National Alliance of Preservation Commissions

NAPC

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Sample Guidelines for Solar Systems in Historic Districts

INFORMATIVE TOPICS

JANUARY 8, 2015

The rapidly growing trend toward retrofitting homes to be more energy efficient has brought an increase in the number of applications for installing solar energy systems on buildings within locally designated historic districts. The increase in solar systems applications in recent years has prompted numerous local preservation commissions to hastily develop guidelines for them with varying degrees of success.

The following Sample Guidelines for Solar Systems for Locally Designated Historic Properties were developed in 2009 by Kimberly Kooles, NAPC support staff and revised by Caty Rushing in 2011. They are intended to serve as a starting point for local preservation commissions developing their own guidelines for solar systems.

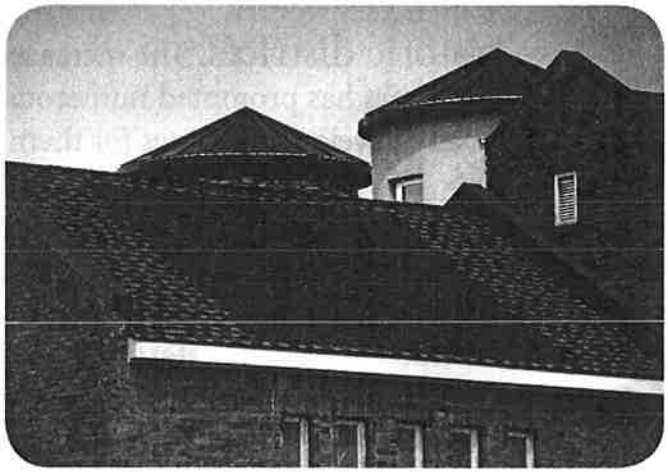
Types of Systems:

• Photovoltaic

A photovoltaic system (or PV system) is a system which uses one or more solar panels to convert sunlight into electricity. It consists of multiple components, including the photovoltaic modules, mechanical and electrical connections and mountings and means of regulating and/or modifying the electrical output.

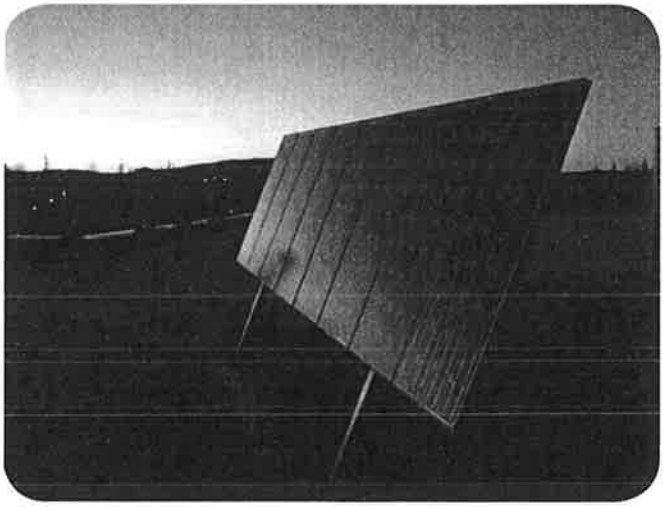
• Solar Shingles

Solar shingles, also called photovoltaic shingles, are solar cells designed to look like conventional asphalt shingles. There are several varieties of solar shingles, including shingle-sized solid panels that take the place of a number of conventional shingles in a strip, semi-rigid designs containing several silicon solar cells that are sized more like conventional shingles, and newer systems using various thin film solar cell technologies that match conventional shingles both in size and flexibility



• Freestanding

Freestanding PV panels or freestanding arrays allow the benefits of renewable solar power without disrupting the roofline or altering the house. They are placed away from the residence and connected through an undergroud wiring. When a roof may be blocked by trees or not recieving direct sunlight, the mobillity of a freestanding panel allows the ability to move into optimal sunlight areas that may change seasonally.



Sample Guidelines for Solar Systems for Locally Designated Historic Projects

When planning the installation of solar panels the overall objective is to preserve character-defining features and historic fabric while accommodating the need for solar access to the greatest extent possible. All solar panel installations must be considered on a case by case basis recognizing that the best option will depend on the characteristics of the property under consideration. Some guidelines apply to virtually all installation options and are repeated in each section.

All solar panel installations should conform to the Secretary of the Interior's Standards for Rehabilitation.
Applicable Standards are:

Standard Two: The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

Standard Nine: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

1 Primary Elevations

For most properties, locating solar panels on the primary facade is the least desirable option because it will have the greatest adverse effect on the property's character defining features. All other options should be thoroughly explored.

- Utilization of low-profile solar panels is recommended. Solar shingles laminates, glazing, or similar materials should not replace original or historic materials. Use of solar systems in windows or on walls, siding, and shutters should be avoided.

- Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage to the historic integrity of the resource and district.

These solar panels low profile and location make them unobtrusive even though they are visible from the public right of way. Photo by Paul Trudeau

- Solar panels should be positioned behind existing architectural features such as parapets, dormers, and chimneys to limit their visibility.

- Use solar panels and mounting systems that are compatible in color to established roof materials. Mechanical equipment associated with the photovoltaic system should be treated to be as unobtrusive as possible.

2 Secondary Elevations

- Solar panels should be installed on rear slopes or other locations not easily visible from the public right-of-way. Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage the historic integrity of the resource and district.

- Flat roof structures should have solar panels set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted to reduce visibility from public right-of-way.

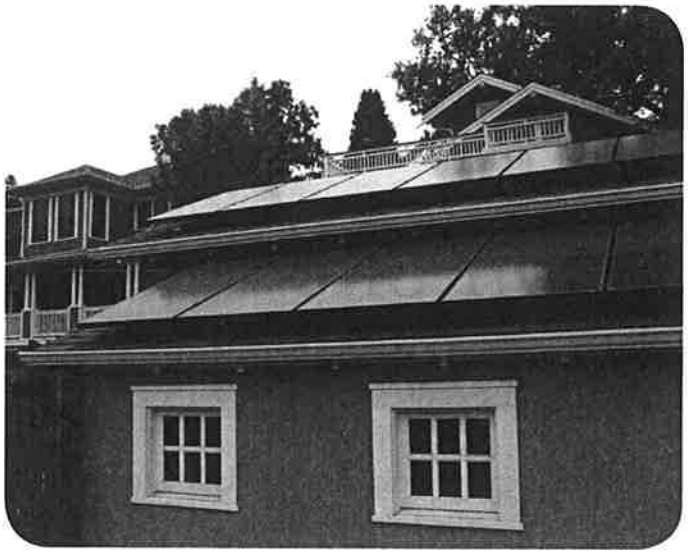
- Solar panels should be positioned behind existing architectural features such as parapets, dormers, and chimneys to limit their visibility.

2 Secondary Elevations (Continued)

- Use solar panels and mounting systems that are compatible in color to established roof materials. Mechanical equipment associated with the solar panel system should be painted or treated to be as unobtrusive as possible

- Use of solar systems in non-historic windows or on walls, siding, or shutters should be installed as to limit visibility from the public right of way.

3 Historic Accessory Structures



Solar panels placed on an accessory structure not visible from the public right of way should still follow the slope of the roof and have a low profile. Photo courtesy of Dan Corson

- Solar panels should be installed on rear slopes or other locations not highly visible from the public right-of-way. Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage the historic integrity of the resource and district.

- Flat roof structures should have solar panel installations set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted to reduce visibility from public right-of-way.

- Solar panel installations should be positioned behind existing architectural features such as parapets, dormers, and chimneys to limit their visibility.

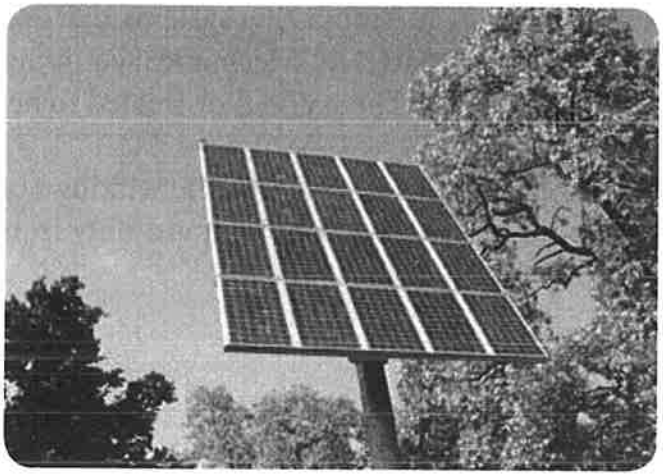
- Use solar panels and mounting systems that are compatible in color to the property's roof materials. Mechanical equipment associated with the photovoltaic system should be as unobtrusive as possible.

- Use of solar systems in non-historic windows or on walls, siding and shutters should be installed as to limit visibility from the public right of way.

4 Freestanding or Detached

- Freestanding or detached on-site solar panels should be installed in locations that minimize visibility from the public right of way. These systems should be screened from the public right of way with materials elsewhere in the district such as fencing or vegetation of suitable scale for the district and setting.

- Placement and design should not detract from the historic character of the site or destroy historic landscape materials.



Freestanding solar panels should be installed in locations that minimize visibility from the public right of way.

Consideration to the visibility of solar panels from neighboring properties should be taken, without infringing upon the required solar access.

5 New Construction On-Site

- Solar panels should be integrated into the initial design of new construction or infill projects, when possible, to assure cohesion of design within a historic context.

- Solar panels should be installed on rear slopes or other locations not highly visible from the public right of way whenever possible. Panels should be installed flat and not alter the slope of the roof.

- Flat roof structures should have solar panels set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted to reduce visibility from the public right-of-way.

- Use solar panels and mounting systems that are compatible in color to established roof materials. Mechanical equipment associated with the solar panel system should be treated to be as unobtrusive as possible.

- Use of solar systems in windows or on walls, siding, or shutters should be installed with limited visibility from the public right-of-way.

Not Recommended for Any Reason

- Removal of historic roofing materials during the installation of solar systems.
- Removing or otherwise altering historic roof configuration – dormers, chimneys, or other features – to add solar systems.
- Any other installation procedure that will cause irreversible changes to historic features or materials.

When considering retrofitting measures, historic building owners should keep in mind that there are no permanent solutions. One can only meet the standards being applied today with today's materials and techniques. In the future, it is likely that the standards and the technologies will change and a whole new retrofitting plan may be necessary. Thus, owners of historic buildings should limit retrofitting measures to those that achieve reasonable energy savings, at reasonable costs, with the least intrusion or impact on the character of the building.

(National Park Service. Preservation Brief 3: Conserving Energy in Historic Buildings. Available from http://www.nps.gov/history/hps/TPS/briefs/brief03.htm#Preservation%20Retrofitting. Accessed on August 10, 2009.)

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NATIONAL TRUST FOR HISTORIC PRESERVATION

Design Guidelines for Solar Installations

Solar panels on the Spring Lake Inn in New Jersey.

Credit: Adrian Scott Fine

In many cases, historic buildings, structures, and sites can be preserved while also accommodating solar energy installations. Indeed, as the need for renewable energy systems increases, technology evolves, political pressure to remove regulatory barriers mounts, and logistical problems are resolved, precluding the installation of solar energy systems may become indefensible. Moreover, with incentives in place, applications to install solar and other alternative energy systems within historic districts are likely to increase dramatically. Just as state agencies and local preservation boards developed policies and guidelines to address the needs of persons with disabilities, they should also develop policies that encourage compatible and appropriate installations of solar energy systems.

The following considerations can facilitate preservation boards and commissions in their review of solar panel requests and provide a foundation for the adoption of local guidelines related to solar energy installations. The primary objective of preservation ordinances is to preserve historic properties, so a preservation board should encourage project outcomes that meet solar access requirements while maintaining the integrity of historic resources. Consideration should always be given to solutions that protect historic features, materials, and spatial relationships with the visibility of all solar energy installations – including solar panels – minimized to the greatest extent possible.

Locate solar panels on the site of a historic resource. If possible, use a ground-mounted solar panel array. Consider solutions that respect the building's historic setting by locating arrays in an inconspicuous location, such as a rear or side yard, low to the ground, and sensitively screened to further limit visibility. Care should be taken to respect the historic landscape, including both its natural (i.e. topography) and designed (i.e. materials) features.

Locate solar panels on new construction. In cases where new buildings or new additions to historic buildings are proposed and approvable, encourage the placement of solar panels on the new construction. To achieve overall compatibility with the historic building and its setting, consider solutions that integrate the solar panel system in less visible areas of the new design.

Locate solar panels on non-historic buildings and additions. If the site cannot accommodate solar panels and the project does not include new construction, consider placing solar panels on an existing, non-historic addition or accessory structure. This will minimize the impact of solar installation on the significant features of the historic resource and protect the historic fabric against alteration.

Place solar panels in areas that minimize their visibility from a public thoroughfare. The primary façade of a historic building is often the most architecturally distinctive and publicly visible, and thus the most significant and character defining. To the greatest extent possible, avoid placing solar panels on street-facing walls or roofs, including those facing side streets. Installations below and behind parapet walls and dormers or on rear-facing roofs are often good choices.

Avoid installations that would result in the permanent loss of significant, character-defining features of historic resources. Solar panels should not require alterations to significant or character-defining features of a historic resource, such as altering existing roof lines or dormers. Avoid installations that obstruct views of significant architectural features (such as overlaying windows or decorative detailing) or intrude on views of neighboring historic properties in an historic district.

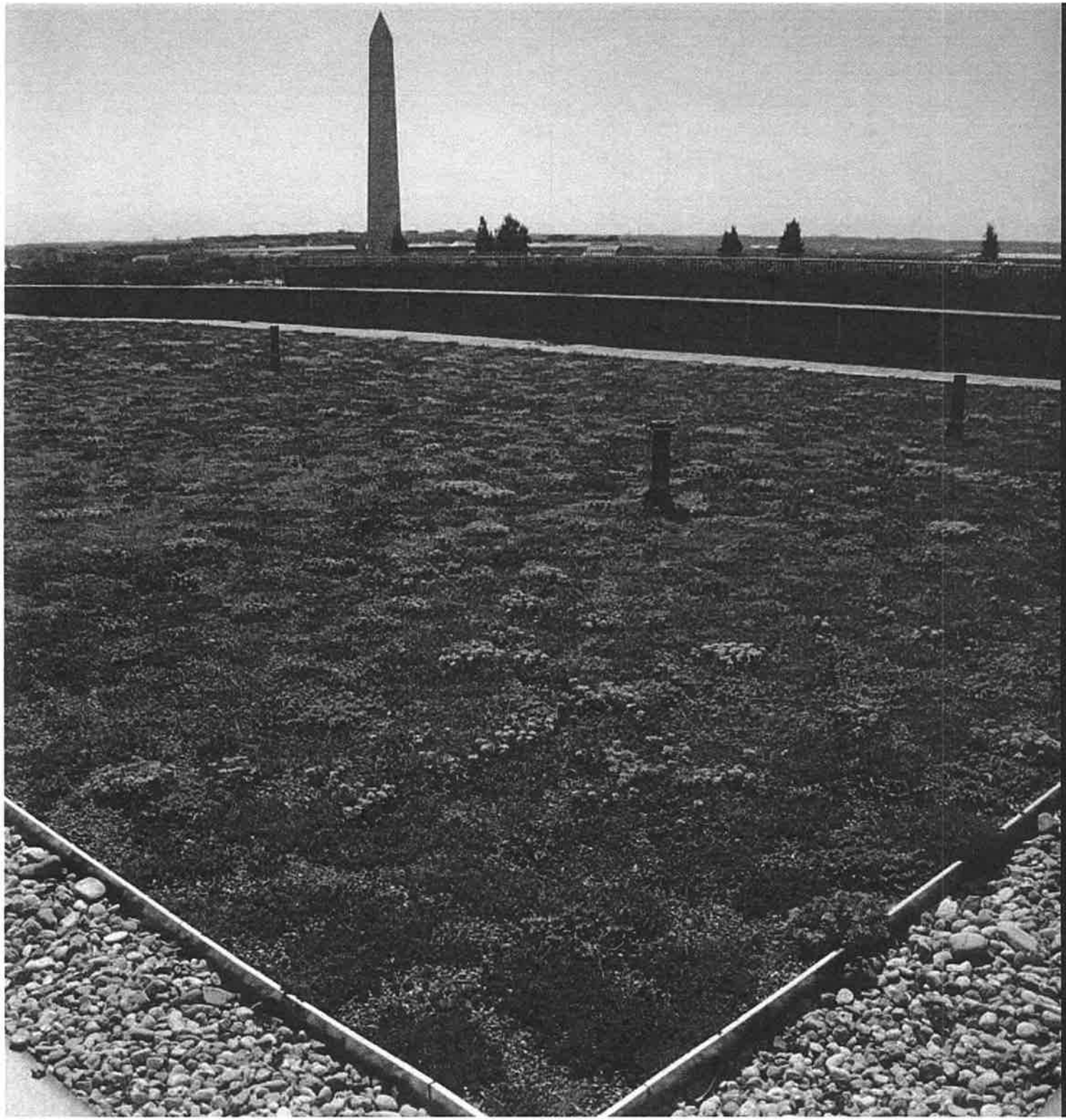
Avoid solutions that would require or result in the removal or permanent alteration of historic fabric. Solar panel installations should be reversible. The use of solar roof tiles, laminates, glazing, and other technologies that require the removal of intact historic fabric or that permanently alter or damage such fabric must be avoided. Consider the type and condition of the existing building fabric for which solar panels installation is proposed, as well as the method of attachment and future removal. Minimizing the number of points of attachment, including the use of brackets, will avoid damaging historic fabric.

Require low profiles. Solar panels should be flush with – or mounted no higher than a few inches above – the existing roof surface. They should not be visible above the roofline of a primary façade.

On flat roofs, set solar panels back from the edge. Because they are generally hidden from view, flat roofs can provide an ideal surface for solar panel arrays. To ensure that a solar installation is minimally visible, set the solar panels back from the roof's edge and adjust the angle and height of the panels as necessary.

Avoid disjointed and multi-roof solutions. Solar panels should be set at angles consistent with the slope or pitch of the supporting roof. For example, avoid solutions that would set panels at a 70 degree angle when the roof pitch is 45 degrees. In addition, solar panels should be located on one roof plane (as opposed to scattered among several roofs) and arranged in a pattern that matches the general shape and configuration of the roof upon which they are mounted.

Ensure that solar panels, support structures, and conduits blend into the surrounding features of the historic resource. The overall visibility and reflectivity of solar panels and their support structures can be substantially reduced if elements of the solar installation match the surrounding building fabric in color.



THE SECRETARY OF THE INTERIOR'S STANDARDS FOR REHABILITATION &

ILLUSTRATED GUIDELINES ON **SUSTAINABILITY** FOR REHABILITATING HISTORIC BUILDINGS

U.S. Department of the Interior
National Park Service
Technical Preservation Services

SOLAR TECHNOLOGY

RECOMMENDED	NOT RECOMMENDED
Considering on-site, solar technology only after implementing all appropriate treatments to improve energy efficiency of the building, which often have greater life-cycle cost benefit than on-site renewable energy.	Installing on-site, solar technology without first implementing all appropriate treatments to the building to improve its energy efficiency.
Analyzing whether solar technology can be used successfully and will benefit a historic building without compromising its character or the character of the site or the surrounding historic district.	Installing a solar device without first analyzing its potential benefit or whether it will negatively impact the character of the historic building or site or the surrounding historic district.
Installing a solar device in a compatible location on the site or on a non-historic building or addition where it will have minimal impact on the historic building and its site.	Placing a solar device in a highly-visible location where it will negatively impact the historic building and its site.
Installing a solar device on the historic building only after other locations have been investigated and determined infeasible.	Installing a solar device on the historic building without first considering other locations.

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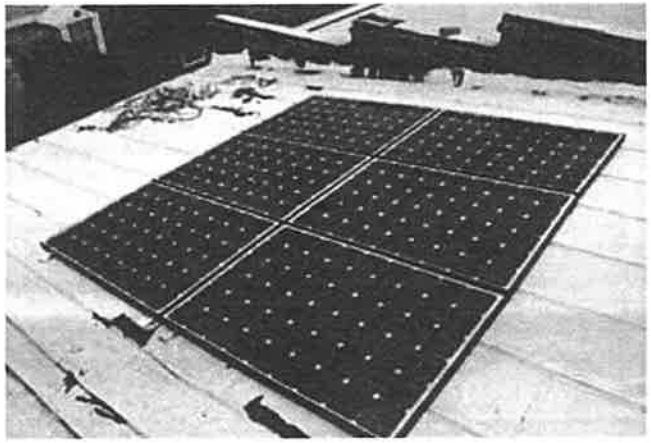

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Recommended: [72-73] Solar panels were installed appropriately on the rear portion of the roof on this historic row house that are not visible from the primary elevation.

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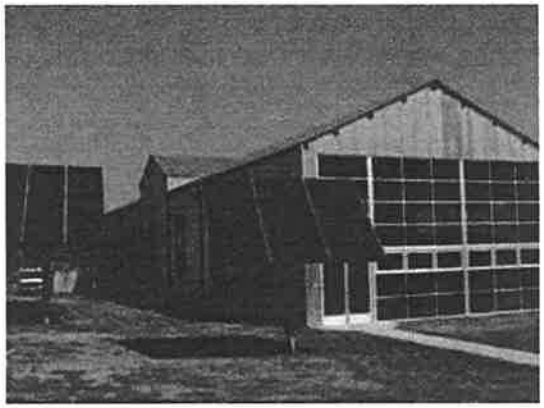

Recommended: [74] Free-standing solar panels have been installed here that are visible but appropriately located at the rear of the property and compatible with the character of this industrial site.

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Not Recommended: [75] Solar roof panels have been installed at the rear, but because the house is situated on a corner, they are highly visible and negatively impact the character of the historic property.

SOLAR TECHNOLOGY

RECOMMENDED	NOT RECOMMENDED
Installing a low-profile solar device on the historic building so that it is not visible or only minimally visible from the public right of way: for example, on a flat roof and set back to take advantage of a parapet or other roof feature to screen solar panels from view; or on a secondary slope of a roof, out of view from the public right of way.	Installing a solar device in a prominent location on the building where it will negatively impact its historic character.
Installing a solar device on the historic building in a manner that does not damage historic roofing material or negatively impact the building's historic character and is reversible.	Installing a solar device on the historic building in a manner that damages historic roofing material or replaces it with an incompatible material and is not reversible.
	Removing historic roof features to install solar panels.
	Altering a historic, character-defining roof slope to install solar panels.
	Installing solar devices that are not reversible.
Installing solar roof panels horizontally -- flat or parallel to the roof—to reduce visibility.	Placing solar roof panels vertically where they are highly visible and will negatively impact the historic character of the building.

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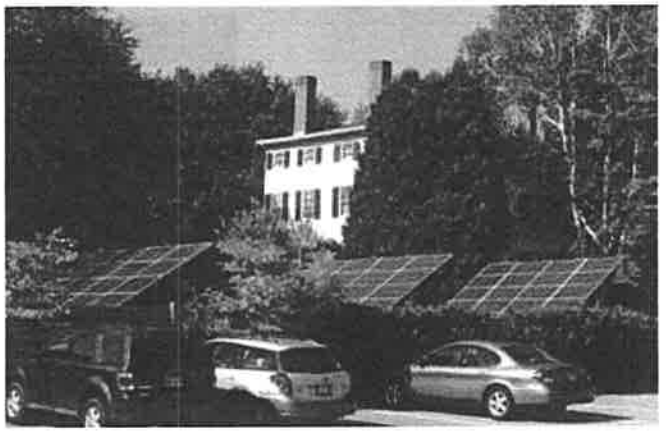

Not Recommended: [79] Although installing solar panels behind a rear parking lot might be a suitable location in many cases, here the panels negatively impact the historic property on which they are located.

Recommended: [76-77] Solar panels, which also serve as awnings, were installed in secondary locations on the side and rear of this historic post office and cannot be seen from the front of the building. [78] Solar panels placed horizontally on the roof of this historic building are not visible from below.

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