

Guidelines for Preservation and Replacement of Historic Wood Windows in Newburyport

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Adapted with permission
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Introduction

A primary objective of the Newburyport Zoning Ordinance is to ensure the preservation and protection of the distinct characteristics of historic buildings and places throughout the city. Historic wood windows are one of these distinct characteristics. The Newburyport City Council finds that the protection of historic wood windows not only preserves an irreplaceable resource, but is also cost-effective to the property owner and environmentally responsible. The following guidelines are intended to inform Newburyport property owners on the benefits of wood-window restoration, and to guide property owners, city staff, and members of city boards and commissions in evaluating the appropriateness of window replacement.

Why Preserve Historic Wood Windows?

Windows are an essential component of buildings, both as a means for light, ventilation, and visibility, and as an architectural feature. By providing scale, profile, and composition to a façade, windows are often one of the most important character-defining features of a structure. Federal preservation guidelines advise that “windows should be considered significant to a building if they: 1) are original, 2) reflect the original design intent for the building, 3) reflect period or regional styles or building practices, 4) reflect changes to the building resulting from major periods or events, or 5) are examples of exceptional craftsmanship or design.” (Myers, John. “Preservation Brief 9: The Repair of Historic Wooden Windows.” Technical Preservation Services, U.S. Department of the Interior (1981) [<http://www.nps.gov/history/hps/tps/briefs/brief09.html>].) Busy property owners are often led to believe that old windows cannot be repaired, and that they are inconvenient, high-maintenance, inefficient, and ultimately replaceable. Historic wood windows were built to last, however, and some are still in service after two centuries or more.

A Brief History

Moveable wood sash windows date back to the early eighteenth century. Early sash construction techniques evolved into an intricate combination of molded wooden members (“muntins”) to hold panes of glass. Early wood sash windows were marked by thick muntins and small panes, or lights, due to the high price of glass. As glass technology improved and prices decreased, lights became larger and muntins became thinner.

By the late eighteenth century, dimensions of windows were standardized according to the sizes of glass imported from Britain. The principal window type of this era was the double-hung sash, which is commonly found today in Newburyport’s older buildings. Sash construction remained a complex process, and windows were milled from old-growth lumber that is denser than the wood available today – one reason for the longevity of these windows.

Historically, the character and configuration of window sash have been essential to the style of a building. Nineteenth century muntin profiles and sash designs changed with evolving architectural styles, demonstrating deliberate design choices and skilled craftsmanship. Window glass manufactured before the mid-1920s exhibits wavy patterns and defects that are an important characteristic of older buildings. Historic windows are detailed differently than modern windows, and their old glass provides a markedly different pattern of reflection from modern glass. Preserving the sometimes subtle distinctions between modern and historic sash is critical to maintaining the historic character of a building.

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Consider Restoration before Replacement

Property owners are sometimes reluctant to hear the case for restoring historic wood windows opposed to their replacement. The benefits of window restoration can be summed up under three categories: Sustainability; Energy-Efficiency; and Historic Character.

Sustainability

An important facet of preserving historic buildings is the retention of original components. Like most structural elements of older, wood-framed buildings, historic wood windows were milled from old-growth lumber that can last centuries, even when not properly maintained. Their sustainability is complemented by the fact they were carefully constructed with mortise and tenon joinery to fit tightly into the window openings of a house with extreme care and craftsmanship. Mass-produced wood replacement windows are typically constructed of new-growth lumber, often with glued-together finger joints, and are highly susceptible to rot. The preservation of an old window maintains an irreplaceable, sustainable resource.

In addition to craftsmanship and the durability of the wood, historic wood windows are also sustainable in that they are easily repairable. With the abundance of allegedly “maintenance-free” replacement window options on the market today, it is not surprising that property owners are often inclined to do away with old wood windows. “Maintenance-free,” however, is a misleading claim. Any product that is in constant operation and is susceptible to seasonal fluctuations and weathering will need maintenance. Replacement windows typically have plastic and metal parts that become outmoded over time, making them difficult (if not impossible) to repair. Vinyl windows are prone to denting, warping and fading in high temperatures. (Paul Fisette, “Understanding Energy-Efficient Windows,” *Fine Homebuilding* 114 (1998): 68-73.)

In most cases, wood replacement sashes have aluminum or vinyl exterior cladding meant to protect the wood as an alternative to storm windows. However, if moisture finds its way in, through weep holes or other infiltration sources, the new-growth lumber shielded beneath the cladding can quickly rot.

Another major claim of the window-replacement industry is insulating glass. Insulating glass involves two panes of glass with an inert gas sealed in the space between them; these windows are called “double-glazed.” Their design, however, does not lend to sustainability. Windows with insulating glass come with only a 15- to 20-year warranty; when the sealant fails, the window will lose its insulating quality, the glass will fog, and the entire window may have to be replaced. (Walter Sedovic and Jill H. Gotthelf, “What Replacement Windows Can’t Replace: The Real Cost of Removing Historic Windows,” *APT Bulletin: Journal of Preservation Technology* 36:4 (2005): 25-29.)

Historic wood windows with a single pane of glass can be repaired with tools found at a local hardware store and will last up to ten times longer than a replacement model. Homeowners should be aware that the payback period for restoring wood windows and installing quality storm windows is significantly less than installing replacement windows. In sum, the term “replacement window” means just what it says – it will have to be replaced again and again.

As climate change and related issues beset our city, recycling and sustainability are important terms. Window restoration incorporates both of these concepts. Restoration of existing wood windows reduces both landfill waste and the production of the energy-consuming, synthetic materials found

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in many replacement windows. Hiring a local window restoration specialist to work on your windows also helps sustain local economies as *labor* intensive, opposed to *materials* intensive, concept.

Energy-Efficiency

Much like sustainability, energy efficiency is an important factor in the “green” discussion, and is often the primary reason homeowners look to replace their windows. The generally erroneous notion is that older wood windows are not as energy efficient as today’s double-glazed replacement models.

However, window replacement companies will often compare their product to an unrestored wood window with little or no weatherstripping and a poor (or no) storm window. With proper repair and maintenance, coupled with weather stripping and a quality storm window, *a single-glazed historic wood window will have a comparable level of energy efficiency to that of a double-glazed replacement window.* Industry guidelines indicate that the addition of a storm window to an existing single-glazed window will reduce the energy loss through the window area by approximately 50%.

Several studies reveal comparable energy savings between a restored single-glazed wood window/storm combination and a double-glazed replacement window. (See, e.g., Bill Mattinson, et. al., “What Should I Do About My Windows?” *Home Energy* 19/4 (2002); Noelle Lord, “Embracing Energy Efficiency,” *Old House Journal* (September/October 2007); Andrew Shapiro and Brad James, “Creating Windows of Energy-Saving Opportunity,” *Home Energy Magazine Online* (September/October 1997), <http://homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970908.html>.)

As replacement window manufacturers will attest, the best insulation on a small scale is dead air space. The extra dead air space created with a sealed storm window (typically 2”) means more insulation and increased energy efficiency. Replacement window dead air space between the double-glazing is only 1/16 to 1/32 of an inch.

It is important to note that infiltration of air, rather than heat loss through the glass, is the principal culprit affecting energy efficiency; it can account for as much as 50% of the total heat loss of a building. (Sedovic and Gotthelf, 27.) Moreover, most of the heat loss in an old house occurs in areas other than windows. Insulation in walls, attics, and between floors, and weather stripping around doors will help prevent loss of heat. (The U.S. Department of Energy has detailed information on air infiltration and other energy-loss related issues at http://www1.eere.energy.gov/consumer/tips/air_leaks.html.)

Replacement window manufacturers also often misquote U-values as the value through the center of the glass (the location of the best U-value) and not for the entire unit. (Sedovic and Gotthelf, 27.) A U-value is a rating of energy efficiency for all the *combined* components of a window or door – the lower the U-value, the greater the efficiency. An optional feature of replacement windows is “low-e” (low-emissivity) glass, a microscopically thin, virtually invisible, metal or metallic oxide layer deposited directly on the surface of one or more of the panes of glass. The low-e coating reduces the infrared radiation from a warm pane of glass to a cooler pane, thereby lowering the U-factor of the window. The same effect can be achieved with low-e storm windows and/or energy-saving window film that can be applied directly to single-glazed windows.

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Historic Character

A third reason to restore existing wood windows is the retention of character-defining features of historic wood windows that are nearly impossible to duplicate with double-glazed replacement windows. As mentioned earlier, the muntin profiles and old glass in wood windows are distinct characteristics of a historic façade. Replacement windows or sash rarely have the same details. The traditional ½” or 5/8” exterior muntin with a putty bead is difficult to reproduce in an insulated glass, true divided light window, and is extremely costly. Many wood replacement windows have a muntin at least 7/8” wide with an inappropriate moulded profile affixed to the glass and not actually holding individual panes of glass (referred to as a “simulated divided light” to simulate a true divided light profile). Cheaper models, typically vinyl or aluminum windows, feature removable grilles or grilles between the glass, providing no profile, depth, or shadow lines. Some replacement windows will decrease the glazed opening by as much as 3” in width, with a significant loss of light and alteration of the appearance.

Replacement windows will also often require a change in a window’s rough opening because these products are based on national standards and do not match “Boston Pattern” dimensions –window sash sizes that have been standard in the Boston area since the 18th century. This will involve an increase in vinyl or aluminum framing members to hold the replacement window properly, detracting from the historic character of a building. Custom sizing will add to the expense of replacement windows.

It is often argued that storm windows have a negative impact on the historic character of wood windows. An important point to consider is that storm windows have been used for over 100 years. Although aluminum storm windows do not replicate the appearance of wood storms, they are allowed without review in historic districts and neighborhood conservation districts and are always preferred to window replacement unless the windows themselves are judged not significant. Storm windows are a fully-reversible alteration that protect the original fabric of the building and can make the window assembly as energy-efficient as replacement windows. For optimal results, the storm windows meeting rails should correspond to the position of the existing meeting rails of the sash and match in color.

Interior storm windows or energy panels are a secondary option, but can damage casings and sills and cause condensation on the interior face of the sash. Moreover, the exterior face of the sash is not protected from the elements, leaving gaps against both exterior and interior finishes. Unless specially ordered, modern windows will have a different configuration of casings, stops, and screens, dimensionally-thinner sills and casings, and will sometimes occupy a different plane in the wall.

When is Replacement Acceptable?

In some cases, an old wood sash may be beyond repair and need to be replaced. In such a situation, replacing the historic, single-glazed wood sash with a single-glazed reproduction wood sash is the preferred option. It is important that the new sash have the same number of lights (unless the existing sash are themselves inappropriate replacements).

Coupled with a quality storm window, this solution satisfies much of the rationale for restoration listed above. There are window manufacturers that produce single-glazed, true divided light windows. Local manufacturers such as Brosco and Boston Sash & Millwork feature a line of Boston

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Pattern wood sash. Several other manufacturers produce custom wood sash that are authentic reproductions of historic sash.

If a double-glazed replacement window is the only option, City staff, commissions and boards will generally consider how the proposal will impact the historic character of a building; namely how closely the replacements match the originals in pattern, details, materials and finishes as closely as practicable. Dimensions and profiles of casings, sills, jambs, meeting rails and muntins are all subject to review.

Some manufacturers have been able to produce double-glazed wood windows with muntin profiles that are a closer match to those found on single-glazed sash. OPD staff can recommend models. Although there have been advances in recreating the details of historic windows, the sustainability and energy efficiency issues are still highly debatable. However, there are replacement models of higher quality than others.

It is essential to distinguish between “windows” and “sash,” especially when discussing their potential replacement. “Replacing a window” means removing the entire window, including the sash, the jambs, the interior and exterior casings, and the sill, and installing an entirely new unit. This is often problematical because the casings will almost inevitably have different dimensions from the original,

“Replacing a sash” means replacing the moveable parts of a window, leaving the casings, jambs and sill intact. There are two approaches to replacing sash:

- Replacing the sash and balances only. Locally-made Boston Pattern sash fit window openings from all periods. Sash can be replaced with new spring balances that eliminate sash weights and allow weight pockets to be filled with insulation. This operation may have little or no effect on the exterior architectural character of the house.
- Replacing the sash with a new window, within the existing jambs. Some manufacturers offer replacement windows containing both sash and jambs that are made to fit within the existing jambs. This may seem like an attractive alternative, but the additional width of the extra jambs and balances introduces new visual elements and can significantly reduce the size of the glazing.

What about Lead Paint?

Lead paint was banned by the federal government in 1978 to reduce the risk of lead poisoning in children. In older homes, windows, in particular, may contain lead paint. The repeated use and operation of the window sash may increase the likelihood of paint chipping and the creation of lead dust. Property owners are often concerned that the presence of lead paint on windows may require immediate replacement of the windows.

Although it is not uncommon to find lead paint on historic wood windows, lead abatement can be achieved without posing serious health hazards. A licensed risk assessor can confirm the presence and location of lead paint and a licensed lead abatement contractor should be able to stabilize and treat it appropriately. Property owners need to be aware that certain methods of lead paint removal, including electric sanding without proper filter vacuums and the use of heat guns, may be illegal. This is especially critical when hiring a paint contractor or window restoration specialist to work on site, as these methods can produce dust and are considered a potential health hazard for the

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worker(s), but more importantly, for children under the age of six. With proper precautions and safety measures, however, historic wood windows with lead paint can be remedied.

In legal terms, the Code of Massachusetts Regulations directs a property owner to fully comply with State lead abatement procedures when a child under six years old resides in a house or building where lead paint is identified by a certified lead inspector. (See CMR 460.000, “Lead Poisoning Prevention and Control” from the Department of Public Health.) The regulations do not require the immediate removal of windows or window sash containing lead paint, but rather careful and thorough abatement. Special consideration is given to buildings on the State Register of Historic Places, recommending offsite stripping and reinstallation of any components containing lead paint and advising against permanent removal of “historic architectural features” such as wood sash. (*Id.*) The abatement method, either through stripping of the lead paint or replacing the sash, is ultimately at the discretion of the homeowner.

For more information on lead abatement in Newburyport, please contact the Building Department at (978) 465-4405.

Contact the Office of Planning & Development

If you are a Newburyport property owner and are thinking about replacing your windows, contact the staff of Office of Planning and Development at 978-465-4400. The staff can help you to identify a local window restoration contractor, as well as window companies that manufacture single-glazed replacement models.

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