

Residential Solar Energy Systems

Permits

Building permits are required to install solar energy systems including:

- Roof-top mounted photovoltaic systems
- Building-integrated photovoltaic systems
- Ground-mounted photovoltaic systems

In addition to the building permit, an electrical permit will be required. Electrical permits are issued by the State of Minnesota, Department of Labor and Industry's Electrical Division. For more information, call (651) 284-5026 or go to http://www.dli.mn.gov/CCLD/etrakit_electrical.asp.

Plans

Required drawings shall be scaled and dimensioned, readable, and legible. See example plans at the end of this handout.

Plans for roof-top mounted solar PV systems:

Site plan indicating the buildings and features of the property. The site plan shall show the following:

- Property line locations
- Location of all structures on the site, including driveways and streets
- Setbacks from property lines
- Location of solar energy systems
- Solar panel setback dimension from the peak and all edges of the roof. (To avoid turbulence and uplift, the suggested set back from edges/ridges is 2" per 1" lift from roof surface. E.g., for an array which is mounted 4" off the roof surface, there would be an 8" setback.)
- Main service location
- Solar easement across adjoining properties (if applies)

Elevation of structure illustrating the appearance of the proposed solar installation and indicating the finished height of the system above the roof surface.

Building cross section including the following details:

- Rafter size, spacing, and span dimension
- Roof slope(s)
- Style, diameter, length of embedment of bolts (i.e. 5/16th" lags with minimum 3" embedment into framing, blocking, or bracing) and plan details illustrating method of fastening equipment to the roof

Checklist

This checklist (questions begin at page 4) must be completed in full and submitted with the building permit application and plans for roof-top mounted PV systems and ground-mounted PV systems. Building-integrated photovoltaic systems (where the solar collector replaces or substitutes for an architectural or structural component of a building such as a roof, shingle, or awning) do not require this checklist – but shall provide manufacturer specifications and code evaluation reports for building-integrated photovoltaic system products being installed.

For roof-top mounted systems at dwellings or at detached habitable accessory structures (ADUs):

Roof plan showing the location of all required roof access locations, pathways, and setbacks. Roof plans must be to scale, fully dimensioned, and include all the following:

- Locations of each array and each panel in each array
- Layout and number of panels
- Locations of obstructions such as vent pipes, conduit, or mechanical equipment
- Total plan view roof area in square feet
- Area of the solar arrays in square feet
- Locations and dimensions of the required pathways (not less than 2) from the lowest roof edge to ridge
- Show and dimension setbacks at horizontal ridges
- Identify any portions of a roof that is below an emergency escape and rescue opening

Note:

- Roof access is not required to be provided at detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises and similar structures.
- Roof access and pathway requirements do not apply to roofs with slopes of two units vertical in 12 units horizontal (17 percent slope) or less.

Plans for ground-mounted solar PV installations

For ground-mounted solar energy systems, the installation must meet property line setback standards for solar accessory structures, as identified in the Minneapolis Zoning Code: Title 20, Chapter 535 – Regulations of General Applicability, Article XII – Solar Energy Systems, 535.820-870 (www.municode.com/library/mn/minneapolis/codes/code_of_ordinances).

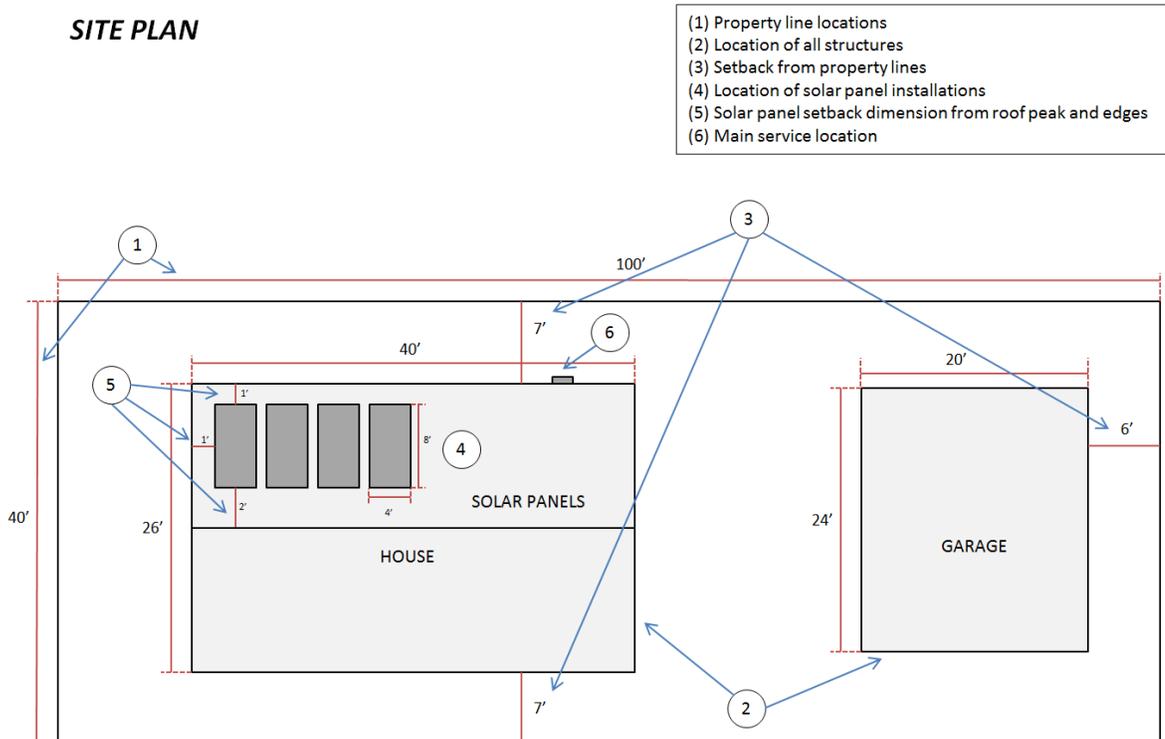
Required Drawings and Plans

Elevation of structure illustrating the appearance of the proposed solar installation indicating the finished height of the system above ground.

Site plan indicating the buildings and features of the property. The site plan shall show the following:

- Property line locations
- Location of all structures on the site
- Setbacks from property lines
- Location of solar energy systems
- Main service location
- Property lines and setbacks are required to be verified.
 - Provide a current survey prepared and signed by a licensed land surveyor
 - or -
 - Denote locations of the found property pins on the site plan, as located by homeowner or contractor.

Example Plans



BUILDING CROSS SECTION

- (1) Roof construction
- (2) Rafter size
- (3) Rafter spacing
- (4) Bolt style, diameter, and embedment length
- (5) Rafter span dimension
- (6) Approximate roof slope
- (7) Mounted solar system

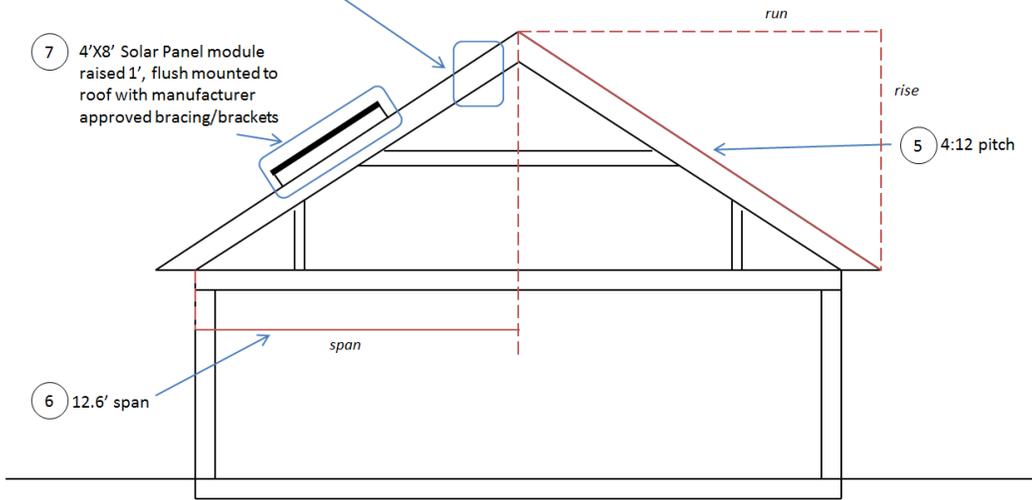
1, 2, 3, 4

Rafters: 2X4 rafters, spaced 16" on center;
Decking: 5/8" plywood;
Roof Cover: one layer asphalt shingles;
Lag Bolts: 1/4" bolts with 2 1/4" length

7 4'X8' Solar Panel module raised 1', flush mounted to roof with manufacturer approved bracing/brackets

5 4:12 pitch

6 12.6' span



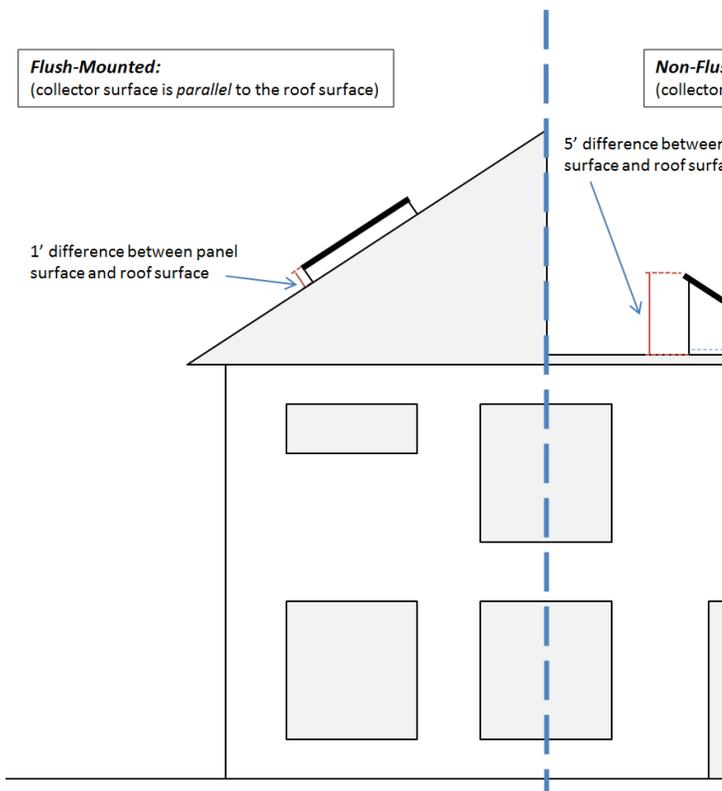
ELEVATION

Flush-Mounted:
(collector surface is *parallel* to the roof surface)

Non-Flu:
(collector

1' difference between panel surface and roof surface

5' difference between surface and roof surface



Permit applicant checklist for residential solar energy installations

Applicant must complete this checklist (and provide the requested information, reports and documentation identified in the checklist) and submit it electronically with the building permit application and plans.

*If the answer is "No" for any parts of questions 8, 9, or 10 below:

- Provide a study or statement regarding the proposed solar installation and all proposed structural modifications as required and approved (stamped) by a Minnesota licensed/certified structural engineer
- and -
- Provide construction plans denoting the roof structure and any modifications to the structure if required, as well as the method of installation of solar collector on the subject property.
- or -
- Provide a letter from the engineer, specifically addressing the subject property, explaining its roof structure, any required modifications, as well as method of installation of the solar collector on subject property.

General Information

Project Address: _____

Property owner Name: _____
Address: _____
Phone number: _____

Plan preparer Name: _____
Address: _____
Phone number: _____

Contractor company Name: _____
Address: _____
License: _____

Installation company Name: _____
Address: _____
License: _____

Description of proposed work, including both solar equipment installation and all associated construction: _____

System Information for electric (photovoltaic) systems

System kW rating (DC): _____

System designation: (circle one) Inter-tie or stand alone

Does the system include backup power? (circle one)	Yes	No
If yes, is it an uninterruptible power supply (UPS)? (circle one)	Yes	No
If yes, is it an energy storage system (ESS)? (circle one)	Yes	No

Heritage Preservation

Exterior work, including installation of solar systems, within city designation heritage preservation sites and districts is subject to additional review and approval by administrative staff or the Heritage Preservation Commission prior to the issuance of city permits. For a city map showing individual sites and district boundaries go to the city website (www.ci.minneapolis.mn.us/hpc/landmarks/). You may also search a specific address by using “property look-up” at www.ci.minneapolis.mn.us/propertyinfo/.

1. Is the installation address within a heritage preservation district, or on a landmark property or building?
(circle one) Yes No

Roof-top Installations

2. What is the roof type? (circle one)
Flat roof (nominal pitch 2:12 or less)
Sloped - identify pitch: _____
3. What is the existing roofing type? (shingles, tile, metal, ballasted, membrane, etc.): _____
4. How many roofing layers will be under the panels? (no more than 2 layers of roof shingles are allowed):

5. What is the age and condition of the roofing material?

6. Is the edge of the roof less than three feet from a lot line? (circle one) Yes No
7. Has the homeowner been made aware of the lifespans of the existing roof and a new solar installation?
(circle one) Yes No
8. Is the system to be mounted according to panel and rack manufacturer’s instructions?
(circle one) Yes No*
If No, explain: _____
Attach additional pages if more space is need
9. Is the equipment to be *flush mounted* to the roof (such that the collector surface is parallel to the roof)?
(circle one) Yes No*

9a. If Yes, does the roof structure use 2x4 or larger rafters, spaced no wider than 24 inches on center?
(circle one, then continue to #10) Yes No*

9b. If No, (i.e. if non-flush-mounted), is the finished pitch of the collector at or less than a 12/12 pitch?
(circle one) Yes No*

Is the collector or racking system fastened to the roof within one foot of the roof peak?
(circle one) Yes No*

Is the collector or racking system fastened to each rafter passing under the collector?
(circle one) Yes No*

Is the horizontal span (roof span dimension) of the rafter less than 7.75 feet for 2X4 rafters or 11.5 feet for 2X6 rafters?
(circle one) Yes No*

Roof decking and structural supports should all be in good condition without visible roof sag/deflection.

10. Is the roof structure in good condition, having no visible sag, cracking or splintering of rafters, or other potential structural defects?
(circle one) Yes No*

- Provide photos showing the condition of the roof structure (rafters in the attic space), if accessible.
- or -
- Provide exterior photos, showing a side view of the roof, if accessible.

*If the answer is “No” for any parts of questions 8, 9, or 10 above:

- Provide a study or statement regarding the proposed solar installation and all proposed structural modifications as required and approved (stamped) by a Minnesota licensed/certified structural engineer
- and -
- Provide construction plans denoting the roof structure and any modifications to the structure if required, as well as the method of installation of solar collector on the subject property.
- or -
- Provide a letter from the engineer, specifically addressing the subject property, explaining its roof structure, any required modifications, as well as method of installation of the solar collector on subject property.