



11/7/2024

Freedom Forever LLC
 43445 Business Park Dr., Suite 110
 Temecula, CA 92590

Job Number: 514140
 Project Name: Tiara Broadie
 Project Address: 151 Barnsley Road , Angier, NC

Design Criteria:

Applicable Code = ASCE 7-16
 Design Wind Speed = 130 mph (3 Second Gust)
 Exposure Category = B
 Ground Snow Load = 15 psf Roof Snow Load= 11.55 psf
 Module Type = HANWHA QCELL: Q.PEAK DUO BLK ML-G10+ 410
 Module Quantity = 10

To whom it may concern,

The above mentioned residential rooftop solar project has been designed to the specifications shown above. The team at Freedom Forever LLC has visited the site to observe the roof and its framing as well as gather other required information for the project. During this observation they did not see any signs of damage or distress to the roof structure which would preclude solar from being installed. Based on that review and the information provided, the calculations on the following pages were completed to determine the adequacy of the roof framing as well as the allowable attachment spacing for the PV panels. The calculations show that the roof can support the proposed PV system without structural modifications.

Mounting Plane	1	2	3	4	5	6	7	8	9	10
Roof Type	Comp Shingle									
Framing Type	Rafter									
Framing Size	2x4 @ 24									
Upgrade Size	NA									
Attachment Type	Ecotasten RockIt Smart									
Lag Count	2									
Embedment Depth	2									

Sincerely,

Taqi Khawaja, PE
 Freedom Forever LLC

Down Force

Mounting Plane	1		2		3		4		5	
Module Location	EM	IM	EM	IM	EM	IM	EM	IM	EM	IM
D+S (psf)	11.32	11.32								
D+06W (psf)	8.08	6.33								

Mounting Plane	6		7		8		9		10	
Module Location	EM	IM	EM	IM	EM	IM	EM	IM	EM	IM
D+S (psf)										
D+06W (psf)										

Lateral Parallel to Roof

Mounting Plane	1	2	3	4	5
D+S (psf)	4.12				

Mounting Plane	6	7	8	9	10
D+S (psf)					

Framing Check

Lumber Species: DF

PV Load = 3 psf

Mounting Plane	1	2	3	4	5
Framing Type	Rafter				
Framing Size	2x4				
Framing Spacing (in)	24				
Span (ft)	7				
Moment (lb-ft)	224				
Shear (lbs)	128				
% Stressed	49%				
Upgrade Size	NA				
New % Stressed	NA				

Mounting Plane	6	7	8	9	10
Framing Type					
Framing Size					
Framing Spacing (in)					
Span (ft)					
Moment (lb-ft)					
Shear (lbs)					
% Stressed					
Upgrade Size					
New % Stressed					



Array Attachment Spacing

Module = HANWHA QCELL: Q.PEAK DUO BLK ML-G10+ 410

Mounting Plane	1	2	3	4	5
Roofing Material	Comp Shingle				
Attachment Type	Ecofasten RockIt Smart Slide				
Lag Count Per Attachment	2				
Min Lag Embedment (in)	2				
Landscape	72				
Portrait	48				

Mounting Plane	6	7	8	9	10
Roofing Material					
Attachment Type					
Lag Count Per Attachment					
Min Lag Embedment (in)					
Landscape					
Portrait					