

Alternative Materials Design Guidelines

NOTE: The tracked changes below are Landmarks Staff and Commission recommended changes to the Nore' Winter text for review:

The Design Guidelines chapters sometimes refer to the use of alternative materials when describing appropriate replacement of historic building features and components such as moldings, windows, siding, and other architectural details. An alternative material, sometimes referred to as a “substitute” or “replacement” material, is one which is different from that used historically. Alternative materials can be appropriate for historic resources in some cases. An alternative replacement material should always convey the visual qualities, character, and durability of an original material and be researched fully by Landmarks Commission Staff.

Four Circumstances That May Warrant the Use of Alternative Materials:

1. Unavailability of historic materials: the most common reason and particularly a problem for masonry materials where the color and texture are derived from the material itself.
2. Unavailability of skilled craftsmen: particularly true for ornamental work such as carved wood ~~or~~ and stone, or cast iron.
3. Inherent flaws in original materials: if incompatible materials were used together on a historic structure, or if materials have eroded, a more durable natural material may be appropriate as a substitute.
4. Code-required changes: many times, building codes require changes to historic buildings for the health and safety of its occupants. In some cases, replacing heavy historic elements with light replicas may be an appropriate solution. However, it is important to keep in mind that this action could affect any local or National Register designation status of the building, as well as resulting in a loss of potential tax credit money.

Appropriate Use of Alternative Materials

Alternative materials are sometimes used to replace damaged, deteriorated, or missing features. While it is usually best to use historic materials, in some circumstances it may be appropriate to imitate historic materials with substitute materials. When using substitute materials, it is important to match them as closely as possible to the historic material and to ensure that no damage to the remaining historic fabric will result upon installation.

Approval for Use of Alternative Materials

The use of alternative materials is considered on a case-by-case basis as replacement materials, or for use on a new addition or new building in a preservation district. The Architectural Review Committees (ARC) and Landmarks Commission will consider a variety of factors when determining whether an alternative material is appropriate (as described below). Additionally, the ARCs, Landmarks Commission,

and ~~Metro~~ Landmarks Commission Staff will consider the reasonable availability of the preferred material, the skill required to execute the preferred approach, and the quality, appearance, and character of solutions. Any COA application that includes the proposed use of a material that is new or has not been reviewed before will be reviewed by the ~~Architectural Review Committee~~ ARC of the appropriate preservation district. While not every new material may be deemed appropriate for the use on historic structures, the Landmarks Commission ~~staff~~ Staff encourages the testing and analysis of new materials, especially as the use of some new materials may provide a greener solution than replacing a material in-kind. ~~Occasionally, staff will test a new material to determine its compatibility with a historic material and its durability.~~ Materials that meet the correct standards will then be shown to the Landmarks Commission and ~~Architectural Review Committee~~ ARCs for future reference. Applicants are also welcomed to suggest a new material to staff for ~~testing~~ review.

After obtaining approval from the Landmarks Commission and ~~Landmarks Commission Metro~~ Staff for the use of an alternative material, consult a qualified professional and experienced fabricator and contractor. The Landmarks Commission will consider the following factors when determining whether an alternative material is appropriate.

Potential Impact on Historic Significance

Removing an original material diminishes the integrity of a historic property by reducing the percentage of building fabric that remains from the period of historic significance. Retaining the original material is always preferred. If this is not feasible, alternative materials may be considered. When used, an alternative material should convey the character, including detail and finish, of the original to the greatest extent feasible.

Durability

An alternative material should have proven durability in similar applications. While some new materials are very sturdy, others may degrade quickly and can be difficult to repair.

Appearance

An alternative material should have a similar profile, texture, and finish as the ~~original~~ historic material. Some synthetic siding has an exaggerated, rusticated finish that is an inaccurate representation of original clapboard, and ~~many vinyl~~ some products have a sheen that ~~is can be~~ out of character with that of painted wood and metal.

Location

Up close, it is easier to identify some alternative materials due to differences in texture, finish, and feel. ~~Tapping on a~~ hollow plastic column or ~~vinyl~~ fence does not convey the same experience as the ~~historic~~ original. For this reason, locations that are ~~more remote~~ less visible are better. ~~Similarly, and as~~ the use of alternative materials ~~is could be~~ more appropriate on non-primary facades.

Cost

Some alternative materials are promoted because their initial costs appear to be less than repairing or replacing the original. When the other qualities of appearance and durability are proven, then the less

expensive option may be appropriate. However, long-term, “life cycle” costs should also be weighed. Sometimes, the up-front savings is deceptive.

Environmental Impacts

The potential environmental impacts of alternative materials should also be considered including impacts associated with manufacture, transport, installation, and ability to recycle.

Interaction with Historic Building Materials

Some alternative materials may interact negatively with historic materials. For example, some metals may corrode, and stain original materials, and some window and siding materials may expand and contract with temperature changes in ways that degrade historic characteristics of an original material.

Some Alternative Material Examples

With the previous considerations in mind, the following products are examples of those that are often discussed as possible replacements for original materials on historic buildings, or those to be used in new construction in preservation districts. The following list does not imply that these materials will be approved by the [Architectural Review Committee](#)ARC, Landmarks Commission, or [Landmarks Commission Metro-Staff](#); it is intended to highlight some potential applications and issues related to their use. The qualities of these materials that are described here are not definitive and are provided to alert users to some of the variables that they should evaluate when considering alternative materials.

Fiberglass

Fiberglass is a type of reinforced plastic where the fiber is glass. It appears in a variety of grades, some of which are designed for exposure to exterior elements. It is typically used for reproducing decorative molding and architectural details, as well as roofing shingles. In exterior applications, protected areas may extend the durability of the product. As a replacement material, there are sometimes concerns about the ~~“hollow” sound and~~ lightweight feel when it is used in locations where people may frequently come into direct contact, such as on a front porch column.

Fiberglass Shingles

As shingles, fiberglass can appear similar to asphalt shingles, although some versions have a shiny finish that may be out of character in preservation districts. Fiberglass shingles are reported to have good fire protection qualities and be more environmentally friendly, as they use less asphalt. However, they also are reported to be somewhat less durable than asphalt shingles and less suitable for cold climates.

Composite Fiberglass

A variation is composite fiberglass, which combines other materials with fiberglass. In architectural materials, this may include ground stone to simulate genuine stone products. This is reported to be more durable than basic fiberglass. Columns and moldings are examples of its use. Casts can be ordered to accurately match [historical original](#), missing details.

Plastic Composite Decking

This is typically made from sawdust and recycled plastics mixed with pigments and preservatives. It is provided in boards that can be installed in a manner similar to wood decking. Finish and appearance have improved in recent years, to more closely resemble wood in scale, character, and finish. It is reported to be durable and require little maintenance.

Glass-Fiber-Reinforced Concrete (GFRC)

This product combines glass fiber with concrete. It is reported to be used for its stronger weight carrying qualities and durability. It may appear as window trim, decorative columns, and moldings. It can have a stone finish or be painted.

Vinyl (Polyvinyl Chloride (PVC) Resin

Vinyl is a synthetic man-made plastic that appears as many building products, including siding, windows and doors, fences, and decking. Industry organizations claim that the material is durable and can be recycled, but others have raised concerns about these qualities. Other concerns ~~that are raised~~ relate to the appearance. Some siding, for example, is produced with an exaggerated “wood” grain, or with a shiny finish that is not authentic to most historic applications of genuine wood siding. Some siding also is produced in dimensions that are out of character and lack the precise edge that genuine wood provides. Trim boards may also be out of scale with historic designs.

Synthetic (Cultured) Stone

This product combines concrete with ground stone to simulate genuine solid stone. It is cast as a blend of stone particles and resins, combined with pigments. It appears in a variety of finishes that simulate various stone types, such as granite, limestone, and sandstone. It appears as columns, railings, and architectural details.

Synthetic stone also occurs as a veneer that is intended to simulate genuine stone. ~~Concerns have been raised about~~ There is concern about the appearance when applied as a wall veneer, because the detailing may not look authentic. ~~However, m~~ More accurate versions have become available, ~~however.~~

Fiber Cement Siding and Trim

This product is a composite of sand, cement, and cellulose fibers. It most often appears as a siding product, often as a substitute for wood lap siding. It can be cut and installed as individual planks, similar to wood. Fiber cement siding can be painted. It is reported to be very durable and can be obtained in dimensions and finishes that appear similar to genuine wood siding. ~~However, o~~ Other versions, ~~however,~~ may not have appropriate finishes or dimensions for application in preservation districts. If proposed for trim, c are should be taken in assuring that trim boards and details are similar to genuine wood.

Exterior Insulation and Finish Systems (~~EIFS~~ EIFS)

This product is a synthetic stucco that is a multi-layered composition, with a protective outer layer covering a softer inner core. It is claimed to have good insulation properties. ~~Concerns have been raised about~~ Some potential issues include durability, moisture intrusion, mold growth, and infestation by animals. Some improvements of the product have been reported, but concerns remain about its use in preservation districts.

Synthetic Slate Roofing

Synthetic slate shingles are a composition of plastic and rubber. Some include cellulose or mineral dust. They can be shaped to resemble genuine slate. It is reported to be recyclable and ~~to be~~ highly durable. Key considerations in historic contexts are that the finish, profile, dimensions, and details appear similar to those of original slate.

Synthetic Tile Roofing

This composite material appears as a substitute for clay or concrete roof tiles. They are reported to be highly durable. When applied in historic contexts, key considerations are that the color, finish, and profile appear similar to original tiles.

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Archaeology Design Guidelines

NOTE: The tracked changes below are Landmarks Staff and Commission recommended changes to the Nore' Winter text for review:

AR.1 Do not disturb or destroy archaeological resources, nor allow artifact collectors, amateur archaeologists, or others to do so.

- Artifacts recovered through excavation, with the intent to collect artifacts or archaeological investigations, should not be sold.

AR.2 Report all archaeological discoveries such as artifacts, features, and other archaeological deposits to the Landmarks Commission.

- Examples include Native American spear points and tools, historic objects (old bottles, dish fragments, marbles, bones, nails, etc.), historic trash pits/dumps, privies (outhouse pits), cisterns, wells, and foundations.
- Property owners who wish to retain ownership of artifacts shall provide sufficient time for the Landmarks Commission to properly document the materials.
- If something is discovered, a professional archaeologist as defined by the Kentucky Heritage Council shall write a letter stating what was found for the file.

AR.3 Notify the Landmarks Commission of a work schedule prior to any excavation, including repair or replacement of underground utilities.

AR.4 Design a research plan and proposal prior to beginning an archaeological investigation.

- When qualified personnel are unavailable, the Landmarks Commission may design, research, and conduct archaeological investigations.
- Do not begin an archaeological investigation prior to submitting and receiving approval from the Landmarks Commission for the research, design, and proposal.

AR.5 If an applicant plans to conduct archaeological investigations, or an archaeological investigation is required, a professional archaeologist as defined by the Kentucky Heritage Council should conduct the work.

- Present discovered artifacts to an acceptable curation facility (museum) to be curated (stored).

Maintenance Design Guidelines

NOTE: *The tracked changes below are Landmarks Staff and Commission recommended changes to the Nore' Winter text for review:*

Entrances

MA.1 Carry out regular maintenance for entrance features.

- Proper maintenance includes regular cleaning, rust removal, limited paint removal, and the application of protective coatings.

MA.2 Remove and then reinstall door hardware when repainting.

MA.3 Apply weather stripping as needed.

- Installation of weather stripping around door frames can increase energy efficiency significantly.

MA.4 Do not paint historically clear-finished doors.

Masonry

MA.5 Regularly inspect a building for mortar deterioration caused by a leaking roof and gutter, exposure, differential settlement, and capillary action in which moisture is drawn up into the walls.

- Where mortar joints have deteriorated, repoint with an appropriate mortar mixture that is no harder than the original historic mortar.

MA.6 Identify the cause(s) of localized mortar failure.

- Such failure can be caused by broken downspouts, damaged flashing, building settlement, or improper site drainage.

MA.7 Identify the cause(s) of localized masonry deterioration.

- Drainage problems, rising damp, freeze-thaw cycles, absorption of de-icing salts, building settlement, hard mortar, and vine or moss coverage can all cause brick to crack and crumble.

MA.8 Do not clean a masonry surface unless heavy soiling is causing deterioration.

- Cleaning should use only the gentlest means necessary, such as low-pressure water and natural bristle brushes.
- Do not use metal brushes, which can damage masonry surfaces.

MA.9 Do not apply a waterproof coating, paint, or stucco to a masonry building as a substitute for repointing and general maintenance.

- In addition to altering the original appearance, such treatments may ultimately trap moisture within the walls. They should be used only as a last resort in instances where maintenance and masonry repairs have not succeeded in limiting water penetration.

MA.10 Remove deteriorated paint only to the next sound layer before applying a compatible paint coating system to previously painted masonry.

- Paint that firmly adheres to masonry should be left in place, since it acts as a protective coating.

MA.11 Install a sloping mortar wash surface at the top of a chimney to protect the chimney wall.

MA.12 Do not place insulation within the cavities of a masonry wall unless the wall was built to have this insulation.

- This limits-can limit the ability of water vapor to pass through the walls and could lead to condensation-related deterioration within the walls. In addition, installation can significantly damage historic fabric.

MA.13 Do not use an anti-graffiti masonry sealant. They alter the appearance of historic masonry after frequent applications.

Metals

MA.14 Regularly inspect ornamental metalwork for signs of corrosion, tears, holes, or missing pieces.

- Rust and surface discoloration are often evidence of internal deterioration. Sanding, priming, and painting can address small patches of deterioration; however, more extensive damage may require limited replacement.

MA.15 Identify the types of metal on your historic building before undertaking any type of project, since the unique characteristics of each metal require different treatments.

Paint

MA.16 Remove, handle, and dispose of lead-containing paint in compliance with all local, state, and federal standards.

MA.17 Remove deteriorated paint only to the next sound layer before applying a compatible paint coating system to previously painted masonry.

- Paint firmly adhering to masonry should be left in place, since it acts as a protective coating.

MA.18 Remove only deteriorated paint layers using the gentlest means possible (hand-scraping and hand-sanding in conjunction with chemical strippers).

- Electric hot-air guns and electric heat plates may be used with extreme caution when total paint removal is required. Care should be taken not to scorch the wood or start a fire.

MA.19 Prepare wood surfaces properly and apply a compatible paint coating system following manufacturers' application instructions.

- Generally, a primer coat and two finish coats are recommended.

MA.20 Coat all surfaces of wood repairs [with primer](#), including those that will be concealed, ~~with primer~~.

- This is called “back-priming” and helps combat deterioration and warping caused by moisture absorption over time.

MA.21 Paint all wood porch elements.

- Painting protects porch elements from exposure and undue weathering.

MA.22 Reapply an appropriate paint or other coating system to previously painted metal features after cleaning.

- Failure to do so will result in accelerated corrosion of the metal or alloys.

MA.23 Remove and then reinstall window and door hardware when repainting.

MA.24 Do not use propane or butane torches, sandblasting or water-blasting, or belt or disc sanders to remove deteriorated paint from the wood surfaces of historic buildings.

- These methods are extremely harsh and can significantly damage historic woodwork.

Porches and Entrances

MA.25 Install wood lattice or grillage between porch piers for adequate ventilation.

MA.26 Install a stone or concrete plinth upon which the wood post and bottom steps can rest.

- This will help control future deterioration by raising wood members above the ground level.

MA.27 Paint all wood porch elements. Painting protects porch elements from exposure and undue weathering.

MA.28 Do not apply waterproof sealants over masonry walls or steps.

- This will cause moisture to become trapped within the steps or walls.

MA.29 Do not use rock salt or halite to melt snow and ice on stone or brick steps.

- Salts dissolved in the meltwater will be absorbed and crystallize, damaging historic masonry.

Roofing

MA.30 Regularly inspect gutters, flashing, and downspouts to ensure that they are effective in carrying rainwater away from the building.

- All roof surfaces should be watertight, and flashing should be intact around chimneys, parapets, dormers, and along valleys created by intersecting slopes.

MA.31 Maintain the effectiveness of the roof by regularly cleaning gutters and downspouts, replacing deteriorated flashing as needed, properly venting attics to prevent moisture condensation, and inspecting for insect infestation.

MA.32 Use [low-profile](#) gutter guards to reduce the collection of organic matter.

MA.33 In the absence of a sub-surface system, install splash blocks beneath downspouts [or downspout extensions](#) to carry water away from the foundation and limit soil erosion.

MA.34 Replace any missing downspouts.

- Uncontrolled roof drainage will result in severe damage to masonry, foundations, and interiors over time.

MA.35 Install a sufficient number of gutter hangers to attach downspouts securely to the wall.

MA.36 Protect a leaking roof temporarily, until permanent repairs can be made.

- Without such intervention, deterioration of other building materials, such as adjacent masonry, wood, plaster, and paint, will be accelerated.

MA.37 Make provisions to protect adjacent features (windows, trim, etc.) and landscape elements when undertaking a roof replacement project.

Siding and Trim

MA.38 Regularly inspect ornamental woodwork and siding for cracks or loose joints, and recaulk and paint as needed.

MA.39 Reduce wood deterioration by painting, repairing faulty flashing, leaking gutters, and cracks in siding, as well as removing invasive plant material and remedying fungus or insect infestation.

MA.40 Pay particular attention to the condition of the siding above the foundation. This area is exposed to rain, splashing water, and rising damp, which makes it very susceptible to deterioration.

MA.41 Treat rot by eliminating the source of excess moisture.

- Drying and cleaning the wood and using a sterilizing fungicide and a wood preservative treatment should follow.
- Use only dry, un-infested wood for replacement.

MA.42 Repaint wood surfaces with colors that are appropriate to the historic building and the district.

MA.43 Use wood sealants only at vertical joints, such as where a clapboard meets a corner board.

- Applying sealant to horizontal joints will trap moisture and cause deterioration.

MA.44 Retain and renew paint coatings on historically-painted wood features.

- Such coatings inhibit deterioration caused by ultraviolet light, moisture, and the elements.

MA.45 Prepare wood surfaces properly and apply a compatible paint coating system following manufacturers' application instructions.

- Generally, a primer coat and two finish coats are recommended.

MA.46 Coat all surfaces of wood repairs, including those that will be concealed, with primer. This is called “back-priming” and helps combat deterioration caused by moisture absorption over time.

MA.47 Remove only deteriorated paint layers using the gentlest means possible.

- Hand-scraping and hand-sanding in conjunction with chemical strippers is best for wood structures, and chemical strippers are effective on masonry buildings. Electric hot-air guns and electric heat plates are not recommended, because of their tendency to dry and scorch the wood and ignite debris behind clapboards.

MA.48 Do not use propane or butane torches, sandblasting or water-blasting, or belt or disc sanders to remove deteriorated paint from historic buildings.

- These methods are extremely harsh and can significantly damage historic woodwork.

MA.49 Do not strip historically-painted architectural features to bare wood, leaving it in an unfinished state.

Vegetation and Landscaping

MA.50 Take the health and shape of trees into account when pruning. Over pruning [and topping a tree crown](#) should be avoided [as it can significantly impact the health and life span of the tree](#).

MA.51 Ensure that the grade around the perimeter of a building is sufficient to carry water away from the foundation and basement.

- Improper drainage may cause rising damp where water is drawn into the walls by capillary action, leading to efflorescence, mortar joint deterioration, and flaking stone.

MA.52 Monitor vegetation adjacent to or on historic structures to ensure that it is not damaging wood or masonry through root penetration, abrasion, or related biological growth.

Storefronts

MA.53 Practice regular cleaning, limited paint removal, painting, and inspection for metallic corrosion where necessary.

MA.54 Carry out regular window maintenance, including inspecting caulk and glazing putty, painting, reinforcing wooden members as needed, and monitoring metal sash for signs of corrosion.

MA.55 Regularly inspect windows to make sure that the joints where the frame and masonry or wood meet are tight. If they are loose or open, the joints should be caulked to prevent the infiltration of air and water.

MA.56 Install interior storm windows with air-tight gaskets, ventilating holes, and/or removable clips to avoid condensation damage to historic windows.

- A metal thermal sash is recommended for metal windows and a wood, PVC, or vinyl thermal sash for wood windows.

MA.57 Remove and then reinstall window hardware when repainting.

MA.58 Apply unobtrusive metal caps along the top edge of shutters to increase their longevity.

MA.59 Do not use the “dip-stripping” method to remove paint from shutters.

- This weakens the glue and can abrade the wood. In-place chemical stripping is the preferred method.

Energy Efficiency

MA.60 Install batt insulation in attic and crawl spaces with the vapor barrier facing the heated space to prevent moisture build-up from condensation.

MA.61 If blown-in insulation is to be used in the wall of a historic building, use a procedure that will not cause damage to the structure.

- The use of blown-in insulation is not recommended in historic structures, because this technique does not install needed vapor barriers. Without a vapor barrier, moisture will condense within the walls, resulting in deterioration and mildew inside.

Mural Design Guidelines

NOTE: The tracked changes below are recommended changes from the Public Art Administrator for review:

Murals are defined as a hand-produced work of visual art that is applied directly upon, or affixed directly to, an exterior wall of a building or structure. This may include but is not limited to tiled, painted, or printed art.

Mu.1

Retain and preserve artwork that contributes to the overall historic character of a building, site, or district.

Mu.2

Except in very limited cases where appropriate, murals are not permitted on primary facades of historic buildings. Secondary elevations of buildings may be an appropriate location for murals.

Mu.3

Artwork should be subordinate in scale to the overall building.

Mu.4

A tiled or painted mural is not permitted on an unpainted historic masonry wall such as brick, stone, or stucco. A tiled or painted mural may be permitted on a masonry wall composed of concrete block and previously painted historic masonry, if appropriate. Murals should instead be painted on removable materials such as MDO plywood, metal, or other suitable outdoor material. Anchoring shall be placed into masonry joints or other non-damaging areas of the walls. Framing shall be done so as not to trap water between the mural and the wall. Hanging or anchoring shall be reversible.

Mu.5

New murals shall not damage historic masonry or alter historic streetscapes where unpainted masonry is a character defining feature.

Mu.6

Murals shall not adversely affect historically significant architectural details, including but not limited to cornices, bay windows, or decorative terracotta.

Mu.7

Murals shall not contain hate speech or symbology, known gang symbols, drug references, weapon references, or depict an unreasonable or offensive act, utterance, gesture, or display that creates a clear and present danger of a breach of peace or imminent threat of violence.

Mu.8

In order to not be further classified and regulated as a sign, a murals cannot contain an advertisement in any form, actual or perceived, including but not limited to a slogan, logo, graphic, distinctive emblem, trademark, web address, or phone number that identifies a commercial business or a product or service offered by businesses, business complexes, schools, attractions, historical or tourist locations, malls, or other organizations (charitable, non-profit, fraternal, religious, political organizations, etc.). However, the mural may include a logo, emblem, or trademark to acknowledge the sponsor or artist so long as the inclusion is incidental to the artwork and does not alter the message of the art, and its primary purpose is not to serve as an advertisement for the sponsor or artist's products or services.

Mu. 9

To ensure a higher level of quality and longevity, the surface should be properly prepared and using high-quality and compatible materials. Murals should be produced to remain in good condition for a duration of 5-10 years.

Mu. 10.

Murals should be maintained and repaired by the property owner if the surface is damaged, faded, or vandalized. Protective coatings are encouraged. Treatment operations include cleaning, retouched damaged or faded surfaces, reattachment of plaster detached from the wall, re-adhering flaking paint, and graffiti removal.

Mu. 11.

Additional review by the Commission on Public Art is required for all murals installed in historic preservation districts or on Individual Landmarks.

Sustainability and Energy Efficiency Design Guidelines

NOTE: The tracked changes below are Landmarks Staff and Commission recommended changes to the Nore' Winter text for review:

SB.1 Preserve an inherent energy efficient feature of the historic original building structure.

- Identify a structure building's inherent sustainable features and operating systems, and maintain them in good condition.
- Repair or restore a covered, damaged, or missing feature where appropriate.

SB.2 Maintain a structure building's energy efficient features in operable condition.

- Retain historic original shutters, awnings, canopies, and transoms. Operable features like these will increase the range of conditions in which a structure building is comfortable without mechanical climate controls.
- Install a draft stopper in a chimney to increase energy efficiency.

SB.3 Use non-invasive strategies when applying weatherization techniques.

- Weather-strip original historic framework on windows and doors.
- Install additional insulation in an attic, basement, or crawl space as a simple method to make a significant difference in a structure building's energy efficiency. Provide sufficient ventilation to avoid moisture build-up in the wall cavity.
- Install weatherization strategies in a way that avoids altering or damaging significant materials and their finishes.
- Use a material that is environmentally friendly and will not interact negatively with a historic building material.
- When a roof must be replaced, consider installing a radiant barrier.

SB.4 Enhance the energy efficiency of an original historic window or door.

- Make best use of an original historic window or door; keep them in good repair and seal all leaks.
- Retain original historic glass, taking special care in putty replacement.
- Maintain the glazing compound regularly. Remove old putty with care.
- Use operable systems such as storm windows, insulated coverings, curtains, and awnings to enhance performance of historic original windows.
- Weather-strip and caulk historic original framework.
- Double pane glazing may be acceptable where original historic glazing has been lost is not character defining and the frame can support the weight and profile.

SB.5 Design site and landscape improvements to promote energy efficiency.

- Use drought tolerant plants to reduce the need for irrigation.
- Plant trees and shrubbery to serve as windbreaks and provide seasonal shading.

SB.6 Avoid adverse impacts to a historic structurebuilding when installing a green roof.

- A green roof provides thermal mass to help regulate internal temperature, as well as and helps to reduce the urban heat island effect.
- Green roof material should not replace historically significant character defining roofing materials that are visible from the public right of way street-facing or street-address façade.
- The weight of the green roof should not threaten the structural integrity of the structurebuilding. If additional structural support is needed, it should avoid adverse impact to the structurebuilding's historic significance integrity.

SB.7 Locate energy-generating technology to minimize impacts to the historic character of the site and structure.

- Locate technology where it will not damage, obscure, or cause removal of significant features or materials.
- Maintain the ability to interpret the historic character of the buildingstructure.
- Plan installation of integrated photovoltaic systems so they will not hinder the ability to interpret the historic significance of the structure. For example, installation of solar shingles on a rear or secondary roof facade where the original-historic roof material is missing or significantly damaged would be appropriate.
- Size collector arrays to remain subordinate to the historic structure.
- Mount collectors flush below the ridge line on a sloping roof.
- Install collectors on an addition or secondary structure.
- Minimize visual impacts by locating collectors back from the street-facing or street-address façadefront facade.
- Ensure that exposed hardware, frames, and piping have a matte finish and are consistent with the color scheme of the primary structure.

SB.8 Install new technology in a reversible manner.

- Install technology in such a way that it can be readily removed, and the original-historic character easily restored.
- Use materials that are environmentally friendly and will not interact negatively with historic building materials.
- Attach turbines in a manner that avoids damage to significant features.
- Install turbines to allow restoration of affected structurebuilding areas.
- Install turbines as freestanding structures in unobtrusive locations when feasible.
- Do not overload structural or roof protection systems when attaching turbines.

SB.9 Minimize adverse effects from solar collectors on the character of a historic structurebuilding.

- Place collectors to avoid obscuring significant features or adversely affecting the perception of the overall character of the property.
- Size collector arrays to remain subordinate to the historic structure.
- Mount collectors flush below the ridge line on a sloping roof. This will not cause a significant decrease in the device's solar gain capabilities.
- Install collectors on an addition or secondary structure.

- Minimize visual impacts by locating collectors back from the street-facing or street-address façade~~front facade~~.
- Ensure that exposed hardware, frames, and piping have a matte finish and are consistent with the color scheme of the primary structure.

SB.10 Use the least invasive method feasible to attach solar collectors to a historic roof.

- Avoid damage to significant features.
- Install a collector in such a way that it can be removed, and the original-historic character easily restored.
- Do not threaten the structural integrity of the structure~~building~~ with collector arrays.

SB.11 Consider using building-integrated photo voltaic technology where the use of new building material is appropriate.

- Plan installation of integrated photo voltaic systems so they will not hinder the ability to interpret the historic significance of the structure. For example, installation of solar shingles on a rear or secondary roof facade where the original-historic roof material is missing or significantly damaged would be appropriate.

SB.12 Minimize the visual impacts of a wind turbine from public view.

- Use turbines and any exposed hardware with a matte finish that is consistent with the color scheme of the primary structure.
- Do not obscure significant features or impair interpretation of the structure~~building~~'s historic significance.

SB.13 Install turbines to be readily removed.

- Attach turbines in a manner that avoids damage to significant features.
- Install turbines to allow restoration of affected building-structure areas.

SB.14 Minimize structural impacts when installing turbines.

- Install turbines as freestanding structures in unobtrusive locations when feasible.
- Do not overload structural or roof protection systems when attaching turbines.