Conservation Guide for Heritage Property Owners

Prepared by

the Loyalist Township Heritage Committee

Special Thanks

The Loyalist Township Heritage Committee thanks the Region of Waterloo for allowing the Committee to use their *Practical Conservation Guide* as a resource for creating this guideline.

Information has also been taken from the *Standards and Guidelines for the Conservation of Historic Places in Canada*, a nation-wide benchmark for heritage conservation practices in Canada.

The images for the front cover show the Ham House during restoration initiatives taken by owners Bonnie Crook and Ron Tasker. Ham House is located in Bath, Ontario.

Contents

DISCLAIMER

This practical guide contains useful information on restoring and preserving heritage buildings, but it is intended as a general resource only.

Content from third parties with specific expertise has been heavily relied upon and their original works have been acknowledged in the list of references included throughout this document.

The Corporation of Loyalist Township has taken all reasonable steps to ensure the accuracy of the information in this publication. However, it is recommended that building owners consult with trained specialists, such as contractors, builders, plumbers, heating and air professionals and electricians, before undertaking any renovations, repairs or construction on their properties.

Loyalist Township does not assume responsibility for any loss or damage resulting from adherence to the information in this practical guide.

INTRODUCTION

The Conservation Guide for Heritage Property Owners provides conservation tips and information for heritage property owners. This includes owners of municipally designated properties and owners of other important heritage sites and features.

Heritage is important for building strong, vibrant communities. The preservation and conservation of existing structures, landscapes, and cultural practices can define communities' unique identities and promote character and sense of place. Heritage preservation can also contribute to economic development and tourism. Preserving physical representations of history allows us to maintain an understanding of the past and understanding of what we value as we move forward as a community.

One way to ensure the preservation of heritage buildings, structures, and landscapes is through designation. Heritage designation in Ontario can take place at three levels: municipal, provincial, and federal. While the designation of a building or landscape is not the only signifier of heritage, designation does allow governments to actively protect heritage resources through special provisions and laws as outlined in the *Ontario Heritage Act*. Heritage preservation is the responsibility of the community as well as individual property owners who are responsible for maintaining their own designated property with the intention of preserving its historic value for future generations.

If you own a designated heritage property and are looking to make any changes to your property, please contact Loyalist Township to see if a Heritage Permit is required before work begins. Heritage Permits are required for work that might affect or alter designated attributes of a heritage property. Designated attributes are identified in the designating By-law. Building permits may also be required. To help property owners, the Loyalist Township Heritage Committee offers property owners pre-consultation meetings for any projects pertaining to a heritage property. For example, window replacements or residing can have significant impact on heritage attributes and must be considered against the requirements of a property's designating By-law as well as the Loyalist Township Policy on Window Renovations for Heritage Buildings. Pre-consultations are available by request regardless of a project's complexity or the owner's background knowledge.

To connect with Loyalist Township regarding heritage property matters, please contact the Planning & Heritage Assistant through the following:

Email: planning@loyalist.ca
Phone: (613) 386-7351
Mail: P.O. Box 70, Odessa, Ontario K0H 2H0

Alternate formats of this document are available upon request. Please contact the Planning Assistant at Planning@loyalist.ca, 613-386-7351, TTY 519-575-4608 to request an alternate format.

This document was completed in January 2026. The last revision was completed in January 2026.

TERMINOLOGY

The following terminology will be used through the pages of this guide. Please refer to these definitions as needed.

Conservation:
In the context of built heritage such as designated properties, conservation refers to measures taken to extent the life and cultural value of a property or site by maintaining the physical attributes protected by its designation status as outlines within the designating By-law. This can include features such as windows, doors, design elements, and occasionally paint colours.

Preservation:
The aim of preservation is to avoid any damage that is liable to be caused by environmental or accidental factors, which may pose a threat within the immediate surroundings of the property or site in question. Accordingly, preventative methods and measures are not usually applied directly to the property's designated features but are designed to control the conditions of the surrounding environment, such as ensuring downspouts are undamaged and lead water away from the foundation of a structure to prevent water damage.

Restoration:
The restoration of a property is the process of accurately revealing, recovering, or representing the state of a historic property or site, or of an individual component of a property, as it appeared within a particular period in its history while also protecting the heritage value of the property or site.

Rehabilitation:
Rehabilitation is the process of continuing or making compatible the contemporary use of a historic property or site, or of an individual component, through repair, alteration, and/or additions to the property or site while protecting its heritage value.

GUIDING PRINCIPLES FOR HISTORIC CONSERVATION

The Ontario Provincial Government has established the *Eight Guiding Principles in the Conservation of Built Heritage Properties* based on international charters and standards that have been established over the last century. These principles provide the basis for all decisions concerning good practice conservation around the world.

1. **Respect for Documentary Evidence:**
   Do not base restoration on conjecture. Conservation work should be based on historic documentation such as historic photographs, drawings, and physical evidence.

2. **Respect for the Original Location:**
   Do not move buildings unless there is no other means to save them. Site is an integral component of a building or structure. Change in site diminishes cultural heritage value considerably.

3. **Respect for Historic Material:**
   Repair/conserve — rather than replace building materials and finishes, except where absolutely necessary. Minimal intervention maintains the heritage content of the built resource.

4. **Respect for Original Fabric:**
   Repair with like materials. Repair to return the resource to its prior condition, without altering its integrity.

5. **Respect for the Building's History:**
   Do not restore to one period at the expense of another. Do not destroy later additions to a building or structure solely to restore to a single time period.

6. **Reversibility:**
   Alterations should be able to be returned to original conditions. This conserves earlier building design and technique. For example, when a new door opening is put into a stone wall, the original stones are numbered, removed, and stored allowing for future restoration.

7. **Legibility:**
   New work should be distinguishable from old. Buildings or structures should be recognized as products of their own time, and new additions should not blur the distinction between old and new.

8. **Maintenance:**
   With continuous care, future restoration will not be necessary. With regular upkeep, major conservation projects and their high costs can be avoided.

ADDITIONAL REFERENCE MATERIALS

Much of the references for each of the following sections in this guide are from the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*, from which this guide was created. The following list of references are suggested by the Loyalist Township Heritage Committee for extra reference material that could be helpful for research purposes.

Please note that at the end of each section several web-based references that had been used in the Region of Waterloo's *Practical Conservation Guides* no longer work. Some of the following references may be useful substitutes in this case.

Architecture Conservatory of Ontario's (ACO) Magazine ACORN.

Badone, Donalda. *The Complete House Detective: An Ontario House and its history*. Erin, ON: Boston Mills Press, 1988.

Bucher, Ward, and Christine Madrid French. *Dictionary of building preservation*. New York, NY: Preservation Press, John Wiley & Sons Inc, 1996.

Ching, Francis D. K. *A Visual Dictionary of Architecture*. Hoboken, NJ: John Wiley & Sons, Inc, 1995.

Downing, A.J. *Cottage residences, or, A series of designs for rural cottages and cottage villas, and their gardens and grounds: adapted to North America*. New York, NY: Wiley and Putnam, 1842.

Fairfield Homestead Heritage Association. "The Fairfield East Porch Roof: A Touch of Style." *Fairfield Homestead Heritage Association Newsletter*, Summer 2015. Amended August 2023.

McAlester, Virginia, Suzanne Patton Matty, Steve Clicque, A. Lee McAlester, Lauren Jarrett, and Juan Rodriguez-Arnaiz. *A Field Guide to American Houses: The Definitive Guide to Identifying and Understanding America's Domestic Architecture*. New York, NY: Knopf, 2014.

Nelson, J. G., and Susan M. Preston. *Towards a sense of place: Preparing Heritage Landscape Guides: A Manual for Urban and Rural Communities in Ontario*. Waterloo, ON: Environments Publications, 2005.

Wickersham, John B., and Margot Gayle. *Victorian Ironwork: A Catalogue*. Philadelphia, PA: Athenaeum, 1977.

Woodward, Geo. E., and F.W. Woodward. *Woodword's Country Homes*. New York, NY: Geo. E. & F.W. Woodward, 1866.

ADDITIONS

Introduction

Historic buildings come in many different styles, and each addition project is unique whether it is a horizontal or vertical addition, a dormer, garage, or a porch. As a result, this section is quite general so that it can be applied to a wide variety of building types and situations.

The information in this section was largely adopted from the US National Parks Service Preservation Brief 14, "New exterior additions to historic buildings: Preservation concerns," and the *Standards & Guidelines for the Conservation of Historic Places in Canada*.

A 'sensitive addition' is defined as a major alteration or expansion that respects the architecture and detailing of a historic structure and should strive to:

1. Preserve significant historic materials, features, and forms. Damaging or destroying original materials and craftsmanship should be avoided as much as possible.
2. Be compatible by preserving the historic character.
3. Differentiate from the historic building by making it clear which portion is old and new. The new addition should take its design cues from, but not copy, the historic building.

How these guidelines are implemented rests on the skills of a good designer and builder. Studying the original structure thoroughly and observing time-honoured concepts and commonly employed best practices can help. The most important point to take away from this guidance is the concept that an addition needs to be subordinate and complimentary to the historic building.

Standards & Guidelines for the Conservation of Historic Places in Canada

The *Standards & Guidelines for the Conservation of Historic Places in Canada* is a pan-Canadian benchmark for heritage conservation practice in the country. The *Standards & Guidelines* offer results-oriented guidance for sound decision-making when planning for, intervening on, and using historic places.

The specific standards and guidelines that relate to additions are listed below:

- Aim for minimal intervention.
- Make sure the new work is physically and visually compatible with, subordinate to, and distinguishable from the historic place.
- Design new work so that it could be removed in the future (reversibility).

- Select the location for a new addition so that the heritage value of the original building is maintained.
- Design the new addition in a manner that draws a clear distinction between what is historic and what is new.
- Design the addition so that it is compatible in terms of materials and massing with the exterior form of the historic building and its setting.
- Find solutions to meet accessibility requirements that are compatible with the exterior form of the historic building, i.e. introducing a gently sloped walkway instead of a constructed ramp with handrails in front of an historic building.
- Work with accessibility and conservation specialists and users to determine the most appropriate solution to accessibility issues with the least impact on the character-defining elements and overall heritage value of the historic building.

Documentation

Before beginning a major alteration or expansion project, document the existing building and materials and take measurements of the floor plan, vertical heights, and the components of the structure — its windows, doors, and cladding.

Architectural Massing and Rooflines

When adding to or altering your building, consider its scale (apparent size), actual dimension, and massing (proportion/balance). Many additions to old houses fall into one of three general types: wings, garages, and dormers.

Wings

Adding a wing or two increases livable space and complexity of the house and provides the opportunity to enhance the interest of the structure if done sensitively. Connecting the wing to the main house by means of a hyphen (recessed connector or passageway) helps reduce its impact visually and structurally and, where practical, is a favoured conservation approach.

Images 1 & 2: ‘Good’ and ‘Bad’ examples of wings added to a heritage building. The ‘good’ example above shows a wing addition that respects the existing scale and massing of the house, not overpowering it. The ‘bad’ example below shows an addition that does not match the style, massing, or materials of the original portion of the structure and detracts from the overall appearance of the structure (Amanda Sherrington, 2013).

Garages

Garages tend to look best when they are smaller than the main house. If the house is on a corner lot, the side street becomes the natural place to face the garage. Attached garages are effectively wings and should be treated with the same guidelines, including setback equal to their width. One-car versions are best for old houses, not only because of their historic precedents but also because they reduce the opportunity for massing problems.

Images 3 & 4: Two examples of garage additions to a heritage building. One has been added below the building's façade and the other is detached and placed behind the structure. Both examples are in keeping with the scale and massing of the original buildings as they are subordinate to the houses and designed for one care (Amanda Sherrington, 2013).

Dormers

Dormers are typically added to a building to increase the usable space and natural light in the top story of the building. Dormers should be similar in style and placement to the building's existing openings. A common practice is following the bays of the house so that dormers are in line with windows and doors on the story below them. Dormers should use windows consistent with the rest of the house. Also, if there are no dormers in the main house, chances are dormers will look odd on an addition. Generally, maintaining the same roof pitch not only as the main roof, but also among dormers is a very good idea. Examples of 'good' and 'bad' dormer window additions are show in the illustrations below.

Images 5, 6 & 7: ‘Good’ and ‘Bad’ examples of dormer window additions to heritage buildings. The ‘good’ example on the left features a dormer window that is of a similar style to the house and places in line with the existing window openings. Both ‘bad’ examples show the addition of a dormer window to a house of an architectural style that would not have a dormer window in its design. The second ‘bad’ example on the far right shows a dormer window constructed in at a scale far too large for the house, resulting in a dormer window that overwhelms the roofline and general massing of the structure (Amanda Sherrington, 2013).

Placement

Placement is a key consideration when planning an addition. A good rule of thumb is to subordinate the addition in one or more ways. Less important portions of old buildings, such as additions, make the most visual sense when they are subordinate to the most important portion of the house — the main, original body. Most successful additions to old houses keep the size and scale smaller so that they are interpreted as secondary.

How to subordinate an addition:

1. **Reduce the scale**
   Make sure the addition is significantly smaller. Height is especially important and is best kept below the eave line of the original building. A common example is a one-storey addition to a two-storey house.

2. **Secondary position**
   The street side or front façade holds the most important features, materials, and character defining elements and carries a lot of weight. The secondary or rear elevations, where there are typically fewer details to impact and less visibility to be concerned with, are the non-primary facades and the first places to consider placing an addition. Adding on to the back of a structure preserves the public façade of the house, thereby maintaining the historic character of the home and the context of the neighbourhood. Limiting impacts to the primary elevation of an old house reduces the risk of compromising its historic character.

3. **Setbacks**
   An addition should be setback to maintain views of the outer edges and the historic form of the original house.

4. **Subordinate materials**
   Materials used in the new addition should not detract from those used in the

original portion of the structure. The new materials should resemble and complement the materials used in the original portion of the structure.

5. **Similarity of purpose**
   Maintain a similarity of shape among the parts that share the same purpose. Windows, for example, are a prime concern in making sensitive additions work and work best when they take their cues from the old fenestration. Sizes can very if the general proportions of the originals are continued. Please refer to the Windows, Shutters, and Doors section included in this guide for additional guidance.

6. **Similarity of roofs**
   A helpful rule of thumb is to make sure that all roofs on a building are of the same pitch, ensuring similarity. Roof form, and eave/cornice lines are the critical parameters to watch. Please refer to the Roofs section included in this guide for additional guidance.

Materials

Use materials, textures, and colours (see the Paint and Colour section included in this guide) similar to those of the historic building. The materials do not need to be the same as those on the original building, but they should not be so different that they stand out or distract from the historic building.

A new addition to a historic building can damage or destroy significant materials and can change the building's character and should only be considered after it has been determined that the new use can't be met by altering non-significant, or secondary, interior spaces.

A good way to maintain continuity between the old and the new is to incorporate salvaged materials.

Architectural Details

It may be desirable to replicate details from the original house into the new addition, but well-done projects make sure to leave enough clues to let the next generation know where the original structure ends and the new one begins. The addition should be subtle but clear.

Landscape

During the completion of a sympathetic addition, it is important to protect the historic integrity of the property and its environment. Historic landscape features, including clear grade variations, pathways, and vegetation need to be respected. Any new landscape features, including plants and trees, should maintain or replace a scale and density that compliments the historic resource. For example, a traditionally landscaped property should not be covered with large, paved areas for parking, which would drastically change the character of the site. For more information, please refer to the Landscaping section included in this guide.

Archaeological Discoveries

It is possible that while making alterations to your historic property archeological material may be unearthed. These objects can include foundations of previous structures, cisterns, ceramics, bottles, coins, and tools. Archeological artifacts are important for the information they yield about past human activity on the property. If you find significant archeological material on your property, contact the Ministry of Tourism, Culture & Sport for guidance on how to proceed.

Summary

Additions to historic buildings should be constructed in a manner that preserves significant materials, features and forms, and conserves the building's historic character. An addition should be differentiated from the historic building so that the new work is compatible with but distinguishable from the historic building and can not itself be confused as heritage.

References

Note: many of these titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December of 2025, links in black are dead links.

If you would like to learn more about constructing an addition on your heritage building, please refer to the following sources:

Grimmer, Anne E., and Kay D. Weeks. *Preservation Brief 14,* "*New exterior additions to historic buildings: Preservation concerns.*" Washington, DC: U.S. Department of the Interior, National Park Service, 2010.

National Trust for Historic Preservation. (2013). "Restore vs. Rehabilitate: Which is right for your historic house?"

Old House Online. "Additions." oldhouseonline.com.

Old House Online. "How to Create Sensitive Additions." oldhouseonline.com.

Standards & Guidelines for the Conservation of Historic Places in Canada. 2nd ed. Ottawa, ON: Parks Canada, 2010.

HAZARDS TO YOUR HEATH: ASBESTOS, MOLD, RADON, AND LEAD

Introduction

As a heritage property owner, a tenant, or an employee in a heritage building it is important to be aware of the potential health hazards and related safety precautions associated with asbestos, mold, and lead as outlined in this section.

Asbestos

What is Asbestos?

Asbestos products have been widely used in building products due to their durability and resistance to fire. Asbestos is a generic term applied to a wide range of fibrous materials found naturally in rock formations worldwide. Commercial asbestos fibers can be attributed to either the serpentine (chrysotile) or amphibole mineralogical groups. Both possess different structural and chemical traits. Chrysotile asbestos is most commonly found in manufactured asbestos products, although its use has dramatically declined since the 1980s. Amphibole asbestos, no longer mined, contains more iron and can remain longer in the lungs.

Why is Asbestos Dangerous?

Asbestos is harmful when its fibers can be inhaled. The extent of damage and exposure depends on the:

- Amount of fibers in the air.
- Exposure length and occurrence.
- Size of the fibers inhaled.
- Amount of time since first exposure.
- Type of asbestos fiber.

According to Health Canada, the health risks associated with asbestos are not determined by the amount of asbestos in a product. There is no significant health risks associated with asbestos when its fibers stay intact and enclosed within a product.

When inhaled in significant quantity, asbestos fibers can be responsible for the following health conditions:

- Asbestosis (scarring of the lungs).
- Mesothelioma (rare cancer in the lining of the chest or abdominal cavity).
- Cancer (Lung, Larynx, and Ovarian).
- Some evidence suggesting ties to cancer of the pharynx and stomach.

Are You at Risk of Asbestos Exposure?

Natural levels of asbestos fibers in water and air are extremely low. If asbestos products in your home are undisturbed, fiber levels will typically be the same indoors as they are outdoors. Asbestos fibers become a health hazard when the product containing them is cut, damaged, or deteriorated. Often times, it is best not to remove intact asbestos products. It is however important to identiy which products and surfaces in your home may contain asbestos fibers; to alleviate damages, help prevent deterioration, and ensure proper abatement.

Common Residential Sources of Asbestos

A professional can help you to identify and analyze which products in your home contain asbestos. Health Canada identifies the following as potential products containing asbestos:

- Textured paint and patching compounds.
- Paper, millboard, and cement sheets used around wood-burning stoves.
- Insulation.
- Vinyl and vinyl-sheet flooring and adhesives.
- Hot-water and steampipe taping and insulation.

Asbestos Abatement

Homeowners are encouraged to seek expert advice before removing materials that may contain asbestos. If you must handle a small area of damaged products containing asbestos, refrain from cutting or damaging the material further.

Mold

What is Mold?

Molds belong to a group of microorganisms called fungi, along with mushrooms and yeast. Fungi are quick to grow and reproduce. Although molds do provide helpful functions, such as penicillin and use in the production of certain foods and beverages, it is problematic when found in the interior of dwellings.

Mold can be identified by the following symptoms, as stated by the Canadian Mortgage and Housing Corporation (CMHC):

- Discoloration on surfaces (i.e. walls, ceilings, and furnishings).
- Stains on carpets.
- Stains on drapes and rear of furniture.
- Stains on personal items close to affected areas (i.e. storage boxes and clothing).
- Musty smells.
- Rotting wood.

Health Canada attributes the major causes of mold growth to:

- Condensation of moisture on surfaces due to excessive humidity, lack of ventilation, or low temperature.
- Water leakage (i.e. broken pipe).
- Exterior water infiltration (i.e. leaking rood or cracked basement foundation).
- Past flood.

Why is Mold Problematic?

Mold in your home can cause physical damages to the property, such as:

- Damage to physical property (i.e. discolouration of paper products, damage to fabrics, paints, wood, drywall, ceiling tiles, and eventual structural damage).
- Allergies.
- Unsightly stains.
- Illness.

Health problems are caused due to spores and chemicals released by the fungi. Effects can range from insignificant to causing allergies and illnesses, depending on the type of mold, exposure degree and length, and health of residents or occupants. Researchers have identified more than 270 types of molds living in Canadians homes. Infants, pregnant people, the elderly, and individuals with a weakened immune system or respiratory disease have a higher risk associated with exposure to mold. Consult your family physician if you believe that you or one of your family members are at risk.

Mold Prevention

There are several steps that can be taken to help prevent mold growth in heritage buildings:

- Ensure that areas of high humidity are well ventilated, and materials are dry before storing to avoid condensation.
- Purchase a hygrometer at your hardware or electronic store to measure your residence’s relative humidity.
- De-clutter your personal belongings and furnishings to allow for better air movement.
- Clean often. It is preferable to vacuum with a HEPA filter.
- If mold is detected, clean the area and try to determine and eliminate the source of moisture. Mold will reappear if the condition is not altered.
- Painting over mold will only temporarily mask the situation, as it does not stop it from growing.

Mold Clean-Up

If attempting to clean small mold problems, CMHC recommends that you wear the following minimum protection gear:

- Disposable dust mask (3M 8210 or equivalent).
- Household rubber gloves.
- Safety glasses or goggles.

To clean moldy drywall, first clean the surface with a damp rag using a little detergent or baking soda. The drywall should not get wet. If cleaning does not remove the stain, the drywall might need to be discarded.

To clean mold on washable surfaces, first vacuum the affected area, preferably with a HEPA vacuum cleaner. Secondly, scrub the area with an unscented detergent before sponging with a wet rag. Once again, vacuum the area and surroundings.

The working area should not be accessible to any infants or individuals with heightened risk during cleaning.

Lead

Why is Lead Dangerous?

Lead is a cumulative poison and a primary recognized brain poison, or neurotoxin. Lead can inhibit the production of hemoglobin and the processes necessary for metabolizing vitamin D and calcium. Long-term exposure to lead can inhibit the development of the brain and nervous system, resulting in learning and behavioural difficulties. It is therefore extremely important to protect children and pregnant people from lead exposure. There is not safe amount of lead intake, although risks associated with exposure decrease with decreasing amounts of lead.

Are You at Risk of Lead Exposure?

You and your family may be at risk if any of the following apply:

- You live in a home built before 1960.
- Your home’s plumbing was installed before 1990.
- You live near an industry (i.e. lead-battery recycling factory) or large vehicular artery (i.e. highways).

Common Residential Sources of Lead

Some common sources of lead found in homes include:

- Paint and paint dust.
- Water.
- Soil.

Lead-Based Paint

If your home was built before 1960, it most likely contains one or more layers of lead-based paint. It is best to test your paint if you suspect it might be lead-based. The Standards Council of Canada and the Canadian Association for Laboratory Accreditation are two organizations in Canada responsible for certifying laboratories for lead-based paint testing. Any laboratory will help you with preparations and safety precautions prior to sending paint samples for analysis. Do-it-yourself lead test kits can also be purchased at local hardware stores.

Where lead paint is intact and will not be within reach of children, it may be safest not to remove it. The area can be repainted or covered with wallpaper, wallboard, or paneling for extra precaution against lead dust. Care should be taken to evaluate high-friction areas such as windows, doors, flooring, and stairs for wear and lead dust.

Removal of Lead Based Paint

As with all paints, lead paint will eventually chalk, peel, flake, or erode, at which time it should be removed following strict safety precautions and guidelines.

Before removing or altering any feature of your home, assess its historical and architectural significance. This can also help you identify which features should be preserved, replaced in kind, or can be removed. Consider hiring a professional to limit the safety risks associated with the removal of lead-based paint. There is, however, no legal requirement for contractors in Canada to take courses on lead-based paint abatement. As training is not widely available, you can also consider hiring a contractor who is familiar with asbestos removal as the work ethics and principles are the same.

If conducting the work yourself, do not use any removal methods that will create lead dust, flakes, or fumes such as sander, heat guns, or blowlamps. Although they may also contain harmful substances, chemical paint strippers, in the form of a paste applicable by brush, are preferred. Please read the warnings and instructions provided by the manufacturer before use. Refer to the Paint and Colour section included in this guide for more information on paint removal methods.

Work Principles for Lead and Asbestos Abatement

The following work principles for lead and asbestos abatement have been compiled from a number of sources referenced at the end of this section.

Prior to work:

- Remove all furnishings (i.e. carpets, curtains, furniture, toys, books, etc.) from the work area. Use plastic sheeting to completely cover and seal anything that cannot be removed.
- To prevent the spread of dust and fumes to other sections of the home, isolate the work area by covering all doorways and vents with plastic sheeting and tape. Cover the floor or any wall-to-wall carpet with a plastic sheet, attached to the baseboards with heavy duty adhesive tape.
- Before starting the work, make sure that the room is properly ventilated.

Further safety precautions include:

- Always wear protective clothing (i.e. goggles, gloves, overalls, hat, shoe covers) and a good quality breathing mask.
- Never eat drink or smoke while removing paint and keep anything that might cause a spark or static electricity out of the work area.
- Keep misting the work area with water, as it will help contain dust.
- Take breaks outdoors often. It is recommended you do not work for more than 10 minutes at a time when removing lead paint. Leave the work area right away if your have trouble breathing, get a headache, or feel dizzy or sick.

Cleaning After Work:

- Clean the work area thoroughly at the end of each day. Put paint scrapings, chips, and any other product waste in a sealed container marked Hazardous Waste. Then wipe down the work area with a clean damp cloth and throw the cloth away.
- Clean all horizontal surfaces (i.e. walls, moldings, ledges, etc.), cracks, corners, floorboards, and carpets with a vacuum (preferably a HEPA vacuum).
- Damp wipe and mop all surfaces. Squeeze the dirty water from mops and rags into an empty bucket, keeping the rinsing water separate. Change the rinsing water bucket often.
- Remove footwear and work clothes upon exiting the work area. Wash work clothes separately from family laundry or throw clothes away. Double-rinse the machine before the family laundry is complete.
- Contact Loyalist Township Waste Management for instructions on hazardous household waste disposal.
- After removing lead paint, a lead-dust swab should be conducted before access to the room is reinstated.

Water

Since lead concentration in natural water supplies is very low, lead content in your home's water supply is most likely due to the use of lead pipes in your home, welded lead plumbing used for repairs or lead service connections joining your home to the jurisdiction's water supply. Your home may have leaded pipes or leaded solder if it was built prior to 1990 and may have leaded services if built prior to 1960. It is recommended that you test the lead levels in your drinking water by contacting the Canadian Association for Laboratory Accreditation, who have partnered with the Standards Council of Canada, since home tests may result in false findings. Under the Guidelines for Canadian Drinking Water Quality, the amount of lead measured in cold tap water should not exceed 10 parts per billion. If your well uses a submersible pump made of leaded brass, it's important to check your drinking water for lead concentration.

Soil

Lead does not decompose quickly in soil. Its presence is often linked to deteriorated exterior lead-based paint, the historic use of leaded gasoline, and local industrial sources. Urban areas will often have higher concentrations of lead in the soil, compared to rural areas. Good precautions include removing shoes before entering the home and washing hands after spending time outdoors. If you are planning an urban garden, have your soil tested first. If contaminated, replace the soil and build raised beds or containers overtop the affected areas. It is always a good idea to have your soil tested for lead levels by the Canadian Association for Laboratory Accreditation.

Note:
For information on radon gas testing and reduction, please see the Foundations section included in this guide.

Radon Gas Testing and Reduction

What is Radon Gas?

Radon is a gas formed by the breakdown of uranium, which is a natural radioactive material found in all soil and rock. You can't see, smell, or taste it. When radon escapes from the ground into the outdoor air it is diluted to low concentrations and is no cause for concern. However, when radon enters an enclosed space, like a home, it can accumulate to high levels and become a health hazard. Long-term exposure to radon is the second leading cause of lung cancer after smoking, and the leading cause of lung cancer for people who have never smoked. If the radon level in your home is high, it can easily be fixed at a reasonable price.

How can Radon Enter a Building?

For most of the year, the air pressure inside your home is lower than the pressure in the soil surrounding your foundation. This difference in pressure can draw air and other gases in the soil, including radon, into the house. Gas containing radon can enter your home at any opening where the house contacts the soil. There are many potential entry routes for radon in the foundations of heritage buildings including cracks, areas with exposed soil or rocks, and openings for utility fixtures or hollow objects, such as support posts.

Radon Testing

Almost all homes have some radon in them, but it may be advantageous to determine how much. Radon levels in a home can vary from hour-to-hour and day-to-day, so the most accurate way to find out if you have a problem is to measure radon levels in your home for at least three months.

There are two options for testing a house for radon:

1. Purchase a do-it-yourself long-term radon test kit.
2. Hire a certified radon measurement professional.

If radon levels in your home exceeds the Canadian guideline of 200 Bg/m^3, recommended timelines for reducing it depends on the concentration:

- Between 200-600 Bq/m^3 - within **two** years.
- Above 600 Bq/m^3 - within **one** year.

Reducing the amount of radon in your home is easy. Techniques to lower radon levels are effective and can be reduced by more than 80% for about the same cost as other common home repairs, such as replacing the furnace or air conditioner.

For more information about radon testing and radon reduction methods visit Health Canada's *Radon Reduction Guide for Canadians*.

Hiring a Professional

If radon levels in your home are above the Canadian guideline, Health Canada recommends that you hire a professional certified under the Canadian National Radon Proficiency Program (C-NRPP). Lowering radon levels in a home requires specific technical knowledge and skills to ensure the job is done properly. To fix a radon problem, choose a contractor the same way you would for any other home renovation or repair. It is wise to get more than one quote that outlines all the work to be carried out and ask for references. Contact those references to ask if they are satisfied with the contractor's work.

Summary

It is important that you are aware of the health hazards and safety precautions attributed to asbestos, mold, and/or lead in your residence and surrounding areas. The CMHC and Health Canada provide great tips and instructions on how to identify materials and stay safe, as well as instructions on how to test the affected area. The Canadian Association for Laboratory Accreditation and the Standards Council of Canada are the two organizations in Canada responsible for certifying laboratories for lead and asbestos testing. These resources will enable you to recognize, analyze, and abate the potential dangers within your heritage home.

References

Note: Many of these titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in November of 2025, links in black are dead links.

Asbestos

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Health Canada. *Health Risks of Asbestos*. Ottawa, ON: Government of Canada, 2012.

Mold

"About your Apartment: The Tenant's Guide to Mold." *Canada Mortgage and Housing Corporation*, 2008.

"Mold." *Canada Mortgage and Housing Corporation*, n.d.

Health Canada. *Residential Indoor Air Quality Guidelines: Moulds*. Ottawa, ON: Government of Canada, 2007.

Radon

Health Canada. *Radon: Reduction Guide for Canadians*. Ottawa, ON: Government of Canada, 2014.

Lead

Health Canada. *Lead Information Package*. Ottawa, ON: Government of Canada, n.d.

Leeke, John C. “Save America’s Windows.” in *Practical Restoration Reports*, edited by John C. Leeke, 45. CreateSpace Independent Publishing Platform, 2009.

Park, S.C., and D.C. Hicks. *Preservation Brief 37*, “Appropriate Methods for Reducing Lead-Paint Hazards in Historic Housing.” Washington, DC: U.S. Department of the Interior, National Park Service, 2006.

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FOUNDATIONS

Introduction

Foundations comprise the base of a building and act as a stable platform on which structures are built. They allow weight to be transferred evenly into the ground and anchor the building against forces such as strong winds. The way foundation is built will be determined by the quality of the earth beneath it, whether it is hard or soft, wet or dry. Without a proper foundation, buildings are subject to movement and shifting due to settlement, water penetration, and freeze-thaw cycles. Movement in a building often results in cracked walls and windowpanes, heaving floors, and stuck doors. This section provides an overview of foundation construction and materials, and explains how to prevent, identify, and repair foundation deficiencies and natural threats, such as the presence of radon gas, in heritage buildings.

Foundations serve several significant functions. They support the weight of a structure, hold back the surrounding earth, protect the building from water, dampness and insects, and form the shell of the basement, often the ‘service centre’ of a structure housing its infrastructure. Before purchasing an older house, inspect the foundation to ensure it is sound.

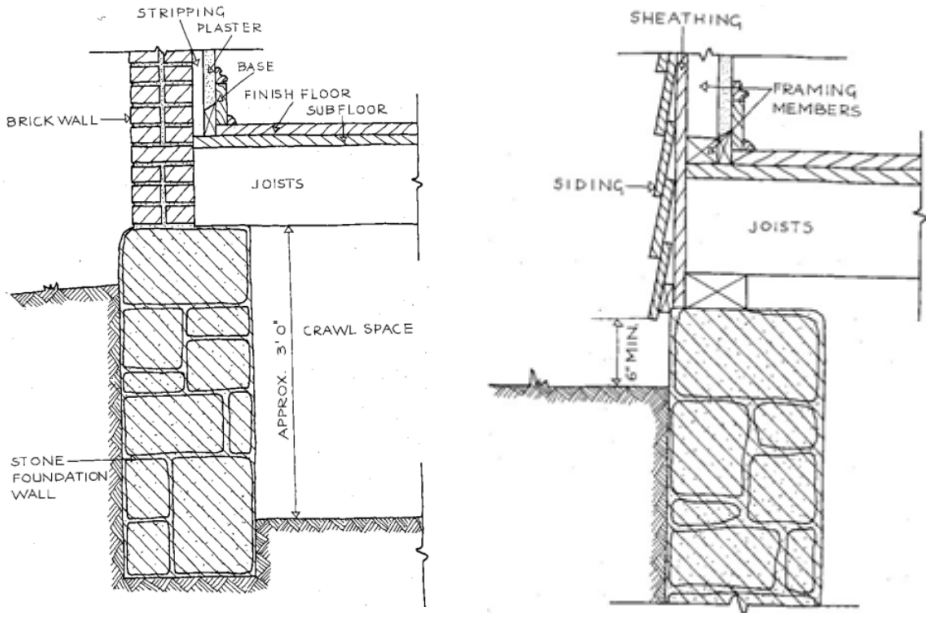
Design

Foundation walls are generally constructed of stone, brick, cast concrete, or concrete block — materials that withstand the effects of moisture. Due to the aesthetic concerns of builders, often the foundation material exposed above grade will be more attractive than the material below. Stone and brick of various types were the preferred construction material for above grade foundation walls in the 1800s. Poured concrete or concrete block foundations, sometimes concealed behind stone or brick cladding, became more common after 1890 and into the 1900s.

Construction

Understanding proper construction practices for foundations can help you identify causes of trouble, anticipate future issues, and better understand the process of undertaking major foundation work. The following illustrations show the parts of a foundation. Note that a foundation should extend a minimum of six inches above the soil level to protect the home from contact with excessive moisture.

A crawl space is the shallow area beneath a house that does not have a full basement and is usually enclosed by foundation walls. Girders (not labelled) should be placed at least 24 inches above the ground, and joists 36 inches above the soil in crawl spaces. Any replacement wood should be treated with a preservative if it will be in contact with masonry or installed within eight inches of the ground. Wood already located in a crawl space should also be protected from moisture and treated to prolong its life. For more information, see the Structural Woodwork section included in this guide.



Images 8 & 9: Left - Parts of a foundation; Right - Minimum recommended foundation height (Betty Anderson, 1983, p. 196, 197).

Walls and Footings

Footings are the foundation's base, and their function is to distribute the structure's load to prevent uneven settling. Some older houses' footings may be the same width as or wider than the foundation walls or they may be nonexistent. Many heritage buildings have stone foundation walls that simple sit on earth below grade, often below the frost line (the lowest depth that frost reaches). Soil under the foundation should be undisturbed and compact. For this reason, good drainage around the foundation walls and footing extending below the frost line will help to achieve a stable foundation.

Maintenance and Repair

Dampness

Dampness is a common problem in foundations, crawl spaces, and basements. Excess moisture may result in rotted wood and insect infestation, which can lead to weakened materials. The first step in controlling dampness is to identify the source. Poor drainage is a common cause and can be avoided by installing gutters, downspouts, and water drainage systems (i.e. storm drains, dry wells) that direct water away from the house. Water entering through window wells is another source of dampness. Another solution is to add a shield over the window well or the drain that leads from the window well to a dry well at least 15 feet from the foundation. The ground surrounding the foundation should slope away from the house for six or more feet. If it does not, earth can be moved around the house to create this slope. On a sloping lot, water may be effectively directed past the house by installing underground drains on the high side of a retaining wall roughly 15 feet from the house on the uphill side.

Seepage and Condensation

Seepage of water into the basement and condensation are other common sources of dampness. The best remedy for condensation is continuous ventilation on dry days or the use of a dehumidifier. Seepage takes more work to correct and can be accomplished by thoroughly cleaning and filling all cracks in the mortar, then sealing the interior walls of the basement with a waterproof coating. Although many techniques and products are recommended for coating foundation walls, like oil-based and latex waterproofing paint and clear sealers, their effectiveness can be limited and should be used with caution.

Rising Damp

Rising damp is a term used when water is absorbed from moist soil and drawn into brick or stone walls by capillary action. Poor drainage and soil that does not slope away from the foundation are sources of this problem. Consult with a specialist to determine the best intervention, which may include installing a vapour barrier on the walls to protect them and adjacent wood from deterioration.

Major Interventions

For serious issues of water penetration through foundation walls, it may be necessary to excavate a trench and install drains to a sump pump inside the walls. Another solution is to dig soil away from the foundation, install drain tiles level with the footings, and install a waterproof membrane on the exterior foundation walls. For interventions such as these, it is advised to contact a reputable firm that specializes in waterproofing.

Crawl Spaces

Rising damp is also a common problem with crawl spaces, as is condensation resulting from heating in cool weather and air-conditioning in hot, humid weather. Proactively keeping a crawl space dry will reduce the likelihood of decay and insect infestation.

Vents installed around the perimeter of the foundation, ideally near the corners, will improve the movement of air within the crawl space. As well, unheated crawl spaces should be insulated, and the vapour barrier should be installed above the insulation facing the heated room.

Care

Foundations, crawl spaces, and basements should be inspected once a year for the following common problems as outlined in the Province of Manitoba's Heritage Building Maintenance Manual.

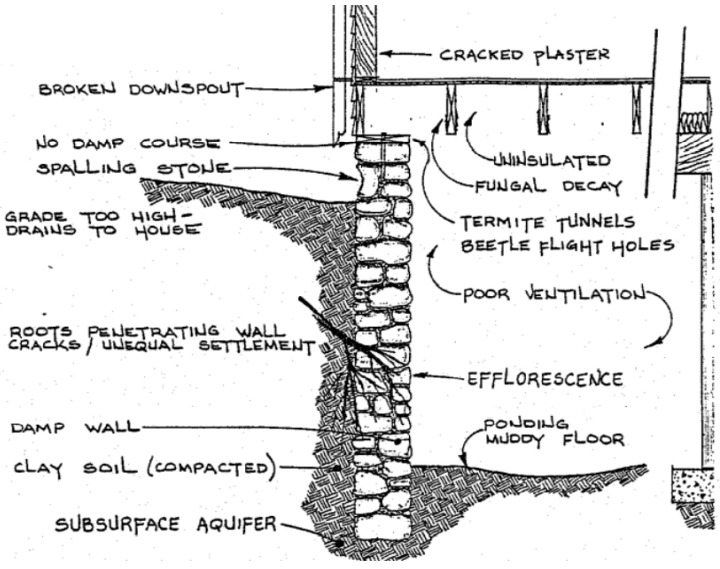


Image 10: Illustration depicting problems that impact foundations (Philip Marshall, 1981, p. 140).

Moisture

- After a hard rain, are gutters, downspouts, and water drainage systems working properly and directing water away from the foundation?
- Are there any signs of leaking?
- Are there any signs of excessive moisture — musty smell, corrosion, insect infestation?
- Is there any condensation forming or rising ground moisture?
- Are the wood posts, beams, or floor joists damp or soft?
- In a finished basement, are floor ties loosened or the bottom of walls showing signs of mold, mildew, and warping (for more inforation, see the Hazards to you Health section in this guide).

Movement

- Are any serious cracks visible?
- Are there any signs of movement – patched cracks re-opening, cracks in walls, bulging siding, windows or doors unaligned?
- Is the roofline straight and horizontal?
- Are beams, columns, posts, and joists sound?
- Are posts vertical and stable?

Exterior

- Is the parging or mortar in good condition? Are there any new cracks or flaking?
- Is the ground properly sloped away from the building?
- Are there any trees or saplings growing within two feet of the foundation?

Settlement and Cracks

As mentions in the Movement section above, foundations may settle and move because of shifting or shrinking soil. There are many causes for foundation movement:

- A house may have been built on soil with insufficient bearing capacity.
- Underground water in the form of streams or pressure due to impervious soil (i.e. clay).
- Vibrations from traffic.
- Tree roots near the foundation.
- Flooding.
- Improper drainage away from the foundation.

- Expansion and contraction of building materials.
- Rotting timbers.
- Insufficient footings.
- Significant increase in the load that a floor must carry, often due to a change in building use.
- Installation of an HVAC (heating, ventilation, air-conditioning) system requiring new loads on the floors.

Settlement Tests

If there is a crack in your wall or foundation, your building may have moved or may be moving. A foundation settlement test includes determining whether or not your floor is sloping by placing a marble or ball on an uncarpeted floor. If it rolls to the same side almost every time in various rooms, then the foundation is likely settling.

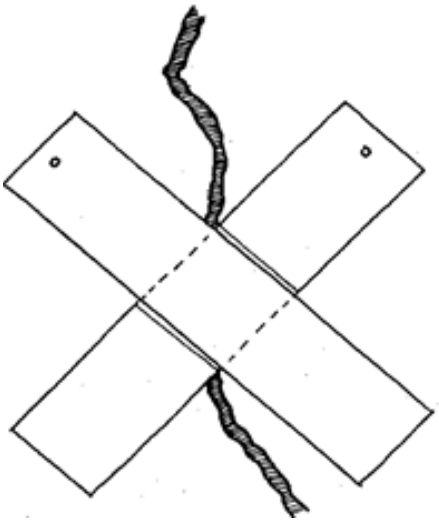


Image 11: Method used to test for foundation settlement (Betty Anderson, 1983, p. 198).

Once it has been determined that a foundation is settling, it is useful to know if the movement has ceased (keep in mind that there may not always be a crack indicating the foundation is settling). For a test, attach two strips of metal overlapping in the form of an X to the cracked mortar with a nail at the top of each piece. Etch the starting point into the metal with a sharp object. If the settlement is active, you will be able to see which way the wall is moving by watching the position of the etched lines over time — allow an extended period of time for observation. For an active crack or a very large crack seek advice from a structural engineer or a knowledgeable contractor to determine the best means of intervention.

If it is determined that the foundation is stable, fill the cracks in a brick or stone foundation with mortar of the same strength as the original mortar (for information on masonry restoration and mortar composition, please refer to the Masonry section in this guide). Ensure that the mortar in the joints is in good condition and repoint when necessary. In exposed foundation walls, repair or replace any deteriorated stones or bricks with replacements of the same size, colour, and texture as the original material. On portions of the foundation wall that are not visible, it is not necessary to match materials as closely. Work should be done in small sections to prevent the wall from collapsing, and the mortar should be allowed to harden before proceeding to the next section.

Summary

Foundations are a vital component of building construction, especially heritage structures, and they require proactive maintenance for proper functioning. Improper foundation construction, uneven settling, insufficient sloping of earth away from the foundation, poor perimeter drainage, deterioration of soft mortar, flaking stone or crumbling brick are the key threats to a foundation. Unbalanced settlement or extensive degeneration may require replacing portions, or all, of the foundation, which can be an expensive undertaking and calls for professional assistance. Substantial foundation work should be undertaken before other improvements to the house. Foundations should be inspected annually and after heavy rain to determine if any repairs are needed.

References

Note: Many of these titles were used for the Region of Waterloo's "Practical Conservation Guides for Heritage Properties". Links in blue are shown only if working in November 2025, links in black are dead links.

If you would like to learn more about conserving your foundation, please refer to the following sources:

Hanson, Shirley, and Nancy Hubby. *Preserving and Maintaining the Older Home*. New York, NY: McGraw-Hill, 1983.

Kalman, Harold. *The Sensible Rehabilitation of Older Houses.* Ottawa, ON: Canada Mortgage and Housing Corporation, 1980.

Manitoba Historic Resources Branch. *Heritage Building Maintenance Manual*. Winnipeg, MB: Government of Manitoba, n.d.

Schechteman, J. "Wet Basements." *The Old-House Journal,* 9, no. 6. (1981).

NEW CONSTRUCTION IN HERITAGE NEIGHBOURHOODS

Introduction

Infill housing is new construction on an available site within a historic or mature neighbourhood. Mature neighbourhoods often have a distinct architectural character. This is the result of geographic and climatic conditions, local building techniques and materials, and the style of the period during which the area was built. A sensitive infill project will be sympathetic to the existing architecture of the neighbourhood, while providing new residential developments that take advantage of the existing infrastructure. Ideally, an infill project will use existing open space and will not require the demolition of a building. The design of the new construction should be compatible with the existing streetscape to conserve the neighbourhood's heritage character by adopting appropriate building styles, profiles, massing, and materials.

Infill projects that may impact formally designated structures or neighbourhoods under the *Ontario Heritage Act* will require consultation with and approval from a Municipal Heritage Contact.

Small-Scale Historic Infill

When new buildings are integrated into an existing historic property or historic neighbourhood, the following approaches are encouraged in order of preference:

1. **Preservation/conservation**
   Maintain historic buildings with little alteration.
2. **Adaptive reuse**
   Reuse historic buildings by implementing restoration and/or rehabilitation efforts.
3. **Incorporation**
   Adaptive reuse that generally requires significant alterations or additions.

This section will primarily address small-scale infill projects into historic surroundings, such as:

- Secondary suites (converted basement or addition).
- Garage Suites.
- Garden Suites (laneway housing).
- Small lots (single-detached houses).
- Semi-detached houses (side-by-side duplexes).
- Duplexes (up-and-down duplexes).
- Fourplexes.
- Row Housing (up to five units).

For guidance on additions to heritage structures, please refer to the Additions section included in this guide.

Elements of Successful Infill Design

It is important to note that new construction does not need to imitate or replicate the original in order to be compatible with its surrounding heritage streetscape. An infill project should be identifiable as a product of its own time to avoid giving a false sense of the past. A contemporary building can coexist with its heritage neighbours, if the design is respectful and innovative. Every project is unique and should be assessed accordingly.

As identified by the District of Columbia's *Historical Preservation Guidelines* for "New Construction in Historic Districts," successful infill design will consider the following:

- Proportion.
- Scale.
- Orientation.
- Setback.
- Rhythm.
- Massing.
- Height.
- Materials.
- Colour.
- Roof Shape.
- Detail and ornamentation.
- Landscape features.
- Secondary buildings.
- Parking.

Setback

An infill project should respect a building's setback from the street and the existing setback of surrounding buildings. The streetscape should not be dominated by new construction. Respecting the alignment of rear facades is not as necessary as they can rarely viewed from a public street. Setbacks will be identified in your City or Township's Zoning By-law.

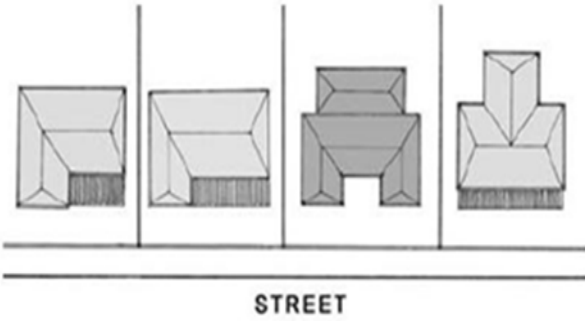


Image 12: Good example of infill maintaining existing setbacks (Helen Lardner, Conservation and Design Pty Ltd, 2006, p. 3).

Orientation

The orientation of a building is the direction that it faces. Most historic buildings squarely face the street, with their façade and main entrance in full view. In some cases, historic buildings are oriented to a side yard. A new building should respect the primary orientation of its neighbours. The porch is often an important feature of the home as seen from the street. When possible, avoid hiding the

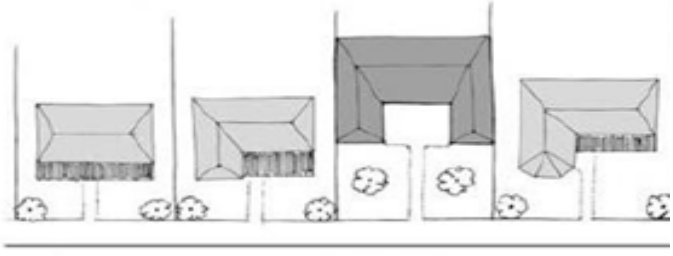


Image 13: Less desirable example of infill that does not match existing front and side yard setbacks (Helen Lardner Conservation & Design Pty Ltd, 2006, p.3).

entrance behind an oversized garage, and create an inviting design to encourage public use of the street.

Scale

Scale is the relative size of a building in relation to neighbouring structures or a common object, such as cars. It is also the relative size of building elements to one another and the overall building, such as windows, doors, cornices, and other features. Most residential buildings are designed to the human scale, rather than a monumental scale, as is the case with many churches or government buildings. The building scale of a new structure should be kept consistent with the general scale of its neighbours. If you had hoped to build a taller structure, opt to place the highest portions of the building away from the street, so they are less noticeable to pedestrians and do not cast unnecessary shadows.

Proportion

Proportion is the relationship of the dimensions of building elements, like windows and doors, to each other and to elevations. Proportions are often expressed in mathematical ratios. For example, many heritage buildings designed in the 1800s and early 1900s used mathematical proportions to determine the size and position of building elements. The design of a new building should respect, but not necessarily duplicate, the existing proportions of neighbouring buildings.

Rhythm

The spacing of repetitive façade elements, like projecting bays, windows, doors, and brackets, gives an elevation its rhythm. The space between houses, the height of roofs, cornices, towers, and other roof projections establishes the rhythm of a street. A new building should respect the rhythm of its neighbours and the streetscape.

Image 14: Site lines used to determine visibility of taller infill at the back of a lot as seen from the street (Helen Lardner Conservation and Design Pty, Ltd, 2006, p. 4).

Massing

Massing is the general shape and size of a building. A building's massing significantly contributes to the character of a street, especially in areas with row houses and adjoining commercial buildings. As a result, new construction should respect the massing of existing neighbouring buildings. The apparent mass of a structure may be altered through the appearance of dormers, towers, and other roof projections, as well as façade projections such as bays, porches and steps.

Height

The height of walls, cornices, roofs, bays, chimneys, and towers all contribute to the character of a building and neighbourhood. New buildings should be designed to respect existing building heights, although they do not necessarily need to be the same height. Generally, a new build will appear out of place if it is taller or shorter than existing buildings by half a storey or more. However, a new building added to a street with structures of varied heights may be more than one storey higher or lower than its neighbours and still be compatible. Upper storey setbacks can be helpful in reducing the apparent height of a new building.

Image 15: Unsuccessful example of infill due to significantly smaller massing and height compared to adjacent heritage buildings (Helen Lardner Conservation & Design Pty Ltd, 2006, p.4).

Image 16: Undesirable example of infill housing. The new construction is substantially larger than adjacent heritage buildings (Helen Lardner Conservation & Design Pty Ltd, 2006, p.5).

Materials

Materials typical of a historic neighbourhood, such as brick, stone, or wood should be used in the design of new construction. If several materials are used in an area, there will be more leeway to integrate a wider variety of materials. The size, texture, surface finish, and other defining characteristics of exterior materials are as important as the new type of material itself. For example, a new building constructed of glazed brick in a street of heritage buildings clad in buff brick would not be compatible.

Colour

The construction materials used on a building often determine its colour scheme. For example, brick, stone, terra cotta, slate, wood, stucco, asphalt shingle, copper, lead and other materials that are usually left unpainted give colour to a building. The colour scheme of a new building should complement the surrounding buildings. As a general rule, no more than three different colours should be used on a new building.

Roof Shape

The roof shape of a new building should respect those of its neighbours. For example, on a street composed of homes with front gable roofs, it is advised that a new building have a similarly designed roof. Introducing a different roof style, such as a flat roof,

would alter the established character of the street. For more information on roofs, please see the Roofs section included in this guide.

Detail and Ornamentation

Image 17: Poor example of infill due to inappropriate roof type and placement of window and door openings (Helen Lardner Conservation & Design Pty Ltd, 2006, p.5).

Some heritage buildings in Loyalist Township contain elaborate detail and ornamentation while others have relatively simple designs. A new building should take into account the amount, location, and elaborateness of architectural ornamentation on neighbouring buildings. Existing details and ornamentation can be used as the basis for those on a new building, but they should not be copied exactly. A contemporary interpretation of historic details and ornamentation should be used to differentiate between a heritage building and sympathetic new construction.

Landscape Features

Plants, trees, fences, retaining walls, sidewalks, driveways, and other landscape features are important character-defining elements in historic neighbourhoods (see the Landscaping section for more information). If possible, mature trees and shrubs and existing landscaping should be retained when a new structure is built on a lot. If this is not possible, landscaping that complements the new building and the neighbouring structures and landscaping should be designed. New construction may alter site drainage patterns and affect trees both on and near the site. Protection of major trees with extensive root systems may require the oversight of a specialist during construction. Significant existing landscape features, such as retaining walls and iron fences, should also be retained. Again, if this is not possible, new compatible features should be constructed along with the new building.

Secondary Buildings

Secondary buildings, such as garages and sheds, are important character defining elements in some historic neighbourhoods. They add scale and visual interest to primary buildings. New structures designed for inclusion in neighbourhoods with existing secondary buildings should consider the contributions they make to the character of the site and the street, while respecting their location, size, and materials.

Parking

Image 18: Inappropriate inclusion of garages inconsistent with design of adjacent buildings (Helen Lardner Conservation and Design Pty Ltd, 2006, p. 6).

New infill developments should not worsen the neighbourhood parking situation, especially if there is already a shortage of parking spaces for residents and visitors. Parking spaces should be screened from private and communal outdoor living areas and should be secure and visible from the house.

Neighbourhood Composition

Mature neighbourhoods in Loyalist Township have distinct architectural character resulting from local building methods and materials, and the style of the period in which the neighbourhood was built. It is important that new infill development reflect the existing style as closely as possible. However, when the existing character is more varied, as in neighbourhoods that developed over longer time periods or areas with a diverse mix of houses and industrial or commercial buildings, there is less pressure to conform.

Neighbourhood Amenities

Plans for infill construction should try to take advantage of adjacent neighbourhood amenities, such as parks, services, and public transit. For example, new construction should ensure that a significant view or access to a neighbourhood park is not spoiled or altered for residents and visitors to the area. The existing site landscape should be used to continue or contribute to the enjoyment of public parks and open spaces. More specifically, angled or bay windows can be incorporated to gain views of significant topographical features, or upper-level balconies and roof terraces can be included to provide private outdoor living areas and unobstructed views.

Demolition

The conservation and integration of heritage buildings into new development is encouraged and may be required by the local municipality. An assessment of the potential reuse of buildings on an infill site should be undertaken before a decision is made to demolish them. When contemplating removing a historic building to allow for higher densities, moving the building onto a new site should be considered. However, if this is not possible, the careful salvage of significant historic building materials should be taken to allow their use in the restoration of other buildings.

Summary

The construction of successful infill in historic neighbourhoods is an effective way to ensure that the vibrancy and unique architectural character of a neighbourhood is maintained over time. It allows a neighbourhood to evolve while still respecting the spirit of the era in which it was first constructed. To ensure that an infill project is successful, adherence to the principles outlined in this practical guide should be followed. Consultation with a heritage professional as well as a local Municipal Heritage Committee or Municipal Planning staff will also ensure that the design of a new infill project is respectful of the neighbourhood context in which it will be located.

References

Note: Many of these titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in November of 2025, links in black are dead links.

If you would like to learn more about infill in historic neighbourhoods, please refer to the following sources:

District of Columbia Office of Planning. *District of Columbia Historic Preservation Guidelines: New Construction in Historic Districts*. Washington, DC: District of Columbia Office of Planning, 2010.

Stovel, Herb. *CMHC: New Housing in Existing Neighbourhoods: Advisory Document*. Ottawa, ON: Canada Mortgage and Housing Corporation, 1982.

INSULATION

Introduction

Many of Loyalist Township's heritage buildings were constructed before modern heating, ventilation, and air conditioning (HVAC) systems were invented. Older buildings were built to breathe as opposed to the current method of construction that aims for airtight structures with mechanical air circulation. Although the use of insulation was limited, many old buildings incorporated passive energy features to help structures hold heat in the winter and stay cool in the summer, such as deep overhanging eaves, the positions of opening windows, porches, and brick construction. They also considered natural light, airflow, heat retention, and cooling. Many aspects of traditional design are thus inherently green and sustainable, resulting in many historic buildings having the potential to outperform modern ones.

Heritage property owners wanting to improve the comfort and energy conservation of an older building can often do so by carefully upgrading the thermal efficiency of a historic building's envelope by adding insulation to walls and roofs. It is important, however, that modifications that improve energy efficiency do not alter the historic character of a structure and that methods and materials used do not create future maintenance problems. Traditional building assemblies that breathe (transpire) require a different approach from modern ones that are sealed and need help to breathe. New technologies offer ways to improve the performance of old building envelopes, while retaining their character and improving energy performance.

This section provides advice on the various methods that can be undertaken to add insulation to your heritage building. It should be noted, however, that heritage conservationists have differing opinions about the best methods and materials used to insulate older buildings. More research is needed to fully understand the passage of moisture through buildings and how certain forms of construction and materials can mitigate these risks.

Primarily, English Heritage's Energy Efficiency and Historic Building guides were relied upon given the heritage expertise of the organization and the recent publication date. A number of additional sources were also consulted and are included in the references list at the end of this section to help you choose the most informed approach to insulating your heritage building. It would also be advisable to consult with a certified Energy Advisor, one who specializes in energy retrofits for traditional or heritage homes.

Typical Energy Problems

Addressing the typical energy problem experiences in detached structures built pre-1950 could significantly increase the thermal performance of your building. Common sources of heat loss include:

- Large air leaks (around windows and doors).
- Poor attic insulation.

- Walls with little or no insulation.
- Uninsulated foundations.
- Uneven heating of rooms.

Typical Energy Solutions

Typical energy solutions to heat loss in detached structures built pre-1950 include:

- **Air Sealing**
  Use caulk and weather stripping to close any cracks near the baseboards, ceilings, around window and door openings, and foundations. The goal is to reduce the amount of air leaking in or out of the building. Air sealing can be considered a must-do upgrade because it is inexpensive and highly effective. The lowest impact measures, such as air sealing a window, must be completed first or else there is no benefit in improving or replacing more heritage sensitive features such as windows.
- **Insulation**
  To avoid damaging historic fabric, insulation should begin with the hot water pipes, heating ducts, and hot water heater. This should be followed by roof and attic insulation, which is extremely cost effective. Insulation should also be installed at the top of the basement walls. With wall insulation, the impact of retrofitting depends on the type of insulation and how it is installed. Options are discussed throughout this section.

Air sealing and insulating can usually be completed without compromising a building's historic value. They are therefore the most important interventions that should be done prior to upgrading any other aspects of a heritage building. Air-sealing and insulation upgrades are safe for heritage houses if ventilation improvements are also planned.

Other energy solutions to heat loss in pre-1950 structures include:

- Closing fireplace dampers when not in use.
- Upgrading duct work and maintaining heating and cooling systems so that they run efficiently. New energy efficient domestic heating and hot water systems are cost effective and can be retrofitted without damaging the special character of your home, but don't rush to get rid of hot water radiators. They provide efficient and inexpensive heat.
- Adjusting the thermostat heat to a lower temperature in the winter and cool to a higher temperature in the summer, turning the water heater thermostat down.
- Augmenting existing heritage windows with exterior or interior storm winders. They can be attractive and removable, and they do not compromise the character defining features of your home.

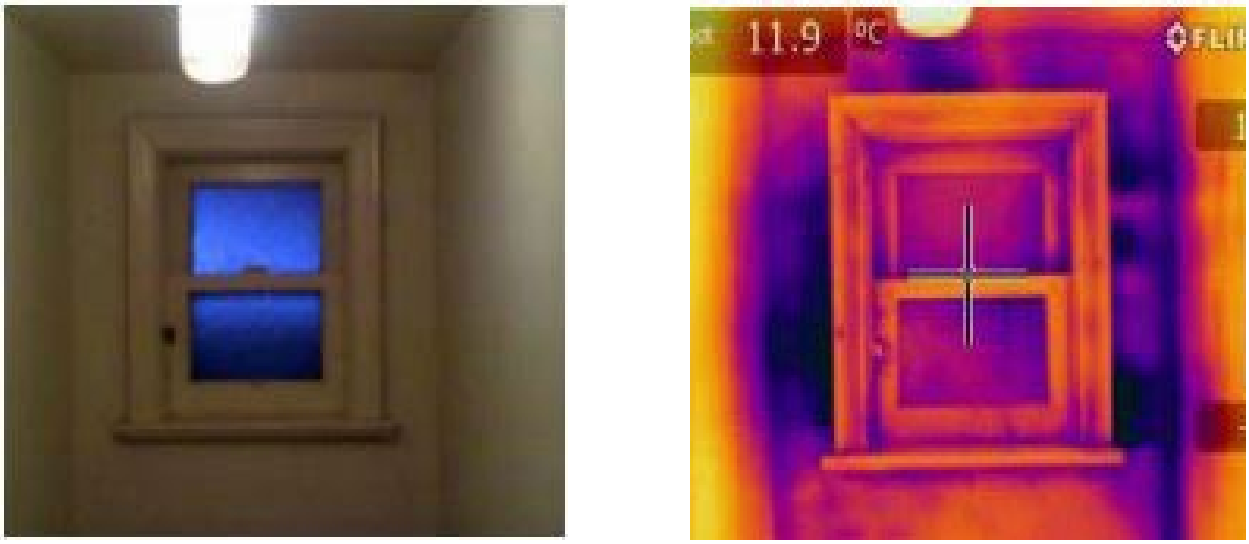
Planning and Assessment

Before you decide to improve the thermal performance of your heritage building by adding insulation it is important to assess the structure to determine:

- The heritage significance of the building and the anticipated impact of the interventions on its heritage value.
- The construction and condition of the building.
- The existing hygrothermal behaviour of the building (the movement of heat and moisture through a building).
- If the effort and impact of improving energy performance will be worth the cost.
- The technical risks associated with the chosen method.

Considering these points will help to identify if insulation should be added to your building externally or internally and will ultimately reduce the risk of accidentally creating long-term problems.

It is best to hire a certified Energy Advisor or auditor who specialises in retrofits for heritage homes to assess your home and recommend upgrades. They may suggest certain tests. For example, thermal imaging which displays the surface temperature of the building, is the ideal method for diagnosing hidden moisture, insulation, and air leakage issues typical of older homes. A thermal imaging camera shows pictures of how the heat and cold are travelling through your home's walls, ceilings, and basement. This will lead to recommendations on how to control the flow of heat, air, and moisture so that your indoor temperatures are more comfortable and stable.



Images 19 & 20: Thermal imaging of a cold air leaking through the window trim (City of Vancouver, 2014, p. 18).

An Energy Advisor can also suggest a blower door test which is a very effective way to visualize air leaks at a modest expense. The blower creates negative pressure, and air enters through all the leaky points. By using a smoke puffer, the leaks are identified and sealed.

Other tests such as hygrothermal modelling, ‘free water saturation’ testing, ‘vacuum saturation moisture content’ testing, and frost dilatometry to determine ‘critical degree of saturation’ testing, though expensive, are available to analyze brick structures for any risks of freeze-thaw and embedded metal corrosion that could result from interior insulation retrofits on older brick buildings. Testing for freeze-thaw risk in brick structures will be discussed further under the Interior Insulation for Solid Brick Walls section below.

For designated heritage buildings, a heritage permit application may need to be submitted to the Loyalist Township Heritage Committee and Planning Department before you undertake any work, to ensure that your plans respect the integrity of the structure. Do not hesitate to reach out to the municipality and inquire whether a heritage permit will be required.

Types of Insulation

There are a number of different types of insulation to choose from when improving your heritage building’s insulation. They can be broadly classified into fibre and foam. Fibre insulation types can be used in the form of batts (thick blanket-like pads that fit between studs), in rigid boards, or in loose-fill form which can be blown in. Foam insulation is typically a spray.

All are typically inserted into the air space between the inside or outside of wood or masonry walls. Each is quite different and should be explored with professional help to determine which has the properties best suited to your particular building. The chief measure of insulation performance is R-value, which is derived from tests that determine how well the material resists heat flow. The higher the R-value, the more effective the insulation. Current Canadian Standards call for at least R-22 for exterior walls and R-50 for attic insulation. As a general rule, the better the material performs, the more it costs. Older materials are evolving, and new ones are appearing. An overview of some of the available types follows:

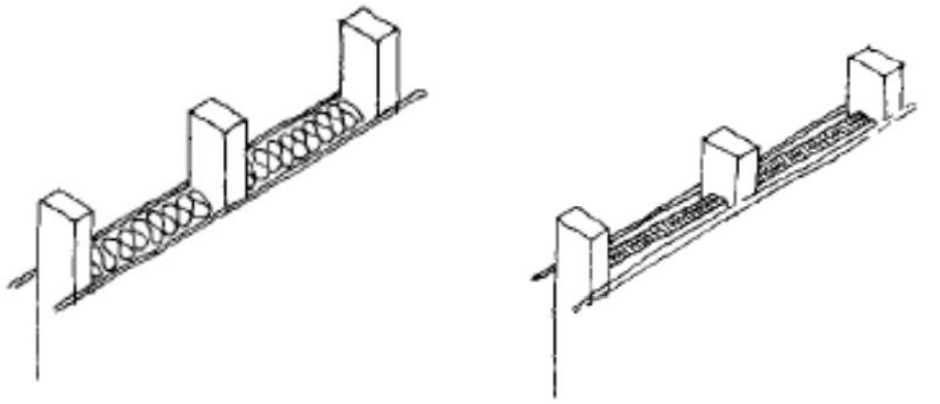
Fibre

Loose-fill cellulose
Made from shredded, fluffed-up newsprint containing 85% recycled material and 15% borate based fire retardant, which also stops mold and pests. It can be blown into place dry or damp. It does tend to settle over time, but an added adhesive can reduce that tendency. Also, when the blown in cellulose incorporates a borax additive there are positive reviews of it not slumping within the wall. Cellulose is good for retrofit work and attic insulation and has an R-value of 3.8 per inch.

Cotton batts
Recycled and shredded denim that are turned into thick batts and can be used to insulate walls and floors in open stud bays. It is treated with the same borate fire

retardant as cellulose and is a low-chemical, green choice. The R-value is 3.7 per inch, and it is good for new construction and attics.

Rigid foamboard insulation
Made from expanded polystyrene and other materials. Due to the thin, compact nature of this type of insulation, it is best used in the attics of one-and-a-half storey houses or on walls where there is little room for ventilation once the insulation has been added. Two types to look for are Dow's Blue and Owen Corning's Pink. These products have an insulating factor of R-5 per inch and can be effectively used in newer, air-tight buildings.



Batt insulation in wood studs. Rigid insulation in wood studs.

Images 21 & 22: Types of Insulation (District of Columbia, 2010, p. 6).

A Note on Health and Safety Precautions

Health warnings accompany both fibreglass and Roxul insulations due to the potential inhalation of these materials.

An approved cartridge type respirator (rated for lead and asbestos) should always be used when handling these materials.

Fibreglass batts
Lightweight batts of spun glass that offer a predictable R-value if they are not compressed. Fibreglass insulation gets its R-value from the amount of air it traps between its fibres, so if it is jammed too tightly into a cavity, it can not trap as much air and won't be effective. R-value is 3-4 per inch and is best used between open studs in new construction and attics.

Mineral wool (Roxul)
Made from recycled slag and mined basalt rock and is naturally resistant to fire and pests and is highly sound absorbent. It comes in batts or as a rigid board foundation insulation or can be blown into place wet. It is considered by some professional heritage conservationists to be the best candidate of all batt insulations to recover after being saturated with water. It has an R-value of 4 and is good for new construction and attics.

Sheep's wool
A fibre that is sheared from sheep and once cleaned, is formed into batts and lofty loose fill, then treated for moth and mildew proofing. Like cotton, it tends to be a health-related choice. Sheep's wool and cotton are good choices for insulation as the fabric can still breathe and buffer moisture without impairing performance, however they are more expensive and may be difficult to obtain.

Foam

Cementitious foam
Made from magnesium oxide cement mixed with water, frothed with air, and pumped into cavities. It is efficient, naturally fireproof, and resists mold and pests.

Polyurethane spray foam
A commonly used alternative to traditional building insulation. It is a two-component mixture of isocyanate and polyol resin that is combined and applied through the tip of a gun to form an expanding foam. They can be sprayed at the floor joists, floor slabs, wall cavities, and around window and door perimeters to ensure the continuity of the air barrier and insulation system.

High-density polyurethane spray foam
A rigid closed-cell structure that forms a hard rigid surface that makes it impermeable to water. Although not flammable, it must be protected with drywall or plaster to stop off-gassing during a fire. Its R-value is 7 per inch and costs four times that of fibreglass batts. It is good for masonry basement walls but not recommended for external wall insulation in older homes.

Low-density polyurethane spray foam (polyicynene)
An open-cell structure and can be blown into wall cavities as a liquid and in a few seconds, it expands to 100 times its volume and hardens. Its R-value is 4 per inch. It is the technology of choice by many for new construction or retrofitting in attics or crawl spaces, as it bonds with studs and sheathing to seal against air movement, yet flexes enough to accommodate seasonal wood movement, and its open-cell structure still allows moisture to escape, thus reducing the possibility of trapped moisture. It costs four times more than fibreglass batts. There is a tamer version of the foam, which is more suitable for retrofitting existing walls without exposed stud bays. Since it takes longer to expand, the threat of cracking existing plaster is minimized.

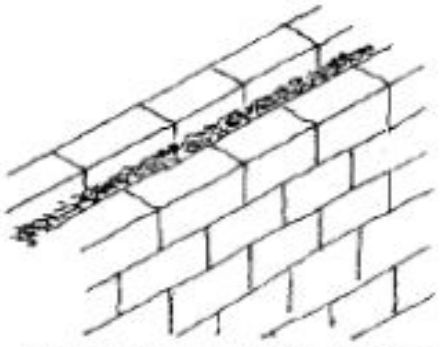

Blown-in insulation in a masonry cavity wall.

Image 23: Types of insulation (District of Columbia, 2010, p. 6).

Extruded Polystyrene or Polyisocyanurate

Expanded polystyrene or polyisocyanurate foam is used to make rigid foamboard panels. Its closed-cell structure is an effective vapour barrier, and it holds its R-value over time. It is flammable and must be protected from solvents and sunlight. It has a thin compact nature and is used for in-ground foundation insulation or in newer airtight buildings, attics, or walls where there is little room for ventilation once the insulation has been added. It has an R-value of 5 per inch.

Agricultural Base

In some formulations of polyurethane, petroleum-based ingredients are partially replaced with those from agricultural resources like soybean oil, sugar cane, and corn. They are available as sprayed foam and, in the case of soy-based, a rigid board.

Summary

Most of the materials described above can be used in open stud bays. But in older houses where the interior finish is to be retained the most suitable materials for retrofitting walls are blown-in cellulose, loose-fill fibreglass and open-cell foam (the tamer version). They are blown into the cavity of a wall through small holes (or larger holes for fibreglass fill) drilled either on the exterior or on the interior at both the top and bottom of the walls. In a retrofitting procedure, a vapour barrier cannot be used. Blown cellulose is a preservation approach as no major deconstruction is required to install it. It is sustainable since it is recycled from old newspaper, it moderates air infiltration and can buffer moisture. However, a draw-back of loose insulation stems from its tendency to settle and pack down over time, leaving a void on top where heat can escape. An added adhesive and borax additive have been shown to reduce this tendency. Both blown-in cellulose and fibreglass allow air to pass through them easily, and have the potential to become waterlogged through condensation, thus reducing their insulating capacities.

New insulation products are always being developed, especially types with minimal thickness (10mm). it is important to keep in mind that these products may only slightly reduce energy consumption and can be expensive. However, they help to make a room feel more comfortable by raising the surface temperature of the walls and possibly reducing the occurrence of condensation. It is important to understand the possible effects of your interventions at the design stage in order to avoid damage to the historic building fabric. An insulation professional who is experienced in heritage buildings would be helpful in these early stages.

Factors to Consider Before Insulating

Movement of Water Vapour

Consider the effect of insulation on the movement of water vapour through the building. The creation of condensation on a building’s surfaces or between walls can lead to health problems from mold formation and decay of the building fabric. Avoiding the risk of condensation can be a challenge as there are many variables to consider and the

solution may not be cut and dry. Many heritage practitioners recommend the addition of insulation that has hygroscopic properties (a material that readily absorbs moisture) to reduce the risk of condensation. To protect internal insulation from collecting condensation it is sometimes useful, for certain types of insulation, to separate it from the interior warm moisture-rich air by using a vapour barrier (like sheets of plastic or kraft paper), or a vapour retarder which blocks most moisture but still allows the insulation to breathe. This being said, adding vapour barriers and materials that resist the passage of water vapour are not generally appropriate or recommended for use on older buildings as they will trap moisture, increasing the risk of decay. In these older buildings, interior moisture from the exterior tends to dry out by itself through evaporation and convection, all of which is why these buildings have been around for so long. A useful rule of thumb regarding the passage of moisture is that all layers of an insulated solid wall become increasingly more permeable from the interior to the exterior.

Environmental Influences

Consider the environmental influences such as the location, orientation, and exposure of the building to direct sunlight, wind, and rain. These factors have important influences on a building's condition and performance. Different parts of a building are affected by different micro-climates, which need to be considered before determining an approach to insulation.

Older Buildings Need to Breathe

Consider that older buildings breathe. Most heritage buildings are constructed of permeable materials and do not include barriers to moisture movement commonly found in new buildings, such as air cavities, rainscreens, damp-proof courses, vapour barriers, and membranes. As a result, the permeable materials that compose historic buildings tend to absorb more moisture that is ultimately released by internal and external evaporation. When older buildings are performing as they were designed to, evaporation will keep dampness to a manageable level, preventing decay. For this reason, older structures are often referred to as breathing buildings.

Adding materials and systems that do not allow a building to breathe can exacerbate existing problems or create new ones. Incompatible materials that should be avoided are:

- Closed cell foam and extruded plastic insulation.
- Plastic vapour barriers.
- Cement or acrylic based renders.
- Cement pointing.
- Plastic based external wall paints.
- Vinyl wallpaper.
- Emulsion paints.

Adding these incompatible materials to an outside wall will trap moisture within the wall, leading to damp and decay and making the walls feel cold and clammy. Installed on the inside, they may do less damage but will also reduce the ability to manage moisture levels in the internal air, reducing the comfort of the building's occupants who may compensate by turning up the heat.

Mixing Building Components

Consider that traditional building assemblies that breathe require a different approach from modern ones that are sealed and need assistance to breathe. Avoid mixing building components made for sealed building envelopes (such as modern plastic and aluminium replacement windows) with traditional building envelopes. The effects on moisture movement at the boundary of the two can be unpredictable and could accelerate the decay of the building envelope.

Thermal Mass

Masonry buildings, especially those with thicker walls, have higher thermal capacities. This means that they can absorb heat over time and release it slowly as the outside temperature cools. In the summer when strong sun can cause very high temperatures, the thermal mass of a brick building's walls cools the interior by absorbing the excess heat during the day and releasing it slowly during the night as the outside air cools. This phenomenon helps to reduce the need for air conditioning.

Dampness

Most types of insulation are designed to limit heat loss and avoid interstitial condensation from water vapour generated within a building. They do not take into consideration how insulation can affect the movement of water and salt already present in an older brick wall. For insulation applied both externally and internally, it is advisable to not apply it to damp walls. Insulation can make existing water problems worse, create new problems such as the displacement of damp and salts, the decay of timbers in contact with walls, create health risks for residents (mold), and be impacted by moisture that can reduce its performance.

Walls that have been damp for a long time can take years to dry out completely. The selection of insulation and the method chosen to install it should take into account the drying-out process both before and after installation, and the presence of remaining damp and salts. An energy audit conducted by an experienced professional will identify all the issues contributing to moisture, heat loss/gain, and ventilation, and report detailed instructions on how to proceed.

Thermal Bridges

Thermal bridges cause heat loss and occur where insulation is not continuous because of gaps due to the presence of other building materials. With external insulation, these weak points are typically found around windows and doors, and with internal insulation they may occur where floors meet external walls. These areas with reduced or no insulation will be colder and will attract relatively more condensation. This can result in local decay, especially to wood members and finishes.

Care should be taken to avoid thermal bridges around window and door openings by installing additional insulation in the gaps between building materials. However, this can increase the cost of both the design and installation. In some cases, it may be possible to add the level of insulation necessary, so depending on the potential severity of the consequences, it may be wiser not to install insulation at all.

Masonry Deterioration

Masonry will be more resistant to deterioration if it absorbs less water. The more water within brick pores typically means a greater risk for deterioration from freeze-thaw cycles. Brick that was previously kept warm and dry by heat losses will be colder following placement of interior insulation, leading to a host of problems such as condensation and freeze-thaw cycles which can damage not just the bricks, but also the supporting framework. Many heritage buildings constructed before 1914 have vast timber framing which could be damaged. So, minimizing moisture is essential.

Moisture in brick masonry walls can come from different sources:

- Rising ground moisture can affect masonry walls if a damp proof course in not in place.
- Resident use internally, through breathing, cooking, and washing.
- Water from the rain will generally only dampen the exterior of the wall, which will dry out when the rain stops if it is in good condition.

A visual examination of parapets and chimneys, the wall components typically exposed to water and freezing, can provide initial indications of how other wall areas perform once they are made colder by interior insulation. If parapets or chimneys are deteriorated, this might indicate the brick is porous and susceptible to degradation. The risks of installing insulation in heritage buildings can be analyzed by establishing your bricks' water absorption potential through material testing, regardless of its visual condition and this testing should be considered early on in the process. These types of tests are discussed later in this section under Interior Insulation for Solid Brick Walls.

Note:
Avoid using vapour-proof type insulations in direct contact with old masonry walls. Always leave an air space between vapour-proof insulations and the masonry.

Effects of Insulating Plaster Walls

Consider the possible side-effects of insulating plaster walls. Some concerns have been expressed about pillowing when using blown-in cellulose or foam. Installers may not have been able to control the pressure of these products being crammed into a closed plastered wall cavity. Foam expands and the pressure used to install dense pack cellulose properly cannot be controlled within a closed wall, which can result in plaster failures in old homes. The pressure may also be great enough to loosen nails holding the wood or wire lath to the studs resulting in the plaster bowing inward and cracking. However, a slower pouring version of polycicynene foam is available. It takes longer to expand, minimizing the threat of cracked plaster.

Focus More On: Roofs and Attics, Windows and Doors

Most free-standing buildings lose about 20-30% of their heated or cooled interior air through walls and foundations, with the remaining 70-80% of heat loss through roofs, windows, and doors. It makes sense to concentrate energy efficiently measures on the attic, windows, and doors if possible.

Roofs and Attics

The key, and the most cost effective way, to insulate a heritage house is to focus on the attic, not the walls, since heat rises and this is where heat is lost. Don't forget to air seal first. Then batt, rigid and blown-in insulation can usually be installed easily between attic rafters, often without professional assistance. You must still have proper ventilation in your attic to avoid condensation, so be sure not to place insulation over the soffit vents. These small round micro vents, found at most hardware stores, are helpful to incorporate into the soffit of your heritage building to allow air to flow in and out of the attic.

Much heat loss occurs through ceilings located immediately below roofs, which can lead to damaging ice dams forming at the cold projecting eaves. Ice dams can force water from the thawing rooftop snow up under the roof above and down through the eaves or into the interior. Improving the thermal performance of your roof will help avoid problems like this.

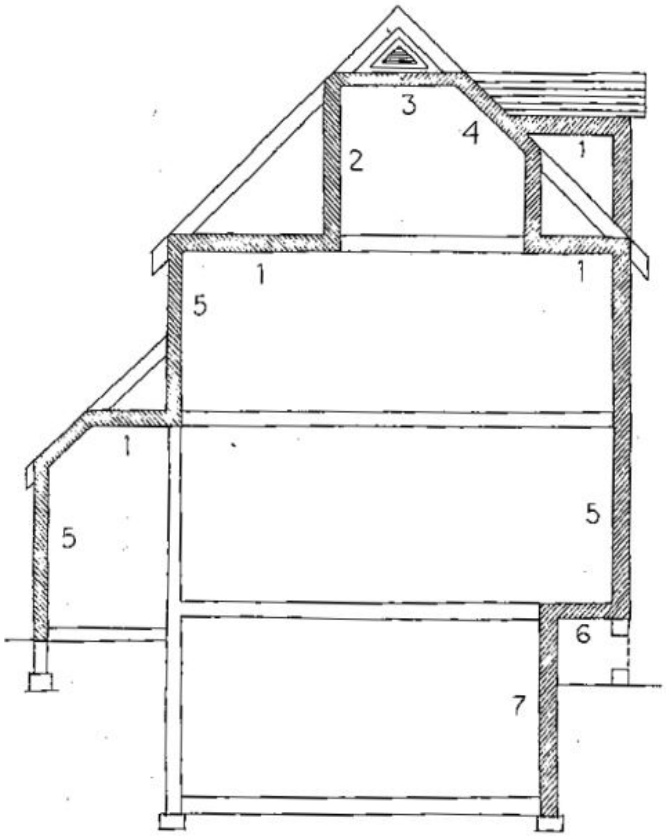


Image 24: The drawing depicts the priority for the placement of insulation. Number 1 for being the highest priority and number 7 the lowest.

Windows and Doors

When seeking to upgrade the thermal efficiency of your building, look for major drafts through cracks and joints around windows and doors, then install weatherstripping and caulking to reduce them. If existing weatherstripping is deteriorated, it should be replaced in-kind. If missing or if it never existed, new weatherstripping can usually be added without altering the existing character of the door or window. The same can be said for the addition of synthetic caulking when sealing the joints between the window and door frames. Care should be taken when selecting caulking to ensure it is chemically compatible with the surrounding materials and is the right colour to blend with the existing walls, windows, and doors.

It is preferable to upgrade the thermal efficiency of existing windows rather than replace them. The simplest course of action is to repair and maintain the original wooden windows and ensure the windows are well seated and sealed. Vinyl windows cannot be repaired and since the sealed units must be replaced after 15-20 years, they will cost more over the life of the house than you will save in energy. The original windows have lasted for decades if not centuries and with maintenance will likely last that much longer.

Also, even though you can replace your heritage windows with new wooden windows, the quality of your heritage window's old-growth lumber cannot be replaced. Wooden materials today are no longer as dense and will not provide the same protection against insect infestation and rot.

An important way to increase thermal efficiency is to install storm windows and doors. A study by English Heritage found that using a storm window reduced heat loss through the window by 58%, and some wood window proponents say the storm window is all a homeowner really needs and at a fraction of the cost of new window replacements. Heritage windows dressed in an exterior storm window will perform equally well if not better in R-value when compared to vinyl and aluminium counterparts. An exterior storm window will also protect your windows from the elements. Storm windows and doors are non-invasive and do not detract from the character of the house if they are designed with care. Since they may be the most visible feature, it is recommended they should closely match the size, shape, profile, colour, and other character-defining features of the existing ones. Additionally, they should have clear glass, rather than reflective or tinted glass. The same considerations should be given to interior storm windows; however, because they are installed inside, a single pane of glass can be used rather than matching the panes of the existing window. Care should be taken to ensure that the window is properly vented to avoid condensation.

For more information on repair and maintenance of older windows, please refer to the Windows, Shutters, and Doors section.

Consideration for Insulating Brick Walls

There is a great deal of debate within the building design and construction community over the addition of insulation to buildings with solid masonry walls in cold climates. The main challenge is finding a way to improve the performance while not compromising durability. Adding materials, and systems that do not allow a building to breathe can exacerbate existing problems or create new ones. In some cases, the risks of adding insulation to solid walls will outweigh the benefits. If so, alternative ways of improving energy efficiency may be more appropriate.

The following sections discuss the current thinking on the addition of insulation to the interior and exterior of older brick buildings. Much of this advice similarly applies when insulating traditionally constructed wood frame structures.

Exterior Insulation of Solid Brick Walls

Structures built pre-1900 were often constructed with solid load-bearing clay-fired exterior brick with no insulation. This type of construction can be difficult and costly to insulate. Some of these structures can be over-clad with external insulation. The addition of external insulation will significantly alter the appearance of the building and will erode or eliminate its heritage features. This method is suitable for buildings without heritage designation and when changes to exterior appearances are acceptable or desired. For designated heritage buildings, a heritage permit may be required.

Care should be taken to avoid thermal bridges around windows and door openings. Also, the addition of vapour barriers to the outside or cold sides of the wall should be

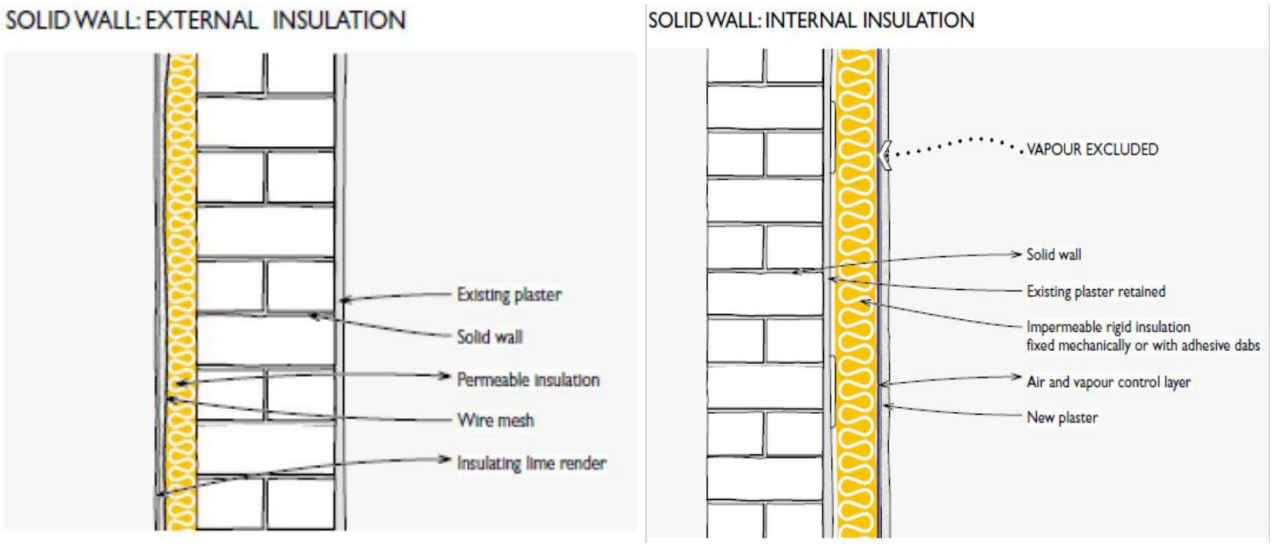
avoided as this will form a vapour trap, encouraging condensation and deterioration of the building fabric. It is important that the insulation and protective finish installed externally still allow the building to breathe and allow moisture to evaporate away without causing harm. Remember the rule of thumb that all layers of an insulated solid wall should become increasingly more permeable from the interior to the exterior.

Avoid using modern closed-cell foam and other plastic based insulations that limit the movement of moisture. Cement or acrylic based renders, cement pointing, and plastic based external wall paints should also be avoided. Instead, use a moisture-permeable protective finish, such as a lime render or rain-screen cladding with lapped joints, to protect the insulation from rain and damage. External insulation should generally be treated as a two-component system with all layers working together.

Interior Insulation of Solid Brick Walls

For heritage buildings where the unique architectural features of the façade are to be conserved, the addition of new insulation is best placed on the interior side of the building. This is thought of as a retrofit option to increase energy efficiency and resident comfort. However, this method does have some pitfalls. Masonry freeze-thaw deterioration is a particular risk with interior insulation retrofits of old buildings. As discussed previously under Factors and Risks to Consider, brick that was previously kept warm and dry by heat losses will be colder following the placement of interior insulation, which can lead to problems such as condensation and freeze-thaw cycles that can damage the bricks and supporting framework. Incorporating a vented airspace is one technique to keep bricks below the critical moisture content level during freeze-thaw cycles. Freeze-thaw risks can be analyzed by several methods. In the Free Water Saturation test, bricks are places in a container of water to determine how long it will take for the moisture to seep through them. Another is Vacuum Saturation Moisture Content which determines the maximum amount of water that can be absorbed by a porous material and is conducted in a vacuum. Frost dilatometry is used to determine the critical degree of saturation. Below this critical moisture content level, masonry can experience unlimited freeze-thaw cycles. Above it, damage occurs quickly.

When the goal is to preserve the existing interior finishes to maintain desirable historical or heritage features, retrofitting typically involves drilling holes at the top and bottom of the walls, inserting insulation between the studs, and then blowing in cellulose, fiberglass, or open-cell foam before repairing the holes. The risks of doing so have already been discussed, and it might be more cost efficient to make sure efforts and money are first spent on sealing air leaks around windows and doors and insulating the attic.



Images 25 & 26: Illustration of the addition of permeable insulating solution with batts fixed to the masonry and finished with breathable lime render on the exterior (left) and the addition of insulation placed within the interior side of the building (right) (English Heritage, 2012, p. 14).

When the interior wall finish is to be replaced, retrofitting can take advantage of a larger selection of insulation options that are available for use between open studs, still taking into account the proper control of vapour and avoidance of sources of dampness. New internal finishes can then be used, either to copy the original or to introduce a new design.

The design and installation of internal insulation should be undertaken with care to avoid thermal bridging especially surrounding windows and doors, and wall and floor junctions. It may be necessary to relocate elements such as radiators, pipes, electrical outlets, light switches, baseboards, plaster cornices, picture rials, window and door surrounds, and built-in furniture, as they may be concealed or disturbed by the addition of insulation. Although possible to replicate these details, the room proportions will change. Careful attention should be paid when planning this work to ensure that the intervention does not significantly change the character of the room.

Regarding the movement of moisture, the same rule of thumb applies: all layers of insulated solid wall should become increasingly more permeable from interior to exterior. Insulation systems that are hygroscopic and vapour permeable (i.e wood fibre) can be used, or a vapour control layer for certain types of insulation, which also carries its own risks.

Brick Cavity Wall Insulation

This segment provides guidance on how to improve the thermal performance of buildings constructed with early forms of masonry cavity walls pre-dating World War II.

Cavity or ‘hollow’ walls consist of two masonry leaves tied together but separated by a continuous airspace. The existence of a cavity can only be determined by looking at the

overall depth of the wall. In a cavity wall, the outer leaf acts as protection against the elements and the inner leaf serves as a dry construction to support the interior walls. The two leaves are tied together to provide structural stability.

The cavity between the two leaves prevents moisture from passing from the outside to the inside of the wall. This prevents damage from damp and decay to any woodwork or decorative elements in contact with the inner leaf. The cavity also allows for the evaporation of any condensation or rainwater that penetrates the outer leaf and ensures a more even temperature inside the building. The cavity may run continuously through the wall. However, if bricks are used as ties, it may not since these ties create direct contact with the two leaves. This thermal bridge allows moisture to transfer across the cavity. In this case, the cavity wall acts like a solid brick wall. Similar to solid masonry walls, early cavity walled buildings are ‘breathing’ structures that exchange moisture between the indoor and outdoor environments.

There are three ways to insulate a cavity wall — internally, externally, or placing insulation within the cavity. Sometimes a combination may be useful. Internal and external insulation were discussed in the previous segment. Insulating the cavity, however, is the preferred alternative as long as the technical risks can be overcome, since it does not impact the internal or external appearance or character of the structure. Materials might include mineral wool, foam insulation, beads, or granules which are blown or injected into the cavity. Insulating cavities narrower than 50mm is typically not cost-effective, as there is a risk the insulation could allow water to cross the cavity, and the material may not be effective in such limited space.

Non-Brick Wall Insulation

Much of the advice discussed for insulating brick walls similarly applies when insulating traditionally constructed wood frame structures. They are also breathing buildings, and their traditional construction generally includes a cavity to act as a thermal chamber, which slows the movement of heat through a wall. Before adding external insulation to an older frame house, keep in mind that wood buildings can be maintained indefinitely with proper care and conservation, unlike some building materials that have limited lifespans and must eventually be replaced. For older post and beam structures, the same general advice for insulating walls applies, but it is recommended that a professional come on site to address the installation on an individual basis.

Foundations

Insulating crawl spaces and basements can provide good energy savings but special considerations should be taken to prevent the collection of moisture, as these areas can become damp easily. Insulation can be readily added to newer basement walls, while older historic basements with rugged walls made from dirt, brick, or fieldstone may be more difficult. Simply ensuring that foundation walls are in good repair and not in need of repointing will reduce drafts. If walls are not suitable for insulating, it is recommended that basement or crawl space insulation be installed on the basement ceiling or between the first-floor joists. Exposed piping and ductwork in these locations can also be wrapped in insulation.

Financial Implications and Payback

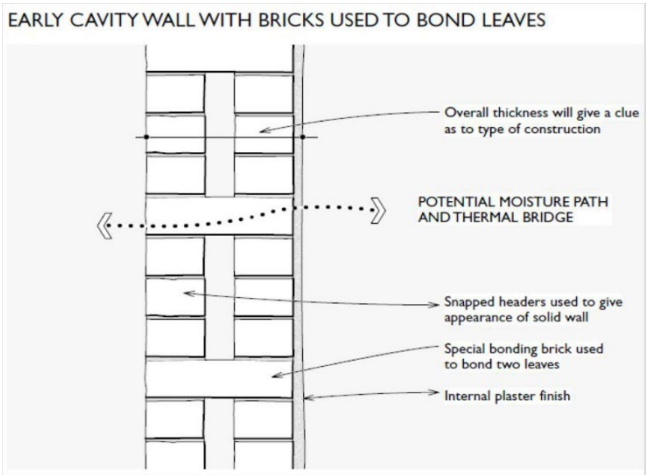
The addition of external and internal insulation to older buildings can be expensive, and the time associated with financial payback can be lengthy. Do not underestimate the costs associated with the level of care that should be taken to avoid thermal bridges. Full payback periods can be 30+ years, but they can vary greatly between individual buildings.

As a result, it is not typically worth insulating external walls until the full range of easier and more immediate upgrades have been done, like repairing and air-sealing windows and doors, or insulating attics, roofs, and suspended ground floors.

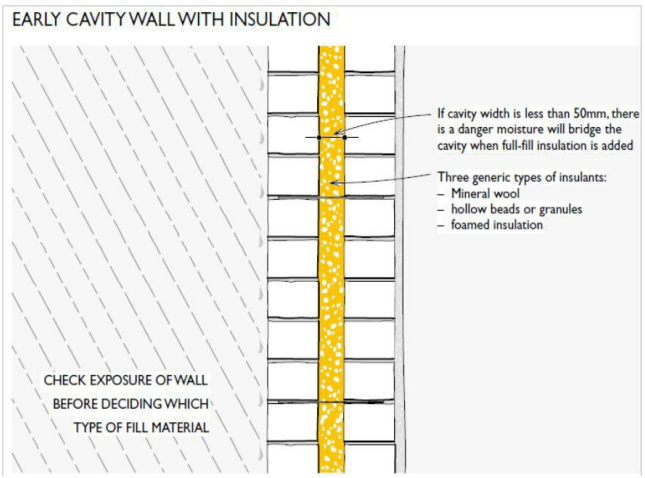
Summary

The base of knowledge surrounding the insulation of heritage buildings is always progressing, enabling practitioners to avoid problems associated with insulating solid and cavity masonry walls along with wood frame buildings. This knowledge is furthering the effectiveness of retrofit strategies and is continually being advanced as new lessons are learned from observing past retrofit projects.

This section has attempted to help you become better informed on the many variables and complexities involved in the insulation of a heritage building. But when deciding on the best solution for your own situation, and because every heritage building has its own unique challenges, it is advisable to consult with the professionals before final decisions are reached.



Images 27 & 28: Above - Illustration of an early cavity wall with bricks used to bond leaves. Below - Illustration of an early cavity wall with insulation. (English Heritage, 2012, p.15).



References

Note: Many of these titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in November of 2025, links in black are dead links.

District of Columbia, Office of Planning. *District of Columbia Historic Preservation Guidelines: Energy Conservation for Historic Buildings*. Washington, DC: District of Columbia Office of Planning, 2010.

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English Heritage. “Energy efficiency and historic buildings: Insulating solid walls.” English-heritage.org.uk, 2012.

INSURANCE AND HERITAGE PROPERTIES

Introduction

There are numerous resources available to help heritage property owners navigate the process of insuring an older and/or historically recognized structure.

There are two main reasons why insurance companies are sometimes hesitant to insure heritage buildings:

1. The perception that heritage buildings carry a higher risk due to the age of the building fabric, such as wiring, pipes, heating equipment, foundations, and roofs.
2. The view that it is too expensive for insurance companies to replace the materials of Ontario Heritage Act designated heritage buildings "with like kind and quality," if a claim is made.

To reduce age-related risks for insurance companies, you can take the following steps:

- Ensure your property is compliant with relevant building codes.
- Install smoke detectors and alarm systems.
- Assess and replace old-style knob-and-tube wiring, if necessary.
- Update and/or upgrade your roof, heating system (forced air or electric) and plumbing (galvanized cast iron to copper and/or PVC).
- Consider installing sewer backflow valves.
- If your building has an oil tank, ensure it is inspected and maintained regularly.
- If the property is semi-detached or a row house of any age, insurers may want proof of an adequate firebreak between the buildings.

If you own a property designated under the Ontario Heritage Act, contact your municipality to verify what would be required in the case of an insurance claim. Not all designation By-laws require that a building be reconstructed using the exact same materials as the original, and most designations only cover the exterior of heritage buildings, not the interior construction.

The Insurance Bureau of Canada offers five tips for all heritage property homeowners seeking insurance:

1. Shop around for the most suitable policy and price.
2. Consider the claims settlement process and the deductible.
3. Reduce your risk by reducing your chances of having to make a claim.
4. Keep accurate records of the unique features of your heritage home.

5. Make sure to purchase enough insurance coverage (i.e guaranteed replacement cost coverage).

If you have specific questions about ensuring your heritage property, contact the Insurance Bureau of Canada.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about properly insulating your heritage building, please refer to the following sources:

Useful information about heritage properties and Insurance can be found on Community Heritage Ontario's Heritage Property Insurance Information webpage.

Ministry of Tourism, Culture and Gaming's *Heritage properties and insurance* webpage.

Ascroft, Sheila. "What's Your Policy? Owners Face Insurance Woes on Older Homes." *Heritage,* Spring 2004.

Insurance Bureau of Canada. *Heritage Properties: Insuring the Living Past*. Insurance Bureau of Canada, 2022.

Insurance Bureau of Canada. *Insuring your heritage home*. Insurance Bureau of Canada, 2007.

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Ministry of Tourism, Culture and Gaming. "Heritage properties and insurance." ontario.ca.

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Voll, Jane. "Getting Insurance on your heritage property: Insurance industry working to make it easier." *Heritage,* Winter 2005.

LANDSCAPING

Introduction

Lawns, trees, flowers, shrubs, and non-living landscape features, such as designed grades, paths, decks, patios, driveways, walls, and fences all contribute to the character of heritage properties and neighbourhoods. Historically, landscaping and landscape features have been designed to complement the architecture of the associated building. As successive architectural styles evolved and became popular, so did the design of ideal gardens and landscapes.

This section provides recommendations for property owners wishing to maintain or rehabilitate a landscape associated with a heritage property. Much of the advice in this guide was adopted from the District of Columbia's Historic Preservation Guidelines: Landscaping, Landscape Features, and Secondary Buildings in Historic Districts.

Evolution of Landscape Design

Your landscape should match the style and character of the primary building on the property. The following sections discuss the style of gardening associated with architectural styles common in a given era.

Victorian Gardens (1800s to early 1900s)

In the second half of the 19th century and early 1900s, the Victorian Garden landscape style was popular, emphasizing informal or natural forms and groupings of plants. Public space, such as the street and sidewalk were separated from the front yard by low stone or brick walls or by decorative cast iron fences. Side boundary lines were marked by shrubs, trees, and flower beds. Cast stone, concrete, and cast-iron lawn ornaments and statues were popular decorative elements.

Shrubs and dense flowerbeds were planted using a mix of available annuals and perennials sourced from neighbours and catalogues. Prior to 1850, native species of plants were almost exclusively used in gardens. However, the Victorian Garden often included exotic plant materials imported from Europe, Asia, South America, and the United States.

After 1850, the design of back yards was more utilitarian than the design of front yards, especially for rowhouses. Generally, shrubs, trees, flowers, or fences were used to separate yards, and many back yards would have vegetable gardens.

Landscapes in the Early 1900s

The designs of residential landscapes in the early 1900s were influenced by the architectural style of the associated building. For example, single detached houses built in the Colonial Regency style typically had front yards with a lined path and symmetrically placed trees. More generally, landscaping from this era included a limited number of trees, along with shrubs and flowers used for foundation plantings. Concrete sidewalks led from the street or sidewalk to the front door of the building. The front yard was often separated from the street by low shrubs, wooden fences, or brick or stone

retaining walls. Back yards were generally enclosed by wooden fences and contained garages that could be accessed from a rear alley.

The landscaping associated with the modest buildings during the early 1900s, such as rowhouses, was usually simple and utilitarian. Front yards were often grass with some foundation planting and may have been separated from the public sidewalk with a cast iron fence or low stone or brick retaining wall.

Modern Landscapes (Mid-1900s to present)

Modern landscapes represent a shift away from the more 'wild' garden aesthetic common to the Victorian era and focus on clean structured lines (termed 'rectilinear' by landscape architects) and organized plantings. Both exotic and native plant species may be incorporated independently or mixed in a modern garden. Hard landscaping, composed of the construction materials used to improve a landscape like gravel, rock or stone, concrete, timber, bitumen, glass, and metals, focus more prominently in modern gardens than in previous eras following an increased desire for outdoor amenity space after World War II.

Conservation

Maintaining a building's context and the surrounding landscape is an important aspect of conserving heritage buildings. Identifying, retaining, and preserving the existing organization and patterns of a landscape as they have evolved over time is key to landscape conservation.

Documentation

To begin a landscape restoration project, first document the features of your property that make it special and note its organization and pattern. Pay close attention to the size, proportions, configuration, and relationships in your landscape and the components that comprise it.

Planning

Similar to interior restoration projects, improving the exterior landscape is best approached with careful planning. Assess what your goals are for the landscape. Some helpful questions to ask before formulating a plan and prioritizing goals include:

- Do you want a true period restoration or a period appropriate recreation that reflects the past?
- How much time do you want to invest in the upkeep and maintenance of the garden and landscape?
- Do you want to reflect the home's original construction date in the landscape or another significant time in the property's history?
- Are there certain aspects of the landscape that you want to address, like highlighting a feature in the garden, or screening an undesirable view?

To better inform the plan for your landscape, you can also research what it might have looked like in the past and which appropriate plants are available today. Some useful

sources of information available at your local library and/or archives include: historic photographs, illustrated magazines, articles, local newspaper photographs, nursery ads, archives, garden club documents, personal correspondence, and diaries.

Removing Elements

Heritage conservationists often warn owners to ‘do no harm.’ In other words, avoid interventions that could destroy features that make the property unique and tell its story. One of the most common mistakes is to ‘clean up.’ Instead, carefully groom the landscape without removing evidence of what once great there, as this can leave the property looking like a blank slate. For example, incorporating 100-year-old lilacs or remnants of a stone foundation help root the landscape in the past. Landscape architects recommend considering not only how the landscape appears today, but also how it will look as plants mature.

It is important to avoid adding new components to a landscape without careful consideration. If altering the existing landscape is appropriate or necessary, consider the effects that removing or adding plantings will have on the character of the landscape, its mature plants, the building, and the streetscape. Contact local landscape architects or nurseries to gather feedback on the design of your proposed alterations.

Design

There are several design issues related to heritage landscaping and landscape features. As discussed above, existing features in front and back yards may have been altered, added or removed. Any additions or changes to landscaping associated with a heritage building should strive to create continuity among adjacent properties, and in the character of the entire neighbourhood.

Some general tips suggested by landscape architects include:

- Use plant material to soften building size, mass, and edges to maintain a human scale for pedestrians.
- Use landscaping to screen and buffer parking, open storage and other unsightly areas where required.
- Use landscaping to buffer high density buildings from low density where required.
- Incorporate native plants into the design as part of the planting palette.
- Tour you neighbourhood to see how others have landscaped properties of a similar age and architectural style. Older parks, cemeteries, and gardens are other good places to get ideas.

Front Yard Landscapes

The design of front yard landscaping is a very important character-defining element of heritage buildings, especially for single-detached residential structures and rowhouses It helps to establish the context of a building as it relates to its neighbours using common designs and plant materials. Pride of ownership is also evident in a properly maintained front yard. If your home is in or near an established Heritage Conservation District

(HCD), there may already be rules or guidelines in place for appropriate landscape treatment. Refer to the Loyalist Township's Designated Heritage Properties page on the municipal website for more information of HCDs in the area.

Landscape Features

Some common landscape features, often referred to as hardscaping, include:

- Sidewalks and paths.
- Driveways.
- Fences.
- Decks and patios.

When these features are located in a front yard or other area that can be viewed by the public, there design can contribute to the character of the property and streetscape.

Sidewalks and Paths

Historically, sidewalks and paths were constructed of concrete and laid at the same time the main structure was built. The design and location of these features in front yards can help to define the character of the landscape and neighbourhood. Most often a path will run in a straight line, leading from the sidewalk or street to the front porch, steps, or door. Less frequently the path will be curved to accommodate a semicircular driveway, or to create a meandering path to the main entrance.

Existing sidewalks and paths should be maintained, and if necessary, repaired or replaced in kind. For sidewalks and paths located in front yards and areas visible to the public this is especially important. If new sidewalks or paths are added, they should be designed and constructed of materials that are compatible with the heritage building and landscape context of the area.

Driveways

The design, placement, and material used in driveway construction contribute to the landscape character of the property. For paving, simple scored concrete, stone, paving brick, or other historic materials are recommended over concrete block, asphalt or other modern concrete treatments. Where a particular material or style is documented or is still visible in the existing surface it should be maintained if possible.

On historic properties, driveways typically lead straight from the road to a garage in the back yard. Historic rowhouses do not accommodate the inclusion of driveways in front yards, rather garages or parking spaces are accessed by an alley at the rear of the building.

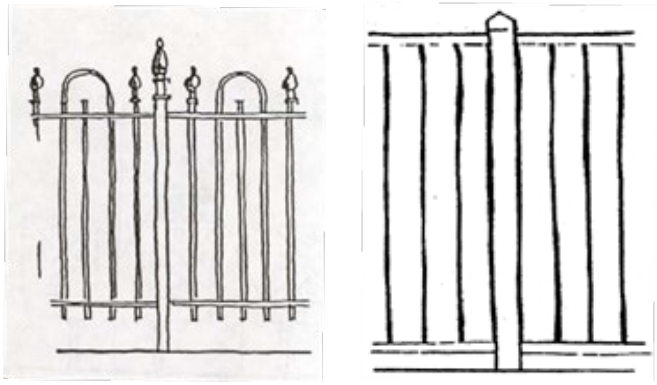
Fences

Fences are included in front yards to define property lines and enclose private space from the public. They also create harmony in a streetscape when included on numerous adjacent properties in a neighbourhood. Open fences were typically made of cast iron or wood. Fences in back yards are also used to define property lines but are generally taller and solid to provide privacy.

Many architectural styles had fences designed to enhance the features of the house, such as white picket fences accompanying Georgian homes. In some cases, the

architectural features were repeated in the fence designs, especially more delicate metal fences.

Existing fences that contribute to the character of the property should be conserved. If you are adding or replacing a fence that has been removed, it is advised that the fence be selected based on documentary evidence, such as photographs, plans or the design of neighbouring fences to guide the replacement's shape and material. In front yards, wood or metal picket fences found in many styles are often appropriate for heritage properties. The addition of a fence or changes to an existing fence may require a building and/or heritage permit.



Images 29 & 30: Left - Fences in front yards should have an open design. Right - Fences in rear yards are more commonly taller and solid (District of Columbia, 2010, p.6).

Decks and Patios

Most decks and patios included on heritage buildings in Loyalist Township are not original. They were likely added after World War II when outdoor recreation space became desirable. Most often, decks and patios were located in back yards, although some may be in the side yards of single-detached houses. It is uncommon for these features to contribute to the character of a property or neighbourhood due to their later addition and use of contemporary designs and materials that may be incompatible with the existing building and landscape. Therefore, it is acceptable to alter existing decks and patios so long as the new construction is located in the back yard and the design compliments the heritage structure and landscape. The addition of a deck or changes to an existing deck may also require a building and/or heritage permit.

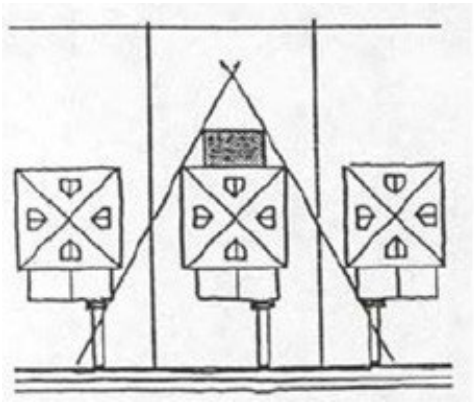


Image 31: Decks and patios should be placed so they are not visible from public property (District of Columbia, 2010, p.7).

Archaeological Discoveries

It is possible that while making alterations to your historic landscape archaeological materials may be unearthed. These objects can include foundations of previous structures, cisterns, ceramics, bottles, coins, and tools. Archaeological artifacts are important for the information they yield about past human activity on the property. If you find significant archaeological material on your property, contact the Ministry of Tourism, Culture and Gaming for guidance on how to proceed.

Maintenance

There are two main components of a landscape that will require maintenance: the vegetation and the hard landscaping.

Vegetation

Undertaking regular maintenance of a landscape, such as pruning trees, trimming hedges, replanting annuals, raking, weeding and cutting the lawn will help to ensure that the landscape context of a heritage building is conserved. It also helps to ensure that trees, shrubs, vines and other plants do not become overgrown or cause additional problems for the building. For example, some plants can cause maintenance and repair problems if they are allowed to grow on or near the walls, foundations, and roofs of a building.

Foundation planting can lead to water entering basements and crawl spaces. Roots may clog weeping tiles, underground pipes attached to downspouts, or bore into cracks in foundation walls. Shrubs and other foundation plantings can shade the ground, inhibiting the speed of drying after rain and snow. Accidentally overwatering foundation plantings in the summer can also lead to water entering basements. See the Foundations section included in this guide for more information on how to ensure your basement or crawl space is watertight.

Roots of large trees on your property may cause foundation walls to crack or heave, especially if the house was constructed before the tree matured. Generally, this movement or resulting cracks will not affect the structural integrity of the building, but it could lead to water entering the basement, setting the stage for larger problems that may develop in the future if left uncorrected.

Vines, such as ivy, are often allowed to grow on the stone, brick, or wood walls of a building. Although the appearance of these plants may add charm to a heritage building, their roots can cause a wall to deteriorate, paint to peel, and wood to rot. This type of vegetation also provides shelter for insects that may exacerbate moisture problems. As a solution, vines should be trained to grow on a trellis mounted in front of, but not directly attached to, a structure's walls.

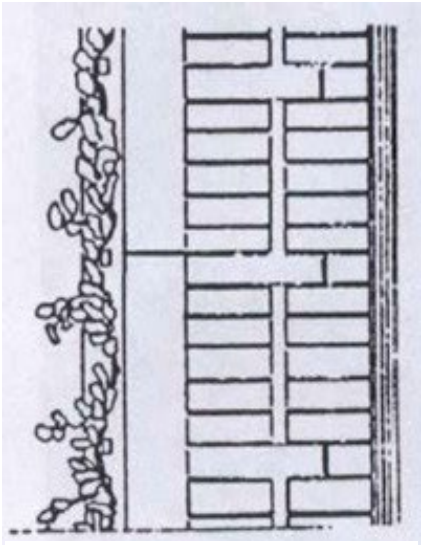


Image 32: Vines should not grow directly on walls but trained to grow on trellises (District of Columbia, 2010, p.11).

The growth of moss, lichen or other plant material on roofs shaded by trees, particularly low-pitched roofs, is another maintenance problem. These types of vegetation trap moisture against the roof membrane and should be removed. Overhanging tree limbs can also lead to growth of plant material in gutters, especially if they are not cleaned regularly, and should be trimmed.

Regular landscape maintenance includes spring and fall cleanups. In the spring, the vegetation must be raked and winter debris removed. There are two approaches to the fall cleanup. One is to remove dead annuals but leave fallen leaves and perennials intact and wait until spring to cut them down. There are several advantages to this approach. The seed heads provide a winter food source for birds, the plant stalks trap snow insulating the garden below, and winter gardenscapes of snow on stalks, flower heads, and seed pods offer a pleasing sculptural appeal. The other approach is to cut down and remove the perennial stalks in the fall and rake the garden beds clean. The advantages of this approach include a more clean and tidy landscape, reduced risk of pests and diseases within vegetative debris, and significantly less work the following spring.

Hard Landscaping

Hard landscaping features are composed of several materials, including:

- Wood.
- Brick.
- Stone.
- Concrete.

For more detailed conservation advice relating to the maintenance of these materials please refer to the Structural Woodwork, Masonry, and Metalwork sections included in this guide.

Wood

Wood is susceptible to rot and insect infestation and is often painted or stained to protect it from the elements. Painted wood is subject to blistering, peeling, cracking, and fading. Minimal rot can be repaired by thoroughly drying the affected area and treating it with epoxy or a similar consolidant, followed by the application of a sealer or preservative. If a portion of the wood is beyond repair, it should be replaced using the same type of wood and then finished and sanded to match the existing material.

Blistered, cracking, flaked, or peeled paint is best removed by hand-sanding before repainting. If paint layers are too thick and obscuring details, they may be stripped using chemical strippers. Power sanding, heat guns, and sandblasting should be used rarely, with caution, and only by trained professionals to prevent damage to the wood. After the wood has been properly prepared, it can be repainted in an appropriate colour (see the Paint and Colour section for more information).

Brick and Stone

Many landscape features are constructed of brick and stone, like sidewalks, paths, steps, retaining walls, and patios. Although these materials are durable, if not properly maintained, they are subject to spalling and may lean or crack due to mortar deterioration. When mortar joints erode a ½-inch or more they should be repointed. This involves removing all the loose mortar by hand and adding new mortar in the joint that is compatible with the existing mortar and masonry. Using new mortar that is harder than the existing should be avoided as it can cause the surface of the brick or stone to spall. The new mortar join should be profiled to match the existing joints. It is not advised to use power tools to cut out old mortar from joints as they may damage the surrounding brick or stone (refer to the Masonry section for more information).

Concrete

Sidewalks, steps, and some patios are constructed of concrete. This material is susceptible to spalling, powdering, cracking, settling, and heaving. Spalling and powdering is usually caused by a poor initial mixture or by salt and chemicals used to de-ice in the winter. Cracking, settling, and heaving may stem from tree roots, freeze-thaw cycles, and loss of ground water.

Spalling or powdering concrete should be removed and replaced with like material that is coloured and finished to match the existing concrete. Badly cracked, settled, or heaved concrete may require removal and replacement. Minor cracking can be successfully patched using patching cement. Concrete slabs that are moderately heaving or settling can be lifted intact and laid again on a new base of sand a gravel.

Summary

Historically, landscapes and landscape elements were used to enhance the view to or from a heritage building. They represent character-defining elements that contribute not only to the significance of an individual heritage property but also to the character of entire historic neighbourhoods. The advice provided in this practical guide highlights the aspects of a landscape to be conserved, common construction materials, associated conservation advice for each, and strategies for planning and landscaping restoration project. By adding even one traditional element to your heritage home's landscape you will increase its authenticity and the richness of your neighbourhood.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your property's landscape, please refer to the following sources:

Bimbaum, Charles A. *Preservation Brief 36,* "Protecting cultural landscapes: Planning, treatment and management of historic landscapes." Washington, DC: U.S. Department of the Interior, National Park Service, 1994.

District of Columbia, Office of Planning. *District of Columbia historic preservation guidelines: Landscaping, landscape features and secondary buildings in historic districts*. Washington, DC: District of Columbia Office of Planning, 2010.

Standards & Guidelines for the Conservation of Historic Places in Canada. 2nd ed. Ottawa, ON: Parks Canada, 2010.

MASONRY

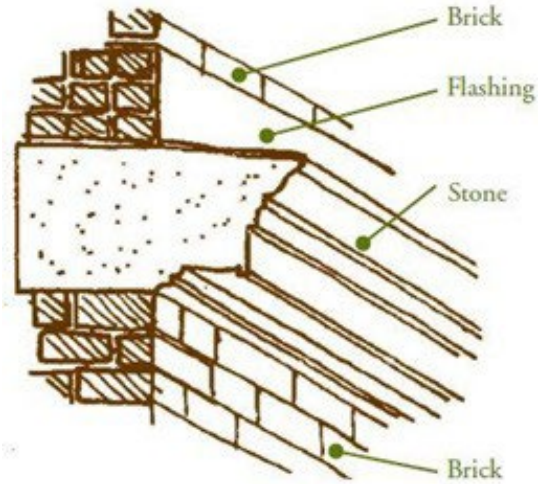
Introduction

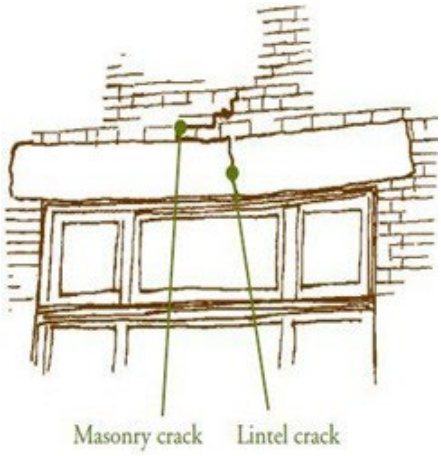
Masonry — stone, brick, architectural terra cotta, cast stone, concrete, and concrete block — is often found on heritage buildings. Common masonry applications include complete masonry exteriors, foundations, chimneys, and decorative elements. Masonry is prone to deteriorate over time. Regular maintenance and cleaning is required to ensure the visual and structural integrity of your building.

This guide provides information on repointing and the variety of cleaning methods and materials that are available for use on the exterior of heritage masonry buildings. The information in this guide was largely adopted from the US National Park Service *Preservation Brief* 1 and 2 related to repointing and cleaning historic masonry, respectively. Although specifically intended for heritage buildings, the information is applicable to all masonry buildings.

Understanding Masonry Types

Masonry is a term used to represent a group of building materials that include stone, brick, architectural terra cotta, cast stone, concrete, and concrete block. These materials can represent structural elements of a building or can be used aesthetically as cladding or decorative elements. The occurrence of historic masonry types will often depend on what was locally available from regional quarries. Some types of masonry are more expensive than others or unavailable in certain geographic areas. Expensive or unavailable materials may have been imitated for cost savings. For this reason, along with the similarity in appearance in some masonry, such as sandstone and limestone, it can be hard to distinguish different masonry types. Materials that appear to be masonry, such as decorative cornices, entablatures, and window hoods may, upon further inspection, prove to be metal and/or wood. The use of stucco – a lime, sand, and water mixture – has also commonly been used to imitate masonry. Before beginning any masonry intervention, it is important to first properly identify the masonry types you are working with.





Images 33 & 34: Above - wall section. Below - exterior wall crack (Saint John Heritage, 2010).

Maintenance and Repair

Investigate and document your masonry surfaces before making alterations or repairs. It is important to

identify any deterioration caused by exterior or interior moisture and locate the source. Deterioration is most commonly identified by cracks or spalling and is often the result of:

- Water penetration from the interior or exterior.
- Expansion and contraction of materials due to repeated wetting and drying.
- Freezing and thawing action of water in the masonry.
- Stresses caused by the formation of salt crystals beneath the surface, especially common when cement is used as a quick fix to fill a masonry crack.
- Material impurities and incompatibility.

All moisture problems should be resolved before trying to repair the masonry. Repairs often include repointing or cleaning. These should not be attempted by untrained professionals and efforts should be made to ensure that every intervention is reversible.

Repointing

Repointing consists of removing old and damaged mortar from masonry joints and replacing it with new mortar. Repointing is necessary if the mortar has eroded as deep as the mortar joint is wide, or water is penetrating. Repointing is only necessary where mortar has failed. If these issues are not present over most of the brickwork, then no intervention is necessary. An entire building will seldom need to be repointed. However, if appropriate repairs are not undertaken to halt the source of the problem, mortar deterioration will continue and repointing will be a waste of time and money. Heritage conservationists recommend that only trained professionals complete repointing projects.

Physical Examination

A non-technical evaluation of the masonry units and mortar by an experienced and knowledgeable craftsman can provide information about their strengths and permeability. This information is vital when selecting an appropriate repointing mortar. A visual analysis of the historic mortar can provide the clues necessary to choose the new mortar mix and application techniques. The goal is to select a repointing mortar compatible with the masonry units that matches the historic mortar as closely as possible. When this is achieved, the new mortar coexists with the old in a sympathetic, and if necessary, sacrificial way. It is much easier to replace mortar that damaged masonry units.

The strength of a mortar will vary based on its composition. If the mix has a high ratio of Portland cement, it will be a harder mortar. The more lime added, the mortar becomes softer, more plastic and workable. Mortars for repointing projects, especially those involving heritage buildings, are custom mixed to ensure they contain the proper physical and visual qualities and can create a mortar with ideal performance and durability. The composition of a particular mortar type should take into consideration all factors affecting a specific building, such as site conditions, current condition of the

masonry, function of the new mortar, amount of weather exposure, and skill of the mason.

To prevent damage to the masonry units, repointing mortars should be softer or more permeable than the masonry units. It is a common mistake to assume that high strength and hardness is desirable, especially for lime-based historic mortars. Stresses and movements in the walls should be braced by the entire structure, not transferred to individual masonry units through hard mortars. The units' inability to freely move with the structure will result in damage, such as cracks and spalling mortar. Also, the use of mortars with high cement content can trap salt within the masonry envelope, resulting in efflorescence, and further deterioration.

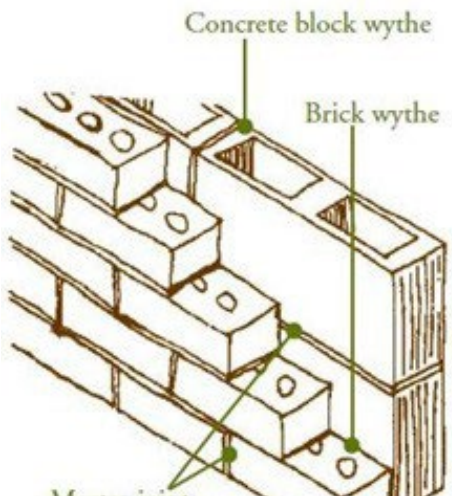


Image 35: Masonry wall section (Saint John Heritage, 2010).

New mortar should meet the following criteria:

- Must match the historic mortar colour, texture, and tooling.
- Sand must match the sand in the historic mortar (colour and texture of the new mortar will usually be replicated if the sand is well matched).
- Must have greater vapour permeability and be softer (measured in compressive strength) than the masonry units.
- Must be as vapour permeable and as soft or softer (measured in compressive strength) than the historic mortar.

The mortar application technique and type of mortar joint should be the same as the previously applied mortar and discourage water infiltration.

Mortar Components

Sand

Sand is the highest proportion ingredient in mortar and the material that gives it its distinctive colour, texture, and cohesiveness. Sand must be free of impurities, such as salts or clay.

Lime

Before the late 19th century lime was used as the primary binding material in mortar. At that time, limes and other components of mortar varied significantly as they were natural. This is different from modern lime that is manufactured and standardized. Some kinds of lime and other components of mortar that were used historically are no longer readily available, making it difficult to replicate a 'historic' mix.

Lime mortar is slightly water soluble and can re-seal any hairline cracks that may develop over time. It is a good choice for heritage buildings as it is soft, porous, and

changes little in volume during temperature fluctuations. Due to these qualities, high calcium lime mortar could be considered for many repointing projects, not just those involving heritage buildings.

Portland Cement

Portland cement has been commonly used in 20th century mortar as a primary binding material. A Portland cement and sand mortar is very hard, resists the movement of water, shrinks upon setting, and expands and contracts as the temperature fluctuates. The more Portland cement added to a mortar mix the harder it becomes and the faster the initial set.

Undertaking the Work

Test Panels

Test panels are often prepared by the contractor using the same techniques that will be used on the rest of the structure. Several test panels may be necessary to cover all types of masonry, mortar colour, and joint styles. These are ideally located at inconspicuous locations. The panels can be used as a benchmark to elevate subsequent work on the building.

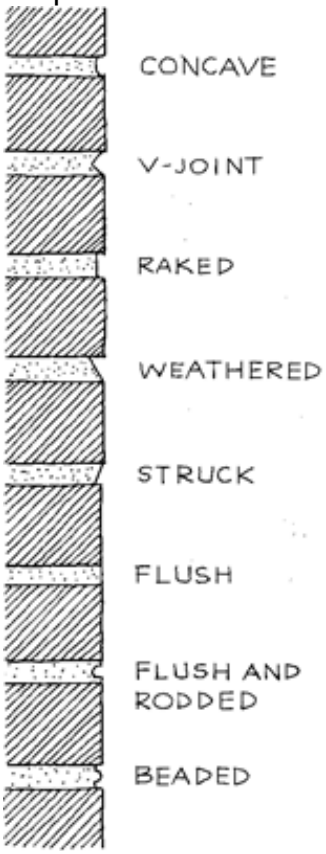


Image 36: Brick mortar joints (Betty Anderson, 1983, p.101).

Joint Preparation

To prepare a masonry wall for repointing, the old mortar needs to be removed to a minimum depth of 2-2.5 times the width of the joint. This ensures the new mortar can bond well and will prevent mortar 'popouts.' The use of hand chisels and mash hammers is the traditional way to remove mortar. These tools are labour intensive, but they are less likely to damage the historic masonry units while producing a quality result.

The use of power saws and grinders is the most common method for mortar removal. However, the use of these tools by unskilled masons can destroy heritage masonry, especially soft brick. Small pneumatic chisels can generally be used safely and effectively to remove mortar on heritage buildings if a mason uses the equipment appropriately.

Foundations and Structural Brick

Foundation repairs should be undertaken before permanent work on walls as most cracks in masonry walls, especially those that run horizontally, are based on problems with the foundation. It is also important not to treat structural brick as brick cladding. Care should be taken no to break or disrupt brick tie courses as this may impact the structural integrity of the wall.

Chimneys

Many heritage buildings have a masonry chimney and their continual exposure to the elements makes them more susceptible to damage and deterioration. To avoid leaks or the danger of fire, chimneys deserve special attention, and professional guidance should be sought when considering repairs. Chimney masonry deterioration may include cracks, the breakdown of mortar, or the slanting of a chimney shaft.

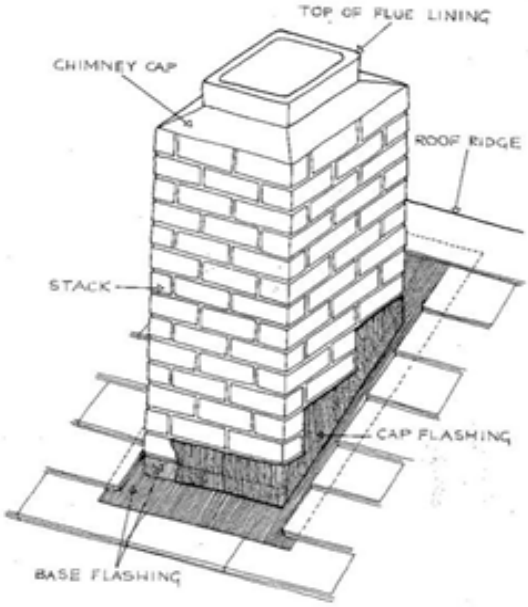


Image 37: Parts of a masonry chimney (Hanson & Hubby, 1983, p. 70).

Consult and Contractor Selection

It may be helpful to retain a consultant, such as a historic architect or masonry expert to analyze your building for causes of deterioration. They will determine the most appropriate solutions to problems and can prepare specifications that reflect the requirements of each job and can provide oversight of the work as it progresses.

Prior to selection, qualified contractors can also provide lists of other repointing projects you can inspect to assess the quality of their work. Ideally, only choose masons that have a minimum of five years experience repointing heritage masonry buildings.

Budget and Scheduling

Repointing is often expensive and time consuming due to the extent of hard work and special materials required. It is recommended that only deteriorated mortar be repointed rather than an entire wall. However, if 25-50% or more of a wall needs to be repointed, repairing the entire wall may be more cost effective than spot repointing. Each project requires judgement based on a variety of factors and recognizing this at the outset will help to prevent many projects from becoming prohibitively expensive.

When scheduling repointing, seasonal temperatures are a significant factor to consider as they will affect the amount of time it takes for the mortar to settle and the lime to cure. As a rule, repointing should not be done when the temperature is below 5°C. Work undertaken around 20°C is best to prevent freezing or excessive evaporation of the water in the mortar, which will cause the material to expand or contract and inhibit the proper settling of the masonry units. Ideally, repointing should be done in the shade, away from strong sunlight to slow the drying process, especially during hot weather.

Keep in Mind

It is important to keep in mind, as the owner of a heritage building, that repointing is likely to be a lengthy, expensive process. The tendency to rush the work or cut corners should be avoided if the heritage building is to retain its structural and visual integrity. To avoid unanticipated problems, schedules for repointing and other associated projects will require planned coordination. Time should be dedicated to evaluating the building's

condition and investigating the cause of the problems. The work itself is precise, time-consuming, noisy, and scaffolding may temporarily cover portions of the building.

Cleaning

An important aspect of masonry conservation is choosing the appropriate method for cleaning masonry components. The purpose of this section is to provide information on the variety of cleaning methods and materials that are available for use on the exterior of heritage masonry buildings, and to provide guidance in selecting the most appropriate method or combination of methods. Masonry cleaning is a perceived improvement but may not always be recommended. Unless these procedures are carried out under the guidance and supervision of a trained professional, they may result in irreparable damage to the heritage structure.

Reasons for Cleaning

It is important to first determine if cleaning your masonry is necessary. Reasons for cleaning a heritage masonry building include:

- Improving the appearance of the building by removing dirt, soiling materials, or non-historic paint from the masonry.
- Preventing deterioration by removing soiling materials that may damage the masonry.
- Providing a clean surface to accurately match repointing mortars or patching compounds, or to conduct a condition survey of the masonry.

Historic Appearance

Before removing paint from a masonry building, you should first determine if unpainted masonry is historically appropriate and why the building was painted initially. Structures may have been painted purposefully as a fashionable treatment of the time, to cover bad repointing, unmatched repairs, or to protect soft brick or hide deteriorating stone.

If a building was painted upon its construction or shortly after, the paint should be retained as it may be considered historically important and character defining. Refer to the Paint and Colour section for more information on paint retention, cleaning, and appropriate removal materials.

Choosing the Appropriate Cleaner

When developing a cleaning program, the construction of your building should be considered. Poorly suited cleaning methods can have a negative effect on the masonry and other building materials. To begin, identify the type of masonry. You should always test the chosen cleaning method on a small inconspicuous surface, as choosing the wrong cleaning agents can permanently damage historic masonry. For example, acidic cleaners can damage acid-sensitive stones, like limestone and marble, and will result in etching and dissolution. A firm understanding of the physical and chemical properties of masonry, coupled with testing, will help avoid accidental damage by cleaning.

It is important to keep in mind that other building materials, such as paint and glass, may be affected by the application of cleaning agents on your surface structure. Some

building elements that may not be visible, such as iron cramps or ties, can suffer corrosion from the use of chemicals, even water. Studying your building's unique construction in detail is the best way to evaluate potential cleaning methods and prevent problems from arising.

Cleaning Methods

There are four major groups of masonry cleaning methods: water, chemical, poulticing, and abrasion. Regardless of the method selected, masonry cleaning projects should begin at the bottom of the structure and work to the top, always keeping all surfaces wet below the area being cleaned. This is advised based on the assumption that dirty water or cleaning solvents dripping from the area being cleaned above will leave streaks on a dirty surface but will not streak a clean surface if it is frequently rinsed.

Water cleaning methods are the gentlest means possible and can be used to safely remove dirt from most types of historic masonry. However, it should be noted that the use of water cleaning on some badly deteriorated masonry, or on gypsum, which is very soluble in water, may be detrimental.

There are four kinds of water-based methods:

1. **Soaking**
   This involves prolonged spraying or misting with water and is a useful method for removing accumulations of soot, sulfate, or gypsum crusts that usually form on portions of a building protected from the rain. Water washing with a gentle scrubbing is frequently used in combination with soaking and is followed by a final water rinse. This is a very slow, gentle method that takes several days or a week to complete.

2. **Pressure Water Washing**
   This is a common method for removing dirt or other soiling from historic masonry. It is recommended to begin by using low-pressure water (100 psi or below), even a garden hose, and then progressing to medium-pressure water as needed (no higher than 300-400psi). To clean areas of the masonry that are especially dirty, scrubbing with natural bristle or synthetic bristle brushes can help. Avoid the use of metal brushes as they can erode the masonry surface and/or imbed metal particles that may stain the masonry.

3. **Water washing with Detergents**
   The use of non-ionic detergents, which are synthetic organic compounds and different from household soaps, are used effectively to remove oily soil, especially when added to a low or medium-pressure water wash. Unlike household detergents, non-ionic detergent does not leave a visible residue on masonry. Cleaning textured or intricately carved masonry can be achieved by scrubbing non-ionic detergent with a natural or synthetic bristle brush. Scrubbing should be followed with a final water rinse.

4. **Steam Cleaning**
   This is equivalent to a low-pressure hot water washing as the steam condenses upon leaving the hose. It is a gentle method ideal for:

- Cleaning stone, especially acid-sensitive stones.
- Removing built-up soil deposits and dried plant materials.
- Cleaning carved stone details.

Steam cleaning does not generate a lot of water runoff and may also be appropriate for cleaning interior masonry. Paint and graffiti can be removed using the DOFF system, a steam-based stone cleaning apparatus that uses super-heated steam. Before removing graffiti, refer to the Paint and Colour section included in this guide for more information.

Potential Hazards of Water Cleaning

Although water-based methods are the gentlest method for cleaning your historic masonry, they still present an opportunity for damage if not well thought out.

It is important to keep in mind that power washing at too high a pressure is very abrasive and can easily wear away brick and other soft stones, like marble. As well, the type of nozzle used and the distance it is placed from the masonry surface, coupled with the gallons per minute (gmp), are important variables to consider when water cleaning. Visible grains of stone or sand in the water or solvent runoff is a good indication that the water pressure is too high. Without careful consideration of these factors damage may be done to the heritage masonry. For this reason, it is important to take time to work through the process carefully and monitor the results.

To avoid the spalling and cracking of masonry units, do not use cleaning methods that involve water if there is the threat of frost. Moisture trapped in masonry will cause the unit to expand and become damaged. After cleaning, a masonry wall may take over a week to dry. Therefore, water cleaning should not be permitted for several days prior to the first forecasted frost date.

Chemical Cleaning

Chemical cleaners work on historic masonry by reacting with dirt, soiling material or paint, including graffiti. After the reaction, the runoff is rinsed from the masonry surface with water. Chemical cleaners used to remove dirt and stains include acids, alkalis, and organic compounds. Paint removers are alkaline, based on organic solvents or other chemicals.

There are two types of chemical cleaners used to remove dirt:

1. **Acidic Cleaners**
   These should only be used on non-acid-sensitive masonry, including: granite, most sandstone, slate, unglazed brick, unglazed architectural terra cotta, cast stone, and concrete. Hydrofluoric acid is the main ingredient in most commercial acidic cleaners. The process involves applying acid cleaners to the pre-wet masonry that should then be kept wet while the acid is cleaning. When the process is complete, the acid should be removed with a water wash.
2. **Alkaline Cleaners**
   These should only be used on acid-sensitive masonry including: limestone, polished and unpolished marble, calcareous sandstone, glazed brick, glazed

architectural terra cotta, and polished granite. Alkaline cleaning products are primarily composed of two ingredients: a non-ionic detergent or surfactant, and an alkali such as potassium hydroxide or ammonium hydroxide.

The treatment process is similar to acidic cleaners with the addition of two steps. The alkaline cleaner is applied to pre-wet masonry, allowed to settle and then rinsed off with water. Next, the masonry is neutralized with a slightly acidic wash, often with acetic acid, and then rinsed with water again. Alkaline cleaners may need to set longer than acidic cleaners.

Removing stains effectively depends on matching the right remover to the stain. Stains may be: industrial (smoke, soot, grease, tar), metallic (iron, cooper), or biological (plant, fungal). The successful removal of stains from historic masonry may require a process of elimination until the right remover is found.

Stripping layers of paint from historic masonry is done by applying the remover with a brush, roller or spray, followed by a water wash. There are three types of chemical cleaners used to remove stains, paint, and graffiti:

1. **Alkaline Paint Removers**
   These are often similar in composition to alkaline cleaners. They can effectively remove multiple layers of paint, specifically oil, latex, and acrylic paints, and may also remove some acrylic water-repellent coatings. Similar to other alkaline cleaners, an acidic neutralizing wash and final water rinse are recommended following their use.

2. **Organic Solvent Paint Removers**
   These may include a combination of solvents, including, methylene chloride, methanol, acetone, xylene, and toluene.

3. **Other Paint Removers and Cleaners**
   Based on N-methyl-2-pyttolidone (NMP), or on petroleum-based compounds, these can be used to remove paint and some graffiti from heritage masonry.

Potential Hazards of Chemical Cleaning

As most chemical cleaning methods involve water, they are susceptible to the same hazards as mentioned in the water cleaning section above. As well, many chemical cleaners do not work in cold temperatures, so their use should be avoided in months with the potential for frost. It is important to keep in mind that acidic and alkaline cleaners can be dangerous to those using them. Precautions should be taken to limit environmental contamination and plan for the safe disposal of chemicals associated with masonry cleaning.

Chemical cleaners have the potential to react adversely with many types of masonry if not chosen appropriately. Unfortunately, the composition of masonry materials is not always known and for this reason testing the cleaner on an inconspicuous spot on the building’s masonry is advisable.

Poulticing

The use of a poultice is often the most effective way to remove graffiti and stains that have penetrated masonry. A poultice is a paste that can be applied to a stain. It is composed of an absorbent material or clay powder (such as kaolin or fulleris earth, or even shredded paper or paper towel), mixed with a liquid (a solvent or other remover). The moist poultice should remain on the stain as long as it takes to dry and draw the stain out of the masonry surface. The masonry must be thoroughly rinsed once the stain has been removed.

Abrasive and Mechanical Cleaning

As a general rule, the use of abrasive cleaning methods is not recommended on heritage buildings as they operate by wearing down dirt or paint from a masonry surface. These methods include grit blasters, grinders, and sanding discs, all of which mechanically remove dirt, soiling material or paint, and possibly some of the masonry surface. Blasting with abrasive grit or another rough material is the most commonly used abrasive technique. Brick, architectural terra cotta, soft stone, detailed carvings, and polished surfaces are most at risk of physical and aesthetic damage by abrasive methods. Mortar joints, especially those with lime mortar, can be eroded by abrasive or mechanical cleaning, leading to water penetration and ultimately to the need to repoint.

Summary

Well planned masonry repointing and cleaning efforts are essential to the preservation, restoration, or rehabilitation of historic masonry. Adhering to the guidelines discussed in this practical guide can enhance the aesthetics and structural stability of a masonry heritage building. A sound repointing job can last at least 30 years and as long as 100 years; guaranteeing the long life of the mortar joint, the wall, and ultimately the historic structure. As such, the mortar joint in a heritage masonry building has been called a wall's 'first line of defence.' It is important to remember that mortar joints are intended to be sacrificial and will probably require repointing in the future.

If undertaken by qualified professionals, removing years of dirt, pollutants, stains, graffiti, and paint can extend the life of a heritage structure. Cleaning masonry should be done using the gentlest means possible to avoid damage. Using the wrong cleaning method or using the right method incorrectly can result in serious damage, both physically and aesthetically. You should always pause before undertaking work to evaluate and determine if the intervention is necessary and in the best interest of the overall structure. Do not hesitate to seek guidance from masonry experts before undertaking any work to your heritage structure.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your historic masonry, please refer to the following sources:

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METALWORK

Introduction

Maintenance is key to protecting your metal architectural features from oxidation. Metals vary in hardness and durability, and when exposed to oxygen they form an oxide layer.

There are two types of metals: ferrous (wrought and cast iron, steel, tin) and non-ferrous (aluminum, copper, bronze, stainless steel). Oxidation of non-ferrous metals may help prevent the metal from further deterioration, whereas oxidation of ferrous metals increased the metal's deterioration rate.

The deterioration of all metals is encouraged by pollutants and moisture. These pollutants can come from the air, acidic rainwater, wood (red cedar and oak), moss, and certain materials in Portland cement and lime mortar. Mixing different metals will also enable electro-chemical corrosion.

Cleaning and repairing metals often require the help of an experienced professional to limit damages to the metal, property, and health of works and residents. The inspection of structural metal (steel or iron work) and consequent interventions, if any, should be made by a structural engineer. If replacing any metal that has badly deteriorated, always replace in kind.

Metals and Paint

Ferrous metals should be painted to inhibit their quick oxidation and subsequent deterioration, and non-ferrous metals, such as copper, bronze, and stainless steel, should be left uncovered. An architectural conservator should be consulted prior to any paint removal from metals as the removal method will depend on the type of metal and the paint previously applied. Refer to the Paint and Colour section for further details.

Iron Reinforcement Rods and Cramps

The oxidation of iron reinforcement rods and cramps within your masonry construction can lead to fractures within the building fabric. These fractures, caused by the pressure resulting from corroded iron, can easily be identified by the rust-coloured stains coming from the fracture. Prevention is necessary to avoid these cracks. Water should always be directed away from the masonry to keep the structure dry, and sand should be used on slippery surfaces instead of salt in the winter.

Cast Iron

Cast iron, an iron alloy with high carbon content, has been extensively used both structurally and ornamentally. Its use was very popular as a construction material for main street storefronts from the mid-to-late 19th century due to its inexpensive prefabrication, resistance to compression loads and corrosion (in comparison to wrought iron and steel), and ability for quick on-site installation. Although cast iron cannot be shaped by hammering, rolling, or pressing like wrought iron and steel due to its comparative brittleness and hardness, it does provide better resistance against

buckling. Cast iron was originally believed to be fire resistant but was found to buckle due to temperature changes between fire and its extinguishment. For this reason, as well as its insufficient tensile strength, cast iron is used for cladding and decorative purposes.

Cleaning and paint removal methods include abrasive (wire brushing and sandblasting), thermal (flame cleaning), and chemical processes.

Fences

Metal fences tend to rust at their base, especially if located near a walkway or road that is salted during the winter. Routine inspection will enable you to remove light rust with a wire brush before priming and repainting is done. Primer should never be applied over rust as this will not stop the corrosion, but will simply hide it temporarily. If rust cannot be removed with a wire brush, you can use low-pressure sandblasting. Ensure that any surrounding surfaces will not be damaged, and that a primer is applied immediately after the sandblasting is complete. If primer is not applied promptly, your fence will rust by the next day. A badly deteriorated fence can also be removed and repaired at a metal shop to avoid damage.

Tin Ceiling Tiles

Tin ceiling tiles, a popular ceiling choice from the 1880s to 1920s, were traditionally manufactured from stamped-steel panels and covered with paint. Utilized as a fire-proofing device, the tiles were nailed to a grid of wood strips. Their fire protection potential has been scrutinized, however, as the wood framing beneath the tiles can be ignited regardless of the tiles' non-combustible composition. An enflamed structure would fare much better if the tiles were installed over an earlier plaster ceiling. In spite of their name, tin ceiling tiles were not originally coated in tin. However, today's tin ceiling tiles are tin plated.

Tin ceilings were most likely painted with lead-based paint. Multiple layers of paint may be hiding detailing or deterioration. See Hazards to your Health: Asbestos, Mold, Radon, and Lead included in this guide before beginning your repainting, repair, or removal project. Tin ceiling tiles should never be cleaned using abrasive methods, such as sandblasting.

Hardware

A building's hardware may consist of hinges, handles, knobs, latches, locks, knockers, and mail slots. Conserving original hardware by undertaking regular maintenance and repair preserves your building's character, charm, and authenticity.

Replacement Hardware

Replacement of hardware can be very expensive and frustrating if trying to find pieces that are representative of a certain architectural style or historic period. If the original hardware is missing, look to historical sources, your neighbours' homes, or ask a

professional for inspiration. If you are creating an addition to your heritage building, try to respect the original materials.

Maintenance and Cleaning

Hardware should be maintained to ensure that your building's doors, windows, and shutters are operating well. Hinges should be regularly polished and should not be painted as paint build up can inhibit their proper function. If you are painting the surface around the hardware, it is best to temporarily remove the hardware. The pins within hinges may also need to be wiped with oil.

Cleaning methods should be appropriately selected for the hardware's material to prevent damaging the metal. Refer to the Paint and Colour section for appropriate paint removal methods for metal, and the Hazards to your Health: Asbestos, Mold, Radon, and Lead section for information on the health hazards related to lead-based paint and necessary safety precautions.

Loose and Sagging Hardware

If a piece of hardware begins to sag because the holes have become too large for the screws, remove the screws and fill the holes with a mixture of small wood pieces and glue. Do not reinsert the screw until the glue has fully dried. Screws will also require periodical tightening.

Locks

Your original locks may need to have their inner works cleaned and greased for optimal performance. Powdered graphite or lubricant spray is preferred to oil, which may cause a build up of dirt. Contemporary locks may need to be added on top of the heritage hardware due to rising expectations for safety provided by locks. If adding a lock to your door or window, ensure that it is visually appealing and respects the existing heritage features and hardware.

References

Note: These titles were used for the Region of Waterloo's "Practical Conservation Guides for Heritage Properties." Links in blue are shown only if working in December 2025, links in black are dead links.

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PAINT AND COLOUR

Introduction

Paint and colour are important aspects to your home or commercial building as it accentuates the building's features and lines, expresses design tastes and mood of a particular time, and protects the underlying materials from the elements. Maintaining painted surfaces is an ongoing job. Exterior paint will, on average, last five to eight years on wooden surfaces. It is important that exterior paint be kept in good condition as it protects the underlying material from moisture and consequent deterioration. Interior paint will typically last longer as it sustains less damage from the elements.

Heritage conservationists recommend that paint should be retained and repaired instead of replaced, whenever possible to preserve your home's authenticity. Paint removal and re-painting is one of the most demanding conservation tasks and can present many health hazards. We advise you to contact a qualified professional and/or resources for technical information, as well as advice and safety precautions for paint removal, paint testing, and waste management.

Conservation of Paint and Colour

Conservation, in terms of paint, refers to measures taken through maintenance to extend the life of the paint on the structure. Prior to undertaking a painting project on your heritage property, it is important to decide what type of conservation project you wish to undertake: a preservation, rehabilitation, or restoration project.

A preservation project occurs when there are no desired changes to the paint and the colour. Paint is cleaned, maintained, and repaired as needed. If the paint requires new application, the new paint will match the existing paint in terms of colour and type.

A rehabilitation project aims for an efficient reuse or renovation of spaces or features. Paint colour decisions can be based on research of similar examples with comparable architectural style and era, historic paint research, the taste and opinion of the current owner, and economic factors.

Restoration projects aim to faithfully represent the property as seen during a carefully selected period, most often the period of greatest significance for the property. The paint colours and textures will be based on historical research, onsite collection of paint samples, and laboratory analysis. The evidence takes precedence over the preferences and tastes of the current owner.

Types of Modern Paints

A first step in all painting projects is determining the type of paint that you will be using. This decision is based on the existing paint, the surface material, and the desired finish. There are several types of modern paint to choose from.

Primers and Sealers

Primers and sealers can be either oil or water based and should match the existing coating a well as the expected top-coat. Primers are applied before the application of a new coat of paint on an existing paint layer for optimal adhesion. Water-based paints should not be applied to existing oil-based paint without an oil-based primer. Metal surfaces are prepared with anti-rust or galvanized primers. Primer and paint should be bough in combination from the same manufacturer.

Sealers are applied to prevent the topcoat of paint from soaking into unpainted wood or to surfaces that have lost all previous paint in an effort to provide a uniform surface.

Oil-Based and Alkyd Paints

Prior to the 1870s, colour pigments mixed into linseed oil had only been used to cover the homes of the wealthy due to its expense. Pre-mixed oil-based exterior paints were made widely available in the 1870s.

Oil-based paints are best applied with brushes, and provide efficient adhesion and durability, especially over previously painted surfaces with oil-based paints. These paints are slow drying. Today, oil-based paints used for architectural coatings are steadily being phased out due to newly developed latex and waterborne paints that are more environmentally friendly and provide lower volatile organic compound (VOC) emissions.

Within the family of oil-based paints, alkyd paints refer to using alkyd resins as a binder. The use of these resins creates a quicker drying paint with the ability to sustain daily wear and tear. Traditional alkyd paints have, for the most part, been discontinued due to their high level of VOCs. Following the Government of Canada's 2010 VOC regulations, the production of alkyd paints has ceased with the exception of the following products:

- Flat for Calcimine (Stucco) Ceilings.
- Alkyd Dry fall.
- Stain sealing primers.
- Rust preventative metal paints.
- High gloss floor enamels.

Although the use of traditional paints may be preferred by some, alternatives have since been developed and continue to improve. Waterborne alkyd primers and paints preserve the high performance of traditional alkyd paints and provide safer alternatives for interior application due to their low VOC levels and minimal odour. These paints can also be cleaned with water and soap, a much safer alternative to the use of mineral spirits required for traditional alkyd paints.

Latex (Acrylic Waterborne) Paints

Latex paints are quick drying synthetic resins carried in water. They can be applied to surfaces with a roller. They are very porous and will permit water from within to evaporate. They are therefore recommended for exterior surfaces, such as masonry

and shutters that might retain water. They are also encouraged for their low level of VOCs. Latex paints need to be applied following an oil-based primer for best adhesion results if the previous paint was oil-based. Selections from historical colour palettes are available today.

Milk Paints

Milk paint is a historic type of paint that is environmentally friendly with no VOCs. It is composed of milk protein (casein), limestone, clay, chalk, and natural pigments with slight variances. Although it does not have long retail longevity, it is mold resistant and very durable once applied. It is appropriate for interior and exterior surfaces and best applied on porous surfaces. Milk Paint Bonding Agent can be purchased online or from some paint retailers and can be included in the mixture for better adhesion on previously painted and lacquered surfaces.

Clear Coat Finish

Glazes originally consisted of an oil and turpentine mixture. Today, they are also made using a water base and can be applied by brush to stimulate the deep finish of heritage paints. A heritage professional should be consulted to distinguish between the need of a glaze or high-gloss enamel for your project.

Calcimine/Whitewash

Until the availability of pre-mixed oil-based paints, building exteriors were primarily whitewashed. Whitewash consisted of a mixture of lime, water, and a little linseed oil. Calcimine is a type of modern water-based paint that produces the same appearance as traditional whitewash for your project.

Selecting Your Paint Colour

Regardless of the type of project, the design guidelines below can be used as a helpful aid when selecting paint colours:

- **The Paint Colours Should Be Appropriate**
  Exterior paint colours are often chosen to accentuate the traditional building material. The chosen colours should be appropriate to the style and period of the property, and respectful of the neighbourhood. Colours can be determined from paint samples, Heritage Conservation District studies, historical research and examples, and historical colour palettes.

- **Maintain Architectural Integrity**
  Ensure that your exterior colours hold a relationship in both hue and value, as to not segregate different features of your home. The colours should unite your home's features. Remember that any paint scheme will be dominated by the primary exterior wall colour. Lighter colours will best reflect shadows on your home, which add intricate value to the façade and highlight broader surfaces areas of interest. You can also choose a darker colour to hide surface imperfections.

- **Colour to Instill Balance of Proportions and Details**
  Visual unity and balance is achieved by an even distribution of colour that

complements your home's features and height.

- **Don't Over-Do it with Accent Colours**
  A selection of dark, medium, and light colours was typically applied to buildings built before 1915. Since stronger colours will fade quicker, save these accents for small details. Your home will require less painting that way, especially if you grow tired of the accent colour.

Paint Samples and Documentation

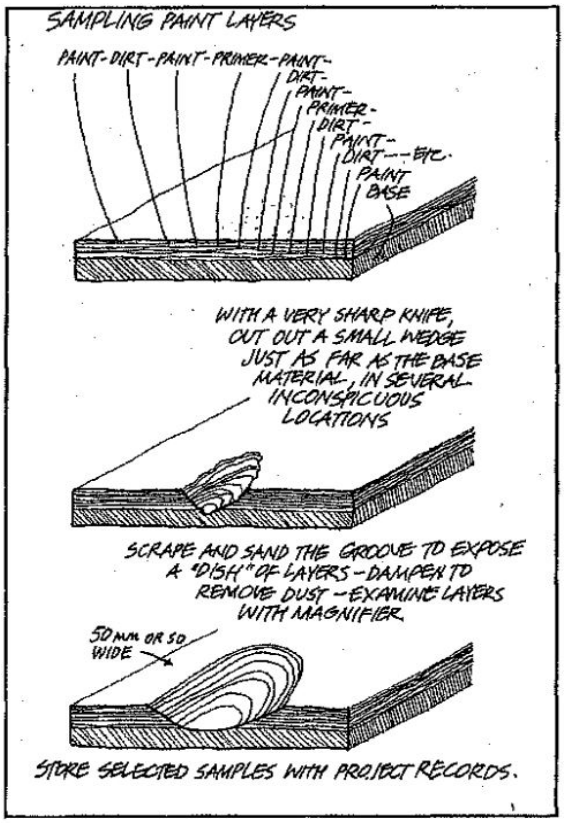

Image 38: How to sample paint layers (Fram, 2003, p. 165).

Before you start a painting project document the existing form, material, and condition of the painted surface for future reference. To do this, collect samples of paint from each exterior or interior surface. Samples should be chips of peeled paint and can be feathered to show underlying tones. These should be analyzed and saved for future reference, along with any documentation provided. Use a high-powered magnifier or microscope at 30x to 100x magnification to examine the layers of paint and help distinguish between primer and finish colours.

The finish colour can often be identified by traces of dust on its exterior surface. Distinctions between varnish and paint layers may not be apparent.

Although this sampling technique is not 100% accurate, it can help inspire your project or guide your restoration efforts. Keep in mind that since colour does fade, it is recommended that you try to match your paint sample with a historical colour palette. Colours, techniques, and varnishes manufactured and sold today may not comply with those previously applied in your home, so select a colour as similar as possible.

Maintenance and Repair of Wooden Painted Surfaces

All required maintenance and repairs of the surface, including any intricate woodwork, should be undertaken prior to painting. Refer to the Windows, Shutters, and Doors section for information on maintenance and removing paint from your wooden windows, shutters, and doors.

The following charts outline the most appropriate remedy for various paint conditions.

Limited Paint Removal Required:

Condition	Cause	Remedy
Crazing	Recognized by its jagged surface cracking of the top layer, crazing occurs when the old paint layers are not longer flexible enough to respond to the wood's contracting and expanding.	Sand the surface, mechanically or by hand, before repainting. A new coat will protect the surface from moisture penetration. The hairline cracks may still be visible.
Inter-Coat Peeling	Peeling is caused by the layers' inability to bond, most likely due to poor preparation before paint application.	Ensure that the surface is void of any salts or impurities before painting. Always sand the surface for best paint adhesion. Apply oil-based paint on oil, and latex paint on latex. To ensure bonding of different paint, always apply an oil primer (for oil and latex paint) before the topcoat.
Solvent Blistering	Blistering occurs when solvent-rich paint dries too quickly when applied in direct sunlight. Un-dried solvents are trapped underneath the dried paint film, eventually creating blisters. To discern between solvent and moisture blistering, cut open a blister. If the underlying paint layer can be seen, it is likely solvent blistering, while it is probably moisture blistering if the wood is revealed.	Scrape and sand the surface, mechanically or by hand, before repainting. Ensure that the surface is not in direct sunlight to enable it to dry properly.

Paint Removal Required:

Condition	Cause	Remedy
Peeling	When peeling paint reveals bare wood, there is an excess of interior or exterior moisture collecting behind the paint layer. The paint is no longer able to bond with the surface, which usually begins as blistering,	The moisture problem will need to be resolved before repainting, since any future coats will not adhere to the surface otherwise. After locating the source(s) of moisture, let the wood dry before scraping off damaged paint with a putty knife. Sand the surface,

	since the wooden surface swells due to the excess of moisture.	mechanically or by hand, before priming and painting.
Cracking and Alligatoring	Cracking and alligatoring are advanced stages of crazing. If the crazing is not attended to, moisture penetrates the surfaces and the wood will swell. Cracking will continue parallel to the wood grain, eventually extending into the wood at which time the paint will also flake.	If the cracking and alligatoring have not progressed to the wood's surface, scrape and sand, mechanically or by hand, the affected paint layers. The paint will need to be completely removed if it has begun to flake. The paint can be removed by abrasive, thermal or chemical methods. Prime the wood within 48 hours of paint removal, and paint.

No Paint Removal Required:

Condition	Cause	Remedy
Organic Matter or Grime	It is common for organic matter to adhere to a painted surface, especially where it is protected (i.e. eaves). This is not a problem unless grime is painted over.	Grime can be hosed down or washed with a solution of detergent and water. Inspect the area after it has completely dried to assess if repainting is necessary.
Mildew Growth	Mildew is caused by fungi that feed on the nutrients within the paint film. Fungi prosper in moisture and warm climate, particularly in damp and shaded areas. Mildew can be distinguished from dirt, as it will turn white with a drop of household bleach.	First, alter the environment in which mildew can thrive. To clean, apply a solution of one cup non-ammoniated detergent, one quart household bleach, and one gallon water. The solution should be scrubbed over the affected area with a medium solid brush before being rinsed off with a garden hose. When painting the area choose a mildew-resistant paint.
Excessive Chalking	Chalking is caused by the disintegration of the resin in the paint film due to ultraviolet (UV) rays. When moderate, chalking is the optimal way for paint to age since the chalk will rid the surface of stains and dirt when washed off to provide a clean	To avoid future excessive chalking, ensure the surface is properly primed before painting and do not spread the paint too thin.

	surface for repainting. When in excess, however, the chalk can imbed into previous layers of paint to create streaking and inhibit bonding of new paint.	If chalk appears after wiping your hand on the surface, clean the surface with a solution of ½ cup of household detergent to one gallon of water with a medium soft bristle brush. Rinse with a garden hose and let it dry before recoating with a non-chalking paint.
Staining	Staining can be caused due to: 1. Oxidation or rusting of metal features. 2. Chemical reaction between moisture and natural extractives in wood.	First, locate the source of the stain. 1. Stain the metal feature by hand, coat with a rust-inhibitive primer, and paint with two layers of finish. 2. Wash colour extractives with a solution of 1 denatured alcohol and water and rinse thoroughly. Apply a stain blocking primer after the area has dried.

The above charts were created with the aide of the National Preservation Services' *Preservation Brief 10*, "Exterior Paint Problems on Historic Wood," and Ken Marchtaler's "Paint," in *Your Old House Series #1*.

Safety Precautions

Lead-based Paints

If your home was built before 1960, it most likely contains one or more layers of lead-based paint. If it was built and painted between 1960 and 1990, although unlikely, your home may contain a small amount of lead-based paint on certain interior surfaces. For more information on lead-based paint and safety precautions, please refer to the Hazards to your Health: Asbestos, Mold, Radon, and Lead section in this guide.

Volatile Organic Compounds (VOCs)

Certain architectural coatings, such as oil and alkyd paints, wood stains and varnishes contain a high quantity of organic chemicals hazardous to the environment and our health called volatile organic compounds (VOCs). VOCs have been used in paints for their effectiveness in controlling the paint's thickness, ease of application and drying time. They can unfortunately present health hazards with extended exposure, especially in interior spaces. These products have been heavily regulated following the Government of Canada's introduction of the 2010 VOC regulations requiring paint compliance on limited VOC levels.

Health Canada recognizes 2-butanone, oxime, to cause reversible damage to the tissue lining the nose. To avoid health hazards associated with VOCs, you should always apply paint in a well-ventilated area and read the manufacturer's safety and application instructions. Although VOCs are not worrisome in paint that had dried, their use in interior spaces should be limited.

Paint Removal Methods

It is recommended that historic/original paint and finishes, including stenciling, marbling, and graining be preserved during restoration efforts to conserve your home's heritage character, and minimize damages done to the underlying layers of paint and base material. Previous layers of paint could be helpful to you and future owners for analysis.

It is possible to remove deteriorated paints and finishes to the next underlying layer using the gentlest possible method of paint stripping or cleaning. If replacing deteriorated paint, replace in kind where there are surviving prototypes, and match the new work to the old in form and detailing. It is important to be prepared before beginning a painting project.

Thermal

This removal method is recommended for extensive paint removal. There are two main methods of thermal removal:

1. for flat surfaces, use an electric heat plate.
2. for solid decorative molding, balusters, fretwork, and 'gingerbread' detailing, use an electric heat gun. Do not use a blowtorch as you can ignite dust within the paint or wood.

Chemical

This method is recommended for extensive paint removal. The method, consisting of solvent-based strippers or caustic strippers, should be used with caution and the manufacturer's instructions read carefully to take proper precautions against inhalation of toxic fumes and to limit damage done to the material's surface. Chemical removers also work well on smaller decorative features, window muntins, doors, exterior shutters, balusters, railings, and columns.

Abrasive

Abrasive cleaning should only be resorted to after gentler methods have proven ineffective. This removal method can be extremely destructive and should be used only when it is necessary to halt deterioration or remove heavy soiling. It is applicable for flat surfaces without detailed features, for limited to extensive paint removal. An orbital sander or belt sander is recommended, operated by a skilled individual. Rotary drill attachments, high pressure water blasting, or sandblasting are not recommended.

Removal of Paint on Masonry

Before removing the paint on your masonry façade, consider the following:

Why was the Masonry Painted?

Masonry might have been painted to help protect softer masonry, conceal deteriorating stone, protect the masonry from moisture, or imitate stone.

Will the Removal of Paint Affect the Heritage Significance or Image of the Building?

If the building has been painted for a long time, how will the removal of paint affect the building, the streetscape? If buildings were painted at the time of construction, or shortly thereafter, the paint could be considered historically important.

Will the Paint Removal Methods Damage the Masonry?

With the help of a conservation professional identify which cleaning method is appropriate for the type of masonry and paint. Paint retention or removal can often be justified by the anticipated damage to the masonry. It is often best not to remove paint from masonry. Paint may need to be removed to ensure a good bonding surface if there have been too many consecutive layers built-up on the surface.

Graffiti Removal

The removal of graffiti should not be attempted by untrained professionals. Removal techniques will vary depending on the type of the surface and paint applied to it. Inappropriate removal methods can permanently damage the surface. Painting over graffiti is also not recommended, as it will damage the architectural character and material of your home or business.

Paint and Metals

Metals, like masonry, vary in hardness and durability. It is important to cover ferrous metals to stop their quick oxidation and subsequent deterioration, and to uncover metals that are supposed to be uncovered such as copper, bronze, and stainless steel. An architectural conservator should be consulted prior to any paint removal from metals as the removal method will depend on the type of metal and any paint previously applied. The paint should be sampled to determine the composition of previous layers (i.e was sand added for texture? Was the texture matte or gloss? Was the surface polychrome or marbleized?).

Paint covering ferrous metals should always be kept in good condition to discourage rust. If the topcoat of paint does not show signs of deterioration or damage, it can be prepared for re-painting by lightly sanding the surface. A well-prepared surface will protect the underlying paint and provide ‘teeth’ for adhesion of new paint. Do not use any water, water-based chemical cleaners or high-pressure grit to clean ferrous metals. Architectural metal features that will be subject to heavy pedestrian use should be protected with a final lacquer or wax coating.

Paint Removal on Soft Metals

To remove paint from metals, such as lead, tin, copper, and zinc, use the appropriate chemical removal method. Abrasive methods are not recommended for soft metals as their finishes are easily scratched.

Paint Removal on Hard Metals

To remove paint from hard metals such as cast iron, wrought iron, and steel use a wire brush or scraper. If the paint cannot be removed by hand, use very low-pressure dry-grit blasting (100psi). Alkaline compounds, such as methylene chloride or potassium hydroxide, can also be effectively used instead of abrasive blasting.

Summary

This practical guide has described how paint will highlight and accentuate your home's exterior architectural features, while protecting the underlying surface material from the elements, specifically unwanted moisture penetration. Potential hazards and safety precautions should be well understood before undertaking work or hiring a professional as there is no paint removal method that is completely safe to you and the surface material.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about paint and colour for your heritage home, please refer to the following sources:

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Standards & Guidelines for the Conservation of Historic Places in Canada. 2nd ed. Ottawa, ON: Parks Canada, 2010.

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PLASTER, STUCCO, AND WALLPAPER

Introduction

The conservation of plaster, stucco, and wallpaper requires a highly trained professional or a knowledgeable and practiced homeowner. Although routine maintenance may seem straightforward, damage can occur to the unique materials in your heritage home as a result of inappropriate conservation efforts.

Plaster

Plaster consists of a mixture of powdered lime or gypsum with water, applied to the interior surfaces of a building. The mixture was traditionally applied on walls and ceilings over a lath made of wooden bands secured to wall studs or ceiling joists but has more recently been applied to heavy-duty metal mesh. The application of plaster traditionally includes three or more coats. The first, or base coat, was strengthened to best adhere to the lath, with binders of animal hair and aggregates of sand. The second coat consisted of a similar composition and texture but aimed at riding the surface of irregularities. The final application often saw the addition of lime to whiten and create a smooth surface free of imperfections. Paint and wallpaper would be applied directly on top of this final coat.

Contemporary wet plaster has typically replaced lime with gypsum, a hydrated calcium sulfate or sulfate of lime that hardens faster. Modern gypsum plaster does bond to the traditional plaster well, helped by the lime's softer and more porous character. If the combination of plaster does not remain dry, dampness will cause stress and lead to hairline cracks due to their differences in porosity. If the situation is left to worsen, both materials will deteriorate.

Drywall, also known as plasterboard, gypsum board, or Gyproc, is comprised of gypsum plaster pressed between two thick sheets of paper. Due to the skill and amount of time required for traditional plaster application, drywall is most commonly used today. It is used as the surface for direct painting or as the primary coat and lath for wet plaster. As drywall is much thinner and harder than traditional plaster coats applied to the lath, it does not possess the same insulation against noise. Also, drywall does not provide the same depth of character and craftsmanship.

Decorative Plaster

Ornamental plaster displays great craft and skill. It was commonly used for cornices, ceiling medallions and coffered ceilings, ranging from simple cornices to elaborate architectural sculptures. Decorative plaster work can be produced by a trained professional on site or cast off site. Any required repair greater than a crack or a pit should be addressed by a professional.

Stucco

Stucco is one of the most common traditional building materials and can be used as a decorative coating for walls and ceilings as well as a sculptural and artistic material in

architecture. It may be used to cover less visually appealing construction materials such as metal, concrete, cinder block, or clay brick. The application of stucco is a historic technique that consists of applying a lime mortar onto a lath. Many regional variations of stucco exist, including mixtures of lime, mud, clay, cement, chalk, straw, or gravel.

Traditional stucco applied to a wooden lath consisted of a lime, sand, and water mixture that was bonded with straw, animal hair, or other binders for sturdiness. This mixture would be applied to a wooden lath in two or three coats for optimal performance and durability. The first layer was a rough coat, known as the 'scratch' coat, which provided adhesion between the lath and consecutive coats applied. The texture finish would be created with the final coat, and often mixed with pigments for colour. Stucco's composition shifted to include an increasing percentage of Portland cement mixed with lime. Today, lime is often replaced with gypsum, but it may still be used for the finish coat. Traditionally, stucco was — and should still be — left unpainted.

Wallpaper

Wallpaper, in combination with paint, plaster moldings, and molded woodwork is characteristic of the interior décor of heritage homes. Wallpaper was typically applied directly onto plaster walls and ceiling, unless the wall had been previously prepared with canvas. Today, wallpaper is most often added to restore an interior room in a heritage building to a pre-determined period. It is recommended to keep samples of existing layers of wallpaper as a record of the modifications made to the room throughout its existence.

When trying to date your wallpaper, consult heritage wallpaper catalogues and a qualified professional. Consider the following questions provided by Heritage New England:

- **Type of Paper**
  Is the wallpaper machine or handmade?
- **Printing Process**
  Is the wallpaper hand painted, block, machine, or screen printed?
- **Style and Pattern**
  Is the style and pattern characteristic of a certain time period?
- **Colour**
  Can the colour be used to date the wallpaper? Although certain time periods can be characterized by common wallpaper colour, it is sometimes difficult to determine a specific time.
- **Date of Construction**
  When was your home built? Knowing the date of your home's construction can give you a good starting point.

Samples and Documentation

Before starting your conservation project, document the existing form, material, and condition of the surface.

If you want to identify previous installations of wallpaper, collect samples from each interior surface. On surfaces with many layers, samples should be taken in the form of chips of peeled paint and paper. The chips can be feathered to show underlying tones. These should be analyzed and saved for future reference, along with any documentation provided. Use a high-powered magnifier or microscope at 30x to 100x magnification to examine the layers and help distinguish between paint, primer, finish colours, and wallpaper. If you would like to install a reproduction of your old wallpaper in a similar colour and pattern, uncover as much of the heritage wallpaper's pattern as possible without damaging it. You can reference heritage wallpaper catalogues or speak with a professional to find a match to your wallpaper. Although this sampling technique is not 100% accurate, it can help inspire and guide your conservation project.

As stucco is typically left unpainted, it will not require the sampling technique mentioned above. Care should be taken to document any texture or decoration pattern, as well as the top layer's pigmented colour before doing any work. When undertaking repairs, note and maintain the width of all combined coats of stucco relative to the wood trim. Colour samples should be taken from weathered and freshly broken areas and preserved for future colour matching purposes.

Maintenance and Repair

Heritage features should be maintained wherever possible with minimal intervention. Cleaning methods should be selected based on the materials and chemical composition of the surfaces to limit potential damage. Repairs or replacement may be required if the material has deteriorated due to environmental conditions or extensive structural damage to the building. A heritage professional should be contacted for historical assessment, repair advice and guidance, and removal or replacement of plaster, stucco, and wallpaper.

Plaster

Causes of Failure

Plaster can fail as the result of a number of problems as identified by Gordon Bock in the Old House Journal's "Plaster Repair Option."

1. Plaster dating from the 1850s and earlier may be affected by weakness of materials if the mixture contained lime of uneven quality or sand with impurities.
2. Poor application condition resulting in the plaster being unable to settle or freezing prematurely (i.e. the plaster was applied in inadequate weather: too hot/humid or too cold).
3. Structural shifts.
4. Moisture.

5. Gravity.

Prevention against Deterioration
Ensure there are no building conditions that would cause moisture related damage, such as high humidity or leaks. Ideally, there should be minimal differences in humidity between the rooms of the home. Moisture conditions should be resolved before completing any plaster work.

Repair of Hairline Cracks
Small hairline cracks in random directions do not typically imply plaster failure. They can be fixed before repainting by being opened slightly with the point of a can opener or tool specifically for this function, and filled with a mixture of gypsum and lime, or spackling compound. Certain cracks will reoccur with contraction and expansion of the material. They will need to be remedied either by removing all debris to open the crack in the shape of a 'V' before damping and filling the void with patching plaster, or covering the crack with drywall or fibreglass tape before covering with a drywall joint compound. It is important to use a non-shrinking compound and to give newly applied plaster sufficient curing and drying time prior to sealing. After repairs are finished, apply a coat of white shellac to protect and prevent paint moisture from seeping into the plaster.

If the hairline cracks are too numerous, but the plaster is fundamentally sound, you can apply canvas to the wall. This is a historic technique used in the 1920s. First prepare the wall by filling in any voids in the plaster and removing any paint. Apply a traditional canvas material, or a contemporary fiber product for wall canvassing, using an adhesive applied to the full surface of the wall. Canvassing a wall will also smooth its appearance after years of wear and imperfections caused by repairs, repainting, and wallpaper removal. It should be noted that this technique can be difficult to undertake. Consulting with an expert is advised. Sourcing canvas can be difficult these days, but some sailing shops will sell pure canvas. Most home renovation stores will sell synthetic alternatives. Fibreglass is a sound alternative if undertaking work on your own. Specification Chemical sells a product called Nu-Wall that has received good reviews from industry experts.

Stucco

Prevention against Deterioration
If properly mixed and applied, stucco can be as durable as a brick and lime mortar wall. Stucco can protect the building envelope from rain and wind, and can provide a certain degree of fire protection. However, this material is very fragile and prone to cracking and crumbling if not regularly maintained. If hairline cracks are permitted to develop, water can penetrate through the voids to create moisture issues and rot of the structural elements.

Routine Maintenance
Traditionally, property owners applied a coat of whitewash annually to conserve stucco. The lime within the whitewash acted as a hardening agent, filling the hairline cracks to prevent them from developing. Paraffin or oil mastics were also applied to improve stucco's impermeability. Today, whitewash is still being applied to preserve stucco, although its composition and texture has changed. It most often consists of a mixture of

cement, lime, sand, and water with a binding agent, and is applied with a brush. It is important to know your base before applying whitewash. Before stucco work is undertaken, the building elevations should be evaluated and the composition of existing stucco must be identified to match the new stucco in strength, texture, colour, and material. All materials should be repaired and replaced in kind.

Repair of Hairline Cracks
To repair a small hairline crack, clean the crack of its loose materials and debris with the help of a towel or putty knife. Gently brush all dust away with a damp paintbrush and let it dry. Remove a piece of the original stucco topcoat that has failed, place it on a heavy piece of plastic, cardboard, or cloth outdoors, and grind it to a powder. Fill the crack with a tri-polymer sealant, hold the crushed stucco adjacent to the sealant-filled crack, and gently blow it into the void. If the sealant should accidentally get onto the surface of the stucco, it can be cleaned off with a soft rag dipped in mineral spirit; a petroleum derived clear liquid also known as mineral turpentine. This repair may require some practice to avoid wasting all the powdered stucco.

Removal of Stucco
Stucco should not be removed unless it has deteriorated. All removals should be done with the help of a trained professional. This includes stucco that has been applied directly to masonry without lath. The stucco was most likely applied to protect the underlying masonry that was never meant to be exposed.

Wallpaper
Wallpaper deterioration will most often reflect the deterioration of the plaster beneath. An inspection should be done by a professional before undertaking any repairs. Wallpaper repairs will vary based on the intent of the conservation project, and the remaining amount and condition of paper still adhering to the plaster. Heritage conservationists recommend that property owners consult a trained professional before cleaning, repairing, or removing your heritage wallpaper. Conservation of wallpaper in place is preferred to its removal to preserve the authenticity of application, seams, and wrinkles.

Safety Precautions: Lead-based paints
If your home was built before 1960, it most likely contains one of more layers of lead-based paint. As wallpaper will help contain lead dust from deteriorating lead-based paint, caution should be taken if cleaning or removing the wallpaper to expose underlying paint. For more information on lead-based paint and safety precautions, please refer to the section Hazards to Your Health: Asbestos, Mold, Radon and Lead included in this guide.

Summary

Care should be taken to conserve the features of your home, since the craftsmanship and authenticity of your heritage plaster, stucco and wallpaper cannot be matched by contemporary products. Although the repair and removal of these materials require specialized labour, their superior quality and longevity are worthwhile to maintain. This

is not a complete guide. The untrained should seek professional help before attempting repairs, removal or any other work to their historic plaster, stucco and wallpaper.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your plaster, stucco or wallpaper, please refer to the following sources:

Bock, G. "Plaster Repair Options." *Old House Journal,* n.d.

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PORCHES

Introduction

Porches are common design elements found on many older buildings. Representing a transition between the outside and the inside, porches shelter the entryways from the weather and create spaces to gather and observe the street. Porches may be prominent and elaborately decorated or, more commonly, may include simple design features.

Porches are among the most vulnerable components of an older building. As they are generally constructed of wood, they are susceptible to rotting, sagging, deterioration, and freeze-thaw cycles. They are also often modernized with unsympathetic alterations that use inappropriate contemporary materials. For these reasons, many original porches have not survived, making the conservation of those remaining more important.

For the purpose of this guide the term ‘porch’ is used broadly and the recommendations can also be applied to related structures such as porticoes, verandahs, and decks.

Design

Porches help create the appeal of heritage homes as they are often the most embellished components of an older building. They come in a variety of sizes, proportions, and styles including:

- Low one-storey porches.
- Imposing two-storey variations.
- Balcony porches.
- Roof decks.

Porches consist of several different components including the structure, decking, stairs and railings, support columns, and the roof. Porch roofs are usually low pitched or nearly flat and covered in the same material as the main structure’s roof. Columns are common and can be a variety of designs. Balustrades are also diverse and range from simple posts to elaborate turned balusters.

Porch Styles

Porches compliment the architectural style of a building. The following are some images of porches from St. John Heritage (2010) associated with specific architectural styles that can be found the Loyalist Township.

Image 39: Georgian Pre-1800-1830 (St. John Heritage, 2010, p.1).

Image 40: Gothic Revival 1850-1870 (St. John Heritage, 2010, p.1).

Image 41: Italianate 1850-1870 (St. John Heritage, 2010, p.2).

Image 42: Second Empire 1860-1900 (Victoria Heritage Foundation).

Image 43: Queen Anne 1880-1900 (St. John Heritage, 2010, p.2).

Image 44: Edwardian 1890-1916 (Victoria Heritage Foundation).

Image 45: Arts & Crafts 1890-1940 (Victoria Heritage Foundation).

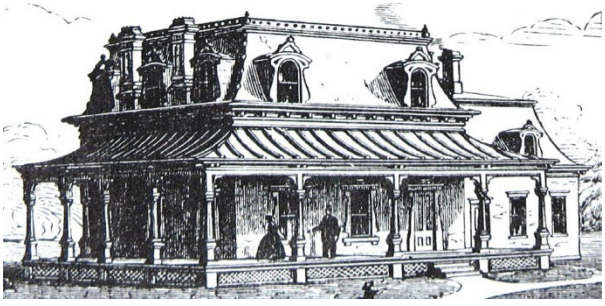

Image 46: Awning Porch 1865 (Woodward's Country Homes).

Often porches were added to the original building later by a subsequent owner and as a result may have a design that is incompatible with the style of the house. To determine if a porch is well suited for an older home, consider the structure's architectural style, geographic location, climate, and social customs of the area. Deciding to keep a later porch also depends on where it is located on the structure and how much use it will receive. Consultation with an architect or heritage contractor can help you to determine how to proceed.

Some hints to help determine if your porch is original or appropriate for the structure include:

- Examine its construction, especially where it meets the wall of the house. Is there evidence that the structure is old such as nails, mortise, and tenon joints?
- Analyze the construction materials. Many older porches are wood, stone, or brick. Modern materials, such as concrete steps, wrought iron columns, and plastic awnings are a sign of contemporary alterations.
- Count the paint layers and compare them with layers on a section of the house you know is original.
- Locate historic photographs of the building to see if the porch is visible.
- Scan the neighbourhood for houses designed in the same style to see if they have a porch resembling yours.

Maintenance and Repair

Although porches are a sheltering feature, they are unsheltered themselves from the weather. Without proactive maintenance, rapid deterioration is inevitable. Due to their placement near the ground, porches are targets for insects and moisture penetration. It is best to keep all wood above the ground unless it is pressure with a wood preservative.

The relationship between the porch and the house is important. If portions of the porch are decaying or if foundation piers are sinking, the roof structure may pull away from the house. Many porch decks are fastened to the main building on a ledger, which is a horizontal board along the house's foundation. A decaying ledger may compromise the structural integrity of the porch and can represent a major safety issue. To ensure porch problems do not transfer to the house, proper maintenance and repair is important.

Rot

Proactive and frequent maintenance is key to a porch with a long life. When a moisture-related problem is spotted, identify and eliminate its source and then address the damage. There are many places on a porch that are susceptible to moisture related problems, and it is recommended to inspect them at least once a year. The parts of a porch to inspect include:

- The wood steps and posts, porch underside, other wood near the ground and the place where the porch joins the house for decay and signs of termites or other insects.
- The area under the porch for excessive moisture.
- The columns and posts, especially at the base.
- The flooring and steps for cracks and deterioration, and to ensure they properly slope away from the house.
- The joints for any gaps, especially where the porch joins the house or another roof.
- Masonry, mortar joints, and wood signs of deterioration.
- The roofing material and flashing to see if they are in good condition. Check under the roof for dampness or moisture stains.

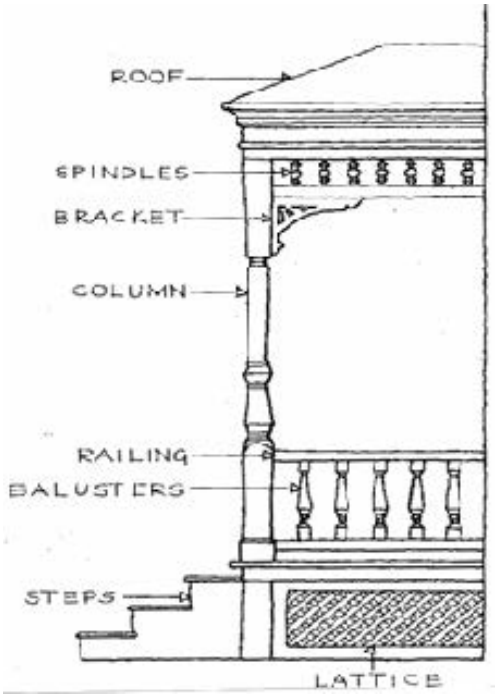

Image 47: Parts of a porch (Betty Anderson, 1983, p. 123).

- The gutters and downspouts to make sure they work well and to see if water splashes any nearby wood.
- The nails for rust spots. Might indicate moisture problems.

Wood Care

Many porches are constructed of wood and when it comes time to repair the components of your porch it is best to understand the variety of wood types and their associated characteristics.

Wood Characteristics

Species	Cut or Grade	Cost	Workability	Resistance to Decay	Resistance to Cupping	Paint Holding Ability
Redwood	Clear, Vertical-grain, all-heart	$$$	Fair	Excellent	Excellent	Excellent
	"B" Select, flat-grain	$$	Fair	Excellent	Good	Good
Cedar	Clear	$$	Fair	Excellent	Good	Fair
Cypress	Clear	$$	Fair	Excellent	Fair	Good
Douglas Fir	"C" & better, Vertical grain	$$	Fair to Poor	Good to Fair	Excellent	Fair
Southern Yellow Pine	"D" Select, flat-grain	$	Fair	Fair	Good	Fair
	Vertical-grain	$$$	Fair	Fair	Excellent	Fair to Good
Eastern White Pine	"D" Select, flat-grain	$	Excellent	Fair	Excellent	Good
	Vertical-grain	$$$	Excellent	Fair	Good	Excellent
Poplar	Firsts and Seconds	$	Good	Poor	Good	Fair
American Mahogany	Clear	$$$	Excellent	Excellent	Excellent	Good

This table summarizes the characteristics of just a few of the different species available, including the workability of the wood (indicating a better wood for decorative porch pieces), the resistance to decay (an important feature for all porch components), resistance to cupping (a wood highly resistant to cupping is a better choice for floor board replacement) and paint holding ability. The Cut or Grade is also listed, as a low-grade wood can perform very differently than a higher grade in the same species. Cost will vary depending on region and market supply and demand. In general, it is best to contact two or three local lumberyards to find the available woods with the characteristics needed in the local market.
Source: Practical Restoration Report, Exterior Woodwork Details.

Image 48: Characteristics of wood types best suited to porch construction (Sullivan and Leeke. *Preservation Brief 4,* "Preserving Historic Wood Porches." Washington, DC: U.S. Department of the Interior, National Park Service, 2006).

Filling

Small cracks in the wood can be filled with putty or caulk. Larger cracks or holes can be filled with plastic wood. For wide gaps in the wood or joints, insert oakum or a similar filler then caulk over the filler. Other products used to lengthen the life of wood include epoxy consolidants for deteriorated wood and epoxy fillers for holes and cracks.

Replacing

Alternatively, the rotted section of wood can be replaced. This is done by cutting out the damaged wood and patching it with a piece of wood of the same dimensions and characteristics. Glue the patch into place, caulk over the joint and paint or finish the patch to match the existing wood. When replacing wood in areas near the ground and exposed to excessive moisture, install pressure treated wood, wood treated with a preservative, or heartwood stock of naturally decay-resistant woods like redwood, cedar, white oak, cypress, or black locust. Use of pressure treated wood is not recommended beyond areas of the porch that are in contact with the ground.

Protecting

On areas of the porch where paint has peeled or deterioration has begun and where horizontal ledges occur, treat the existing wood with a wood preservative. Before removing the paint, examine the layers to determine the colours and finishes historically used. Once the paint is removed apply a preservative and allow it to soak in. Apply a primer compatible with the preservative before painting. Finally, repaint using historical colours to illustrate the distinctive character of the building.

Masonry Care

When necessary, repoint the joints and repair any cracks or deterioration. It is important to replicate the existing mortar, its colour and the type of joint originally used on the porch. Any new bricks or stones added should match the colour, size, and texture of the original masonry material. More detailed maintenance recommendations for conserving the brick or stone that may be located on or under your porch are discussed in the section on Masonry.

Roofs

The more effectively water drains and diverts away from the porch roof, the longer the porch will last. To prevent moisture damage, the gutters and downspouts of the house should work well and divert water away from the structure. The inclusion of eavestrough diverters may be needed to control where water goes, or gutters and downspouts added in inconspicuous locations, when possible. Additionally, the porch roof should slope away from the house.

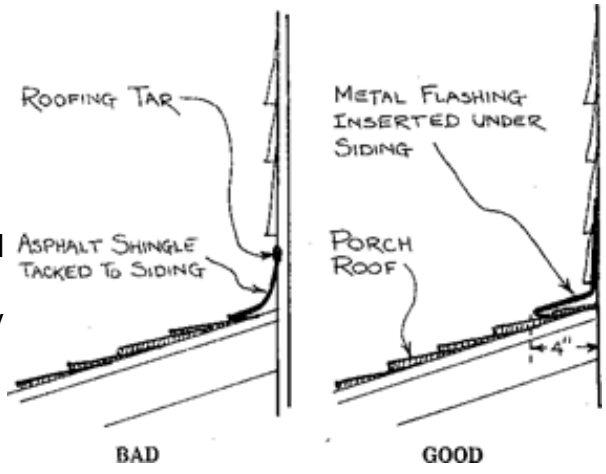

Image 49: Illustration of good and bad porch roof flashing (The Old Houe Journal, 1981, p. 224).

The juncture of the porch roof and another roof or the wall of the house is another spot susceptible to water penetration. Ensure that the flashing is installed properly and does not have holes or cracks and is not loose. If problems are spotted, make the repairs as quickly as possible as water can enter the walls of the house and cause structural

damage. A drop of solder for a small crack or a hole and a metal patch for larger holes can repair metal flashing. If the flashing has come loose and leaves a gap, put the flashing back in place and seal the joint with caulking. If it becomes necessary to remove part of the wall or roof material to reach flashing, it may be best to contact a heritage professional.

Columns, Balustrades, Entablatures, and Brackets

Porch columns, balustrades, entablatures, and brackets should be checked regularly for damage, repaired as needed, and repainted whenever the house is painted — or more frequently if necessary. Prior to painting undertake the necessary repairs as outlined below. To prepare surfaces for painting, first scrape off cracked or loose paint. Then sand, clean, and apply a coat of primer to seal the wood pores.

Any loose joints should be tightened when spotted to prevent water penetration. To do this, insert a screw at an angle through both pieces of wood to hold them together. First, drill a pilot hole, countersink the screw, cover the hole with plastic wood and paint over it. It is recommended to keep joints caulked and painted.

Railings will last longer and shed water better if the top slopes away from the centre. Wood bottom railings will also last longer if they do not touch the porch floor, limiting the exposure to moisture. Similarly, the base of a column does not typically dry out and consequently rots because it is affixed to the porch floor. Vents inserted in the base and near the top of a column help to dry it out. Adding a metal plate between the floor and column's base is another way to prevent rot. If any part of a damaged column needs to be replaced, retain the sound parts and replace the damaged section with like materials.

Balusters are also susceptible to rot at the bottom where moisture accumulates. The top portion may last longer as it is protected from the weather by the handrail. If only a few balusters have rotten bottoms, carefully remove these and replace the rotten portion with new materials.

Tip:
When numerous balusters have deteriorated, consider removing them all and making the necessary repairs, replacing them upside down with the stronger portion now at the bottom. The usefulness of this option will depend on the extent of the damage and baluster's design.

You can make small repairs to relatively sound entablatures and brackets by replacing small broken or missing pieces. Use a piece of cardboard to trace the pattern of the piece in need of replacement. A small saw, such as a bandsaw, can be used to cut the design from wood. Treat the wood with a preservative then glue or nail the piece in place. Prime and paint the area to match the existing colour.

Porch Floors and Steps

Inspect porch floors periodically for loose or warped planks, protruding nails, exposed or deteriorated wood, or crumbling concrete or masonry mortar. Wide surfaces, like porch floors or treads on steps hold moisture easily, especially if there are depressions in the wood or concrete. For this reason, porch floors should slope slightly away from the house to shed water. A slope from 1/8 to 1/4 inch per foot works well. It is not advised to

use a subfloor as this increases the potential for trapping moisture and prevents the top flooring from ventilating from below.

It is important to treat the floor boards with wood preservative or waterproof coating. This will greatly extend the life of the topcoat of paint. Remember to check that the underside of the flooring is in good condition as well.

Wood steps are especially susceptible to deterioration when they have concave areas, do not slant away from the porch, or if the steps or their supports are in contact with the ground. A three or four-inch concrete strip laid between the bottom step and the ground is one way to separate wood steps from the soil. Caulk the joint between the step and the concrete to help divert moisture away from the wood.

Tip:
If steps are worn or warped, it may be possible to turn over the treads and expose the sturdy underside, allowing you to reuse existing materials.

End Grain

Water is rapidly absorbed by the end grain on a piece of lumber and is where deterioration starts on most porches. These areas are also prone to paint loss, leading to even greater water penetration and ultimately rot.

To limit moisture absorption, keep end grain surfaces painted and minimize exposed end grain by following these two rules:

1. Use the minimum number of pieces in porch construction, resulting in fewer joints and less exposure of end grain.
2. Cover the end grain of all wood exposed to the weather with trim.

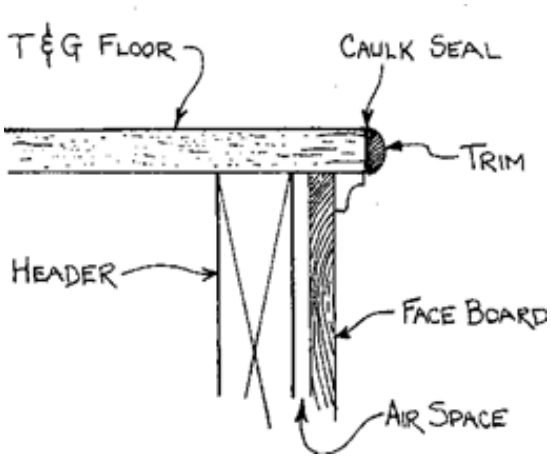

Image 50: Nosing protects floorboard end grain. The Old House Journal, 1981, p. 222).

Protecting the end grain of floorboards is done with a rounded or square piece of trim, called nosing. The addition of high-performance caulk, such as polyurethan, run on the ends of the boards before the trim is nailed in place will seal the joint.

Groundwork

A porch's supports, foundation, or crawl space — and the underside of the floor — should be regularly inspected as these less-visible areas can be the source of many problems. To begin with, it is recommended that the soil beneath the porch slopes away from the structure. As well, good ventilation is key and the addition of vents may help to disperse collected moisture. If the porch sits over dirt, not concrete or stone, cover the ground with sheets of building paper or polyethylene overlapping roughly six inches to help reduce moisture on the porch.

As discussed in the Wood Care section, when replacing wood, pressure treated wood should be used when it will touch the ground as it is better protected against moisture than wood that only had a brushed-on water repellant coating. Untreated wood should remain elevated above the soil. However, if the existing wood used in the porch sub-structure is not pressure treated, a brush-on coat of wood preservative or non-toxic water repellent is recommended. Concrete footings are one way of raising wood supports above the ground level. Installing a poured footing with a metal stirrup that holds the wooden post above the concrete will allow water to drain away from the end grain at the bottom of the post, which is the area most prone to decay.

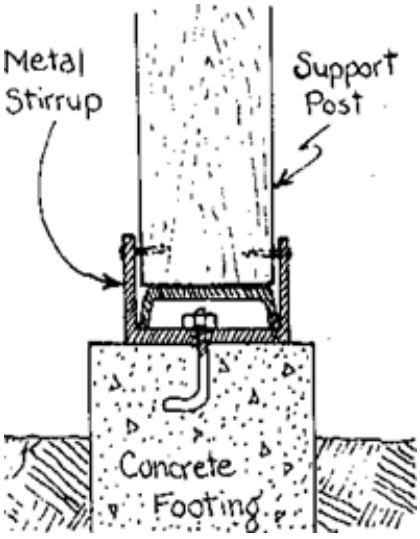

Image 51: A porch's concrete footings (The Old House Journal, 1981, p.222).

The uneven settling of a foundation may cause a porch to sag. When the porch roof and floor sag in the same area, the problem may be caused by the foundation or footings. If this is the case, it is advisable to contact a general contractor for advice.

Water Repellants

It is important to maintain an intact protective coating on exterior wood surfaces so that moisture is kept out, prohibiting the growth of fungus and ultimately deterioration. Preservation specialists have reported that water repellants seem to reduce wood's ability to absorb moisture much better than a primer. The goal of using a wood preservative or water repellant prior to priming is not so much to kill decay-causing bacteria but to prolong the life of paint on exposed wood surfaces.

A simple make-it-yourself water repellant developed by the Forest Products Laboratory in Madison, WI has proven effective. The formula includes:

1. Exterior varnish – 3 cups.
2. Paraffin wax – 1 oz.
3. Mineral spirits (paint thinner or turpentine) – add to make 1 gallon.

Paraffin is sold in grocery stores for sealing canning jars. It is best to shave the paraffin block as finely as possible to help it to dissolve faster. Different brands of exterior varnish have been tested, and they all appear to work equally well.

Replacement

The type of porch used in different architectural styles helps to give the building its character.

Selective Replacement

If only one part of the porch has deteriorated beyond repair, replace only that part rather than tearing down the entire structure. Selective repairs cut down on costs and preserve the original integrity of the building. Try to retain as many original components as possible. If a piece cannot be saved, try to find exact or similar pieces that reflect its materials, dimensions, and details. For replacement materials, try suppliers of decorative parts that carry an assortment of columns, capitals, pilasters, balusters, brackets, cornices, and friezes in many sizes. You may also be able to special order designs from some of these companies. Other sources of replica materials may be stores specializing in architectural salvage, lumber and millwork companies, and cabinet makers. If you are unable to find a reproduction of the original, copy the material and design with or without the intricate details.

When restoration work is undertaken on columns, posts, or other supporting members of the porch, it will be necessary to temporarily support the roof. You may decide to seek professional help for this.

Complete Replacement

When large portions of a porch have deteriorated severely, repair or partial replacement may not be practical. If this is the case, a porch will likely need to be removed and a sympathetic replacement constructed. The new porch should reflect the previous structure's design, massing, and materials if it was determined to be original. Consider improving upon the design of a porch that was clearly inappropriate in style and materials. An architect can advise you about whether or not to keep porches that were added later and are not designed in the same style as the house.

Image 52: Inconsistent appearance of an altered enclosed porch (District of Columbia, 2010, p. 8).

Enclosures

Some homeowners choose to enclose their porch allowing year-round use of the space. This type of intervention is rarely recommended as it alters the appearance of the porch and main façade of the building. If the addition of an enclosure is decided, attempt to maintain a sense of the openness of the porch through the use of transparent materials like glass or screens. Also, try to place enclosures behind significant architectural detailing so that they remain visible.

Summary

A porch may be a character-defining element of a heritage building. When undertaking repairs, retain the original designs and materials if they reflect the structure's architectural style. If the porch will require total replacement, try to duplicate the original size, shape, materials, decoration, silhouette and placement on the building. A sympathetic replacement is most important for porches on the front of the house, row houses, or streets where many buildings are designed in the same style with similar porches.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your porch, please refer to the following sources below:

City of Jacksonville. "Maintenance and Rehabilitation of Historic Buildings: Porches, Porte Cochere and Garages." jacksonville.gov, 2010.

District of Columbia, Office of Planning. *District of Columbia Historic Preservation Guidelines: Porches and Steps on Historic Buildings*. Washington, DC: District of Columbia Office of Planning, 2010.

Hanson, Shirley, and Nancy Hubby. *Preserving and Maintaining the Older Home*. New York, NY: McGraw-Hill, 1983.

National Park Service. "Exterior Features – Entrances & Porches," in *Standards for Preservation and Guidelines for Preserving Historic Buildings* (Washington, DC: U.S. Department of the Interior, National Park Service, 2001): 190-192.

Saint John Heritage. "Practical Conservation Guideline: Porches." Saint John, NB: City of Saint John, 2010.

Sullivan, Anne E., and John Leeke. *Preservation Brief 45,* "Preserving Historic Wood Porches." Washington, DC: U.S. Department of the Interior, National Park Service, 2006.

Woodward, Geo. E., and F.W. Woodward. *Woodword's Country Homes*. New York, NY: Geo. E. & F.W. Woodward, 1866.

ROOFS

Introduction

Although there are numerous shapes, sizes, slopes, and styles of roofs, they all play the same vital role as an umbrella for your home. A watertight roof is the most important element for maintaining a building.

A roof is a large component of your building's architectural character, so it is important that a roof's materials and style be respected. Roofs are susceptible to damage caused by severe weather, ongoing exposure to the elements, poor material considerations or installation, and occasional foot traffic. It is recommended that a professional roofer and/or an architect be consulted before doing any repairs or alterations to a roof. Take the proper safety precautions prior to climbing on a roof and take care not to damage the roofing materials.

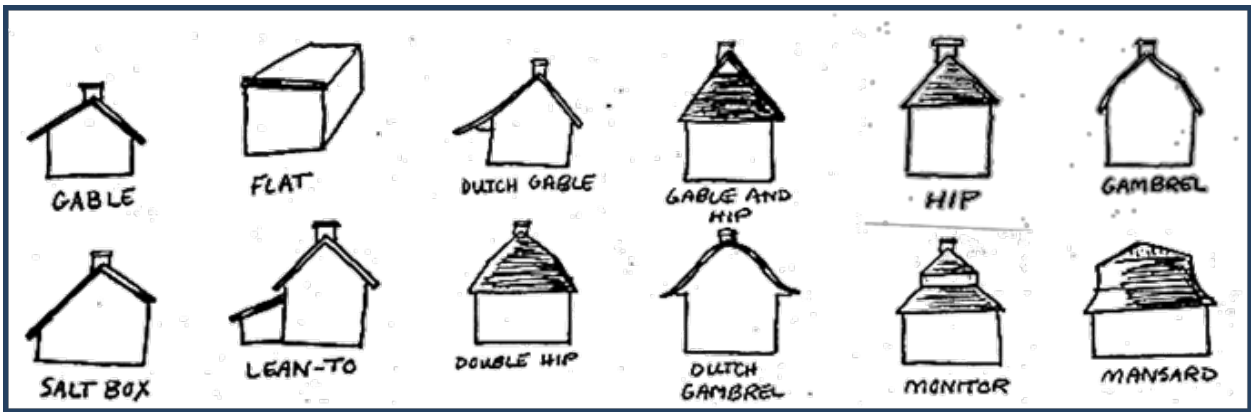

Image 53: Roof styles representative of a variety of different architectural styles (Amanda Sherrington, 2013).

Roof Styles

A roof's decorative features and pitch is based on the structure's architectural style. Architectural styles are often a reflection of the local climate, regional traditions, available roofing materials, and desired living space.

Prior to undertaking a roofing project, understand your building's original roof style and investigate if previous occupants have altered the structure for extra room or stylistic changes. If you want to restore your roof to its original design, the original roof may still be intact beneath the current.

As noted above, roofing is incorporated into the general scheme of a home's style. The following drawings and summaries describe styles that can be found in Loyalist Township. They are based on the information published in Saint John's Practical Conservation Guide.

Image 54:
Greek Revival 1830-1860
Low pitched gable roof creates a temple-like profile. The cornice under the eaves can be wide, plain, or detailed.

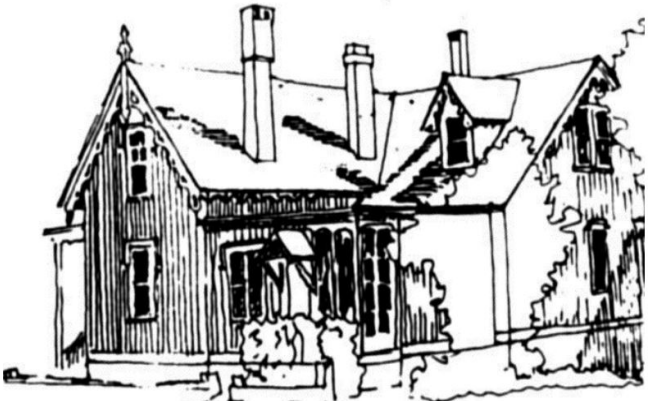

Image 55:
Gothic Revival 1850-1870
Steep pitched gable roofs usually include dormers, finials, pinnacles, and chimneys. Decorative roof edge 'bargeboards' are common.

Image 56:
Italianate 1850-1870
Gently sloped hip or gable roofs that are often crowned by a central cupola. This style of roof exhibits deep projecting eaves, supported by large wooden brackets on a wide cornice.

Image 57:
Mansard 1860-1880
Steeply sloped surface may be straight, curved, convex, or concave. Projecting eaves, supported by large wooden brackets on a wide cornice. Dormers and iron cresting is common.

Image 58:
Romanesque 1875-1895
Steeply sloping gable roofs that are often intersecting. This style of roof can be enriched with delicate finials and terracotta panels.

Image 59:
Queen Anne 1880-1900
Steep gables and intersecting roofs with dormers, turrets and towers, decorative iron cresting, finials, and patterned and coloured shingles that enrich the roofscape.

Roof Architectural Details

Eaves

An eave is the edge of the roof that typically projects out beyond the building's exterior walls. Eaves are essential in directing water and snow away from the building's façade and foundation, preventing water from entering the building where the roof meets the wall and can be designed to adjust a building's solar heat gain. Made of wood, eaves are typically enclosed by a soffit and facia, and the eaves also enable the attachment or installation of gutters. Eaves are sometimes decorated with brackets, providing aesthetic cohesion by creating a distinction between the building's verticality and roof incline.

Gutters and Downspouts

Gutters and downspouts are important features of your home that help capture and move water out and away from the building. They can be attached on the

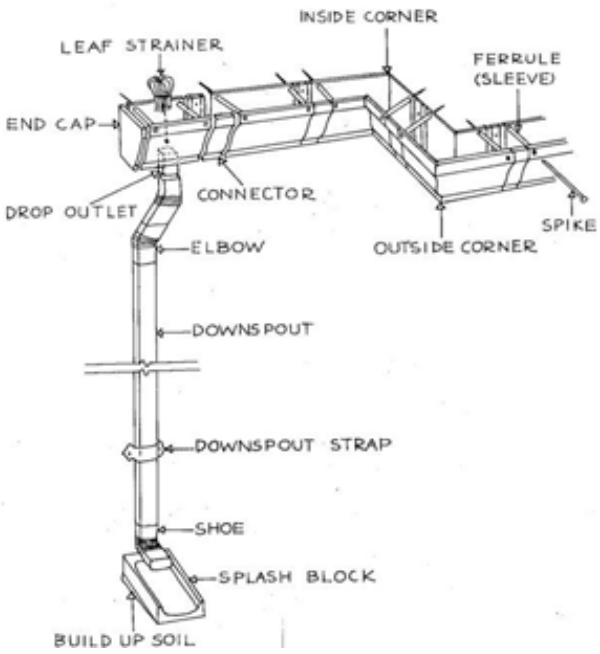

Image 60: Parts of a gutter and downspout (Betty Anderson, 1983, p. 59).

exterior or interior of an eave or sloping roof. Exterior gutters and downspouts were originally made of copper or galvanized steel, while interior ones are likely terneplate, lead, or copper.

It is important to keep gutters and downspouts clear of debris to prevent clogging. An electric heating cable can be installed in these units to prevent the freezing of water in the winter months. Downspouts should empty out onto the ground away from the building's foundation or can be connected underground to run into the public sewer or into a dry well.

Cornices and Parapets

A cornice is the horizontal decorative molding that 'crowns' a building as was originally designed to throw rainwater away from a building's walls. In today's residential building space, this function is handled by projecting gable ends, roof eaves, and gutters. However, house eaves may also be called 'cornices' if they are finished with decorative molding.

On a flat roofed building, a cornice serves both an aesthetic and practical function, providing architectural interest while creating a weather tight seam between the façade and roof. The cornice may strictly adorn the main façade or extend to all sides of the building.

A parapet is similar to a cornice and provides the same weather-tight function, but it is most often simpler and gives the building greater height. A parapet is capped by a single coping made of tile, metal, stone, or pre-cast concrete.

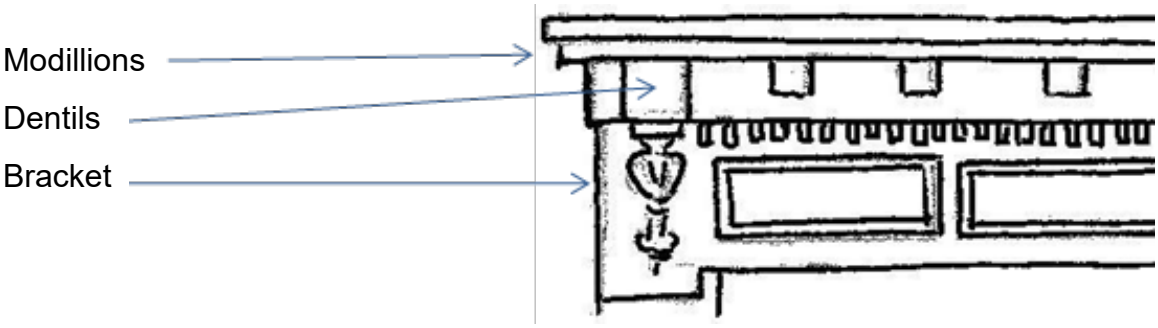

Image 61: Illustration of the decorative elements that compose a parapet (Sherrington, 2013).

Dormers

A dormer consists of windows or vents projecting from a slopped roof. The projections are capped with a roof of their own, most often a gable, hipped, shed, or round roof. If adding new dormers, ensure that the style and size of the window or vent, as well as the slope of the roof, is consistent with the architectural style of the building. Consider reviewing the design guidelines available in the sections on Additions and Windows, Shitters, and Doors.

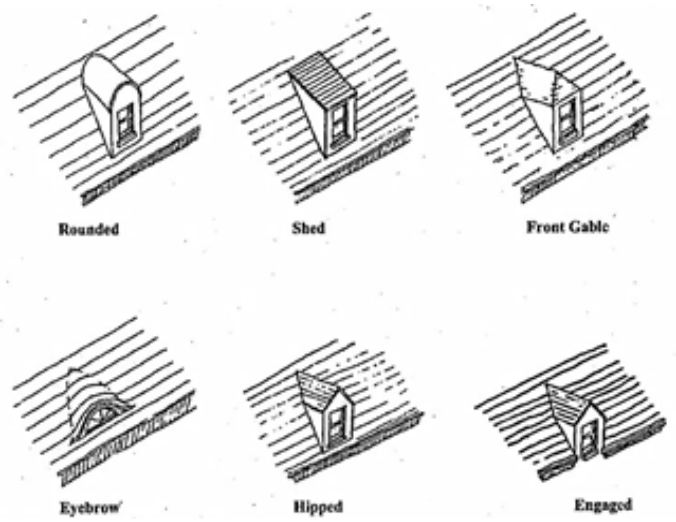

Image 62: Types of dormer windows (District of Columbia: Historic Preservation Guidelines, 2010, p. 7).

Chimneys

An important character defining element, chimneys vary in quantity, design, materials, and dimensions. They are most often constructed of brick, yet stone and stucco may also be used. Refer to the Masonry section for maintenance and repair information.

Flashings

Flashings are used to seal joints. These may include roof valleys or places where the roofing material meets obstructions such as chimneys, windows, and vent pipes. Flashings are considered the weakest areas of the roof since they are extremely susceptible to deterioration caused by water penetration. The material used for flashing should be compatible with that of the roof.

Materials

Wooden Shingles and Shakes

Shakes are made of split wood giving the building a very rustic look due to the inconsistency of sizing and thickness, whereas shingles are typically machine cut and tapered to give a smoother appearance. Locally, historic buildings with wooden roofs would have had shingles, not shakes. The durability and resistance of wooden shingles and shakes to rot and insects depends heavily on the quality of material. White pine, cypress, oak, redwood, and red cedar were often used for roofing. New shingles and shakes currently on the market are typically made from cedar and will last on average between 30 to 60 years. Since wooden shingles and shakes present a fire hazard, they were often replaced in urban areas with fire-resistant options.

Asphalt and Fiberglass Shingles

Asphalt shingles are constructed of felt that is saturated with asphalt and topped with a final coating of ceramic grains. Today, higher quality and more fire-resistant shingles made of fibreglass offer a longer lasting option. Asphalt shingles are often preferred for

their relatively low price and will typically last for 15 to 25 years before requiring replacement. They are made to imitate the texture and shadow of traditional roofing materials such as wooden shingles.

Slate Shingles

Slate roofs are constructed on thin natural slate shingles nailed to wooden cross members. These shingles will typically last for 60 to 125 years before requiring replacement. They require low maintenance and are fire-resistant. Slate was popular on 19th-century Mansard and Gothic and 20th-century Tudor Revival buildings due to the materials availability in different colours and the ease of creating intricate patterns. Slate's quality and longevity will vary depending on the source of the material and regular maintenance. The nails supporting the shingles will often deteriorate first, requiring frequent inspections to identify corroded or loosened nails and roof fasteners. For this reason, ferrous metals should not be used as fasteners or nails. Copper or zinc-coated metals are recommended.

Slate is prone to crackling under too much direct weight and will become brittle with age. To avoid cracking slate shingles, you should never directly step on them. Use wooden planks or ladders, and learn how to distribute your weight to limit damages. Other factors responsible for the cracking of slate, such as hail and fallen branches, are more difficult to prevent.

Sheet Metal

The types of metal used in historic sheet metal roofing vary and include copper, lead, terneplate, tin plate, galvanized iron and zinc. Existing metal roofs should be maintained and/or replaced in kind. Some roofing companies still specialize in sheet metal roofs.

Non-ferrous metals, such as copper, should never be coated or covered. Sheet metal roofing will most likely last for up to 60 years, and potentially longer if well maintained. Its lifespan will be shortened by deterioration or corrosion, as well as galvanic action and rust. One advantage to metal roofing is that it can be installed on lower slopped surfaces.

Tile

Tile roofing, either terra cotta clay or concrete (cement) tiles, are installed on moderately pitched roofs. Tile roofing is much heavier than other roofing materials and will require structural reinforcement. Tile roofing will most likely last for a minimum of 50 years and will usually have a lifespan of 80 years if well maintained. Similarly to slate, roofing tiles cannot support too much weight. If terra cotta clay tiles were under-fired, their porous surfaces will encourage spalling and cracking caused by freeze and that cycles.

Inspection

Roofs are extremely susceptible to damage caused by weather, water, sunlight, pollutants, animals, insects, and occasionally foot traffic. Roofs should be inspected for physical damages and deterioration at minimum twice a year by carrying out a dry and wet inspection. It is important to exercise caution when inspecting your roof and attic. Never attempt to walk on a wet, damp, or frost covered roof. Although you will need to directly access a flat roof for assessment, a sloped roof can be inspected from the

ground with binoculars. A professional should be contacted if you are unable to perform an inspection.

Wet Inspection

A wet inspection is conducted during heavy rainfall from the ground with binoculars. If you notice any branches knocking the building due to heavy winds, have those branches cut. Check the gutters and downspouts. If the gutters are overflowing with rainwater you will likely need to clean debris from within or find a better fitting gutter. Ensure that the downspouts are directing water away from the building, and that the site has a good drainage scheme. You will also want to carefully inspect the interior of the attic to see if there are any leaks. Any damp areas should be noted and measured and inspected on the exterior of the roof once it has completely dried.

Dry Inspection

A dry inspection should be conducted once the roof has dried but soon enough after rainfall to be able to see if there is any standing water and/or damage or deteriorating roofing materials. Pay close attention to areas that are more susceptible to leaks, such as any location with a pitch change, and valleys and joints between the roofing and other materials (siding, flashing, chimney, etc.). Once again, check the attic interior for any damp areas and record findings.

For safety reasons, only access the roof if you are equipped with the proper safety equipment (secured ladder and high traction shoes) and are knowledgeable about your roof's material and design. Ensure that your ladder will not damage the gutter or edge of the roof and install appropriate brackets if worried. Be cautious of wet leaves as they are slippery.

Maintenance and Repair

After inspecting your roof, any damage cracked or clogged gutter(s) should be remedied immediately to prevent water damage. If any deterioration is detected, a qualified roofer should be consulted. Temporary patching should be carefully chosen to limit further damage to the building envelope. Repairs should only be conducted on deteriorated or damaged units. Refrain from altering or replacing roofing that is still intact and functional. Regular inspections should not be neglected, as eventual repairs and their expense will often reflect the amount of time that a roof was left unattended. It is important to undertake repairs to the structure, if necessary, before conducting repairs on the roof's surface.

Damages could be made inadvertently by service employees fixing cables, or painters that are not familiar with the weakness of your roofing material. It is important that you familiarize yourself with your roofing material to inform service employees of the best plan of action so that damages do not occur.

Vegetation growing on or near the building should be maintained to ensure that it does not cause damage.

Flashings
Small holes in flashings can be mended with roofing cement or solder. Caulking can always be applied to seal gaps between different materials and will permit flexible joint movement.

Wood Shingles
If wood shingles were sawn across the grain, moisture will eventually penetrate and deteriorate the material. If your wood shingles or shakes have deteriorated, remove and replace only the affected area with like materials. If corrosion stains and streaks are apparent, copper nails might have been used in combination with cedar shingles. These materials are not chemically compatible.

Asphalt Shingles
Roofing cement can be used to glue down asphalt shingles that have curled out of place and to cover nails once hammered into place. Deteriorating shingles will need to be replaced once mineral granules start to shed from the surface.

Slate Shingles
If slate shingles have cracked or have detached due to corroded anchors, remove and replace them with the like material. Minor cracks may be remedied with roofing cement.

Sheet Metal
Deterioration of all metals is encouraged by pollutants and moisture. These pollutants can come from the air, acidic rainwater, more acidic wood (red and white cedar, chestnut, oak, Douglas fir), moss, and certain materials in Portland cement and lime mortar. Mixing of different metals will also enable electro-chemical corrosion.

Ensure that all metals used are compatible and that paint used to cover ferrous metals is well maintained to inhibit the metal from rusting. If the metal has corroded slightly, a soft bristle wire brush can be applied to clean the surface before re-printing and painting. Extensive corrosion, abrasion and pitting will require replacement. Only the corroded metal should be removed and replaced with like material and application techniques. A drop of solder will usually fix small holes and will not require full scale replacement.

Tile
If terra cotta clay or cement tiles have cracked or detached due to corroded anchors, remove, and replace them with like material.

Replacement and Substitute Materials

All roof materials will eventually need to be replaced in whole or in part. If original, replace the roof of your heritage home in kind, with the same roofing material, colour, and design (roofing pattern). If it is not possible to replace the existing material in kind, assess your other options carefully. Consideration should be given to longevity, colour, chemical composition, compression and expansion potential, price, and compatibility. Rather than installing your new roof on top of the old, remove the old roof before

installation to give the new roof's materials greater flexibility. While the roof is bare, inspect underlying materials for potential deterioration.

Insulation

A roof's performance is not limited to its ability to shed water, it should also possess the capacity to prevent heat loss during winter months and heat gain during the summer months. A uniform snow build-up on the roof is desired. If irregularities in snow melting patterns, icicles, or ice dams are noticeable, the roof most likely lacks adequate insulation or ventilation. It is important to remember that your heritage home needs to breathe and that unsympathetic insulation can actually deteriorate your roofing materials. To find out about ventilation and insulation options for the attic, speak to a professional about correcting these problems and refer to the section on Insulation.

Skylights and Solar Panels

The installation of these features should be done in a way as to not alter your home's character. Although your heritage home may have utilized skylights to illuminate interior spaces, contemporary skylights should also respect the home's character and architectural style. Design considerations for new skylights and solar panels should follow the home's colour palette and be installed at the rear of a building where they are not visible from the street. Before applying these features to your home, ensure that their impact on the structure will be reversible and will not damage the original fabric.

Summary

As a property owner, it is vital that you are familiar with your roof's components and understand the importance of protecting your home from the elements. Unforeseen circumstances aside, you can regularly inspect and anticipate necessary repairs to limit expensive maintenance and replacement projects. However, do not put yourself in harm's way. Hire a professional roofer for inspections and repairs if necessary. Your home will benefit immensely from an efficient and stylistically sound roof.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your roof, please refer to the following sources:

Saint John Heritage. "Saint John Heritage Conservation Areas: Roofs." Saint John, NB: City of Saint John, 2010.

District of Columbia, Historic Preservation Office. (2010). "District of Columbia Historic Preservation Guidelines: Roofs on Historic Buildings."

National Trust for Historic Preservation. "Start with the Roof: A Guide for Keeping Weather-Tight." savingplaces.org, 2009.

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SIGNAGE

Introduction

Historic signs can contribute to a neighbourhood's sense of place by telling the story of the community and offering landmarks. Today, historic signs stand out among the uniform franchise signs and plastic 'box' signs for their unique details, materials, and references to particular people, shops, or events.

There are several challenges to conserving historic signs, most notably the fact that buildings change uses and businesses change in ownership. This results in signage changes to reflect the new owner's business practices or to project a new image. Trends in architecture and technology can also lead to sign changes, such as the Art Deco lettering popular in the 1920s and 1930s, and the use of neon in the 1940s.

The cultural significance of signs combined with their tendency to change makes the conservation of historic signs a challenge. This section, influenced by the U.S. Department of the Interior, National Park Service, *Preservation Brief 25, "*The Preservation of Historic Signs," will discuss historic sign practices and give examples of how historic signs have been preserved even when a business has changed hands or a building has been converted to a new use. This section will also provide advice on maintaining historic signs and installing new ones that are compatible with heritage structures.

Historic Sign Types

19th Century Types

Prior to the 1800s, hanging commercial signs were the most commonly used sign type and included symbolic sign mounted on poles, suspended from buildings, or painted on hanging wooden boards. Suspended signs posed safety hazards, and creaked when they swayed in the wind. Flat signs, with lettering mounted flush against a building gradually replaced hanging signs, and by the beginning of the 1800s, a number of sign variations began to be observed.

Fascia Signs

Fascia Signs were the most common 19th century sign type and were named for their placement on the fascia or horizontal band between the storefront and second floor. Fascia is often called the 'signboard' due to its perfect dimensions to mount or paint on a sign. Due to the narrowness of fascia, sign makers had limited space to work with and usually produced signs that included only the name of the business and a street number.

Image 63: Example of a fascia (Lindsay Benjamin, 2014).

Wall Signs

Wall signs were common in the 1800s and were located flat against or painted onto the surface of a building, generally on the upper façade. Owners would advertise their name and product on available plain wall surfaces. The most common type of sign was a large board or individual letters running horizontally across the face of a building between windows of the upper floors. Many buildings could have two or three such signs and most would stretch the full width of the property.

Image 64: Wall Sign (Lindsay Benjamin, 2014).

Hanging or Projecting Signs

Hanging or projecting signs, both lettered and symbolic, were still used in the 1800s but in a more limited capacity than in previous eras. Projecting signs are placed at right angles to a building face and either fixed to the wall or hung from a bracket to increase visibility.

Goldleaf or Gilded Signs

Goldleaf or gilding produced elegant, durable signs and was a very popular sign material in the 1800s and early 1900s. These signs were commonly painted or etched on glass windows, doors, and transoms.

Porcelain Enamel Signs

Porcelain enamel signs were very popular in the last half of the 1800s and into the mid-1900s. They are made of glass bonded onto metal (generally steel) at a high temperature to produce high gloss that maintains colour for decades.

Sidewalk Signs

Sidewalk signs or ‘sandwich boards’ provided an additional opportunity to catch the eye of a passerby who might not notice signs overhead. Many tenants in the 1800s looking for additional advertising space were creative with placement. They would use entrance steps to mount signs on handrails, risers, skirts, and balusters to give businesses on the upper levels a chance to attract notice as well.

Awnings

In addition to sheltering shoppers and merchandise, and reducing glare and temperatures, awnings on commercial buildings offered valuable advertising space. Photographs from the mid-1800s show a wide range of lettering and logos on the sloped coverings and side flaps of awnings, including business names,

Image 65: Signs and awnings are a critical component of a streetscape (Saint John Heritage, 2010).

type of products, and street numbers. The most common placement of a shop proprietor's business name or service was on the fringe or skirt of the awning, as well as the panel at the side. The front fringe provided a flat surface visible whether the awning was closed or extended.

Rooftop Signs

In the mid-to-late 1800s rooftop signs became more common and ornate and were typically found on hotels, theatres, banks, and other large buildings. Prior to this they were much simpler, often just larger versions of fascia signs on a building's first storey.

Rooftop signs were not used alone but were part of larger signage efforts, partnered with window and awning signs that attracted pedestrians, while upper level signs reached viewers at a greater distance.

As the 19th century progressed, signs increased in size and scale. By the last half of the 1800s it was not uncommon to find wall signs several storeys high. It was around this time that cities were experiencing rapid population growth and the addition of larger buildings. Elevated trains and electric streetcars became more common and increased the pace of street activity. It became well known that the faster people travel the larger a sign needs to be for them to see it clearly.

Image 66: Rooftop sign illustration (Saint John Heritage, 2010).

20th Century Types

In the 1900s electricity became widespread and allowed signs to incorporate light and movement while also providing the opportunity to light streets at night. Signs were initially lit by shining light onto them, but the real advantage of electrified signs occurred when light bulbs were used to form images and words. Light bulbs flashing on and off quickly caught the attention of those passing by and bulbs blinking in sequence could simulate movement. It should be noted that this form of lighting is not appropriate for most historic buildings.

It was during this era that architects began integrating signs and buildings into a unified design. For example, Art Deco buildings would be adorned with signs that reflected the structure's architectural style and detailing.

Neon

Neon was a new material added to the art of sign making in the 1900s. Neon is a gas that glows when an electric charge passes through it. It is encased in glass tubes shaped into letter and symbols and offered sign makers an unlimited number of options for shapes, images, and colours.

Neon first appeared in signs in the 1920s, reached the pinnacle of its popularity in the 1940s, and then became popular again in the 1970s. Renewed interest in neon signs during this time sparked concern for their preservation that continues today.

Plastic

Following World War II, signs were transformed by the wide availability of plastic. Due to the advantages it had over traditional signs constructed of wood and metal, plastic quickly became the dominant sign material.

General Recommendations

Signs are regulated by local sign By-laws that must be adhered to while also considering the following recommendations.

Location

Signs are most effective located on the flat, blank parts of a façade, such as show windows, awning flaps, masonry surfaces, and the frieze. When possible, ensure that signs do not obscure the building's architectural details like windows, cornice, decorative brickwork, and storefronts. Care should be taken to ensure they don't interfere with the sight lines of adjoining buildings.

Style

When deciding on the style of a sign, context should be considered to ensure the design is consistent with the surrounding neighbourhood appearance. Signs should be of a style, size, material, and appearance consistent with the architecture of the main structure on the property. Ornate signs or signs based on architectural styles inappropriate to the commercial architecture of the era and area should be avoided.

Scale

Signs should be simple and scaled to be legible to pedestrians and/or those in slow passing vehicles. They should not impose on pedestrian traffic or disturb the streetscape continuity. Signs should also be small enough that they do not overpower buildings originally designed for non-commercial purposes.

Lighting

Lighting the surface of a sign may be desirable, depending on the character of the building and adjacent structures. Back lit signs and awnings, neon signs and flashing lights are not normally recommended on historic streetscapes.

Colours

The colours used in a sign should be consistent with the colour scheme of the structure they are affixed to. Common colours used in the 1800s include dark green, dark brown, and black. The palette was quite limited as the focus was on creating strong contrasts.

Lettering

Lettering should be used that has a simple traditional design, like block and serif styles. Ensure text is large enough to have an impact at a distance, and letters are clear enough to be legible. Background contrast is also important, and letters should be painted in high contrast to the sign panel colour.

As a general rule, fascia signs mounted on a storefront, parallel to the street, can only be read from approximately 90 feet away. The following chart recommends the best letter heights to maximize readability:

Letter Height	Maximum Impact	Viewable Distance
2’’	20’	200 feet
6’’	60’	600 feet
8’’	80’	800 feet
10’’	100’	1,000 feet
12’’	120’	1,200 feet

Retaining Historic Signs

Original historic signs should be retained whenever possible, especially when they are:

- Associated with historic figures, events, or places.
- Significant as evidence of the history of a product, business, or service advertised.
- Significant in reflecting the history of the building or the development of the heritage district. A sign may be the only indicator of a building’s historic use.
- Characteristic of a specific historic period, such as goldleaf on glass, neon, or stainless steel lettering.
- Integral to the building’s design or physical fabric, for example, when the name of the historic business or the date is etched in stone, metal, or tile. In such cases, removal can harm the integrity of a heritage property’s design, or cause damage to its materials.
- Outstanding examples of a sign maker’s art, whether because of their craftsmanship, use of materials, or design.
- Local landmarks that are recognized and appreciated by a community.
- Elements important in defining the character of an area, like marquees in a theatre district.

Maintaining and Repairing Historic Signs

Maintenance of historic signs is essential for their long-term conservation. Sign maintenance involves periodic inspections for markers of damage and deterioration, such as burnt-out light bulbs, peeling paint, weakened or missing screws and bolts, dirt and debris accumulation. Water collecting in or on signs could damage electrical connections. The source of water penetration should be identified and sealed. Most of these minor repairs are routine maintenance measures that do not require special expertise but should still be done carefully.

More extensive repairs should be undertaken by professionals. The sign industry is large and active. Sign designers, fabricators, and skilled craftsmen are located throughout Loyalist. Once in danger of being lost altogether, gold leaf on glass and porcelain enamel are undergoing revivals, and the art of bending neon tubes is now more common. Finding help from qualified sources shouldn't be hard, but before contracting work on historic signs you should check references and view other projects completed by the same company.

Major repairs may require removal of the sign to a workshop. Since signs are sometimes damaged while the building is undergoing repair, work on the building should be scheduled while the sign is in the shop. If the sign remains in place, it should be protected while work is being done.

Repairing Historic Sign Materials

This section discusses repair techniques for specific sign materials. The overall goal in repairs is to restore only the damaged portions of a sign that is otherwise in good condition. Remember that the apparent age of a historic sign is one of it major features. Efforts should be made to avoid 'over restoring' to prevent all evidence of a sign's age being lost, even though the original design and form may be recaptured.

Goldleaf or Gilding

Surface-gilded signs, for example gilded raised letters or symbols, found on the exterior of a building generally last 40 years. Damage to these signs results from weather and abrasion. Damage to gilded signs on glass normally occurs when the protective coating applied over the gilding is removed by hard cleaning chemicals or scratched by scrub brushes. This type of damage will cause the sign to flake off.

Historic gilded signs can be repaired, typically by regilding damaged areas. An oil size is painted on the surface and then gold leaf is applied when the surface has become tacky.

Similarly, historic reverse on glass goldleaf signs can be repaired by experts. A sample of the flaking sign is taken to determine its composition. Reverse on glass signs use goldleaf ranging from 12-23 karats. The gold is alloyed with copper and silver in different amounts for variations in colour. The damaged portions of the sign are then regilded the same way they were historically. First, the inside surface of the glass is coated with a gelatin and then gold leaves roughly three inches square are spread over the area. The new letter or design is then drawn in reverse on the new leaf, and coated with a backing paint (usually a chrome yellow). With the new design sealed, the rest of the leaf is removed, and it is covered with a clear, water-resistant varnish.

Image 67: Repair of a goldleaf sign (The Sign Depot, 2014).

Gilded signs, both surface and reverse on glass, can be cleaned gently with soap and water, using a soft cloth. And for glass signs, the varnish backing should be replaced at least every seven years.

Porcelain Enamel

Porcelain enamel is one of the most durable materials used in signs and it keeps its high gloss and colour for decades. This type of sign is almost maintenance free as the surface is essentially glass. Dirt can be washed off with soap and water or glass cleaner.

This type of sign can be damaged if struck by stones or other sharp objects. If the enamel surface and undercoat are scratched, the metal surface can rust at the impact site. The rust will not spread behind the glass but will remain in a localized area due to the strong bond between the glass and metal. However, if the sign edges were not enameled, they can rust. To address this problem, clean the rust carefully and touch-up the area with cold enamel (a type of epoxy used in jewelry) or enamel paints. Should a porcelain enamel sign become dented it is best not to try to fix it as attempting to hammer out the dents risks further damage.

Wall Signs

Painted wall signs, if not touched up over the years, will begin to peel and fade as a result of exposure to the elements. In this state the signs are often referred to as ‘ghost signs’ as they have been weathered and faded to the extent that they have lost their original brightness and visibility. The recommended best practice is to leave ghost signs intact on a building façade, and to avoid painting over or removing them.

Wall signs were originally painted with oil-based house paints. Much of the paint that remains visible today likely contains lead, which keeps the paint strongly adhered to the masonry surface. New products for consolidation are available that structurally stabilize both the components of the paint and the masonry substrate. Consult with a professional that specializes in wall sign conservation and/or rehabilitation, often referred to as ‘Wall Dogs,’ before restoring a historic sign to ensure that the proper materials and colours are used.

Neon

Neon signs typically last 20-25 years, but some can last up to 50 years. When a neon sign breaks, it is not because the gas has failed, but because the system surrounding it has broken down. The glass tubes may have been broken letting the gas escape, or the electrodes or transformers may have failed. If the tube is broken, a new one must be made by a highly skilled ‘glass bender.’

Neon gas (neon or mercury-argon) gives different colour light. Neon gives red light and mercury-argon produces blue. Other colours result from using coloured glass and various phosphor coatings inside the tube. Green, for example, can be produced by using mercury-argon in yellow glass. Since colour is so important in neon signs, it is key to determine the original colour or colours. A neon studio can assist with this using a number of specialized techniques.

A failing transformer can cause the neon sign to flicker and may have to be replaced. Flickering neon can also indicate a problem with the gas pressure inside the tube. If so, the gas must be repumped. Repairs to neon signs also include mending the surrounding components of the sign. The metal cans that often serve as backdrops to the tubing may need cleaning or scraping, and repainting if they rust.

Similarly to gilded signs, neon sign repairs should be undertaken by a professional.

Reusing Historic Signs

Historic signs associated with former businesses should be reused after a building or business changes hands. If possible:

- **Keep the historic sign, unaltered**
  It is often possible to do this even when the new business is different from the old. Retaining an old sign can be a good marketing strategy, playing on the recognition value of the previous company name and associated public fondness for the sign. This is especially true when the sign is a community landmark.
- **Relocate the sign to the interior**
  Such as in the lobby or above the bar in a restaurant if it is not possible to retain it on the exterior of the building. Although this is not the ideal option, it does preserve the sign and allows the opportunity to return the sign to its historic location in the future.
- **Modify the sign to reflect the new business**
  This should only be done if the modifications will not destroy essential features.

If these options are not possible, the sign could be donated to a local museum, historical society or other group.

Sign Bylaws

Loyalist Township has enacted a Sign By-law to regulate the number, size, placement, and type of signs that are permitted. The By-law has specific provisions in Heritage Conservation Areas, Districts and Designated Homes. Owners are asked to complete a sign permit application outlining the specifications of their proposed sign for municipal approval. Where a property is designated through By-law under Part IV or V of the Ontario Heritage Act, the following signs are prohibited:

- Visible A-Frame Signage.
- Portable or Mobile Signage.
- Electric Spectacular Signage.
- Animated Signage.
- Readograph Signage.

For these same designated properties, home identification signs, memorial, and historical interest signs or tablets shall not need a sign permit but the proposed signage

and location must be reviewed by both the Chief Building Official or designate and the Loyalist Township Heritage Committee, and be approved in accordance with the Ontario Heritage Act by Council before it is erected.

It should be noted that sign By-laws are not without problems. They can impose a uniformity that falsifies history. It is important that sign designs are simple without attempting to create a pseudo-historic appearance.

New Signs and Heritage Buildings

Although preserving old signs on heritage buildings is worthwhile, so is the creation of new signs that are sympathetic to the building's history and architecture. This is interesting as some historic sign practices were not sympathetic to buildings and can now be learned from and avoided.

It has been observed that many efforts to control signage leads to monotonous, uncreative signs. For this reason, the US National Park Service discourages the adoption of local guidelines that are too restrictive and that dictate uniform signs within commercial districts. Instead, they encourage communities to promote diversity in sign sizes, types, colours, lighting, lettering, etc. Business owners are also encouraged to choose signs that reflect their own tastes, values, and personalities, but which also respect the integrity of the building and context of the surrounding community.

The US National Preservation Services suggests consideration of the following points when designing and constructing new signs for heritage buildings:

- Signs should be viewed as part of an overall graphics system for the building. They do not have to do all the 'work' themselves. The building's form, name and features, both decorative and functional, also support the advertising function of a sign. Signs should work with the building, rather than against it.
- New signs should respect the size, scale, and design of the historic building. Often features or details of the building will suggest a motif for new signs.
- Sign placement is important and new signs should not obscure significant features of the historic building. For example, signs above a storefront should fit within the historic signboard.
- New signs should also respect neighbouring buildings. They should not shadow or overpower adjacent structures.
- Sign materials should be compatible with those of the historic building. Materials characteristic of the building's period and style, used in contemporary designs, can form effective new signage.
- New signs should be attached to the building carefully, both to prevent damage to historic fabric and to ensure the safety of pedestrians. Fittings should be affixed to mortar joints rather than brick and sign loads should be properly calculated and distributed.

Summary

With the rise of chain stores and franchises, mass-produced signs have largely replaced historic local signs that differed from owner to owner, and from signmaker to signmaker. This has resulted in the elimination of regional differences and local character. Although this trend toward sameness has been observed, it is interesting that some crafts, such as gold-leafing and porcelain enameling, have experienced a revival in recent decades. The preservation of historic signs is one way to ensure that at least some of these traces of local history continue to enliven our streets, representing the past commercial history that helped to shape our communities.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about signage as it relates to your heritage property, please refer to the following sources:

Auer, Michael J. *Preservation Brief 25,* "The preservation of Historic Signs." Washington, DC: U.S. Department of the Interior, National Park Service, 1991.

Saint John Heritage. "Saint John Heritage Conservation Areas: Signage." Saint John, NB: City of Saint John, 2010.

STRUCTURAL WOODWORK

Introduction

Wood is a natural and renewable material that has been widely used for the construction and ornamentation of our built heritage and continues to be used today. Regardless of the varying appearances and strengths of different trees and resulting wood types, all possess great tensile strength yet are susceptible to deterioration. Wood has unique compression and expansion characteristics that include slight changes in dimensions. These shifts in size will often vary with moisture changes, as well as the wood types and its milling. It is important that exposed wood and woodwork be well protected and maintained to deter moisture related problems and deterioration. Any woodwork project on a heritage building should strive to identify, retain, and conserve wood features that are important in defining the overall historic character of the building such as siding, stairs, cornices, brackets, window architraves, and doorway pediments.

Wood Construction

Variances in regional construction traditions, building types, and available materials had an impact on the construction method used. Common framing schemes, such as post and beam, balloon and platform construction, as well as log and barn building, are identified on the following pages.

Old Growth Wood

The wood used in most heritage buildings is a superior building material as it was harvested from old growth timber. It incorporates both hardwoods and softwoods, often harvested from unfertilized old-growth stock, with a denser and more naturally occurring grain structure than the second-growth stock or fertilized tree-farm wood used today. These materials are stronger, more stable and durable than modern wood products.

Wood types once commonly found in Loyalist and used when constructing many of the area's historic buildings include red pine, oak, chestnut, butternut, maple, and cherry.

Each species of tree will result in wood with different characteristics and will require different approaches to restoration based on traits such as density and colour. Heartwood should be used when possible as it is the most disease resistant. Sapwood of most species should never be used.

Log Construction

A log building is characterized by horizontal or vertical structural walls built of logs. A distinction should be made between the log cabin, an impermanent one to one-and-a-half storey round-log construction, and the log house, typically a hewn-log permanent construction of a more intricate design. The log construction method was also utilized for commercial buildings, schools, barns, gristmills, and churches. Notching, the way in which the logs are joined at each corner, are characteristic of log construction. If the construction includes vertical posts at its corners, logs may be fastened with tenons. The latter is known as false notching.

Log constructions would typically be covered with wooden siding or stucco for aesthetic and practical reasons. Over time, historic cladding may become damaged, or logs may deteriorate. Cladding should not be removed unless necessary and should first be properly documented and identified. Log constructions should be regularly inspected for signs of moisture damage, insect infestation and/or rot. Where the logs or planks can't be repaired, replace with like materials and installation techniques.

Post and Beam

Post and beam construction, also referred to as timber framing, is a method of wood construction that uses heavy timbers rather than more precisely cut lumber, such as 2" x 4"s. This method, common in wood buildings from the 1800s and earlier, was used to build structures using heavy squared-off and carefully fitted and joined timbers with joints secured by large wooden pegs, somewhat similar to mortise and tenon joints in furniture, but at a larger scale. This method originated with the use of logs before modern saws where available to precisely cut lumber. Artisans or farmers would gradually assemble buildings using these timbers as vertical support posts that were formed using axes, draw knives, hand powered auger drill bits and labour-intensive woodworking. Due to the centuries' old tradition of post and beam construction across the world, there are many styles of historic framing categorized by foundation type, walls, beam intersection, the use of curved timbers and roof framing details. In English-speaking countries there are three basic types of timber frames: box, cruck, and aisled.

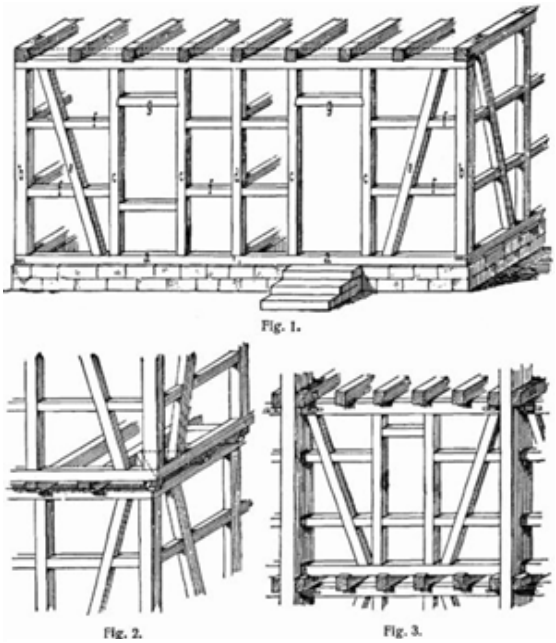


Image 68: Illustration of post and beam construction (Otto Leuger, Lexikon der Gesamten Technik, 1904).

Barns

Barns, typically of post and beam construction, are the gems of our rural landscapes. These historic structures face multiple threats regardless of their aesthetic appeal. If they are not dismantled for their timber, barns are often left to deteriorate due to changes in the farming industry, as well as shift in farm size and economy. Maintenance and repair of these structures can be challenging due to their vulnerability and size. The retrofitting of barns to accommodate contemporary farming practices and building codes can be economically beneficial and is strongly encouraged to conserve these rural landmarks. The surrounding farming landscape, along with the barn's relationship to silos, should be conserved as alteration could negatively impact the cultural heritage resource's character.

Balloon Framing

In the late-1800s to early-1900s, balloon framing was the preferred method of construction. This framing system enabled buildings to be erected quickly and soundly

by employing light standard-cut lumber boards held together by nails. This method of construction did not offer good fire resistance as the exterior and certain interior studs run the entirety of the building's vertical height from the foundation to the roof framing. Although rarely used today, this framing system influenced the practice of contemporary platform construction.

Platform Construction

Inspired by balloon framing, platform construction has been a dominating practice since the 1940s and is the conventional housing construction method in Canada today. Advantageously, the walls can be prefabricated off-site as the studs run the height of a storey rather than the entire height of the building. This system enables a platform for easier assembly as well as floor and ceiling fire stops provided by the bottom and top plates.

Wooden Architectural Elements and Details

Uniquely authentic to heritage buildings, architectural details and elements such as wood siding, wide plank flooring, wooden porches, and shingle roofs are character defining elements that should be conserved.

Flooring

Wide-plank or antique flooring is characteristic of heritage homes, although the look can be achieved by installing salvaged timber flooring. Original flooring should not be removed unless necessary. Damaged or deteriorated planks can often be consolidated, without losing the desired appearance of wear. If the lifting of boards is required for plumbing or electrical purposes, hire a qualified carpenter capable of doing the job without damaging the floor planks.

Wood Siding

Siding is installed for both aesthetic and functional purposes. Wooden siding can be found in a variety of patterns, materials, and sizes to add texture and intricacy, complementing the building's intended style. It can be installed horizontally or vertically, or as shingles in various patterns. Siding is important to the building's appearance and compatibility within the streetscape. Siding protects the structure within from weather and deterioration. The weather proofing system typically consists of siding, also referred to as the weather-shedding surface, along with the elements it is attached to (planks or grits) by means of fasteners. For optimal weather protection, siding is coated with oil, stain, paint or limewash. Wind protection is often installed between the siding and underlying surface, while the fasteners are covered and protected by putty. The siding system should be maintained regularly to ensure good performance against rot.

If replacement is necessary, wooden siding should be replaced with like materials and painted to adhere to your building's exterior colour palette. Wood siding should not be replaced with vinyl or aluminium counterparts as the building's character, along with its decorative detail, will be lost with its installation.

Porches
For information on the preservation, repair and maintenance of wooden porches, please refer back to the section on Porches.

Roofing
Wooden cedar shakes and shingles can on average last between 30 to 60 years. The durability and resistance of wooden shingles and shakes to rot and insects heavily depends on the quality of the material. Wooden shingles and shakes should not be painted. Please refer to the section on Roofs for more information on repair and maintenance of wooden roofing shakes and shingles.

Maintenance and Repair of Exterior Woodwork

To conserve your building's character and authenticity, it is best to maintain and repair the heritage woodwork. Failing to identify, evaluate, and treat the causes of wood deterioration, such as faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect (powder post beetles, termites, carpenter ants, etc.) or fungus infestation could lead to larger problems and should be proactively avoided.

Ensuring that your exterior woodwork is protected from the elements by maintaining paint and repairing any moisture related issues immediately will prolong your woodwork's life. If woodwork has too badly deteriorated, replace only the affected areas with like materials. In this case, wood splicing as described below is a common and affordable course of action.

If you choose to undertake maintenance and repair work yourself, ensure that you have properly researched the most effective method before you begin to avoid causing further damage. If you choose to hire a contractor, it is important to select one that is knowledgeable and has experience in traditional construction methods and materials.

Paint
Exterior wooden elements should be painted in accordance with your building's colour palette. It is important that exterior paint be kept in good condition, as it protects the underlying wooden surface from moisture and subsequent deterioration. Heritage conservationists recommend that paint should be retained and repaired instead of being stripped whenever possible to preserve your structure's authenticity. Additionally, it is recommended to apply chemical preservatives to wood features that are exposed to decay hazards and are traditionally unpainted, such as beam ends or outriggers. Refer to the Paint and Colour section for design, maintenance and repair guidelines to conserve your building's painted wooden surfaces as well as tips on how to effectively remove paint and prepare wood for repainting.

Wood Splicing
Wood splicing, also known as 'piecing-in,' enables the replacement of a badly deteriorated piece of wood without having to replace the entire unit. This localized repair is begun by carefully removing the rotted wood by carving out the affected areas and replacing the void with like material. The replacement wood should have a grain pattern

similar to the previous material but should still be identifiable upon close inspection to guide future research and interventions. Whenever possible, the portion of wood that is deteriorated should be stabilized, repaired, or replaced, rather than replacing entire historic wood features. It is useful to document all new work to assist future interventions.

Epoxy Consolidation

Use epoxy resin techniques to repair small badly deteriorated areas. Remove loose rotted material and drill ¼ inch holes at an angle into the damaged area. Use a plastic squeeze bottle to insert the resin into the holes. Fill and shape with a paste of resin and sawdust. Profiles of missing sections can be replicated by pouring epoxy into handheld molds.

Managing Moisture

Moisture flow within any building must be managed to prevent water accumulation that can lead to premature deterioration of building materials. Water will lead to deterioration by corrosion in steel products, spalling and cracking in concrete products, and fungi or insect infestation in wood products.

Moisture sources in and around buildings are numerous. Exterior moisture sources include precipitation, irrigation systems, and groundwater. Water vapour is also present in the exterior environment and may affect the building envelope in some climates. Rainwater, especially wind driven, is the moisture source that has the greatest impact on building envelope performance.

For more information on how to control unwanted moisture in your heritage home, refer to the US Department of the Interior, National Park Service *Preservation Brief 39*, "Holding the Line: Controlling Unwanted Moisture in Historic Buildings."

Moisture and Woodwork

APT's Practice Points bulletin entitled, "Basics of Wood Inspection: Considerations for Historic Preservation," provides a helpful overview of the impacts of moisture on the wood in your heritage building. The guidance that follows was largely adopted from this bulletin.

Wood can perform well in a structure for over a century when kept dry and protected from moisture and deterioration as a result of insects and fungi. The open construction typical of historic buildings allows them to breathe as air can travel through the structure, quickly drying out wood if it gets wet. Problems may arise when moisture is trapped in a structure, or the strength requirements of wooden members change, due to alterations, etc.

When planning work on a heritage building, it is best to know when deterioration has occurred and if the structural members are strong enough to proceed with the planned work. Carrying out a wood inspection is the best way to determine this.

There are three reasons to conduct a wood inspection:

1. Concerns about moisture and its effects.

2. Deterioration, both physical and biological.
3. Need to determine material properties.

The behaviour of wood is variable due to the following reasons:

- Different wood species.
- Rate of tree growth, measured in growth rings per inch.
- Age of the tree.
- How the lumber was cut from the log.
- Prescence of defects (i.e. knots).
- End-use conditions (interior or exterior use).

When working on a heritage structure it is important to understand the variable nature of its wood components.

Long-term exposure to moisture can result in maintenance issues in the wood components of a building, leading to moisture stains, peeling paint, and warping of lumber and timber. It is important to determine whether a stain is the result of a single leak or an ongoing moisture problem. Decay and insect attacks are significant problems associated with both periodic leaks and sources of moisture.

Deterioration of wood can be the result of physical processes:

- Weathering.
- Failure due to overload.
- Mechanical damage.
- Shrinkage.

Or biological processes:

- Decay.
- Insect attack.

Wood Decay

The most common type of wood decay is the result of fungi. Depending on the wood species, large timbers will hold onto moisture internally, which can lead to interior rot invisible from the surface. Moisture absorption through end grain, checks (separation of wood fibres in a piece of wood, typically along the length of the piece, from the wood drying after processing or installation in a structure), or holes provides an ideal environment for decay fungi to attack the heartwood at the centre of a large timber. The heartwood (the inner growth rings of the tree) usually has more decay resistance than the sapwood (the outer growth rings of the tree). However, even the heartwood of durable species, such as chestnut, will decay when exposed to enough moisture.

Deterioration is a concern where the wood is in contact with the ground or with other materials, such as porous masonry, that may allow for moisture to be absorbed into the wood.

Fungi associated with wood include mildew, stain, and decay fungi:

- Fungi grows from spores in the air.
- Mildew grown on the surface of wood and paint and does not affect the strength of the wood.
- Stain fungi (not to be confused with moisture stains) penetrate the surface of the wood but do not reduce its strength.
- Decay fungi breaks down wood components over time and all types of decay fungi affect woods performance.

Determining the specific fungus during wood inspection is not essential, but identifying the location and extent of deterioration is important.

Generally, fungi can't grow if the moisture content of the wood is less than 20%. Areas with moisture content between 20-30% can support the growth of fungi but the moisture may not be enough for long-term active decay. Moisture content between 30-40% is ideal for active fungal growth and can indicate advanced decay with symptoms such as internal voids and surface deterioration. Insects prefer moisture levels above 10% to actively deteriorate wood.

Termites and wood-boring insects affect wood by either digesting or tunneling through it. Subterranean and drywood termites digest wood as they move below the surface of it. You can identify termites through the presence of mud tubes on the exterior of either the structure or the individual wood members. Wood-boring beetles create holes that are packed with frass (a byproduct of the tunneling process). Carpenter ants and bees leave large clean tunnels in wood.

Wood Inspection

The goal of wood inspection will determine what parts of a structure to inspect and what tools to use. Begin inspections by looking for problems where they are most likely to occur. Missing or deteriorated wood members, moisture stains, the presence of fungus, decayed wood, insect bore holes, mud tubes, or frass will require more investigation. Focus an inspection on these potential problem areas:

- Wood in contact with the ground.
- Wood with moisture stains.
- Wood with visible decay.
- Roof penetrations (i.e around chimneys, vents).
- Attic sheathing, framing lumber, timbers.
- Sill beams and wall plates, especially if in contact with masonry.
- Floor joists and girders, particularly where they rest on exterior walls.
- Openings (i.e floors, windows).
- Places where two materials intersect (i.e. wood and masonry).

- Exterior woodwork (i.e cladding, shingles, soffits).
- Porches.
- Crawl spaces and basements.
- Altered areas of the structure.

It is important to remember that the purpose of an inspection is to provide information that can be used to answer questions raised by the architect, engineer, and/or property owner about the condition of the wood.

Simply by controlling the environment of the area in which moisture is causing damage to woodwork can eradicate the problem. Straightforward interventions, such as ventilation and the use of a dehumidifier, can significantly reduce moisture levels.

Summary

Identifying, retaining, and preserving wood features that are important in defining the overall historic character of a building is a vital component of the conservation process. To successfully undertake woodwork projects, it is helpful to first understand the various wood components of a heritage structure and the deficiencies each is most susceptible to. Wood is a common decorative feature on heritage properties and composes many unique and valuable architectural elements. Preventing, monitoring, stabilizing, and/or repairing weaknesses in each wood feature will prolong the life and aesthetic appeal of heritage structures.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your structural woodwork, please refer to the following sources:

Canadian Wood-Frame House Construction. 3rd ed. Ottawa, ON: Canada Mortgage and Housing Corporation, 2013.

Anthony, Ronald.W. "Basics of Wood Inspection: Considerations for Historic Preservation." *APT Practice Points*, no. 3 (2007): 1-6.

Auer, Michael J. *Preservation Brief 20,* "The Preservation of Historic Barns." Washington, DC: U.S. Department of the Interior, National Park Service, 1989.

Bomberger, Bruce L. *Preservation Brief 26,* "The Preservation and Repair of Historic Log Buildings." Washington, DC: U.S. Department of the Interior, National Park Service, 1991.

National Park Service. "Standards for Preservation and Guidelines for Preserving Historic Buildings: Exterior Features," in *Standards for Preservation and*

Guidelines for Preserving Historic Buildings (Washington, DC: U.S. Department of the Interior, National Park Service, 2001).

Weeks, Kay D., and Anne E. Grimmer. "Entrances and Porches," in *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings.* (Washington, DC: U.S. Department of the Interior, National Park Service, 1995): 38-39.

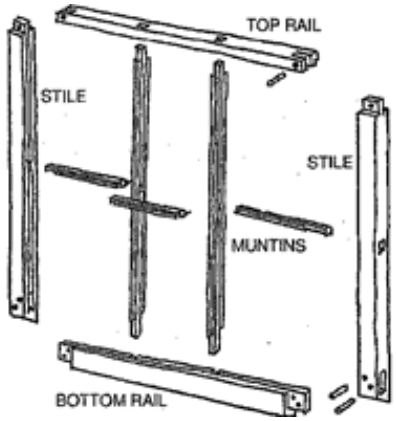
WINDOWS, SHUTTERS, AND DOORS

Introduction

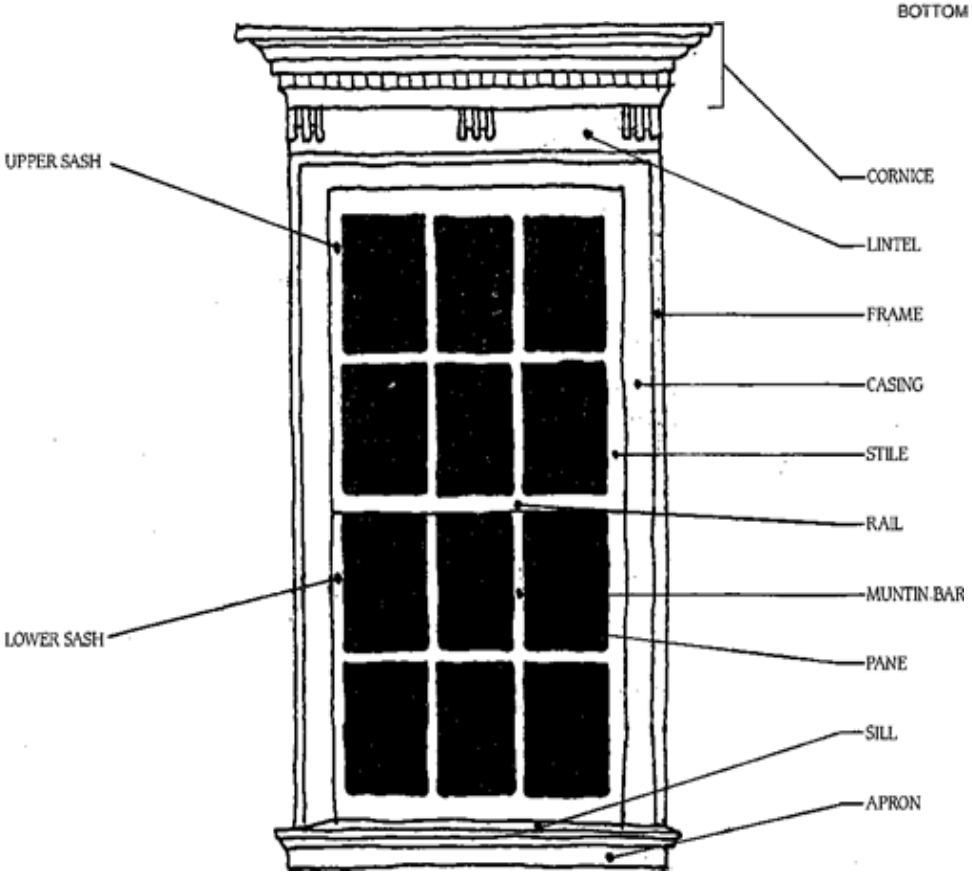
Windows, shutters, and doors are features that directly relate to a building's architectural style and contribute to the streetscape and neighbourhood. It is important to understand your windows, shutters, and door styles, characteristics, and components, to ensure that routine maintenance, repair, or replacement is done sympathetically for optimal performance and authenticity.

Wooden Windows

Windows are an important architectural feature as they provide character, ventilation, and light, and link interior and exterior spaces. Wooden windows are a good indicator of a building's age as they often reflect the structure's original style and building techniques.



Images 69 & 70: Left - sash window anatomy (Saint John Heritage, 2010. Right – Sash window components (John Leeke, 2009, p. 32).



The following key characteristics should be consistent and preserved to ensure the cohesive appearance of the building:

- Pattern and proportion of window, frame, sash, and muntins.
- Architectural style consistent with that of the building.
- Type of wood.
- Paint colour or finish.
- Characteristics of the glass.

Window Openings

Window types and placement were most often determined by the particular style of the home. Other factors that influenced placement include the desired amount of light in a room, climate, and purpose.

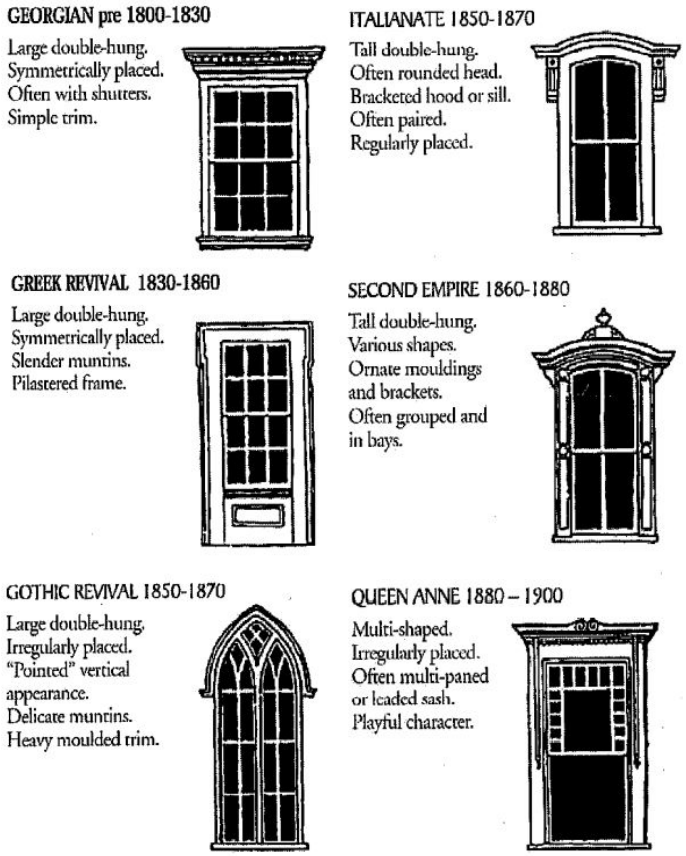
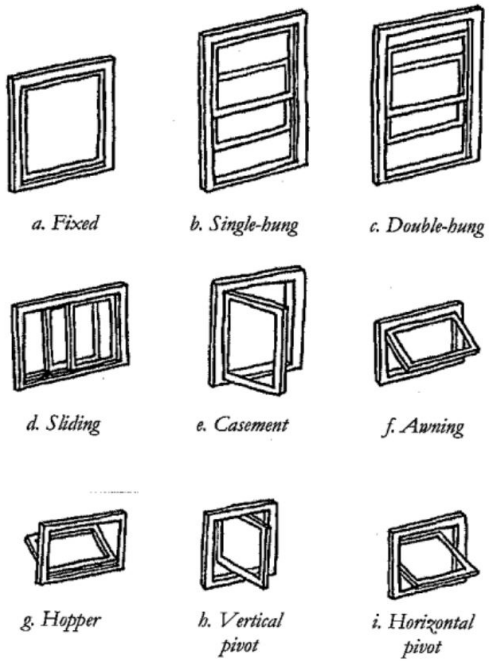
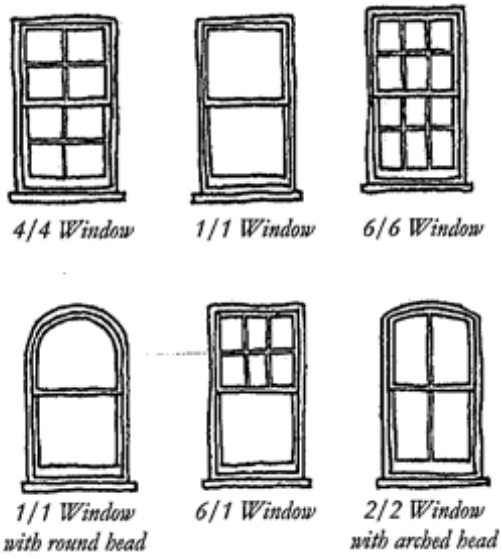


Image 71: Window styles (Saint John Heritage, 2010).





Images 72 & 73: Common window types (Township of Cheltenham, 2002, p. 2).

Your Window's Glass

A heritage window's character is determined by its type, material, trim, and glass. New glass has a different look when compared to wavy and glistening historic glass. Heritage homes with new glass windows have an odd look as the windows do not suit the rest of the building. Older original glass can help you determine the age of your window and building and also gives it special depth when viewed from the exterior. Historic windows have separate panes of glass supported by muntins, also known as mullions or glazing bars, which gives a window sparkle and shadow in comparison to a single glass pane with a flat interior plastic grid. You are encouraged to spot the difference between old and new glass to better understand the powerful impact this choice has on your home and on your neighbourhood's streetscape.

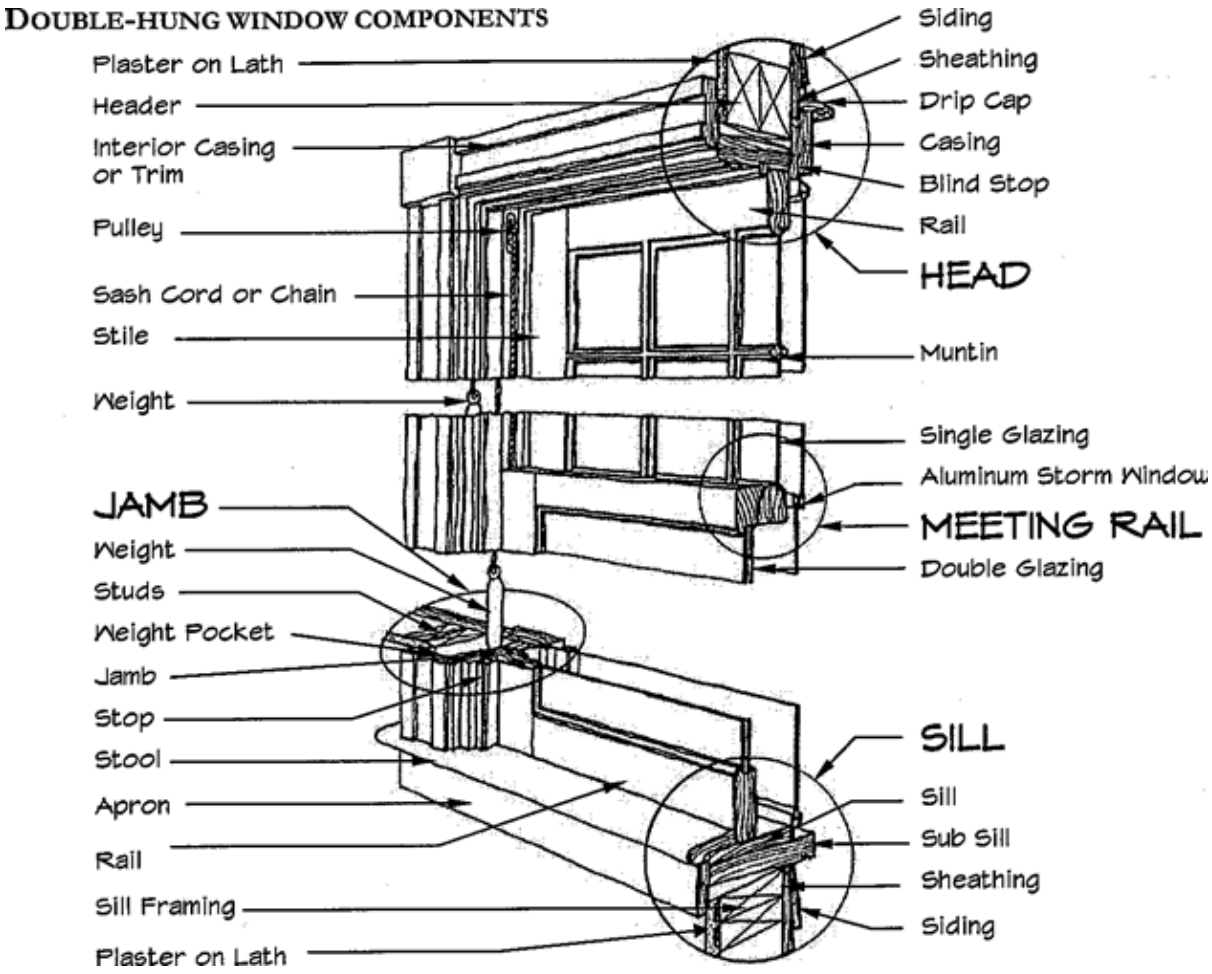


Image 74: Double-hung window components (Township of Cheltenham, 2002, p.2).

Shutters

Although used today primarily for aesthetic purposes, shutters can offer protection and can help conserve energy if they are shut during winter nights to protect from the cold air, and during summer days to protect against the hot sun. Each shutter should be half the width of the window to ensure that the entire window is covered when they are both closed. It is recommended that you retain your wooden shutters, especially if you suspect they are original to the home's design.

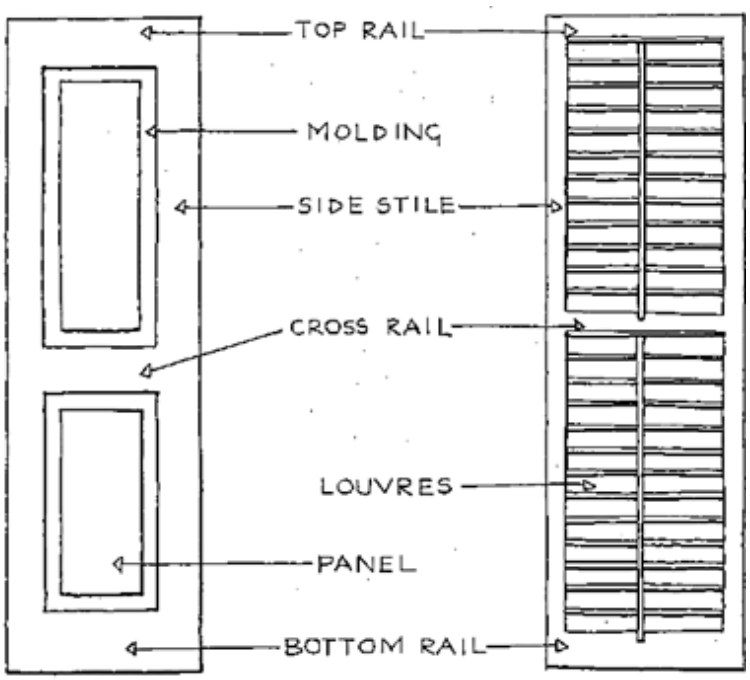
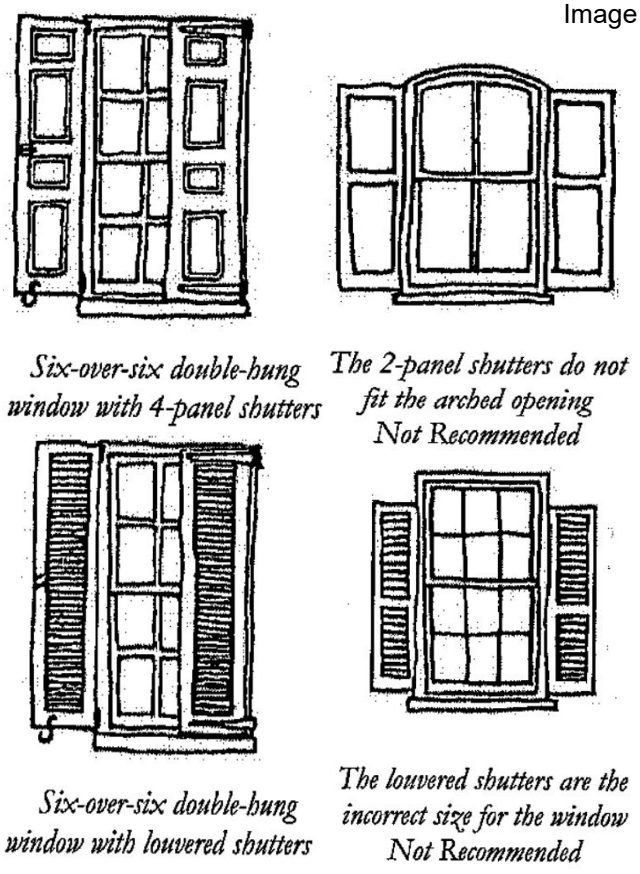


Image 75: Parts of a shutter and blind (Shirley Hanson and Nancy Hubby, 1983, p. 180).



Images 76, 77, 78 & 79: Windows contrasting appropriate/inappropriate shutters (Township of Cheltenham, 2002, p. 2).

It is, however, uncommon for Queen Anne, Romanesque, and Tudor style homes to have shutters. Shutters reappeared as decorative features of the Georgian Revival home. Dormer windows or windows in mansard roofs should not have shutters.

If you are trying to determine if your home may have had shutters, look for visible holes at the top and bottom of the window frame. These could easily be traces of a shutter's pintle, upright pivot, or hinges. Faded paint displaying the shape of opened shutters against a wall can also suggest previous use of shutters. If the window is heavily detailed it may be best not to re-install shutters. If replacing or re-installing new shutters, ensure that the design is appropriate for your home's architectural style.

Awnings

Awnings are a commonly included design element for both residential and commercial buildings constructed pre-1950. They not only played an important functional role but also helped define the visual character of a streetscape. Awnings provided natural climate control before the existence of air conditioning and tinted glass and were generally installed only where necessary. Awnings are efficient and cost effective, and work by blocking out the sun's rays or sheltering a place from rain while admitting daylight and allowing air to circulate between interior and exterior spaces.

Repairing and Maintenance

If awnings already exist on a heritage building, they can be evaluated to determine if they are appropriate to the age, style, and scale of the building. If an existing awning suits the structure, the recommended preservation practice is to maintain and repair the original elements to extend the life of the awning. The condition of its covering, hardware, connections between the hardware and the building, and the awning's operability should be assessed. Hardware (arms, rollers, gearboxes) may only need cleaning and lubrication. In other cases, more substantial repairs by an awning company familiar with historic hardware may be needed.

It is suggested that about once a month, preferably on a sunny day to speed drying, the awning covering is hosed down with clean water. Keep retractable awnings extended until they dry completely. The awning underside can be kept clean by brushing it with a household broom. Regular cleaning helps prevent dirt from becoming embedded in fabric awnings. At least twice a year the awning should be gently scrubbed using a soft brush and a mild, natural soap (not a detergent) and rinsed with a hose. Every two or three years, professional cleaning is recommended. Local awning companies may offer this service, or a building owner can ship the covering to a specialty awning cleaning firm. Depending on the frame style and fabric, some awnings can be cleaned without being removed.

Replacement Awnings

If it is determined that a replacement or new awning will be added to a heritage building it is important to select an appropriate awning shape, material, frame dimension, signage (if any) and placement that is compatible with the heritage character of the building. Historic photographs and drawings can prove helpful in determining earlier awning configurations. It is important when installing new awnings on historic buildings to ensure that the covering does not obscure the building's unique architectural features. New awning hardware should not be installed in a way that damages historical materials. Clamps and fasteners used to attach awning frames should penetrate mortar joints, not brick or other masonry surfaces. If new backboards and rollers are installed, care should be taken not to damage cornices or transoms.

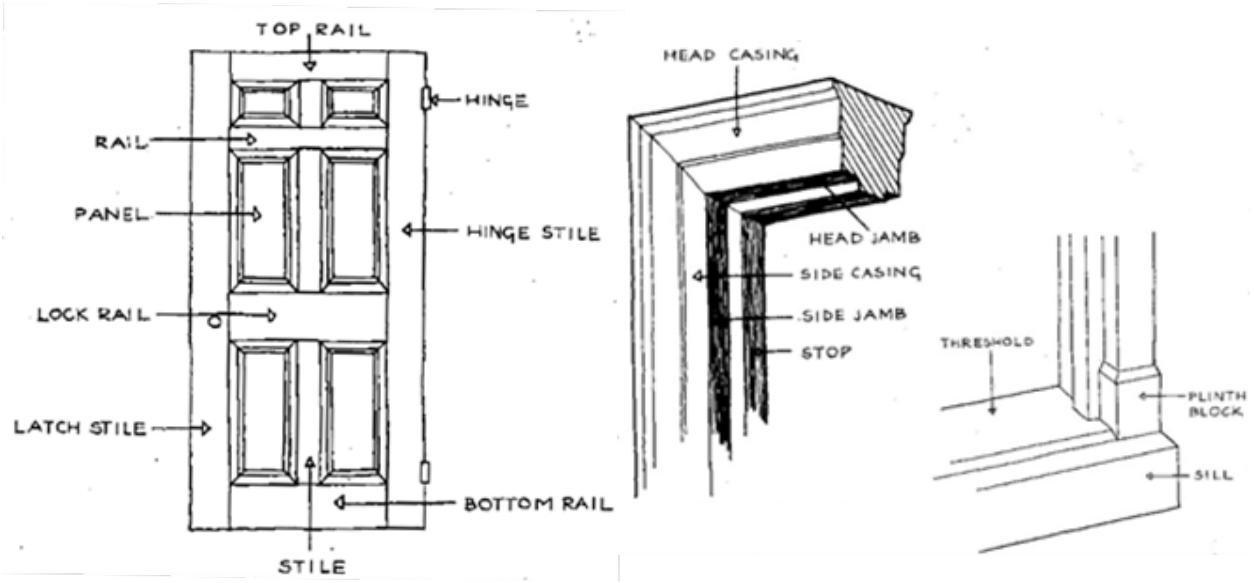
Material

Historically, awnings were covered with canvas in either solid colours or painted with stripes. Canvas, canvas blends or acrylics that resemble canvas continue to be the suggested material used. Professionals do not recommend using metal or vinyl awnings, as these materials may clash with the wood, brick, or stone cladding of older

buildings. As awnings often play a significant role in contributing to the historic character of a building, it is important that owners, architects, engineers, historians, and others consider the guidance provided in this document when planning work on heritage structure.

Wooden Doors

In addition to windows, doors were also traditionally built of wood. They are characterized by the size of the frame, the paneling design, decorative detail, and the window openings. Much like wooden windows, doors are representative of a building's style and period of construction. Its colour and detailing should be consistent with that of the windows. The removal of a heritage door or an unsympathetic replacement can alter the authenticity and character of your home.



Images 80 & 81: Left - Parts of a door Image. Right - Parts of a door frame and parts of a threshold (Hanson and Hubby, 1983, p. 139).

Storm Windows and Doors

Heritage windows fitted with exterior storms can perform equally, if not better, in R-value when compared to vinyl and aluminium units. Exterior storm windows and doors will help keep noise and cold air out of your home. They will also protect your windows and doors from the elements and reduce the condensation on the surface of your interior window during winter. Ensure that installing storms will not detract too much attention from the features' character. The frame of a storm should respect the colour palette of your home. Storm windows should be removed during the warmer months and the storm door replaced by a screen door. The installation and removal of exterior storm windows can pose physical difficulties.

Since storm windows and doors can distract from the structure's architectural details and proportions, a storm can be installed on the inner side of the door instead of the exterior one. Interior storms are a possible alternative but will not protect your window from the elements or provide the same overall R-value since the distance between the window and the storm is greater when the latter is located on the exterior, providing insulation as a result. An interior storm may also encourage undesired condensation on the primary window unit that can result in moisture damage if the storm is not removed on warmer days to permit the window to dry out.

Repair vs Replace

Heritage conservationists recommend repairing your wooden windows, shutters and doors, and to replace them only when absolutely necessary. If extreme deterioration occurs, only replace the specific component of the window with a reproduction of like material. Wooden windows were constructed to be taken apart and fixed, unlike the vinyl counterparts that require complete replacement.

If replacing an entire unit, replace it in kind, with like materials, design, and proportions. Do not forget your window, shutter and door's architectural significance and style, as well as its impact on the entirety of your building's composition. Always use surviving prototypes as a guide when custom designing a new unit. Before replacing any heritage element, remember that a replacement unit will lack the original authenticity.

It is important to note that although you can replace your heritage windows with new wooden windows, the quality of your heritage windows' old-growth lumber cannot be replaced. Wooden materials today are no longer as dense and are unable to provide the same protection against insect infestation and rot.

Don't Underestimate your Wooden Windows

Sustainability encompasses more than energy conservation as it speaks to the nature and ability of a material to endure. The greener and most sustainable option is one that is already there — your heritage windows have already served for 50-100 years or more, and will continue doing so for another 100-200 years if well maintained. This is in contrast to a vinyl window that will often require replacement in 10-25 years. Today's sealed vinyl units will often carry warranties of a mere 8-10 years. Advertisements claiming that vinyl window replacements are 'greener' and 'maintenance-free' are misleading. There is no such thing as a maintenance-free and green vinyl window. Vinyl windows are only considered maintenance-free because the entire unit will typically need replacement when repairs are necessary.

Contractors fail to mention the embodied energy lost to the landfill when each vinyl unit is replaced. Glass and aluminium are ranked among building materials with the highest embodied energy, while vinyl is a non-renewable petroleum product. Since the conservation of windows is labour rather than material-inclusive, employing contractors for repairs encouraged local trade, supports the local economy, and the re-use of a salvaged materials rather than newly harvested trees and other resources.

In addition, cost effective studies have shown that restored heritage windows outlast two sets of vinyl windows and cost far less. Many double-hung heritage windows have two layers of glass, and, with the addition of a Low-E storm window over the top, results in a triple glazed window. With good spacing between the layers of glass, it will be just as energy efficient as the best of modern windows.

Maintenance and Repair

Wooden windows, shutters, and doors require regular maintenance. Unfortunately, there is a current shortage of contractors who offer services for maintaining, repairing, and replacing these heritage features. In addition, the annual installation and removal of exterior storm windows can be cumbersome. The following information aims to help you complete the routine tasks required of a wooden window, shutter, and door and will help you understand the cause of various problems and the associated terminology if you require professional assistance.

Physical Examination

A unit's appearance is often worse than its actual condition. It is therefore important to conduct a thorough physical examination to identify potential problems and resulting maintenance requirements.
Care should be taken to clearly identify each window, shutter, and door, and their location prior to a condition assessment. This will help you to be systemic when identifying each unit's condition, organizing required repairs, and will enable you to reference your notes in the future.

A physical examination will evaluate the following:

- Unit location (ensure you have matched storms and screens to the right window and door openings).
- Condition of the paint.
- Condition of the frame and sill.
- Condition of the sash (rails, stiles, and muntins).
- Glazing problems.
- Hardware.
- Overall condition of the unit (excellent, fair, poor, etc.).

Preventing Deterioration

Deterioration can be attributed to multiple factors, such as poor design, vandalism, insect infestation, lack of maintenance, and moisture. It is important to note that some moisture problems may occur due to roof flashings, caulking, or exterior cladding. Deterioration does not necessarily mean that the unit needs to be replaced.

Deterioration of windows and doors will often begin where water can accumulate, at the horizontal planes and near the joints. Maintenance can prevent any further problems stemming from deterioration. Fixing these problems is possible unlike the irreversible

problems that occur with vinyl and aluminium windows, such as unstoppable fading, failure of factory sealants, and separating joints that require replacement.

To avoid deterioration of your wooden windows and doors:

- Check that sills are properly sloped to drain water away from windows and the building.
- Check the condition of the glass and putty.
- Check that all joints are properly caulked (water may be entering around the edges of the frame).
- Check for condensation.
- Make sure vent holes are open and clean.
- Check for air and water infiltration on a windy day.
- Examine the weather-stripping for wear and deterioration.

The condition of paint is often a good indicator of areas with excessive moisture. Paint damaged by moisture will blister, crack, flake, and peel, and will identify areas of water penetration, moisture saturation, and possible deterioration. Please read the section Paint and Colour for details on paint conditions and remedies. The condition of the wood does not necessarily correlate with paint failure as it is often in sound physical condition beneath damaged paint. Moisture penetration should be identified and eliminated before undertaking any repairs. Always aim for reversibility when undertaking repairs.

Routine Maintenance

Routine maintenance is inevitable and is easiest if you do a little at a time on a regular basis. Work typically involves:

- Some degree of interior and exterior paint removal.
- Removal and repair of window sash (including reglazing where necessary).
- Repairs to the frame.
- Weather-stripping and reinstallation of the sash.
- Repainting.

Paint and Colour

Exterior paint will on average last five to eight years on wooden surfaces. Windows, shutters, and doors should be painted at the same time as the remainder of the exterior of the home. If your home was built before 1960, and still has its original windows, shutters, and doors, they most likely contain one or more layers of lead-based paint. Please read the section Hazards to your Health: Asbestos, Mold, Radon, and Lead to learn of the health hazards and safety precautions associated with lead-based paint and dust.

When removing paint, first remove excess layers of paint as they will accumulate over time and end up hiding key architectural details and may seize the unit's operation. When removing excess paint from your windows, first remove paint on the interior window frame. If required, a utility knife should be used along the length of the seam to break the paint bond, particularly where the interior stop and parting bead meet the jamb along the seam of the frame. If applying heat to the unit to remove paint, it is important to remove or protect the glass with an overlay of aluminium foil on gypsum board. The use of steam and hollow core scrapers makes both paint and old putty easy to remove in an eco-friendly manner. The application of steam at about 94°C for one to three hours loosens paint and penetrates putty. A steamer can be used directly on the window, and a hollow vacuum scraper will make the job much easier.

If re-painting is necessary, it is important to remove loose paint before sanding down the surface. Before applying new paint, clean the surface with a mild detergent and apply a primer-sealer. Latex paints are preferred, although you should not apply them to existing oil-based paint without an oil-based primer. Please refer to the section Paint and Colour for more information on appropriate types of modern paint, exterior colour palettes, and paint samples used to determine the colour of previous paint layers.

Hardware

If possible, original hardware should be retained as it is characteristic of the feature's architectural significance. If hardware is missing, try and find appropriate salvaged hardware from the period of construction.

Glass

Simply use detergent to clean glass and use ultra fine steel wool if dirt and stains are being stubborn. If decorative or heritage glass has cracked, clean the edges with acetone and seal the crack with clear fluid glue.

Replacing Putty

A hot air gun can be used to soften deteriorated putty for ease of removal and a wide scraper can be employed to protect the glass from the heat. A chisel or stiff knife can be used to remove softened putty from the window. To soften any putty that remains on the glass, soak the panes in linseed oil to avoid breaking the glass. It is important to brush the wood with linseed oil and prime it with an oil-based primer or paint before applying any glazing compound. Before painting the newly applied putty, wait until it has developed a top layer skin. This will usually take two or three days. When repainting, make sure that you go over the edges of the glass slightly, to form a bond between the putty and glass. This will create a seal to help stop water and moisture from penetrating between both surfaces.

Caulking

Caulking is helpful to seal any voids between different materials and building elements. Simply ensure that the chosen caulking will adhere to all materials and will enable the joints to contract and expand with varying weather conditions. Larger joints should first be filled with a foam backer rod to provide a supported surface for the caulking. Do not caulk the exterior of the upper sash as it will cause the window to trap condensation.

Weather-Stripping

Installing weather-stripping products, even though your window or door might be accompanied by a storm, can reduce drafts and the heating bill by sealing cold air out of the house. Weather-stripping can also stop your unit from rattling in the frame when shut. When choosing from the various weather-stripping products available consider its physical effect on the window or door's appearance and choose materials that will not trap moisture.

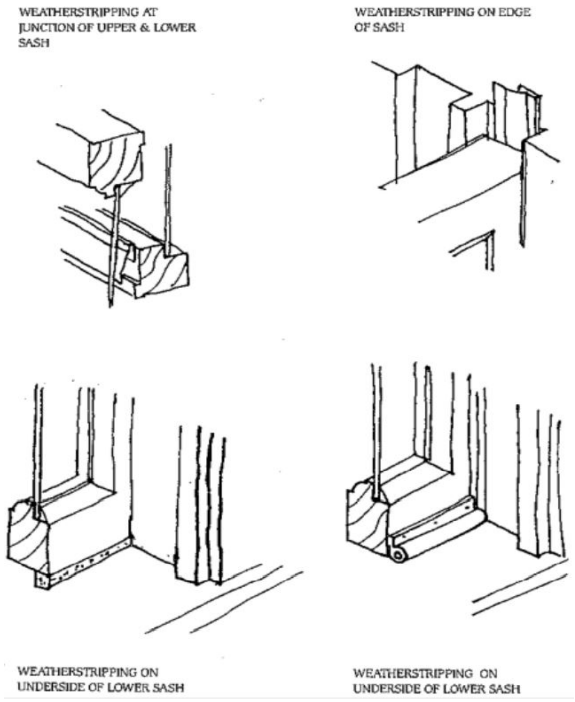


Image 82: Weatherstripping installation options (Saint John Heritage, 2010).

Removing and Repairing a Window Sash

To remove and repair a sash window, the first step is to remove the trim from the frame. Remove the thin strips of wood that hold the sashes in place using a utility knife or a chisel. Once the trim is removed, lift out the lower sash. Cut the attached sash cords and be sure to hold onto the weight of the sash to prevent it from falling. Repeat the same process for the upper sash, removing additional trim or parting beads where necessary.

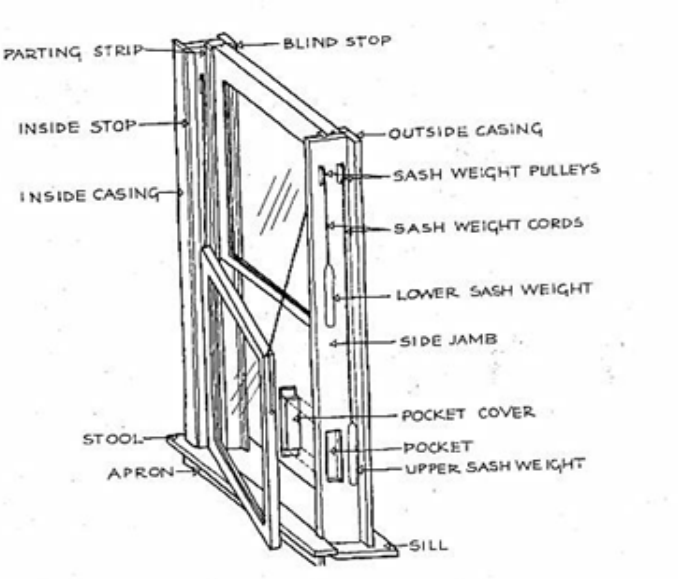


Image 83: Window components useful to understand when removing or repairing a window sash (Hanson and Hubby, 1983, p. 168).

With the sashes removed, you will be able to assess issues with the wood, glass, or hardware. Make sure you are checking all components of the window including the hardware, paint, wood, and any glass that might need to be replaced.

Loose Window Joint Repair

A misaligned sash is most likely due to loosened or rotted joints. To fix this problem, you can install a corner iron or brace or insert dowels presoaked in waterproof glue through the two sections of wood. The latter must be done with the sash taken out of the frame. Remember to always pre-drill necessary holes to avoid splitting the wood.

Sagging of Shutters and Doors

Sagging of shutters or doors will often inhibit its functioning and can provoke rubbing. Unless weatherstripping has been installed, there should always be a 1/16" space between a door and its frame to prevent rubbing. The sagging of shutters and doors can often be attributed to one of the following:

Condition	Cause	Remedy
Loose Connections	The connections have loosened. The hole is most likely too big for the nail or screw at the connection point.	If the wood is still sound, replace the nail or screw with a larger connection. You can also fill the hole with a mixture of glue and small pieces of wood before re-inserting the original nail or screw.
Decayed Wood	Moisture has penetrated and deteriorated the wood.	Remove the unit. See stabilization methods listed below. If the wood is too badly deteriorated, undertake a repair called the *Dutchman*. Remove the deteriorated area and replace with like material. Secure the new piece with waterproof glue before repainting.
Separated Joints	The mortise and tenon joints have loosened and separated.	If the rail and stile cannot be gently pushed back together, insert wood screws of dowels soaked in waterproof glue to strengthen the joint.

Warped Door

A warped door can be adjusted if the warping is not excessive. If the installation of a third hinge does not correct the warp, the door can be adjusted with weights. First remove the door by pushing the bottom hinge pin upward by tapping against a screwdriver or piece of wood wedged at the top of the hinge pin. After the door has been removed, lay it down across supports (placed at both ends of the unit) and place weights on the bulge for a minimum of 24 hours.

Stabilizing Deteriorated Windows

The National Park Service Technical Preservation Services Brief #9 discusses three effective methods for the stabilization of partially decayed or weathered wood:

1. The first method is effective for wood that has split or shows signs of rot:
    a. Dry the wood.
    b. Treat decayed areas with fungicide.
    c. Waterproof with two or three applications of boiled linseed oil (applications every 24 hours).
    d. Fill cracks and holes with putty.

e. Paint the surface after a skin forms on the putty.

2. The second method is effective for wood that has build-up of damaged sills or membranes:

   Homemade mixtures or wood putties can be applied in consecutive layers, sanded, primed, and painted when sills and other membranes display signs of weatherization. The homemade mixtures can consist of sawdust and resorcinol glue, or whiting and varnish. Care should be taken to ensure flat surfaces slope away from the window frame, to prevent water build-up.

3. The third method is effective for consolidation.

   For larger damaged areas or missing sections, use epoxy resin techniques. Drill ¼" holes at an angle into the rotted area. Use a plastic squeeze bottle to squeeze the resin into the holes. Fill and shape with a paste of resin or sawdust. Profiles of missing sections can be replicated by pouring epoxy into handheld molds.

Summary

Routine maintenance and repair is strongly recommended to prevent damage and deterioration to your wooden windows, shutters and doors. These are important architectural features, and their replacement should be avoided. Be aware that window contractors and manufacturers can be misleading by providing the impression that new replacement windows are the only cost-effective and energy efficient alternative. The comparison between the life cycle cost analysis of a maintained wooden window and a vinyl replacement over 20 years has proven that repairing your heritage window is more cost effective and environmentally friendly, including comparisons of the maintenance costs, capital costs and energy savings.

If your unit must be replaced, please follow this guide and other available resources to ensure that the replacement unit respects the original window or door in each of its aspects and material. Be aware that once replaced, the original character and authenticity of your heritage windows, shutters and doors will be lost. If you choose to replace them, store the original windows, shutters and doors in the attic or basement, rather than throwing them out.

References

Note: These titles were used for the Region of Waterloo's *Practical Conservation Guides for Heritage Properties*. Links in blue are shown only if working in December 2025, links in black are dead links.

If you would like to learn more about conserving your windows, shutters, and doors, please refer to the following sources:

Saint John Heritage. "Saint John Heritage Conservation Areas: Doors." Saint John, NB: City of Saint John, 2010.

Saint John Heritage. "Saint John Heritage Conservation Areas: Windows." Saint John, NB: City of Saint John, 2010.

Hanson, Shirley, and Nancy Hubby. *Preserving and Maintaining the Older Home*. New York, NY: McGraw-Hill, 1983.

Myers, John H. *Preservation Brief 9,* "The Repair of Historic Wooden Windows." Washington, DC: U.S. Department of the Interior, National Park Service, 1981.

Society for the Protection of Ancient Buildings (SPAB). "Technical Q&A 5: Old Doors." spab.org.uk, 2009.