



Starling Madison Lofquist, Inc.

*Consulting Structural and Forensic Engineers*

5224 South 39<sup>th</sup> Street, Phoenix, Arizona 85040

tel: (602) 438-2500 fax: (602) 438-2505 www.smleng.com

Roof Tech, Inc.  
333 H Street, Suite 5000  
Chula Vista, CA 91910

January 1, 2018

page 1 of 52

Attn: Mr. Takashi Chiyoda, General Manager

**Subject: Roof Tech RT-[E] Mount Gen II rail-less – Structural Analysis**

SML Job No.: 471-13

Dear Mr. Chiyoda:

We have analyzed the Roof Tech RT-[E] Mount Gen II rail-less photovoltaic (PV) panel roof mount system and determined that, for the configurations and criteria described below, it is in compliance with the applicable sections of the following Reference Documents:

- Codes: ASCE/SEI 7-10 Min. Design Loads for Buildings & Other Structures  
International Building Code 2012 & 2015 Editions  
International Residential Building Code 2012 & 2015 Editions
- Other: Aluminum Design Manual, 2010 & 2015 Editions

The Roof Tech RT-[E] Mount Gen II rail-less photovoltaic (PV) panel roof mount system is comprised of a 6000 series aluminum [E] Mount base, panel spacer, mid clamp, end clamp, and optional shims (up to 12-2mm shims). A stainless steel SS304 8.0 mm bolt and nut fastens the mounting system together, and the system is attached to the roof wood substrate with SS304 5.0 mm x 60 mm wood screws.

Three wood substrates were tested with the fasteners also passing through two layers of composite asphalt roof shingles and 2 layers of building paper. The first tested wood substrate consisted of 7/16" thick sheathing over a 2x4 DF #2 rafter (2x truss top chord OK by inspection), the second tested wood substrate consisted of 7/16" thick OSB only, and the third tested wood substrate consisted of 15/32" thick plywood only. See Exhibit 'A' – attached. Two wood screws are required at the rafter installations and four wood screws are required at the OSB and plywood only installations.

The testing data provided by Institute of Building Technology (IBT) report no.: 2426-17001-002 project no.: 28156 dated June 14, 2017, and report no.: 2426-17003 project no.: 28959 dated October 4, 2017 shows that the critical failure occurs in one of three ways; pullout of the wood screws from the OSB/Plywood only wood substrate, yielding of the attached components in shear, or ultimate failure of the aluminum [E] Mount. Maximum allowable values for these failure conditions were derived using a safety factor of 2.0 on the ultimate loads resulting in aluminum failure and a safety factor of 3.0 of the loads resulting in wood failure. The safety factor for downward compression on the sheathing is 2.0. The testing was performed in general accordance with IAPMO Uniform Evaluation Services *Evaluation Criteria for Joist Hangers and Miscellaneous Connectors*, EC002 adopted June 2007, revised January 2016 and ASTM D1761-2012, *Standard Test Methods for Mechanical Fasteners in Wood*.

Compression load capacity on the OSB and plywood installations were determined by calculations using the methods presented in the Panel Design Specification 2012 by The Engineered Wood Association (APA). This document provides the allowable moment for various wood sheathing materials including 7/16" thick OSB and 15/32" thick plywood. A simply supported beam analysis was used assuming the sheathing is supported on joists at 24" apart and that a 24" width of the sheathing is engaged. The results of this analysis are presented below.

**RT-[E] Mount PV Panel in Landscape Orientation:**

The maximum allowable uplift and shear force for 7/16" thick sheathing over a 2x4 DF #2 rafter is 586 lb and 304 lb respectively. The maximum allowable uplift, down force, and shear force for 7/16" thick OSB only is 141 lb, 258 lb, and 190 lb respectively. The maximum allowable uplift, down force, and shear force for 15/32" thick plywood only is 151 lb, 556 lb, and 217 lb respectively.

**RT-[E] Mount PV Panel in Portrait Orientation:**

The maximum allowable uplift, down force, and shear force for 7/16" thick OSB only is 119 lb, 258 lb, and 219 lb respectively. The maximum allowable uplift, down force, and shear force for 15/32" thick plywood only is 173 lb, 556 lb, and 263 lb respectively.

The attached tables below show the minimum number of mounts at each panel required for the combined loading criteria of wind speed, roof slope, and snow loads which produce reaction loads less than the allowable loads listed above. The effect of seismic loads (for all design categories A-F) have been determined to be less than the effect due to wind loads in all load conditions and combinations. The assumed topography is flat with a  $K_{zt} = 1.0$ . Therefore, the minimum allowable number of attachments for common load cases due to dead, wind and snow loads are the controlling load cases.

Table 0. Roof Angle to Roof Slope Conversion	
Roof Angle (Degrees)	Roof Slope (in/in)
0.0	0:12
4.8	1:12
9.5	2:12
14.0	3:12
18.4	4:12
22.6	5:12
26.6	6:12
33.7	8:12
39.8	10:12
45.0	12:12

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	6*	6*	6*	6*	6*	6*	6*	6*	6	6
		35	6*	6*	6*	6*	6*	6*	6*	6*	6	6
	40	6*	6*	6*	6*	6*	6*	6*	6*	6	6	
	C	0	4	4	4	4	6	6	6	6		
		5	4	4	4	4	6	6	6	6		
		10	4	4	4	4	6	6	6	6		
		15	4	4	4	4	6	6	6	6		
		20	4	4	4	4	6	6	6	6		
		25	4	4	4	4	6	6	6	6		
		30	6*	6*	6*	6*	6	6	6	6		
		35	6*	6*	6*	6*	6	6	6	6		
	40	6*	6*	6*	6*	6	6	6	6			
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	4	4	4	6	6	6				
		25	4	4	4	6	6	6				
		30	6*	6*	6*	6	6	6				
		35	6*	6*	6*	6	6	6				
	40	6*	6*	6*	6	6	6					

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4	6
		5	4	4	4	4	4	4	4	4	4	6
		10	4	4	4	4	4	4	4	4	4	6
		15	4	4	4	4	4	4	4	4	4	6
		20	6*	6*	6*	6*	6*	6*	6*	6*	6*	6
		25	6*	6*	6*	6*	6*	6*	6*	6*	6*	6
		30	6*	6*	6*	6*	6*	6*	6*	6*	6*	6
		35	6	6	6	6	6	6	6	6	6	
	40											
	C	0	4	4	4	4	4	6	6	6	6	
		5	4	4	4	4	4	6	6	6	6	
		10	4	4	4	4	4	6	6	6	6	
		15	4	4	4	4	4	6	6	6	6	
		20	6*	6*	6*	6*	6*	6	6	6	6	
		25	6*	6*	6*	6*	6*	6	6	6	6	
		30	6*	6*	6*	6*	6*	6	6	6	6	
		35	6	6	6	6	6	6				
	40											
	D	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	6*	6*	6*	6*	6	6	6			
		25	6*	6*	6*	6*	6	6	6			
		30	6*	6*	6*	6*	6	6	6			
		35	6	6	6	6						
	40											

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4	6
		5	4	4	4	4	4	4	4	4	4	6
		10	4	4	4	4	4	4	4	4	4	6
		15	4	4	4	4	4	4	4	4	4	6
		20	4	4	4	4	4	4	4	6*	6*	6
		25	6*	6*	6*	6*	6*	6*	6*	6*	6*	6
		30	6*	6*	6*	6*	6*	6*	6*	6*	6*	6
		35	6	6	6	6	6	6	6	6	6	6
	40	6	6	6	6	6	6	6	6	6		
	C	0	4	4	4	4	4	4	6	6	6	
		5	4	4	4	4	4	4	6	6	6	
		10	4	4	4	4	4	4	6	6	6	
		15	4	4	4	4	4	4	6	6	6	
		20	4	4	4	4	6*	6*	6	6	6	
		25	6*	6*	6*	6*	6*	6*	6	6	6	
		30	6*	6*	6*	6*	6*	6*	6	6	6	
		35	6	6	6	6	6	6	6	6	6	
	40	6	6	6	6	6	6	6				
	D	0	4	4	4	4	4	6	6	6		
		5	4	4	4	4	4	6	6	6		
		10	4	4	4	4	4	6	6	6		
		15	4	4	4	4	4	6	6	6		
		20	4	4	4	6*	6*	6	6	6		
		25	6*	6*	6*	6*	6*	6	6	6		
		30	6*	6*	6*	6*	6*	6	6	6		
		35	6	6	6	6	6	6	6			
	40	6	6	6	6	6						

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	6*	6	6	6
		20	4	4	4	6*	6*	6*	6	6	6	6
		25	4	4	6*	6*	6*	6*	6	6	6	6
		30	6*	6*	6*	6*	6*	6*	6	6		
		35	6*	6*	6*	6*	6	6	6			
	40	6	6	6	6	6						
	C	0	4	4	4	4	4	6	6	6		
		5	4	4	4	4	4	6	6	6		
		10	4	4	4	4	4	6	6	6		
		15	4	4	4	6*	6	6	6			
		20	6*	6*	6*	6*	6	6	6			
		25	6*	6*	6*	6*	6	6	6			
		30	6*	6*	6*	6*	6	6				
		35	6*	6	6	6						
	40	6	6	6								
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	6*	6*	6	6	6				
		20	6*	6*	6*	6	6	6				
		25	6*	6*	6*	6	6					
		30	6*	6*	6*	6						
		35	6	6	6							
	40	6	6									

Landscape - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 2	B	0	6	6	6						
		5	6	6	6						
		10	6	6	6						
		15	6	6	6						
		20	6	6	6						
		25	6	6	6						
		30	6	6	6						
		35									

Landscape - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 2	B	0	6	6	6						
		5	6	6	6						
		10	6	6	6						
		15	6	6	6						
		20	6	6	6						
		25	6	6	6						
		30	6	6	6						
		35									

Landscape - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 2	B	0	6	6	6						
		5	6	6	6						
		10	6	6	6						
		15	6	6	6						
		20	6	6	6						
		25	6	6	6						
		30	6	6	6						
		35	6	6	6						

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	6	6					
		5	4	4	4	6	6					
		10	4	4	4	6	6					
		15	4	4	4	6	6					
		20	6*	6*	6*	6	6					
		25	6	6	6	6	6					
		30	6*	6*	6*	6	6					
	35	6	6	6	6	6						
	C	0	6	6	6							
		5	6	6	6							
		10	6	6	6							
		15	6	6	6							
		20	6	6	6							
		25	6	6	6							
		30	6	6	6							
	35	6	6	6								
	D	0	6									
		5	6									
		10	6									
		15	6									
		20	6									
25		6										
30		6										
35	6											

Landscape - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	6	6					
		5	4	4	4	6	6					
		10	4	4	4	6	6					
		15	4	4	4	6	6					
		20	6*	6*	6*	6	6					
		25	6*	6*	6*	6	6					
		30	6	6	6	6	6					
	35	6	6	6	6	6						
	C	0	6	6	6							
		5	6	6	6							
		10	6	6	6							
		15	6	6	6							
		20	6	6	6							
		25	6	6	6							
		30	6	6	6							
	35	6	6	6								
	D	0	6									
		5	6									
		10	6									
		15	6									
		20	6									
25		6										
30		6										
35	6											

Note: Installations in Zone 3 are not acceptable for roof slopes less than 28 degrees

Landscape - Plywood Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 1	B	0	4	4	4	4	4	6	6	6	
		5	4	4	4	4	4	6	6	6	
		10	4	4	4	4	4	6	6	6	
		15	4	4	4	4	4	6	6	6	
		20	4	4	4	4	4	6	6	6	
		25	4	4	4	4	4	6	6	6	
		30	4	4	4	4	4	6	6	6	
		35	4	4	4	4	4	6	6	6	
		40	4	4	4	4	4	6	6	6	
		50	4	4	4	4	4	6	6	6	
		60	6*	6*	6*	6*	6*	6	6	6	
		70	6*	6*	6*	6*	6*	6	6	6	
	80	6	6	6	6	6	6	6	6		
	C	0	4	4	4	6	6				
		5	4	4	4	6	6				
		10	4	4	4	6	6				
		15	4	4	4	6	6				
		20	4	4	4	6	6				
		25	4	4	4	6	6				
		30	4	4	4	6	6				
		35	4	4	4	6	6				
		40	4	4	4	6	6				
		50	4	4	4	6	6				
		60	6*	6*	6*	6	6				
70		6*	6*	6*	6	6					
80	6	6	6	6	6						
D	0	4	6	6	6						
	5	4	6	6	6						
	10	4	6	6	6						
	15	4	6	6	6						
	20	4	6	6	6						
	25	4	6	6	6						
	30	4	6	6	6						
	35	4	6	6	6						
	40	4	6	6	6						
	50	4	6	6	6						
60	6*	6	6	6							
70	6*	6	6	6							
80	6	6	6	6							



Landscape - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 27°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	6	6	6		
		5	4	4	4	4	4	6	6	6		
		10	4	4	4	4	4	6	6	6		
		15	4	4	4	4	4	6	6	6		
		20	4	4	4	4	4	6	6	6		
		25	4	4	4	4	4	6	6	6		
		30	4	4	4	4	4	6	6	6		
		35	4	4	4	4	4	6	6	6		
		40	4	4	4	4	4	6	6	6		
		50	6*	6*	6*	6*	6*	6	6	6		
		60	6	6	6	6	6	6	6	6		
		70										
	80											
		C	0	4	4	4	6	6	6			
			5	4	4	4	6	6	6			
			10	4	4	4	6	6	6			
			15	4	4	4	6	6	6			
			20	4	4	4	6	6	6			
			25	4	4	4	6	6	6			
			30	4	4	4	6	6	6			
			35	4	4	4	6	6	6			
			40	4	4	4	6	6	6			
			50	6*	6*	6*	6	6	6			
			60	6	6	6	6	6	6			
			70									
		80										
		D	0	4	6	6	6					
			5	4	6	6	6					
			10	4	6	6	6					
			15	4	6	6	6					
			20	4	6	6	6					
			25	4	6	6	6					
			30	4	6	6	6					
			35	4	6	6	6					
			40	4	6	6	6					
			50	6*	6	6	6					
	60		6	6	6	6						
	70											
	80											

Landscape - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount									
			Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	6*	6*	6*	6*	6	6	6			
		60	6	6	6	6	6	6	6			
		70	6	6	6	6	6	6	6			
	80											
		C	0	4	4	6	6	6				
			5	4	4	6	6	6				
			10	4	4	6	6	6				
			15	4	4	6	6	6				
			20	4	4	6	6	6				
			25	4	4	6	6	6				
			30	4	4	6	6	6				
			35	4	4	6	6	6				
			40	4	4	6	6	6				
			50	6*	6*	6	6	6				
			60	6	6	6	6	6				
			70	6	6	6	6	6				
		80										
		D	0	6	6	6						
			5	6	6	6						
			10	6	6	6						
			15	6	6	6						
			20	6	6	6						
			25	6	6	6						
			30	6	6	6						
			35	6	6	6						
			40	6	6	6						
			50	6	6	6						
	60		6	6	6							
	70		6	6	6							
	80											

Landscape - Plywood Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°											
E-Mount		Ground Snow Load (psf)	Wind Speed (mph)								
Roof Zone	Exposure Category		110	115	120	130	140	150	160	170	180
Roof Zone 2	B	0	6	6	6						
		5	6	6	6						
		10	6	6	6						
		15	6	6	6						
		20	6	6	6						
		25	6	6	6						
		30	6	6	6						
		35	6	6	6						
		40	6	6	6						
		50	6	6	6						
		60	6	6	6						
		70	6	6	6						
		80	6	6	6						

Note: Installations in Exposure Category C & D are not acceptable

Landscape - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
E-Mount		Ground Snow Load (psf)	Wind Speed (mph)									
Roof Zone	Exposure Category		110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	6	6	6	6						
		5	6	6	6	6						
		10	6	6	6	6						
		15	6	6	6	6						
		20	6	6	6	6						
		25	6	6	6	6						
		30	6	6	6	6						
		35	6	6	6	6						
		40	6	6	6	6						
		50	6	6	6	6						
		60	6	6	6	6						
		70										
		80										
	C	0	6									
		5	6									
		10	6									
		15	6									
		20	6									
		25	6									
		30	6									
35	6											
40	6											
50	6											
60	6											

Note: Installations in Exposure Category D are not acceptable

Landscape - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	6	6	6	6						
		5	6	6	6	6						
		10	6	6	6	6						
		15	6	6	6	6						
		20	6	6	6	6						
		25	6	6	6	6						
		30	6	6	6	6						
		35	6	6	6	6						
		40	6	6	6	6						
		50	6	6	6	6						
		60	6	6	6	6						
		70										
		80										

Note: Installations in Exposure Category C & D are not acceptable

Landscape - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	4	4	4	6	6	6				
		25	4	4	4	6	6	6				
		30	4	4	4	6	6	6				
		35	4	4	4	6	6	6				
		40	4	4	4	6	6	6				
		50	6*	6*	6*	6	6	6				
		60	6	6	6	6	6	6				
		70	6	6	6	6	6	6				
		80										
	C	0	6	6	6							
		5	6	6	6							
		10	6	6	6							
		15	6	6	6							
		20	6	6	6							
		25	6	6	6							
		30	6	6	6							
		35	6	6	6							
		40	6	6	6							
		50	6	6	6							
		60	6	6	6							
		D	0	6	6							
	5		6	6								
	10		6	6								
	15		6	6								
	20		6	6								
	25		6	6								
30	6		6									
35	6		6									
40	6		6									
50	6		6									
60	6	6										
70	6	6										

Landscape - Plywood Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 3	B	0	4	4	4	6	6	6			
		5	4	4	4	6	6	6			
		10	4	4	4	6	6	6			
		15	4	4	4	6	6	6			
		20	4	4	4	6	6	6			
		25	4	4	4	6	6	6			
		30	4	4	4	6	6	6			
		35	4	4	4	6	6	6			
		40	4	4	4	6	6	6			
		50	6*	6*	6*	6	6	6			
		60	6	6	6	6	6	6			
	70	6	6	6	6	6	6				
	C	0	6	6	6						
		5	6	6	6						
		10	6	6	6						
		15	6	6	6						
		20	6	6	6						
		25	6	6	6						
		30	6	6	6						
		35	6	6	6						
		40	6	6	6						
50		6	6	6							
60	6	6	6								
70	6	6	6								
D	0	6	6								
	5	6	6								
	10	6	6								
	15	6	6								
	20	6	6								
	25	6	6								
	30	6	6								
	35	6	6								
	40	6	6								
	50	6	6								
60	6	6									
70	6	6									

Note: Installations in Zone 3 are not acceptable for roof slopes less than 28 degrees

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
	70	4	4	4	4	4	4	4	4	4	4	
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	C	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
	70	4	4	4	4	4	4	4	4	4	4	
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	D	0	4	4	4	4	4	4	4	4	4	4
5		4	4	4	4	4	4	4	4	4	4	
10		4	4	4	4	4	4	4	4	4	4	
15		4	4	4	4	4	4	4	4	4	4	
20		4	4	4	4	4	4	4	4	4	4	
25		4	4	4	4	4	4	4	4	4	4	
30		4	4	4	4	4	4	4	4	4	4	
35		4	4	4	4	4	4	4	4	4	4	
40		4	4	4	4	4	4	4	4	4	4	
50		4	4	4	4	4	4	4	4	4	4	
60		4	4	4	4	4	4	4	4	4	4	
70	4	4	4	4	4	4	4	4	4	4		
80	4	4	4	4	4	4	4	4	4	4		
90	4	4	4	4	4	4	4	4	4	4		
100	4	4	4	4	4	4	4	4	4	4		
110	4	4	4	4	4	4	4	4	4	4		

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	C	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	4	6	6
		60	4	4	4	4	4	4	4	4	6	6
		70	4	4	4	4	4	4	4	4	6	6
	80	4	4	4	4	4	4	4	4	6	6	
	90	4	4	4	4	4	4	4	4	6	6	
	100	4	4	4	4	4	4	4	4	6	6	
	110	4	4	4	4	4	4	4	4	6	6	
	D	0	4	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	4	6	6	6
		20	4	4	4	4	4	4	4	6	6	6
		25	4	4	4	4	4	4	4	6	6	6
		30	4	4	4	4	4	4	4	6	6	6
35		4	4	4	4	4	4	4	6	6	6	
40		4	4	4	4	4	4	4	6	6	6	
50		4	4	4	4	4	4	4	6	6	6	
60		4	4	4	4	4	4	4	6	6	6	
70		4	4	4	4	4	4	4	6	6	6	
80	4	4	4	4	4	4	4	6	6	6		
90	4	4	4	4	4	4	4	6	6	6		
100	4	4	4	4	4	4	4	6	6	6		
110	4	4	4	4	4	4	4	6	6	6		

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	C	0	4	4	4	4	4	4	4	4	4	6
		5	4	4	4	4	4	4	4	4	4	6
		10	4	4	4	4	4	4	4	4	4	6
		15	4	4	4	4	4	4	4	4	4	6
		20	4	4	4	4	4	4	4	4	4	6
		25	4	4	4	4	4	4	4	4	4	6
		30	4	4	4	4	4	4	4	4	4	6
		35	4	4	4	4	4	4	4	4	4	6
		40	4	4	4	4	4	4	4	4	4	6
		50	4	4	4	4	4	4	4	4	4	6
		60	4	4	4	4	4	4	4	4	4	6
		70	4	4	4	4	4	4	4	4	4	6
	80	4	4	4	4	4	4	4	4	4	6	
	90	4	4	4	4	4	4	4	4	4	6	
	100	4	4	4	4	4	4	4	4	4	6	
	110	4	4	4	4	4	4	4	4	4	6	
	D	0	4	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	4	6	6	6
		20	4	4	4	4	4	4	4	6	6	6
		25	4	4	4	4	4	4	4	6	6	6
		30	4	4	4	4	4	4	4	6	6	6
35		4	4	4	4	4	4	4	6	6	6	
40		4	4	4	4	4	4	4	6	6	6	
50		4	4	4	4	4	4	4	6	6	6	
60		4	4	4	4	4	4	4	6	6	6	
70		4	4	4	4	4	4	4	6	6	6	
80	4	4	4	4	4	4	4	6	6	6		
90	4	4	4	4	4	4	4	6	6	6		
100	4	4	4	4	4	4	4	6	6	6		
110	4	4	4	4	4	4	4	6	6	6		



Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	C	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	D	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
20		4	4	4	4	4	4	4	4	4	4	
25		4	4	4	4	4	4	4	4	4	4	
30		4	4	4	4	4	4	4	4	4	4	
35		4	4	4	4	4	4	4	4	4	4	
40		4	4	4	4	4	4	4	4	4	4	
50		4	4	4	4	4	4	4	4	4	4	
60		4	4	4	4	4	4	4	4	4	4	
70		4	4	4	4	4	4	4	4	4	4	
80	4	4	4	4	4	4	4	4	4	4		
90	4	4	4	4	4	4	4	4	4	4		
100	4	4	4	4	4	4	4	4	4	4		
110	4	4	4	4	4	4	4	4	4	4		

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	4	6	6
		60	4	4	4	4	4	4	4	4	6	6
	70	4	4	4	4	4	4	4	4	6	6	
	80	4	4	4	4	4	4	4	4	6	6	
	90	4	4	4	4	4	4	4	4	6	6	
	100	4	4	4	4	4	4	4	4	6	6	
	110	4	4	4	4	4	4	4	4	6	6	
	C	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	4	4	4	4	6	6	6			
		60	4	4	4	4	6	6	6			
	70	4	4	4	4	6	6	6				
	80	4	4	4	4	6	6	6				
	90	4	4	4	4	6	6	6				
	100	4	4	4	4	6	6	6				
	110	4	4	4	4	6	6	6				
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	4	4	4	6	6	6				
		25	4	4	4	6	6	6				
		30	4	4	4	6	6	6				
35		4	4	4	6	6	6					
40		4	4	4	6	6	6					
50		4	4	4	6	6	6					
60		4	4	4	6	6	6					
70	4	4	4	6	6	6						
80	4	4	4	6	6	6						
90	4	4	4	6	6	6						
100	4	4	4	6	6	6						
110	4	4	4	6	6	6						

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	4	6	6
		60	4	4	4	4	4	4	4	4	6	6
	70	4	4	4	4	4	4	4	4	6	6	
	80	4	4	4	4	4	4	4	4	6	6	
	90	4	4	4	4	4	4	4	4	6	6	
	100	4	4	4	4	4	4	4	4	6	6	
	110	4	4	4	4	4	4	4	4	6	6	
	C	0	4	4	4	4	4	4	6	6	6	
		5	4	4	4	4	4	4	6	6	6	
		10	4	4	4	4	4	4	6	6	6	
		15	4	4	4	4	4	4	6	6	6	
		20	4	4	4	4	4	4	6	6	6	
		25	4	4	4	4	4	4	6	6	6	
		30	4	4	4	4	4	4	6	6	6	
		35	4	4	4	4	4	4	6	6	6	
		40	4	4	4	4	4	4	6	6	6	
		50	4	4	4	4	4	4	6	6	6	
		60	4	4	4	4	4	4	6	6	6	
	70	4	4	4	4	4	4	6	6	6		
	80	4	4	4	4	4	4	6	6	6		
	90	4	4	4	4	4	4	6	6	6		
	100	4	4	4	4	4	4	6	6	6		
	110	4	4	4	4	4	4	6	6	6		
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	4	4	4	6	6	6				
		25	4	4	4	6	6	6				
		30	4	4	4	6	6	6				
35		4	4	4	6	6	6					
40		4	4	4	6	6	6					
50		4	4	4	6	6	6					
60		4	4	4	6	6	6					
70	4	4	4	6	6	6						
80	4	4	4	6	6	6						
90	4	4	4	6	6	6						
100	4	4	4	6	6	6						
110	4	4	4	6	6	6						

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	4	6	6
		60	4	4	4	4	4	4	4	4	6	6
	70	4	4	4	4	4	4	4	4	6	6	
	80	4	4	4	4	4	4	4	4	6	6	
	90	4	4	4	4	4	4	4	4	6	6	
	100	4	4	4	4	4	4	4	4	6	6	
	110	4	4	4	4	4	4	4	4	6	6	
	C	0	4	4	4	4	6	6	6	6	6	
		5	4	4	4	4	6	6	6	6	6	
		10	4	4	4	4	6	6	6	6	6	
		15	4	4	4	4	6	6	6	6	6	
		20	4	4	4	4	6	6	6	6	6	
		25	4	4	4	4	6	6	6	6	6	
		30	4	4	4	4	6	6	6	6	6	
		35	4	4	4	4	6	6	6	6	6	
		40	4	4	4	4	6	6	6	6	6	
		50	4	4	4	4	6	6	6	6	6	
		60	4	4	4	4	6	6	6	6	6	
	70	4	4	4	4	6	6	6	6	6		
	80	4	4	4	4	6	6	6	6	6		
	90	4	4	4	4	6	6	6	6	6		
	100	4	4	4	4	6	6	6	6	6		
	110	4	4	4	4	6	6	6	6	6		
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	4	4	4	6	6	6				
		25	4	4	4	6	6	6				
		30	4	4	4	6	6	6				
35		4	4	4	6	6	6					
40		4	4	4	6	6	6					
50		4	4	4	6	6	6					
60		4	4	4	6	6	6					
70	4	4	4	6	6	6						
80	4	4	4	6	6	6						
90	4	4	4	6	6	6						
100	4	4	4	6	6	6						
110	4	4	4	6	6	6						

Landscape - Rafter Install												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	C	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
		20	4	4	4	4	4	4	4	4	4	4
		25	4	4	4	4	4	4	4	4	4	4
		30	4	4	4	4	4	4	4	4	4	4
		35	4	4	4	4	4	4	4	4	4	4
		40	4	4	4	4	4	4	4	4	4	4
		50	4	4	4	4	4	4	4	4	4	4
		60	4	4	4	4	4	4	4	4	4	4
		70	4	4	4	4	4	4	4	4	4	4
	80	4	4	4	4	4	4	4	4	4	4	
	90	4	4	4	4	4	4	4	4	4	4	
	100	4	4	4	4	4	4	4	4	4	4	
	110	4	4	4	4	4	4	4	4	4	4	
	D	0	4	4	4	4	4	4	4	4	4	4
		5	4	4	4	4	4	4	4	4	4	4
		10	4	4	4	4	4	4	4	4	4	4
		15	4	4	4	4	4	4	4	4	4	4
20		4	4	4	4	4	4	4	4	4	4	
25		4	4	4	4	4	4	4	4	4	4	
30		4	4	4	4	4	4	4	4	4	4	
35		4	4	4	4	4	4	4	4	4	4	
40		4	4	4	4	4	4	4	4	4	4	
50		4	4	4	4	4	4	4	4	4	4	
60		4	4	4	4	4	4	4	4	4	4	
70		4	4	4	4	4	4	4	4	4	4	
80	4	4	4	4	4	4	4	4	4	4		
90	4	4	4	4	4	4	4	4	4	4		
100	4	4	4	4	4	4	4	4	4	4		
110	4	4	4	4	4	4	4	4	4	4		

Portrait - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 1	B	0	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	6	6	6
		20	4	4	4	4	4	4	6	6	6
		25	4	4	4	4	4	4	6	6	6
		30	6*	6*	6*	6*	6*	6*	6	6	6
		35	6*	6*	6*	6*	6*	6*	6	6	6
		40	6*	6*	6*	6*	6*	6*	6	6	6
		50									
	C	0	4	4	4	6	6	6			
		5	4	4	4	6	6	6			
		10	4	4	4	6	6	6			
		15	4	4	4	6	6	6			
		20	4	4	4	6	6	6			
		25	4	4	4	6	6	6			
		30	6*	6*	6*	6	6	6			
		35	6*	6*	6*	6	6	6			
		40	6*	6*	6*	6	6	6			
		50									
	D	0	4	4	6	6	6				
		5	4	4	6	6	6				
		10	4	4	6	6	6				
		15	4	4	6	6	6				
		20	4	4	6	6	6				
		25	4	4	6	6	6				
		30	6*	6*	6	6	6				
		35	6*	6*	6	6	6				
		40	6*	6*	6	6	6				
		50									

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	E-Mount									
			Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	6*	6*	6*	6*	6*	6*	6*	6*	6	6
		25	6*	6*	6*	6*	6*	6*	6*	6*	6	6
		30	6*	6*	6*	6*	6*	6*	6*	6*	6	6
		35	6	6	6	6	6	6	6	6	6	6
		40										
		50										
	C	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	6*	6*	6*	6*	6	6	6			
		25	6*	6*	6*	6*	6	6	6			
		30	6*	6*	6*	6*	6	6	6			
		35	6	6	6	6	6	6				
		40										
		50										
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
		20	6*	6*	6*	6	6	6				
		25	6*	6*	6*	6	6	6				
		30	6*	6*	6*	6	6	6				
		35	6	6	6	6	6					
		40										
		50										

Portrait - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 1	B	0	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	6	6	6
		20	4	4	4	4	4	4	6	6	6
		25	4	4	4	4	4	4	6	6	6
		30	6*	6*	6*	6*	6*	6*	6	6	6
		35	6*	6*	6*	6*	6*	6*	6	6	6
		40	6	6	6	6	6	6	6	6	6
		50									
	C	0	4	4	4	4	6	6	6		
		5	4	4	4	4	6	6	6		
		10	4	4	4	4	6	6	6		
		15	4	4	4	4	6	6	6		
		20	4	4	4	4	6	6	6		
		25	4	4	4	6*	6	6	6		
		30	6*	6*	6*	6*	6	6	6		
		35	6*	6*	6*	6*	6	6	6		
		40	6	6	6	6	6	6	6		
		50									
	D	0	4	4	4	6	6	6			
		5	4	4	4	6	6	6			
		10	4	4	4	6	6	6			
		15	4	4	4	6	6	6			
		20	4	4	4	6	6	6			
		25	4	4	6*	6	6	6			
		30	6*	6*	6*	6	6	6			
		35	6*	6*	6*	6	6	6			
		40	6	6	6	6	6				
		50									



Portrait - OSB Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 1	B	0	4	4	4	4	4	6	6	6	6
		5	4	4	4	4	4	6	6	6	6
		10	4	4	4	4	4	6	6	6	6
		15	4	4	4	4	4	6	6	6	6
		20	4	4	4	4	6*	6	6	6	6
		25	4	4	4	6*	6*	6	6	6	6
		30	6*	6*	6*	6*	6*	6	6	6	6
		35	6*	6*	6*	6*	6*	6	6	6	
		40	6*	6*	6*	6	6	6			
		50	6	6	6						
	C	0	4	4	4	6	6	6			
		5	4	4	4	6	6	6			
		10	4	4	4	6	6	6			
		15	4	4	4	6	6	6			
		20	4	6*	6*	6	6	6			
		25	6*	6*	6*	6	6	6			
		30	6*	6*	6*	6	6	6			
		35	6*	6*	6*	6	6				
		40	6	6	6	6					
		50									
	D	0	4	4	6	6	6				
		5	4	4	6	6	6				
		10	4	4	6	6	6				
		15	4	4	6	6	6				
		20	6*	6*	6	6	6				
		25	6*	6*	6	6	6				
		30	6*	6*	6	6	6				
		35	6*	6	6	6	6				
		40	6	6	6						
		50									

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	6	6	6						
		5	4	6	6	6						
		10	4	6	6	6						
		15	4	6	6	6						
		20	4	6	6	6						
		25	4	6	6	6						
		30	4	6	6	6						
		35	4	6	6	6						
		40	6*	6	6	6						
	50											
	C	0	6	6								
		5	6	6								
		10	6	6								
		15	6	6								
		20	6	6								
		25	6	6								
		30	6	6								
		35	6	6								
40		6	6									
50												

Note: Installations in Exposure Category D are not acceptable

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	6	6	6					
		5	4	4	6	6	6					
		10	4	4	6	6	6					
		15	4	4	6	6	6					
		20	4	4	6	6	6					
		25	4	4	6	6	6					
		30	4	4	6	6	6					
		35	6*	6*	6	6	6					
		40	6	6	6	6	6					
	50											
	C	0	6	6								
		5	6	6								
		10	6	6								
		15	6	6								
		20	6	6								
		25	6	6								
		30	6	6								
		35	6	6								
40		6	6									
50												

Note: Installations in Exposure Category D are not acceptable

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	6	6	6					
		5	4	4	6	6	6					
		10	4	4	6	6	6					
		15	4	4	6	6	6					
		20	4	4	6	6	6					
		25	4	4	6	6	6					
		30	4	4	6	6	6					
		35	4	4	6	6	6					
		40	6*	6*	6	6	6					
	50											
	C	0	6	6								
		5	6	6								
		10	6	6								
		15	6	6								
		20	6	6								
		25	6	6								
		30	6	6								
		35	6	6								
40		6	6									
50												

Note: Installations in Exposure Category D are not acceptable

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	6*	6*	6*	6*	6	6	6			
	50	6	6	6	6	6	6	6				
	C	0	4	6	6	6						
		5	4	6	6	6						
		10	4	6	6	6						
		15	4	6	6	6						
		20	4	6	6	6						
		25	4	6	6	6						
		30	4	6	6	6						
		35	4	6	6	6						
		40	6*	6	6	6						
	50	6	6	6	6							
	D	0	6	6	6							
		5	6	6	6							
		10	6	6	6							
		15	6	6	6							
		20	6	6	6							
		25	6	6	6							
		30	6	6	6							
35		6	6	6								
40	6	6	6									

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	6									
		5	6									
		10	6									
		15	6									
		20	6									
		25	6									
		30	6									
		35	6									
		40	6									
		50										

Portrait - OSB Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	6*	6*	6*	6*	6	6	6			
		40	6*	6*	6*	6*	6	6	6			
		50	6	6	6	6	6	6	6			
	C	0	4	6	6	6						
		5	4	6	6	6						
		10	4	6	6	6						
		15	4	6	6	6						
		20	4	6	6	6						
		25	4	6	6	6						
		30	4	6	6	6						
	35	6*	6	6	6							
	D	0	6	6	6							
		5	6	6	6							
10		6	6	6								
15		6	6	6								
20		6	6	6								
25		6	6	6								
30		6	6	6								
35	6	6	6									

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4	
		5	4	4	4	4	4	4	4	4	4	
		10	4	4	4	4	4	4	4	4	4	
		15	4	4	4	4	4	4	4	4	4	
		20	4	4	4	4	4	4	4	4	4	
		25	4	4	4	4	4	4	4	4	4	
		30	4	4	4	4	4	4	4	4	4	
		35	4	4	4	4	4	4	4	4	4	
		40	4	4	4	4	4	4	4	4	4	
		50	4	4	4	4	4	4	4	4	4	
		60	6*	6*	6*	6*	6*	6*	6*	6*	6*	
		70	6*	6*	6*	6*	6*	6*	6*	6*	6*	
	80	6*	6*	6*	6*	6*	6*	6*	6*	6*		
	C	0	4	4	4	4	4	4	4	6	6	6
		5	4	4	4	4	4	4	4	6	6	6
		10	4	4	4	4	4	4	4	6	6	6
		15	4	4	4	4	4	4	4	6	6	6
		20	4	4	4	4	4	4	4	6	6	6
		25	4	4	4	4	4	4	4	6	6	6
		30	4	4	4	4	4	4	4	6	6	6
		35	4	4	4	4	4	4	4	6	6	6
		40	4	4	4	4	4	4	4	6	6	6
		50	4	4	4	4	4	4	4	6	6	6
		60	6*	6*	6*	6*	6*	6*	6*	6	6	6
70		6*	6*	6*	6*	6*	6*	6*	6	6	6	
80	6*	6*	6*	6*	6*	6*	6*	6	6	6		
D	0	4	4	4	4	4	4	6	6	6		
	5	4	4	4	4	4	4	6	6	6		
	10	4	4	4	4	4	4	6	6	6		
	15	4	4	4	4	4	4	6	6	6		
	20	4	4	4	4	4	4	6	6	6		
	25	4	4	4	4	4	4	6	6	6		
	30	4	4	4	4	4	4	6	6	6		
	35	4	4	4	4	4	4	6	6	6		
	40	4	4	4	4	4	4	6	6	6		
	50	4	4	4	4	4	4	6	6	6		
	60	6*	6*	6*	6*	6*	6*	6	6	6		
	70	6*	6*	6*	6*	6*	6*	6	6	6		
80	6*	6*	6*	6*	6*	6*	6	6	6			

Portrait - Plywood Only													
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°													
E-Mount			Wind Speed (mph)										
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180		
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4		
		5	4	4	4	4	4	4	4	4	4		
		10	4	4	4	4	4	4	4	4	4		
		15	4	4	4	4	4	4	4	4	4		
		20	4	4	4	4	4	4	4	4	4		
		25	4	4	4	4	4	4	4	4	4		
		30	4	4	4	4	4	4	4	4	4		
		35	4	4	4	4	4	4	4	4	4		
		40	4	4	4	4	4	4	4	4	4		
		50	6*	6*	6*	6*	6*	6*	6*	6*	6*		
		60	6	6	6	6	6	6	6	6	6		
		70	6	6	6	6	6	6	6	6	6		
	80												
		C	0	4	4	4	4	4	4	4	6	6	
			5	4	4	4	4	4	4	4	4	6	6
			10	4	4	4	4	4	4	4	4	6	6
			15	4	4	4	4	4	4	4	4	6	6
			20	4	4	4	4	4	4	4	4	6	6
			25	4	4	4	4	4	4	4	4	6	6
			30	4	4	4	4	4	4	4	4	6	6
			35	4	4	4	4	4	4	4	4	6	6
			40	4	4	4	4	4	4	4	4	6	6
			50	6*	6*	6*	6*	6*	6*	6*	6*	6	6
			60	6	6	6	6	6	6	6	6	6	6
			70	6	6	6	6	6	6	6	6	6	6
		80											
		D	0	4	4	4	4	4	6	6	6	6	
			5	4	4	4	4	4	4	6	6	6	6
			10	4	4	4	4	4	4	6	6	6	6
			15	4	4	4	4	4	4	6	6	6	6
			20	4	4	4	4	4	4	6	6	6	6
			25	4	4	4	4	4	4	6	6	6	6
			30	4	4	4	4	4	4	6	6	6	6
			35	4	4	4	4	4	4	6	6	6	6
			40	4	4	4	4	4	4	6	6	6	6
			50	6*	6*	6*	6*	6*	6	6	6	6	6
	60		6	6	6	6	6	6	6	6	6	6	
	70		6	6	6	6	6	6	6	6	6	6	
	80												

Portrait - Plywood Only													
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°													
E-Mount			Wind Speed (mph)										
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180		
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4		
		5	4	4	4	4	4	4	4	4	4		
		10	4	4	4	4	4	4	4	4	4		
		15	4	4	4	4	4	4	4	4	4		
		20	4	4	4	4	4	4	4	4	4		
		25	4	4	4	4	4	4	4	4	4		
		30	4	4	4	4	4	4	4	4	4		
		35	4	4	4	4	4	4	4	4	4		
		40	4	4	4	4	4	4	4	4	4		
		50	4	4	4	4	4	4	4	4	4		
		60	6*	6*	6*	6*	6*	6*	6*	6*	6*		
		70	6	6	6	6	6	6	6	6	6		
	80												
		C	0	4	4	4	4	4	4	4	6	6	
			5	4	4	4	4	4	4	4	4	6	6
			10	4	4	4	4	4	4	4	4	6	6
			15	4	4	4	4	4	4	4	4	6	6
			20	4	4	4	4	4	4	4	4	6	6
			25	4	4	4	4	4	4	4	4	6	6
			30	4	4	4	4	4	4	4	4	6	6
			35	4	4	4	4	4	4	4	4	6	6
			40	4	4	4	4	4	4	4	4	6	6
			50	4	4	4	4	4	4	4	4	6	6
			60	6*	6*	6*	6*	6*	6*	6*	6*	6	6
			70	6	6	6	6	6	6	6	6	6	6
		80											
		D	0	4	4	4	4	4	6	6	6		
			5	4	4	4	4	4	4	6	6	6	
			10	4	4	4	4	4	4	6	6	6	
			15	4	4	4	4	4	4	6	6	6	
			20	4	4	4	4	4	4	6	6	6	
			25	4	4	4	4	4	4	6	6	6	
			30	4	4	4	4	4	4	6	6	6	
			35	4	4	4	4	4	4	6	6	6	
			40	4	4	4	4	4	4	6	6	6	
			50	4	4	4	4	4	4	6	6	6	
	60		6*	6*	6*	6*	6*	6*	6	6	6		
	70		6	6	6	6	6	6	6	6	6		
	80												

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 1	B	0	4	4	4	4	4	4	4	4	4	6
		5	4	4	4	4	4	4	4	4	4	6
		10	4	4	4	4	4	4	4	4	4	6
		15	4	4	4	4	4	4	4	4	4	6
		20	4	4	4	4	4	4	4	4	4	6
		25	4	4	4	4	4	4	4	4	4	6
		30	4	4	4	4	4	4	4	4	4	6
		35	4	4	4	4	4	4	4	4	4	6
		40	4	4	4	4	4	4	4	4	4	6
		50	4	4	4	4	4	4	4	4	4	6
	60	6*	6*	6*	6*	6*	6*	6*	6*	6*	6	
	70	6	6	6	6	6	6	6	6	6	6	
	80	6	6	6	6	6	6	6	6	6	6	
	C	0	4	4	4	4	4	4	6	6	6	6
		5	4	4	4	4	4	4	6	6	6	6
		10	4	4	4	4	4	4	6	6	6	6
		15	4	4	4	4	4	4	6	6	6	6
		20	4	4	4	4	4	4	6	6	6	6
		25	4	4	4	4	4	4	6	6	6	6
		30	4	4	4	4	4	4	6	6	6	6
		35	4	4	4	4	4	4	6	6	6	6
		40	4	4	4	4	4	4	6	6	6	6
		50	4	4	4	4	4	4	6	6	6	6
	60	6*	6*	6*	6*	6*	6*	6	6	6	6	
	70	6	6	6	6	6	6	6	6	6	6	
	80	6	6	6	6	6	6	6	6	6	6	
	D	0	4	4	4	4	4	6	6	6		
		5	4	4	4	4	4	6	6	6		
10		4	4	4	4	4	6	6	6			
15		4	4	4	4	4	6	6	6			
20		4	4	4	4	4	6	6	6			
25		4	4	4	4	4	6	6	6			
30		4	4	4	4	4	6	6	6			
35		4	4	4	4	4	6	6	6			
40		4	4	4	4	4	6	6	6			
50		4	4	4	4	4	6	6	6			
60	6*	6*	6*	6*	6*	6	6	6				
70	6	6	6	6	6	6	6	6				
80	6	6	6	6	6	6	6	6				



Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	4	4	4	4	6	6	6			
		60	6*	6*	6*	6*	6	6	6			
		70	6*	6*	6*	6*	6	6	6			
	80	6*	6*	6*	6*	6	6	6				
	C	0	4	6	6	6						
		5	4	6	6	6						
		10	4	6	6	6						
		15	4	6	6	6						
		20	4	6	6	6						
		25	4	6	6	6						
		30	4	6	6	6						
		35	4	6	6	6						
		40	4	6	6	6						
		50	4	6	6	6						
		60	6*	6	6	6						
70		6*	6	6	6							
80	6*	6	6	6								
D	0	6	6	6								
	5	6	6	6								
	10	6	6	6								
	15	6	6	6								
	20	6	6	6								
	25	6	6	6								
	30	6	6	6								
	35	6	6	6								
	40	6	6	6								
	50	6	6	6								
60	6	6	6									
70	6	6	6									
80	6	6	6									

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	6*	6*	6*	6*	6	6	6			
		60	6	6	6	6	6	6	6			
		70	6	6	6	6	6	6	6			
	80											
		C	0	4	4	6	6	6				
			5	4	4	6	6	6				
			10	4	4	6	6	6				
			15	4	4	6	6	6				
			20	4	4	6	6	6				
			25	4	4	6	6	6				
			30	4	4	6	6	6				
			35	4	4	6	6	6				
			40	4	4	6	6	6				
			50	6*	6*	6	6	6				
			60	6	6	6	6	6				
			70	6	6	6	6	6				
		80										
		D	0	6	6	6	6					
			5	6	6	6	6					
			10	6	6	6	6					
			15	6	6	6	6					
			20	6	6	6	6					
			25	6	6	6	6					
			30	6	6	6	6					
			35	6	6	6	6					
			40	6	6	6	6					
			50	6	6	6	6					
	60		6	6	6	6						
	70		6	6	6	6						
	80											

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°												
Roof Zone	Exposure Category	Ground Snow Load (psf)	Wind Speed (mph)									
			110	115	120	130	140	150	160	170	180	
Roof Zone 2	B	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	4	4	4	4	6	6	6			
		60	6*	6*	6*	6*	6	6	6			
		70	6	6	6	6	6	6	6			
	80											
	C	0	4	4	6	6	6					
		5	4	4	6	6	6					
		10	4	4	6	6	6					
		15	4	4	6	6	6					
		20	4	4	6	6	6					
		25	4	4	6	6	6					
		30	4	4	6	6	6					
		35	4	4	6	6	6					
		40	4	4	6	6	6					
		50	4	4	6	6	6					
		60	6*	6*	6	6	6					
		70	6	6	6	6	6					
	80											
	D	0	6	6	6	6						
		5	6	6	6	6						
		10	6	6	6	6						
		15	6	6	6	6						
20		6	6	6	6							
25		6	6	6	6							
30		6	6	6	6							
35		6	6	6	6							
40		6	6	6	6							
50		6	6	6	6							
60		6	6	6	6							
70		6	6	6	6							
80												

Portrait - Plywood Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 2	B	0	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	6	6
		60	6*	6*	6*	6*	6*	6*	6*	6	6
		70	6	6	6	6	6	6	6	6	6
	80	6	6	6	6	6	6	6	6	6	
	C	0	4	4	4	4	6	6	6		
		5	4	4	4	4	6	6	6		
		10	4	4	4	4	6	6	6		
		15	4	4	4	4	6	6	6		
		20	4	4	4	4	6	6	6		
		25	4	4	4	4	6	6	6		
		30	4	4	4	4	6	6	6		
		35	4	4	4	4	6	6	6		
		40	4	4	4	4	6	6	6		
		50	4	4	4	4	6	6	6		
		60	6*	6*	6*	6*	6	6	6		
70		6	6	6	6	6	6	6			
80	6	6	6	6	6	6	6				
D	0	4	4	4	6	6	6				
	5	4	4	4	6	6	6				
	10	4	4	4	6	6	6				
	15	4	4	4	6	6	6				
	20	4	4	4	6	6	6				
	25	4	4	4	6	6	6				
	30	4	4	4	6	6	6				
	35	4	4	4	6	6	6				
	40	4	4	4	6	6	6				
	50	4	4	4	6	6	6				
	60	6*	6*	6*	6	6	6				
	70	6	6	6	6	6	6				
80	6	6	6	6	6	6					

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 0° to 7°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	6	6	6	6						
		5	6	6	6	6						
		10	6	6	6	6						
		15	6	6	6	6						
		20	6	6	6	6						
		25	6	6	6	6						
		30	6	6	6	6						
		35	6	6	6	6						
		40	6	6	6	6						
		50	6	6	6	6						
		60	6	6	6	6						
		70	6	6	6	6						
	80	6	6	6	6							
		C	0	6								
	5		6									
	10		6									
	15		6									
	20		6									
	25		6									
	30		6									
	35		6									
	40		6									
	50		6									
	60		6									
70	6											
80	6											

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 8° to 20°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	6	6	6						
		5	4	6	6	6						
		10	4	6	6	6						
		15	4	6	6	6						
		20	4	6	6	6						
		25	4	6	6	6						
		30	4	6	6	6						
		35	4	6	6	6						
		40	4	6	6	6						
		50	6*	6	6	6						
		60	6	6	6	6						
		70	6	6	6	6						
	80											
		C	0	6	6							
	5		6	6								
	10		6	6								
	15		6	6								
	20		6	6								
	25		6	6								
	30		6	6								
	35		6	6								
	40		6	6								
	50		6	6								
	60		6	6								
70	6		6									
80												

Portrait - Plywood Only											
MINIMUM NUMBER OF MOUNTS - Roof Slope 21° to 27°											
E-Mount			Wind Speed (mph)								
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180
Roof Zone 3	B	0	4	6	6	6					
		5	4	6	6	6					
		10	4	6	6	6					
		15	4	6	6	6					
		20	4	6	6	6					
		25	4	6	6	6					
		30	4	6	6	6					
		35	4	6	6	6					
		40	4	6	6	6					
		50	4	6	6	6	6				
		60	6*	6	6	6	6				
		70	6	6	6	6	6				
	80										
	C	0	6	6							
		5	6	6							
		10	6	6							
		15	6	6							
		20	6	6							
		25	6	6							
		30	6	6							
		35	6	6							
		40	6	6							
		50	6	6							
		60	6	6							
70		6	6								
80											

Portrait - Plywood Only												
MINIMUM NUMBER OF MOUNTS - Roof Slope 28° to 45°												
E-Mount			Wind Speed (mph)									
Roof Zone	Exposure Category	Ground Snow Load (psf)	110	115	120	130	140	150	160	170	180	
Roof Zone 3	B	0	4	4	4	4	4	4	4	4	6	6
		5	4	4	4	4	4	4	4	4	6	6
		10	4	4	4	4	4	4	4	4	6	6
		15	4	4	4	4	4	4	4	4	6	6
		20	4	4	4	4	4	4	4	4	6	6
		25	4	4	4	4	4	4	4	4	6	6
		30	4	4	4	4	4	4	4	4	6	6
		35	4	4	4	4	4	4	4	4	6	6
		40	4	4	4	4	4	4	4	4	6	6
		50	4	4	4	4	4	4	4	4	6	6
	60	6*	6*	6*	6*	6*	6*	6*	6*	6	6	
	70	6	6	6	6	6	6	6	6	6	6	
	80	6	6	6	6	6	6	6	6	6	6	
	C	0	4	4	4	4	6	6	6			
		5	4	4	4	4	6	6	6			
		10	4	4	4	4	6	6	6			
		15	4	4	4	4	6	6	6			
		20	4	4	4	4	6	6	6			
		25	4	4	4	4	6	6	6			
		30	4	4	4	4	6	6	6			
		35	4	4	4	4	6	6	6			
		40	4	4	4	4	6	6	6			
		50	4	4	4	4	6	6	6			
	60	6*	6*	6*	6*	6	6	6				
	70	6	6	6	6	6	6	6				
	80	6	6	6	6	6	6	6				
	D	0	4	4	4	6	6	6				
		5	4	4	4	6	6	6				
		10	4	4	4	6	6	6				
		15	4	4	4	6	6	6				
20		4	4	4	6	6	6					
25		4	4	4	6	6	6					
30		4	4	4	6	6	6					
35		4	4	4	6	6	6					
40		4	4	4	6	6	6					
50		4	4	4	6	6	6					

Table Notes for Tables 1 to 6 – Tabulated values are based on the following criteria:

1. Building mean roof height = 30 ft maximum.
2. Risk Category = II.
3. Solar panel maximum area = 18.88 square feet (68 in. x 40 in.).
4. Solar panel dead load = approximately 3.0 psf.
5. ASCE 7-10.
6. OSB shall be 24/16 APA rated sheathing minimum (7/16" thick).
7. Plywood shall be 32/16 APA rated sheathing minimum (15/32" thick).
8. Sheathing shall be free of defects including, but not limited to water damage and delamination.
9. Roof rafters or trusses spaced at 24" on center maximum.
10. PV panels must be supported per the manufacturer's required orientation, location and/or spacing.
11. Through a maximum of 2 layers of composite asphalt roof shingles or maximum 20 gage metal decking provided the metal is predrilled as wood screws are not designed to penetrate the metal decking. Not valid on concrete roof tile.
12. The tables show the minimum number of mounts required to support each panel. 4 & 6 refer to 4 mounts or 6 mounts positively attached to each panel. 6\* indicates the need for 4 mounts which are attached to the panel and 2 mounts located at the panel midpoint to support downward compression loads only. These two compression only mounts are not required to be attached to the panels.

**'Rail Option':**

The 'Rail Option' consists of the Roof Tech RT-[E] Mount base attached to the roof structure in the same manner as the standard rail-less installation using SS304 5.0 mm x 60 mm wood screws. An appropriately load rated 'L-Foot', by others, shall be attached to the [E] Mount base with a stainless steel SS304 8.0 mm bolt, nut, and star conical washer. An appropriately load rated rail, by others, shall be attached to the 'L-Foot' per the rail manufacturer's installation instructions. The RT-[E] Mount may only be installed with the long direction parallel to the roof framing.

For the 'Rail Option' the lateral loads have been reduced by a ratio of 2.165 inches / 5 inches for OSB/Plywood Only installation options and 2.165 inches / 7 inches for the Rafter installation option, which is the maximum allowable height ratio for the 'Rail Option'. The maximum height for the 'Rail Option' is measured from the bottom of the [E] Mount base to the top of the rail. See Exhibit 'B' – attached, for the allowable 'Rail Option' PV panel layouts and 'L-Foot' and rail configuration. The maximum rail cantilever shall be limited to the smaller of 40% of the maximum rail span in the 'Rail Option' tables below and the rail manufacturer's specified maximum cantilever. It is the responsibility of the contractor to verify that the 'L-Foot' and rails that are used have a span rating greater than that shown in the 'Rail Option' tables below. Provide thermal expansion splices along the rail at intervals not to exceed 11 feet and refer to the rail manufacturer's thermal expansion splice detailing for proper installation.



For the 'Rail Option' the maximum allowable uplift and shear force for 7/16" thick sheathing over a 2x4 DF #2 rafter is 586 lb and 139 lb respectively. The maximum allowable uplift, down force and shear force for 7/16" thick OSB only is 141 lb, 236 lb, and 82 lb respectively. The maximum allowable uplift, down force and shear force for 15/32" thick plywood only is 151 lb, 227 lb, and 67 lb respectively.

The attached 'Rail Option' tables below show the maximum [E] Mount spacing in feet that the mounts can safely support for the shown wind speed, wind exposure, roof zone, roof angle, and snow loads which produce reaction loads below the allowable loads listed above.

<b>RT-[E] Mount Rail Option for OSB Only Installations                      (60 &amp; 72 Cell PV Panels)                      Maximum Mount Spacing in Feet</b>								
<b>Landscape Orientation - ASCE 7-10</b>								
<b>Snow Load</b>	<b>Exposure Category</b>	<b>Roof Angle</b>	<b>Roof Zone</b>	<b>Basic Wind Speed, V (mph)</b>				
				<b>110</b>	<b>115</b>	<b>120</b>	<b>130</b>	<b>140</b>
<b>0 PSF</b>	<b>B</b>	<b>7 to 27 Degrees</b>	1 2	8 4	7 4	7 3	6 3	5 2
		<b>28 to 45 Degrees</b>	1 2	6 5	6 5	5 4	5 4	4 3
		<b>7 to 27 Degrees</b>	1 2	6 3	5 2	5 2	4 2	3 0
	<b>C</b>	<b>28 to 45 Degrees</b>	1 2	5 4	4 3	4 3	3 3	3 2
		<b>7 to 27 Degrees</b>	1 2	5 3	5 2	5 2	4 2	3 0
		<b>28 to 45 Degrees</b>	1 2	4 4	4 3	4 3	3 3	3 2
<b>1-10 PSF</b>	<b>B</b>	<b>7 to 27 Degrees</b>	1 2	5 4	5 4	5 3	5 3	5 2
		<b>28 to 45 Degrees</b>	1 2	5 5	5 5	5 4	4 4	4 3
		<b>7 to 27 Degrees</b>	1 2	5 3	5 2	5 2	4 2	3 0
	<b>C</b>	<b>28 to 45 Degrees</b>	1 2	4 4	4 3	4 3	3 3	3 2
		<b>7 to 27 Degrees</b>	1 2	3 3	3 2	3 2	3 2	3 0
		<b>28 to 45 Degrees</b>	1 2	3 4	3 3	3 3	3 3	3 2
<b>11-20 PSF</b>	<b>B</b>	<b>7 to 27 Degrees</b>	1 2	3 3	3 3	3 3	3 3	3 2
		<b>28 to 45 Degrees</b>	1 2	3 3	3 3	3 3	3 3	3 3
		<b>7 to 27 Degrees</b>	1 2	3 3	3 2	3 2	3 2	3 0
	<b>C</b>	<b>28 to 45 Degrees</b>	1 2	3 3	3 3	3 3	3 3	3 2
		<b>7 to 27 Degrees</b>	1 2	3 3	3 2	3 2	3 2	3 0
		<b>28 to 45 Degrees</b>	1 2	3 3	3 3	3 3	3 2	3 2
<b>21-30 PSF</b>	<b>B</b>	<b>7 to 27 Degrees</b>	1 2	3 3	3 3	3 3	3 3	3 2
		<b>28 to 45 Degrees</b>	1 2	3 3	3 3	3 3	3 3	3 3
		<b>7 to 27 Degrees</b>	1 2	3 3	3 2	3 2	3 2	3 0
	<b>C</b>	<b>28 to 45 Degrees</b>	1 2	3 3	3 3	3 3	2 2	2 2
		<b>7 to 27 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
		<b>28 to 45 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
<b>31-40 PSF</b>	<b>B</b>	<b>7 to 27 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
		<b>28 to 45 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
		<b>7 to 27 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 0
	<b>C</b>	<b>28 to 45 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
		<b>7 to 27 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2
		<b>28 to 45 Degrees</b>	1 2	2 2	2 2	2 2	2 2	2 2

RT-[E] Mount Rail Option for OSB Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	4	4	4	3	3
			2	2	2	2	0	0
		28 to 45 Degrees	1	4	3	3	2	2
			2	3	3	2	2	2
	C	7 to 27 Degrees	1	3	3	3	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	2	0	
		2	2	2	2	0	0	
1-10 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	2	2	2	0	0
		28 to 45 Degrees	1	3	3	3	2	2
			2	3	3	2	2	2
	C	7 to 27 Degrees	1	3	3	3	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	2	0	
		2	2	2	2	0	0	
11-20 PSF	B	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	2	0	0
		28 to 45 Degrees	1	2	2	2	2	2
			2	2	2	2	2	2
	C	7 to 27 Degrees	1	2	2	2	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	0	0	
		2	2	2	2	0	0	
21-30 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	0	0	0	0	0	
		2	0	0	0	0	0	
31-40 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	0	0	0	0	0	
		2	0	0	0	0	0	

RT-[E] Mount Rail Option for OSB Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	4	4	3	3	2
			2	2	2	0	0	0
		28 to 45 Degrees	1	3	3	3	2	2
			2	3	2	2	2	0
	C	7 to 27 Degrees	1	3	2	2	2	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	0	0
			2	2	2	0	0	0
1-10 PSF	B	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2
			2	2	2	2	2	0
	C	7 to 27 Degrees	1	2	2	2	2	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	0	0
			2	2	2	0	0	0
11-20 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	2	2	0	0	0
			2	2	2	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
21-30 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
31-40 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0

RT-[E] Mount Rail Option for Plywood Only Installations (60 & 72 Cell PV Panels) Maximum Mount Spacing in Feet								
Landscape Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	8	8	7	6	5
			2	4	4	3	3	2
		28 to 45 Degrees	1	6	6	5	5	4
	C	7 to 27 Degrees	1	6	5	5	4	3
			2	3	3	2	2	2
		28 to 45 Degrees	1	5	4	4	3	3
		2	4	4	3	3	2	
1-10 PSF	B	7 to 27 Degrees	1	6	6	6	6	5
			2	4	4	3	3	2
		28 to 45 Degrees	1	6	6	5	5	4
	C	7 to 27 Degrees	1	6	5	5	4	3
			2	3	3	2	2	2
		28 to 45 Degrees	1	5	4	4	3	3
		2	4	4	3	3	2	
11-20 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	2
		28 to 45 Degrees	1	4	4	4	4	4
	C	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	2	2	2
		28 to 45 Degrees	1	4	4	4	3	3
		2	4	4	3	3	2	
21-30 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	2
		28 to 45 Degrees	1	3	3	3	3	3
	C	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	2	2	2
		28 to 45 Degrees	1	3	3	3	3	3
		2	3	3	3	3	2	
31-40 PSF	B	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	2	2	2
		28 to 45 Degrees	1	2	2	2	2	2
	C	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	2	2	2
		28 to 45 Degrees	1	2	2	2	2	2
		2	2	2	2	2	2	

RT-[E] Mount Rail Option for Plywood Only Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	5	4	4	3	3
			2	2	2	2	2	0
		28 to 45 Degrees	1	4	3	3	3	2
			2	3	3	2	2	2
	C	7 to 27 Degrees	1	3	3	3	2	2
			2	2	0	0	0	0
28 to 45 Degrees		1	3	2	2	2	0	
		2	2	2	2	0	0	
1-10 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	2	2	2	2	0
		28 to 45 Degrees	1	3	3	3	3	2
			2	3	3	2	2	2
	C	7 to 27 Degrees	1	3	3	3	2	2
			2	2	0	0	0	0
28 to 45 Degrees		1	3	2	2	2	0	
		2	2	2	2	0	0	
11-20 PSF	B	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	2	2	0
		28 to 45 Degrees	1	2	2	2	2	2
			2	2	2	2	2	2
	C	7 to 27 Degrees	1	2	2	2	2	2
			2	2	0	0	0	0
28 to 45 Degrees		1	2	2	2	2	0	
		2	2	2	2	0	0	
21-30 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	2	2	2	2	2
			2	2	2	2	2	2
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	2	0	
		2	2	2	2	0	0	
31-40 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	0	0	0	0	0	
		2	0	0	0	0	0	

RT-[E] Mount Rail Option for Plywood Only Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	4	4	3	3	2
			2	2	2	2	0	0
		28 to 45 Degrees	1	3	3	3	2	2
			2	3	2	2	2	0
	C	7 to 27 Degrees	1	3	3	2	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	0	0	
		2	2	2	0	0	0	
1-10 PSF	B	7 to 27 Degrees	1	3	3	3	3	2
			2	2	2	2	0	0
		28 to 45 Degrees	1	3	3	3	2	2
			2	3	2	2	2	0
	C	7 to 27 Degrees	1	3	3	2	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	0	0	
		2	2	2	0	0	0	
11-20 PSF	B	7 to 27 Degrees	1	2	2	2	2	2
			2	2	2	2	0	0
		28 to 45 Degrees	1	2	2	2	2	2
			2	2	2	2	2	0
	C	7 to 27 Degrees	1	2	2	2	2	2
			2	0	0	0	0	0
28 to 45 Degrees		1	2	2	2	0	0	
		2	2	2	0	0	0	
21-30 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	0	0	0	0	0	
		2	0	0	0	0	0	
31-40 PSF	B	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
		28 to 45 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
	C	7 to 27 Degrees	1	0	0	0	0	0
			2	0	0	0	0	0
28 to 45 Degrees		1	0	0	0	0	0	
		2	0	0	0	0	0	

RT-[E] Mount Rail Option for Rafter Installations (60 & 72 Cell PV Panels) Maximum Mount Spacing in Feet								
Landscape Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
1-10 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
11-20 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
21-30 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	8
31-40 PSF	B	7 to 27 Degrees	1	6	6	6	6	6
			2	6	6	6	6	6
		28 to 45 Degrees	1	6	6	6	6	6
			2	6	6	6	6	6
	C	7 to 27 Degrees	1	6	6	6	6	6
			2	6	6	6	6	6
		28 to 45 Degrees	1	6	6	6	6	6
			2	6	6	6	6	6



RT-[E] Mount Rail Option for Rafter Installations (60 & 72 Cell PV Panels) Maximum Mount Spacing in Feet (Cont.)								
Landscape Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
41-50 PSF	B	7 to 27 Degrees	1	5	5	5	5	5
		28 to 45 Degrees	2	5	5	5	5	5
	C	7 to 27 Degrees	1	5	5	5	5	5
		28 to 45 Degrees	2	5	5	5	5	5
		7 to 27 Degrees	1	5	5	5	5	5
		28 to 45 Degrees	2	5	5	5	5	5
51-60 PSF	B	7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4
	C	7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4
		7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4
61-70 PSF	B	7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4
	C	7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4
		7 to 27 Degrees	1	4	4	4	4	4
		28 to 45 Degrees	2	4	4	4	4	4

RT-[E] Mount Rail Option for Rafter Installations (60 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	7	6
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	7	6	6	5	4
		28 to 45 Degrees	1	8	8	8	7	6
			2	8	8	7	6	5
1-10 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	8	8	7	6
		28 to 45 Degrees	1	8	8	8	8	8
			2	8	8	8	8	7
	C	7 to 27 Degrees	1	8	8	8	8	8
			2	7	6	6	5	4
		28 to 45 Degrees	1	8	8	8	7	6
			2	8	8	7	6	5
11-20 PSF	B	7 to 27 Degrees	1	6	6	6	6	6
			2	6	6	6	6	6
		28 to 45 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
	C	7 to 27 Degrees	1	6	6	6	6	6
			2	6	6	6	5	4
		28 to 45 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
21-30 PSF	B	7 to 27 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
		28 to 45 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
	C	7 to 27 Degrees	1	5	5	5	5	5
			2	5	5	5	5	4
		28 to 45 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
31-40 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
		28 to 45 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
	C	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
		28 to 45 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3

RT-[E] Mount Rail Option for Rafter Installations (72 Cell PV Panels) Maximum Mount Spacing in Feet								
Portrait Orientation - ASCE 7-10								
Snow Load	Exposure Category	Roof Angle	Roof Zone	Basic Wind Speed, V (mph)				
				110	115	120	130	140
0 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	7	7	6	5
		28 to 45 Degrees	1	8	8	8	8	7
			2	8	8	8	7	6
	C	7 to 27 Degrees	1	8	8	8	8	7
			2	6	5	5	4	4
		28 to 45 Degrees	1	8	8	7	6	5
			2	7	7	6	5	5
1-10 PSF	B	7 to 27 Degrees	1	8	8	8	8	8
			2	8	7	7	6	5
		28 to 45 Degrees	1	8	8	8	8	7
			2	8	8	8	7	6
	C	7 to 27 Degrees	1	8	8	8	8	7
			2	6	5	5	4	4
		28 to 45 Degrees	1	8	8	7	6	5
			2	7	7	6	5	5
11-20 PSF	B	7 to 27 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
		28 to 45 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
	C	7 to 27 Degrees	1	5	5	5	5	5
			2	5	5	5	4	4
		28 to 45 Degrees	1	5	5	5	5	5
			2	5	5	5	5	5
21-30 PSF	B	7 to 27 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
		28 to 45 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
	C	7 to 27 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
		28 to 45 Degrees	1	4	4	4	4	4
			2	4	4	4	4	4
31-40 PSF	B	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
		28 to 45 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
	C	7 to 27 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3
		28 to 45 Degrees	1	3	3	3	3	3
			2	3	3	3	3	3

Table Notes for Tables R1 to R9 – Tabulated values are based on the following criteria:

1. Building mean roof height = 30 ft maximum.
2. Risk Category = II.
3. Solar panel maximum width = 40 in for Landscape, 68 in for Portrait 60 Cell & 77.5 in for Portrait 72 Cell.
4. Solar panel & rail dead load = approximately 4.0 psf.
5. ASCE 7-10.
6. OSB shall be 24/16 APA rated sheathing minimum (7/16" thick).
7. Plywood shall be 32/16 APA rated sheathing minimum (15/32" thick).
8. Sheathing shall be free of defects including, but not limited to water damage and delamination.
9. Roof rafters or trusses spaced at 24" on center maximum.
10. PV panels must be supported per the manufacturer's required orientation, location and/or spacing.
11. Through a maximum of 2 layers of composite asphalt roof shingles or maximum 20 gage metal decking provided the metal is predrilled as wood screws are not designed to penetrate the metal decking. Not valid on concrete roof tile.
12. Maximum height from bottom of base mount to top of rail shall not exceed 5" for the OSB & Plywood only installation options and 7" for the rafter installation option. Ref. Exhibit 'B' detail 2.

Our analysis assumes that the connections and associated hardware are installed in a workmanlike manner in accordance with the RT-[E] Mount Installation Manual and generally accepted standards of construction practice. It is the responsibility of the contractor to verify that the strength of the roof framing meets the minimum properties used in the tests and can safely support the maximum imposed loads stated within this document. Starling Madison Lofquist, Inc. and Roof Tech assume no liability beyond what is specifically shown in this letter. Additional information is available at the Roof Tech web site, <http://www.roof-tech.us/>.

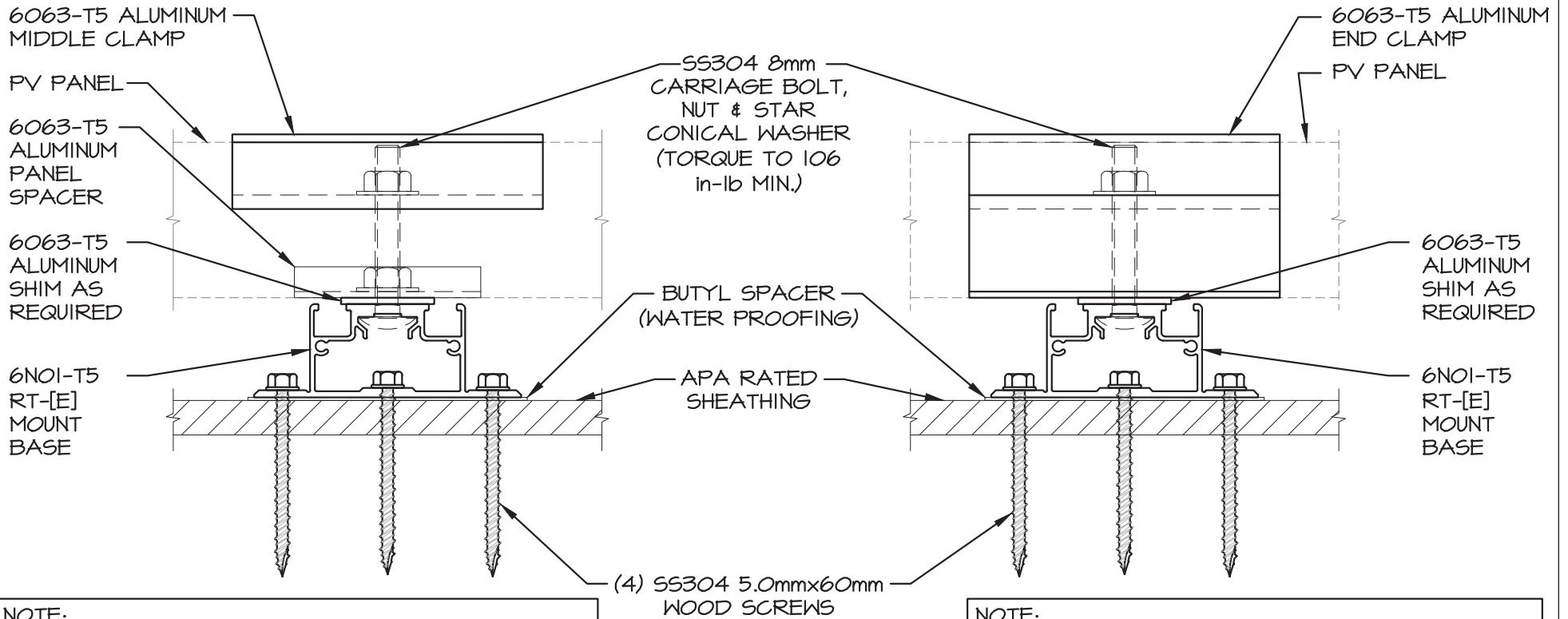
Please feel free to contact me at your convenience if you have any questions.

Respectfully yours,

Tres J. Warner, P.E.  
Design Division Manager



Derek Hanson, P.E.  
Associate/Project Manager



**NOTE:**  
 PROVIDE SS304 BONDING PLATE(S) (NOT SHOWN FOR CLARITY) BETWEEN PANEL SPACER & RT-[E] MOUNT BASE OR SHIM IF USED. WHEN SHIM IS USED PROVIDE ADDITIONAL BONDING PLATE BETWEEN SHIM & RT-[E] MOUNT BASE

**NOTE:**  
 PROVIDE SS304 BONDING PLATE(S) (NOT SHOWN FOR CLARITY) BETWEEN END CAP & RT-[E] MOUNT BASE OR SHIM IF USED. WHEN SHIM IS USED PROVIDE ADDITIONAL BONDING PLATE BETWEEN SHIM & RT-[E] MOUNT BASE

MIDDLE CONNECTION

END CONNECTION

① OSB/PLYWOOD ONLY CONNECTION

SCALE: N.T.S.



Starling Madison Lofquist, Inc.

5224 S. 39th Street  
 Phoenix, Arizona 85040  
 (602) 438-2500  
 fax. (602) 438-2505

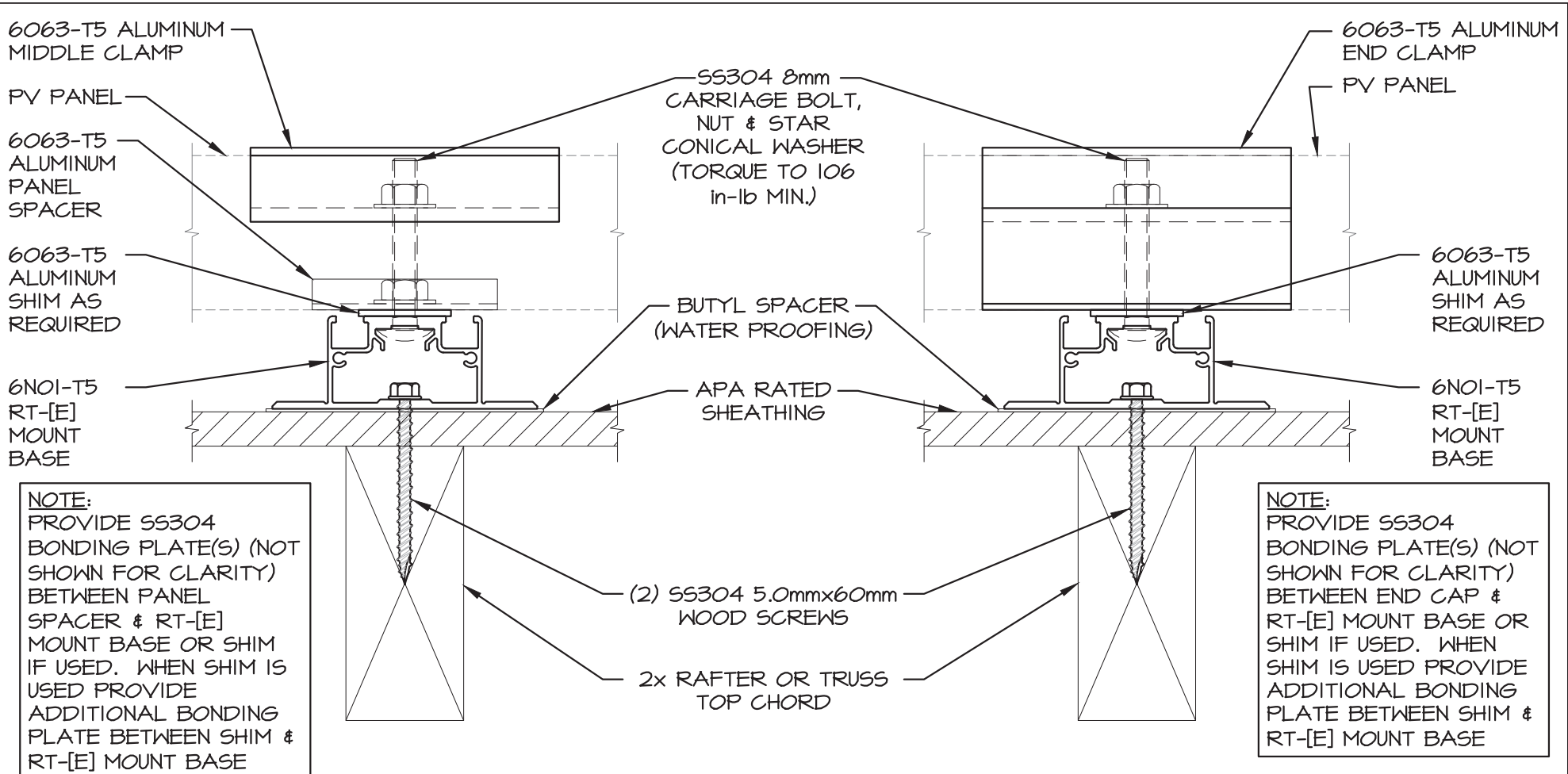
Consulting Structural and Forensic Engineers

DRAWN BY:	T.M.	DATE:	7-21-15
DESIGNED BY:	J.L.	JOB NO:	471-13

ROOF TECH  
 RT-[E] MOUNT  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT A  
 1 OF 4



MIDDLE CONNECTION

END CONNECTION

2
OSB/PLYWOOD OVER 2x RAFTER/ TRUSS

SCALE: N.T.S.



**Starling Madison Lofquist, Inc.**  
 5224 S. 39th Street  
 Phoenix, Arizona 85040  
 (602) 438-2500  
 fax. (602) 438-2505

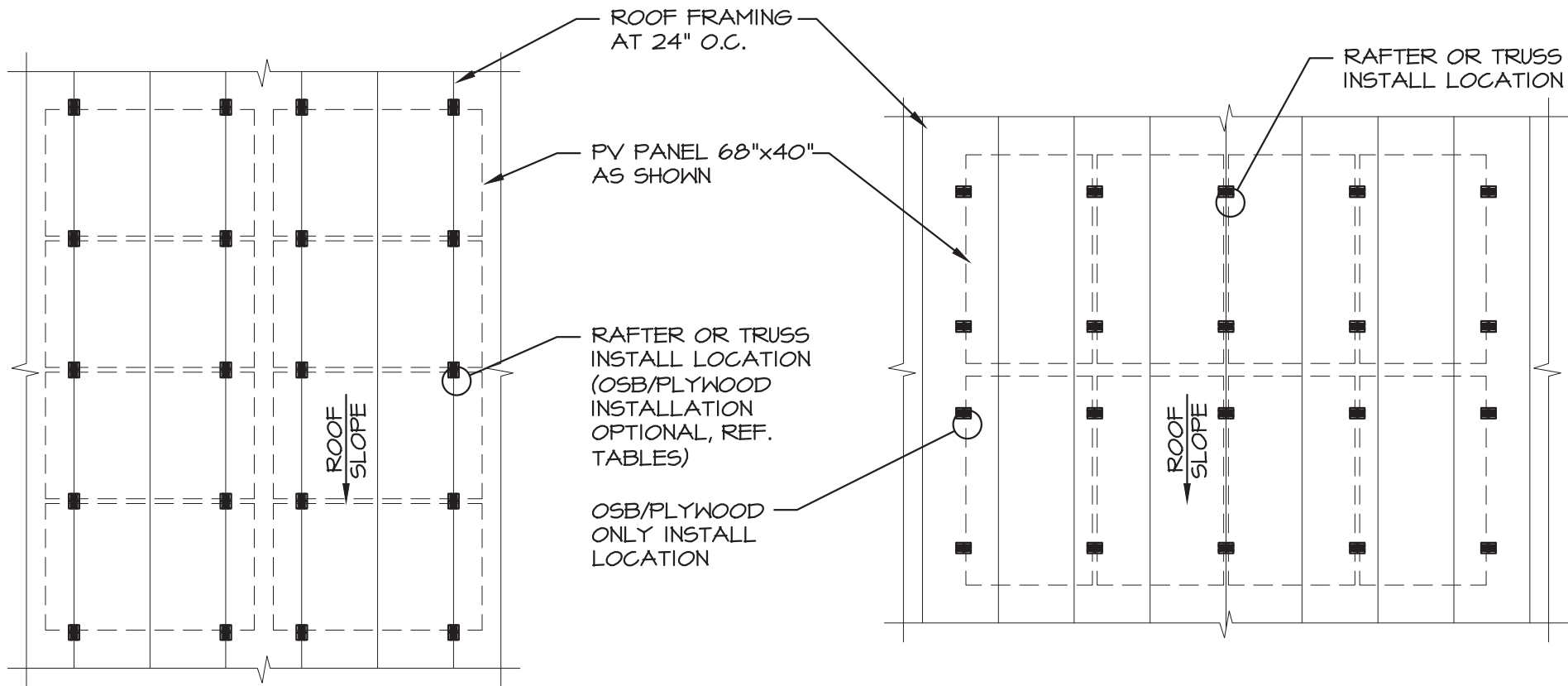
DRAWN BY: T.M.  
 DESIGNED BY: J.L.

DATE: 7-21-15  
 JOB NO: 471-13

ROOF TECH  
 RT-[E] MOUNT  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT A  
2 OF 4



PV PANEL IN LANDSCAPE ORIENTATION

PV PANEL IN PORTRAIT ORIENTATION

**PARTIAL FRAMING PLAN (4 MOUNTS PER PANEL)**

3

SCALE: N.T.S.



Starling Madison Lofquist, Inc.

5224 S. 39th Street  
 Phoenix, Arizona 85040  
 (602) 438-2500  
 fax. (602) 438-2505

Consulting Structural and Forensic Engineers

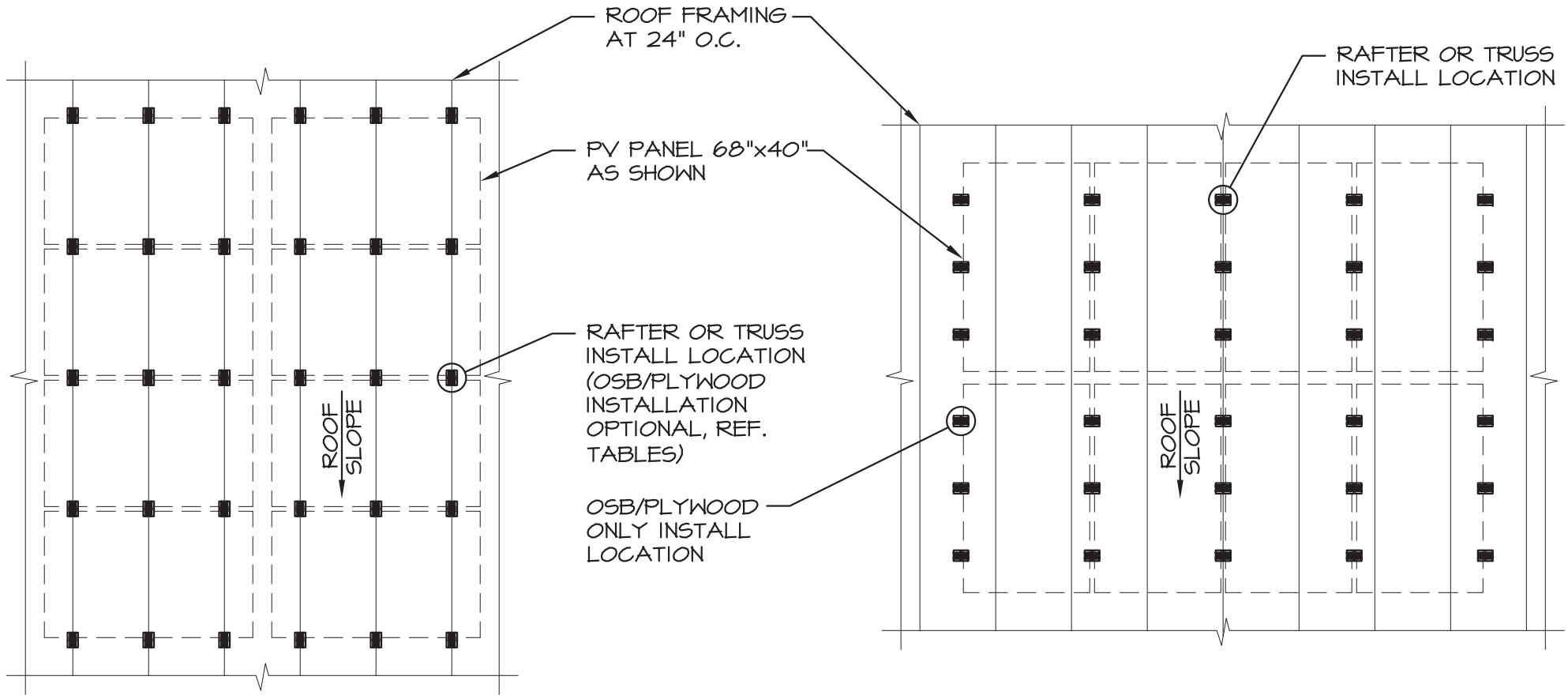
DRAWN BY: T.M.  
 DESIGNED BY: J.L.

DATE: 7-21-15  
 JOB NO: 471-13

ROOF TECH  
 RT-[E] MOUNT  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT A  
 3 OF 4



PV PANEL IN LANDSCAPE ORIENTATION

PV PANEL IN PORTRAIT ORIENTATION

4

PARTIAL FRAMING PLAN (6 MOUNTS PER PANEL)

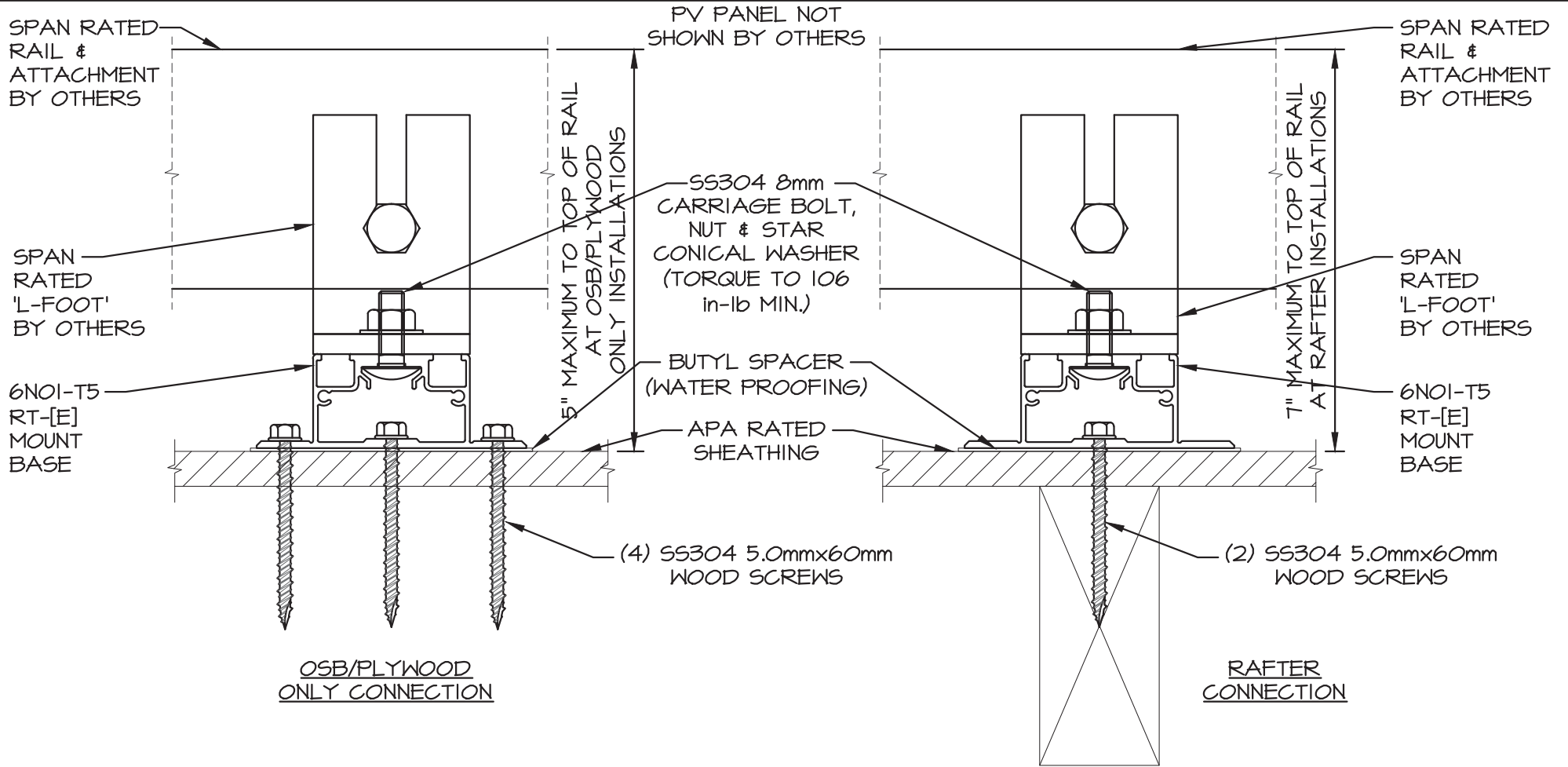
SCALE: N.T.S.



Starling Madison Lofquist, Inc.  
 5224 S. 39th Street  
 Phoenix, Arizona 85040  
 (602) 438-2500  
 fax. (602) 438-2505

DRAWN BY:	T.M.	DATE:	7-21-15
DESIGNED BY:	J.L.	JOB NO:	471-13
ROOF TECH RT-[E] MOUNT STRUCTURAL ANALYSIS		ROOF TECH, INC. 333 H STREET, SUITE 5000 CHULA VISTA, CA 91910	
EXHIBIT A 4 OF 4			





① 'RAIL OPTION' - RAIL AND 'L-FOOT' ORIENTATION  
SCALE: N.T.S.



Starling Madison Lofquist, Inc.  
5224 S. 39th Street  
Phoenix, Arizona 85040  
(602) 438-2500  
fax. (602) 438-2505

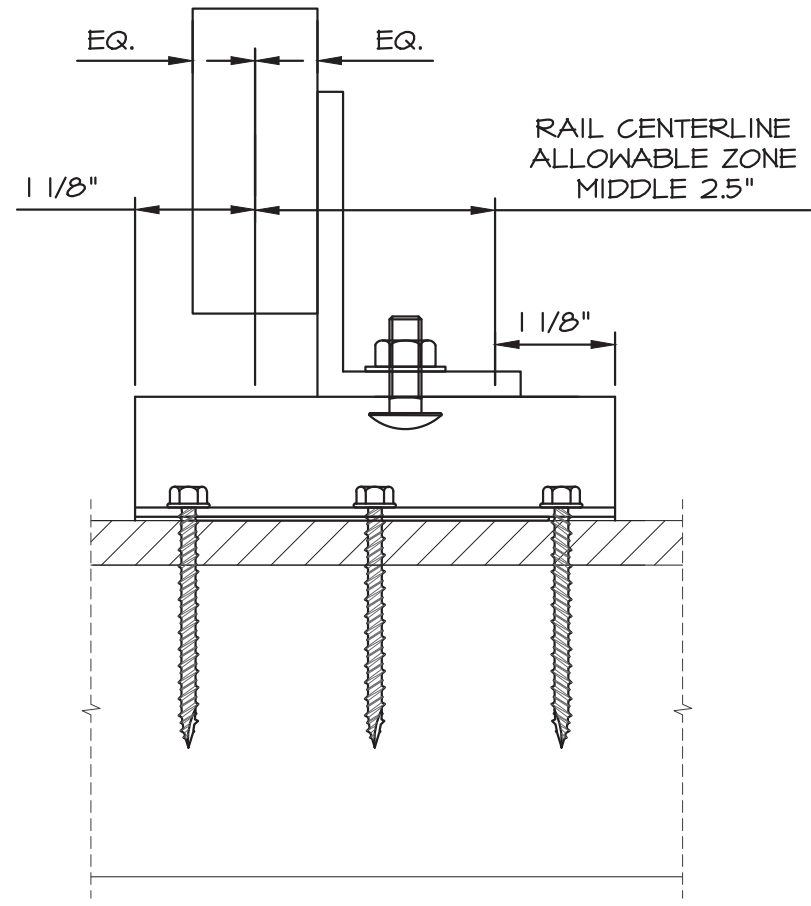
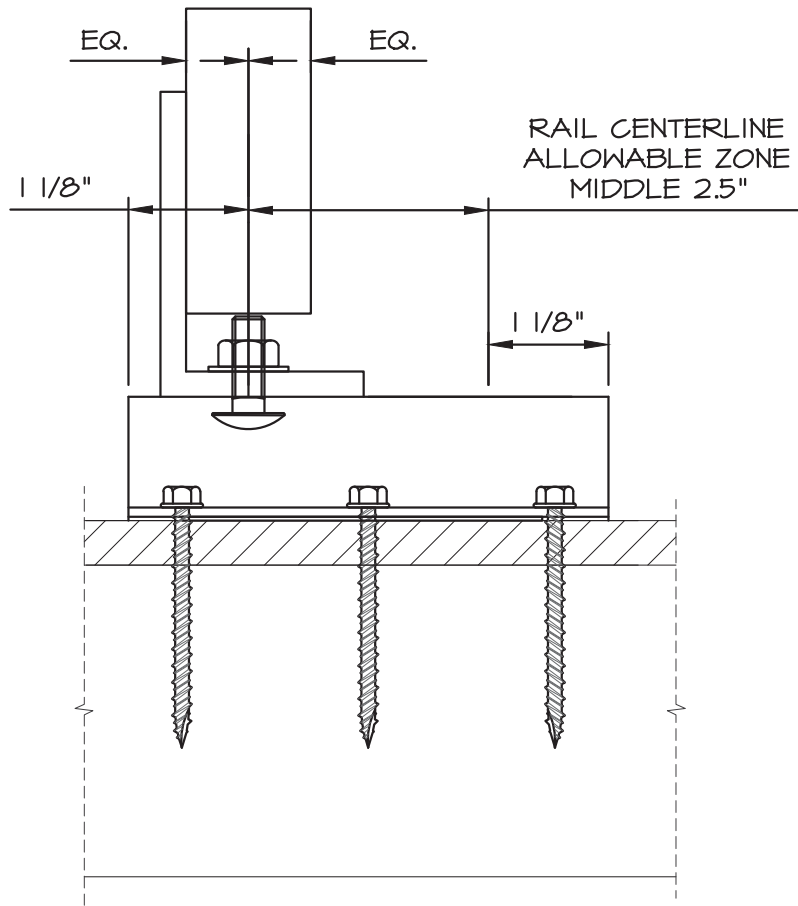
DRAWN BY: J.L.  
DESIGNED BY: J.L.

DATE: 7-28-16  
JOB NO: 471-13

ROOF TECH  
RT-[E] MOUNT + RAIL  
STRUCTURAL ANALYSIS

ROOF TECH, INC.  
333 H STREET, SUITE 5000  
CHULA VISTA, CA 91910

EXHIBIT B  
1 OF 4



2 'RAIL OPTION' - RAIL AND 'L-FOOT' ORIENTATION

SCALE: N.T.S.



Starling Madison Lofquist, Inc.  
 5224 S. 39th Street  
 Phoenix, Arizona 85040  
 (602) 438-2500  
 fax. (602) 438-2505

DRAWN BY: J.L.  
 DESIGNED BY: J.L.

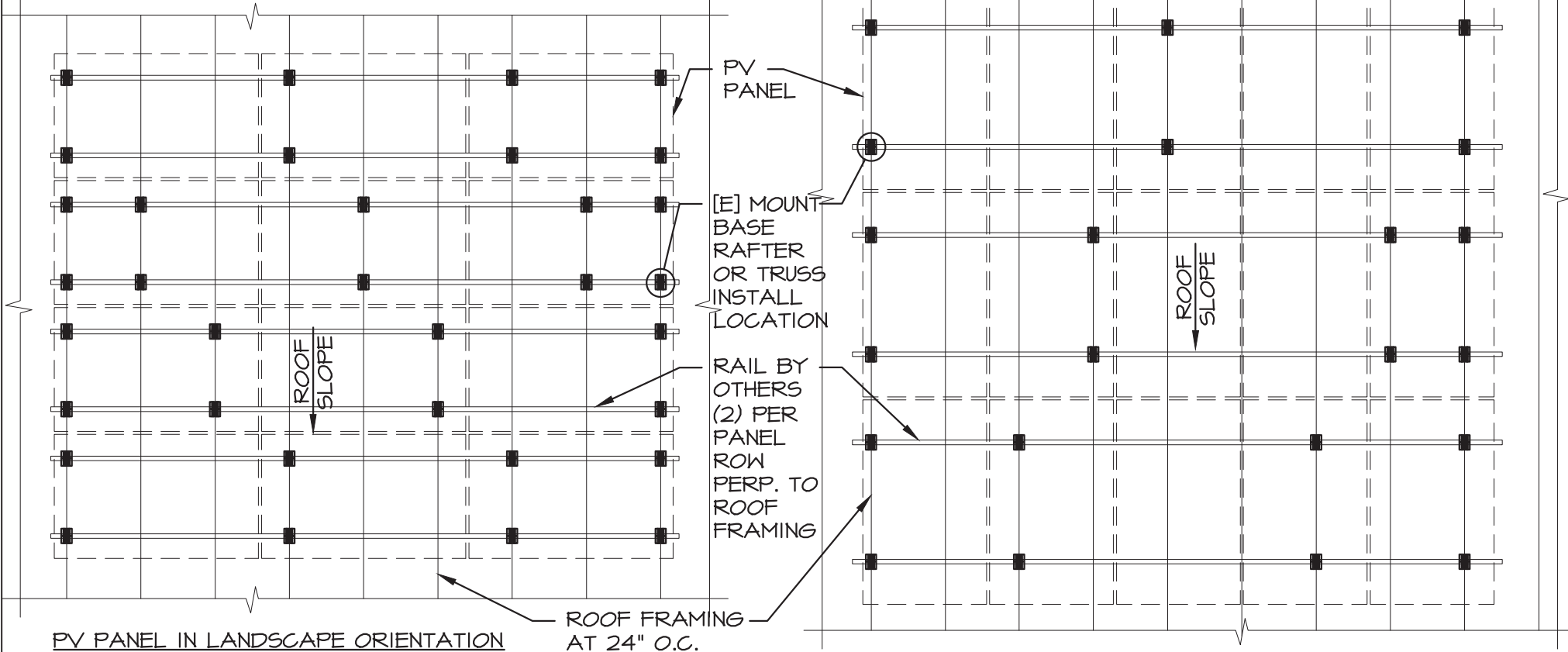
DATE: 7-28-16  
 JOB NO: 471-13

ROOF TECH  
 RT-[E] MOUNT + RAIL  
 STRUCTURAL ANALYSIS

ROOF TECH, INC.  
 333 H STREET, SUITE 5000  
 CHULA VISTA, CA 91910

EXHIBIT B  
 2 OF 4

NOTE: [E] MOUNT BASE TO BE ORIENTED WITH LONG DIRECTION DOWN ROOF SLOPE AS SHOWN. SKIP LOAD ROOF WHERE POSSIBLE TO EVENLY DISTRIBUTE LOAD TO ROOF FRAMING. THERMAL EXPANSION SPLICE RAILS AT 11 FOOT MAXIMUM INTERVALS.



### PARTIAL FRAMING PLAN (RAFTER INSTALLATION)

PV PANEL IN PORTRAIT ORIENTATION

SCALE: N.T.S.



Starling Madison Lofquist, Inc.

5224 S. 39th Street  
Phoenix, Arizona 85040  
(602) 438-2500  
fax. (602) 438-2505

Consulting Structural and  
Forensic Engineers

DRAWN BY: J.L.  
DESIGNED BY: J.L.

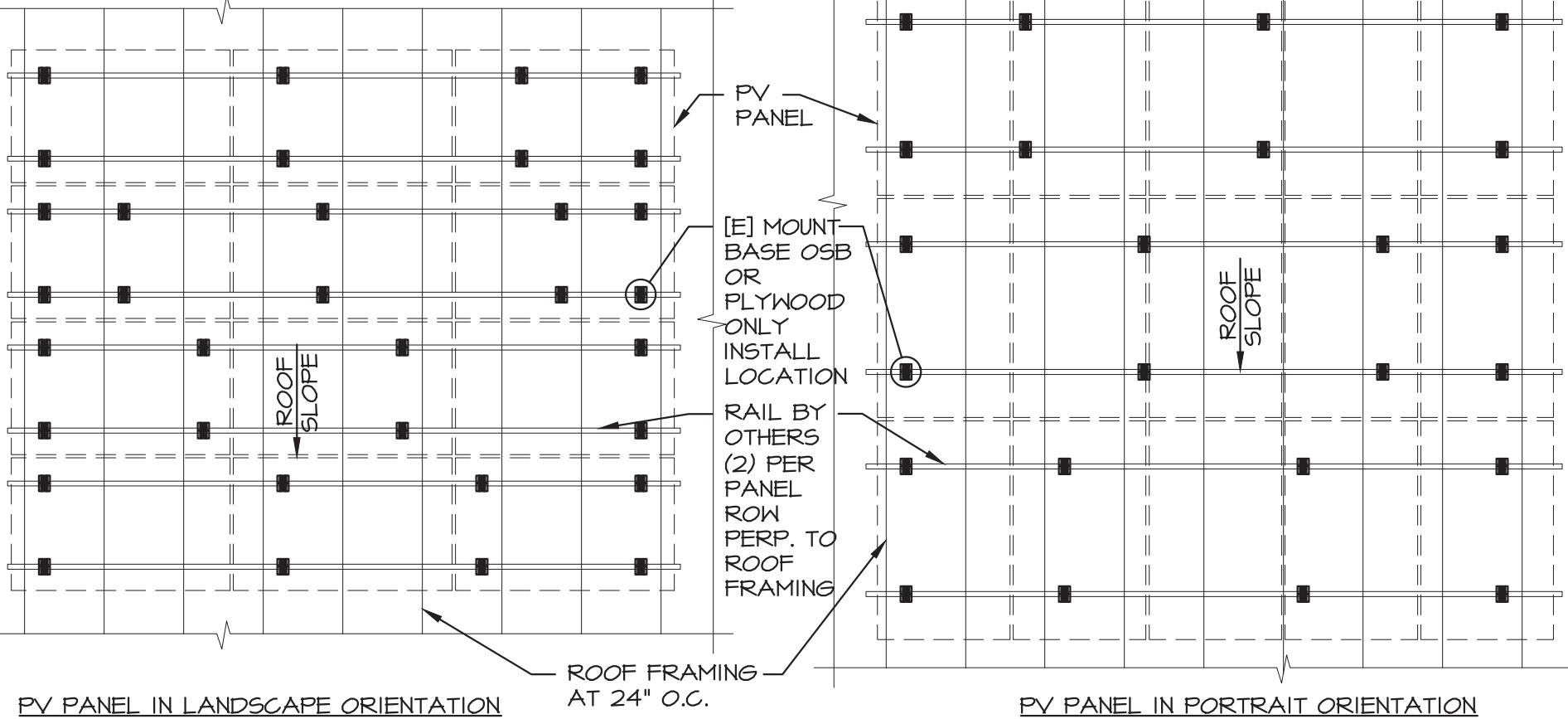
DATE: 7-28-16  
JOB NO: 471-13

ROOF TECH  
RT-[E] MOUNT + RAIL  
STRUCTURAL ANALYSIS

ROOF TECH, INC.  
333 H STREET, SUITE 5000  
CHULA VISTA, CA 91910

EXHIBIT B  
3 OF 4

NOTE: [E] MOUNT BASE TO BE ORIENTED WITH LONG DIRECTION DOWN ROOF SLOPE AS SHOWN. SKIP LOAD ROOF WHERE POSSIBLE TO EVENLY DISTRIBUTE LOAD TO ROOF FRAMING. THERMAL EXPANSION SPLICE RAILS AT 11 FOOT MAXIMUM INTERVALS.



PV PANEL IN LANDSCAPE ORIENTATION

PV PANEL IN PORTRAIT ORIENTATION

**PARTIAL FRAMING PLAN  
(OSB/PLYWOOD ONLY INSTALLATION)**

4

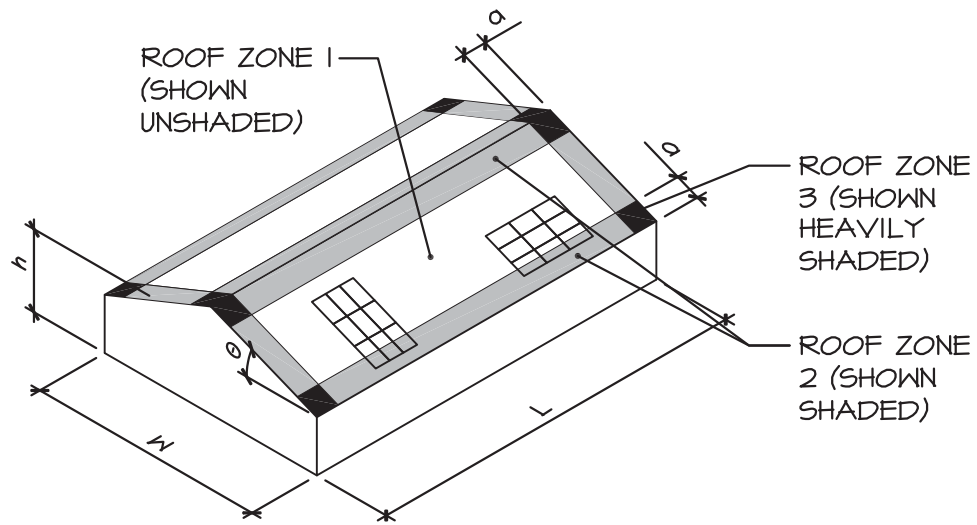
SCALE: N.T.S.



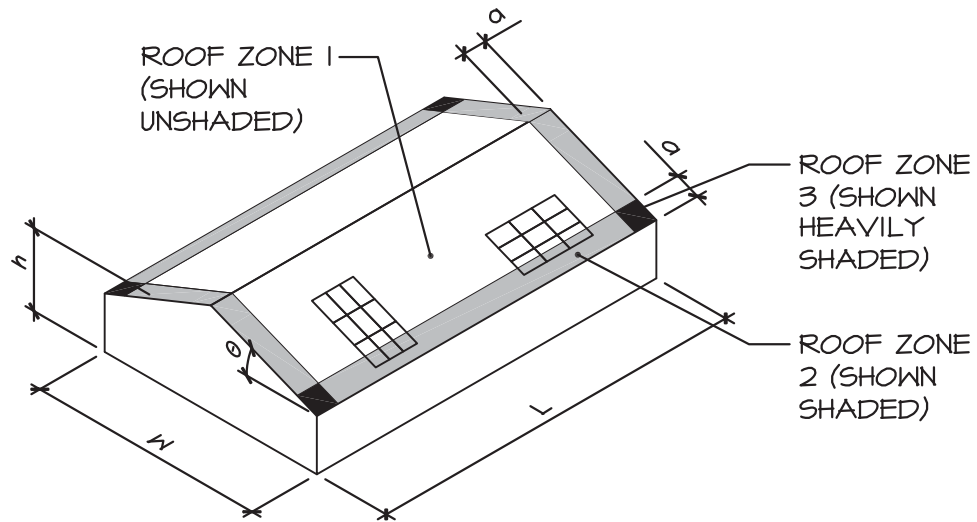
Starling Madison Lofquist, Inc.  
5224 S. 39th Street  
Phoenix, Arizona 85040  
(602) 438-2500  
fax. (602) 438-2505

DRAWN BY:	J.L.	DATE:	7-28-16
DESIGNED BY:	J.L.	JOB NO:	471-13
ROOF TECH RT-[E] MOUNT + RAIL STRUCTURAL ANALYSIS		ROOF TECH, INC. 333 H STREET, SUITE 5000 CHULA VISTA, CA 91910	

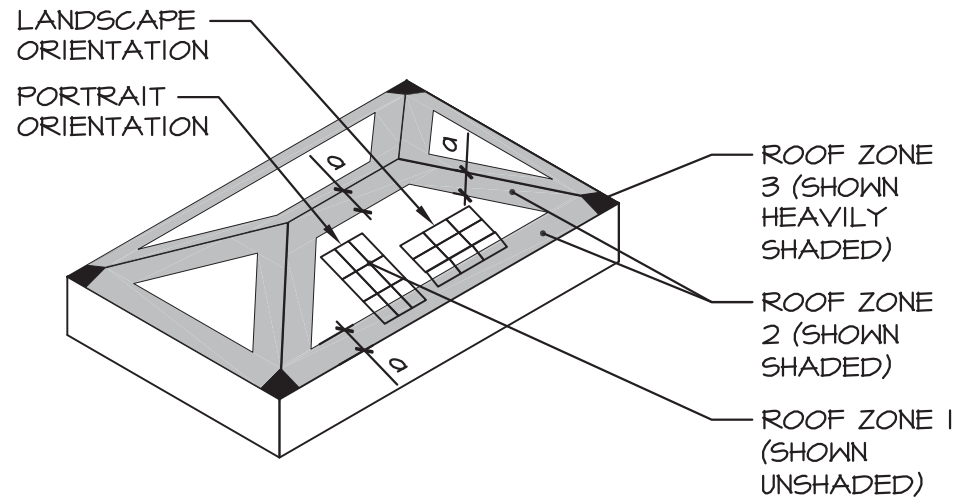
EXHIBIT B  
4 OF 4



$$7^\circ < \theta \leq 45^\circ$$



$$\theta \leq 7^\circ$$



**DEFINITIONS:**

(REF. ASCE 7-10, FIGURES 30.4-1, 30.4-2A, 30.4-2B, 30.4-2C)

$a$  = 10% OF LEAST HORIZONTAL DIMENSION ( $0.1W$ ) OR  $0.4h$ , WHICHEVER IS SMALLER, BUT NOT LESS THAN 3 FT OR 4% OF LEAST HORIZONTAL DIMENSION ( $0.04W$ ).

$W$  = HORIZONTAL WIDTH OF BUILDING.

$L$  = HORIZONTAL LENGTH OF BUILDING.

$h$  = MEAN ROOF HEIGHT, MEASURED VERTICALLY FROM ADJACENT GRADE, EXCEPT THAT EAVE HEIGHT SHALL BE USED FOR  $\theta \leq 10^\circ$ .

$\theta$  = ANGLE OF PLANE OF ROOF FROM HORIZONTAL IN DEGREES.

**FIGURE 1**

WIND ZONE  
DIAGRAM

SCALE: \_\_\_\_\_ NTS



Starling Madison Lofquist, Inc.

5224 S. 39th Street  
Phoenix, Arizona 85040

(602) 438-2500

fax. (602) 438-2505

Consulting Structural and  
Forensic Engineers