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June 29, 2022
revised July 19, 2022

Lumio Solar
12600 Challenger Parkway, Suite 200
Orlando, FL 32826

Re: Engineering Services
Green Residence
117 Southeast Jolene Way, Lake City FL
9.600 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.

B. Description of Structure:

Roof Framing: Prefabricated wood trusses at 24" on center. All truss members are constructed of 2 x 4 dimensional lumber.
Roof Material: Composite Asphalt Shingles
Roof Slopes: 27 +/- degrees
Attic Access: Accessible
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** = 0 psf
- **Wind Load** based on ASCE 7-16
 - Ultimate Wind Speed = 120 mph (based on Risk Category II)
 - Exposure Category B

Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the FBC 2020 7th Edition, 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.

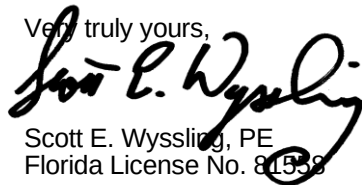
D. Solar Panel Anchorage

1. The solar panels shall be mounted in accordance with the most recent Unirac 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 $\frac{5}{16}$ " lag screw is 235 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on a minimum penetration depth of $2\frac{1}{2}$ ", 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 one $\frac{5}{16}$ " diameter lag screw with a minimum of $2\frac{1}{2}$ " 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.
4. Panel supports connections shall be staggered to distribute load to adjacent framing members.

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 *FBC 2020 7th Edition*, current industry standards and practice, 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
Florida License No. 81558

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Date Signed 07-19-22

LEGEND

X

(E)

(N)

M

MSP

ACD

CB

- MODULE STRING ID

- EXISTING

- NEW

- UTILITY METER

- MAIN SERVICE PANEL

- AC DISCONNECT

- COMBINER BOX

LC

SP

JB

SCT

BAT

ICD

BUL

- LOAD CENTER

- SUBPANEL

- JUNCTION BOX

- STRING CENTER TAP

- CONDUIT

- ENERGY STORAGE

- INTERCONNECTION DEVICE

- BACK UP LOADS PANEL

ADHESIVE FASTENED SIGNS:

- ANSI Z35.4-2011 PRODUCT SAFETY SIGNS AND LABELS, PROVIDES GUIDELINES FOR SUITABLE FONT SIZES, WORDS, COLORS, SYMBOLS, AND LOCATION REQUIREMENTS FOR LABELS. NEC 110.21(B)(1).
- THE LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED. NEC 110.21(B)(3).
- ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT.

WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS
TERMINALS ON BOTH THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

LABEL LOCATION:
COMBINER BOX/ EMT
ENCLOSURES/ AC DISCONNECT/
MAIN SERVICE PANEL
PER CODE: NEC 2017, 690.13(B)

EMERGENCY RESPONDER

SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN
SWITCH TO THE "OFF"
POSITION TO SHUT
DOWN THE ENTIRE PV
SYSTEM



LABEL LOCATION:
RAPID SHUTDOWN
(AC DISCONNECT)
PER CODE: NEC 690.56 (C)(1) &
NFPA1 11.12.2.1.1.1, 11.12.2.1.4

WARNING: PHOTOVOLTAIC
POWER SOURCE

LABEL LOCATION:
CONDUIT/ RACEWAY/ ENCLOSURES/
COMBINER BOX/ AC DISCONNECT
PER CODE: NEC2017, 690.31(G)(3)(4)

PHOTOVOLTAIC
AC DISCONNECT

LABEL LOCATION:
AC DISCONNECT/ BREAKER/
POINTS OF CONNECTION
PER CODE: NEC2017, 690.13(B)

PHOTOVOLTAIC AC DISCONNECT

RATED AC OUTPUT CURRENT 29.0 A

NOMINAL OPERATING AC VOLTAGE 240 V

LABEL LOCATION:
AC DISCONNECT
PER CODE: NEC2017, 690.53

RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM

LABEL LOCATION:
RAPID SHUTDOWN
(AC DISCONNECT)
PER CODE: NEC 690.58 (C)(3)

WARNING

DUAL POWER SOURCE

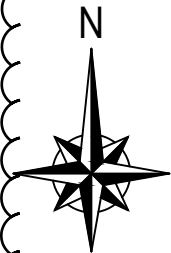
SOURCES: UTILITY GRID AND
PV SOLAR ELECTRIC SYSTEM

LABEL LOCATION:
POINT OF INTERCONNECTION
PER CODE: NEC 2017, 705.12(B)

! WARNING !

INVERTER OUTPUT CONNECTION. DO NOT
RELOCATE THIS OVERCURRENT DEVICE.

LABEL LOCATION:
POINT-OF-INTERCONNECTION OR AT
MAIN SERVICE DISCONNECT (MSP)
PER CODE: NEC 705.12(B)(2)(3)(b)



ROOF #1

(E) MAIN SERVICE PANEL

ROOF #2

ROOF #3

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Date Signed 07-19-22

SE JOLENE WAY

FRONT OF RESIDENCE

BACK OF RESIDENCE

(N) COMBINER BOX

(N) AC DISCONNECT

(E) UTILITY METER

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AKE
SOLAR

ATLANTIC KEY ENERGY LLC
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PROJECT NAME & ADDRESS

JOSH GREEN
RESIDENCE
117 SE JOLENE WAY
LAKE CITY, FL 32025

ENGINEER CONTACT INFORMATION

SCOTT WYSSLING
LICENSE# 81558
76 N MEADOWBROOK DR.,
ALPINE, UT 84004

SIGNATURE WITH SEAL

REVISIONS

DESCRIPTION	DATE	REV
LAYOUT CHANGE	07/19/2022	A

Drawn by: N.R.
Checked by: S.W.
Date: 6/29/22

SHEET NAME

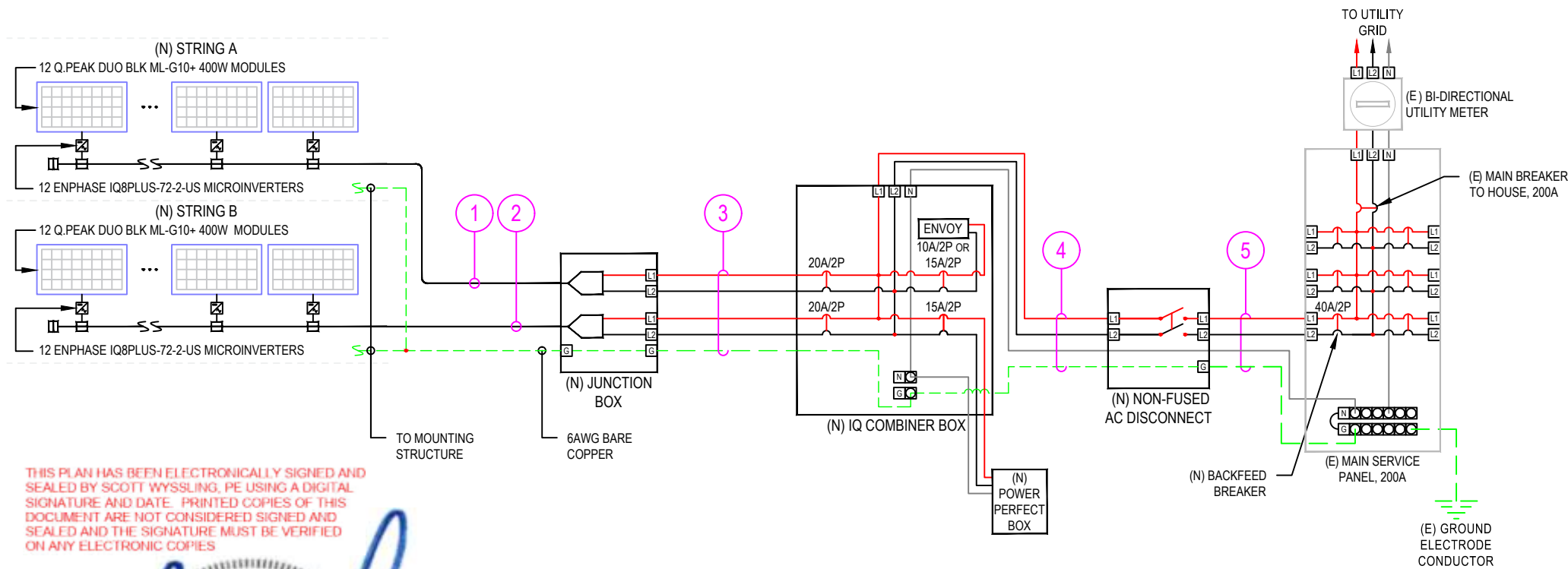
STRING LAYOUT &
SIGNAGE

SHEET NUMBER

E-1

ID	INITIAL CONDUCTOR LOCATION	FINAL CONDUCTOR LOCATION	MIN. CONDUCTOR SIZE (AWG)		MIN. DIA CONDUIT SIZE (IN.)	# OF PARALLEL CIRCUITS	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD (A)	MIN. EGC SIZE (AWG)		TEMP. CORR. FACTOR		CONDUIT FILL FACTOR	CONT. CURRENT (A)	MAX. CURRENT (A)	BASE AMP. (A)	DERATED AMP. (A)	TERM. AMP. RATING (A)	LENGTH (FT)	VOLTAGE DROP (%)
1	STRING A	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.71	56°C	N/A	14.52	18.15	30	N/A	N/A	51.00	0.50
2	STRING B	JUNCTION BOX	12	Q CABLE	N/A	1	2	N/A	6	BARE COPPER	0.71	56°C	N/A	14.52	18.15	30	N/A	N/A	84.00	0.82
3	JUNCTION BOX	IQ COMBINER	10	THWN-2 COPPER	0.75 LTNM	2	4	20	10	THWN-2 COPPER	0.71	56°C	0.8	14.52	18.15	40	22.7	35	65.00	0.98
4	IQ COMBINER	AC DISCONNECT	8	THWN-2 COPPER	0.75 LTNM	1	3	N/A	10	THWN-2 COPPER	0.96	35°C	1	29.04	36.30	55	52.8	50	5.00	0.09
5	AC DISCONNECT	MSP	8	THWN-2 COPPER	0.75 LTNM	1	3	40	10	THWN-2 COPPER	0.96	35°C	1	29.04	36.30	55	52.8	50	55.00	1.04

NOTE: LTNM OR EQUIVALENT TYPE CONDUIT



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1 | ELECTRICAL LINE DIAGRAM

E-2

SCALE: NTS



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DESCRIPTION	DATE	REV
LAYOUT CHANGE	07/19/2022	A

Drawn by: N.R.

Checked by: S.W.

Date: 6/29/22

SHEET NAME

ELECTRICAL LINE
DIAGRAM & CALCS.

SHEET NUMBER

E-2

LEGEND

(E) - EXISTING
(N) - NEW

DESIGN TEMPERATURE SPECIFICATIONS

RECORD LOW TEMP	1°C
AMBIENT TEMP (HIGH TEMP 2%)	35°C
CONDUIT HEIGHT	1.0"
CONDUCTOR TEMPERATURE RATE (ROOF)	56°C