

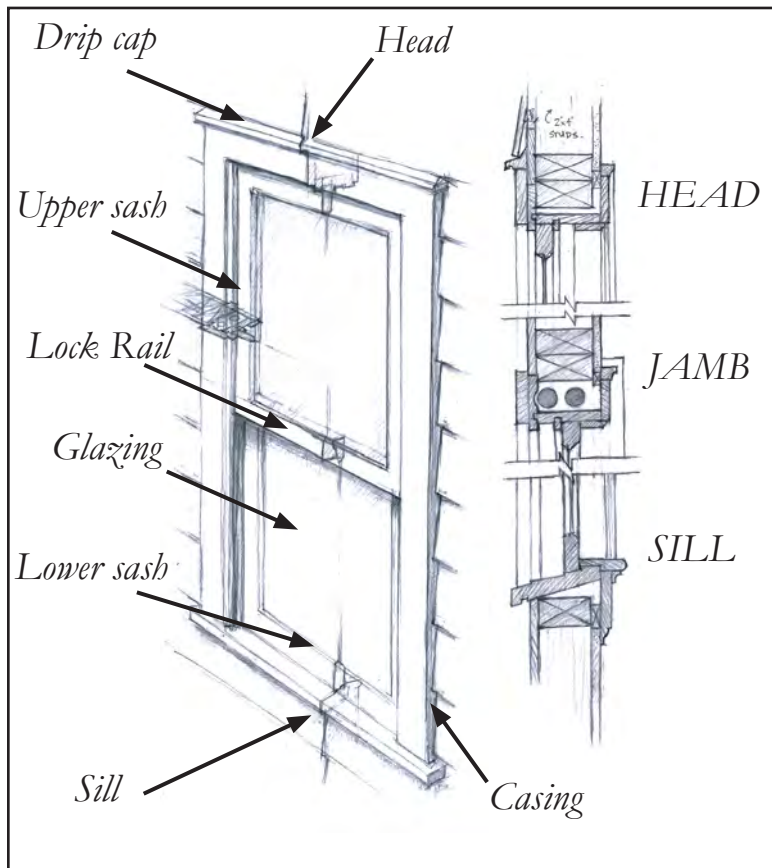
CHAPTER 2.1: WINDOWS

INTRODUCTION

Windows are one of the most visible, yet commonly under-appreciated components of older and historic homes and historic resources. Many historic structures in Santa Barbara have original wood windows that have lasted over a century. They may have intricate details that give depth, light, and shadow to a building's façade. Original windows reflect the design intent for the building, including the period, regional style, and building techniques. In fact, many wood windows are considered hand-crafted pieces of art that are examples of exceptional craftsmanship and design.

Windows give scale to a building and provide visual interest to the composition of individual façades, while distinct designs help define many historic building styles. These openings define character through their material, profile, shape, size, configuration, and arrangement on the façade. These Guidelines will help property owners consider all the factors and options when repairing or replacing original windows.





Components of a traditional, double-hung wood window.

BENEFITS OF KEEPING HISTORIC WINDOWS

Original windows are a key component of a historic building's design and appearance. The benefits of maintaining and repairing a building's original windows include:

- Helps to retain the historic character of the building
- Wood windows made prior to 1940 are likely made from old-growth wood that is significantly denser, more durable, and more rot-resistant. These qualities mean that when properly cared for, older wood windows can last centuries. In contrast, many new windows are made from materials that may last only 10 to 20 years, and vinyl windows, in particular, often warp from sun exposure
- Original windows were made specifically to fit their window openings and were custom installed. New windows will likely have to be custom ordered to fit into the original openings
- Traditional windows were made from individual components. Each piece can be individually repaired or replaced, including rails, stiles, muntins, stops, sills, stools, and jambs. In contrast, windows composed of vinyl, aluminum, fiberglass and composite materials are manufactured as a unit. Their individual components generally cannot be repaired
- Repairing and increasing the energy performance of existing wood windows can be cost-effective
- Hiring a window repair specialist to refurbish windows supports skilled local labor

ENERGY EFFICIENCY

Commonly, homeowners are eager to replace their historic windows because companies promise that their replacement windows will not only save them time and money, but that their products and services are the “green” thing to do. In fact, a thriving industry has grown around the perceived need to replace rather than restore. However, restoring original windows can be a choice that is actually better for environmental conservation. Original windows have embodied energy – a factor often overlooked when evaluating environmental efficiency. Embodied energy is the amount of energy it takes to create a product, including everything from milling the wood to transportation, manufacture, and installation. Tearing out historic windows for replacement units not only wastes their embodied energy, it requires additional energy to remove and dispose of them. Every window that is thrown away is adding more waste to landfills.

Window replacement is thought of as a solution to make homes more energy-efficient, and older windows are often mistakenly blamed for energy loss. A common misconception is that single pane glass or wooden frames lead to energy loss, when in fact most of the problems are caused by gaps or “leaks” in the window surround, which can be addressed without extensive work or replacement. Wood windows are usually the first items to be replaced in an effort to reduce utility bills. However, windows themselves are not always the main culprit. Air infiltration wafts through openings in floors, walls, and ceilings. Adding just 3 ½ inches of insulation in an attic has a greater impact on thermal resistance than replacing a single-pane window with a high energy efficiency replacement window. Adding weather stripping and an interior storm window to a historic wood window in good repair will significantly improve its energy efficiency and the occupants’ comfort level without having to replace the entire unit.

Easy, Low-Cost Energy Efficiency Tips:

- Caulk around the window opening on the exterior
- Caulk around the window trim on the inside
- Add weatherstripping to the window sash
- Use interior insulating windows
- Make sure the sash lock brings the sashes together tightly
- Use curtains and blinds to block sunlight in the summer and contain warm air during the winter
- Consider an entire home energy evaluation by a certified Home Energy System Rating System (HERS) rater to develop the best plan for your structure.
- Using a HERS rater can also qualify your project for low cost loans and government rebates
- Installing new windows may not pay for itself in energy savings





2 over 2 double-hung wood window with original wood trim



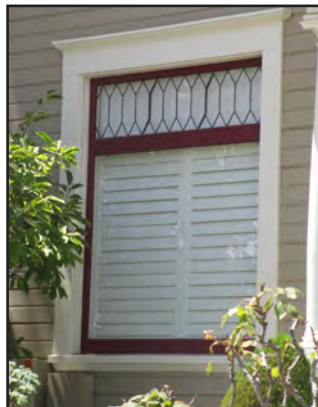
4 over 4 double-hung wood window with original wood trim



6 over 6 double-hung wood window with original wood trim



12 over one single-hung wood window with original wood trim with Ogee lugs on upper sash



The above window has leaded decorative glass in the top sash over of the single-hung lower sash

COMMON HISTORIC WINDOW TYPES

Double-hung: Two sash elements, one above the other. Both upper and lower sashes slide within tracks on the window jambs.

Single-hung: Two sash elements, one above the other. Only the lower sash moves.

Trim: Exterior wood trim, or casing, frames windows and serves as the transition to adjoining wall surfaces. Functionally, it provides protection at the perimeter and corners of openings, creating a weather-tight building enclosure. Houses with a wood exterior (weatherboard siding or shingles) typically have a 4” to 5” x 1” wood trim.

Fixed Sash: The sashes do not move.

Casement: Hinged windows that swing out or in from the wall.

Windows on Stucco Historic resources: The windows usually do not have trim. Windows are typically set at the inside plane of the wall resulting in deeply recessed openings for the exterior.



Casement windows with three horizontal true divided lights that are recessed into the stucco façade with no trim.

WINDOW REPAIR AND MAINTENANCE

Properly maintained, original windows will provide excellent service for centuries. Most problems occur from a lack of proper maintenance. In most cases, windows are protected if a good coat of paint is maintained. The accumulation of layers of paint on a wood sash may make operation difficult, but proper painting techniques, including removing paint layers before repainting or refinishing, can solve this problem. Damage occurs when the painted layer is cracked or peeling. A good layer of paint protects the wood window from water damage and from ultraviolet degradation caused by sunlight. Decay can result that may make operation of the window difficult, and if left untreated, can lead to significant deterioration of window components. In terms of maintenance, wood windows do require painting every five to ten years, depending on their location, sun exposure, water exposure, paint quality, priming, wood quality, etc. Although vinyl and aluminum windows do not require painting, they are rarely maintenance free, and economy grade vinyl and aluminum windows can fail within a few years. Finishes on vinyl and aluminum can deteriorate through UV exposure, oxidation, and denting. Quality wood windows can last indefinitely, depending on maintenance and the quality of wood used. Double hung painted wood windows can also be installed with metal or vinyl tracks, making them easier to open and close as they age. Inness, sticking sashes, and loose putty are all problems that are easy to repair, and they are not reasons to remove and replace historic windows. Changing a sash cord, re-puttying a window or waxing a window track are easy repairs that can extend the life of the window.



This original casement sash has been removed from the frame and is being restored before being repainted and installed.



The Spanish Colonial Revival fixed window with sidelights is the centerpiece of the façade and it has been well maintained.



Before: This is an image of a wood window prior to restoration.



After: The same wood casement window after restoration.

REPLACEMENT WINDOWS

Before investing in replacing original wood windows, understanding the materials of original versus replacement windows is critical. Original wood windows are typically made from old-growth, denser wood that is inherently resistant to decay. Replacement windows are manufactured as a unit and their individual components cannot be repaired as can the parts of an original window. When damaged, usually the entire unit must be replaced. Vinyl and aluminum windows cannot be painted even though they may discolor over time.

VINYL, FIBERGLASS, OR ALUMINUM CLAD WINDOWS?

For clarification, a clad window is part of a window system that is primarily constructed of wood but has an additional material, such as aluminum, applied to the exterior face for maintenance purposes. Generally, clad windows are not appropriate, especially on older residential and commercial properties. However, in some instances they may be acceptable, and if proposed, shall be reviewed on a case-by-case basis. Most clad window products do not have Ogee lugs (the small wood element under the top sash), which are an important feature of older double hung wood windows. In addition, a true divided-light option is not offered for clad windows by any manufacturer. Another issue with vinyl-clad window systems is that they often show seams, as some of these windows are clad with vinyl strips on the outer surface. Aluminum and fiberglass finishes can come in a variety of colors and often have a finish that more closely resembles a painted surface. There are a number of windows constructed of substitute materials on the market today that strive to match the styles and profiles of historic windows. A quick way to get initial feedback

about a new product is to bring the manufacturer's specification sheet to the City Architectural Historian to review. In some cases, the Planning Division may consider approving clad replacement windows that are visible from the street or other public rights-of-way if their architectural compatibility can be adequately demonstrated in terms of overall size, glazing, operation, finish, exterior profiles, and arrangement.

The manufacture of vinyl (polyvinyl chloride, or PVC) windows requires a highly toxic production process. Dioxin, a toxic carcinogen, is formed when PVC is manufactured and when it is burned. Fire fighting has become a serious problem at vinyl-encased homes. Fortunately, the windows are not toxic while they are being used, but they are toxic to produce and to dispose.

Also, while it is often desirable to have all wood windows in your building or house, in many cases, you may choose to use replacement windows of a substitute material in light wells or rear façades that are not visible from the street or other public right-of-ways.



Maintaining the original materials and design of historic windows contributes to the architectural integrity of the structure.



Many Santa Barbara Historic Homes feature a triptych in the center front window with a large window in the center with double hung windows on either side, all in the same opening.



The second floor windows show the top sash of the double hung windows open, allowing a natural cool ventilation through the house.



Santa Barbara is fortunate to have windows that are works of art featuring delicate decorative leaded glass in the top sash.

Requirements to Replace an Original Window

1. Are the windows truly deteriorated beyond repair? Photographs and a written evaluation from a window restoration expert must be provided that the windows warrant replacement of original fabric on a historic or potentially historic resource.
2. Can the deteriorated portions of the window be repaired?
3. Is every window beyond repair? Can some be restored rather than replaced?
4. Can the existing windows be made more energy efficient? Adding weatherstripping and an interior insulating window to a historic wood window in good repair will significantly improve its energy efficiency and the occupants' comfort level without having to replace the entire unit.
5. Has a thorough cost comparison between repair and replacement been completed? A homeowner should seek estimates for repair along with estimates to install replacement windows that truly match the originals. As per the Secretary of Interior Standards, replacement windows need to match originals in material, profile and configuration. This often will require custom-made wood windows to match the originals that fit in the original wood opening. This can cost more than restoring the original windows.
6. Provide specifications of new windows, including profiles, and life expectancy of the new windows. Some new windows only last ten to fifteen years and will need to be replaced again. What are the benefits of the new windows?

For in-depth technical recommendations on restoration of windows, the National Park Service's Secretary of the Interior has published 47 "Preservation Briefs" to help historic building owners recognize and resolve common problems prior to project start. Please see Preservation Briefs 9, 13, and 33 for window restoration at

<http://www.nps.gov/tps/how-to-preserve/briefs.htm>

GUIDELINES

- 2.1.1 Repair the original materials and design of historic windows and their surrounds, including hardware, in original openings.
- 2.1.2 Replace deteriorated windows to match the original windows in size, shape, arrangement of panes, materials, hardware, method of construction and profile. Avoid altering the size and proportions of historic windows.
- 2.1.3 Replace single-pane true-divided-light windows with true-divided-light windows, and replace wood windows with wood windows. Traditional single-pane window glass is preferred over double- (or thermal) pane glass, where the latter will have a negative visual effect but a minimal relative effect in preventing heat loss from an old building.
- 2.1.4 Avoid altering historic patterns or locations of window openings on a façade.
- 2.1.5 Set the window back into the wall the same distance as the historic windows. Carefully look at how the existing window is set in an opening. Many replacement windows are surface-mounted and most historic windows are recessed in the opening. Most stucco historic resources did not have trim and the window is deeply recessed in the thick wall. Avoid installing surface-mounted windows.
- 2.1.6 Repair/replace awnings and shutters that match originals in materials, design, size and operation and install only on openings that had them originally.
- 2.1.7 Match new window openings in materials, type, and size to others on the building. Make sure the window header heights line up to create a consistent rhythm on the façade. Avoid installing new window openings to building front façades.
- 2.1.8 Match trim elements of new windows and doors to be consistent with others on the house.
- 2.1.9 Consider using tempered glass, which is difficult to break, for added security.
- 2.1.10 Consider electronic security systems for additional security without altering the historic appearance of the building's exterior. Avoid installing security bars on street-facing windows.



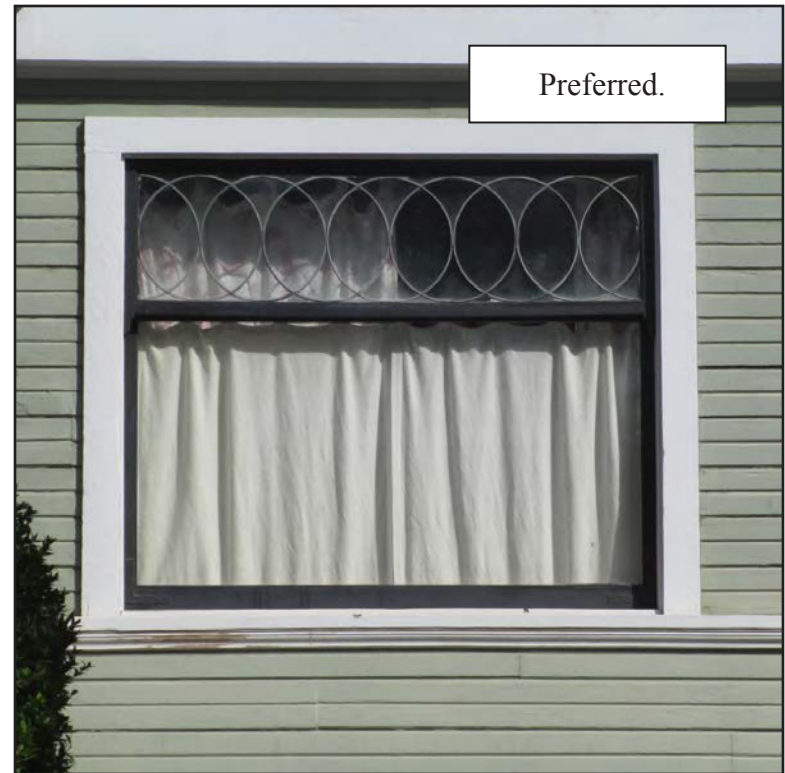
As many original windows are being removed and replaced with windows that do not match the original, Santa Barbara is losing unique architecture elements. The vinyl/aluminum slider windows that open horizontally in the pictures are inappropriate for historical resources because the configuration, material, and profile do not match the original windows, altering the unique character of the window.



Surface-mounted slider windows have replaced the original double hung windows. The original windows were recessed in the stucco façade, but these replacement windows are protruding.



The two double-hung windows have a geometric decorative design in their upper sashes.



The decorative upper sash has rare circular muntins between the glass.