



COMMUNITY DEVELOPMENT DEPARTMENT  
220 E. Mountain View Street, Suite A • Barstow, CA 92311 • PH. 760-255-5161

## Application Submittal, Plan Review and Inspection Procedures for Expedited Solar Photovoltaic Permitting for One-and Two-Family Dwellings (10kW or Less)

### APPROVAL REQUIREMENTS

The following permits are required to install a solar PV system with a maximum power output of 10 kW or less:

- Building Permit
- Electrical Permit, if an electrical panel upgrade is done as part of the Solar Photovoltaic System installation

The following City departments review the submittal for expedited solar photovoltaic permit:

- Building Department
- Barstow Fire Protection District.  
(Fire review is coordinated by the City of Barstow's Building Department. A separate submittal to the Barstow Fire Protection District ***is not*** required.)

### SUBMITTAL REQUIREMENTS

1. Completed City of Barstow Building Permit Application form. This permit application form can be downloaded at [www.barstowca.org](http://www.barstowca.org) or can be requested by email to [building@barstowca.org](mailto:building@barstowca.org) or by calling the Building Department at (760) 255-5161.
2. Letter of Authorization to pull permit on behalf of home owner or contractor, if required.
3. Demonstrate compliance with the Eligibility Checklist for Expedited Solar Photovoltaic Permitting for One- and Two-Family Dwellings to qualify for expedited permit processing. The eligibility check criteria can be downloaded at [www.barstowca.org](http://www.barstowca.org).
4. Submittal of an electrical plan that includes the following:
  - Locations of main service or utility disconnect
  - Total number of modules, number of modules per string and the total number of strings
  - Make and model of inverter(s) and/or combiner box if used
  - Single-line diagram of system
  - Specify grounding/bonding, conductor type and size, conduit type and size and number of conductors in each section of conduit
  - **If batteries are to be installed, include them in the diagram and show their locations and venting**
  - Equipment cut sheets including inverters, modules, AC and DC disconnects, combiners and wind generators
  - Labeling of equipment as required by CEC, Sections 690 and 705
  - Site diagram showing the arrangement of panels on the roof or ground, north arrow, lot dimensions and the distance from property lines to adjacent buildings/structures (existing and proposed)
5. A roof plan showing roof layout, PV panels and the following fire safety items: approximate location of roof access point, location of code-compliant access pathways, PV system fire classification and the locations of all required labels and markings. Examples of clear path access pathways are available in the State Fire Marshal Solar PV Installation Guide, <http://osfm.fire.ca.gov/pdf/reports/solarphotovoltaicguideline.pdf>.
6. Completed *Structural Criteria for Residential Flush-Mounted Solar Arrays* form along with required documentation, if required. The Structural Criteria for Residential Flush-Mounted Solar Arrays form Structural Criteria can be downloaded at the City's website, [www.barstowca.org](http://www.barstowca.org).

For non-qualifying systems, provide structural drawings and calculations stamped and signed by a California-licensed civil or structural engineer, along with the following information:

- The type of roof covering and the number of roof coverings installed
  - Type of roof framing, size of members and spacing
  - Weight of panels, support locations and method of attachment
  - Framing plan and details for any work necessary to strengthen the existing roof structure
  - Site-specific structural calculations
  - Where an approved racking system is used, provide documentation showing manufacturer of the rack system, maximum allowable weight the system can support, attachment method to the roof or ground and product evaluation information or structural design for the rack system.
6. Permit Fee, as per the most currently adopted City of Barstow Master Fee Schedule.

### **3. PLAN REVIEW**

Permit application(s), the *Eligibility Checklist for Expedited Solar Photovoltaic Permitting for One- and Two-Family Dwellings*, and the *Structural Criteria for Residential Flush-Mounted Solar Arrays* can be obtained at:

- The City of Barstow's Building Department Counter located at 220 E. Mountain View Street, Barstow, CA 92311
- The City of Barstow's website, [www.barstowca.org](http://www.barstowca.org)
- Requested by email to [building@barstowca.org](mailto:building@barstowca.org)
- Requested by calling the City of Barstow's Building Department at (760) 255-5161

Permit application(s) and associated documents can be submitted in paper or digital format to the City of Barstow's Building Department in person or by mail/courier to 220 E. Mountain View St., Barstow, CA, electronically by e-mail to [building@barstowca.org](mailto:building@barstowca.org), or by facsimile to (760) 256-1750. Digital signature will be accepted in lieu of wet signature.

Permits application submittals are reviewed within three (3) business days using the California Building Codes most recently adopted by the City of Barstow (currently the 2013 editions). Reviewed plans that receive corrections and are re-submitted by the applicant, will be reviewed and returned within three (3) business days (per re-check).

Upon approval of a complete application submittal, any applicable building and/or electrical permit(s) will be issued.

### **5. INSPECTIONS**

Once all permits to construct the solar installation have been issued and the system has been installed, it must be inspected before final approval is granted for the solar system. On-site inspections can be scheduled by contacting the City of Barstow's Building Department by telephone at (760) 255-5161 or electronically at [building@barstowca.org](mailto:building@barstowca.org). Inspection requests received by the Building Department during operating hours are typically scheduled for the next business day. If next business day is not available the inspection will be scheduled within three (3) business days. A two (2) hour window will be provided to the requester.

Permit holders must be prepared to show conformance with all technical requirements in the field at the time of inspection. The inspector will verify that the installation is in conformance with applicable code requirements and with the approved plans.

Common points of inspection that the applicant should be prepared to show compliance include the following:

- Number of PV modules and model number match plans and specification sheets number match plans and specification sheets.
- Array conductors and components are installed in a neat and workman-like manner.
- PV array is properly grounded.
- Electrical boxes are accessible and connections are suitable for environment.
- Array is fastened and sealed according to attachment detail.
- Conductor's ratings and sizes match plans.
- Appropriate signs are properly constructed, installed and displayed, including the following:
  - Sign identifying PV power source system attributes at DC disconnect
  - Sign identifying AC point of connection
  - Sign identifying switch for alternative power system
- Equipment ratings are consistent with application and installed signs on the installation, including the following:
  - Inverter has a rating as high as max voltage on PV power source sign.
  - DC-side overcurrent circuit protection devices (OCPDs) are DC rated at least as high as max voltage on sign.
  - Switches and OCPDs are installed according to the manufacturer's specifications (i.e., many 600VDC switches require passing through the switch poles twice in a specific way).
  - Inverter is rated for the site AC voltage supplied and shown on the AC point of connection sign.
  - OCPD connected to the AC output of the inverter is rated at least 125% of maximum current on sign and is no larger than the maximum OCPD on the inverter listing label.
  - Sum of the main OCPD and the inverter OCPD is rated for not more than 120% of the bus bar rating.

### **6. DEPARTMENTAL CONTACT INFORMATION**

For additional information regarding this permit process, please consult our departmental page on the City of Barstow's website at [www.barstowca.org](http://www.barstowca.org) or contact the City of Barstow's Building Department at (760) 255-5161.

BUILDING DEPARTMENT  
BUILDING PERMIT APPLICATION



PERMIT NO. B - \_\_\_\_\_

**APPLICANT INFORMATION**

APPLICANT'S NAME <input type="checkbox"/> PROPERTY OWNER <input type="checkbox"/> TENANT <input type="checkbox"/> CONTRACTOR <input type="checkbox"/> ENGINEER/ARCHITECT <input type="checkbox"/> OTHER: _____		TELEPHONE NUMBER ( ) -	
IF APPLICANT IS A BUSINESS, PLEASE LIST THE PRIMARY CONTACT	TELEPHONE NUMBER ( ) -	EMAIL ADDRESS	
APPLICANT'S PHYSICAL ADDRESS	CITY	STATE	ZIP
APPLICANT'S MAILING ADDRESS <input type="checkbox"/> Same as Physical Address	CITY	STATE	ZIP

**PROPERTY OWNER(S) INFORMATION  SAME AS APPLICANT INFORMATION**

PROPERTY OWNER(S) NAME		TELEPHONE NUMBER ( ) -	
PROPERTY OWNER'S PHYSICAL ADDRESS	CITY	STATE	ZIP
PROPERTY OWNER'S MAILING ADDRESS <input type="checkbox"/> Same as Physical Address	CITY	STATE	ZIP

**CONTRACTOR INFORMATION**

CONTRACTOR'S NAME		STATE LICENSE #	CLASSIFICATION	EXPIRATION
ADDRESS		CITY	STATE	ZIP
PHONE NUMBER ( ) -	FAX NUMBER ( ) -	EMAIL ADDRESS		
WORKER'S COMPENSATION CARRIER (INCLUDE COPY OF CERTIFICATE)		POLICY #	EXPIRATION	

**PROJECT INFORMATION  RESIDENTIAL  COMMERCIAL\*Letter of Authorization Required\***

PROJECT ADDRESS	ASSESSOR'S PARCEL NUMBER (APN)
-----------------	--------------------------------

**CHECK ALL WHICH APPLY:**

<input type="checkbox"/> NEW BUILDING	<input type="checkbox"/> ADDITION	<input type="checkbox"/> ALTERATION	<input type="checkbox"/> BLOCK WALL
<input type="checkbox"/> DEMOLITION	<input type="checkbox"/> FIREPLACE	<input type="checkbox"/> FOUNDATION ONLY	<input type="checkbox"/> SIGN
<input type="checkbox"/> SWIMMING POOL/SPA	<input type="checkbox"/> FIRE REPAIR	<input type="checkbox"/> REROOF _____ SQ. FT.	<input type="checkbox"/> PLUMBING
<input type="checkbox"/> GRADING	<input type="checkbox"/> ELECTRICAL	<input type="checkbox"/> DECK/PATIO COVER	<input type="checkbox"/> MECHANICAL

**IS THIS PROPERTY CURRENTLY RED TAGGED?  YES  NO**



PLEASE BE SURE THAT FRONT SIDE IS COMPLETED. THANK YOU.

**PROJECT INFORMATION (CONTINUED)**

EXISTING: Floor Area \_\_\_\_\_ sq. ft. Garage: \_\_\_\_\_ Other: \_\_\_\_\_ # of Units: \_\_\_\_\_

PROPOSED: Floor Area \_\_\_\_\_ sq. ft. Garage: \_\_\_\_\_ Other: \_\_\_\_\_ # of Units: \_\_\_\_\_

SETBACKS: Front: \_\_\_\_\_ Rear: \_\_\_\_\_ Left: \_\_\_\_\_ Right: \_\_\_\_\_

# of Bedrooms: \_\_\_\_\_ # of Bathrooms: \_\_\_\_\_ Total # of Rooms: \_\_\_\_\_

Lot Size: \_\_\_\_\_ Lot Dimension: \_\_\_\_\_ Lot Coverage %: \_\_\_\_\_

**DESCRIPTION OF WORK:**

**RENOVATION, REPAIR AND PAINTING (RRP) RULE**

1. Was property constructed prior to 1978?  YES  NO

*If yes, please answer questions 2 and 3. If no, proceed to Construction Valuation Section.*

2. Is property one of the following?

Residential Home (Single or Multi-family)  Child Care Facility  Pre-School

No, property is not any of the above. *Skip question #3. Proceed to Construction Valuation Section.*

3. The United States Environmental Protection Agency's (EPA's) Renovation, Repair and Painting Rule (RRP) requires contractors whose work disturbs paint in a pre-1978 residence, child care facility or pre-school to be RRP-certified firm. This also applies to rental property owners and property managers who do the paint-disturbing work themselves or through their employees. Failure to comply with the RRP Rule may result in enforcement action by the EPA.

An EPA lead-safe certified Renovator will be responsible for this project.

Certified Firm Name: \_\_\_\_\_ Firm Certification No.: \_\_\_\_\_

There will be no disturbance of lead-based paint in the performance of work to which this permit is being issued.

I, as property owner **and** occupant, am not required to comply with the RRP as I will be doing the work myself on the residence in which I reside. *(This does not apply to rental properties)*

**CONSTRUCTION VALUATION: \$** \_\_\_\_\_

**CERTIFICATE OF COMPLIANCE AND AUTHORIZATION OF ENTRY:**

I certify that I have read this application and state the information provided is true and correct. I agree to comply with all State laws and City ordinances relating to the construction to which this permit is issued. I authorize the City of Barstow's Building Department representative(s) to enter upon the property for which this building permit is issued for the purpose of conducting related inspections.

SIGNATURE

PRINTED NAME

DATE

**For Office Use Only**

DATE APPLICATION RECEIVED

APPROVED BY



**LETTER OF AUTHORIZATION**

**AUTHORIZATION OF AGENT TO ACT ON BEHALF OF  
PROPERTY OWNER, BUSINESS OWNER, AND/OR LICENSED CONTRACTOR**

I hereby authorize the following person(s) to act as an agent(s) to apply for, sign, and file the documents necessary to obtain any business license and/or building permit for the below referenced project.

Date of Authorization: \_\_\_\_\_

Term of Authorization (Please select one):  One-Time Authorization  Annual Authorization

Type of Authorization (Please select one):

Business License Only  Building Permit(s) Only  Business License AND Building Permit(s)

**PROJECT INFORMATION** \*If this is an annual authorization or a business license only authorization, please proceed to next section\*

Permit Number: \_\_\_\_\_ Project Address: \_\_\_\_\_

Scope of Construction Project (or Description of Work): \_\_\_\_\_

**PROPERTY OWNER / BUSINESS OWNER / CONTRACTOR'S INFORMATION**

Property Owner / Business / Contractor's Name: \_\_\_\_\_

Name of Authorization Business Owner / Officer (If Business or Contractor): \_\_\_\_\_

California State Contractor's License Number (If Applicable): \_\_\_\_\_

Property Owner / Business / Contractor's Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Email: \_\_\_\_\_

**AUTHORIZED AGENT INFORMATION** \*Please note that the authorized agent will be required to provide identification at the time of business license and/or building permit application/issuance\*

Please check this box if you are authorizing more than one agent and attach a listing of all agents who you authorize to act on your behalf.

Name of Authorized Agent: \_\_\_\_\_ Phone: \_\_\_\_\_

Address of Authorized Agent: \_\_\_\_\_

**DECLARATION**

I declare under penalty of perjury that I am the authorized owner and/or officer of the above-referenced property, business, and/or contractor license and certify to the accuracy of the contents provided on this authorization form. **(Note: Form notarization or a copy of the property owner's, building owner's, business owner's, and/or license contractor's government-issued identification must be attached to this authorization form).**

If this is an annual authorization, a copy of this authorization form (which has been approved by the City of Barstow) will be required to be submitted for each building permit or business license that is signed by an authorized agent. I acknowledge and authorize that an approved copy of this authorization form shall be as valid as the original. I can revoke this authorization at any time upon written notification to the City of Barstow.

Signature: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Date: \_\_\_\_\_

CITY OF BARSTOW USE ONLY (Rev. 09/2023)		
APPROVED BY: _____	TITLE: _____	AUTHORIZATION EXPIRATION DATE: _____



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# Eligibility Checklist for Expedited Solar Photovoltaic Permitting for One- and Two-Family Dwellings

Applicant's Name: \_\_\_\_\_

Project Address: \_\_\_\_\_

## GENERAL REQUIREMENTS

- |   |                            |                            |
|---|----------------------------|----------------------------|
| A. System size is 10 kW AC CEC rating or less   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. The solar array is roof mounted on one- or two-family residential dwelling or accessory structure            | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| C. The solar panel/module arrays will not exceed the maximum legal building height                              | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| D. Solar system is utility interactive and without battery storage  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| E. City of Barstow Building Permit application is completed and attached  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| F. Authorization Letter to pull permit on behalf of license contractor/property owner is attached (if required) | <input type="checkbox"/> Y | <input type="checkbox"/> N |

## ELECTRICAL REQUIREMENTS

- |  |                            |                            |
|--|----------------------------|----------------------------|
| A. No more than four photovoltaic module strings are connected to each Maximum Power Point Tracking (MPPT) input where source circuit fusing is included in the inverter | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 1) No more than two strings per MPPT input where source circuit fusing is not included   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 2) Fuses (if needed) are rated to the series fuse rating of the PV module  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 3) No more than one noninverter-integrated DC combiner is utilized per inverter  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. For central inverter systems: No more than two inverters are utilized   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| C. The PV system is interconnected to a single-phase AC service panel of nominal 120/220 Vac with a bus bar rating of 225 A or less                                      | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| D. The PV system is connected to the load side of the utility distribution equipment   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| E. A solar PV Standard Plan and supporting documentation is completed and attached and includes:   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 1) Barstow's ambient temperature of 8°F to 115°F   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 2) Conduit attachment details  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| 3) Irreversible crimp is provided in the main panel (if necessary)   | <input type="checkbox"/> Y | <input type="checkbox"/> N |

## STRUCTURAL REQUIREMENTS

- |   |                            |                            |
|---|----------------------------|----------------------------|
| A. A completed <i>Structural Criteria for Residential Flush-Mounted Solar Arrays</i> form is attached. Please be sure to use Wind Exposure C and Wind Speed of 110 MPH. | <input type="checkbox"/> Y | <input type="checkbox"/> N |
|---|----------------------------|----------------------------|

## FIRE REQUIREMENTS

- |  |                            |                            |
|--|----------------------------|----------------------------|
| A. Clear access pathways are provided  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| B. Fire classification solar system is provided  | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| C. All required markings and labels are provided. Please note that all labels and placards are made of hard plastic or metal, except for labels placed on conduit.   | <input type="checkbox"/> Y | <input type="checkbox"/> N |
| D. A diagram of the roof layout of all panels, modules, roof mount locations, clear access pathways and approximate locations of electrical disconnection means and roof access points is completed and attached. Please note such diagram should also include the location of existing roof vent(s), heating/cooling unit(s) and any other appliance(s) or structure(s) located on rooftop. | <input type="checkbox"/> Y | <input type="checkbox"/> N |

### APPLICANTS, PLEASE BE ADVISED:

1. These criteria are intended for expedited solar permitting process for one- and two-family dwellings (10kW or less).
2. If any items are marked NO, please revise the photovoltaic system design to fit within the Eligibility Checklist, otherwise permit application may go through standard permit process.



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# STRUCTURAL CRITERIA FOR RESIDENTIAL FLUSH-MOUNTED SOLAR ARRAYS\*

Project Address: \_\_\_\_\_

Number of Kilowatts: \_\_\_\_\_ Number of Panels/Modules \_\_\_\_\_

## 1. ROOF CHECKS

- A. Visual Review/Contractor's Site Audit of Existing Conditions:
- 1) Is the roof a single roof without a reroof overlay?  Y  N
  - 2) Does the roof structure appear structurally sound, without signs of alterations or significant structural deterioration or sagging, as illustrated in Figure 1?  Y  N
- B. Roof Structure Data:
- 1) Measured roof slope (e.g.6:12): \_\_\_\_\_:12
  - 2) Measured rafter spacing (center to center): \_\_\_\_\_ inch
  - 3) Type of roof framing (rafter or manufactured truss) :  Rafter  Truss
  - 4) Measured rafter size (e.g. 13/4 x 33/4, not 2x4): \_\_\_\_\_ x \_\_\_\_\_ inch
  - 5) Measured rafter horizontal span (see Figure 4): \_\_\_\_\_' \_\_\_\_\_" ft-in
  - 6) Horizontal rafter span per Table 2: \_\_\_\_\_' \_\_\_\_\_" ft-in
  - 7) Is measured horizontal rafter span less than Table 2 span?  Y  N

## 2. SOLAR ARRAY CHECKS

- A. Flush-mounted Solar Array:
- 1) Is the plane of the modules (panels) parallel to the plane of the roof?  Y  N
  - 2) Is there a 2" to 10" gap between underside of module and the roof surface?  Y  N
  - 3) Modules do not overhand any roof edges (ridges, hops, gable ends, eaves)?  Y  N
- B. Do the modules plus support components weigh no more than:
- 1) 4 psf for photovoltaic arrays or 5 psf for solar thermal arrays?  Y  N
- C. Does the array cover no more than half of the total roof area (all roof planes)?  Y  N
- D. Are solar support component manufacturer's project-specific completed worksheets, tables with relevant cells circled, or web-based calculator results attached?  Y  N
- E. Is a roof plan of the module and anchor layout attached? (see Figure 2)  Y  N
- F. Downward Load Check (Anchor Layout Check):
- 1) Proposed anchor horizontal spacing (see Figure 2): \_\_\_\_\_' \_\_\_\_\_" ft-in
  - 2) Horizontal anchor spacing per Table 1: \_\_\_\_\_' \_\_\_\_\_" ft-in
  - 3) Is proposed anchor horizontal spacing less than Table 1 spacing?  Y  N
- G. Wind Uplift Check (Anchor Fastener Check):
- 1) Anchor fastener data (see Figure 3)
    - a) Diameter of lag screw, hanger bolt or self-drilling screw: \_\_\_\_\_ inch
    - b) Embedment depth of rafter: \_\_\_\_\_ inch
    - c) Number of screw per anchor (typically one): \_\_\_\_\_
    - d) Are 5/16" diameter lag screws with 2.5" embedment into the rafter use, OR does the anchor fastener meet the manufacturer's guidelines?  Y  N

## 3. SUMMARY

- A. All items above are checked YES. No additional calculations are required.
- B. One or more items are checked NO. Attach project-specific drawings and calculations stamped and signed by a California-licensed Civil or Structural Engineer

\*This form can only be used for the expedited review for solar photovoltaic permitting of one- and two-family residential dwellings with a system size of 10kW or less.





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## STRUCTURAL CRITERIA FOR RESIDENTIAL FLUSH-MOUNTED SOLAR ARRAYS

Table 1. Maximum Horizontal Anchor Spacing

Roof Slope		Rafter Spacing		
		16" o.c.	24" o.c.	32" o.c.
Photovoltaic Arrays (4 psf max)				
Flat to 6:12	0° to 26°	5'-4"	6'-0"	5'-4"
7:12 to 12:12	27° to 45°	1'-4"	2'-0"	2'-8"
13:12 to 24:12	46° to 63°	1'-4"	2'-0"	2'-8"
Solar Thermal Arrays (5 psf max)				
Flat to 6:12	0° to 26°	4'-0"	4'-0"	5'-4"
7:12 to 12:12	27° to 45°	1'-4"	2'-0"	2'-8"
13:12 to 24:12	46° to 63°	Calc. Req'd	Calc. Req'd	Calc. Req'd

### Table 1 Notes:

1. Anchors are also known as "stand-offs," "feet," "mounts" or "points of attachment." Horizontal anchor spacing is also known as "cross-slope" or "east-west" anchor spacing (see Figure 2).
2. If anchors are staggered from row-to-row going up the roof, the anchor spacing may be twice that shown above, but no greater than 6'-0".
3. For manufactured plated wood trusses at slopes of flat to 6:12, the horizontal anchor spacing shall not exceed 4'-0" and anchors in adjacent rows shall be staggered.
4. This table is based on the following assumptions:
  - The roof structure conformed to building code requirements at the time it was built.
  - The attached list of criteria is met.
  - Mean roof height is not greater than 40 feet.
  - Roof sheathing is at least 7/16" thick oriented strand board or plywood. 1x skip sheathing is acceptable.
  - If the dwelling is in Wind Exposure B (typical urban, suburban or wooded areas farther than 500 yards from large open fields), no more than one of the following conditions apply:
    - The dwelling is located in a Special Wind Region with design wind speed between 115 and 130 mph per ASCE 7-10.
    - The dwelling is located on the top half of a tall hill, provided average slope is less than 15%.
  - If the dwelling is in Wind Exposure C (within 500 yards of large open fields or grasslands), all of the following conditions apply.
    - Design wind speed is 110 mph or less (not in a Special Wind Region).
    - The dwelling is not located on the top half of a tall hill.
  - The solar array displaces roof live loads (temporary construction loads) that the roof was originally designed to carry.
  - The Structural Technical Appendix provides additional information about analysis assumptions. Please contact the Building Department at (760) 255-5161 if you would like a copy of the Structural Technical Appendix.





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## STRUCTURAL CRITERIA FOR RESIDENTIAL FLUSH-MOUNTED SOLAR ARRAYS

Table 2. Roof Rafter Maximum Horizontal Span (feet-inches)

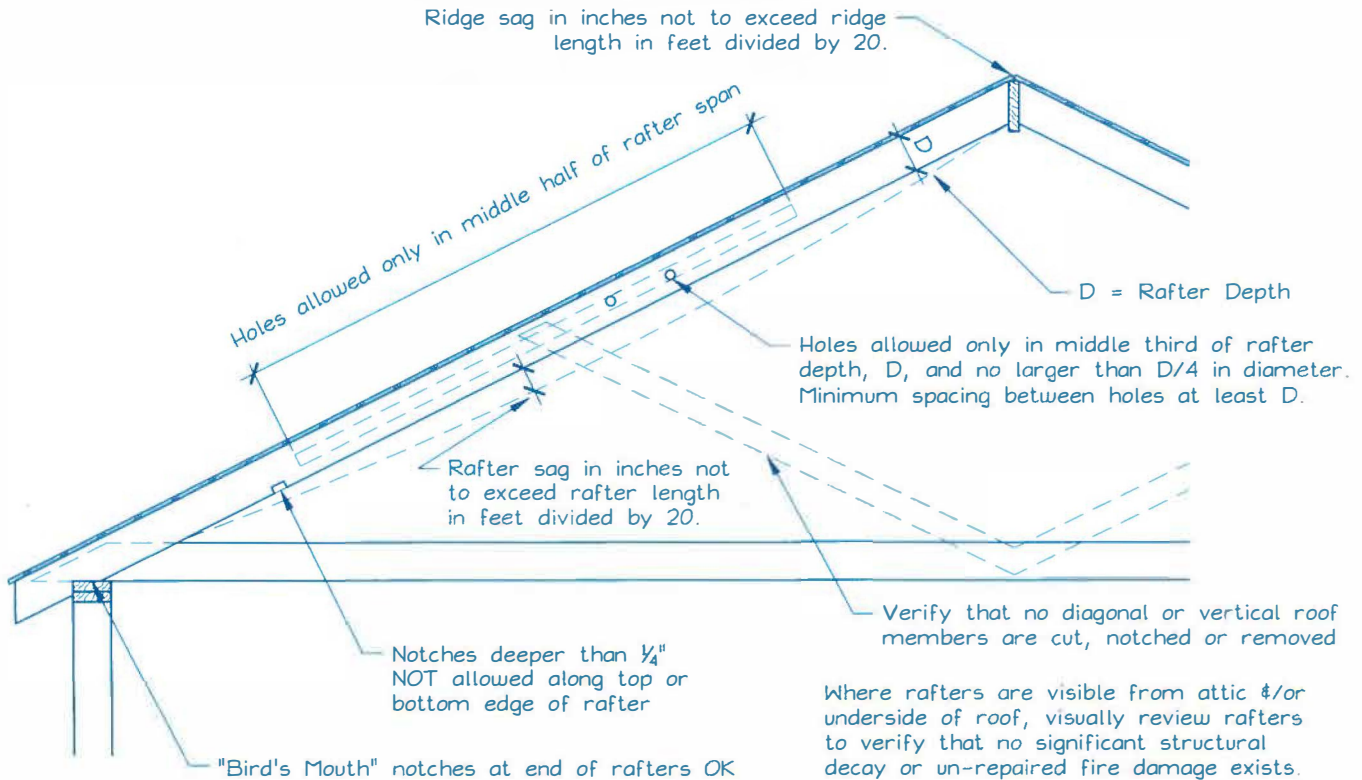
Assumed Vintage	Nominal Size	Actual Size	Non-Tile Roof <sup>2</sup>			Tile Roof <sup>3</sup>		
			Rafter Spacing					
			16" o.c.	24" o.c.	32" o.c.	16" o.c.	24" o.c.	32" o.c.
Post-1960	2x4	1½"x3½"	9'-10"	8'-0"	6'-6"	8'-6"	6'-11"	5'-6"
	2x6	1½"x5½"	14'-4"	11'-9"	9'-6"	12'-5"	10'-2"	8'-0"
	2x8	1½"x7¼"	18'-2"	14'-10"	12'-0"	15'-9"	12'-10"	10'-3"
Pre-1960	2x4	1¾"x3¾"	11'-3"	9'-9"	7'-9"	10'-3"	8'-6"	6'-9"
	2x6	1¾"x5¾"	17'-0"	14'-0"	11'-3"	14'-9"	12'-0"	9'-9"
	2x8	1¾"x7¾"	22'-3"	18'-0"	14'-6"	19'-0"	15'-6"	12'-6"

Table 2 Notes:

1. See Figure 4 for definition of roof rafter maximum horizontal span.
2. "Non-tile Roof" = asphalt shingle, wood shingle and wood shake, with an assumed roof assembly weight of 10 psf.
3. "Tile Roof" = clay tile or cement tile, with an assumed roof assembly weight of 20 psf
4. Unaltered manufactured plated-wood trusses may be assumed to be code compliant and meet intent of Table 2.
5. This table is based on the following assumptions:
  - Span/deflection ratio is equal to or greater than 180.
  - For post-1960 construction, wood species and grade is Douglas Fir-Larch No. 2.
  - For pre-1960 construction, wood species and grade is Douglas Fir-Larch No. 1.
  - Other wood species and/or grade are also acceptable if allowable bending stress is equal or greater to that listed.



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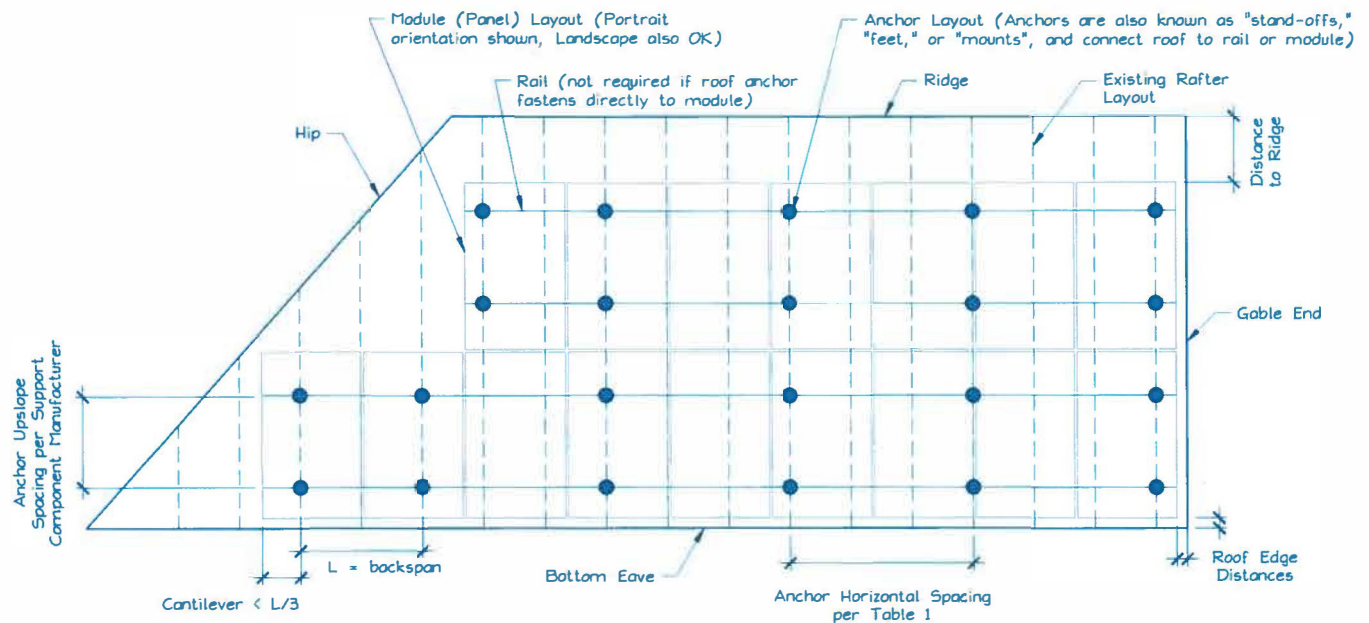


**Figure 1. Roof Visual Structural Review (Contractor's Site Audit) of Existing Conditions.**

The site auditor should verify the following:

1. No visually apparent disallowed rafter holes, notches and truss modifications as shown above.
2. No visually apparent structural decay or un-repaired fire damage.
3. Roof sag, measured in inches, is not more than the rafter or ridge beam length in feet divided by 20.

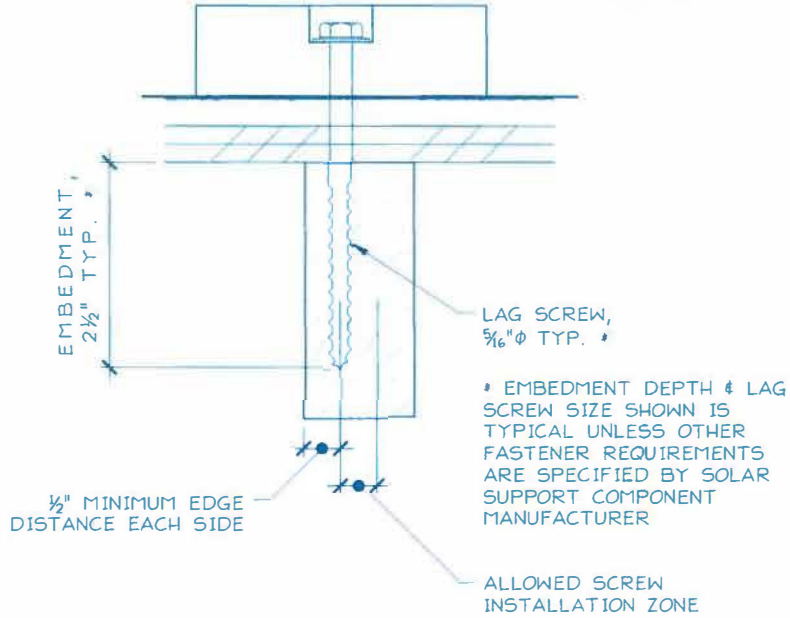
Rafters that fail the above criteria should not be used to support solar arrays unless they are first strengthened.



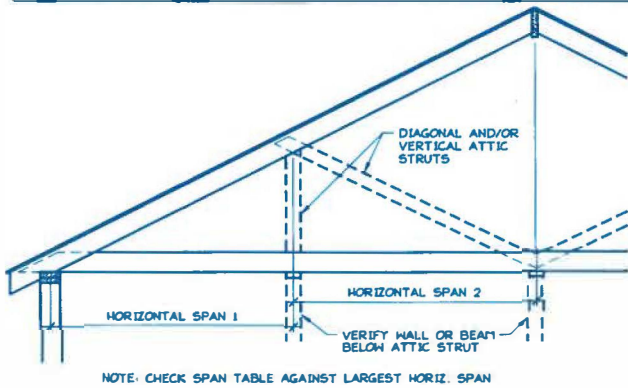
**Figure 2. Sample Solar Panel Array and Anchor Layout Diagram (Roof Plan).**



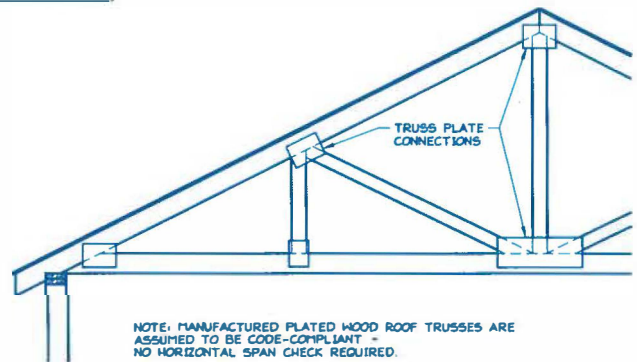
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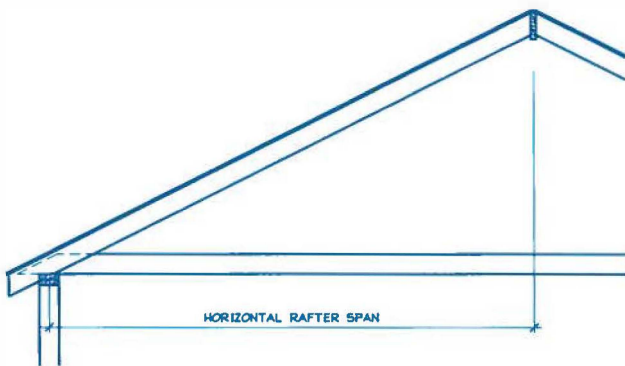
**Figure 3. Typical Anchor with Lag Screw Attachment.**



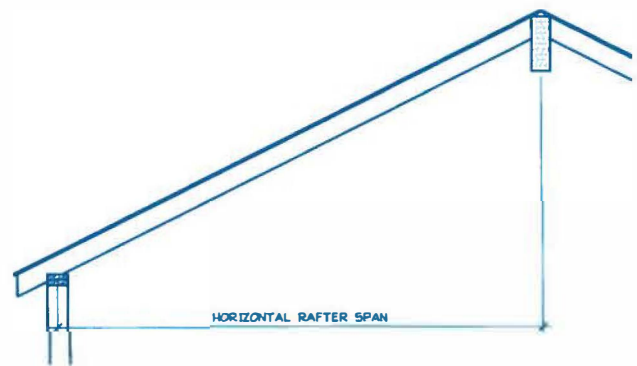
**C STRUTS TO WALLS BELOW**



**D MANUFACTURED PLATED WOOD ROOF TRUSS**



**A SIMPLE ATTIC**



**B CATHEDRAL CEILING**

**Figure 4. Definition of Rafter Horizontal Span.**