RIGHT ANGLE *ENGINEERING*

STRUCTURAL CERTIFICATION REPORT

Roof-mounted Solar Panels

July 30, 2026

PRSOL20261128

To: Ellensburg Solar LLC
Po Box 1681
Ellensburg, WA 98926

Calculations required to be provided by the Permittee on site for all Inspections

Re: 25-0355 Puyallup Public Library
324 S Meridian
Puyallup, WA 98371
AHJ: **Puyallup (City)**, WA

Ellensburg Solar LLC proposes to install new roof-mounted solar panels at this structure and asked *Right Angle Engineering* to review the existing structure for suitability. This letter summarizes the methods that were used to survey, evaluate, and certify the existing roof framing and the attachment of the new solar panels to it.

STRUCTURAL DESIGN

Building Code:	International Building Code 2021
Design Standards:	ASCE 7-16
Snow:	Ground: p_g= 18.0 psf | Flat Roof: p_f= 13.72 psf | Sloped Roof: p_s= 11.89 psf
Wind:	Basic Wind Speed = 98.0 mph | Exposure = C
Seismic:	Risk Category = 3 | Seismic Design Category = D | Site Class = D

STRUCTURE

Right Angle Engineering performed a virtual site inspection of the roof structure and observed the following:

Array Name	Panel Quantity	Roof Framing	Material	Pitch
Array 1	271	Steel Open Web Joists| 112" o.c.	Sloped Standing Seam Metal Sheeting	18°

ANCHORAGE

The solar panel anchorage shall be installed according to the manufacturer's most current installation manual. The attachment configuration should match the certified building plans. The solar panels should be mounted parallel (max 5 inches) to the roof surface.

Array Name	Connection Type	Fastener	Max Anchorage Spacing
Array 1	S-5-U	(2) T-30 Torx setscrews into roof material	48"

Installation Instructions

Solar panels and the equipment shall be installed per the manufacturer's installation specifications. Improper installation will void this certification. If deviations from the approved structural plans occur, Right Angle Engineering must be notified. Prior to installation, the installer should:

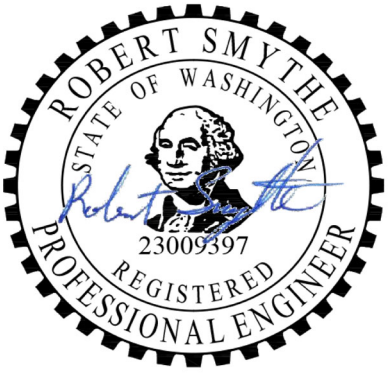
- Confirm that the existing structure matches the information provided in the site survey, the approved installation plans and this certification.
- Identify discrepancies between this certification and the approved installation plans. If found, then this certification shall govern.
- Identify structural elements that are dangerous (cracked, broken, excessive sag, signs of overstress, rot, decay, fire, water). If found, installation shall cease until those elements are adequately abated and made to comply with the referenced building code.
- Verify that both the existing structure and the solar addition has been permitted through the AHJ.

STRUCTURAL CERTIFICATION

I certify the addition of solar panels on the roof of this structure does not cause the structure to become unsafe or make it generally less compliant with the life-safety requirements of the referenced building code. Based on the evaluation methods described below, for the loads that exist at this site, the existing framing will safely support the weight of the new solar panels if they are installed and attached correctly. Electrical design is not included in this certification.

Array Name	Certification Method	Retrofits
Array 1	Prescriptive method International Existing Building code 503.3	None required

Regards,



07/30/2026

Robert D. Smythe, P.E.
Right Angle Engineering

City of Puyallup
Building
REVIEWED
FOR
COMPLIANCE
SKinnear
08/06/2026
4:24:06 PM

Job Details

Roof Snow Load - ASCE 7-16	
Ground Snow Load (p_g) *Section 7.2*	18.0 psf
Exposure Factor (C_e) *Table 7.3-1*	0.9
Thermal Factor (C_t) *Table 7.3-2*	1.1
Importance Factor (I_s) *Table 1.5-2*	1.1
Flat Roof Snow Load (p_f) *Equation 7.3-1*	13.72 psf
Non-Slippery Surface Slope Factor (C_s) *Figure 7.4-1*	1
Slippery Surface Slope Factor (C_s) *Figure 7.4-1*	0.87
Roof Snow Load *Equation 7.4-1*	13.72 psf
Reduced Snow Load (Slippery Surface) *Equation 7.4-1*	11.89 psf

Design Criteria	
Wind Speed (V_{ult}) *Local Design Criteria*	98.0mph
Exposure Category	C
Risk Category	3
Mean Roof Height	30 ft
Roof Type	Gable Roof
Building Type	Enclosed

Roof Live Load	
Existing Roof Live Load *ASCE 7-16 Table 4.3-1*	20 psf

[1]Roof Dead Load	
Sloped Standing Seam Metal Sheeting	1.3 psf
22ga Steel decking Sheathing	1.97 psf
Roof Framing	4 psf
Insulation	1.2 psf
Solar Panel Array	2.76 psf
Dead Load Without Panels	8.47 psf

[1]Roof Dead Load is taken from the worst case scenario dead load from all arrays of the job in order to provide a more conservative evaluation.

Array 1

Array Details	
Roof Framing	Steel Open Web Joists
Spacing	112.0"
Beam Span	39.92', 42.5'
Roof Pitch	18°
Module Type	SIL-580 XM+
Module Wind rating [psf] *Safety Factor = 1.5*	33.42
Panel Quantity	271
Panel Array Area	7528.75 ft²
Panel Orientation	Landscape
Roof Attachment Type	S-5-U (2) T-30 Torx setscrews
Allowable Shear Capacity *S-5 Load Testing*	329.0 lbs
Allowable Pullout Capacity *S-5 Load Testing*	399.0 lbs
Velocity Pressure *Equation 26.10-1 (K_z=0.98, K_{ht}=1, K_d=0.85, K_e=1.0)*	20.49 psf

GCP Zones	1/2e	2n/2r /3e	3r
GC_p *Figure 30.3-(2A-5B)*	-1.69	-2.37	-2.8
Design Pressure Up [psf] *Equation 29.4-7 γ_a=0.51 γ_E=1.0,*	-17.7	-24.8	-29.3
Factored Design Pressure Up [psf] *ASD LC (.6D + .6W)*	-9.1	-13.3	-16.0
Factored Exposed Design Pressure Up [psf] *γ_a=0.51 γ_E=1.5, (.6D + .6W)*	-14.4	-20.7	-24.8
Design Pressure Down [psf]	16	16	16
Tributary Area [ft^2]	44.0	30.0	24.9
Maximum Connection Spacing [in]	284	194	161
Maximum Rail Span [in]	48	48	48
Maximum Rail Cantilever [in]	16	16	16
Design Connection Spacing [in] **Adjusted*	48	48	48
Design Connection Spacing (exposed) [in]	48	48	48

Prescriptive Method: International Existing Building Code 503.3	
Total load on member without solar	21899.76 lbs
Total load on member with solar	21899.76 lbs
Percentage increase on member with solar	0.0%*

The 2021 International Existing Building section 503.3 indicates that alterations to an existing building that results in less than a 5.0% increase in the total stress may be performed without a structural evaluation of the existing building. As demonstrated in the above calculations, the additional weight of the solar panels will be less than 5.0% increase in the gravity loading and therefore stress on the existing roof framing. *According to International Building Code 1607.14.4.1 both load cases have been considered and the live load and snow load may have been reduced for load case 1 thus making the load with solar less than the load without solar.