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POWERHOME Solar
919 North Main Street
Mooresville, NC 28115

Re: Engineering Services
Jones Residence
1740 Audrey Road, Lillington, NC
10.240 kW System Size

To Whom it May Concern:

Pursuant to your request, we have reviewed the following information regarding solar panel installation on the roof of the above referenced home:

1. Site Visit/Verification Form prepared by a POWERHOME Solar representative identifying specific site information including size and spacing of rafters for the existing roof structure.
2. Photographs of the interior and exterior of the roof system identifying existing structural members and their conditions.

Based on the above information we have evaluated the structural capacity of the existing roof system to support the additional loads imposed by the solar panels and have the following comments related to our review and evaluation:

Description of Residence:

The existing residence is typical wood framing construction with the roof system consisting of 2 x 8 dimensional lumber at 16" on center. The attic space is unfinished and photos indicate that there was free access to visually inspect the size and condition of the roof rafters. All wood material utilized for the roof system is assumed to be Doug-Fir #2 or better with standard construction components. The existing roofing material consists of composite asphalt shingles. Photos of the dwelling also indicate that there is a permanent foundation.

A. Loading Criteria Used

- 120 MPH wind loading based on ASCE 7-10 Exposure Category "C" at a slope of 40 degrees
- 7 PSF = Dead Load roofing/framing Live Load = 20 PSF Snow Load = 10 PSF
- 3 PSF = Dead Load solar panels/mounting hardware

Total Dead Load = 10 PSF

The above values are within acceptable limits of recognized industry standards for similar structures in accordance with the North Carolina Residential Code (2018). Analysis performed of the existing roof structure utilizing the above loading criteria indicates that the existing rafters will support the additional panel loading without damage, if installed correctly.

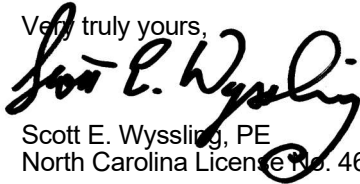
B. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent “QuickMount PV Installation Manual”, which can be found on the QuickMount website (<http://quickmountpv.com/>). 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. Maximum allowable pullout per lag screw is 235 lbs/inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications for Southern Pine *assumed*. Based on our evaluation, the pullout value, utilizing a penetration depth of 3”, is less than what is allowable per connection and therefore is adequate. Based on the variable factors for the existing roof framing and installation tolerances, using a thread depth of 3” with a minimum size of 5/16” lag screw per attachment point for panel anchor mounts should be adequate with a sufficient factor of safety.
3. Considering the roof slopes, the size, spacing, condition of roof, the panel supports shall be placed no greater than 72” o/c.
4. Panel supports connections shall be staggered to distribute load to adjacent rafters.

Based on the above evaluation, it is the opinion of this office that with appropriate panel anchors being utilized the roof system will adequately support the additional loading imposed by the solar panels. This evaluation is in conformance with the North Carolina Residential Code, current industry and standards, and 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

