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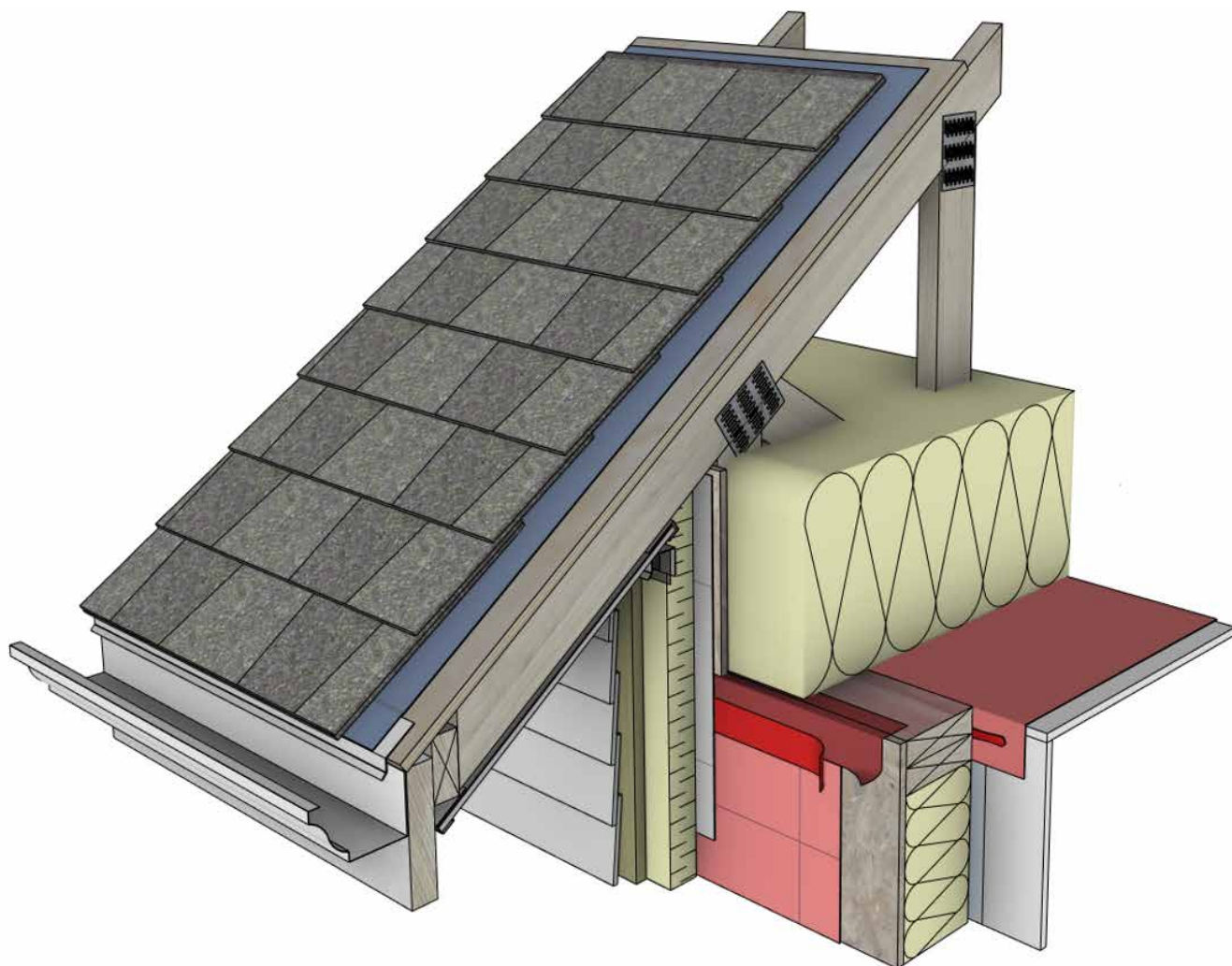
LEEP

LOCAL ENERGY
EFFICIENCY
PARTNERSHIPS

NET ZERO
ENERGY

Roof Guide #1

Vented Attic Roof Assembly



Developed by Natural Resources Canada's
Local Energy Efficiency Partnerships (LEEP) team

CanmetENERGY

Canada

LEEP Net Zero Energy Roof Guide #1
Vented Attic Roof Assembly

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Acknowledgements

The Local Energy Efficiency Partnerships (LEEP) team at CanmetENERGY would like to express appreciation to the many Canadian builders, designers, and industry partners who participate in LEEP programs across the country. Builders are invited through their regional Home Builders Associations to take part in technical forums, workshops, and training. Their input has consistently identified the need for practical, building science based resources, including this updated guide series focused on foundation and roof assemblies for high-performance homes.

We would like to acknowledge RDH Building Science for leading the development and illustration of these guides, for coordinating the technical analysis, and for integrating the broad range of industry feedback received during the review process. We also thank our technical reviewers whose comments and technical insights strengthened the clarity and accuracy of this material.

We would like to acknowledge the valuable support of the many regional partners who help deliver and support LEEP initiatives and make this work possible. We also recognize the provincial and local Home Builders Associations whose participation has been essential, along with ongoing leadership and support from CHBA National.

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Disclaimer

This document does not provide assurances or information related to structural systems, seismic performance, or fire safety. It is intended only as a guide on building enclosure science and foundation and roof assembly selection, detailing, materials and performance. The aim of this publication is to provide builders and designers with a framework for making decisions on the type of foundation and roof assemblies to use for individual homes and for new communities.

Natural Resources Canada assumes no liability for injury, property damage, or loss resulting from the use of information contained in this publication. This guide is intended to provide information only and does not express views of the Government of Canada nor does it constitute an endorsement of any commercial product, manufacturer or any individual.

Building science, related products, and construction practices change and improve over time. It is advisable to regularly consult up-to-date technical publications on building science, products, and practices rather than relying solely on this publication. Seek specific information on the use of products, the requirements of good design and construction practices and the requirements of the applicable building codes before undertaking a construction project. Consult the manufacturer's instructions for construction products and also speak with and retain professional consultants who hold a valid license and have appropriate engineering or architectural qualifications. Work with your municipality or local authority having jurisdiction to ensure compliance with issues of design, zoning and construction practices, including life and fire safety.

The effective R-value ranges and assemblies illustrated in this guide represent potential strategies to reach high-performance targets including the upper tiers of the National Building Code of Canada. As with any performance-based energy target, energy modeling must be used to determine appropriate designs for each individual project. Compliance strategies may be influenced by design choices such as building form, window placement, orientation, mechanical systems, and equipment efficiency.

The information included in this guide is generic in nature and is not tied to any specific voluntary labeling program. Builders and renovators looking to qualify their homes under the Canadian Home Builders' Association Net Zero Home Labeling Program must ensure their homes meet all the Technical Requirements of that Program.

LEEP Context

The LEEP Team at CanmetENERGY works with groups of builders, through their Home Builders Associations (HBAs). LEEP programs offer opportunities to identify barriers and gaps in technology and to discuss and evaluate Net Zero Energy (NZE) and high-performance home building strategies. Builders use forums and workshops to identify key technology challenges and invite experts and manufacturers to respond by proposing solutions, innovations and direction on how to integrate these ideas into construction practices. Through their HBAs, builders use LEEP to define and solve technology challenges, and to connect with design professionals who can help them deliver the homes of tomorrow. The goal is builder-driven enhancement to local building practices.

The Need

There is a need for fundamental change in roof design and construction. Canadian builders are moving beyond typical wood-framing practices to roof assemblies that reach higher levels of performance. LEEP technical forums have been delivered in many locations across Canada. Regional LEEP builder groups have consistently identified high-performance roofs as a key technological challenge. They have requested information on:

- › Increased effective R-values; continuous insulation and reduced thermal bridging
- › Continuous air barrier systems and airtight building enclosures; improved thermal performance, reduced heating and cooling loads, reduced risk of condensation within cavities
- › Water-protection systems; reduced risk of water intrusion from rain and snow using reliable water control details
- › Effective vapour control; reduced risk of trapping moisture within the assembly

There is great diversity in Canadian light wood construction. Roof details and assembly types vary by region and climate zone. Local construction practices can also vary, along with access to reliable technical information and training. Coordination with trades and consultants is critical when introducing new technology and this should not be overlooked. It is our hope that by providing these guidelines for roof assemblies with construction details, we will help builders select, plan and construct robust roof assemblies with success. Project-specific details should always be developed to account for the unique conditions of each project.

We see the LEEP guides for Net Zero Energy Construction not as the end goal, but as an essential tool for the next generation of high-performance buildings.

Documents in This Series

The following is a list of the documents in the LEEP Net Zero Energy Foundation and Roof Technical Guide series:

- › **Foundation Guide #1:** Basement Below-Grade Assemblies
- › **Foundation Guide #2:** Crawl Space and At-Grade Assemblies
- › **Foundation Guide #3:** Exposed Floor Assemblies
- ➔ **Roof Guide #1:** Vented Attic Roof Assembly
- › **Roof Guide #2:** Vented Vaulted Roof Assembly
- › **Roof Guide #3:** Exterior-Insulated Sloped Roof Assembly
- › **Roof Guide #4:** Vented Flat Roof Assembly
- › **Roof Guide #5:** Conventional Flat Roof Assembly

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Vented Attic Roof Assembly Overview

The vented attic roof uses trusses to achieve a sloped roof surface at the exterior, and attic space for insulation and venting above the ceiling. The insulation depth is based on the truss heel height and the required attic ventilation clearance. Vent baffles are typically installed near the eaves to prevent insulation from blocking the required vents.

This assembly can also include an optional interior service cavity below the ceiling poly to accommodate electrical services without penetrating the air barrier.

Vented attic roof assemblies can achieve high R-values but they can be at risk of condensation and ice damming. Proper design, continuous air barrier detailing, effective ventilation, and vapour control are critical for effective performance.

Water-Shedding Surface (Roof Finish)

The sloped roofing, trim, flashings, and any adjoining wall cladding together form the water-shedding surface (WSS). Sloped roof assemblies have at least 2:12 slope, but at least 4:12 slope is typical for most roofing types. An overhang helps protect the wall below from wind-driven rain and provides water control continuity.

The WSS typically consists of roofing shingles or metal panels. These finishes direct most water away by gravity drainage into perimeter gutters. The WSS and the water control layer are usually in direct contact, so these assemblies rely on adequate drainage from the sloped surface. The sloping is needed to avoid prolonged exposure to water and allow the WSS and water control layer to work using shingle-lapped materials.

Flashings, gutters, and downspouts are critical for directing water away from the building. Uninterrupted roof drainage is the key to reducing the potential for roof leaks and maintaining roof performance.

All sloped roofs face some risk of ice-dam formation in winter. This risk grows if the roof is under-insulated or lacks adequate ventilation. See [Ice Damming: Causes, Risks, and Mitigation](#) on page 14 for more information.

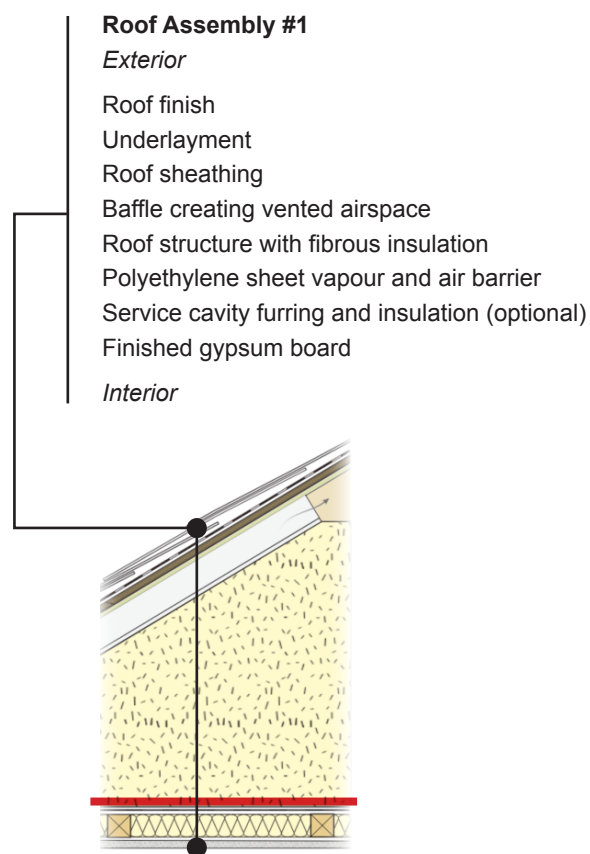


Figure 1 Typical assembly layers of the insulated attic roof assembly.

Airtightness is essential for high-performance NZE roof assemblies. NZE homes target very low air leakage, verified through testing at completion. Strong airtightness improves energy performance and reduces condensation risk in roof cavities. Continuity at transitions and penetrations is critical.

Water Control Layer

In sloped roof assemblies, the roof underlayment beneath the roofing finish serves as the water control layer. Traditional asphalt-saturated organic building paper has often been used, but modern synthetic sheathing membrane can be more durable and easier to install. It is typically lighter weight and more flexible. Self-adhered non-permeable membrane is used for eaves protection.

Air Control Layer (Air Barrier System)

This assembly typically relies on an interior air barrier system such as sealed polyethylene to reduce air movement into the attic. Rigid sheathing board with taped joints can also be used. Robust detailing at all wall top plates and penetrations is important for maintaining the air barrier's continuity and effectiveness. A service cavity beneath the air barrier can help limit penetrations. See [Air Barrier Best Practices](#) on page 15 for more information.

Thermal Control Layer (Insulation)

Attic roof assemblies can use a variety of batt insulation types, including stone wool, fiberglass, or wood-fibre. Blown in fibrous products such as cellulose and fiberglass are also used.

Table 1: Effective R-values of Interior-Insulated Vented Attic Roofs [ft •°F•hr/Btu]*				
Insulation Thickness (in.)	R-3.4 per inch	R-4 per inch	R-3.4 per inch (with 1.5 in. cavity)	R-4 per inch (with 1.5 in. cavity)
8	26.7	30.7	27.6	31.6
9	33.5	38.7	34.4	39.6
10	40.3	46.7	41.2	47.6
12	47.1	54.7	48.0	55.6
14	53.9	62.4	54.8	63.6
16	60.7	70.7	61.6	71.6
18	67.5	78.7	68.4	79.6
*A 10% framing factor is assumed for the lower 3.5" of insulation based on raised heel truss framing at 16" o.c. Components above the vented attic space are not included in the effective R-value calculation.				

Vapour Control Layer (Vapour Barrier)

A sealed polyethylene sheet is typically used as the primary vapour barrier. If another type of ceiling air barrier is used in place of poly, a separate vapour barrier must be added to control moisture diffusion toward cold exterior surfaces. Vapour-barrier paint is a common option for this purpose.

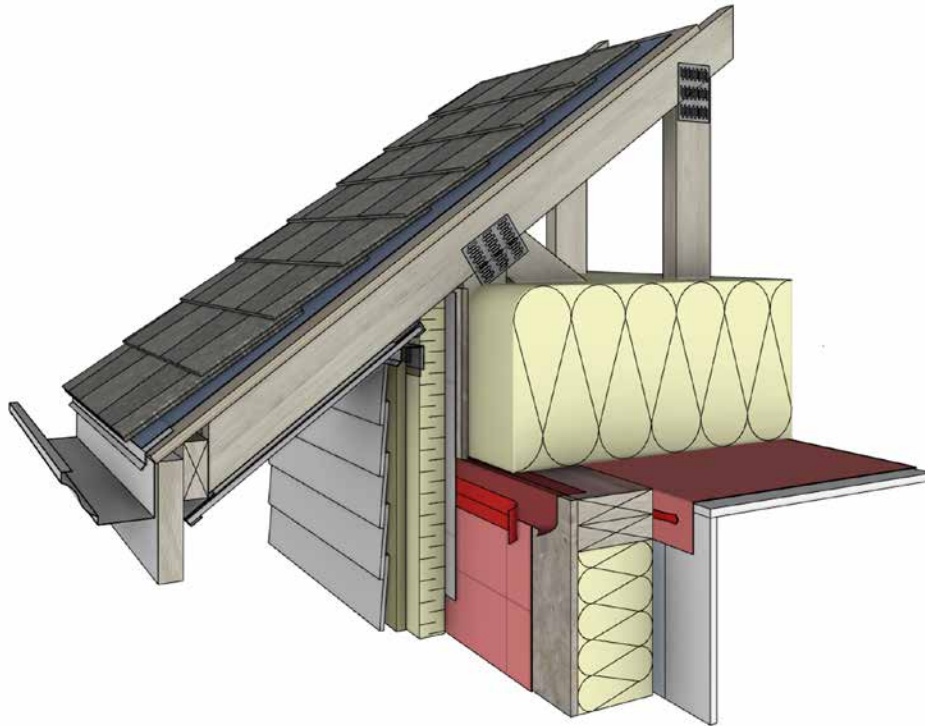


Figure 2 Vented attic roof assembly 3D overview.

Venting and Insulation

The attic roof assembly relies on a dedicated ventilation air space above the insulation to help reduce the risk of moisture buildup in the attic and keep the roof sheathing cooler. Attic roof venting is important for the following reasons:

- › Airflow is a moisture-management strategy in case of minor leaks or condensation.
- › Venting can help reduce humidity if there is vapour flow or air leakage from the interior.
- › Keeping the roof sheathing cooler in the summer can help reduce heat stress on the roofing products.
- › Venting helps limit ice damming by keeping the roof sheathing colder and reducing melt and refreeze cycles at the eaves.

Note that ceiling airtightness remains essential since venting cannot fully compensate for heat loss or warm interior air entering the roof cavity.

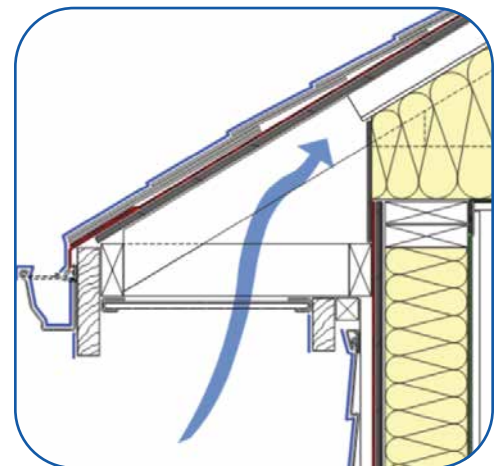


Figure 3 Ventilated roof assembly showing continuous airflow from eave to ridge to help manage moisture and temperature in the attic.

Roof vents must be placed near the eaves and ridges to allow airflow to reach all areas beneath the roof sheathing. In some roof designs, ensuring continuous airflow can be challenging. Consider the following design and construction factors when planning for attic roof venting:

- › **Minimum airspace:** 2.5" clear airspace is required between the insulation and roof sheathing, but the larger the space the better.
- › **Eave Venting:** Raised-heel trusses are the best way to maintain adequate insulation thickness without blocking ventilation. Baffles can also be installed to keep the air channel clear. Eave venting is typically provided through perforated soffits. Top-side venting through port vents near the eave is also an option.
- › **Ridge Venting:** Port vents, gable vents, or proprietary ridge vent products are typically used. Specialty low-profile shingle strip vents are also an option.
- › **Vent Opening Area:** Provide a total vent area of at least 1/300 of the insulated ceiling area, with at least 25% of the openings located near the eave and 25% near the ridge. Joist-insulated roofs (i.e., without attic space), require a vent area of at least 1/150 of the insulated ceiling area.
- › **Screening:** Vent screens and louvers reduce the net free vent area. Account for this reduction when determining the required vent ratio. Note that perforated metal soffits with maximum 1/8" holes may be needed for wildfire resistance to reduce the risk of embers entering the vent space.

Insulation Retention and Wind Washing

Wind entering at the eaves can wash through attic insulation and reduce its thermal performance. It can also dislodge loose-fill insulation and create bare or thinned areas at the roof perimeter. To prevent this, install rigid baffles as insulation stops at every rafter space. The baffles block wind from disturbing the insulation layer and help maintain the ventilation space.

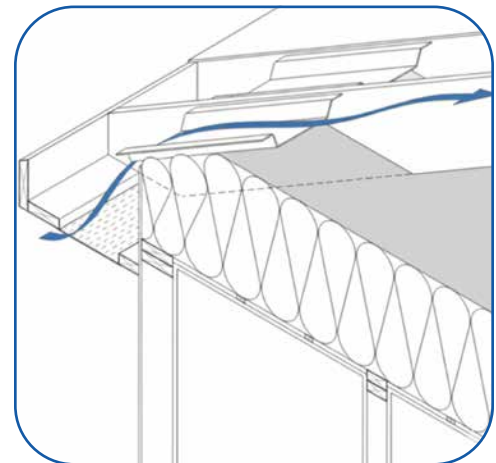


Figure 4 Ventilated eave detail showing baffles and perforated metal soffit for protection against embers.

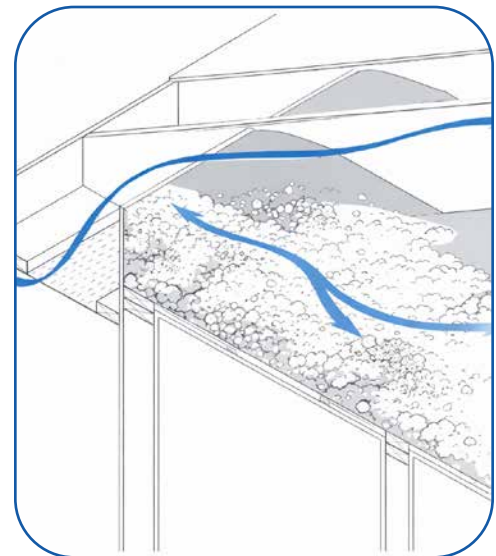


Figure 5 Wind washing at the eaves, showing air dislodging insulation without baffle protection.

Considerations for High-Humidity Environments

In mild coastal climates such as the Pacific Northwest, high outdoor humidity during fall and winter can increase the risk of microbial growth on the underside of roof sheathing in the roof space. This occurs when humid coastal air enters the attic and raises the wood moisture content enough to support microbial growth. Increasing roof ventilation does not reduce this risk.

Although this seasonal discolouration does not typically result in damage or lead to decay, it can pose health concerns. If the attic is expected to be accessed regularly, surface treatments on the underside of the sheathing can be used to limit the risk of microbial growth. Research has shown that the following treatment options can work for this purpose:

- › Fungicidal or mold-inhibiting coatings like stain-blocking primer
- › Borate-based wood preservatives
- › Water-repellent wood sealers
- › Wood sealers/primers
- › Specialty restoration coatings to encapsulate surfaces

These treatments are not part of the roof assembly water control system but serve as a protective measure against microbial growth. Note that, regardless of the risk of discolouration, providing roof ventilation generally leads to more durable assemblies compared to unvented roof assemblies.



Figure 6 Attic sheathing and framing with visible staining and microbial growth due to moisture accumulation.



Figure 7 Test panel showing different coating treatments applied to clean wood to compare their effectiveness in limiting microbial growth.

Ice Damming: Causes, Risks, and Mitigation

An ice dam is a ridge of ice that forms along the colder edge of a sloped roof. Snow on the upper portion of the roof can melt when the roof sheathing becomes warm. The meltwater flows downward until it reaches the colder eaves, where it refreezes and begins to build up. Over time, this creates a blockage that stops additional runoff from draining off the roof.

Why Are Ice Dams a Problem?

- › Water can back up behind the ice and enter the roof assembly.
- › Refreezing below shingles can lift or damage the roofing materials.
- › Icicles that form at the eaves present safety hazards to people below.
- › Repeated freeze/thaw cycles can shorten the lifespan of roofing components.

Common Causes

- › Gaps in insulation or thermal bridges that warm the roof deck.
- › Air leakage from the interior that carries heat into the attic.
- › Attic heat sources such as recessed pot lights, uninsulated ducts, plumbing lines, chimneys, or skylight shafts.
- › Uneven snow cover or differences in sun exposure across the roof surface.
- › Insufficient or blocked roof ventilation that prevents the roof sheathing from staying close to outdoor temperatures.

Recommended Ice Damming Mitigation Measures

Ice dams are difficult to fully prevent in cold climates, but their effects can be significantly reduced through careful control of insulation, airtightness, ventilation, and eave protection. The following measures outline practical strategies that help limit ice dam formation and protect the long-term durability of the roof assembly.

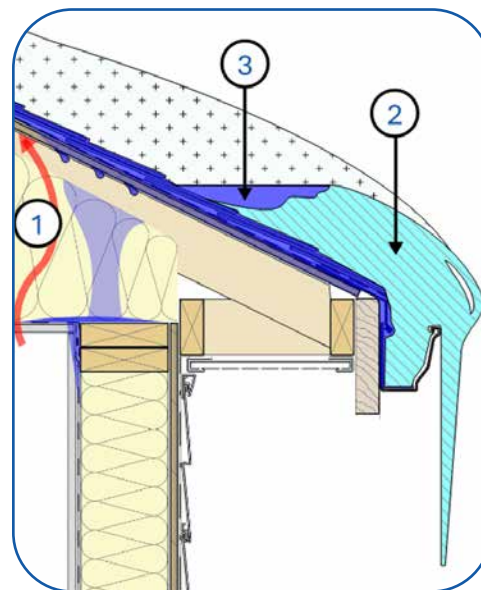


Figure 8 Illustration of an ice dam at the eaves showing warm air leakage from the interior (1), meltwater refreezing at the roof edge (2), and resulting water backup that can leak into the roof assembly (3).

Table 2: Roof Assembly Strategies for Ice Damming Control	
Measure	Explanation
Ensure an airtight ceiling plane	Seal gaps and penetrations to prevent warm interior air from entering the attic.
Improve insulation continuity	Pay special attention at roof-to-wall transitions where insulation is often thin or compressed. Use 12" raised heel trusses.
Eliminate attic heat sources	Air seal or insulate ducts, plumbing lines, vent chases, and other components that release heat.
Increase attic ventilation	Maintain a continuous ventilation channel to keep roof sheathing closer to outdoor temperatures.
Use waterproof membranes at eaves	Extend membranes high enough to manage potential meltwater backup above the wall line.
Consider full-coverage waterproofing	Use non-permeable self-adhered underlayment over all roof areas.

Air Barrier Best Practices

Continuity of the roof air control layer is one of the most important aspects of a properly performing assembly. The air barrier system is critical regardless of its location or material type. Ceiling polyethylene air barriers are a common weak point in buildings seeking to reach high levels of airtightness, so careful planning is needed. The details shown in the [Construction Details](#) on page 18 highlight the air barrier components used to provide continuity across all the interfaces shown.

Top Plates and Roof-to-Wall Interface

Establishing exterior air barrier continuity across top plates and at the roof-to-wall transition involves applying continuous high-performance tape or self-adhered membrane over all top plates before the roof framing is installed. At exterior wall top plates, the membrane also extends over the wall sheathing. This approach is more reliable than polyethylene strips sandwiched between the top plates. The interior ceiling air barrier is then sealed to the sides of all top plates so that the air barrier transfers through the top plate membrane, including at the perimeter roof-to-wall interface. The wall air barrier membrane is then sealed to the top plate tape on the exterior side.

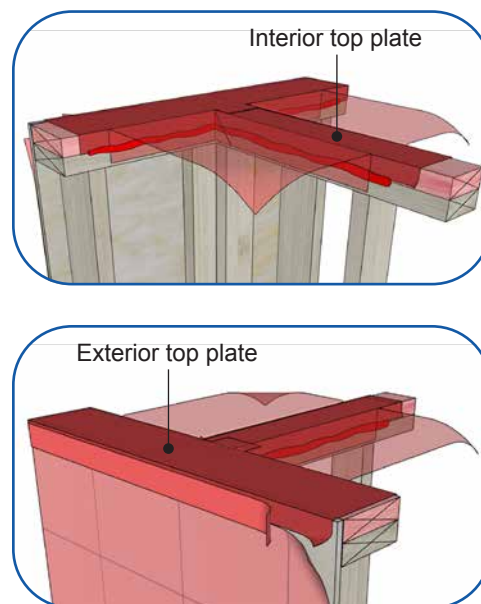


Figure 9 High-performance tape over all top plates to create a continuous air seal at the roof-to-wall transition.

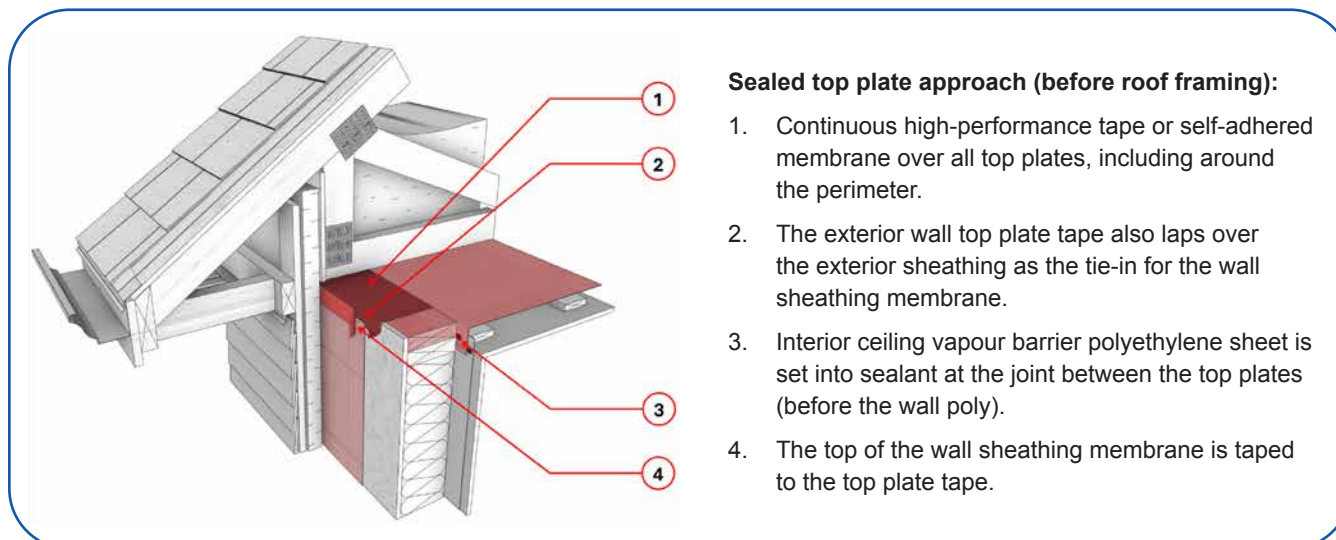


Figure 10 Overview of the key steps to achieving a continuous air barrier connection between the exterior sheathing membrane and the interior ceiling poly using the taped top plate approach.

Top Plate Penetrations

Penetrations through the top plates need clear and inspectable air barrier detailing to maintain continuity at the roof-to-wall transition. The recommended approach is to apply continuous high-performance non-permeable tape along the top and both edges of the top plate before the roof framing is installed. Then, during rough-in, install pre-formed EPDM gaskets or equivalent sealing collars around each penetration so the gasket sits flat on the taped top plates. Once the component is in place, tape the perimeter of the gasket to the top plate tape or set it into a continuous bead of sealant. This provides a durable and visible air seal. High-performance tape, sealant, or utility putty works as well. By making the top plate itself airtight with a non-permeable membrane, there is no need for polyethylene strips between the top plates.

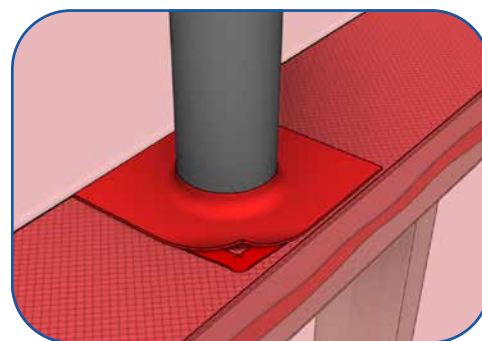


Figure 11 Air seal at a top plate penetration created with a pre-installed gasket sealed to the top plate tape.

Ceiling Penetrations

Common ceiling penetrations such as recessed pot lights and other electrical fixtures present a unique challenge to ceiling airtightness when an interior air barrier is used. A typical home may have dozens of such penetrations. This section outlines three detailing approaches that can be used to achieve high-performance ceiling airtightness.

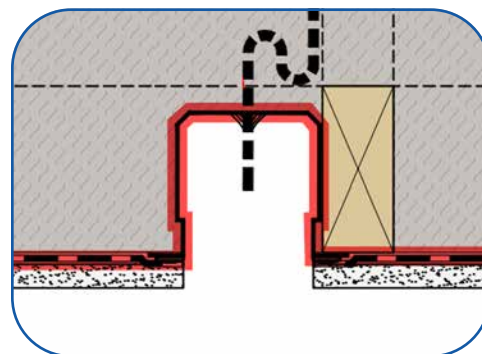


Figure 12 Airtight electrical box detail with utility and perimeter sealant.

Airtight Electrical Box

Airtight electrical boxes can act as the primary air barrier instead of separate polyethylene pans or metal junction boxes. However, two additional steps are needed to make this approach reliably airtight. The factory foam flap at the wire entry is thin and flexible, so electrical putty is added around the wire penetration to create a more durable seal. At the box perimeter, the compression gasket does not always sit flush against the ceiling polyethylene, so a small bead of sealant is applied between the gasket and the air barrier.

Sealed Plywood Housing for Recessed Fixtures

Penetrations for deep fixtures like recessed pot lights, exhaust fans, and speakers can be challenging to make airtight using conventional pre-formed polyethylene pans. These pans are typically too flexible to provide a solid substrate for durable airtight detailing. Instead, sealed plywood boxes can be used at each fixture to provide a stiff airtight housing. Most importantly, the plywood provides a substrate for the rough-in components to be fastened inside the box and the wire penetration permanently sealed. This prevents the air seal from being disturbed during fixture installation.

Dedicated Service Cavity

A service cavity provides a way to significantly reduce the number of penetrations in the ceiling air barrier. Typical service cavities use at least 1.5" deep framing and cross-strapping to allow free routing of services. This approach requires modified sequencing compared to conventional practice as follows:

- › The ceiling air barrier and strapping are installed before the electrical rough-in components are fastened in place.
- › Shallow electrical boxes and fixtures are needed to fit within the cavity.
- › Top plate penetrations route through the side of the plates into the service cavity, rather than up into the ceiling space above the air barrier.
- › Openings must be carefully cut into the ceiling finish to avoid damaging the air barrier.
- › Insulation or tightly spaced strapping is needed to support the air barrier, unless airtight sheathing is used.

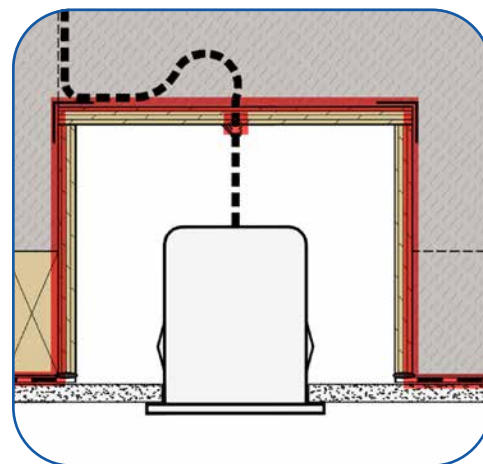


Figure 13 Sealed plywood housing with taped seams, utility putty, and perimeter sealant.

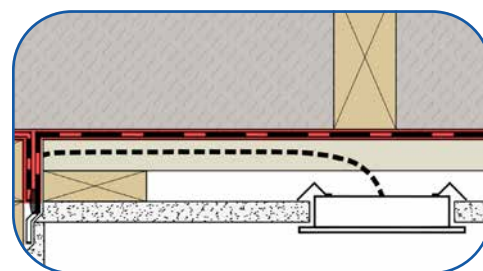


Figure 14 Fixture within a ceiling service cavity.

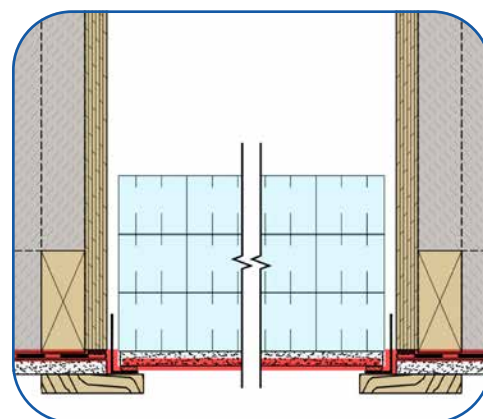


Figure 15 Attic access hatch with airtight and thermally continuous detailing.

Attic Access Hatch

The attic hatch is detailed as part of the ceiling air barrier system using continuous foam gasket at the perimeter edge. This provides a reliable long-term air seal that will continue to function even with repeated use. Note that using rigid insulation board on top of the hatch is more durable than strips of fibrous batt insulation. For attic assemblies with deep insulation, the insulation retention board around the opening is integrated into the air barrier to create a durable and inspectable seal along the edges.

Construction Details

The example details in the following pages establish a common level of detailing for Attic Roof Assembly Guide #1. Each guide in this series provides a similar set of details for its respective assembly. Builders may replicate or adapt these details to meet Net Zero Energy or other high-performance targets, provided the core principles of air barrier continuity, water-resistive barrier continuity, and insulation continuity are maintained.

The assemblies shown were selected through LEEP initiatives where builder groups requested a focus on practical, regionally appropriate high-performance solutions. Building-science experts reviewed these assemblies based on climate, local construction practices, and code requirements. The details highlight key transition strategies, with red “AB” and “AB/WRB” icons identifying air barrier and water-resistive-barrier components.

These illustrations represent best practices. Project-specific work may require additional details, cladding-specific adjustments, and coordination with structural, mechanical, electrical, and life-safety systems. Any modifications should be prepared or reviewed by qualified professionals, as provincial requirements vary.

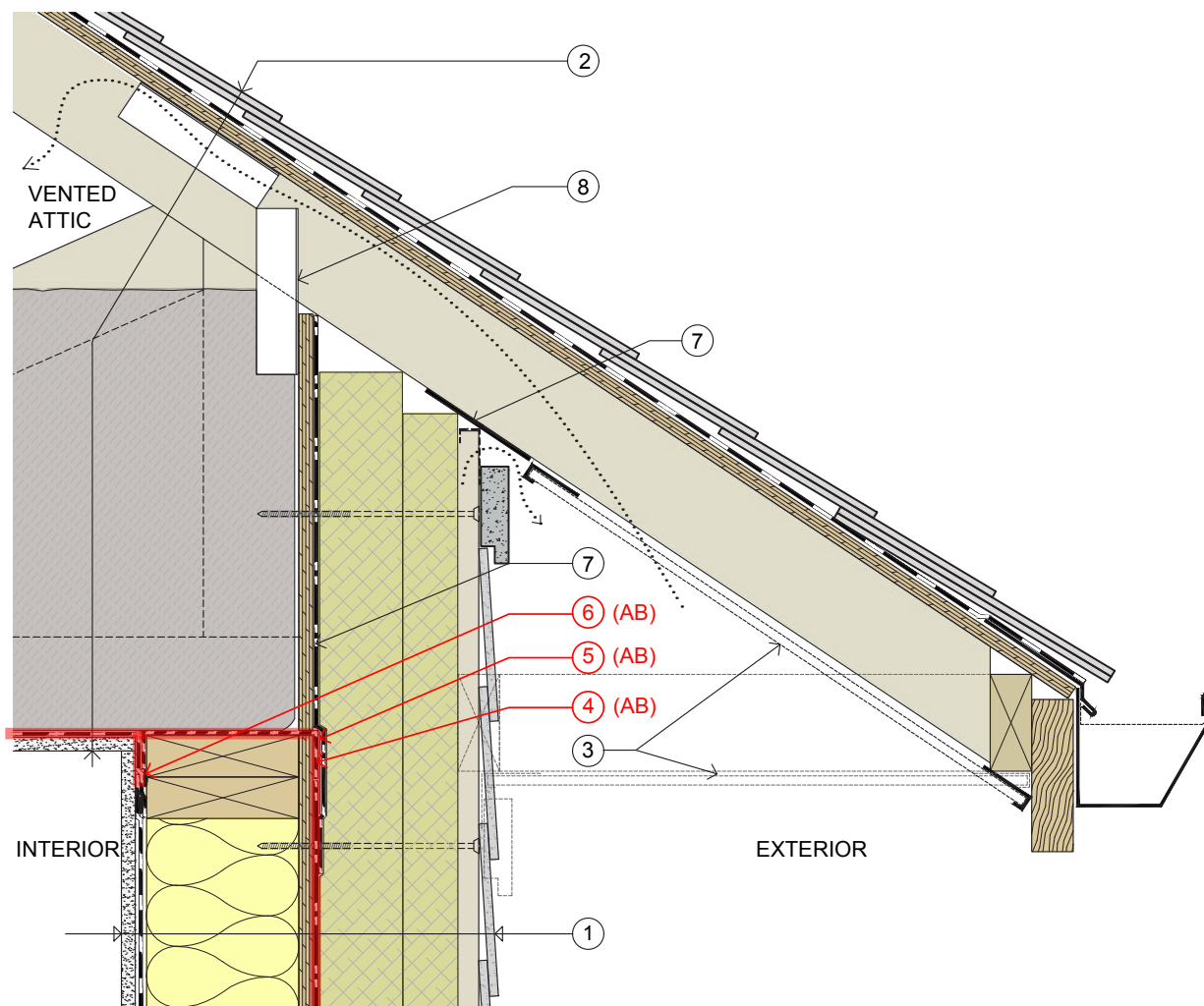
To reduce the risk of water penetration, mould, or other deficiencies, builders are encouraged to review details with a building-science engineer or architect, and to practice installation techniques using full-scale mockups for training and quality control.

Each unique project will require the development of specific details and construction documents to address the varied conditions found in each building and the capacity of local construction trades. In addition, each builder must provide quality control and assume liability for the work they complete. Reliable technical information and training are critical to your success. We recommend that builders take advantage of technical guides and training opportunities offered by credible sources and share this training with everyone on your crew. Work with your local Home Builders Association to find more information and to build local capacity.

For more guidance and example detailing for net zero energy roof assemblies, refer to the following additional resources:

- › Illustrated Guide — Insulated Wood-Frame Vaulted and Flat Roofs for Residential Construction in BC, BC Housing
- › Building Envelope Guide for Houses, BC Housing
- › Canadian Home Builders' Association of BC Building Science for New Homes, CHBA BC
- › BC Energy Step Code Builder Guide, BC Housing
- › Building Enclosure Design Guide, BC Housing

Detail 1.01 Above-Grade Wall at Overhanging Sloped Roof

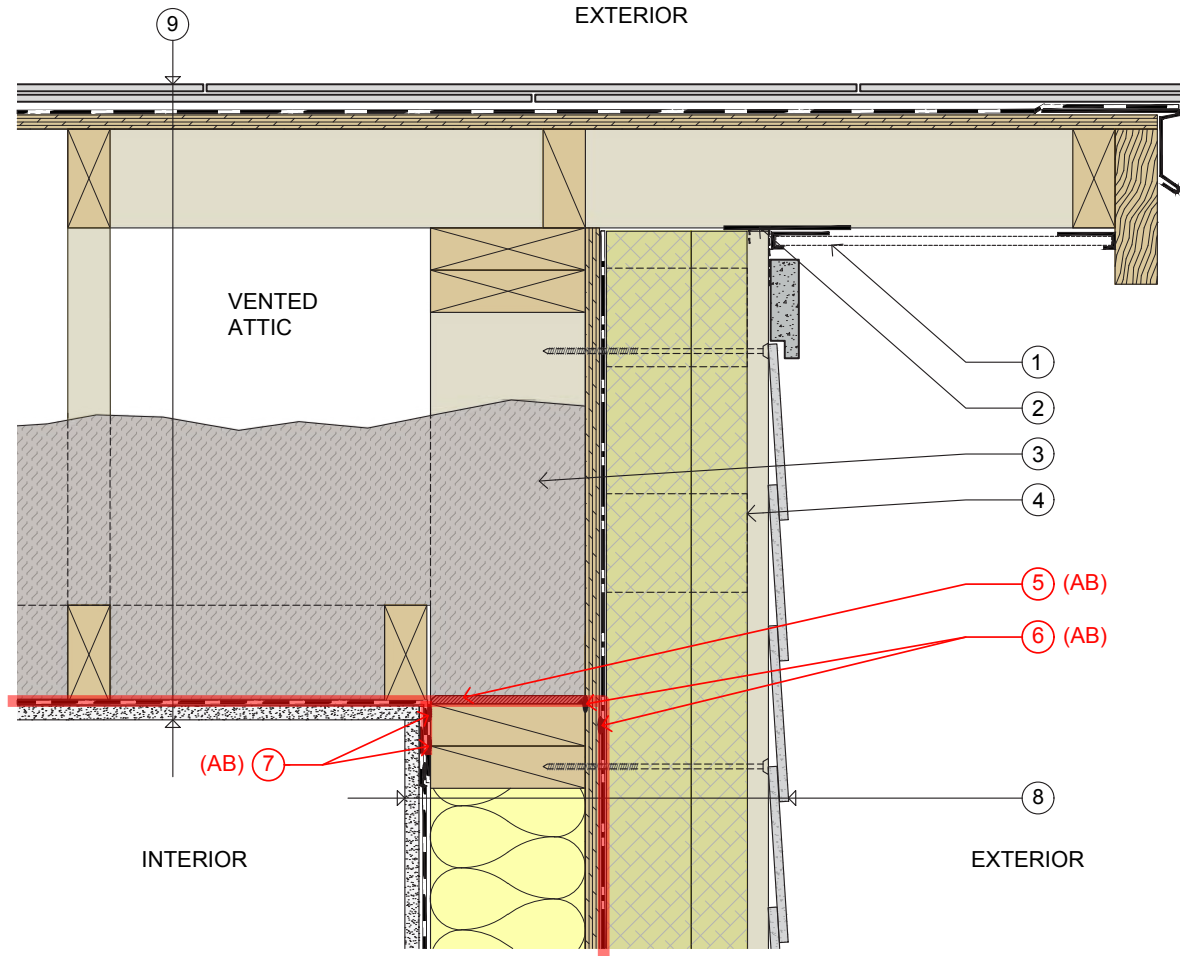


LEGEND

- | | |
|---|--|
| ① Above-grade wall assembly with exterior air barrier system (AB) | ⑤ Continuous tape seal (AB) |
| ② Attic roof assembly | ⑥ Continuous sealant at ceiling poly (AB) |
| • Roofing shingle | ⑦ Sheathing membrane strip on heel truss sheathing lapped over air barrier transition (not AB) |
| • Roofing underlayment including eave protection | ⑧ Attic vent baffle with down leg as insulation stop/wind guard |
| • Roof sheathing | |
| • Attic framing with vented air space | |
| • Fibrous insulation | |
| • Ceiling vapour barrier poly (AB) | |
| • Interior gypsum ceiling | |
| ③ Perforated sloped soffit and flat soffit alternative | |
| ④ Continuous self-adhesive membrane over all top plates (AB) | |

ABOVE-GRADE WALL AT OVERHANGING SLOPED ROOF | D1.01
ROOF #1 - VENTED ATTIC ROOF

Detail 1.02 Balloon-Framed Gable Wall at Attic Roof

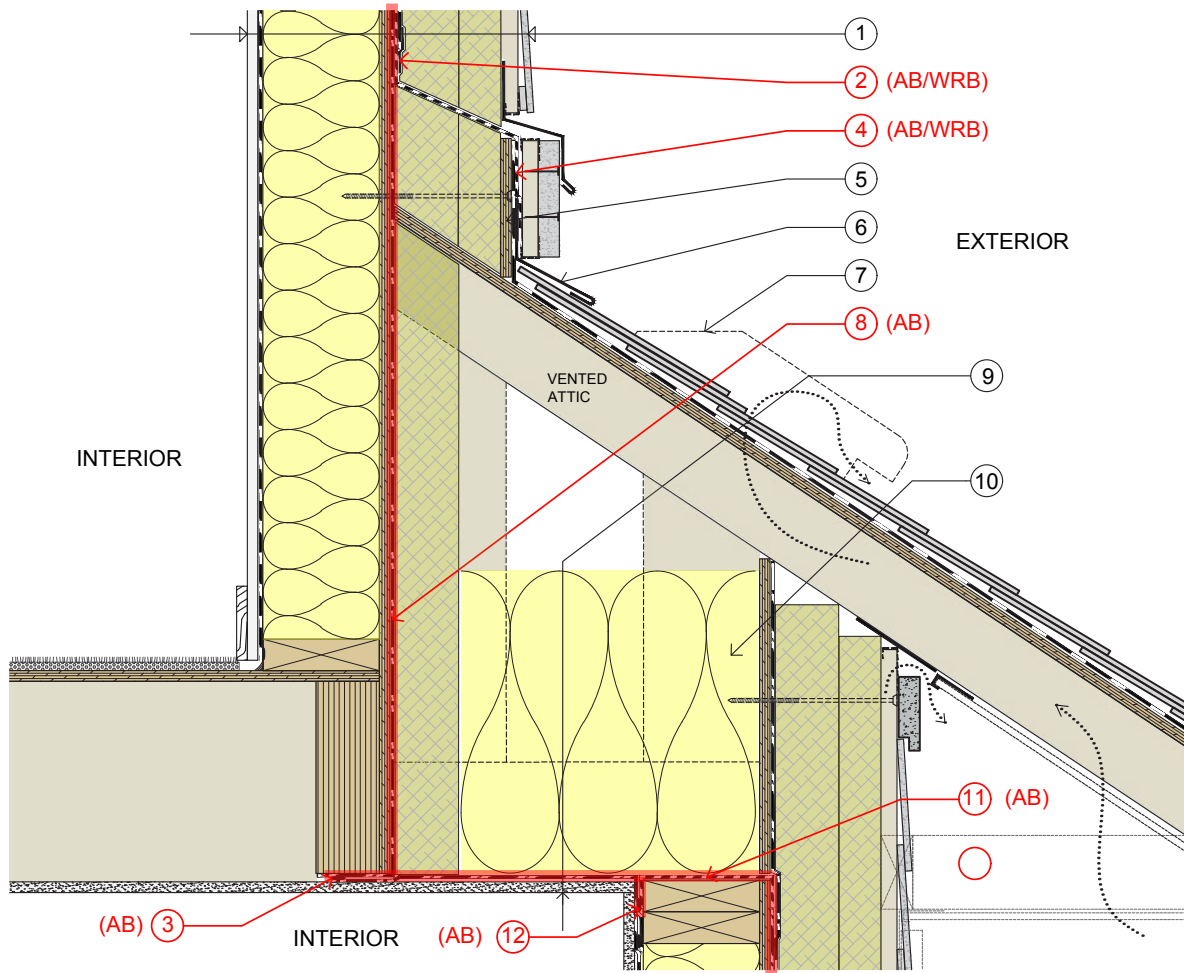


LEGEND

- | | |
|---|---|
| <ul style="list-style-type: none"> ① Perforated soffit panel ② Metal rainscreen closure flashing ③ Attic insulation ④ Optional intermittent blocking instead of exterior insulation at gable area ⑤ Continuous sealant between studs and blocking and at sheathing (AB) ⑥ Sheathing and membrane set in continuous sealant along top of blocking (AB) | <ul style="list-style-type: none"> ⑦ Continuous sealant beads at ceiling vapour barrier poly (AB) ⑧ Above-grade wall assembly with exterior air barrier system (AB) ⑨ Attic roof assembly <ul style="list-style-type: none"> • Roofing shingle • Roofing underlayment including eave protection • Roof sheathing • Attic framing with vented air space • Cellulose fibrous insulation • Ceiling vapour barrier poly (AB) • Interior gypsum ceiling |
|---|---|

BALLOON-FRAMED GABLE WALL AT ATTIC ROOF - | D1.02
ROOF #1 - VENTED ATTIC ROOF

Detail 1.03 Renewable Roof Abutment at Above-Grade Wall

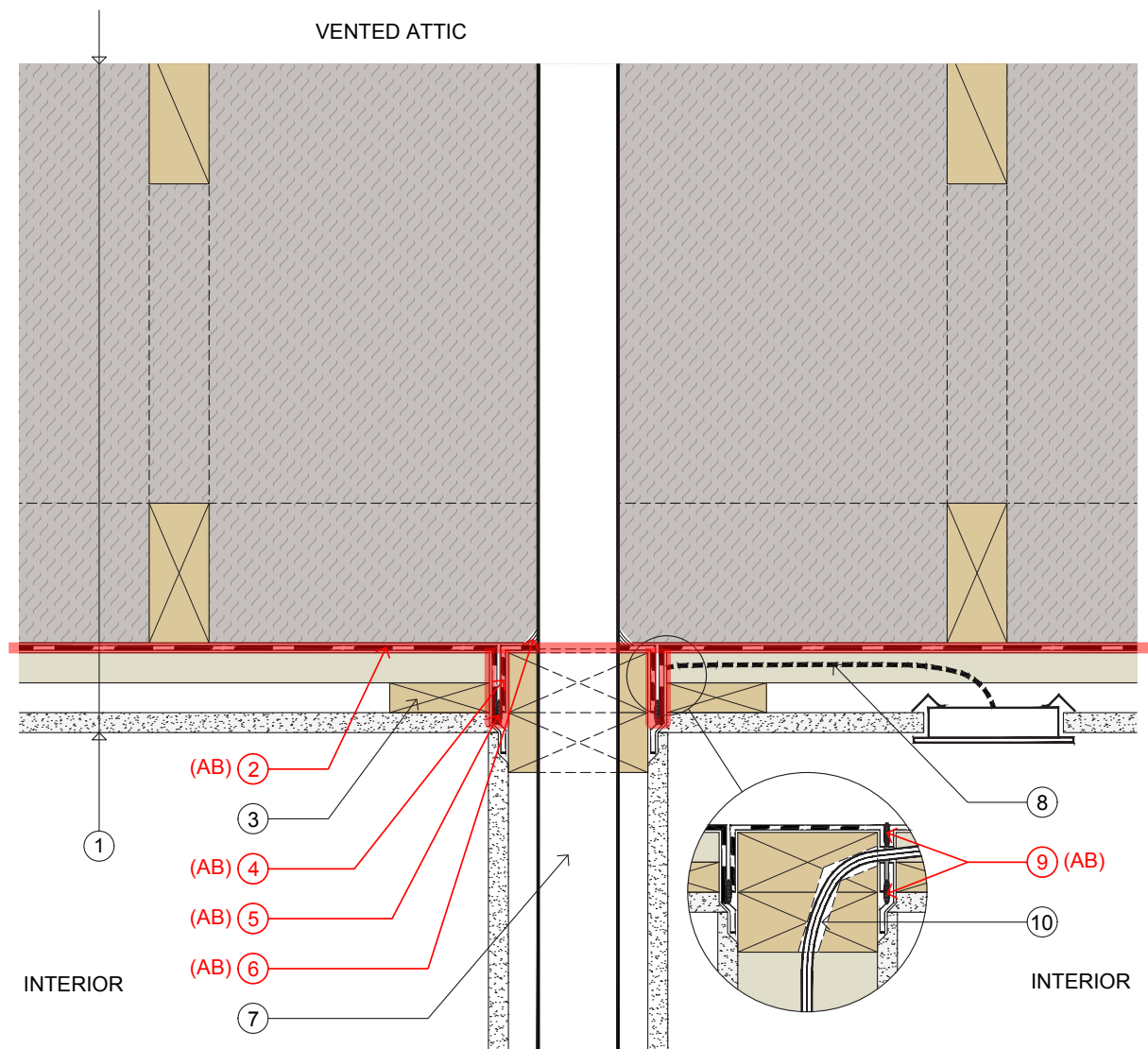


LEGEND

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|---|---|
| ① Above-grade wall assembly with exterior air barrier system (AB) | ⑨ Vented attic roof assembly |
| ② VP sheathing membrane taped to through-wall membrane (AB/WRB) | • Roofing shingle |
| ③ Continuous sealant between ceiling poly and sheathing membrane prestrip (AB) | • Roofing underlayment including eave protection |
| ④ Self-adhesive through-wall membrane lapped onto roof underlay and flashing (AB/WRB) | • Roof sheathing |
| ⑤ Plywood starter curb for roof renewals | • Attic framing with vented air space |
| ⑥ Pre-finished metal flashing | • Batt insulation |
| ⑦ Roof vent beyond | • Ceiling vapour barrier poly (AB) |
| ⑧ Continuous VP sheathing membrane prestrip behind roof framing (AB) | • Interior gypsum ceiling |
| | ⑩ Batt insulation |
| | ⑪ Continuous self-adhesive membrane over all top plates (AB) |
| | ⑫ Continuous sealant bead at ceiling vapour barrier poly (AB) |

RENEWABLE ROOF ABUTMENT AT ABOVE-GRADE WALL | D1.03 ROOF #1 - VENTED ATTIC ROOF

Detail 1.04 Service Penetrations Through Top Plates at Roof

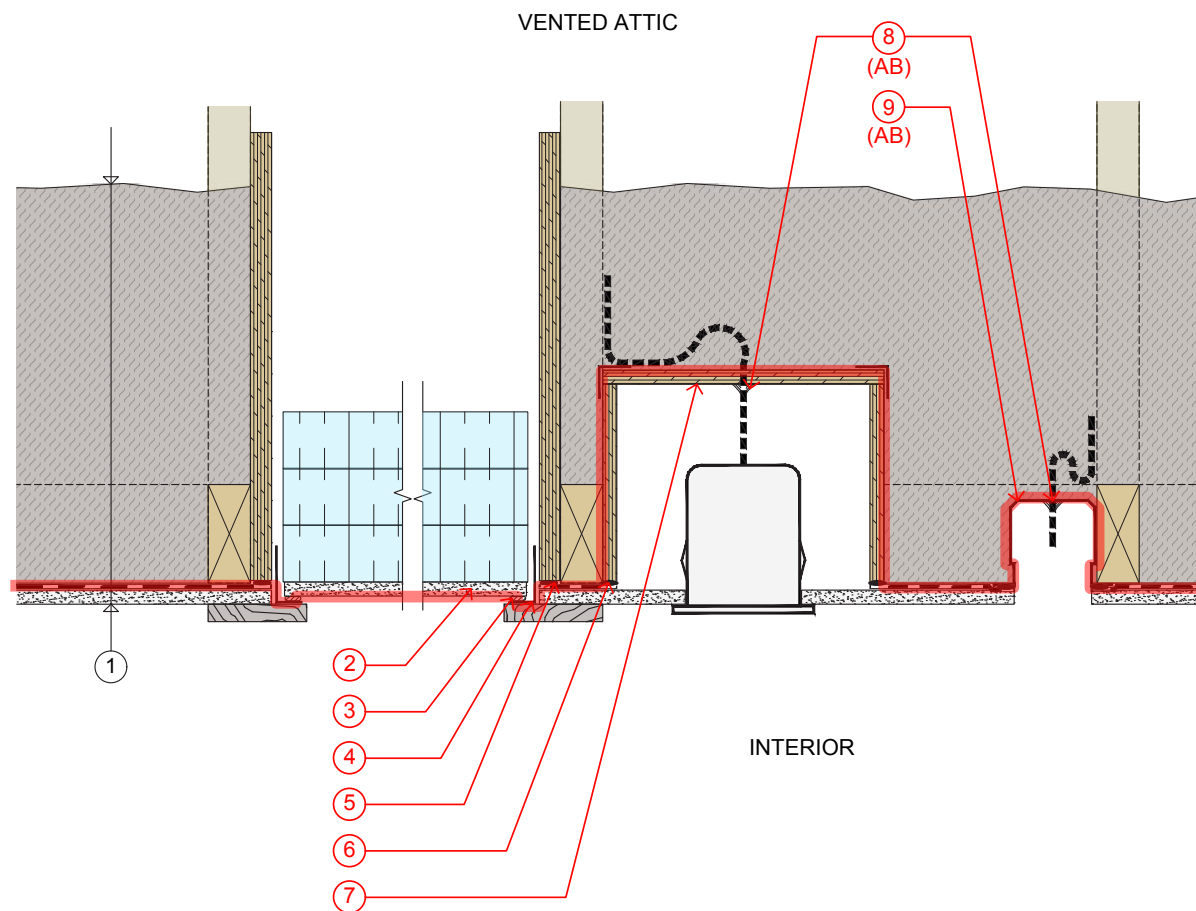


LEGEND

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|---|---|
| ① Vented attic roof assembly with ceiling vapour barrier poly air barrier system (AB) | ⑥ Continuous sealant around top plate penetration (AB) |
| ② Ceiling vapour barrier poly returned down face of top plates (AB) | ⑦ Top plate service penetration into ceiling joist space (vent stack shown) |
| ③ Cross-strapping for ceiling service space | ⑧ Wire penetration into ceiling service space (beyond) |
| ④ Continuous self-adhesive membrane over all top plates (AB) | ⑨ Ceiling poly top plate sealant around wire penetration (AB) |
| ⑤ Continuous ceiling poly top plate sealant (AB) | ⑩ Wire penetration through side of top plate aligned with service cavity |

SERVICE PENETRATIONS THROUGH TOP PLATES AT ROOF | D1.04
ROOF #1 - VENTED ATTIC ROOF

Detail 1.05 Access Hatch and Ceiling Service Penetrations



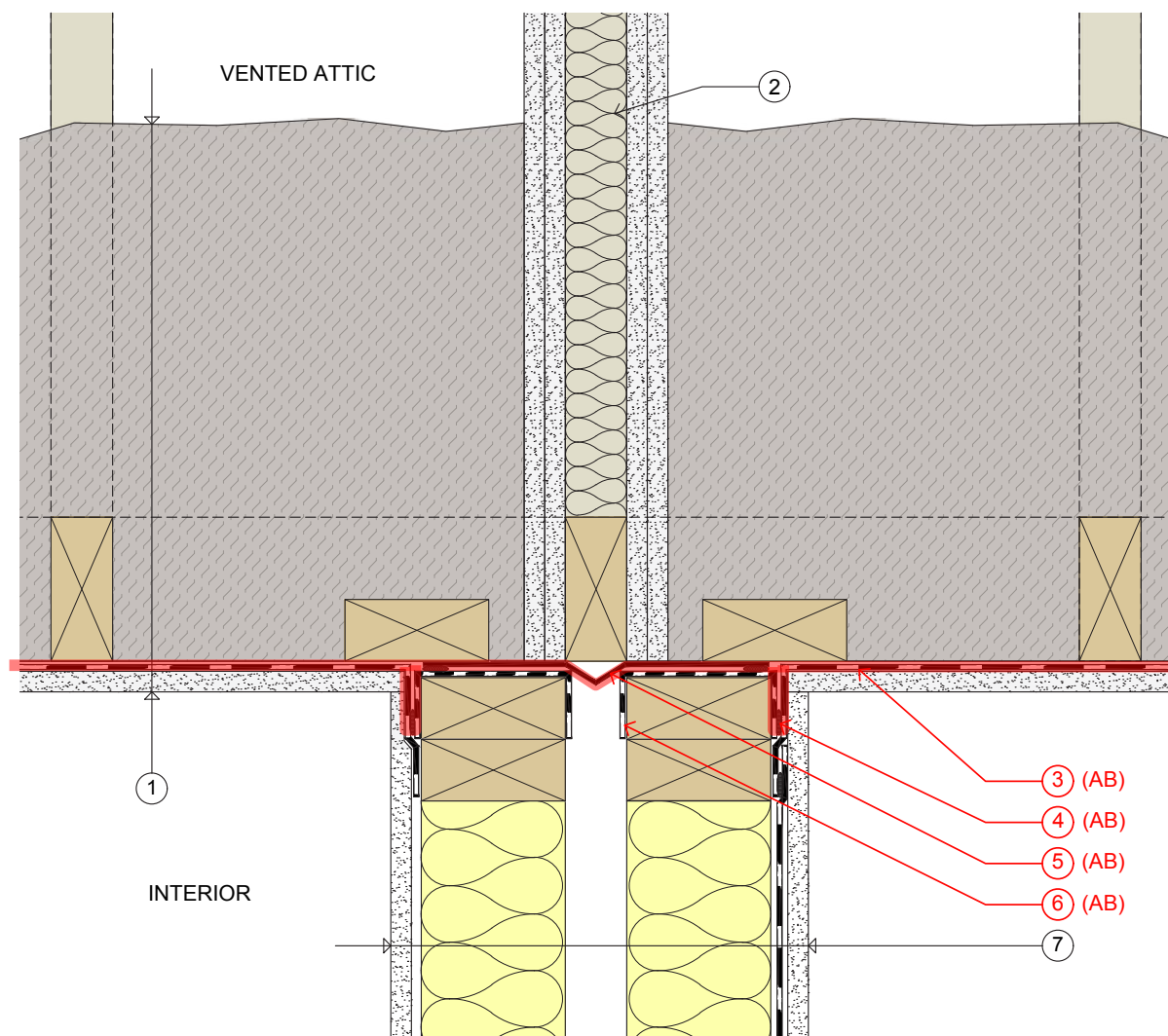
LEGEND

- | | |
|---|---|
| ① Vented attic roof assembly with ceiling vapour barrier poly air barrier system (AB) | ⑦ Attic service box with all joints taped (AB) |
| ② Attic hatch with foam insulation adhered to top side (AB) | ⑧ Sealant or electrical putty around wire penetration (AB) |
| ③ Continuous foam gasket around attic hatch (AB) | ⑨ Electrical junction box with flange gasket at ceiling poly (AB) |
| ④ Continuous high performance tape between trim board and hatch opening insulation retention board (AB) | |
| ⑤ Continuous sealant between ceiling poly and insulation retention board (AB) | |
| ⑥ Continuous sealant between ceiling poly and service box (AB) | |

ACCESS HATCH AND CEILING SERVICE PENETRATIONS | D1.05

ROOF #1 - VENTED ATTIC ROOF

Detail 1.06 Top of Interior Double-Stud Party Wall at Roof



LEGEND

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|--|--|
| ① Vented attic roof assembly with ceiling vapour barrier poly air barrier system (AB) | ⑥ Continuous self-adhesive membrane over all top plates (AB) |
| ② Batt insulation | ⑦ Party wall assembly with partition air barrier system |
| ③ Ceiling vapour barrier poly (AB) | • Interior gypsum wall board |
| ④ Continuous sealant at ceiling poly (AB) | • Poly (AB) |
| ⑤ Continuous sheet metal firestop profile set into sealant on top plates and sealed at joints (AB) | • Wood framing with batt insulation |
| | • Air gap |
| | • Wood framing with batt insulation |
| | • Interior gypsum wall board |

TOP OF INTERIOR DOUBLE-STUD PARTY WALL AT ROOF | D1.06
ROOF #1 - VENTED ATTIC ROOF

Glossary

Air control layer	The control layer designed to resist the flow of air through the building enclosure. Also referred to as the air barrier system.
Air leakage	Uncontrolled airflow through openings in the building enclosure.
Air permeance	The degree to which a material allows air to flow through it.
Vapour control layer (vapour barrier / vapour retarder)	The control layer that manages the diffusion of water vapour through materials and resists movement of water vapour across the enclosure.
Vapour diffusion	The movement of water vapour through a material.
Water control layer	The innermost boundary against liquid water intrusion.
Water-resistive barrier (WRB) membrane	A sheathing membrane capable of resisting non-hydrostatic water pressure and deflecting water off vertical or high-sloped conditions.
Water load	The liquid water the enclosure manages, including precipitation, runoff, groundwater, and ice melt.
Water-shedding surface (WSS)	The outer surface of the building enclosure that deflects most exterior precipitation away from inner layers.
Thermal control layer	The control layer designed to primarily resist heat flow through the building enclosure.
R-value / RSI value	The measure of the thermal resistance of a material or assembly of materials.
Service cavity	An intentional space between interior finishes and the air barrier designed to contain services that would otherwise penetrate the air barrier.
Penetration	Any intentional opening through an assembly to allow ducts, wires, pipes, or fasteners to pass.
Condensation	The change of water vapour to liquid water.
Continuity (of control layers)	Control layers that span across different material types, transitions, interfaces, and joints without breaks.

Notes



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