

No. **R-16-00159**

**Town of Shrewsbury**  
**Building Inspector**  
**Occupancy and Use Permit**

"No building or structure shall be erected, and no land, building or structure shall be used for a new, different, changed or enlarged use without a Building Permit therefore first having been attained from the Building Inspector. No building shall be occupied until a certificate of occupancy or change of use has been issued by the Building Inspector."

Unni Sunil Chandrasekharan Nandakumar Aparna

43 Appaloosa Dr, SHREWSBURY MA 01545

**Issued to****Address**

R-3

V-B

**Use & Occupancy (Chapter 3)****Occupant Load****Type of Construction (Chapter 6)****Auto. Sprinklers Required**

Rooftop PV Solar Installation

**Special Conditions**

John Laverty

04/20/2016

**Wiring Inspector****Inspection Date****Plumbing Inspector****Inspection Date****Fire Inspector****Inspection Date**

Chris Lund

05/09/2016

**Building Inspector****Inspection Date**

THIS PERMIT WILL NOT BE VALID, AND THE BUILDING SHALL NOT BE OCCUPIED UNTIL SIGNED BY THE BUILDING INSPECTOR UPON SATISFACTORY COMPLIANCE WITH TOWN REQUIREMENTS, COMPLIANCE WITH THE INTERNATIONAL RESIDENTIAL CODE 2009 AND INTERNATIONAL BASIC CODE 2009 WITH 780 CMR EIGHTH EDITION AMENDMENTS

May 9, 2016

**Date****Building Inspector**



The Commonwealth of Massachusetts



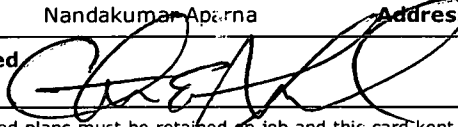
Town of Shrewsbury  
Building Department  
100 Maple Avenue  
Phone: 508-841-8512

**JOB WEATHER CARD**

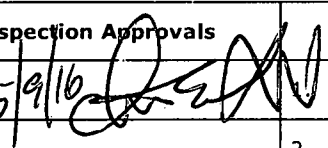
Amount Paid: \$340.00

Check #: 50972

Date Paid: 03/25/2016

<b>Date Issued:</b>	03/30/2016	<b>Permit #:</b>	R-16-00159	<b>Approval Comments:</b>
<b>Applicant:</b>	Jonathan Reese	<b>Address:</b>	247 Maple St, Unit 2 MARLBOROUGH MA 01752	
<b>Permit To:</b>	Other Rooftop Solar PV Installation			
<b>At Location:</b>	43 Appaloosa Dr - SHREWSBURY MA 01545	<b>Proposed Use:</b>		
<b>Owner:</b>	Unni Sunil Chandrasekharan Nandakumar Aparna	<b>Owner Address:</b>	43 Appaloosa Dr Shrewsbury MA 01545	
<b>Approved By:</b>				<b>Comments:</b>
<p>Approved plans must be retained on job and this card kept posted until final inspection has been made. Where a certificate of occupancy is required, such building shall not be occupied until final inspection has been made. Where applicable, separate permits are required for electrical, plumbing and mechanical installations.</p>				

**POST THIS CARD**

Building Inspection Approvals		Plumbing Inspection Approvals	Electrical Inspection Approvals
1. <i>FINAL PASS 5/9/16</i> 			1. <i>J. H. T. ok 4/20/16</i>
2.			2.
3.			3.
4.		Fire Inspection Approvals	Gas Inspection Approvals
5.		1.	1.
6.		2.	2.
7.		3.	3.
Planning Department	Conservation Department	Board of Health	
1.	1.	1.	
Assessors	Water Department		
1.	1.		

Work shall not proceed until the inspectors have approved the various stages of construction. Permit will become null and void if construction work is not started within six (6) months of the date the permit is issued as noted above. Inspections indicated on this card can be arranged for by telephone or by written notification.



March 23, 2016

Town of Shrewsbury Building Department

RE: Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA  
Structural Assessment of Roof Framing  
**MPP Project No: 16-0874**

Dear Sir or Madam:

Pursuant to your request, MPP Engineers has performed a limited structural evaluation of the roof framing at the above referenced site to determine if the roof has adequate capacity to support the proposed solar panels. Our analysis was based on the framing information and configurations provided by Brightstar Solar. It is our understanding that the structural components of the existing roof framing are in good condition. It is further understood that all existing connections between the various roof framing members, including ceiling joists, rafters, and collar ties, are adequate to resist the current loading conditions and behave in the manner that a typical rafter and ceiling tie system is intended to behave prior to installation of the solar panels.

### **Results**

Roofs A & B – adequate to support the proposed solar panels

### **Structural Data and Code Information**

Our analysis was performed in accordance with the requirements of the 780 CMR 51.00: Massachusetts Residential Code which has adopted the 2009 International Residential Code with Massachusetts amendments. Per Table R301.2 (1), the ground snow load to be used for each town is in accordance with Table R301.2 (5). Similarly, the wind speed for each town is in accordance with Table R301.2 (4). The roof framing was analyzed in accordance with Section R104.11 of the 2009 International Residential Code which allows for alternate approved design such as using the ASCE 7 code for determining actual snow loads on roofs (e.g. deriving flat or sloped roof snow loads from the specified ground snow load referenced in Table R301.2 (5)). Wood members are analyzed and designed in accordance with the NDS 2005.

The roof areas for the solar panels of this residence are framed with conventional 2x wood rafters in a gable configuration. The existing roof structure is in good condition and is assumed to have one layer of asphalt shingles. The pertinent data is listed below:

**MUST REMAIN WITH FIELD CARD  
REVIEWED FOR  
CODE COMPLIANCE**

MPP Engineers, LLC | 34 South Main Street, Suite D | Allentown, NJ 08501  
609-489-5511 (Phone) | 609-489-5916 (Fax)

Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA

Roofs A & B:

Roof Rafters:	2" x 12" (#2 Hem-Fir Assumed) – Roof A 2" x 10" (#2 Hem-Fir Assumed) – Roof B
Spacing:	16" O.C.
Roof Slope:	40 Degrees
Horizontal Projected Length of Rafter (Horizontal Projection):	13.50 feet max.
Ceiling Joists:	Present (Roof A only)
Collar Ties:	Present
Roof Sheathing:	Plywood Sheathing
Condition of Framing:	Good
Roof Covering:	Asphalt Shingles
Ground Snow Load, Pg:	50 PSF from Table R301.2 (5) of Massachusetts Residential Code
Importance Factor, I:	1.0
Exposure Factor, Ce:	1.0 (Conservatively taken as Partially Exposed)
Thermal Factor, Ct:	1.1 with Panels (Cold Roof) 1.0 existing condition (Warm Roof)
Design Snow Loads	
On sloped roof:	26.25 PSF (Existing – Unobstructed Warm Roof) 19.25 PSF (New Condition – Slippery Surface on Cold Roof)
Basic Wind Speed:	90 MPH from Table R301.2 (4) of Massachusetts Residential Code
Importance Factor:	1.0
Exposure:	B

Analysis Results:

**General Considerations**

- The proposed solar panels consist of solar panels which impose a total weight of approximately 2.5 to 3 pounds per square foot (PSF) on the roof surface. From a practical standpoint, the International Residential Code allows up to 2 roof coverings on a residential dwelling. Each layer of roofing imposes a net load of about 2.5 to 3.0 PSF on the roof. From this perspective, since the existing roof has only a single layer of shingles, a second layer is allowed to be added by the code without analysis. This 2<sup>nd</sup> layer of shingles essentially weighs the same as the proposed solar panels that will be added instead.
- Materials such as metal roofs or solar panels are considered slippery surfaces. Since the solar panels are mounted slightly above the roof line, it would be conservative to consider a thermal factor Ct of 1.1, treating the panel surface as a cold roof rather than as a warm roof. Based on the roof slope and considering it as a slippery surface, the snow load is reduced by 27% (7 PSF) compared with the snow load acting directly on the existing shingled roof surface. This reduction completely offsets the weight of the solar panels.

MUST REMAIN WITH FIELD CARD  
**REVIEWED FOR  
CODE COMPLIANCE**

Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA

**Gravity Loading:**

Roofs A & B – adequate to support the proposed solar panels

It is our understanding that the panels will be installed using Pro Solar Roof Trac Rail (or equal) with L-feet (or equal) at approximately 48 inches on center (e.g., every two to three rafters). The leveling feet will be fastened directly into the existing joists with 5/16" diameter lag screws with a minimum embedment of 3". In addition, it is important that the leveling feet support locations be staggered between adjacent panels so that no single rafter supports more load than under the existing conditions.

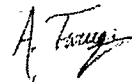
**Wind Loading:**

Based on our calculations, the net wind loads imposed on the roof framing with an attachment spacing as indicated above will be less than the current loading on the roof framing. In addition, provided that the leveling feet are attached to the roof framing members in a typical staggered fashion, the overall wind loading imposed on the structure and the individual framing members will not be impacted to any great extent.

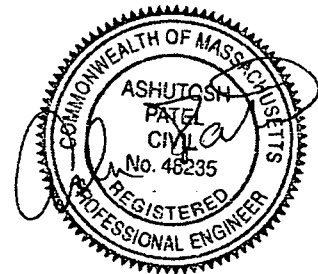
If you have any questions regarding this matter, please feel free to contact my office at 609-489-5511. We appreciate the opportunity to assist you with this evaluation.

Sincerely,

MPP Engineers, LLC



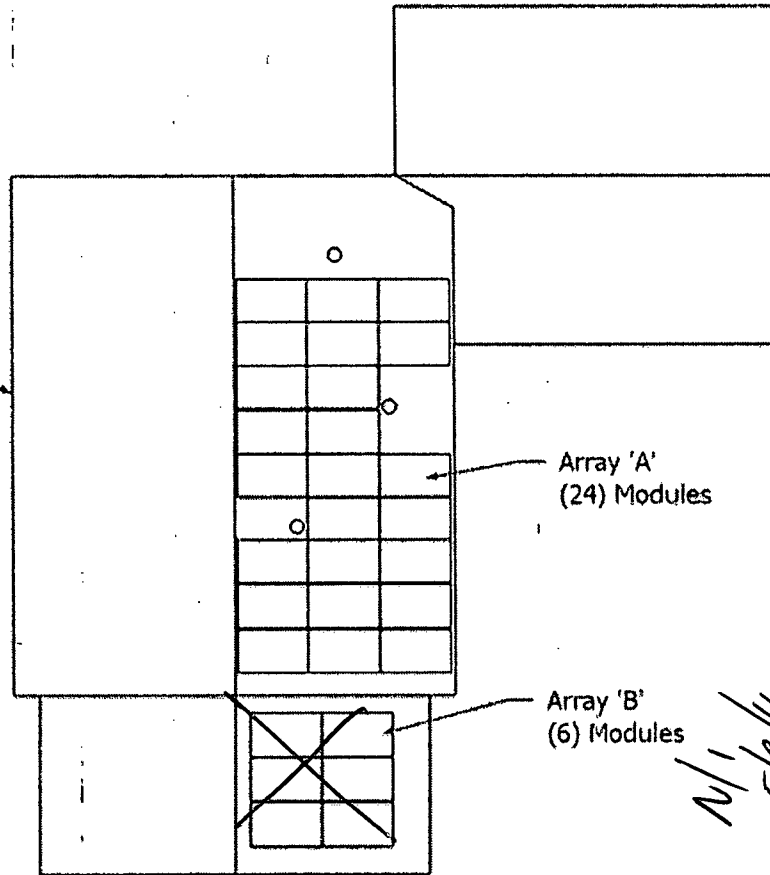
Asma Faruqi



Ashutosh Patel, P.E.  
MA Prof. Eng. Lic. No. 48235

**MUST REMAIN WITH FIELD CARD  
REVIEWED FOR  
CODE COMPLIANCE**

Front of Home  
(Street-Facing)



Array 'A'  
(24) Modules

Array 'B'  
(6) Modules

*N/1*  
*5/9/16*  
*CRJ*

MUST REMAIN WITH FIELD CARD  
**REVIEWED FOR  
CODE COMPLIANCE**



**BRIGHTSTAR**  
SOLAR

<b>CONTRACTOR:</b> <b>BRIGHTSTAR SOLAR</b> 257 Maple St. Unit 2 Marlborough, MA 01752	<b>Roof Plan for Rooftop PV System</b> <b>30 Modules, 9.0 kW (DC)</b>			
	Site Name: Uñni Residence Site Address: 43 Appaloosa Dr, Shrewsbury, MA			
Drawn By: Jon Reese	SCALE NTS	DATE 3/21/2016	DWG NO 001	REV



The Commonwealth of Massachusetts



Town of Shrewsbury  
Building Department  
100 Maple Avenue  
Phone: 508-841-8512

R-16-00159



Application Number:	Date Issued:	Permit Number:	Fees:	Payments:	Check#:	Date Paid:
16-00160	03/30/2016	R-16-00159	\$340.00	\$340.00	50972	03/25/2016

### Application to Construct, Repair, Renovate or Demolish a One or Two Family Dwelling

#### SECTION 1 - SITE INFORMATION

<b>1.1 Property Address:</b> 43 Appaloosa Dr - SHREWSBURY MA 01545		<b>1.2 Assessors Map &amp; Parcel Number:</b> 49 015000	
<b>1.1a Is this an accepted street?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>1.3 Zoning Information:</b> Zoning District - RUR Proposed Use -		<b>1.4 Property Dimensions:</b> Lot Area - 29185.2 sqft. Frontage - ft.	
<b>1.5 Building Setbacks (ft)</b>			
Front Yard		Side Yards	
Required	Provided	Required	Provided
		/	/
<b>1.6 Water Supply (M.G.L. s 54):</b> Public <input type="checkbox"/> Private <input type="checkbox"/>		<b>1.7 Flood Zone Information:</b> Zone: outside flood zone <input type="checkbox"/>	
<b>1.8 Sewage Disposal System:</b> Municipal <input type="checkbox"/> On Site Disposal System <input type="checkbox"/>			

#### SECTION 2 - PROPERTY OWNERSHIP<sup>1</sup>

<b>2.1 Owner of Record:</b> Unni Sunil Chandrasekharan Nandakumar Aparna Name		43 Appaloosa Dr Shrewsbury MA 01545 Address for Service (508) 745-3571 Owner Phone
Signature		

#### SECTION 3 - DESCRIPTION OF PROPOSED WORK<sup>2</sup> (check only one)

<input type="checkbox"/> New Single Family	<input type="checkbox"/> New Two Family	<input type="checkbox"/> New Apartment/Condo	<input type="checkbox"/> Additions/Alterations/Repair	<input type="checkbox"/> Garage
<input type="checkbox"/> Siding/Window/Roof	<input type="checkbox"/> Demolition	<input type="checkbox"/> Pool (above ground)	<input type="checkbox"/> Pool (in ground)	<input checked="" type="checkbox"/> Other (Shed, Deck, Stove, Tent)
Brief Description of Proposed Work <sup>2</sup> : Rooftop Solar PV Installation				

#### SECTION 4 - ESTIMATED CONSTRUCTION VALUES

Item	Estimated Value(Dollars) To be completed by permit applicant	Official Use Only	
1. Building	\$31,770.00	(a) Building Permit Fee Multiplier	\$10.00 per \$1,000.00
2. Electrical	\$2,000.00	(b) Estimated Total Value of Construction from (6)	\$33,770.00
3. Plumbing	\$0.00	<b>Building Permit Fee</b> (a) x (b) (Minimum \$25.00)	<b>\$ 340.00</b>
4. Mechanical (HVAC)	\$0.00		
5. Fire Protection	\$0.00		
6. Total (1 + 2 + 3 + 4 + 5)	\$33,770.00		

**SECTION 5 - CONSTRUCTION SERVICES****5.1 Licensed Construction Supervisor (CSL):** ☐ Not Applicable

Jonathan Reese

CSFA-105995

02/07/2018

Name of CSL Holder

License Number

Expiration Date

257 Maple St, Unit 2, Marlborough, MA 01752

Address

(617)-564-0050

Phone

Signature

Select CSL Type Below:

<input type="checkbox"/> U	Unrestricted (up to 35,000 Cu. Ft.)
<input type="checkbox"/> R	Restricted 1 & 2 Family Dwelling
<input type="checkbox"/> M,	Masonry Only
<input type="checkbox"/> RC	Residential Roofing Covering
<input type="checkbox"/> WS	Residential Windows and Siding
<input type="checkbox"/> SF	Residential Solid Fuel Burning Appliance Installation
<input type="checkbox"/> D	Residential demolition

**5.2 Registered Home Improvement Contractor:** ☐ Not Applicable

Brightstar Solar, LLC

166783

Company Name

Registration Number

257 Maple St, Unit 2, Marlborough, MA 01752

Address

07/02/2016

Expiration Date

(617)-564-0050

Phone

Signature

**SECTION 6 - WORKERS' COMPENSATION INSURANCE AFFIDAVIT (M.G.L. c.152, s 25C(6))**

Workers' Compensation Insurance Affidavit must be completed and submitted with this application. Failure to provide this affidavit will result in the denial of the issuance of the building permit.

Signed Affidavit Attached ☐ Yes ☒ No**SECTION 7a-OWNER AUTHORIZATION (TO BE COMPLETED WHEN OWNER'S AGENT OR CONTRACTOR APPLIES FOR BUILDING PERMIT)**I, Unni Sunil Chandrasekharan, as Owner of the subject property hereby authorize Jonathan Reese to act on my behalf, in matters relating to work authorized by this building permit application.

Signature of Owner

Date

**SECTION 7b - OWNER/AUTHORIZED AGENT DECLARATION**I, Jonathan Reese, as Owner/Authorized Agent declare that the statements and information on the foregoing application are true and accurate, to the best of my knowledge and abilities.

Signed under the pains and penalties of perjury.

Signature of Owner/Agent

Date

**NOTES:**

1. An owner who obtains a building permit to do his/her own work, or an owner who hires an unregistered contractor (not in the Home Improvement Contractor (HIC) Program), will **not** have access to the arbitration program or guaranty fund under M.G.L. c. 142A. Other important information on the HIC Program and Construction Supervisor Licensing (CSL) can be found in 780 CMR Regulations 110.R6 and 110.R5, respectively.

2. When substantial work is planned, provide the information below:

Total floor area (Sq. Ft.): (including garage, finished basement/attics, decks or porches)	
Gross living area (Sq. Ft.):	Habitable room count:
Number of fireplaces:	Number of bedrooms:
Number of bathrooms:	Number of half/bath:
Type of heating system:	Number of decks/porches:
Type of cooling system:	Enclosed: Open:

3. "Total Project Square Footage" may be substituted for "Total Project Value"



**COMMENTS:****SIGNATURES:**

<b>Electrical Review</b>	<u>John Lavery</u>	<b>Date:</b> <u>01/25/2016</u>
<b>Conservation Review</b>	<u>Brad Stone</u>	<b>Date:</b> <u>01/27/2016</u>
<b>Engineering Review</b>	<u>Mathieu Sarcione</u>	<b>Date:</b> <u>01/26/2016</u>
<b>Building Code Review</b>	<u>Chris Lund</u>	<b>Date:</b> <u>03/30/2016</u>
<b>Assessor Review</b>	<u>Mary Lowell</u>	<b>Date:</b> <u>01/25/2016</u>





The Commonwealth of Massachusetts



Town of Shrewsbury  
Building Department  
100 Maple Avenue  
Phone: 508-841-8512

43  
Appaloosa Dr

Application Number:	Date Issued:	Permit Number:	Fees:	Payments:	Check#:	Date Paid:
16-00160			\$340.00	\$ 720	58972	3/25/16

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Name		Address for Service	
Signature		(508) 745-3571	
		Owner Phone	

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Jonathan Reese

CSFA-105995

02/07/2018

Name of CSL Holder

License Number

Expiration Date

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Registration Number

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Expiration Date

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Phone

Signature

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Workers' Compensation Insurance Affidavit must be completed and submitted with this application. Failure to provide this affidavit will result in the denial of the issuance of the building permit.

Signed Affidavit Attached ☐ Yes ☒ No**SECTION 7a-OWNER AUTHORIZATION (TO BE COMPLETED WHEN OWNER'S AGENT OR CONTRACTOR APPLIES FOR BUILDING PERMIT)**

I, Unni Sunil Chandrasekharan, as Owner of the subject property hereby authorize Jonathan Reese to act on my behalf, in matters relating to work authorized by this building permit application.

Signature of Owner

Date

1/25/2016

**SECTION 7b - OWNER/AUTHORIZED AGENT DECLARATION**

I, Jonathan Reese, as Owner/Authorized Agent declare that the statements and information on the foregoing application are true and accurate, to the best of my knowledge and abilities.

Signed under the pains and penalties of perjury.

Signature of Owner/Agent

Date

3/28/16

**NOTES:**

1. An owner who obtains a building permit to do his/her own work, or an owner who hires an unregistered contractor (not in the Home Improvement Contractor (HIC) Program), will not have access to the arbitration program or guaranty fund under M.G.L. c. 142A. Other important information on the HIC Program and Construction Supervisor Licensing (CSL) can be found in 780 CMR Regulations 110.R6 and 110.R5, respectively.

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Total floor area (Sq. Ft.): (including garage, finished basement/attics, decks or porches)

Gross living area (Sq. Ft.):

Number of fireplaces:

Number of bathrooms:

Type of heating system:

Type of cooling system:

Habitable room count:

Number of bedrooms:

Number of half/bath:

Number of decks/porches:

Enclosed: Open:

3. "Total Project Square Footage" may be substituted for "Total Project Value"

**COMMENTS:****SIGNATURES:****Fire Review**

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**Date:**

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**Electrical Review**

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**Date:**

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**Conservation Review**

---

**Date:**

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**Engineering Review**

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**Date:**

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**Building Code Review**

---

**Date:**

---

**Assessor Review**

---

**Date:**

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**Town of Shrewsbury**  
100 Maple Avenue  
Shrewsbury, MA 01545  
<http://www.shrewsbury-ma.gov>

Welcome Back  
Need Help?

Click Here to submit a comment  
or report a problem.



### Workers' Compensation Insurance Affidavit: Builders/Contractors/Electricians/Plumbers

#### Applicant Information

**Name (Business/Organization/Individual):** Jonathan Reese

**Address:**

247 Maple St, Unit 2  
MARLBOROUGH MA 01752

**Phone:**

(617)-564-0050

#### Are you an employer? Check the appropriate box.

1. ☒ I am an employer with 2 employees (full and/or part-time).\*
2. ☐ I am a sole proprietor or partnership and have no employees working for me in any capacity. [No workers' comp. insurance required.]
3. ☐ I am a homeowner doing all work myself [No worker's comp. insurance required.]\*\*

4. ☐ I am a general contractor and I have hired the sub-contractors listed on the attached sheet. These sub-contractors have employees and have worker's comp. insurance.\*\*\*
5. ☐ We are a corporation and its officers have exercised their right of exemption per MGL c. 152 s 1(4), and we have no employees. [No worker's comp. insurance required.]

#### Type of project (required)

6. ☐ New Construction
7. ☐ Remodeling
8. ☐ Demolition
9. ☐ Building Addition
10. ☐ Electrical repairs of additions
11. ☐ Plumbing repairs of additions
12. ☐ Roof Repairs
13. ☒ Other - Rooftop Solar PV

\* Any applicant that checks box #1 must also fill out the section below showing their workers' compensation policy information.

\*\* Homeowners who submit this affidavit indicating they are doing all work and then hire outside contractors must submit a new affidavit indicating such.

\*\*\* Contractors that check this box must attach an additional sheet showing the name of the sub-contractors and state whether or not those entities have employees. If the sub-contractors have employees, they must provide their worker's comp. policy number.

#### I am an employer that is providing workers' compensation insurance for my employees. Below is the policy and job site information.

**Insurance Company Name:**

Hartford Casualty Ins Co

**Policy # or Self-ins Lic. #:**

84 WEC BL5407

**Job Site Address:**

43 Appaloosa Dr -  
SHREWSBURY MA  
01545

**Expiration Date:**

06/01/2016

**City/State/Zip:**

Shrewsbury, MA 01545

I do hereby certify under the pains and penalties of perjury that the information provided above is true and correct.

Signature

Date 3/24/2016

#### Official use only. Do not write in this area, to be completed by city or town official.

**City or Town:** Town of Shrewsbury

**Permit/License #:**

**Issuing Authority:** Building Department

**Contact Person:** Patricia Sheehan

**Phone #:** 508-841-8512

#### Information and Instructions

Massachusetts General Laws chapter 152 requires all employers to provide workers' compensation for their employees. Pursuant to this statute, an employee is defined as "...every person in the service of another under any contract of hire, express or implied, oral or written."

An employer is defined as "an individual, partnership, association, corporation or other legal entity, or any two or more of the foregoing engaged in a joint enterprise, and including the legal representatives of a deceased employer, or the receiver or trustee of an individual, partnership, association or other legal entity, employing employees. However the owner of a dwelling house having not more than three apartments and who resides therein, or the occupant of the dwelling house of another who employs persons to do maintenance, construction or repair work on such dwelling house or on the grounds or building appurtenant thereto shall not because of such employment be deemed to be an employer."

MGL chapter 152.S25C(6) also states that "every state or local licensing agency shall withhold the issuance or renewal of a license or permit to operate a business or to construct buildings in the Commonwealth for any applicant who has not produced acceptable evidence of compliance with the insurance coverage required." Additionally, MGL chapter 152S25C(7) states. "Neither the Commonwealth nor any of its political subdivision shall enter into any contract for the performance of public work until acceptable evidence of compliance with the insurance requirements of this chapter have been presented to the contracting authority."

#### Applicants

Please fill out the workers' compensation affidavit completely, by checking the boxes that apply to your situation and, if necessary, supply sub-contractor(s) name(s), address(es) and phone number(s) along with their certificate(s) of insurance. Limited Liability Companies (LLC) or Limited Liability Partnerships (LLP) with no employees other than the members or partners, are not required to carry workers' compensation insurance. If an LLC or LLP does have employees, a policy is required. Be advised that this affidavit may be submitted to the Department of Industrial Accidents for confirmation of insurance coverage. **Also be sure to sign and date the affidavit.** The affidavit should be returned to the city or town that the application for the permit or license is being requested, **not** the Department of Industrial Accidents. Should you have any questions regarding the law

or if you are requested to obtain a workers' compensation policy, please call the Department at the number listed below. Self-Insured companies should enter their self-insurance license number on the appropriate line.

---

#### City or Town Officials

Please be sure that the affidavit is complete and printed legibly. The Department has provided a space at the bottom of the affidavit for you to fill out in the event the Office of Investigations has to contact you regarding the applicant. Please be sure to fill in the permit/license number which will be used as a reference number. In addition, an applicant that must submit multiple permit/license applications in any given year, need only submit one affidavit indicating current policy information (if necessary) and under "Job Site Address" the applicant should write "all locations in Town of Shrewsbury." A copy of the affidavit that has been officially stamped or marked by the city or town may be provided to the applicant as proof that a valid affidavit is on file for future permits or licenses. A new affidavit must be filled out each year. Where a homeowner or citizen is obtaining a license or permit not related to any business or commercial venture (i.e. A dog license or permit to burn leaves etc.) said person is NOT required to complete this affidavit.

The Office of Investigations would like to thank you in advance for your cooperation and should you have any questions, please do not hesitate to give us a call.

---

The Department address, telephone and fax number are as follows:

Commonwealth of Massachusetts  
Department of Industrial Accidents  
Office of Investigations  
600 Washington Street  
Boston, MA 02111  
Tel. #617-727-4900 ext. 406 or 1-877-MASSAFE  
FAX: #617-727-7749  
[www.mass.gov/dia](http://www.mass.gov/dia)

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# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
**6/1/2015**

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

<b>PRODUCER</b> <b>ASSET ONE INSURANCE SERVICES</b> <b>575 Anton Blvd 3rd Fl</b> <b>Costa Mesa, CA 92626</b> <b>0E66207</b>		<b>CONTACT NAME:</b> <b>PHONE (A/C, No. Ext): (714) 625-8204</b> <b>FAX (A/C, No): (714) 625-8290</b> <b>E-MAIL: aagopian@gmail.com</b> <b>ADDRESS:</b>		
<b>INSURED</b> <b>Bright Star Solar, LLC.</b>  <b>257 Maple St, Unit 2</b> <b>Marlborough, MA 01752</b>		<b>INSURER(S) AFFORDING COVERAGE</b>		<b>NAIC #</b>
		<b>INSURER A: Preferred Contractors Insurance Co.</b>		
		<b>INSURER B: Progressive Insurance Co.</b>		
		<b>INSURER C: Hartford Casualty Insurance Company</b>		
		<b>INSURER D:</b>		
		<b>INSURER E:</b>		
<b>INSURER F:</b>				

**COVERAGES****CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
<b>A</b>	<b>GENERAL LIABILITY</b> <input checked="" type="checkbox"/> <b>COMMERCIAL GENERAL LIABILITY</b> <input type="checkbox"/> <b>CLAIMS-MADE</b> <input checked="" type="checkbox"/> <b>OCCUR</b>	<b>Y</b>		<b>PCIC5009-PCA87998-04</b>	<b>6/1/15</b>	<b>6/1/16</b>	<b>EACH OCCURRENCE</b> \$ <b>1,000,000</b>
	<b>DAMAGE TO RENTED PREMISES (Ea occurrence)</b> \$ <b>100,000</b>						
	<b>MED EXP (Any one person)</b> \$ <b>5,000</b>						
	<b>PERSONAL &amp; ADV INJURY</b> \$ <b>1,000,000</b>						
	<b>GENERAL AGGREGATE</b> \$ <b>2,000,000</b>						<b>PRODUCTS - COMPI/OP AGG</b> \$ <b>2,000,000</b>
	<b>GEN'L AGGREGATE LIMIT APPLIES PER:</b> <input checked="" type="checkbox"/> <b>POLICY</b> <input type="checkbox"/> <b>PROJECT</b> <input type="checkbox"/> <b>LOC</b>						\$
<b>B</b>	<b>AUTOMOBILE LIABILITY</b> <input type="checkbox"/> <b>ANY AUTO ALLOWED AUTOS</b> <input checked="" type="checkbox"/> <b>SCHEDULED AUTOS</b> <input checked="" type="checkbox"/> <b>HIRED AUTOS</b> <input checked="" type="checkbox"/> <b>NON-OWNED AUTOS</b>	<b>Y</b>		<b>04732516-0</b>	<b>6/1/15</b>	<b>6/1/16</b>	<b>COMBINED SINGLE LIMIT (Ea accident)</b> \$ <b>1,000,000</b>
	<b>BODILY INJURY (Per person)</b> \$						
	<b>BODILY INJURY (Per accident)</b> \$						
	<b>PROPERTY DAMAGE (Per accident)</b> \$						
	<b>UMBRELLA LIAB</b> <input type="checkbox"/> <b>OCCUR</b> <b>EXCESS LIAB</b> <input type="checkbox"/> <b>CLAIMS-MADE</b>						<b>EACH OCCURRENCE</b> \$
	<b>DED</b> <input type="checkbox"/> <b>RETENTION \$</b>						<b>AGGREGATE</b> \$
<b>C</b>	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> <b>Y/N</b> <input type="checkbox"/> <b>N/A</b> <b>ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)</b> If yes, describe under DESCRIPTION OF OPERATIONS below	<b>N/A</b>		<b>84 WEC BL5407</b>	<b>6/1/15</b>	<b>6/1/16</b>	<input checked="" type="checkbox"/> <b>WC STATUTORY LIMITS</b> <input type="checkbox"/> <b>OTHER</b>
	<b>E.L. EACH ACCIDENT</b> \$ <b>500,000</b>						
	<b>E.L. DISEASE - EA EMPLOYEE</b> \$ <b>500,000</b>						
	<b>E.L. DISEASE - POLICY LIMIT</b> \$ <b>500,000</b>						

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

**CERTIFICATE HOLDER****CANCELLATION**


SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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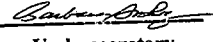



*The Commonwealth of Massachusetts*  
Office of Consumer Affairs & Business Regulation

 **HOME IMPROVEMENT CONTRACTOR**  
Registration: 166783  
Expiration: 7/2/2016 ✓ Type: LLC

**BRIGHTSTAR SOLAR, LLC**


JONATHAN REESE  
97 STRATHMORE RD #8  
BRIGHTON, MA 02135


  
Undersecretary

 **Massachusetts Department of Public Safety**  
**Board of Building Regulations and Standards**

License: **CSFA-105995**  
Construction Supervisor 1 & 2  
Family

**JONATHAN REESE**  
**257 MAPLE STREET**  
**UNIT 2**  
**MARLBOROUGH MA 01752**



  
Commissioner

Expiration: 02/07/2018 ✓



March 23, 2016

Town of Shrewsbury Building Department

RE: Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA  
Structural Assessment of Roof Framing  
**MPP Project No: 16-0874**

Dear Sir or Madam:

Pursuant to your request, MPP Engineers has performed a limited structural evaluation of the roof framing at the above referenced site to determine if the roof has adequate capacity to support the proposed solar panels. Our analysis was based on the framing information and configurations provided by Brightstar Solar. It is our understanding that the structural components of the existing roof framing are in good condition. It is further understood that all existing connections between the various roof framing members, including ceiling joists, rafters, and collar ties, are adequate to resist the current loading conditions and behave in the manner that a typical rafter and ceiling tie system is intended to behave prior to installation of the solar panels.

### **Results**

Roofs A & B – adequate to support the proposed solar panels

### **Structural Data and Code Information**

Our analysis was performed in accordance with the requirements of the 780 CMR 51.00: Massachusetts Residential Code which has adopted the 2009 International Residential Code with Massachusetts amendments. Per Table R301.2 (1), the ground snow load to be used for each town is in accordance with Table R301.2 (5). Similarly, the wind speed for each town is in accordance with Table R301.2 (4). The roof framing was analyzed in accordance with Section R104.11 of the 2009 International Residential Code which allows for alternate approved design such as using the ASCE 7 code for determining actual snow loads on roofs (e.g. deriving flat or sloped roof snow loads from the specified ground snow load referenced in Table R301.2 (5)). Wood members are analyzed and designed in accordance with the NDS 2005.

The roof areas for the solar panels of this residence are framed with conventional 2x wood rafters in a gable configuration. The existing roof structure is in good condition and is assumed to have one layer of asphalt shingles. The pertinent data is listed below:

Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA

Roofs A & B:

<b>Roof Rafters:</b>	2" x 12" (#2 Hem-Fir Assumed) – Roof A 2" x 10" (#2 Hem-Fir Assumed) – Roof B
<b>Spacing:</b>	16" O.C.
<b>Roof Slope:</b>	40 Degrees
<b>Horizontal Projected Length of Rafter (Horizontal Projection):</b>	13.50 feet max.
<b>Ceiling Joists:</b>	Present (Roof A only)
<b>Collar Ties:</b>	Present
<b>Roof Sheathing:</b>	Plywood Sheathing
<b>Condition of Framing:</b>	Good
<b>Roof Covering:</b>	Asphalt Shingles
<b>Ground Snow Load, Pg:</b>	50 PSF from Table R301.2 (5) of Massachusetts Residential Code
<b>Importance Factor, I:</b>	1.0
<b>Exposure Factor, Ce:</b>	1.0 (Conservatively taken as Partially Exposed)
<b>Thermal Factor, Ct:</b>	1.1 with Panels (Cold Roof) 1.0 existing condition (Warm Roof)
<b>Design Snow Loads</b>	
<b>On sloped roof:</b>	26.25 PSF (Existing – Unobstructed Warm Roof) 19.25 PSF (New Condition – Slippery Surface on Cold Roof)
<b>Basic Wind Speed:</b>	90 MPH from Table R301.2 (4) of Massachusetts Residential Code
<b>Importance Factor:</b>	1.0
<b>Exposure:</b>	B

Analysis Results:

**General Considerations**

- The proposed solar panels consist of solar panels which impose a total weight of approximately 2.5 to 3 pounds per square foot (PSF) on the roof surface. From a practical standpoint, the International Residential Code allows up to 2 roof coverings on a residential dwelling. Each layer of roofing imposes a net load of about 2.5 to 3.0 PSF on the roof. From this perspective, since the existing roof has only a single layer of shingles, a second layer is allowed to be added by the code without analysis. This 2<sup>nd</sup> layer of shingles essentially weighs the same as the proposed solar panels that will be added instead.
- Materials such as metal roofs or solar panels are considered slippery surfaces. Since the solar panels are mounted slightly above the roof line, it would be conservative to consider a thermal factor Ct of 1.1, treating the panel surface as a cold roof rather than as a warm roof. Based on the roof slope and considering it as a slippery surface, the snow load is reduced by 27% (7 PSF) compared with the snow load acting directly on the existing shingled roof surface. This reduction completely offsets the weight of the solar panels.

Residence Solar Installation  
43 Appaloosa Drive  
Shrewsbury, MA

**Gravity Loading:**

Roofs A & B – adequate to support the proposed solar panels

It is our understanding that the panels will be installed using Pro Solar Roof Trac Rail (or equal) with L-feet (or equal) at approximately 48 inches on center (e.g., every two to three rafters). The leveling feet will be fastened directly into the existing joists with 5/16" diameter lag screws with a minimum embedment of 3". In addition, it is important that the leveling feet support locations be staggered between adjacent panels so that no single rafter supports more load than under the existing conditions.

**Wind Loading:**

Based on our calculations, the net wind loads imposed on the roof framing with an attachment spacing as indicated above will be less than the current loading on the roof framing. In addition, provided that the leveling feet are attached to the roof framing members in a typical staggered fashion, the overall wind loading imposed on the structure and the individual framing members will not be impacted to any great extent.

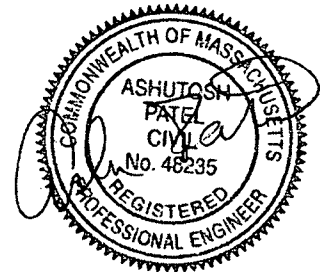
If you have any questions regarding this matter, please feel free to contact my office at 609-489-5511. We appreciate the opportunity to assist you with this evaluation.

Sincerely,

MPP Engineers, LLC



Asma Faruqi



Ashutosh Patel, P.E.  
MA Prof. Eng. Lic. No. 48235



**SCHEDULE OF ROOF-MOUNTED MATERIALS**  
 JOB: 43 APPALOOSA DR, SHREWSBURY, MA

March 21, 2016

**CALCULATION OF SYSTEM AREA:**

**ARRAY 'A'**

MODULE WIDTH (inches)	39.37
MODULE LENGTH (inches)	64.57
AREA PER MODULE (square feet)	17.65
QUANTITY OF MODULES	24
TOTAL MODULE AREA (square feet)	423.69
INTER-ROW SPACING (inches)	0.60
ROW LENGTH (inches)	359.13
NUMBER OF SPACES BETWEEN ROWS	2
TOTAL AREA BETWEEN ROWS (square feet)	2.99
INTER-COLUMN SPACING (inches)	0.60
COLUMN LENGTH (inches)	193.71
NUMBER OF SPACES BETWEEN COLUMNS	7
TOTAL AREA BETWEEN COLUMNS (square feet)	5.65
TOTAL MODULE AREA (square feet)	423.69
TOTAL AREA BETWEEN ROWS (square feet)	2.99
TOTAL AREA BETWEEN COLUMNS (square feet)	5.65
TOTAL ARRAY AREA (square feet)	432.33

**CALCULATION OF SYSTEM WEIGHT:**

	WEIGHT (lbs.)	QUANTITY	WEIGHT (lbs.)
LG300 NEON SOLAR MODULE	37.5	24	900
PRO SOLAR ROOF TRAC RAILS	16.0	12.0	192
TOTAL WEIGHT (lbs.)			1,092

TOTAL ARRAY AREA (square feet)	432.33
SYSTEM WEIGHT (lbs.)/SQUARE FOOT	2.52

NUMBER OF ATTACHMENT POINTS	48
SYSTEM WEIGHT (lbs.)/ATTACHMENT POINT	22.74

RAFTER SIZE	2X12
RAFTER SPACING	16"
ROOF PITCH	10/12 (40')
HORIZONTAL SPAN	13'6"
ROOF TYPE	A-FRAME
RIDGE BEAM	N/A
COLLAR TIES	1/2 RAFTER PAIRS

**ARRAY 'B'**

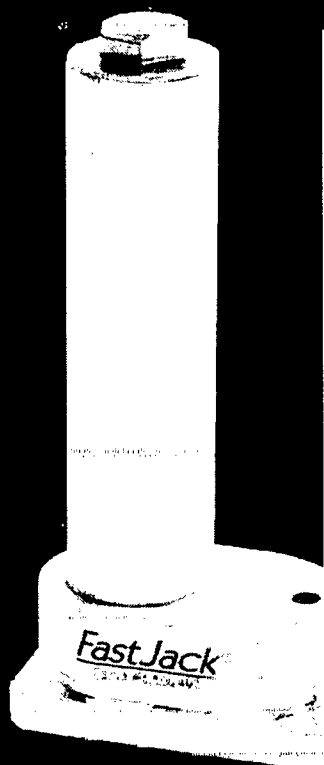
39.37
64.57
17.65
6
105.92
0.60
119.31
1
0.50
0.60
129.14
2
1.08
105.92
0.50
1.08
107.49

WEIGHT (lbs.)	QUANTITY	WEIGHT (lbs.)
37.5	6	225
16.0	3.0	48
		273

107.49
2.54

12
22.74

2X10
16"
10/12 (40')
12'6"
PARTIAL CATHEDRAL
(2) 2x14 LVL, 16'0" SPAN
10' LENGTH, ALL RAFTER PAIRS



Serrated base grips the roof deck to prevent the base from moving while installing the lag bolt

# FastJack®

Patent #6,360,491

Laboratory Tested  
**2,359 lbs**  
Vertical Pullout!  
**808 lbs**  
Side Axial Pullout!

## Flashable Roof Stanchion

The patented design of the FastJack® can be easily expressed as the most innovative, efficient and cost-effective tool of it's kind!

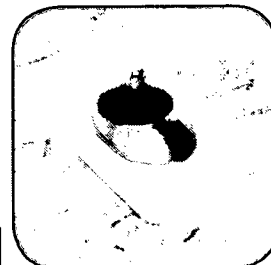
Between the precision CNC machined base and stanchion along with strict engineering and material standards, the FastJack® has been laboratory tested to provide 2,359 pounds of strength using only a single lag bolt (included)!

### Four Sizes Available!

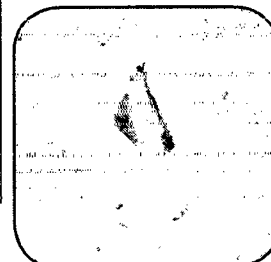
3" High	Part# FJ-300-18
For low profile installations using Oatey® flashings (for composition shingle roof tops)	
4-1/2" High	Part# FJ-450-18
For installations using standard flashings (for composition & flat rooftops)	
6" High	Part# FJ-600-18
For standard flashings (for flat tile rooftops)	
7-1/2" High	Part# FJ-750-18
For standard flashings (sized for S-curve tile roofs and/or double flashed installations)	

The Fast Jack® design is covered under Pat. #6,360,491  
Using 1ea. 5/16" x 3-1/2" Lag Bolt

FastJack® FJ-300-18  
For Oatey® style flashings



FastJack® FJ-450-18  
For standard height flashings



### USED FOR MOUNTING:

- Photovoltaic Solar Panels
- Solar Thermal Panels
- Communication Equipment
- Virtually anything needing structural attachment to a roof!

professional  
**SOLAR**  
products inc.

**(805) 486-4700**

(805) 486-4799-fax  
1551 S. Rose Ave.  
Oxnard, CA 93033

View more info on our  
website at:

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

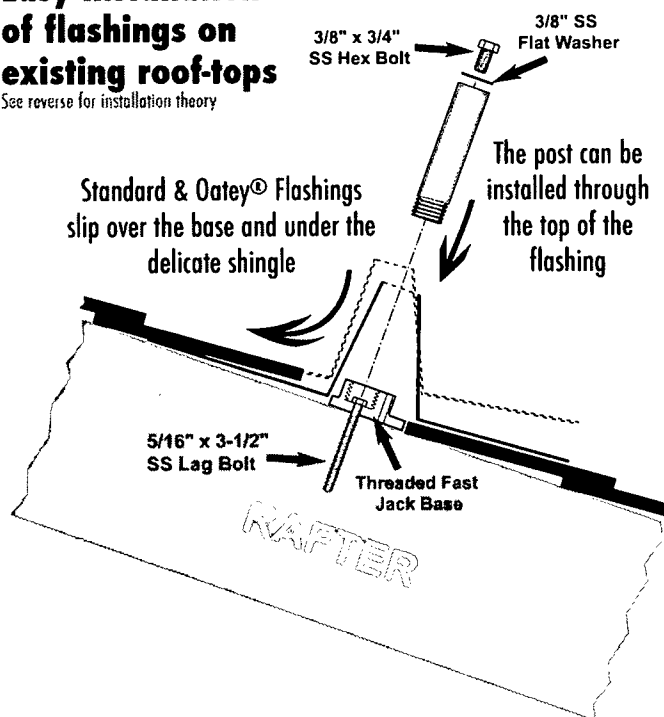
Commercial FastJack® also available (rated at 4,250 lbs.)

### Benefits of the FastJack®

- Removable post makes installation on existing roofs/retrofit quick and easy (refer to the illustration to the right)
- Patented design locates the lag bolt directly under the stanchion providing superior strength values
- Fast & easy to install - saves time and labor costs
- Precision machined from extruded aluminum, there are no welds to corrode or break
- Significantly lighter than steel for installer convenience and reduced shipping costs.
- Integrated drill guide insures perfect pilot holes every time - minimizes the possibility of splitting roof rafters
- Base design allows virtually any roof flashing to install flat on the roof deck

### Easy installation of flashings on existing roof-tops

See reverse for installation theory



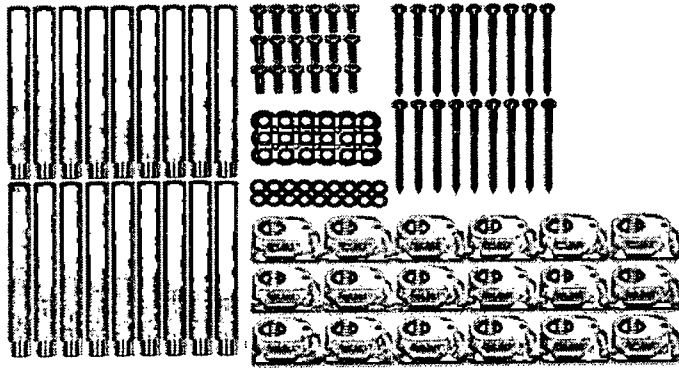
Email us for  
more information

[prosolar@prosolar.com](mailto:prosolar@prosolar.com)

# FastJack®

Patent # 6,360,497

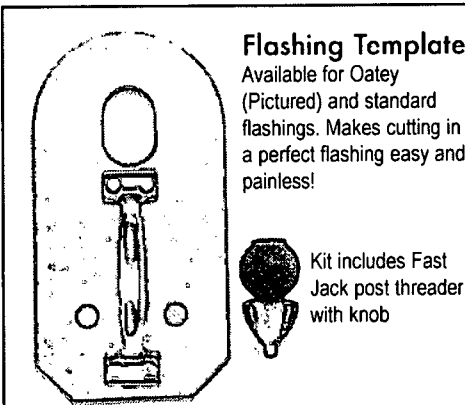
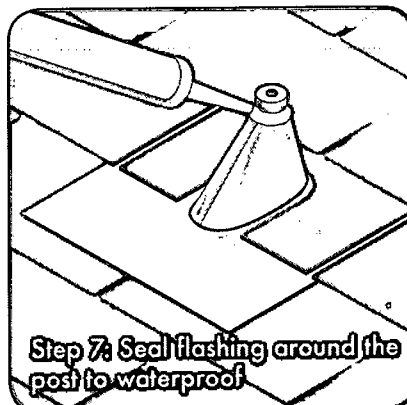
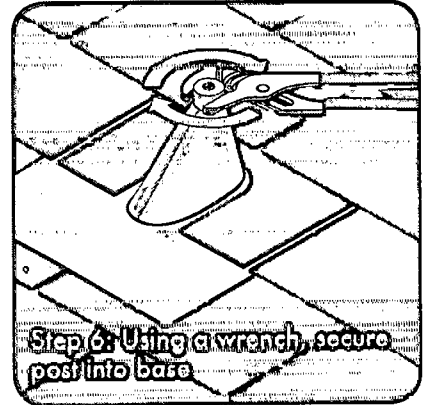
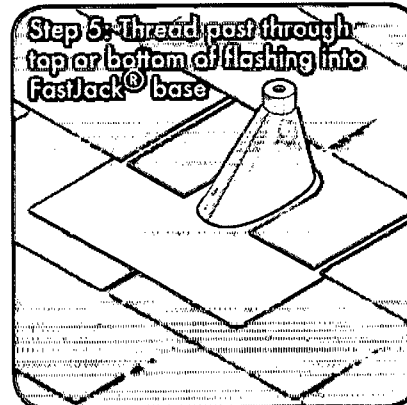
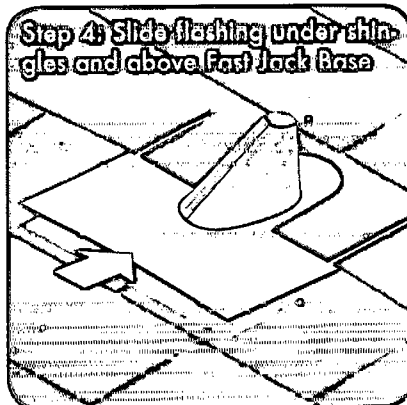
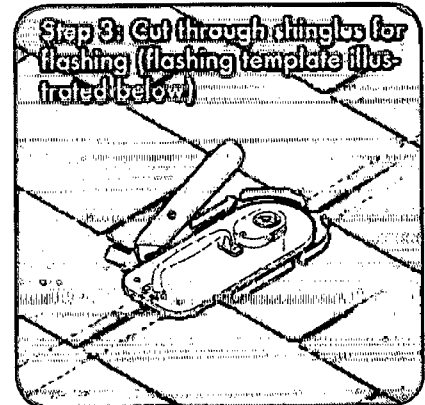
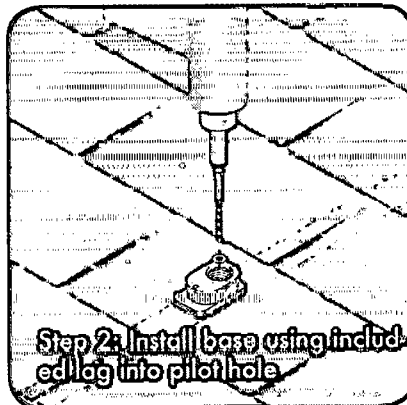
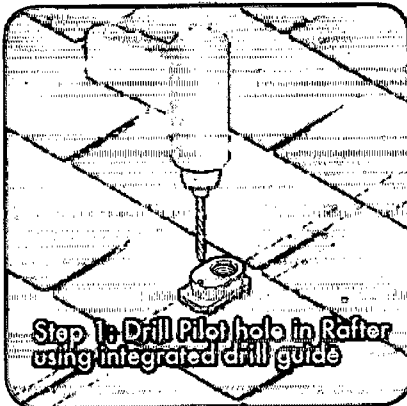
Bulk packaging means easier stocking abilities, less packaging waste and quicker, more convenient installation. Everything in the photo below is shipped in a recloseable box for storage of extra parts.



The Fast Jack® is available in four convenient sizes. All sizes are packaged in quantities of 18 per box:

- 18 - 1" Round Posts (3", 4-1/2", 6" or 7-1/2" tall)
- 18 - Threaded bases
- 18 - 3/8" x 3/4" SS Hex Bolts
- 18 - 3/8" SS Flat washers
- 18 - 5/16" x 3" SS Lag bolts
- 18 - 5/16" SS Flat Washers

## Easy Installation:



Kit includes Fast Jack post threader with knob



# RoofTrac®

Patent #6,360,491

The Original "Top-Down" PV Mounting System.



Intertek  
4007217

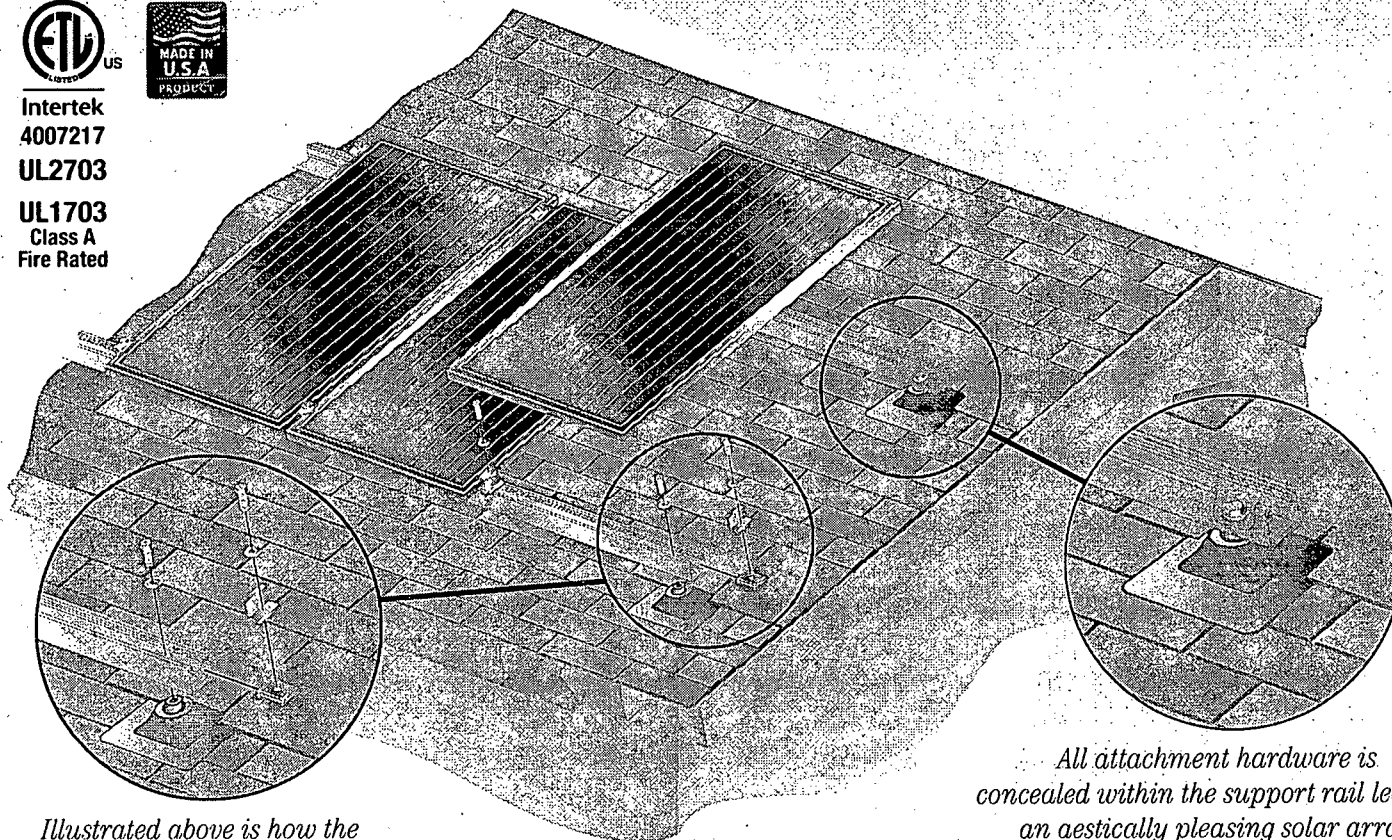
UL2703

UL1703  
Class A  
Fire Rated



## Integrated with FastJack® attachments

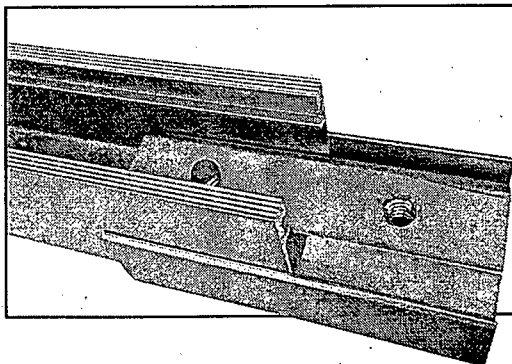
The patented RoofTrac® rail/clamp system installed with the FastJack® attachment method provides an ideal solution for installations where a flashing is desired. The FastJack® is also the solar industries preferred method of attachment for new construction roofs.



Illustrated above is how the FastJack® attachment seamlessly integrates with the RoofTrac® mounting system.

### FastJack® Installation (TileTrac® on back)

All attachment hardware is concealed within the support rail leaving an aestically pleasing solar array

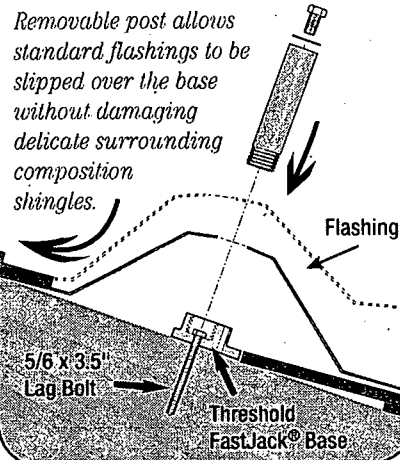


### Splice Self-Bonding Connection

The splice kit provides a solution to rigidly lock multiple rail sets together and bond the rails to one another.

### FastJack® Connection

The FastJack® attachment provides a quick and strong installation solution. Patented design places the bolt directly under the stanchion post where the most support is offered. This feature allows standard roof flashings to lay flat on the roof deck.



professional  
**SOLAR**  
products

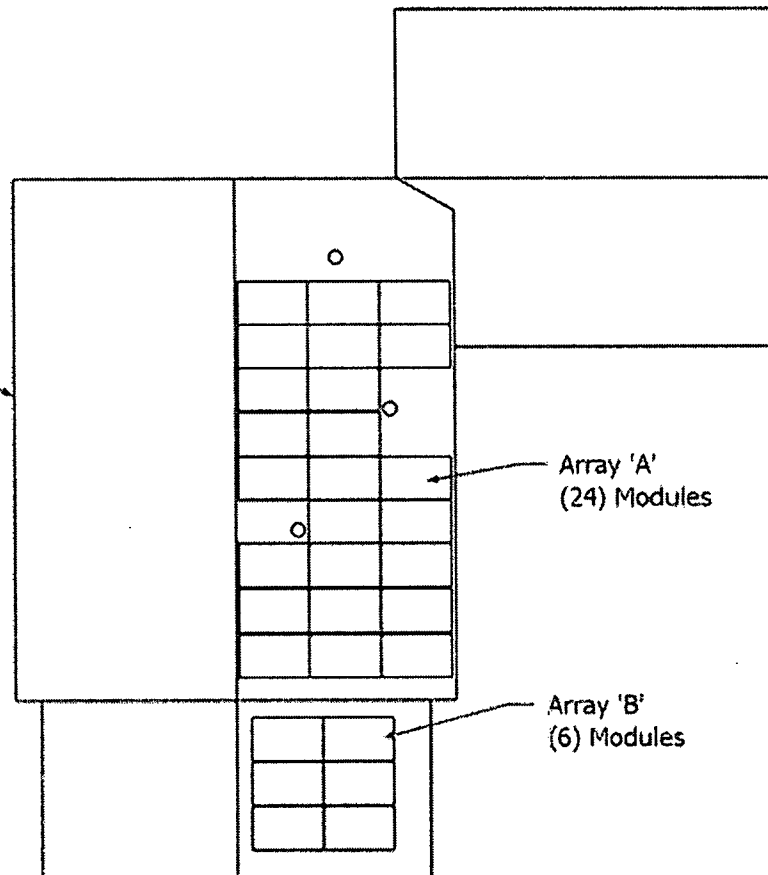
June 2015

For more information you can visit us on the web at

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



Front of Home  
(Street-Facing)



Array 'A'  
(24) Modules

Array 'B'  
(6) Modules



**BRIGHTSTAR**  
SOLAR

**CONTRACTOR:**  
BRIGHTSTAR SOLAR  
257 Maple St. Unit 2  
Marlborough, MA 01752

**Roof Plan for Rooftop PV System**  
**30 Modules, 9.0 kW (DC)**

Site Name: Unni Residence  
Site Address: 43 Appaloosa Dr, Shrewsbury, MA

Drawn By: Jon Reese

SCALE  
NTS

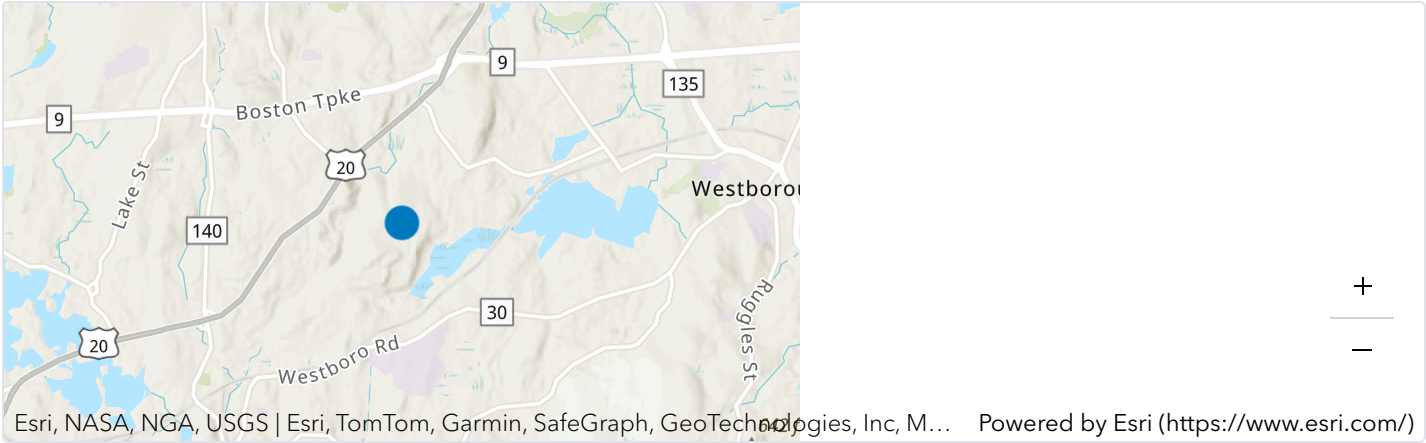
DATE  
3/21/2016

DWG NO  
001

REV

1.6 - Residential Building Permit; Other Improvements (SEE LIST)

31120



Applicant

Location

43 APPALOOSA DR

SHREWSBURY, MA 01545

[View location details \(/locations/17286\)](/locations/17286)

Created

Jan 25, 2016

Status

Complete

Expires

--

Details    Files (0)

Other Projects - Insulation, Roofing, Siding, Windows & Doors Permit Application

## Project Information

Type of Project \* 


--

Project Category \* 

--

Est Project Cost round to nearest \$1000 \* 

--

Description of Work \* 

Rooftop Solar PV Installation

Is the property owner occupied? In other words, is a Home Improvement Contractor's Registration (HIC) required? \*

--

If the property is owner occupied, are you the owner, and will you be doing the work yourself (Exemption to the Home Improvement Contractor's Registration/HIC requirement) \*

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## Please Indicate All The Improvements To Be Performed

Replacing Roof? \*

--

Replacing Exterior Doors? \*

--

Replacing Windows? \*

--

Replacing Siding? \*

--

Replacing or Adding Insulation? \*

--

Chimney repair

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## Applicant Information

APPLICANT I hereby certify that as the applicant for permit, I am the \* ?

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## Waste Disposal Acknowledgement

I hereby insure that If any hazardous waste materials are found, including but not limited to: asbestos, PCB's, lead, mercury, fiberglass, and mold—then the appropriate local, state or federal agencies will be notified and the correct abatement forms will be submitted. I will also hire hazmat licensed contractors to abate such hazardous material. \* ?

--

I am further aware that any non-hazardous construction debris must be tracked and I must indicate the dumpster company or transfer station that is the final destination of said debris. \* ?

--

Dumpster Company or Transfer Station \* ?

--

Location (Town) \* ?

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## General Acknowledgements

I hereby declare that the statements and information contained in this application and submitted in conjunction with said application are true and accurate to the best of my knowledge. I understand that I am responsible to ensure that all construction or other work will be completed in accord with all Federal, State and Local laws, code and ordinances, including but not limited to the State Building Code. I understand that I am responsible to ensure that all inspections will be completed as required by the City, and no structure will be used in violation of Federal, State and Local laws, code and ordinances. The making of a false statement on this form shall constitute a criminal offense. I agree to the terms and conditions referenced above: \* ?

--

I further acknowledge that the submission of this application does not guarantee issuance of a permit. And that I may not begin work on the project described herein until this application is accepted, approved and the permit for work is issued. \* ?

--

I agree that my electronic signature above is equivalent to a handwritten signature and is binding for all purposes related to this transaction \* 

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## Documents

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No documents have been issued...

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## Town of Shrewsbury, MA

### Your Profile

[Sign Up \(/sign-up\)](/sign-up)

[Your Records \(/dashboard/records\)](/dashboard/records)

### Resources

[Search for Records \(/search\)](/search)

[Claim a Record \(/claimRecord\)](/claimRecord)

[Employee Login \(https://shrewsburyma.workflow.opengov.com\)](https://shrewsburyma.workflow.opengov.com)

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