black  
• Color matching is available in batch quantity only

**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 / 115°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

## ATTACHMENT DIAGRAM 2 ROWS OF RAILS PER MODULE



**Lag Screw Installation Guidelines**

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

**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.

\* 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
175 mph	8-20	67	48	38	48	30	25	35	24	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° - 23°			25° - 45°				
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3		
ASCE 7-16 Roof Zones	1 2e	2n 3e	3r	1 2e	2n 3r	3e		
								