

# Royalston Historic District Commission

P.O. Box 125

Royalston, Massachusetts, 01368

Web site: <http://www.royalston-ma.gov>

E-mail: [hdc@royalston-ma.gov](mailto:hdc@royalston-ma.gov)

## Application for Certificate

### Instructions:

- Use separate applications for changes that are not related to each other.
- Include sketches or pictures showing design, sizes, colors, materials, etc. (a sketch is worth a thousand words).
- File four copies of the completed application at an HDC meeting; or mail, e-mail or give it to a commission member for filing at the next meeting.
- It is recommended that applicants attend the meeting or send an agent. Even well prepared applications generate questions and answering them quickly will avoid delays.
- Certificates expire a) after one year if the work was not started and pursued diligently, or b) in case of sale.
- If you have any questions, please contact the Commission.

Date 3-15-2012  
Address of Property 5 on the Common  
Owner's Name Kenneth & Andrea Lively  
Applicant's Name Kenneth Lively  
Applicant's mailing address: Street/P.O. Box P.O. Box 116  
City, State, Zip Royalston MA 01368-0116

Please check the certificate applied for:

☒ Appropriateness

☐ Non-Applicability

☐ Hardship

Short description of the proposed changes. (Provide the details on page 2 and on additional sheets and exhibits as necessary).

We would like to install PV (Photovoltaic) solar panels  
on our roof facing South. Please see details  
that follow.

Alannah P. Lively  
Applicant's Signature

### For Office Use Only

Date Filed March 15, 2012 Received by Peter J. Kramlich Application Number 2012-03-04  
Date Accepted for consideration March 15, 2012 Public Hearing ☒ Notices mailing date(s) 3/28/2012  
Continuation date \_\_\_\_\_ Applicant's signature \_\_\_\_\_ Date \_\_\_\_\_  
Decision not approved Chairperson's signature Peter J. Kramlich Date 05/05/12  
Comments or conditions \_\_\_\_\_

## ROYALSTON HISTORIC DISTRICT COMMISSION APPLICATION

We are in the process of installing a PV (Photovoltaic) solar panel system on our home. The system will consist of 36 Sunmodule SW 240 watt mono black solar panels made by SolarWorld. Each Sunmodule panel measures 65.94" by 37.44" and is a Mono Crystalline cell type. Each panel will have black anodized aluminum frame. The front is tempered glass. Please see the attached brochure, exhibit # 1b, detailing each panel including an actual picture of a panel. The placement of the 36 panels will be as follows; There will be 36 panels installed on our barn and basically fill the entire South facing roof slope. These panels will be installed in the portrait positioning to allow 4 rows of 9 in each row. All of these 36 panels will be installed to follow the slope of the roof and will be mounted on rails to allow the panel air flow under each panel, but as close to the roof as possible. The panels will have a black mono look to them and a black aluminum frame that measures 0.6" on the surface and 1.22" edge. Please see the attached information from Astrum Solar, exhibit # 2b, that shows exactly where each panel will be located on our roof.

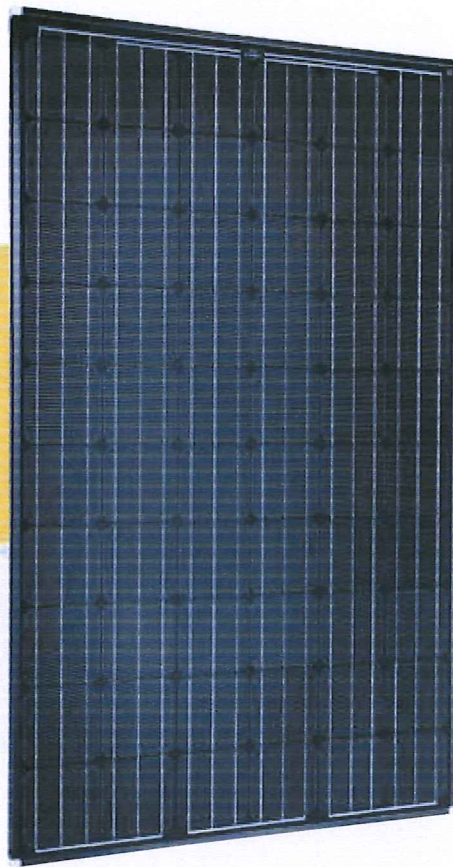
We are trying to minimize what is seen from the street. After much research, talking with Astrum Solar, and taking into consideration what the Commission and neighbors have asked for, this is the best positioning of the panels to allow us the production that we need to power our homes electrical needs, while keeping the Historic District Commission in mind. Please see the pictures, exhibits # 3, # 4, and # 5, taken from 6 different areas on the street to see the possible views that will be seen. This array positioning will allow us to keep the current trees that are around our yard. The more trees that we keep, the less the array will be seen from the street.

I have also consulted the Salem Historical Commission Guidelines Notebook to follow what they recommend. Please see the excerpt from the guidelines that follows in exhibit # 6.

As we considered installing this PV array, we did as much research as we could to place the array in the best spot on our home to minimize the impact to our home and the entire Royalston Historic District. By installing these panels as recommended by Astrum Solar, the visibility from the street will be minimum and we are able to use the current trees as a partial shade of the array, without actually shading the panels from the needed sunlight. The placement of the panels is based on the sunshine that our home receives and maximizes its production. The best placement for solar gain is on our main house roof, 91% - 95%. The next best placement is the woodshed roof at 83%. The ridge of the barn is rated at 89%-90%, but it drops to 79%-82% at the roof edge. It is necessary to have an overall average site quality of at least 80% in order to qualify for the State and Federal funding. By placing the panels as recommended on our barn, the view from the street and the impact on our home and the District will be minimal. Please consider this PV array for our home.



EXHIBIT # 1b



# Sunmodule<sup>+</sup>™

## SW 240 mono black / Version 2.0 and 2.5 Frame

### World-class quality

Fully-automated production lines and seamless monitoring of the process and material ensure the quality that the company sets as its benchmark for its sites worldwide.

### SolarWorld Plus-Sorting

Plus-Sorting guarantees highest system efficiency. SolarWorld only delivers modules that have greater than or equal to the nameplate rated power.

### 25 years linear performance guarantee and extension of product warranty to 10 years

SolarWorld guarantees a maximum performance degradation of 0.7% p.a. in the course of 25 years, a significant added value compared to the two-phase warranties common in the industry. In addition, SolarWorld is offering a product warranty, which has been extended to 10 years.\*

\*in accordance with the applicable SolarWorld Limited Warranty at purchase.  
[www.solarworld.com/warranty](http://www.solarworld.com/warranty)



- Qualified, IEC 61215
- Safety tested, IEC 61730
- Periodic Inspection



[www.solarworld.com](http://www.solarworld.com)

We turn sunlight into power.

## SW 240 mono black / Version 2.0 and 2.5 Frame

### PERFORMANCE UNDER STANDARD TEST CONDITIONS (STC)\*

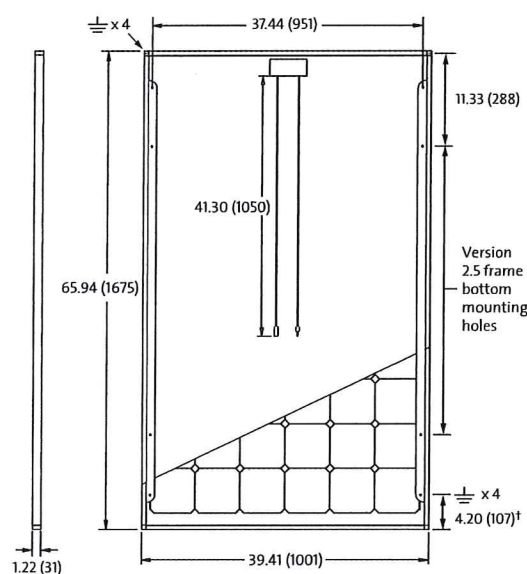
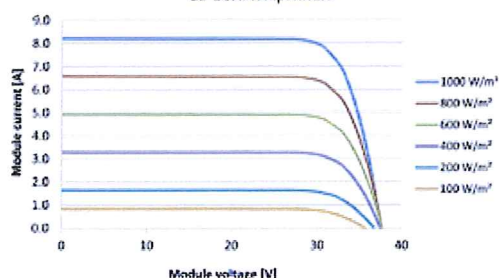
		SW 240
Maximum power	$P_{max}$	240 Wp
Open circuit voltage	$V_{oc}$	37.6 V
Maximum power point voltage	$V_{mpp}$	30.6 V
Short circuit current	$I_{sc}$	8.22 A
Maximum power point current	$I_{mpp}$	7.87 A

\*STC: 1000W/m<sup>2</sup>, 25°C, AM 1.5

### THERMAL CHARACTERISTICS

NOCT	48 °C
TC $I_{sc}$	0.004 %/K
TC $V_{oc}$	-0.30 %/K
TC $P_{mpp}$	-0.45 %/K
Operating temperature	-40°C to 85°C

I-V curves for SolarWorld Sunmodule Plus SW 240 mono at 25°C cell temperature



### PERFORMANCE AT 800 W/m<sup>2</sup>, NOCT, AM 1.5

		SW 240
Maximum power	$P_{max}$	175.4 Wp
Open circuit voltage	$V_{oc}$	34.2 V
Maximum power point voltage	$V_{mpp}$	27.9 V
Short circuit current	$I_{sc}$	6.63 A
Maximum power point current	$I_{mpp}$	6.30 A

Minor reduction in efficiency under partial load conditions at 25°C: at 200W/m<sup>2</sup>, 95% (+/-3%) of the STC efficiency (1000 W/m<sup>2</sup>) is achieved.

### COMPONENT MATERIALS

Cells per module	60
Cell type	Mono crystalline
Cell dimensions	6.14 in x 6.14 in (156 mm x 156 mm)
Front	tempered glass (EN 12150)
Frame	Black anodized aluminum
Weight	46.7 lbs (21.2 kg)

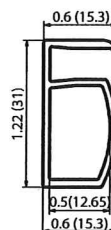
### SYSTEM INTEGRATION PARAMETERS

Maximum system voltage SC II	1000 V
Max. system voltage USA NEC	600 V
Maximum reverse current	16 A
Number of bypass diodes	3
UL Maximum Test Load**	45 psf (2.1 kN/m <sup>2</sup> )
IEC Maximum Snow Test Load**	113 psf (5.4 kN/m <sup>2</sup> )

\*\*Please apply the appropriate factors of safety according to the test standard and local building code requirements when designing a PV system.

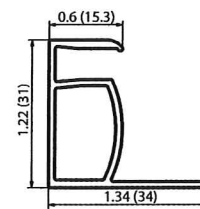
### ADDITIONAL DATA

Power sorting <sup>2)</sup>	-0 Wp / +5 Wp
J-Box	IP65
Connector	MC4
Module efficiency	14.31 %
Fire rating (UL 790)	Class C



#### VERSION 2.0 FRAME

- Compatible with "Top-Down" mounting methods
- Grounding Locations: 4 corners of the frame



#### VERSION 2.5 FRAME

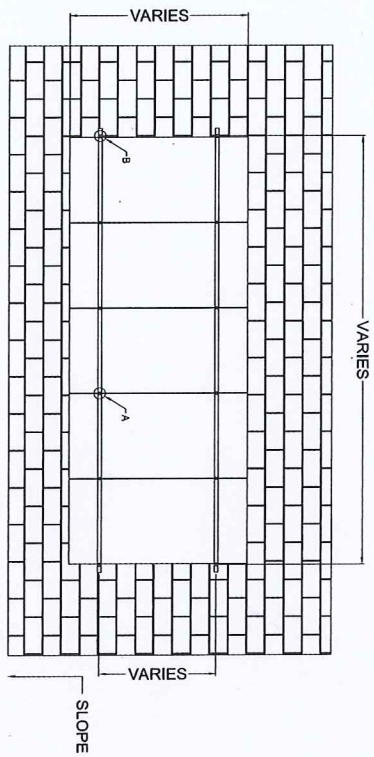
- Compatible with both "Top-Down" and "Bottom" mounting methods
- Grounding Locations:
  - 4 corners of the frame
  - 4 locations along the length of the module in the extended flange†

1) Sunmodules dedicated for the United States and Canada are tested to UL 1703 Standard and listed by a third party laboratory. The laboratory may vary by product and region. Check with your SolarWorld representative to confirm which laboratory has a listing for the product.

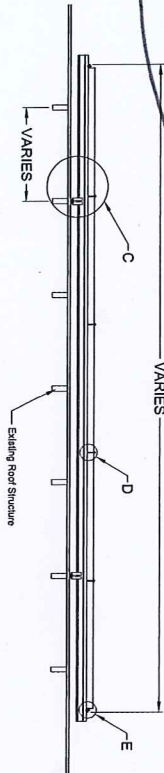
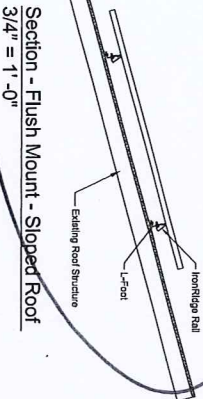
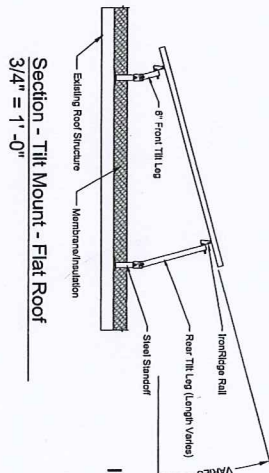
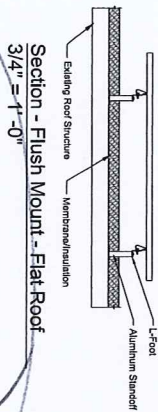
2) Measuring tolerance traceable to TUV Rheinland: +/- 2% (TUV Power Controlled).

3) All units provided are imperial. SI units provided in parentheses.

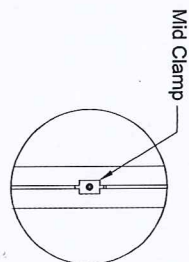




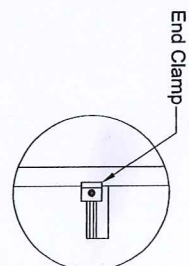
Typical Flush Mount Array - Plan View  
1/2" = 1'-0"



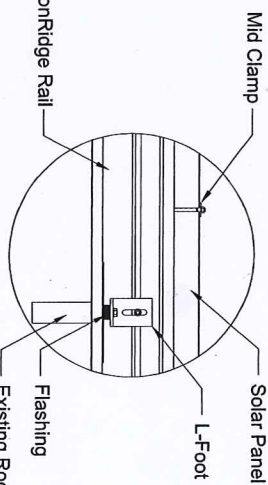
Typical Flush Mount Array - Elevation  
3/4" = 1'-0"



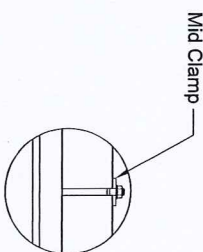
Detail A - Mid Clamp to XRS Rail - Plan  
3" = 1'-0"



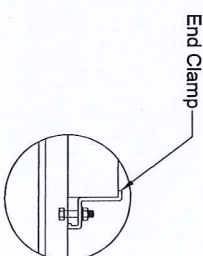
Detail B - End Clamp to Rail - Plan  
3" = 1'-0"



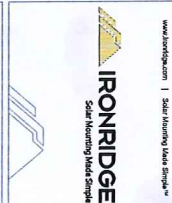
Detail C - Typical Roof Connection  
3" = 1'-0"



Detail D - Mid Clamp to Rail - Elevation  
6" = 1'-0"



Detail E - End Clamp to Rail - Elev.  
6" = 1'-0"



Willis Headquarters  
7435 Sycamore Road  
Willis, CA 94590  
Regional Office  
3500 Sycamore Road Suite #2  
Hayward, CA 94540

Notes:

No.	Description	Date

Product Category: Roof Mounting Systems  
Product: Roof Mount & Tilt Mount  
Drawing Name: Typical Assembly Details  
Date: 18 March, 2012  
Drawn by: EP  
Checked by: XX  
Scale: As Noted  
**IR - 2.01**



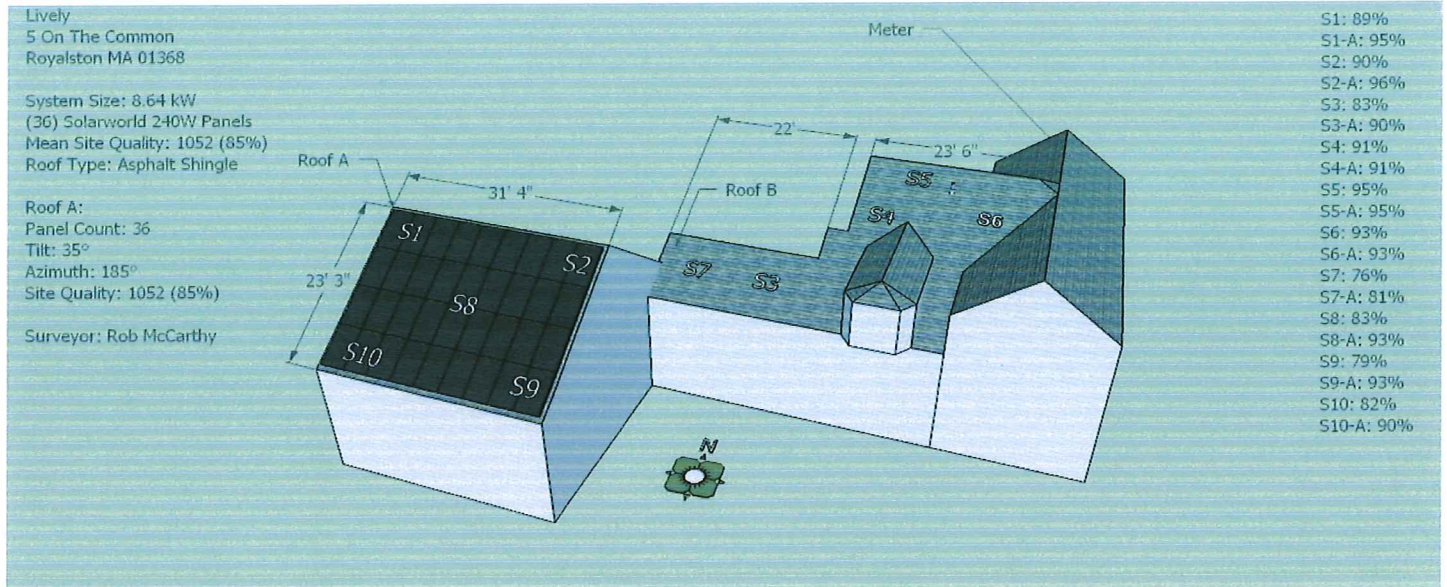
# EXHIBIT # 2b

ASTRUMSOLAR®

SEE A SUNNY DAY IN A WHOLE NEW WAY®

Lively Residence: 5 On The Common, Royalston MA 01368

## Solar Panel Design



NOTES: Surveyed by Rob McCarthy, designed by Chris Rhodes. The S.Q. will be 1135 (92%) after the removal of trees to the south

## Summary

ESTIMATED ANNUAL PRODUCTION (kWh)

9,092kWh

SITE QUALITY (TSRF %)

1052(85%)

TOTAL SYSTEM SIZE

8.64kW

# OF 240 WATT PANELS

36



Exhibit #3





Exhibit #4





Exhibit #5



## **SATELLITE DISHES AND SOLAR ENERGY SYSTEMS**

Rev. 11/17/10

### **Salem Historical Commission Guidelines**

#### *Satellite Dishes*

The Historical Commission has jurisdiction over satellite dishes and finds that they are obtrusive as well as historically and architecturally inappropriate elements in historic districts. Therefore, satellite dishes shall not be visible from any public way. If a homeowner is able to locate the dish so as not to be visible from any public way, it will still require a Certificate of Non-Applicability.

#### *Solar Energy Systems*

The Historical Commission also has jurisdiction over solar energy systems. A solar energy system is a device or structural design feature, a substantial purpose of which is to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generating, or water heating (as defined in G.L. c. 40A, §1A). In general, a solar energy system shall be placed in a location that minimizes visibility from any public way. If a solar energy system will not be visible from any public way, either the contractor or the homeowner must apply for and receive a Certificate of Non-Applicability before such installation. The application shall state the location of the installation, the dimensions and design of equipment to be placed on the exterior of the building, details of operation and the route of exterior wiring, if any. See also the Commission's guidelines for Utilities, below.

For circumstances in which a solar energy system cannot be installed so as not to be visible from the public way, the contractor or the homeowner must apply for a Certificate of Appropriateness or Hardship. Once again, the application shall state the location of the installation, the dimensions and design of equipment to be placed on the exterior of the building, and the route of exterior wiring. Applicants are encouraged to include scaled drawings, manufacturer's specifications and photographs of similar installations. If the system is being proposed for the primary structure, the applicant shall be prepared to discuss why placements with less visibility or less impact are not proposed. When ruling on an application for a Certificate of Appropriateness for a solar energy system, the Commission shall consider the policy of the Commonwealth encouraging the use of such systems and shall protect solar access (G.L. c. 40C, § 7). Nevertheless, the Commission shall consider and review each proposed installation on a case-by-case basis. Among the factors that the Commission shall consider are the following:

- Solar energy systems shall be installed so as to meet the Secretary of the Interior Standards for Rehabilitation and be installed so as to be sensitive to the historic environment.
- Location: Installation shall consider the proportions, balance and scale of a property to determine the least intrusive location. Installation shall have negligible visual impact upon the site as a whole. Preferably, solar energy systems shall be installed on a rear ell, subordinate wing, secondary massings, within an existing skylight, on accessory outbuildings or on the ground. If a solar energy system is placed on the ground, it shall be positioned in a limited or no-visibility location in a secondary area of the property. On buildings, they shall be set back on a flat surface or placed behind an existing architectural feature (parapet, dormer, chimney, etc.), whenever possible. Solar energy systems shall not be installed on the roof of primary elevation of a building unless other options have been explored and eliminated.
- Vegetation or a compatible screen may also be explored to further reduce the impact of these features on a historic property. Such screen should be situated at a sufficient distance from the system to create a visual barrier without casting shadows of a prolonged duration or at times of day that would inhibit energy production.
- In all cases, the installation shall be as flat as possible against the surface where it is installed. The placement of panels, either with horizontal or vertical tilt, shall be done to keep a low profile extension. Pitch and elevation shall be adjusted to reduce visibility from the public right-of-way.
- The historic character of a property shall be retained and preserved. Therefore, installation shall not involve the removal, covering or altering of significant, character-defining features of a building. Roof slopes, dormers, chimneys, windows, shutters and other architectural features shall not be altered to accommodate solar energy systems. Solar shingles laminates, glazing or similar materials shall not replace historic materials, such as slate.
- Roof integrated solar shingles must be low or non-reflective.



- Solar energy systems and mounting systems, whenever possible, shall be comparable in color to established roofing materials. Mechanical equipment associated with the solar panel system shall be non-visible or minimally visible and unobtrusive as possible. Solar energy systems, mounting systems and mechanical equipment, whenever possible, shall have non-reflective finishes.
- Installations shall be reversible and not cause permanent damage to the historic integrity of the property.