



Scott E. Wyssling, PE
Coleman D. Larsen, SE, PE
Gregory T. Elvestad, PE

76 North Meadowbrook Drive
Alpine, UT 84004
office (201) 874-3483
swyssling@wysslingconsulting.com

February 14, 2023
Revised March 20, 2023

Titan Solar Power
210 North Sunway Drive
Gilbert, AZ 85233

Scott
Wyssling, PE

Digitally signed by Scott Wyssling, PE
DN: C=US, S=Utah, L=Alpine, O=Wyssling
Consulting, OU=Engineering, CN="Scott
Wyssling, PE",
E=swyssling@wysslingconsulting.com
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Date: 2023.03.20 10:19:30-06'00'
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Re: Engineering Services
Spivey Residence
131 Edna John Court, Dunn, NC
10.400 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

A. Site Assessment Information

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.
3. During installation, please avoid stacking multiple panels/equipment on roof at any single location. If absolutely necessary, do not exceed a maximum of (2) panels at any single location.

B. Description of Structure:

Roof Framing: Assumed prefabricated wood trusses at 24" on center. All truss members are constructed of 2x2 dimensional lumber.

Roof Material: Composite Asphalt Shingles

Roof Slope: 14 & 22 degrees

Attic Access: Inaccessible

Foundation: Permanent

C. Loading Criteria Used

- **Dead Load**
 - Existing Roofing and framing = 7 psf
 - New Solar Panels and Racking = 3 psf
 - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 15 psf
- **Wind Load** based on ASCE 7-10
 - Ultimate Wind Speed = 119 mph (based on Risk Category II)
 - Exposure Category C

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 NCRC, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.

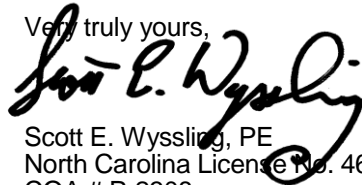
D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent K2 Systems installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a M5 x 60mm lag screw is 213 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of 1-5/8", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using two (2) M5 x 60mm lag screw with a minimum of 1-5/8" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the 2018 NCRC, current industry standards, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,



Scott E. Wyssling, PE
North Carolina License No. 46546
COA # P-2308



Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Signed 3/20/2023

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