



GUIDELINES FOR ROOFING



Township of Hopewell Historic Preservation Commission

GUIDELINES FOR ROOFING



Many secondary buildings, especially farm buildings, have corrugated metal roofs. Corrugated metal roofs are very durable and require little maintenance; however the metal should be galvanized or painted to minimize the potential for rusting.

These *Guidelines* were developed in conjunction with Hopewell Township's Historic Preservation Commission (HPC). The HPC reviews Certificate of Appropriateness (COA) applications for proposed exterior alterations to properties locally designated as Historic Landmarks or within a local Historic District. The applicant is responsible for complying with the provisions of the Zoning and Building Codes at the time of application. The applicant must obtain a Certificate of Appropriateness (COA) as well as all necessary permits prior to proceeding with any work. For more information, or to obtain permit applications, please call the COA Administrator at (609) 737-0612, ext. 643.

Please review this information during the early stages of planning your project. Familiarity with this material can assist in moving a project quickly through the approval process, saving applicants both time and money. Additional *Guidelines* addressing other historic building topics are available at the Township Administration Building and on its web site at www.hopewelltp.org.

PURPOSE

These *Guidelines* were prepared to assist property owners with information when considering the repair, alteration or installation of roofing. They are not intended to replace consultation with qualified architects, contractors and the Historic Preservation Commission (HPC). The HPC will be happy to provide consultation and assistance with materials, free of charge.



The gambrel roof is a distinguishing stylistic element of this Dutch Colonial Revival house. Additional light is gained at the second floor through windows at the shed roof dormer extending across the front elevation.

ROOFS

A building's roof provides the first line of defense against the elements and its design greatly affects the overall appearance of a building. Therefore, the following functional and aesthetic concerns should be considered when considering roof alteration.

- Weather-tight roofing preserves a building and provides shelter from rain, wind, sun and snow
- Temperature variation and building movement affect roofing materials
- Roofing helps define the building's character, silhouette and architectural style
- The form, color and texture of roof and roof penetrations affect the scale and massing of the building
- Roofing variations add visual interest to the streetscape

ROOF FORMS

There are six general roof forms in Hopewell. The roof forms can have various pitches and be combined in different manners to provide numerous roof types.

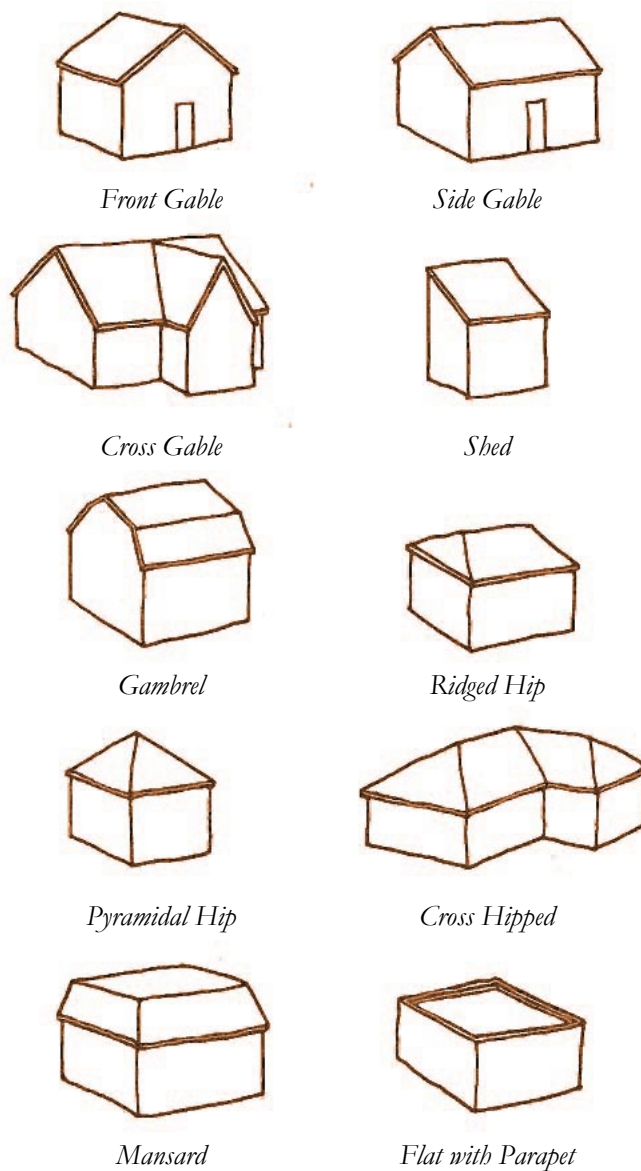
- **Gable Roofs** include front, side and cross-gable configurations. Gable roofs generally have two equally angled inclined planes that meet at a central ridge and represent one of the most common roof forms for their ability to shed water and relative ease of construction. Most vernacular or traditional buildings in the area use this roof form.

In the side gable configuration, the primary entrance is located below the sloping side eaves of the roof. In the front gable configuration, the main entrance is located at a gable end. A cross-gable roof refers to perpendicularly intersecting front and side gable forms, with the primary entrance at either the front or side gable.

- **Shed Roofs**, also known as a pent roofs or lean-tos, are roofs with a single slope, essentially forming a half gable, with rafters spanning between one exterior wall and a secondary wall. Shed roofs are typically used for additions to existing buildings.
- **Gambrel Roofs**, also known as Dutch roofs, include a pair of shallow pitched slopes above a pair of steeply pitched roofs on each side of a center ridge.
- **Hipped Roofs** slope inward from exterior walls, meeting at a ridge or a point, as in pyramidal roofs.
- **Mansard Roofs** include a steeply pitched lower slope beginning at the building cornice, and a nearly flat upper slope that might not be visible from the ground. The lower slope can be straight, concave or convex.
- **Flat Roofs** might be a true horizontal plane or have a low pitch to allow for drainage. Flat roofs often terminate at a parapet, generally an extension of the building's exterior walls.



This mansard roof features rectangular and octagonal slates and has a flat upper roof that is not visible from the ground.



ROOF PITCH AND MATERIALS

The pitch or slope of a roof helps define the appropriate materials for the roof. Low-pitched to flat roofs depend on a continuous or nearly continuous roof surface to minimize moisture infiltration. Material options for low-pitched roofs include built-up hot tar roofing; roll roofing; and soldered flat seam metal. Possibilities for moderately to steeply sloped roofs include unit materials such as slate, wood shingles, standing seam metal, concrete and asphalt shingles.

ROOFING MATERIALS

Historically, roofing materials were selected based upon practical and aesthetic criteria including pitch, weather conditions, and availability of materials and craftsmen.

In Hopewell Township, historic roof materials were generally slate, metal roofing, wood shingles, and later concrete and asphalt shingles. Each material provides a specific color, texture and pattern to a roof surface. Slate and wood shingles provide a modulated surface with variations in color, texture veining or graining and thickness. Decorative slate shingles were also used, particularly in the second half of the nineteenth century, to add additional colors or shapes to roof surfaces. A standing seam metal roof provides distinct shadow lines that establish a rhythm or scale to the building.

With industrialization at the beginning of the twentieth century, new roofing materials were introduced, including asbestos and asphalt based shingles, as well as varieties of rolled or built-up roofing for flat installations. The variety of metal roofing was also expanded, including copper, galvanized sheet steel and aluminum.

More recently, a larger variety of substitute roofing materials intended to simulate historic materials have been developed, with some being more successful than others. These include “dimensional” or “architectural” asphalt-composition shingles; fiberglass, metal or recycled rubber shingles intended to evoke the appearance of wood or slate shingles.

INVESTIGATING HISTORIC ROOFING

Some investigation is needed to determine the historic roof material for a building. A good place to start is in the attic. New roofs are often laid atop older roof surfaces. By looking between rafters, older roofs can sometimes be seen. Another area of review is the roof framing, lath and sheathing. Because of its weight, slate requires more substantial roof framing, tending towards larger rafters with narrower spacing than wood shingle framing. If the original lath is visible, there are variations in lath spacing that relate to standard sizes for slate and wood shingles. Finally, wood sheathing was often needed in metal roof installations, while lath was used in wood and slate shingle installations.

If physical evidence is not available, documentary evidence such as historic photographs, speaking to neighbors or looking at similar buildings in the community might provide clues about original roof materials.



Slates are available in a variety of shapes and colors. The most common color in Hopewell Township is grey.

SLATE

Slate was a popular roofing material, providing a durable, fire resistant and attractive surface, and in certain conditions, capable of lasting for centuries. It was often used in Colonial as well as Victorian architecture where the variety of shapes and colors for slates, including gray, black, red, green and purple, made the roof surface a visually important building feature.

A slate roof can last 60 to 125 years depending on the stone properties, formation, installation quality and regularity of maintenance. A failing slate slowly delaminates, chips and absorbs moisture, causing the deterioration process to accelerate over time.

Even more often than wood roofing, problems with slate roofs are typically the result of localized failure since many of the roof accessories and fasteners do not have the same 100-year life span as the slate itself. To extend the serviceable life of a roof, property owners are encouraged to address localized problems as they become apparent, using a qualified slate roofer.

Typical localized problems and possible repairs for slate:

- Loosening or corrosion of fasteners for slate or accessories – *Reattach or replace fastener*
- Split or cracked slate – *Install sheet metal under shingle, fill split or hole with roofing cement*
- Missing or damaged slates or roof accessories – *Replace to match original*

If over 20% of the slates on a roof slope are damaged or missing, replacement of the roofing might be warranted, although applicants are strongly encouraged to make every attempt to match decorative colors and patterns with replacement materials. Ceramic tile, rubber and other materials are used to simulate slate, but many have not been available commercially for very long. Dimensional or architectural fiberglass asphalt shingles are manufactured by several companies, simulating the shapes, colors and variegated appearance of slate.



Tin requires regular painting to minimize the potential for rust.

METAL

Metal was popularized for roofing after sheet metal production was expanded following the Civil War, and can be found on primary buildings as well as agricultural structures and outbuildings. Traditional sheet roofing metals include lead, copper, zinc, tin plate, tern plate, and galvanized iron. Many metal roofs require painting with traditional colors including red, silver, green or black. On shallow pitch roofs like porches, cupolas or domes, small rectangular pieces of flat seam metal roofing were installed with edges crimped together and soldered to form a weather-tight surface. On steeper pitched roofs, long continuous seams were used, either in a standing seam or batten seam configuration, providing regular ridges down roof slopes.

A well-installed and maintained metal roof is very durable and can last well over a century. If not properly installed, metal roofing is subject to expansion and contraction with changes in temperature, resulting in buckling and warping. Similar to slate roofing, metal roofing work should be undertaken by a specialist.

Deterioration of the metal surface tends to occur from wearing of the protective painted or galvanized surface, chemical action, pitting or streaking, airborne pollutants, rain or material acids, or galvanic action. Galvanic action occurs when dissimilar metals chemically react against each other and corrode, and can come from adjacent metals, such as fasteners and non-adjacent metals, such as roof cresting via rainwater.

Typical localized problems and possible repairs for metal:

- Worn paint, galvanizing or coating – *Repair*
- Slipping sheet, open seam or solder joint – *Refasten and re-solder*
- Isolated rusting or holes – *Replace to match original*

If the roof is generally rusting, splitting, pitted, severely buckled or warped, or many of the seams or edges are open or disfigured, replacement of the roofing might be warranted, although applicants are encouraged to make every attempt to match seam patterns and color with the replacement material. Metal roofing replacement alternatives are generally either hand fabricated of copper or tin; or pre-manufactured of aluminum or steel, typically with a baked-on painted finish.

WOOD SHINGLES

Wood shingles are typically made from cedar, cypress, redwood, oak, elm or white pine. Historically they represented a common roofing material in Hopewell Township due to material availability and ease of installation.

A wood shingle roof can last 30 to 60 years depending on the roof pitch, quality of materials and installation. However, like all exterior wood installations, a shingle roof is subject to deterioration from rot, splitting, warping and eroding. In many cases, wood shingle roofs are replaced at the first indication of a localized problem when regular maintenance or a less intensive repair would be sufficient. Common locations of failure are the roof accessories including the fasteners, flashing and gutters, which might have a shorter life span than the roofing surface. To extend the serviceable life of a roof, property owners are encouraged to address localized problems as they become apparent.

Typical localized problems and possible repairs for wood shingles:

- Loosening or corrosion of fasteners for shingles or accessories – *Reattach or replace fastener*
- Split or punctured shingle – *Install sheet metal under shingle, fill split or hole with roofing cement*
- Moss or fungi on surface – *Trim back adjacent trees allowing sun to dry out roof surface; investigate fungicide application; check attic for adequate ventilation*
- Missing or damaged shingles or roof accessories – *Replace to match original*

If over 20% of the wood shingles on a roof slope are damaged or missing, replacement of the roofing might be warranted. Wood roofing replacement alternatives include dimensional asphalt shingles or rubber shingles with the texture and color of wood shingles.

Wood Shingles vs. Wood Shakes: A wood shingle is sawn while a wood shake is split, historically by hand, resulting in more variable thickness. In this brochure, the term wood shingle is used to refer to either wood shingles or shakes.



Wood shingles are a locally traditional roofing material.



It is likely that the concrete roof shingles in Hopewell were manufactured in Trenton.

CONCRETE SHINGLES

Concrete shingles, also known as cement shingles, gained in popularity through the beginning of the twentieth century. Some benefits of concrete shingles are that they can provide a watertight roofing system, fire resistance and longevity at a relatively low production cost. In addition, the shingles could vary in shape, color and texture and made to resemble other materials including slate, weathered wood, stone slabs and tile.

The waterproof concrete mix for shingles is made from Portland cement, aggregate and water, which is poured around steel reinforcing within a shingle mold. A simple gable roof typically requires the use of four standard tile shapes; a starter tile, regular field tile, left and right end band tiles, and a ridge tile. Custom shapes were often needed for ridge and valley locations.

A concrete shingle roof typically has a service life of 60 to 80 years. As time passes the surface of the concrete can wear, exposing the steel reinforcing to the elements and increasing the potential for rust, brittleness and cracking. Similar to slate roofing, the concrete shingle fasteners can fail, causing shingles to slip out of position. To extend the serviceable life of a roof, property owners are encouraged to address localized problems as apparent, using a qualified roofer.

Typical problems and possible repairs for concrete shingles:

- Loosening or corrosion of fasteners for shingle or accessories – *Reattach or replace fastener*
- Split or cracked shingle – *Install sheet metal under shingle, fill split or hole with roofing cement*
- Missing or damaged shingle or roof accessories – *Replace to match original*

If over 20% of the concrete shingles on a roof slope are damaged or missing, replacement of the roofing might be warranted, although applicants are strongly encouraged to make every attempt to match decorative colors and patterns with replacement materials. Metal shingles can simulate concrete shingle appearance.

ASPHALT

Asphalt became a popular roofing material at the beginning of the twentieth century providing a relatively inexpensive and easily installed roofing material. Early roofing was generally made of asphalt-saturated felts in a variety of shapes, styles, textures and colors. Today, asphalt shingles are made with fiberglass, generally as 3-tab or “architectural” or “dimensional” shingles, which include multiple layers of material with simulated shadows suggesting wood or slate.

An asphalt shingle roof can be expected to last from 15 to 25 years with “architectural” or “dimensional” shingles lasting longer due to their multiple layers. Over time, asphalt shingles can curl, lose their mineral coating, be dislodged by wind or ice, or become brittle.

Typical localized problems and possible repairs for asphalt:

- Split or puncture – *Install sheet metal under shingle, fill split or hole with roofing cement*
- Moss or fungi on surface – *Trim back adjacent trees allowing sun to dry out roof surface*
- Missing or damaged shingles or roof accessories – *Replace to match original*

If over 20% of the asphalt shingles on a roof slope are damaged or missing, replacement of the roofing might be warranted. Some historic styles and colors for asphalt shingles are still available. Property owners are encouraged to replace historic asphalt in-kind.

ALTERNATE MATERIALS

When considering installing alternate roofing materials, it is important to balance installation costs with the roof's design, long-term durability and aesthetics.

The HPC encourages:

- Maintaining historic appearance of roofs when replacing with an alternate material, including size, shape, texture, pattern, color and other visual characteristics of original
- Installing a variegated or blended color
- Visiting a completed installation rather than relying on brochure photographs
- Verifying that proposed material is appropriate for roof pitch
- Understanding the substrate and attic ventilation appropriate for each material
- Understanding that some artificial materials might fade or change appearance over time

ROOF ACCESSORIES

In addition to the roofing surface, roof accessories are also functional and influence a roof's appearance. Roof accessories include flashing, gutters, downspouts and snow birds.

Flashing is made of thin sheet metal formed to prevent water from entering a building at joints, intersections and changes of pitch. It is typically installed around chimneys, parapet walls, dormer windows, roof valleys, vents, and intersections of porches, additions or bay windows.

Flashing often fails before roof surfaces, particularly with more durable roofing such as slate, resulting in interior leaking. If the flashing deteriorates, it is possible to replace it without replacing the entire roof.

When replacing flashing or installing a new roof, it is important to select a flashing material that has an anticipated life span similar or longer than the roofing. Copper, terne, steel, lead and aluminum are all used for flashing. The longevity of each material is based upon its thickness and whether it is galvanized, treated or coated. Generally, copper or lead coated copper has the longest life span, followed by steel, with aluminum being highly susceptible to punctures, tears and a galvanic reaction to other metals and some roofing materials. It is important to verify flashing materials are sympathetic to existing roofing materials.



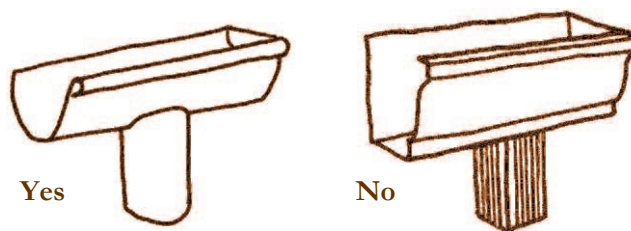
The arrows indicate areas where flashing is typically located.

Gutters are typically located near or along the bottom edge of a roof slope to collect rainwater. Built-in gutters are hidden from view from the ground within or behind architectural features such as cornices or parapets. Pole gutters are located near the bottom edge of a roof slope and project perpendicularly to the roof surface. Both built-in gutters and pole gutters are formed of flashing materials. Hanging gutters are attached to the building just under the roof slope edge and are half-round or profiled in cross section. Hanging gutters have been made of wood, copper, galvanized metals, aluminum and recently vinyl.



Pole gutters, also known as parallel gutters, are built-in gutters located near the roof edge to capture rain water and direct it towards a downspout. They are typically formed of wood, placed vertically to the slope of the roof and wrapped in metal flashing.

Similar to flashings, gutter materials have different longevities. Generally, copper has the longest potential life span, followed by steel, with aluminum being highly susceptible to punctures, tears, dents and galvanic reaction to other metals, and vinyl can become brittle, fracturing in low temperatures.



Half-round gutters with round or rectangular downspouts are preferred to decorative gutters with corrugated downspouts.

Downspouts, also known as rainwater conductors, are generally surface mounted to a building's exterior to conduct a gutter's water down the face of the building to the ground or an underground drainage system. Similar to gutters, downspouts can be fabricated of copper, galvanized metal, aluminum and vinyl with similar characteristics, in a round or rectangular profile.

The HPC encourages:

- Regular cleaning and maintenance of gutters and downspouts
- Retaining original drainage system and appearance, particularly pole gutters or built-in gutters
- Installing half-round gutters rather than a profiled K-gutter, which would compete with building features
- Installing plain round or rectangular downspouts which are more appropriate for use at historic buildings than corrugated downspouts

Snow birds, known as snow guards, are typically cast metal or bent wire devices arranged in a staggered pattern near an eave to prevent large masses of snow from sliding off a roof. They can also protect eaves, cornice and gutters, and take advantage of the insulating effect of snow.



ROOF FEATURES

Roof features are decorative and sometimes functional elements that help to define the profile of a roof against the skyline. Historic rooftop features include chimneys, dormers, cupolas, bell towers, turrets, finials, cresting and weathervanes.

Chimneys were typically designed to complement the style of a building and period of construction. In Hopewell Township, many are constructed of brick with some stone, some of which have been covered with stucco. Early Georgian, Federal style and Colonial Revival buildings tend towards square or rectangular chimney shafts, sometimes with molded caps. Victorian chimneys can include decorative detailing including corbelling, varied patterns, undulating and molded surfaces and decorative terra-cotta chimney pots.



Terra-cotta chimney pots are often found atop brick chimneys on Victorian residences.

Dormers, also known as dormer windows, protrude from the roof surface with a window at the downward slope, providing light and additional headroom under roof eaves. Dormers can have various roof shapes including gables, shed, hipped, eyebrow, segmented pediment and other shapes.



This hipped roof dormer has paired windows.

Cupolas, also known as monitors or belvederes, are structures that project up from the roof, used for ventilation with louvers, or as lookouts with windows. They are often found on agricultural outbuildings to provide ventilation for the animals housed below.



Cupolas should be retained whenever possible.

When addressing roof features, it is important to remember they are part of the stylistic composition of the roof and building, and are often difficult to replace.

The HPC encourages:

- Maintaining and repairing of roof features
- Replacing damaged or missing materials with new to match the material, size, shape, texture, color and other visual characteristics of the original

The HPC discourages:

- Removal of rooftop features without appropriate replacement
- Encapsulating decorative wood elements with vinyl or metal



Replacement of deteriorated asbestos roofing is recommended.

ROOF REPAIR OR REPLACEMENT

The HPC encourages:

- Maintaining, cleaning or repairing of roofing, roof accessories and rooftop features
- Cleaning of gutters and downspouts regularly, typically every spring and fall
- Inspect attics periodically after a storm or freeze to catch small leaks early to minimize interior damage
- Selectively replace damaged or missing materials with new materials to match the material, size, shape, texture, color and other visual characteristics of the original
- If the level of damage or deterioration is beyond repair, completely replacing damaged or missing materials with new materials to match the material, size, shape, texture, pattern, color and other visual characteristics of the original
- If replacement in original material is not possible, replacing the damaged or missing materials with new material of similar size, shape, texture, pattern, color and other visual characteristics of the original
- Installation of fasteners and flashings with a similar expected life span to the roofing material

The HPC discourages:

- Removal of roof features such as chimneys, dormers, cupolas, weathervanes, finials, etc.
- Removing or altering drainage system
- Adding or altering rooftop features at areas visible from a public way that change roof configuration including skylights, television antennas or dishes, solar collectors, mechanical equipment, roof decks, chimney stacks and dormer windows
- Adding rooftop features that create a false historical sense without supporting documentary evidence such as weathervanes or wood shingles on an originally slate roof
- Adding new features that are out of character, scale, materials or detailing to the historic building
- Covering, enclosing or removing eaves or cornices

ADDITIONAL AREAS OF CONSIDERATION

- Roofing work is potentially dangerous and should be left to professionals
- All roofers are not experienced in all materials, obtain references and verify that roofers have appropriately completed compatible work
- Verify the extent of both the material and installation warranties and company histories
- Verify whether removal of existing roofing is required before installation of new roofing; too much weight can damage structural elements
- Verify the condition of substrate for rot or decay and make necessary repairs, including the sheathing or lath, and structural elements
- Use substrate appropriate for roof material and provide adequate ventilation under roof surface
- Use appropriate underlayment including building paper, rosin paper and/or ice shield
- Use a single type of metal compatible to roofing at fasteners, flashing, gutters and downspouts to avoid galvanic action
- Select a flashing material with a comparable life span to the roofing material
- Reference industry standards such as SMACNA, Copper and Common Sense, Slate, etc. – The HPC can suggest project specific references



This project has been financed in part with Federal funds from the National Park Service, U.S. Department of the Interior, and administered by the New Jersey Department of Environmental Protection, Historic Preservation Office. The contents and opinions do not necessarily reflect the views or policies of the U.S. Department of the Interior, nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Department of the Interior.

This program receives Federal financial assistance for identification and protection of historic properties. Under Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975, as amended, the U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, disability or age in federally assisted programs. If you believe that you have been discriminated against in any program, activity, or facility as described above, or if you desire further information, please write to: Office of Equal Opportunity; National Park Service; 1849 C Street, N.W.; (NC200) Washington, DC 20240.

Dominique M. Hawkins, AIA, of Preservation Design Partnership in Philadelphia, PA, prepared this publication.