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Applied Research
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**Green Building
Technologies**

SOUTHERN ALBERTA INSTITUTE OF TECHNOLOGY

GREEN BUILDING TECHNOLOGIES

High Performance Wall Assembly Project
Summary Report

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Abbreviations and Terminology

The following terms have been listed as they are common abbreviations found in industry. They may be frequently used throughout the report.

AB – Alberta

AEF – Alberta Ecotrust Foundation

ARIS – Applied Research and Innovation Services

EPS – Expanded Polystyrene

GBTAC – Green Building Technologies Access Center

ICF – Insulated Concrete Form

LEEP – Local Energy Efficiency Partnerships

NBC – National Building Code of Canada

NECB – National Energy Code of Canada for Buildings

NRCAN – Natural Resources Canada

NZE – Net Zero Energy

O.C. – On Center

R.H. – Relative Humidity

R.O. – Rough Opening

SAIT – Southern Alberta Institute of Technology

SQ/FT – Square Foot

VB – Vapour Barrier

WRB – Water Resistive Barrier

XPS – Extruded Polystyrene

Executive Summary

Purpose

Promote energy efficient building envelope and wall constructions to the residential building sector in Alberta.

Process

6 different assemblies were researched and selected to be showcased. This would consist of the development of construction detail drawings, a physical mockup, and cost comparison analysis for each selected assembly. The assemblies selected to showcase were:

- Tier 1 2x6 Assembly
- Exterior Mineral Wool Tier 3 Assembly
- Double Stud Wall Net Zero Assembly
- Exterior Foam Net Zero Assembly
- Fire Resistant Retrofit Assembly
- Larsen Truss Retrofit Assembly

Physical mockups of the chosen assemblies' walls were constructed by GBTAC. The purpose of these mockups is for AEF to bring across the province to different educational events to showcase, and use for an educational tool. The advantages of each assembly and difficulties were noted during construction of the mockups.

Key Findings/Results

Of the new build construction mockups, the most affordable assembly to build, as per GBTAC's findings, was the Tier 1 2x6 Assembly, while the costliest being the Exterior Foam Net Zero Assembly. In terms of cost for all 6 assemblies, the order from most affordable to least affordable, as per the materials selected for the mockups, was:

1. Larsen Truss Retrofit Assembly (Pricing for retrofit components only)
2. Tier 1 2x6 Assembly
3. Fire Resistant Retrofit Assembly (Pricing for retrofit components only)
4. Double Stud Wall Net Zero Assembly
5. Exterior Mineral Wool Tier 3 Assembly
6. Exterior Foam Net Zero Assembly

GBTAC staff found that the order of difficulty to construct, from least to most difficult were as follows:

1. Tier 1 2x6 Assembly
2. Double Stud Wall Net Zero Assembly
3. Exterior Mineral Wool Tier 3 Assembly
4. Larsen Truss Retrofit Assembly
5. Fire Resistant Retrofit Assembly
6. Exterior Foam Net Zero Assembly

GBTAC found that one of the largest factors on the cost of an assembly was the selection of the WRB, VB, and sealant tapes. The more high performance designated membranes did come at a substantial cost increase over more readily available materials and membranes.

Future Research/Additional Exploration

The largest item that should be considered for future research is to complete a cost analysis on the assemblies using the same materials throughout. Comparing the assemblies when high performance materials were selected for some, but not the other can have an impact on the accuracy of a cost comparison.

Scope/Deliverables

The following report was written by staff at the Green Building Technology Access Center (GBTAC), which is part of the Southern Alberta Institute of Technology's (SAIT) Applied Research and Innovation Services (ARIS) hub. This report is intended to summarize the process and methods used by GBTAC to assist in the design, construction and evaluation of different high-performance wall assemblies for the Alberta Ecotrust Foundation (AEF).

The intention of this project is to promote cost-effective and energy-efficient building envelopes and wall construction in Alberta, specific to the Alberta's climate zones. The deliverables of this project aim to provide valuable data, training materials, and knowledge exchange opportunities to everyone involved in the designing and constructing of high-performance walls in the industry.

The Scope and Deliverables of the project were as follows:

Research and Development

Research and design the below listed 6 assemblies focusing on affordability and constructability.

- List of walls to be researched and developed:
    - 1 Business as Usual (BAU) assembly
    - 1 Tier 3 assembly
    - 2 Net Zero assemblies
    - 1 High-performance retrofit assembly
    - 1 Net Zero retrofit assembly

Deliverable: Wall description (including a section describing how the design is affordable and constructible) materials, and drawing details (rough drawings are acceptable for this deliverable).

Stakeholder Engagement

SAIT's GBTAC will provide details from the Research and Development stage and ENBIX will engage with industry associations (BILD AB, ER, Calgary) to gather insights and address challenges.

Deliverable: Representation from SAIT at each of the three one-hour meetings and one summary meeting with ENBIX

Construction Planning

Begin construction of the six wall assemblies after receiving approval from ENBIX.

Deliverable: SAIT's GBTAC to construct the 6 wall assemblies, document the process via video, detailing the constructability and step-by-step process and will share the challenges encountered along the way in a report.

- A minimum of 10 images/figures per assembly.
- The following construction details for each assembly
  - Wall Section Overview & Materials List
  - Wall Section Detail
  - Base of Wall at Foundation
  - Cladding transition at floor junction
  - Wall & Roof Interface
  - Window sill
  - Window Jamb
  - Window Head
  - Wall Penetration at Duct - Section
  - Wall Penetration at Receptacle – Section

Performance Evaluation

ENBIX to conduct energy modeling, SAIT to do a cost analysis on a per sq ft basis based on a model home to be provided by AEF, to evaluate the performance of each wall assembly. This should be broken out per material in each wall including any fenestration. This will be reviewed by engagement with industry for cost comparison.

Deliverable: Cost per square foot of each wall broken out per material and total cost per wall.

Knowledge Sharing

Participation in BUILDEX Calgary on October 23-24, 2024.

Deliverable: Representation from SAIT at BUILDEX Calgary to assist in running a workshop titled "Building Beyond Code: Exploring High-Performance Wall Assemblies" with the ENBIX team. A presentation will be prepared by ENBIX for the workshop.

Continuous Improvement

Incorporate lessons learned from the project into future iterations.

Constraints/Limitations

Within the scope of the project, there were certain constraints and limitations that had an effect on the final outcome. Some of these include but are not limited to:

- Cost analysis pricing calculations were based off of material pricing gathered by GBTAC in 2023. Pricing is for comparative purposes between the selected assemblies only and not to be used for budgeting.
- Cost analysis pricing was for material only and did not consider labour costs due to the variability of labour costs.
- Cost analysis was completed as per the materials utilized for the physical mock-ups. This can misrepresent a true comparison between the assemblies. High-quality materials, or more affordable materials could potentially be installed on each the selected assemblies. Some of the materials selected for certain assemblies and not for the other can alter the costs significantly.
- Due to the variability of cost and abundant selection, cost analysis pricing did not include windows, attic insulation, or foundation construction costs.
- The cost analysis outlined in the body of this report was completed as if the model home was to be built from scratch. The retrofit assemblies in the cost comparison does not include wall, roof, or floor framing material, as they would be considered to existing.
- The affordability analysis as outlined in ***Appendix D: Cost per sq/ft of Wall Affordability Analysis*** was calculated on a cost per sq/ft of wall assembly material only. The retrofit assemblies did not include wall framing material as they would be considered to be existing.
- Cost and affordability analyses do not include a monetary value. They are comparisons as a percentage based on GBTAC staff material cost estimates.
- Wall mock-ups were constructed in a shop environment. This does not represent the actual build process that would be performed on construction sites in most cases.
- Assembly design and construction is based on GBTAC staff's industry experience. There are numerous methods for constructing various assemblies, and the techniques used for this project may not be the most optimal for every situation.
- Specific materials and manufacturers are only mentioned in regards to the materials utilized for the physical mock-ups. SAIT, ARIS and GBTAC are not sponsored by or endorse any of the manufacturers named.
- Material selection did not consider any specific climate resiliency strategies.
- The materials listed in this report reflect what was used for construction of the mock-ups only. Specific materials and manufacturers were not listed in the drafting and detailing documents.
- Physical mock up stud spacing is not on a set 16" or 24" O.C. spacing. The studs were placed centered in the wall length which varied per mock up.
- Thermal modelling to be done on a 24" O.C. stud spacing.
- Effective thermal performance calculations were calculated on a clear wall. Partitions, windows, doors, fasteners, etc. were not considered.
- Effective thermal performance calculations were not completed for the foundation or roof assemblies.
- Effective thermal performance calculations were calculated based off of the GBTAC developed drawings, not on the physical mock-up construction.

Process

Assembly Selection and Construction

GBTAC used internal staff's industry knowledge, along with input from the AEF Foundation, residential construction professionals, and the NRCAN LEEP NZE Wall Assembly Guides to determine which assemblies to showcase. The 2020 NBC, NBC – 2023 Alberta Edition, and the 2020 NECB were also referenced for the design of all of the assemblies chosen. GBTAC, with the approval from staff at the AEF Foundation developed drawings and construction details. The six assemblies selected were:

- **Tier 1 2x6 Assembly**
- **Exterior Mineral Wool Tier 3 Assembly**
- **Double Stud Wall Net Zero Assembly**
- **Exterior Foam Net Zero Assembly**
- **Fire Resistant Retrofit Assembly**
- **Larsen Truss Retrofit Assembly**

There were several factors that had an influence on the selection of the six assemblies to construct, including but not limited to:

- Constructability
  - How difficult is the assembly to construct?
  - Will it be able to be replicated again and again to the same standard and quality?
  - Does the assembly require specialized trades or workers to complete?
- Material Availability
  - Is the material in the assembly readily available?
  - Can the material be purchased at a local hardware or building supply store?
  - Does the assembly require custom materials to construct?
- Building Science Fundamentals
  - Does the assembly follow basic building science fundamentals, ensuring as durable and energy efficient of an assembly as possible?
- Cost
  - Is the assembly unnecessarily costly?
  - Will the assembly influence the amount of energy used, thereby, influencing the monthly cost of ownership of the building?

GBTAC constructed a physical mock-up for each of the chosen assemblies. These mock-ups were constructed to show an example of an exterior corner of a home. Included is a wall to floor transition, a detailed window opening with a small corner unit window installation, and examples of sealing a duct penetration and electrical penetration through the air control layer on a select few.

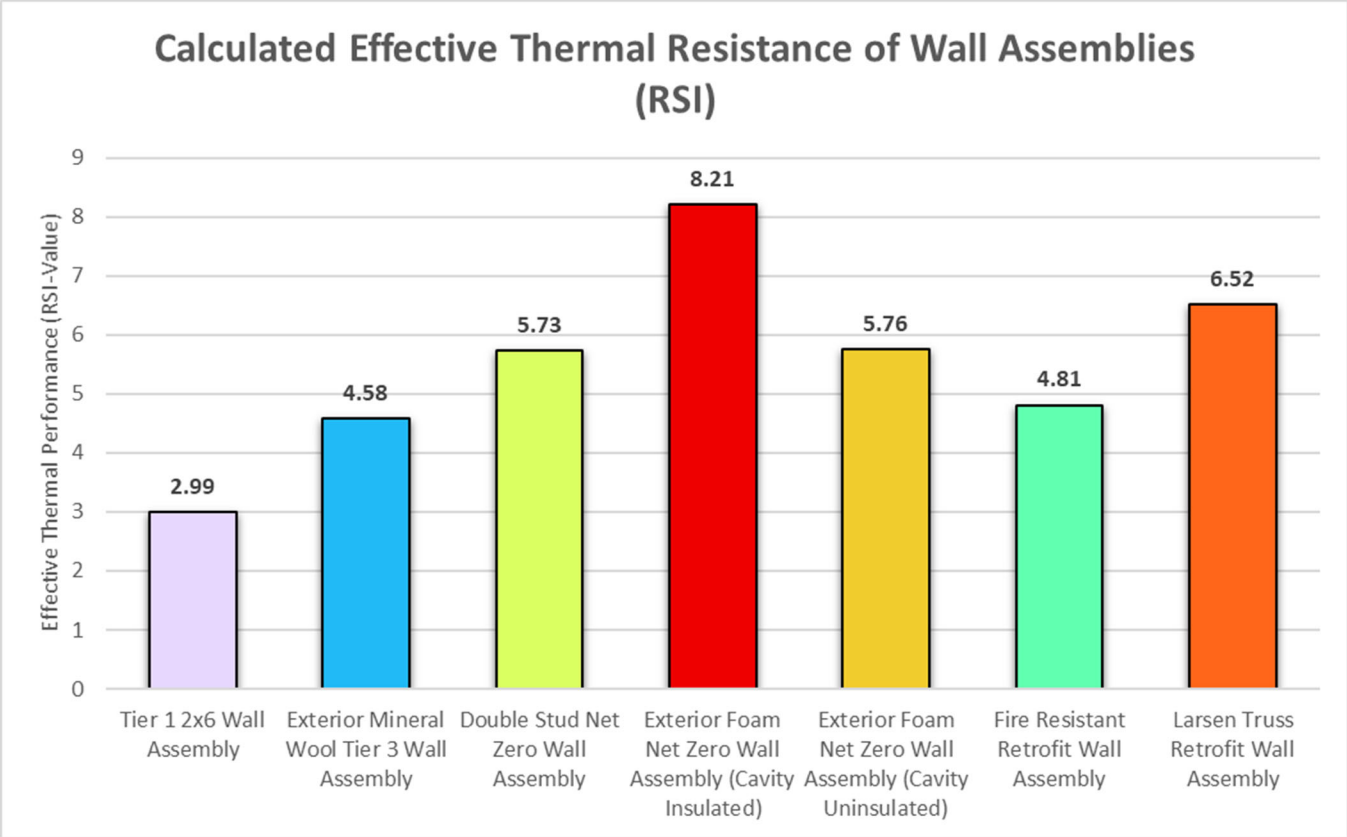
Effective Thermal Resistance

Calculations to determine the wall assembly effective thermal resistance for each wall assembly were completed by GBTAC. All the information to calculate effective thermal resistance were taken from the following sources:

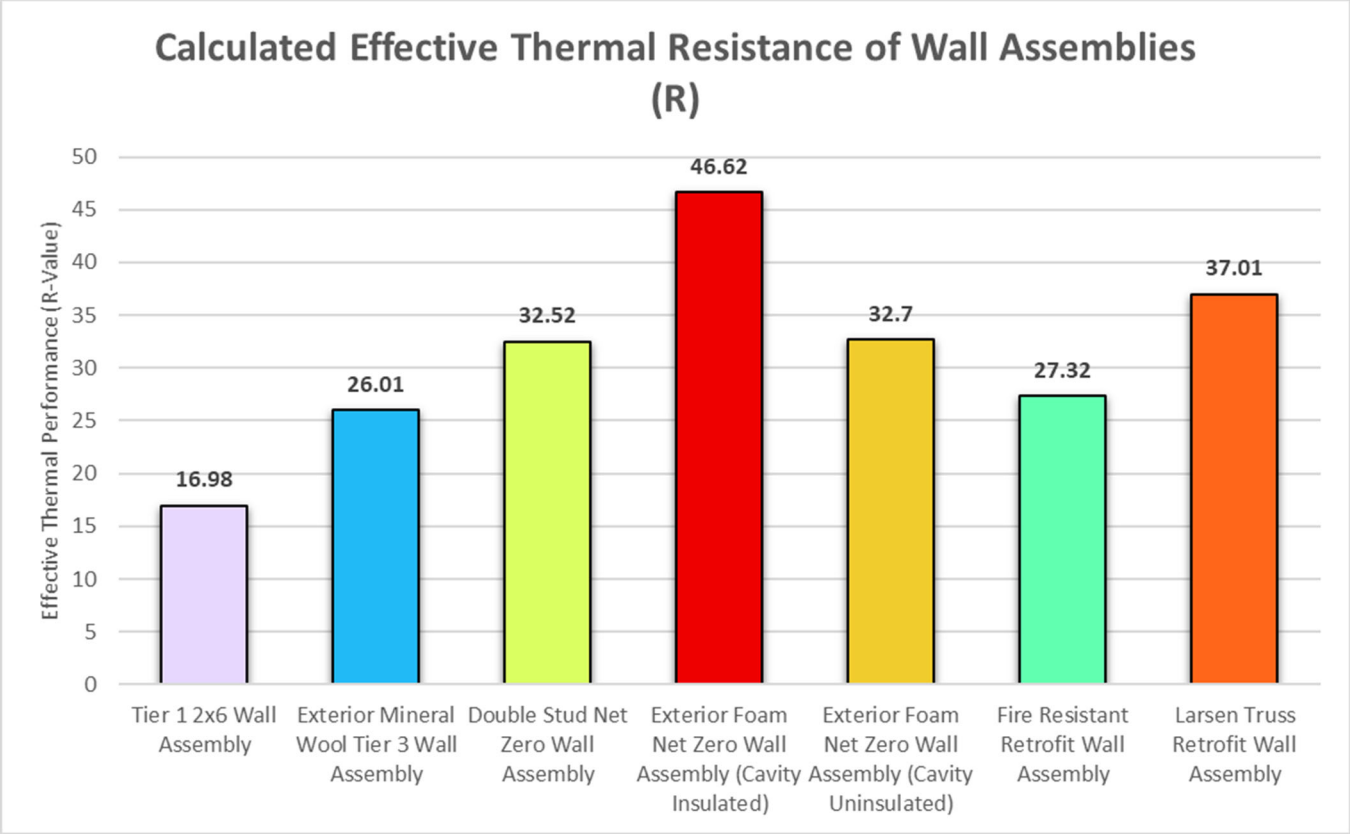
- **2020 NBC – A-9.36.2.4.(1)** Calculating the Effective Thermal Resistance of Building Envelope Assemblies
- **2020 NBC – Table A-9.36.2.4.(1)-A** Framing and Cavity Percentages for Typical Wood-frame Assemblies
- **2020 NBC – Table A-9.36.2.4.(1)-D** Thermal Resistance Values of Common Building Materials

The below graphs show the results of the effective thermal resistance calculations of each wall assembly both in RSI-value and R-value. The calculation information can be found in ***Appendix B: Wall Assembly Effective Thermal Resistance Calculations.***

Graph 1: Calculated Effective Thermal Resistance of Wall Assemblies (RSI)



Graph 2: Calculated Effective Thermal Resistance of Wall Assemblies (R)



Cost & Constructability Analysis

An approximate cost analysis was completed for each assembly. For these cost comparisons, only materials were considered as labour pricing can vary drastically from one builder or trade, to another. GBTAC utilized a database of material prices that were gathered by staff in 2023. Material take-offs for the estimate were calculated using plans from a previously constructed home that had been donated for use by GBTAC and AEF (see ***Appendix C: Cost Analysis Model Home***). New construction assemblies considered the cost to supply and construct the entire wall assembly, as well as an engineered floor and roof truss system.

Retrofit assemblies only considered the material to the exterior of the structural sheathing and did not include material to build walls, floors, or roofs as these were intended to be existing and unchanged.

Some items that were not included in the cost analysis for varying reasons were, but not limited to:

- Cladding
- Interior finishes (gypsum board, trim, etc.)
- Windows and doors
- Foundation and basements
- Decks, porches, or roofs covering them

GBTAC utilized the results from this initial cost analysis to complete an additional affordability analysis (see ***Appendix D: Wall Assembly Affordability and Constructability Analysis***).

Stakeholder Engagement

All of the assemblies that were selected were initially roughly drafted and submitted to AEF for approval. AEF shared these drafts with industry experts, mainly those associated with BILD Alberta, BILD Calgary Region, and BILD Edmonton Region. The majority of the feedback provided from these drafts pertained to the affordability of the higher performance assemblies. This feedback ultimately did not result in any changes to the proposed assembly selection or plans.

GBTAC presented two built mock ups at two events with AEF. The two mock ups were;

- Exterior Mineral Wool Tier 3 Assembly
- Double Stud Net Zero Assembly

These were showcased at the BUILDEX Alberta event in Calgary, Alberta in October 2024, and the Building for Sustainability Symposium in Canmore, Alberta in October 2024. Presenting the mock ups at these two events resulted in valuable conversation with the attendees about other methods of construction and materials that are available. The feedback from these presentations did not result in changes being made to the existing mock ups or the future built mock ups.

Outcome

Selected Assemblies

Tier 1 2x6 Assembly

See ***Appendix A: Tier 1 2x6 Assembly Construction Details*** for plans and construction details.

Description and Overview

This assembly is one of the most common methods of constructing residential buildings in Canada at the time of this report. AEF requested that a "Business as Usual" assembly be developed to display a code requirement level of construction. GBTAC staff, with assistance from AEF, developed the design for this assembly utilizing feedback from the residential building and construction professionals. The wall assembly, from exterior to interior, contains:

- Exterior Cladding
- WRB, vapour open
- Structural sheathing
- 2x6 stud wall @ 24" O.C. with fibreglass batt cavity insulation
- Airtight 6 mil polyethylene sheet vapour barrier
- ½" gypsum board
- Interior finish

With the variability of roof and foundation options, it was decided to go with a flat bottom chord truss system with raised heels to accommodate the required attic insulation for the roof. The foundation was drawn as an 8" concrete foundation, with damp proofing and a capillary break to the exterior. To the interior there is a 1" air space, a 2x4 stud wall at 24" O.C. filled with R-12 fibreglass batt insulation, and then an airtight 6 mil poly vapour barrier.

The window that was used for the physical mock-up was a standard window used in construction in Alberta at the time of writing. It is a triple pane window, with a vinyl frame and jamb extension. Installation is to the structural sheathing layer fastened with nails through an attached nailing flange. The sill of the window R.O. utilizes a piece of bevel siding spanning the length to create a sloped sill, guiding any moisture that may accumulate there to the exterior of the opening, and down the WRB. Sloped shims were then placed at the spots of the window that need structural support, as determined by the window manufacturer.

Materials

Materials used for mock-up wall construction are as follows:

- **WRB**
  - DuPont - Tyvek HomeWrap – mechanically fastened
  - Sill Pan Flashing – Henry Bakor BlueSkin WB & Bakor Aquatec Emulsion Primer
- **Structural Wall**
  - 3/8" OSB structural sheathing
  - 2x6 SPF lumber
- **Cavity Insulation**
  - Owens Corning R-22 Pink Next Gen Fiberglass Insulation

- **Airtight Vapour Barrier**
  - Membrane - Everbilt CGSB Approved 6 mil Vapour Barrier
  - Tape – Tuck Tape - UV-Resistant Sheathing Tape Roll for PE Vapour Barrier
  - Sealant – LePage PL Acousti-Seal Sound Absorbing Vapor Barrier Adhesive
- **Assembly Effective Thermal Performance**
  - RSI-2.99 or R-16.98

Construction

Construction of this assembly mockup was very straightforward and easy to complete. This being a very common assembly, most home builders and trades people will have constructed or worked with this assembly before.

The air control layer for this assembly is the 6-mil poly VB. Maintaining a continuous air control layer was achieved with this membrane along with the following materials:

- Compressed acoustical sealant at joints and openings of the VB and under the wall bottom plates.
- Airtight electrical boxes with gasket seals at the face.
- Expanding spray foam insulation and tape around mechanical penetrations.
- Foam backer rod and caulking at the windows.

Assembly Advantages

- Easy to build and common across Canada.
- Materials were easily accessible at most hardware or building supply stores.
- Materials selected were more affordable compared to other high-performance materials in the other assemblies.
- Construction did not require specialized professionals outside the norm to design or build.
- The VB being the air control layer on the interior of the assembly means that installers have a flat floor and an interior environment for the installation of this layer.

Assembly Disadvantages

- Airtightness detailing was challenging as the air control layer is on the interior of the wall resulting in breaks in the continuity at floor, partition, electrical boxes, and mechanical junctions that needed to be detailed.
- Acoustical sealant as the air seal can be very messy and if not installed with care, can get on and damage certain finishes.
- If acoustical sealant is not properly installed and compressed then the effectiveness of it can be greatly reduced.
- Once the walls are lifted, it was not possible to see if the air control layer is continuous under the wall plate to the floor sheathing, unless a membrane is installed under the plate extending to the interior.
- There is a considerable amount of structural wood thermal bridges in this construction method. This causes heat loss, resulting in higher energy use.

Cost Analysis

This assembly being considered a “Business as Usual” assembly, set the baseline price that was used to compare the other assemblies to. Of the new construction assemblies selected for this project, GBTAC calculations found that this assembly came out to be the most affordable to build.

Exterior Mineral Wool Tier 3 Assembly

*See **Appendix A - Exterior Mineral Wool Tier 3 Assembly Construction Details** for plans and construction details*

Description & Overview

The design of this assembly is similar to the Tier 1 2x6 assembly with 2" of mineral wool insulation wrapping the exterior of the 2x6 framing and floor assembly, from the foundation up to the underside of the top chord of the roof trusses. The wall assembly, from exterior to interior, contains:

- Exterior Cladding
- ¾" rainscreen strapping
- 2" mineral wool insulation
    - Connected with ¾" rainscreen strapping and screws as per manufacturers specifications
- Airtight WRB, vapour open
- Structural sheathing
- 2x6 stud wall with fibreglass batt cavity insulation
- Variable vapour barrier
- ½" gypsum board
- Interior finish

The roof and foundation for drafting and mock-up detailing were the same as the Tier 1 2x6 Assembly.

The window installed in the mock-up was the same as the Tier 1 2x6 Assembly. There were several options considered as to where the window would be located within the wall assembly. The placement of the window selected for this project was to install it in a similar way as the Tier 1 2x6 assembly. With the window installed with the flange mounted to the exterior face of the structural sheathing, it allowed for the exterior insulation to cover the nailing flanges, reducing thermal bridging. The other installation method considered was to install the window at the exterior face of the rainscreen. This would have required a custom structural buck to be build to extend the framing R.O. to the outer face of the wall and would have complicated the water control layer detailing at the window. Installing the window to the exterior of the rainscreen would have allowed for the siding to stop right at the window frame and not require a custom cladding return to the inset window when installed at the sheathing layer.

The decision to select this assembly was primarily influenced by researching common methods utilized by residential builders in Alberta to achieve tier 3 standards.

Materials

Materials used for mock-up wall construction are as follows:

- **Rainscreen Strapping**
  - 1x4 SPF lumber
  - Fasteners - #10 – 5” Construction Screws spaced per insulation manufacturers guidelines
  - Bug screen
- **2” Mineral wool**
  - Owens Corning Thermafiber Insulation – R 4.1/Inch
- **Airtight WRB**
  - Membrane - Siga Majvest 200 – Mechanically fastened
  - Sealing tape – Siga Wigluv in varying sizes.
  - Sill Pan Flashing – Siga Wigluv
- **Structural Wall**
  - 3/8” OSB structural sheathing
  - 2x6 SPF lumber
- **Cavity Insulation**
  - Owens Corning R-22 Pink Next gen Fiberglass Insulation
- **Vapour Barrier**
  - Siga Majrex
  - Sealing Tape – Siga Fentrim
- **Assembly Effective Thermal Performance**
  - RSI-4.58 or R-26.01

Construction

This assembly was very similar to the Tier 1 2x6 Assembly as far as structural framing was concerned. The air control layer for this assembly was the Siga Majvest 200 WRB. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Taping to seal all joints and openings in the WRB.
- Installation of a strip of WRB between the top and cap plate of the wall at the truss connection, draping to the exterior and interior. Taping the joints to the WRB and VB.
- Taping electrical wire penetrations.
- Taping WRB to window frame on the sides and the top.
- Taping WRB to mechanical penetrations
- Foam backer rod and caulking to connect the window frame sill to the WRB at the sill.

Sealing the WRB to maintain airtightness was much easier than sealing the interior VB as there were fewer junctions and penetrations to detail. Additionally, being installed on the sheathing provided solid material for taping and rolling the tape joints to seal the WRB at all laps and penetrations.

The largest difference between this assembly and the Tier 1 Assembly is the installation of 2” of mineral wool and a rainscreen to the exterior of the WRB. The mineral wool was installed by initially tacking it in place with plastic cap nails. The ¾” rainscreen strapping was then installed at the same spacing as the structural framing, ensuring the fasteners attaching the strapping were imbedded into a structural member.

Custom made flashing was required for the areas that the flashing had to return all the way to the back side of the WRB. A bug screen was installed at the top and base of rainscreen sections in between the strapping to prevent bugs and small animals from entering the

assembly. A custom engineered wood window trim return was made for the exterior trim of the window.

Assembly Advantages

- Wrapping the exterior of the wall assembly in 2” of mineral wool insulation reduces the amount of thermal bridging through the wood structural framing members.
- The mineral wool insulation used for the mockup was moisture resistant. This allowed it to be installed as part of the WRB.
- The mineral wool insulation used for the mockup has fire resistant qualities.
- The structural framing is very similar to how most homes are currently being built (Tier 1 2x6 Assembly).
- Utilizing the WRB as the air control layer allowed for less challenging detailing, and a reduced chance of errors at junctions and penetrations compared to locating the air control layer to the interior of the assembly.
- Attaching the mineral wool with ¾” strapping material created a rainscreen for the assembly which would assist with moisture management.
- The framing and construction method for this assembly does not differ greatly from the Tier 1 2x6 assembly.
- Adding only 2” of exterior insulation allowed for the use of screws that can be found at most hardware or building supply stores.

Assembly Disadvantages

- High-performance membranes and materials were costly, and needed to be ordered from the manufacturer.
- Not all cladding systems can be accommodated with this exact assembly. For example, if stucco was to be installed, there would need to be a sheathing layer to the exterior of the rainscreen or other accommodations made.
- Overdriving rainscreen strapping screws can compress the mineral wool insulation, creating a wavy exterior finish.
- Considerable forethought, planning and organization is required, as mistakes can be more time consuming and difficult to fix than the Tier 1 2x6 Assembly.

Cost Analysis

Upon completing a cost analysis of this assembly compared to the Tier 1 2x6 Assembly, the cost to construct this assembly for the model home came out to roughly 54% more.

GBTAC found that the largest cause of additional costs was due to the use of the high-quality membranes and tapes, followed by the mineral wool insulation.

Double Stud Wall Net Zero Assembly

See ***Appendix A: Double Stud Wall Net Zero Assembly Construction Details*** for plans and construction details.

Description & Overview

The design of this assembly utilizes two 2x4 stud walls spaced apart by 3". This entire 10" cavity is then filled with insulation. The construction method is very similar to "Business as Usual" as it is essentially just a thick wall. The interior of the two walls was made the structural wall. This allowed for the floor joists to land on this interior wall and insulation to fill the cavity from the rim board to the exterior of the assembly. The air control layer for this assembly was the VB, detailed in the same manner as the "Business as Usual" assembly. The wall assembly, from exterior to interior, contains:

- Exterior Cladding
- WRB, vapour open
- Structural sheathing
- 2x4 stud wall @ 24" O.C. with fibreglass batt cavity insulation
- 3" cavity with fibreglass batt insulation
- 2x4 stud wall @ 24" O.C. with fibreglass batt cavity insulation
- Airtight variable vapour barrier
- ½" gypsum board
- Interior finish

The roof for drafting and details is the same as with the Tier1 2x6 Assembly. The foundation was drawn as an ICF foundation as is used by many builders utilizing this assembly.

The window installed in the mock-up was the same window as the Tier 1 2x6 Assembly. It was installed to the exterior of the structural sheathing.

The decision to select this assembly was primarily influenced by the fact that multiple high-performance builders in Alberta and across North America have utilized this assembly and it has been replicated many times. This, combined with the relative ease of construction and material availability confirmed that this assembly would be one of the selections to showcase.

Materials

Materials used for mock-up wall construction are as follows:

- **WRB**
  - Membrane – Typar Building Wrap – mechanically fastened
  - Sill Pan Flashing – Henry – BlueSkin Butyl Flash
- **Stud Walls**
  - 3/8" OSB structural sheathing
  - 2 walls - 2x4 SPF lumber
- **Cavity Insulation**
  - 3 rows of Owens Corning R-12 Pink Next Gen Fiberglass Insulation
- **Airtight Vapour Barrier**
  - Membrane - Siga Majrex moisture variable VB
  - Sealing Tape – Siga Fentrim VB tape
- **Assembly Effective Thermal Performance**
  - RSI-5.73 or R-32.52

Construction

Construction of this assembly was again very similar to the Tier 1 2x6 Assembly. Framing consisted of two 2x4 stud walls, framed utilizing current code compliant, industry standard techniques. These walls have a 3" space between them, so a plywood or OSB spacer that is ripped to the width of the overall assembly thickness was installed to the top of the walls cap plate. This kept the walls held the correct distance apart. While building, 3" blocks were utilized to keep the two walls spread apart while securing them together. A ¾" plywood buck was installed around the perimeter of the window and door R.O. to maintain proper spacing and provide a solid R.O. surface.

R-12 fibreglass batt insulation was installed in the exterior 2x4 wall cavity first. The fibreglass batts were then installed in the 3" cavity space horizontally. Installing this layer horizontally allowed the insulation to span across several stud spaces which helped hold the insulation in place the interior wall insulation is then installed. This process, especially installing the insulation in the 3" cavity space, was time consuming but very straightforward and simple.

The air control layer for this assembly was the Siga Majrex Moisture Variable VB. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Taping any joints and openings in the VB and taping the VB to the floor under the wall bottom plate.
- Airtight electrical boxes with gasket seals at the face.
- Foam backer rod and caulking to connect the VB to the window frame.
- Expanding spray foam insulation.
- Taping WRB to mechanical penetrations

Assembly Advantages

- Easy to build as it was essentially just building a second wall compared to "Business as Usual"
- Materials used were easily accessible at a hardware or building supply store, aside from the Siga membrane and tape.
- WRB used was more affordable compared to the Tier 3 assembly.
- Did not require specialized professionals outside the norm to design or build.
- Building two walls with a space between significantly reduces the amount of thermal bridges compared to "Business as Usual".
- The spacing between the walls can be as large or small as needed or wanted.

Assembly Disadvantages

- Airtightness detailing was similar to the "Business as Usual Assembly" and was more challenging compared to the Tier 3 assembly as has been discussed.
- Lifting and moving the connected framed walls was more difficult due to the weight of the increased framing.
- Custom interior jamb finishing, or a custom ordered jamb extension from the window manufacturer was required.

Cost Analysis

Upon completing a cost analysis of this assembly compared to the Tier 1 2x6 Assembly, the cost to construct this assembly for the model home came out to roughly 23% more.

Of the new build assemblies that were selected, this assembly was the most affordable compared to the Tier 1 2x6 Assembly. The materials utilized in the mock-up construction were similar to the Tier 1 assembly, aside from the VB.

GBTAC found that the largest cause of additional costs was due to framing of two walls instead of one, the use of a more expensive high-quality VB, and the added insulation.

Exterior Foam Net Zero Assembly

See ***Appendix A: Exterior Foam Net Zero Assembly Construction Details*** for plans and construction details.

Description & Overview

This assembly followed the same principles as the Exterior Mineral Wool Tier 3 Assembly in that it is a structural 2x6 wall with insulation to the exterior of structural sheathing and incorporates an airtight WRB. The difference being that this wall assembly utilized 6" of vapour closed XPS. This meant a VB membrane did not need to be installed interior of the structural framing. The XPS extends from the underside of the truss top chord overhang, down the face of the above grade walls, and down the face of the foundation as well. The wall assembly from exterior to interior contains:

- Exterior Cladding
- ¾" rainscreen strapping
- 6" Vapour closed XPS insulation
    - Connected with ¾" rainscreen strapping and screws as per manufacturers/engineering specifications
- Airtight WRB
- Structural sheathing
- 2x6 stud wall @ 24" O.C.
- ½" gypsum board
- Interior finish

The roof for drafting and details is the same as with the Tier1 2x6 Assembly. The foundation was drawn as an ICF foundation with 4" of XPS insulation installed to the exterior.

The window installed in the mock-up was the same window as the Tier 1 2x6 Assembly. It was installed to the exterior of the structural sheathing behind the XPS insulation.

The decision to select this assembly was partially influenced by the NRCAN LEEP NZE Wall Guides and the fact that this is a common method of commercial construction. Other influencing factors are that many people in the industry consider this a very sound wall from a building science perspective. Placing the majority or all (when no insulation is installed in the framing cavity) of the insulation to the exterior of the wooden structure helps keep the dew point to the exterior of the structural sheathing and WRB, minimizing the possibility of condensing moisture related damage.

Materials

Materials used for mock-up wall construction are as follows:

- **Rainscreen Strapping**
  - 1x4 SPF lumber & ¾" Plywood
  - Fasteners – 10" Simpson Strong-Tie SDWS Exterior Grade Structural Screws – installed per manufacturers guidelines
  - Bug screen
- **6" XPS Insulation – Vapour Barrier**
  - 3 – 2" layers of Owens Corning Foamular NGX Insulation
- **Airtight WRB**
  - Membrane – Soprema Sopraseal Stick VP – Self Adhering Membrane
  - Sill Pan Flashing – Soprema Sopraseal Stick Flashpro
- **Structural Wall**
  - 3/8" plywood structural sheathing
  - 2x6 SPF lumber
- **Assembly Effective Thermal Performance**
  - With a R-22 fibreglass batt insulated framing cavity
    - RSI-8.21 or R-46.62
  - With an uninsulated framing cavity
    - RSI-5.76 or R-32.70

Construction

Of all the assemblies selected, GBTAC staff found this was the most difficult one to construct. Framing of the structural wall was very straightforward as it is the same process as with the Tier 1 2x6 Assembly. The stud cavity was left uninsulated for the physical mockup but could have been insulated as the amount of exterior XPS insulation utilized maintained an acceptable ratio of insulation to the interior of the VB in Alberta climates as required by the National Building Code - 2023 Alberta Edition.

The air control layer for this assembly was the Soprema self-adhered vapour permeable membrane. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Installation of a strip of WRB on top of the cap plate of the wall at the truss connection, draping to the exterior and interior. Taping the ceiling VB to this membrane
- Expanding spray foam at electrical and mechanical penetrations.
- Adhering WRB to window frame on the sides and the top.
- Foam backer rod and caulking to connect the window frame sill to the WRB at the sill.

Using a self-adhering membrane eliminated needing to staple or nail the membrane in place or tape the joints of the WRB. This made the installation of the air control layer slightly faster compared to the Tier 3 assembly.

The most difficult process of constructing the physical mock-up was installation of the 6" of XPS, the rainscreen strapping, and ensuring proper through flashing installation. GBTAC utilized both metal and WRB membrane through wall flashing. When using metal for the through wall flashing, custom pieces had to be made. The length of the screws resulted in more screws wandering out of line while installing them, missing the structural framing member they were intended to hit. One key consideration is that removing a misaligned screw can result in an air leakage path through the WRB and XPS insulation. Misaligned screw penetrations can be found and sealed on the interior side of the structural sheathing.

Custom cap flashing needed to be constructed to finish the top of the XPS insulation at the sill of window. A custom engineered wood window trim return was made for the exterior trim of the window.

Assembly Advantages

- Wrapping the exterior of the wall assembly with insulation reduces the amount of thermal bridging through the assembly.
- Using a vapour closed insulation allowed for the elimination of a VB membrane on the interior of the wall assembly. This saved time on detailing junctions and penetrations.
- Other rigid insulation types could be used if needed such as mineral wool or EPS.
- The structural framing is very similar to how most homes are currently being built (Tier 1 2x6 Assembly).
- Utilizing the WRB as the air control layer allowed for less challenging detailing, and a reduced chance of errors at junctions and penetrations compared to locating the air control layer to the interior of the assembly.
- Attaching the insulation with ¾" strapping material created a rainscreen for the assembly.
- This assembly is widely considered a safe assembly from a building science perspective by many industry professionals.
- WRB membrane can be utilized as through flashing, helping to reduce thermal bridging that would be caused by using metal through flashing.
- This assembly had the highest calculated effective thermal resistance across all of the selected assemblies for this project when the 2x6 wall cavity was insulated. It had the highest calculated effective thermal resistance of the new build assemblies regardless of whether the 2x6 cavity was insulated or not.
- Any punctures of the air control layer due to misaligned screws from attaching the strapping could be seen and sealed from the inside of the assembly.

Assembly Disadvantages

- High quality membranes, and XPS insulation added a significant cost.
- The self-adhered membranes could be difficult to work with. GBTAC found that a minimum of two installers made installing the membrane go smoothly.
- Once the self-adhered membrane was applied it was very difficult to remove or adjust if needed.
- Some materials could not be found at a common hardware or building supply store and needed to be custom ordered.
- Structural fasteners required for rainscreen and insulation installation were very costly.
- Not all cladding systems can be accommodated with this exact assembly. For example, if stucco was to be installed, there would need to be a sheathing layer to the exterior of the rainscreen or other accommodations made.
- Considerable forethought, planning and organization was required, as missed steps caused considerable delays and extra work.
- There may be difficulty finding trades that can or are willing to install this type of assembly in a residential setting.

Cost Analysis

Upon completing a cost analysis of this assembly compared to the Tier 1 2x6 Assembly, the cost to construct this assembly for the model home came out to roughly 160% more.

Of the new build assemblies that were selected, this assembly was the costliest compared to the Tier 1 2x6 Assembly.

GBTAC found that the largest cause of additional costs was due to the use of the high quality WRB membrane, the XPS insulation and the structural fasteners required.

Fire Resistant Retrofit Assembly

See ***Appendix A: Fire Resistant Retrofit Assembly Construction Details*** for plans and construction details.

Description & Overview

This assembly was approached as if there was only an exterior retrofit being performed on an existing home from the mid twentieth century. All the structural components were staying as-is and an exterior high-performance retrofit was going to take place. To determine what material to include in the physical mock-up that would represent the existing construction, GBTAC staff previous experience in renovations guided the selection. The existing assembly from exterior to interior contains:

- 3/8 plywood structural sheathing
- 2x4 stud wall with R-12 fibreglass batt insulation
- Polyethylene sheet VB

To determine what the high-performance retrofit additions would include, GBTAC staff utilized information from previously completed retrofit projects, and staff knowledge. The final decision was to display the addition of mineral wool to the exterior of the existing structure with a new airtight WRB and window replacement. The exterior retrofit addition, from exterior to interior contains:

- Exterior cladding
- ¾” Rainscreen strapping
- 4” Mineral wool insulation
- Airtight WRB

For the roof assembly it was determined that a 2x6 rafter was a very common way to build roofs. The existing foundation was considered to be a cast in place concrete foundation wall with a 1” airspace, then a 2x4 stud framed wall with R-12 fibreglass batt insulation and a polyethylene VB.

The window installed in the mock-up is the same as the Tier 1 2x6 Assembly.

Materials

Materials used for mock-up wall construction are as follows:

- **Rainscreen Strapping**
  - 1x4 SPF lumber
  - Strapping/Insulation Attachment - Soprema 4” ACS Thermal Clips
- **4” Mineral wool**
  - 2 – 2” layers of Owens Corning Thermafiber Insulation
- **Airtight WRB**
  - Membrane – Pro Clima Solitex Mento – Mechanically Fastened
  - Sealing tape – Siga Wigluv in varying sizes.
  - Sill Pan Flashing – Soprema Sopraseal Stick Flashpro
- **Existing Structural Wall**
  - 3/8” Plywood structural sheathing
  - 2x4 SPF lumber
- **Cavity Insulation**
  - Owens Corning R-12 Pink Next gen Fiberglass Insulation
- **Vapour Barrier**
  - Existing polyethylene plastic sheeting

- **Assembly Effective Thermal Performance**
  - RSI-4.81 or R-27.32

Construction

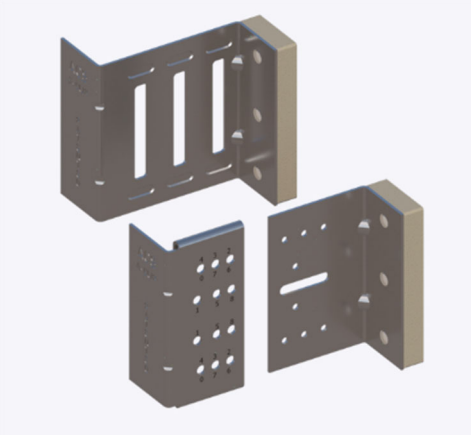
See ***Exterior Mineral Wool Tier 3 Assembly – Construction*** for the construction methods.

This assembly can be closely compared to constructing the Exterior Mineral wool Tier 3 Assembly, with 2" extra mineral wool, and no structural framing. The air control layer for this assembly was the Pro Clima Solitex Mento membrane. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Taping to seal all joints and openings in the WRB.
- Installation of closed cell spray foam insulation at the wall to rafter connection, sealing WRB to ceiling poly.
- Seal WRB to foundation with a sealant that works with the membrane and concrete.
- Taping electrical wire penetrations.
- Taping WRB to window frame on the sides and the top.
- Taping WRB to mechanical penetrations
- Foam backer rod and caulking to connect the window frame sill to the WRB at the sill.

In order to achieve a fire-resistant assembly, mineral wool insulation was used with a thermally broken Z clip (See **Error! Reference source not found.**) to support the insulation and rainscreen strapping.

Figure 1: Soprema ACS Thermal Clip



Assembly Advantages

- Wrapping the exterior of the wall assembly with insulation reduces the amount of thermal bridging through the wood structural framing members.
- Mineral wool has fire-resistant qualities making this assembly useful for areas with fire requirements.
- Other rigid insulation types can be used if needed such as XPS or EPS if a fire-resistant assembly is not needed.
- Retrofitting an existing home saves waste and new construction costs.
- Utilizing the WRB as the air control layer allowed for less detailing, and a reduced chance of errors at junctions when the air control layer is to the interior of the assembly.

- Attaching the insulation with ¾" strapping material created a rainscreen for the assembly, assisting with assembly drying.
- WRB membrane could be utilized as trough flashing, helping to reduce thermal bridging that would be caused by using metal through flashing.
- Using Z girt clips were easy and quick to install on the wall and reduced the chance of missing a structural member which would puncture the air control layer.

Assembly Disadvantages

- Some materials could not be found at a common hardware or building supply store and needed to be custom ordered.
- Self-tapping screws were required to attach the strapping to the clips. This led to some difficulty fastening the strapping occasionally.
- Not all cladding systems can be accommodated with this exact assembly. For example, if stucco was to be installed, there would need to be a sheathing layer to the exterior of the rainscreen or other accommodations made.
- There may be difficulty finding trades that can or are willing to install this type of assembly in a residential setting.
- Air sealing of the attic poly VB is encouraged to be completed as part of a whole building retrofit, which can be a very difficult and arduous task to complete.

Cost Analysis

The cost analysis revealed that completing a retrofit with this assembly for the model home would cost roughly 7% more compared to constructing the home with the Tier 1 2x6 Assembly.

Of the two retrofit examples, this assembly was the costlier of the two.

GBTAC found that the largest cause of additional costs was due to the use of the high quality WRB membrane, and the mineral wool insulation.

Larsen Truss Retrofit Assembly

See ***Appendix A: Larsen Truss Retrofit Assembly Construction Details*** for plans and construction details.

Description & Overview

This assembly was approached the same as the Fire-Resistant Retrofit, as if there was only an exterior retrofit being performed on an existing home from the mid twentieth century. All the structural components were staying as-is and an exterior high-performance retrofit was going to take place. To determine what material to include in the physical mock-up that would represent the existing construction, GBTAC staff previous experience in renovations guided the selection. The existing assembly from exterior to interior contains:

- 3/8 plywood structural sheathing
- 2x4 stud wall with R-12 fibreglass batt insulation
- Polyethylene sheet VB

To determine what the high-performance retrofit additions would include, GBTAC staff utilized information from previously completed retrofit projects, industry feedback, and staff knowledge. The final decision was to display the addition of mineral wool to the exterior of the existing structure with a new airtight WRB and window replacement. The exterior retrofit addition, from exterior to interior contains:

- Exterior cladding
- 1 ½” Rainscreen strapping
- Airtight WRB
- 8” Larsen Truss with dense pack cellulose cavity insulation

The roof and foundation were decided to be the same as with the Fire-Resistant Retrofit Assembly.

The window installed in the mock-up was a representation of a flangeless high-performance European style tilt and turn window with a wooden frame. It is installed in line with where the exterior edge of the existing wall is. The sill of the Larsen truss is sloped so as to drain moisture away, which restricts putting the window farther towards the exterior.

Materials

Materials used for mock-up wall construction are as follows:

- **Rainscreen Strapping**
  - 2x4 SPF lumber
- **Airtight WRB**
  - Membrane – Typar Building Wrap – mechanically fastened
  - Sealing tape – Siga Wigluv in varying sizes.
  - Sill Pan Flashing and window R.O air sealing – Soprema Sopraseal Liquid Flashing & Soprema Sopraseal Stick Flashpro
- **Larsen Truss**
  - Framing - 2x2 SPF lumber studs spaced 8” apart
  - Structural Gussets – 16” x 8” x ¾” Plywood connecting the interior and exterior Larsen Truss 2x2s. Layout as per designer/engineer specifications
- **Larsen Truss Cavity Insulation**
  - Sopra-Cellulose packed to the required density

- **Existing Structural Wall**
  - 3/8” Plywood structural sheathing
  - 2x4 SPF lumber

- **Cavity Insulation**
  - Owens Corning R-12 Pink Next gen Fiberglass Insulation
- **Vapour Barrier**
  - Existing polyethylene plastic sheeting
- **Assembly Effective Thermal Performance**
  - RSI-6.52 or R-37.03

Construction

The majority of the other assemblies for this project can be somewhat closely compared to each other in terms of construction. This assembly construction was vastly different than any of the others. In terms of difficulty, it was fairly straightforward. GBTAC has seen this assembly, or some other variation of this assembly, used in a majority of deep energy retrofits in the past 2 years in the Calgary area.

Construction of the Larsen Truss consisted of a 2x2 framing member installed at the exterior of the existing structural sheathing, fastened into the structural framing member. 16" x 8" x ¾" plywood gussets are then fastened to the side of that 2x2 member spaced out as per designed or engineered requirements. A 2x2 framing member is then attached to the exterior edge of the plywood gusset. The result of this is a site made truss. A ¾" plywood cap was installed along the perimeter of the underside of the truss as well as ¾" plywood window bucks around the window R.O.'s. The sill buck of the window was sloped downward to allow any moisture to drain away. 2x4 material was used for the rainscreen on this assembly as the bulging of the dense pack cellulose would interfere with the installation of the cladding if only ¾" material was used.

The air control layer for this assembly was the Typar Building Wrap WRB. Maintaining a continuous air control layer was achieved with this membrane along with the following materials and methods:

- Taping to seal all joints and openings in the WRB.
- Installation of a strip of WRB and tape at the top of the Larsen Truss at the Rafters. Closed Cell spray foam connecting this layer to the ceiling VB.
- Taping electrical wire penetrations.
- Liquid applied membrane of the window bucks. Alternately, an adhered sheet waterproofing membrane can also be utilized in this assembly.
- Taping WRB to mechanical penetrations
- Foam backer rod and caulking to connect the window frame to the liquid applied membrane.

Assembly Advantages

- Wrapping the exterior of the wall assembly with insulation reduces the amount of thermal bridging through the wood structural framing members.
- Retrofitting an existing home saves waste and new construction costs.
- Utilizing the WRB as the air control layer allows for less detailing, and a reduced chance of errors at junctions when the air control layer is to the interior of the assembly.
- Use of a liquid applied membrane to prep and seal the window buck saved a lot of installation time compared to multiple layers of an adhered sheet waterproofing membrane.
- Using a more affordable WRB/Air control membrane resulted in cost savings.
- Most materials were able to be found at a common hardware or building supply store.
- The Larsen Truss can be as thin or thick as needed, allowing for more, or less insulation.

- According to currently available industry Life Cycle Assessment data, cellulose insulation has a lower embodied carbon than the fiberglass, foam, and mineral wool insulation utilized for the other mockups.

Assembly Disadvantages

- Dense pack cellulose requires installation by a certified installer.
- Installing the flangeless window was more difficult for the purposes of this mockup, than the flanged windows for the other assemblies.
- Utilizing a liquid applied membrane required a drying time before the next steps could be completed.
- Not all cladding systems can be accommodated with this exact assembly. For example, if stucco was to be installed, there would need to be a sheathing layer to the exterior of the rainscreen or other accommodations made.
- There may be difficulty finding trades that can or are willing to install this type of assembly in a residential setting.
- Air sealing of the attic poly VB is encouraged to be completed as part of a whole building retrofit, which can be a very difficult and arduous task to complete.

Cost Analysis

The cost analysis revealed that completing a retrofit with this assembly for the model home would cost roughly 7% less compared to constructing the home with the Tier 1 2x6 Assembly.

Of the two retrofit examples, this assembly was the more affordable of the two. Construction to complete this assembly over the other retrofit assembly came out to roughly 14% less overall.

Future Research/Additional Exploration

While GBTAC feels the project shows a good comparison and showcasing of six different assemblies, we have identified areas for future improvements and more accurate comparisons:

- Cost comparisons between the different assemblies when they use all the same materials for the WRB, VB, and sealing tapes.

Appendices

Appendix A

- Tier 1 2x6 Assembly Construction Details
- Exterior Mineral Wool Tier 3 Assembly Construction Details
- Double Stud Wall Net Zero Assembly Construction Details
- Exterior Foam Net Zero Assembly Construction Details
- Fire Resistant Retrofit Assembly Construction Details
- Larsen Truss Retrofit Assembly Construction Details

Appendix B

- Wall Assembly Effective Thermal Resistance Calculations

Appendix C

- Cost Analysis Model Home

Appendix D

- Cost per sq/ft of Wall Affordability Analysis
- Constructability Analysis

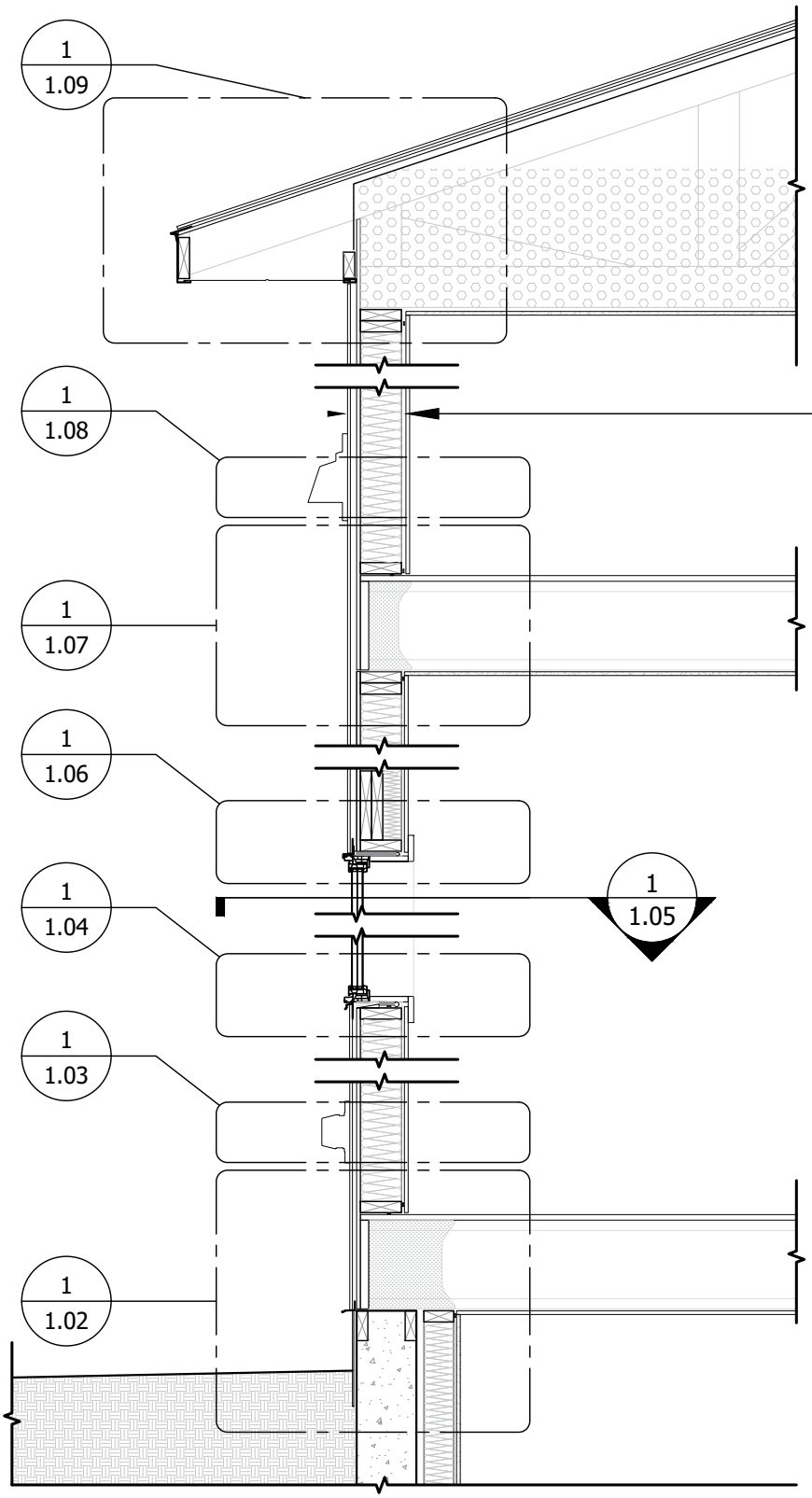
Appendix E

- Physical Mock-Up Photos

Appendix A:

Appendix A:

Tier 1 2x6 Assembly Construction Details



TIER 1 2x6 ASSEMBLY

EFFECTIVE RSI = 2.99; R-VALUE = 16.98

- EXTERIOR CLADDING
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- AIRTIGHT 6 MIL VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

1 ENVELOPE SECTION

1/2" = 1'-0"

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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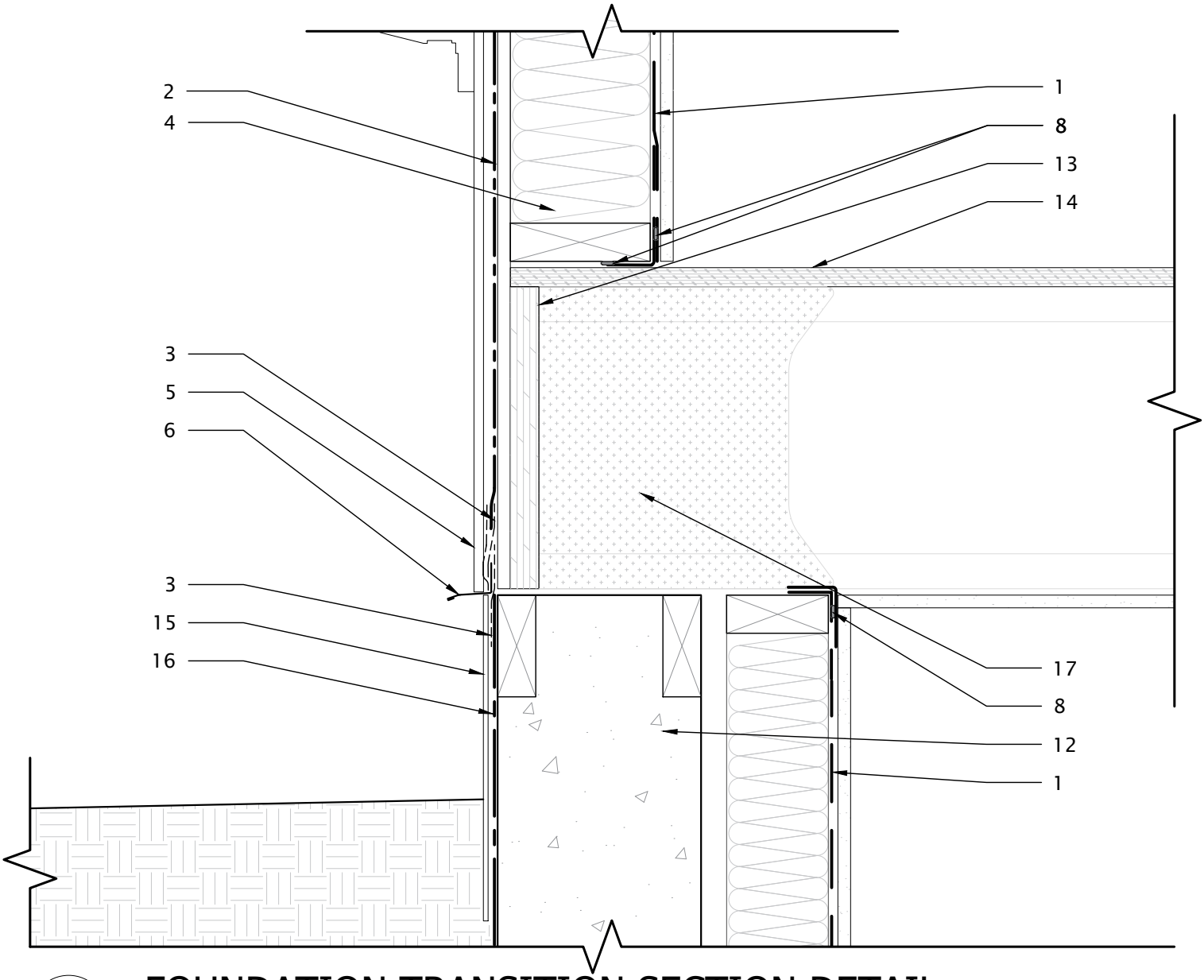

1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 CAST-IN-PLACE CONCRETE
13 RIM BOARD
14 SUBFLOOR
15 PARGING
16 DAMPPROOFING
17 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number: 2024-009
Project Name: HIGH PERFORMANCE WALL ASSEMBLY
Drawn by: PY
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Issued For: ALBERTA ECOTRUST FOUNDATION

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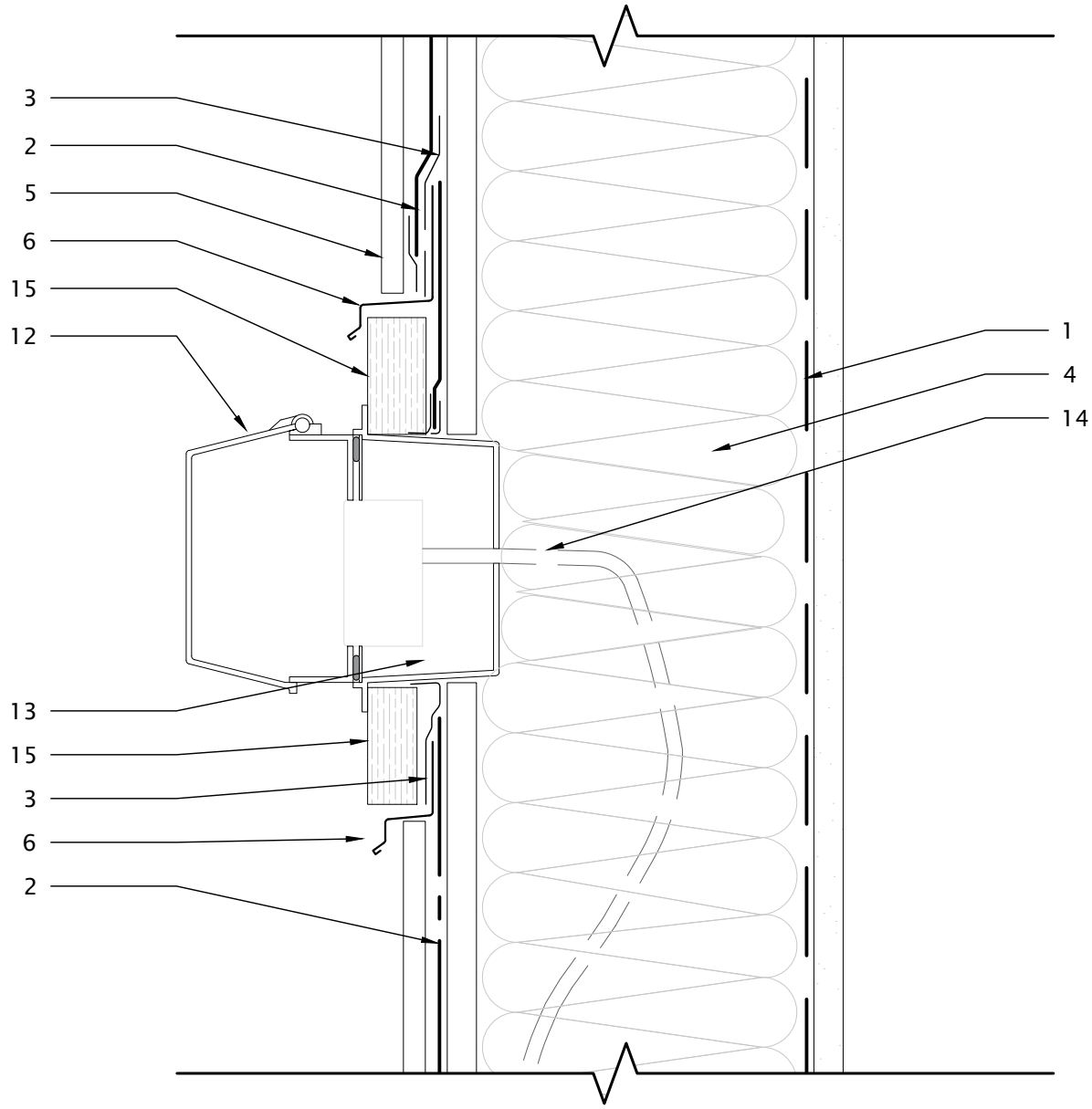

1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 RECEPTACLE COVER
13 RECEPTACLE CAGE
14 ELECTRICAL WIRE
15 BATTEN OSB CAP

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
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Issued For	ALBERTA ECOTRUST FOUNDATION						

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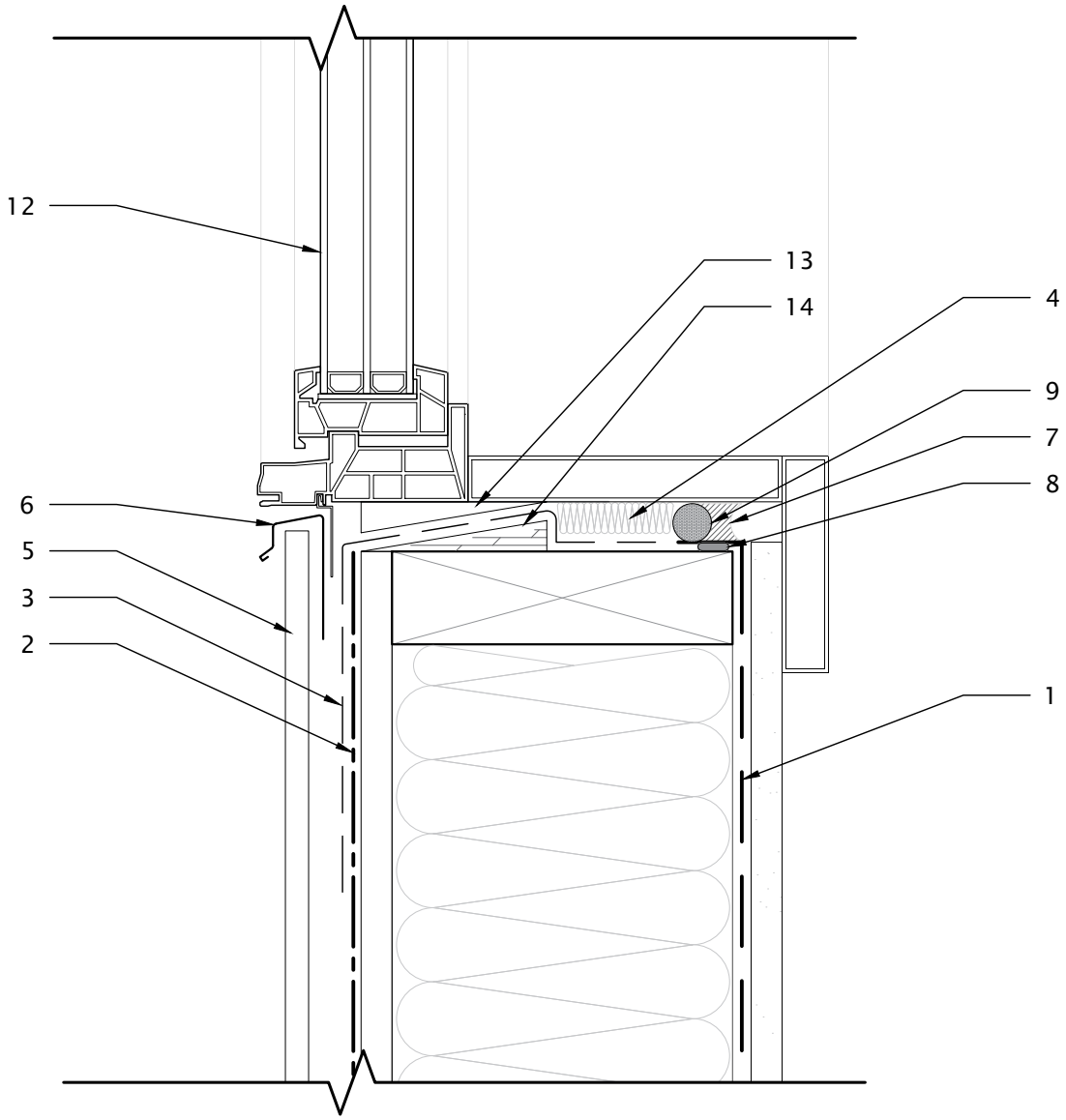

1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 WINDOW SUPPORT SHIM
14 BEVELED SIDING SLOPED DAM

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
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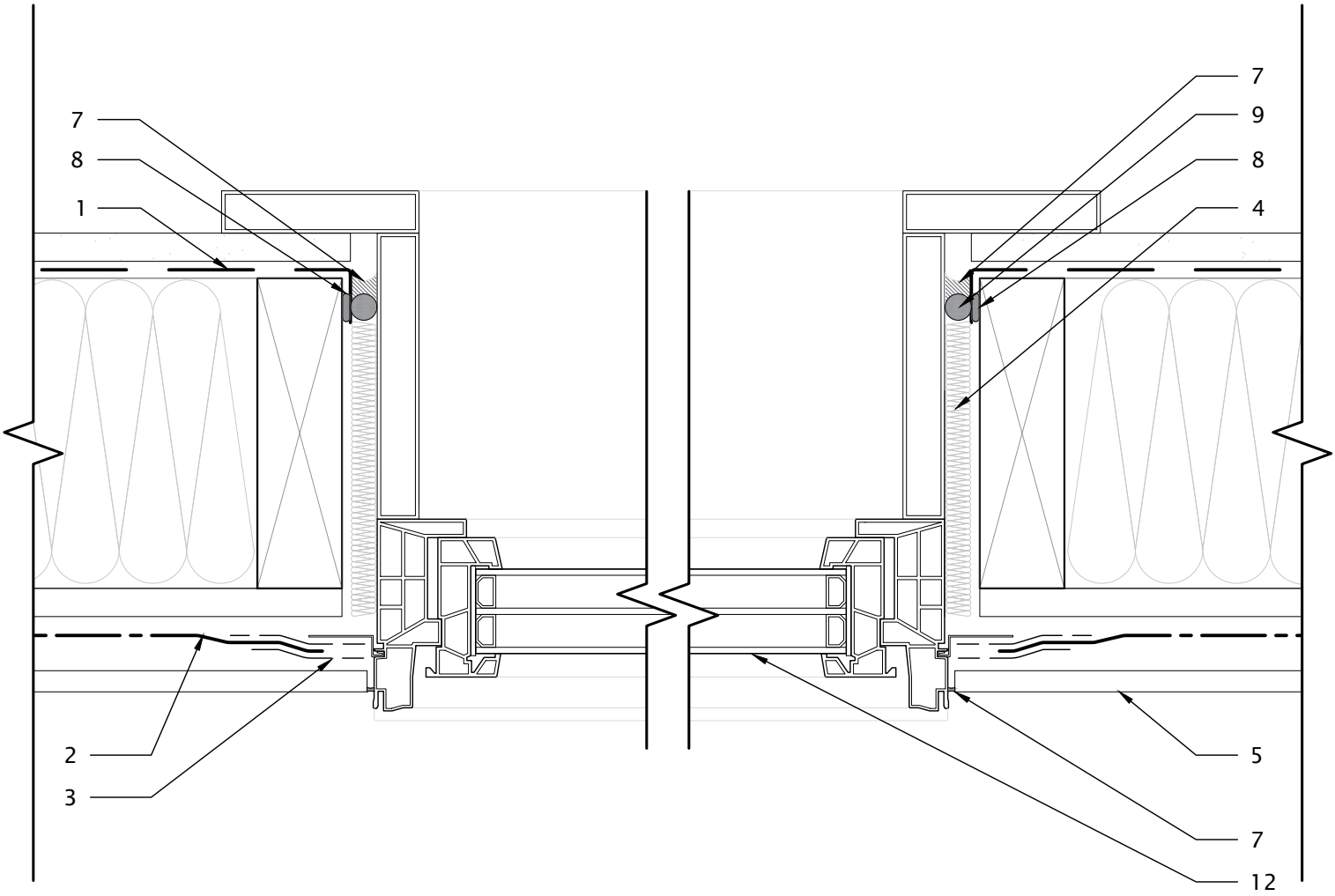

1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

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2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
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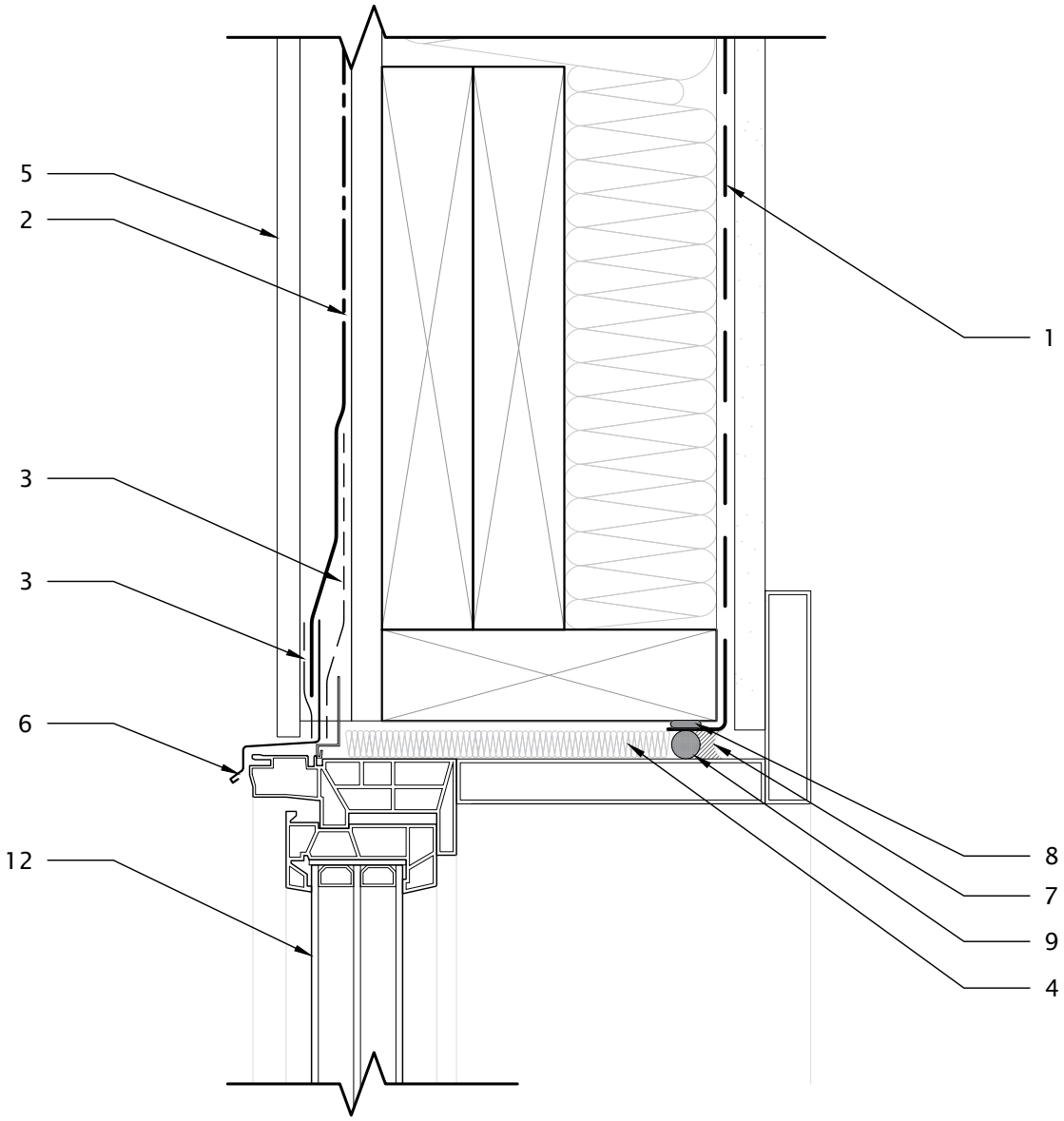

1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
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Issued For	ALBERTA ECOTRUST FOUNDATION						

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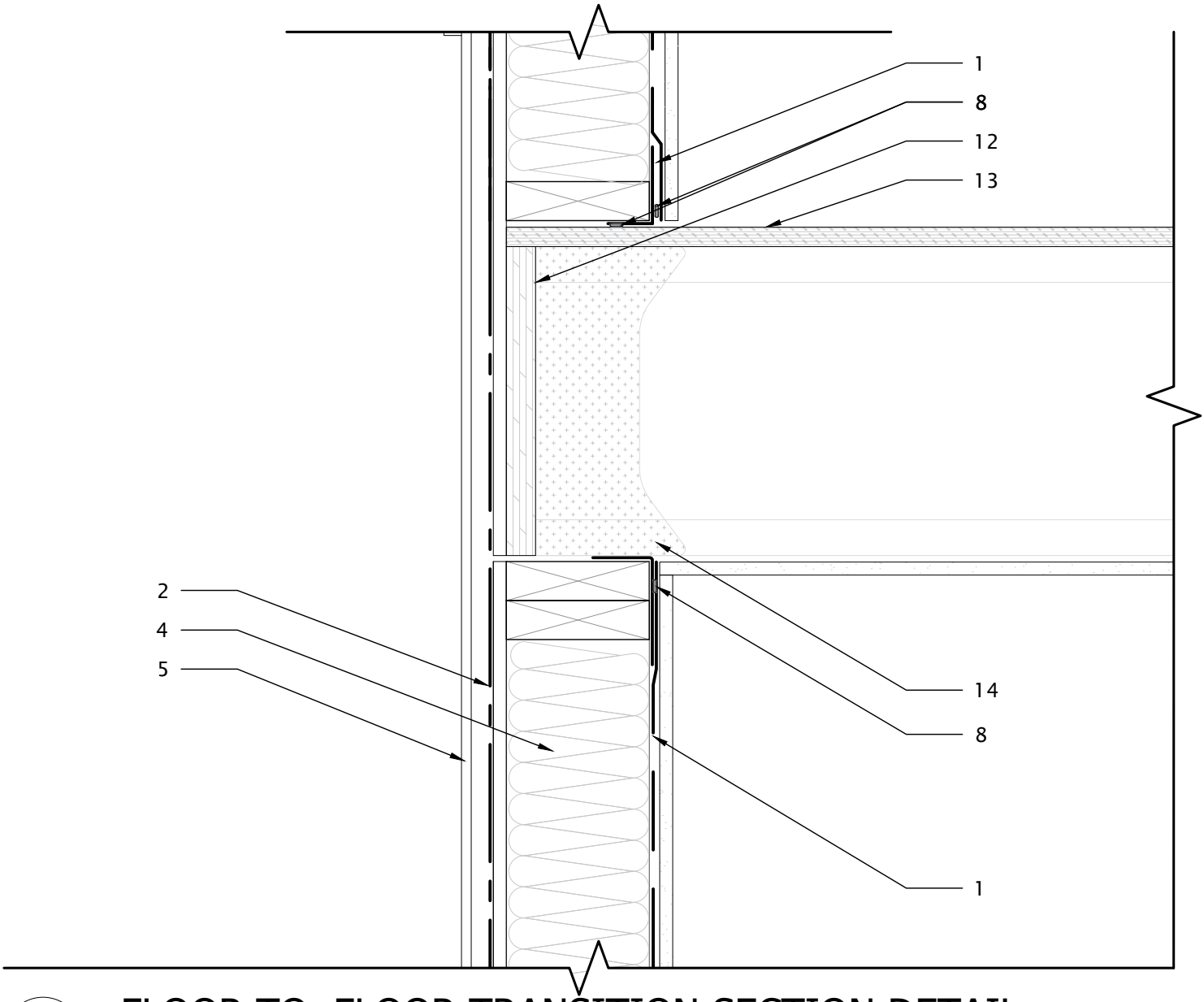


1 FLOOR TO FLOOR TRANSITION SECTION DETAIL

2" = 1'-0"

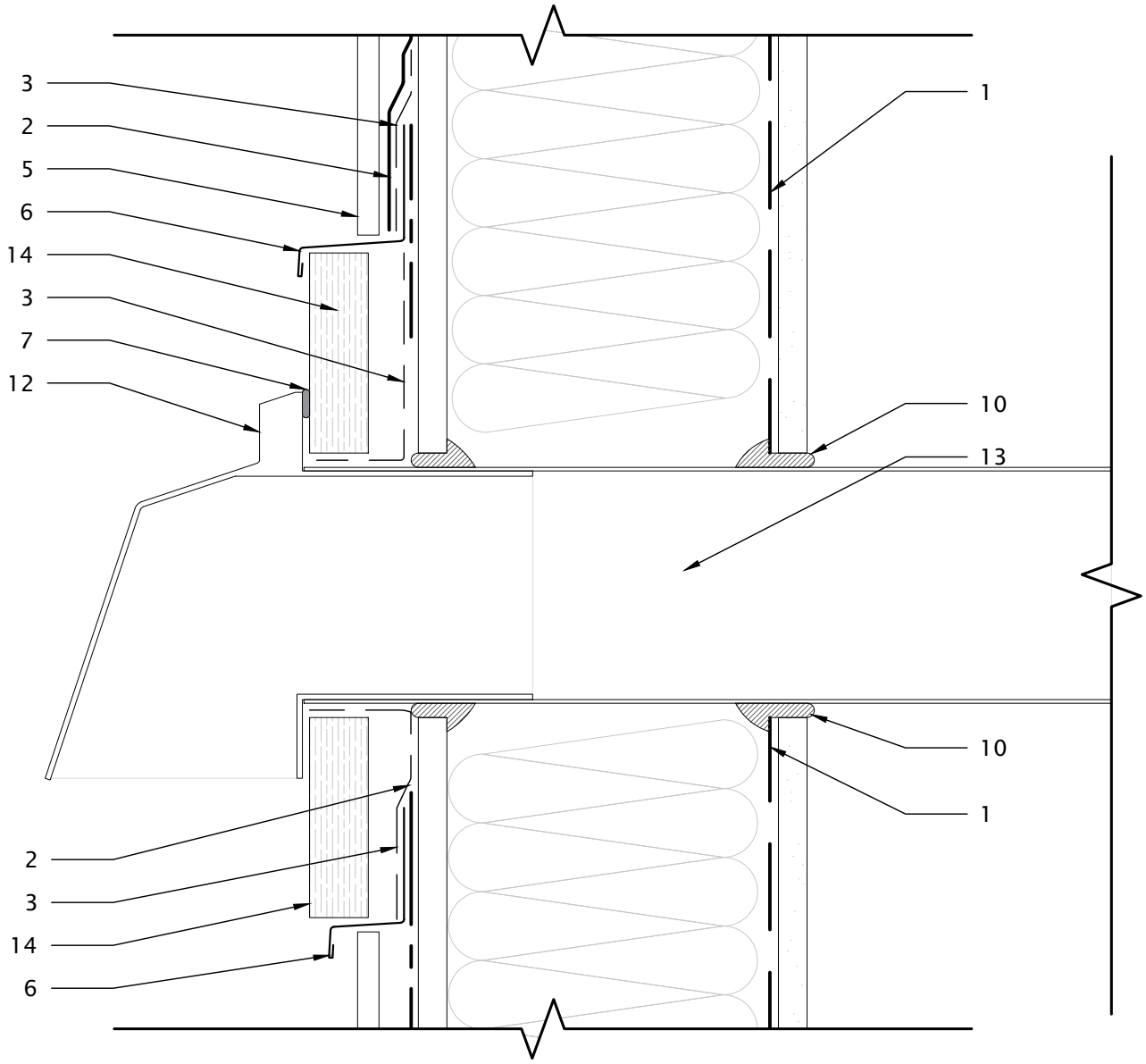
1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 RIM BOARD
13 SUBFLOOR
14 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number: 2024-009
Project Name: HIGH PERFORMANCE WALL ASSEMBLY
Drawn by: PY
Checked by: BH, NM
Date: 2025-04-30
Scale: 2" = 1'- 0"
Project Address: N/A
Issued For: ALBERTA ECOTRUST FOUNDATION

1.07



1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 DUCT HOOD
13 DUCT
14 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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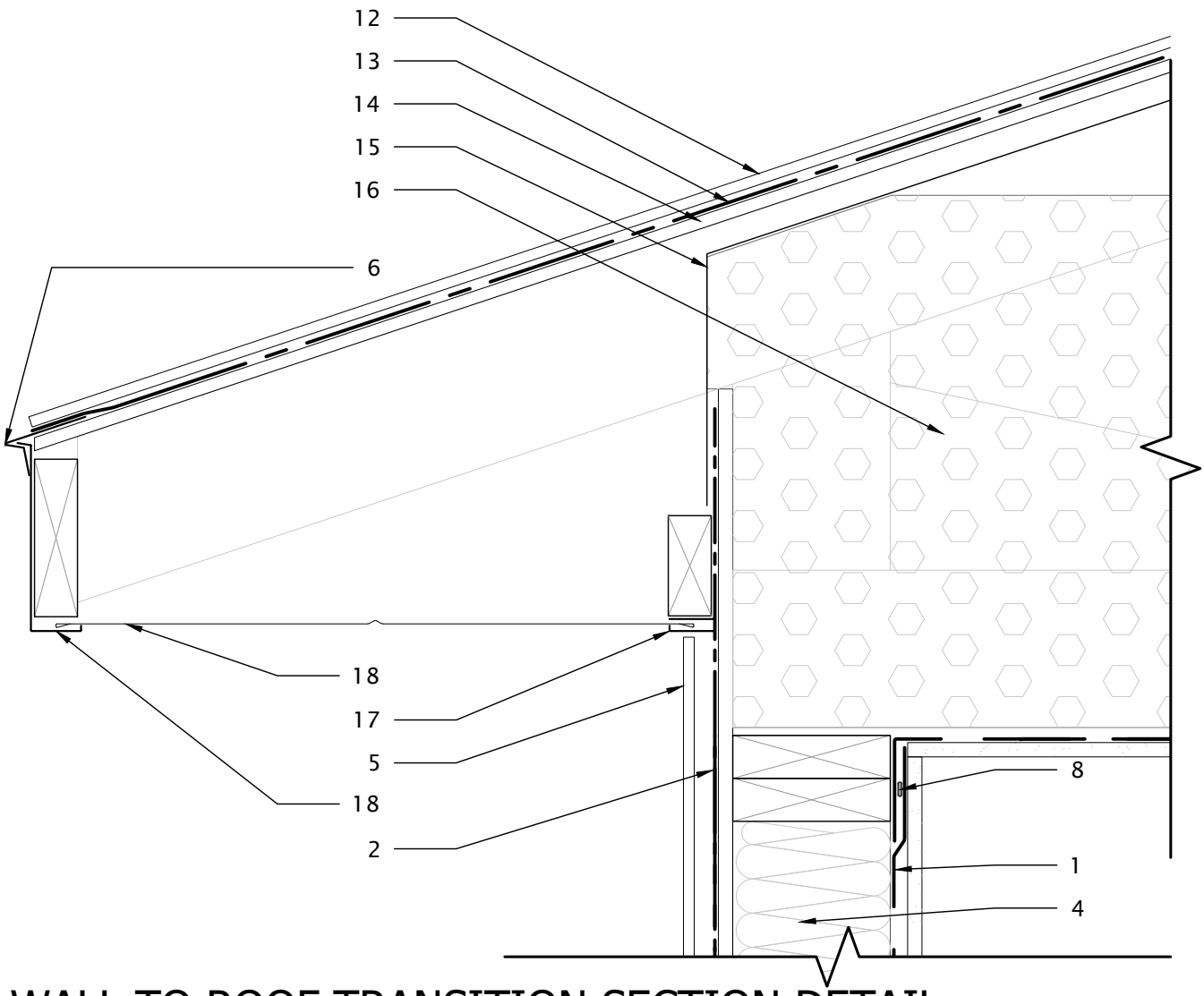

1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 ROOFING SHINGLE
13 ROOFING UNDERLAYMENT MEMBRANE
14 ROOFING SHEATHING
15 INSULATION STOP
16 BLOWN INSULATION
17 J-CHANNEL
18 SOFFIT
19 FASCIA

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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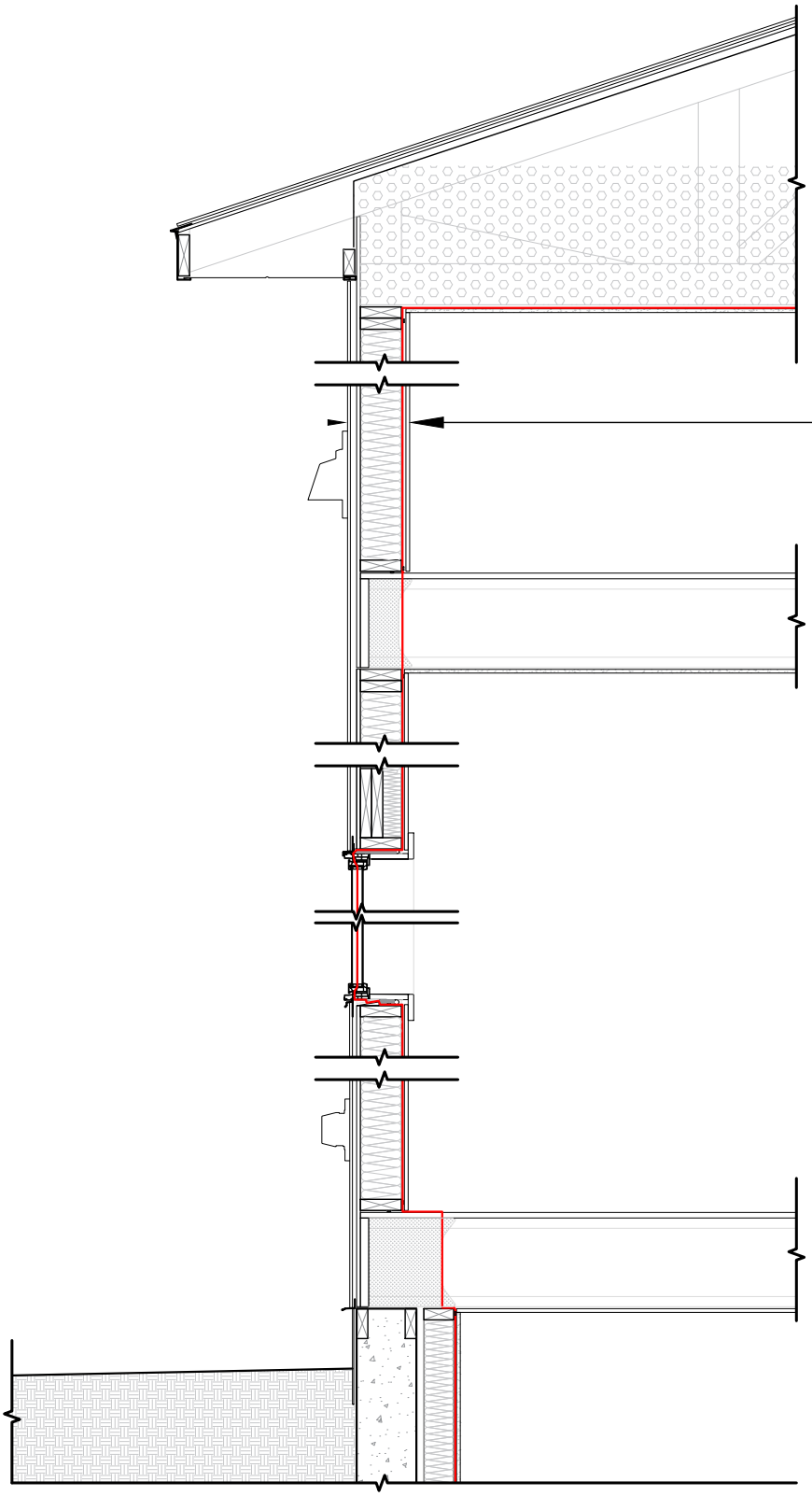

TIER 1 2x6 ASSEMBLY

EFFECTIVE RSI = 2.99; R-VALUE = 16.98

- EXTERIOR CLADDING
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- AIRTIGHT 6 MIL VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

AIR BARRIER

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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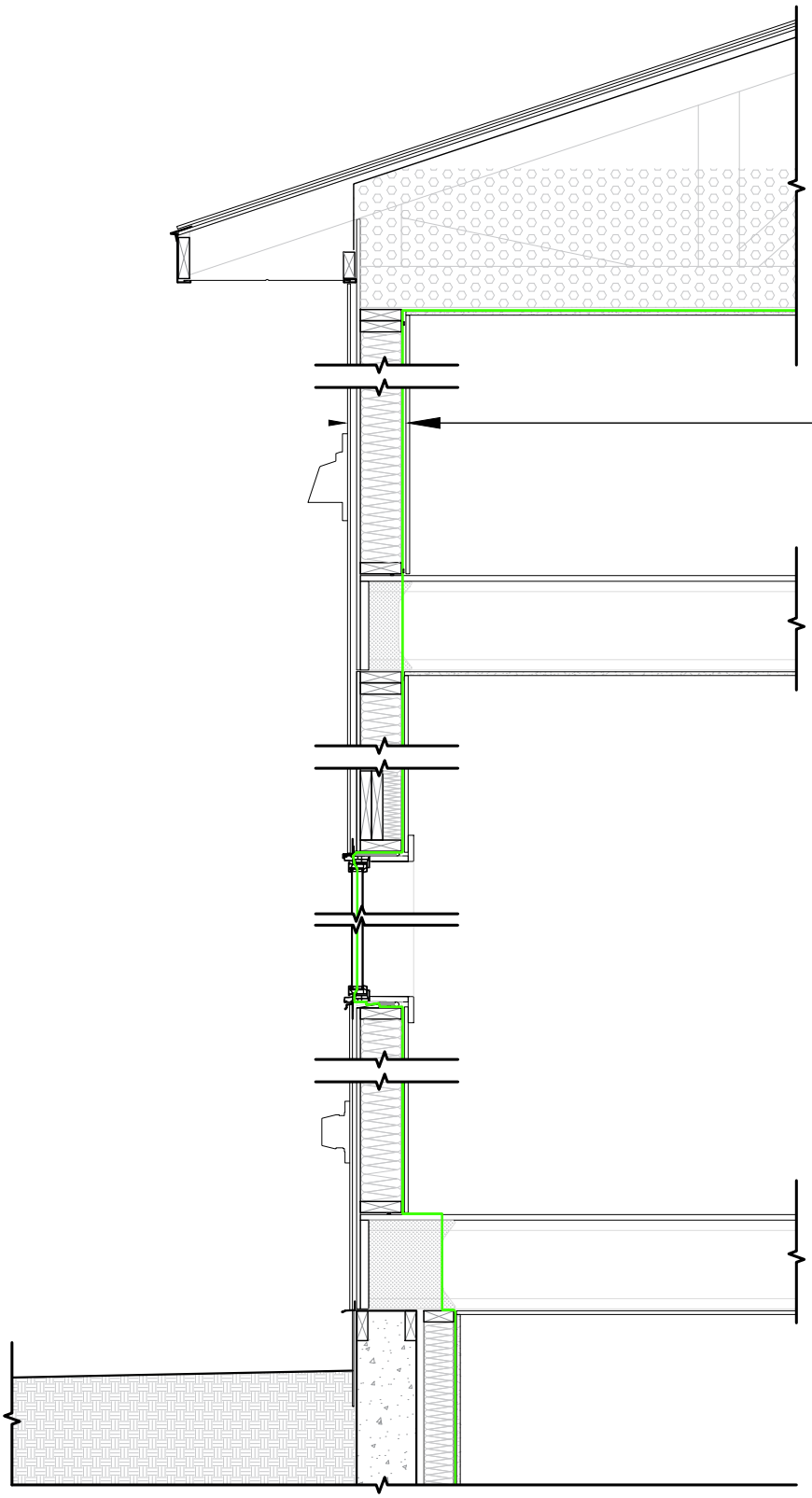


TIER 1 2x6 ASSEMBLY

EFFECTIVE RSI = 2.99; R-VALUE = 16.98

- EXTERIOR CLADDING
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- AIRTIGHT 6 MIL VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

VAPOUR BARRIER

1 VAPOUR BARRIER CONTINUITY

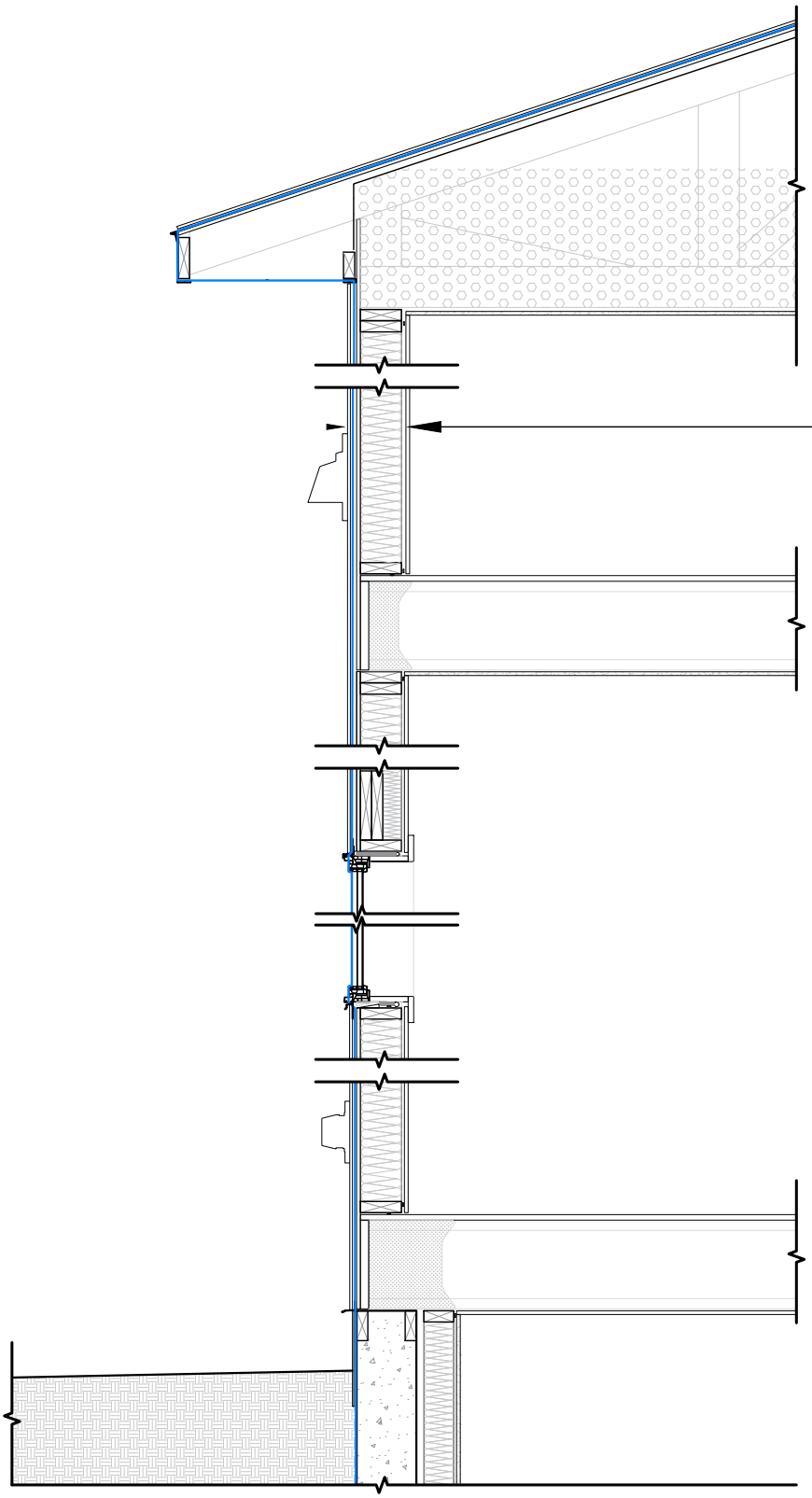
1/2" = 1'-0"

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.11



TIER 1 2x6 ASSEMBLY

EFFECTIVE RSI = 2.99; R-VALUE = 16.98

- EXTERIOR CLADDING
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- AIRTIGHT 6 MIL VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

LEGEND

WATER BARRIER

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

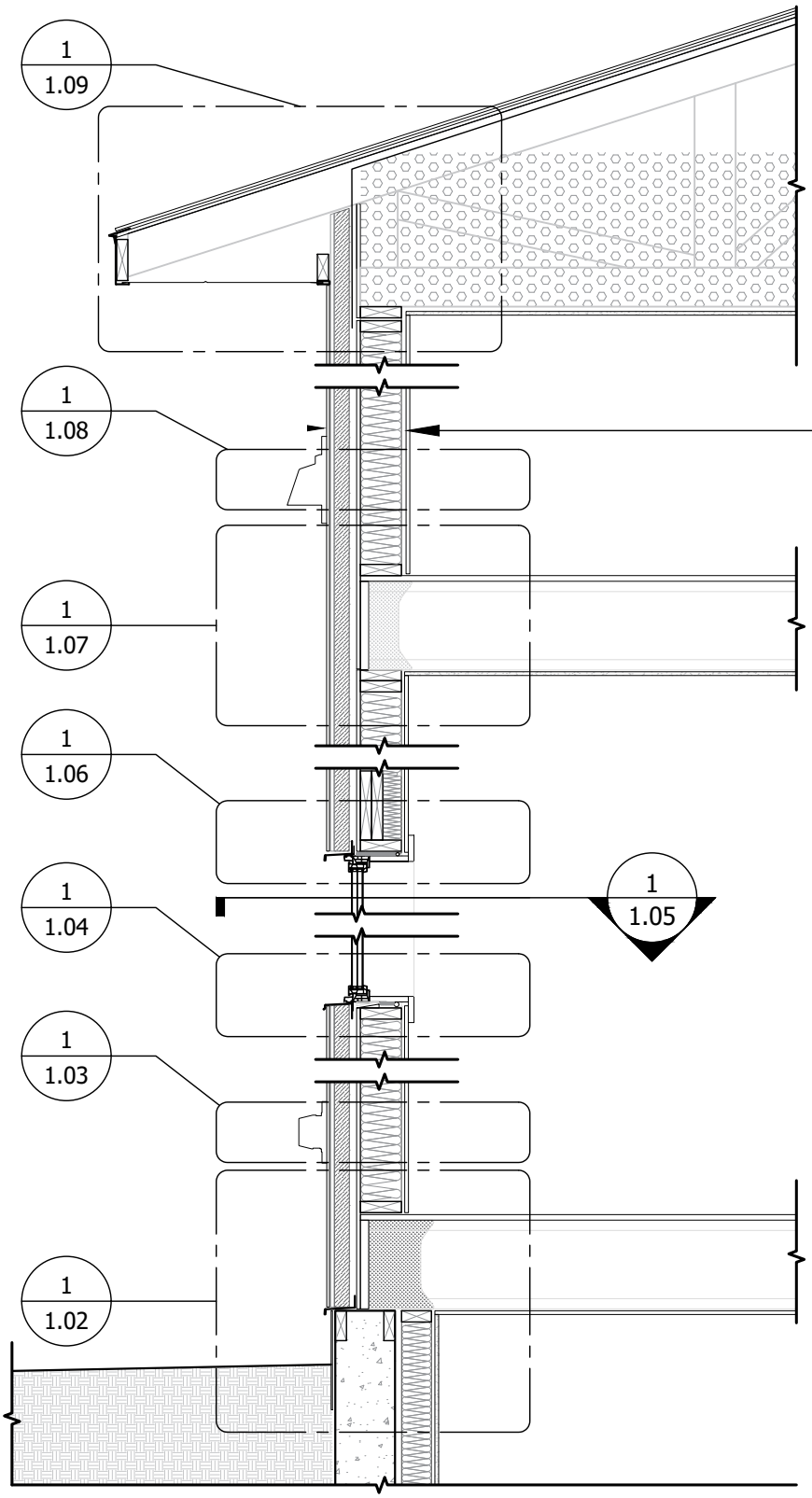
Drawing Title: TIER 1 2x6

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.12

Appendix A:

Exterior Mineral Wool Tier 3 Assembly Construction Details



1 ENVELOPE SECTION

1/2" = 1'-0"

EXT. MINERAL WOOL T3 WALL ASSEMBLY

EFFECTIVE RSI = 4.58; R-VALUE = 26.01

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 2" MINERAL WOOL INSULATION
  -C/W STRAPPING & SCREWS AS PER SPEC.
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

NOTES

- EXT.= EXTERIOR
- T3= TIER 3

SAIT

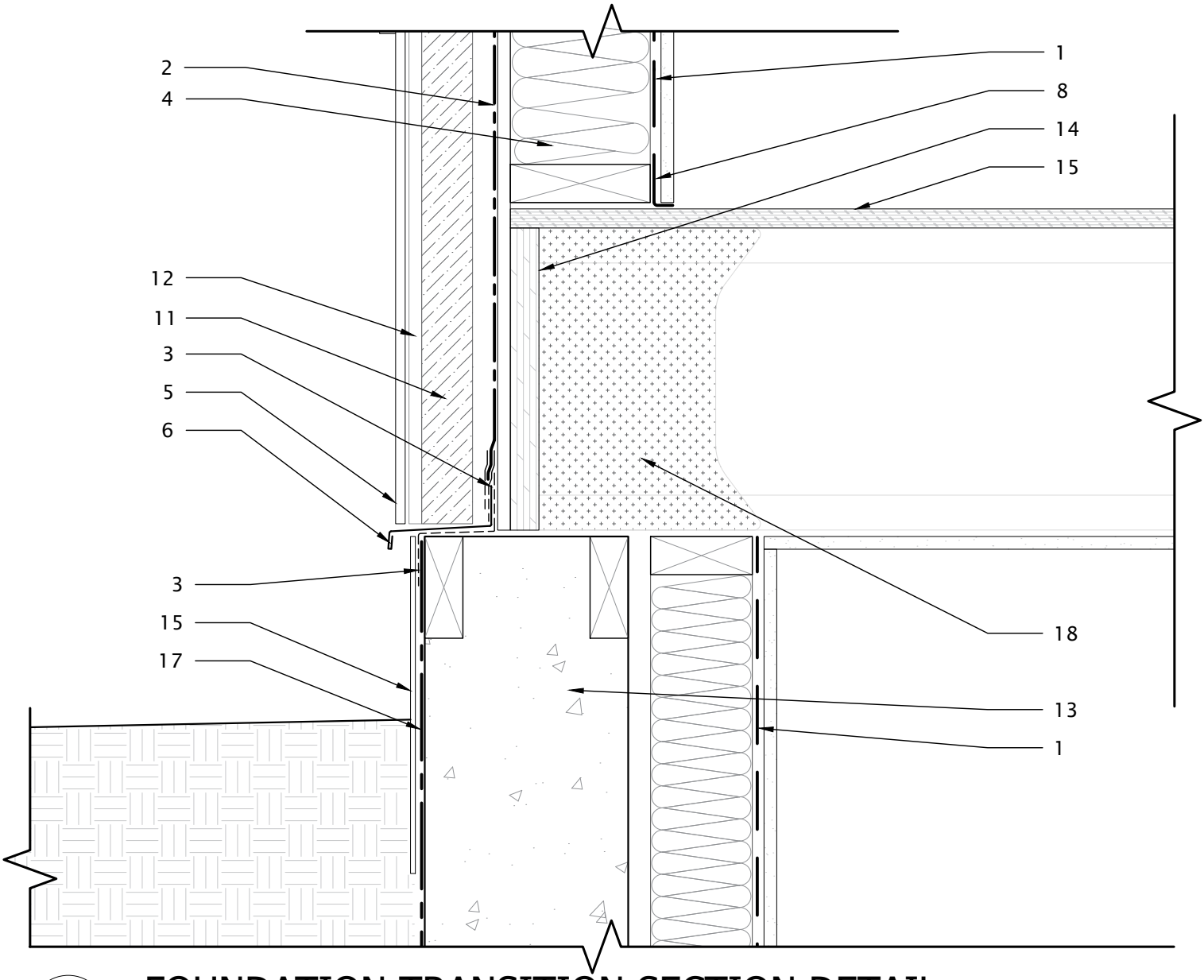
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.01



1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 CAST-IN-PLACE CONCRETE
14 RIM BOARD
15 SUBFLOOR
16 PARGING
17 DAMPPROOFING
18 SPRAY FOAM INSULATION

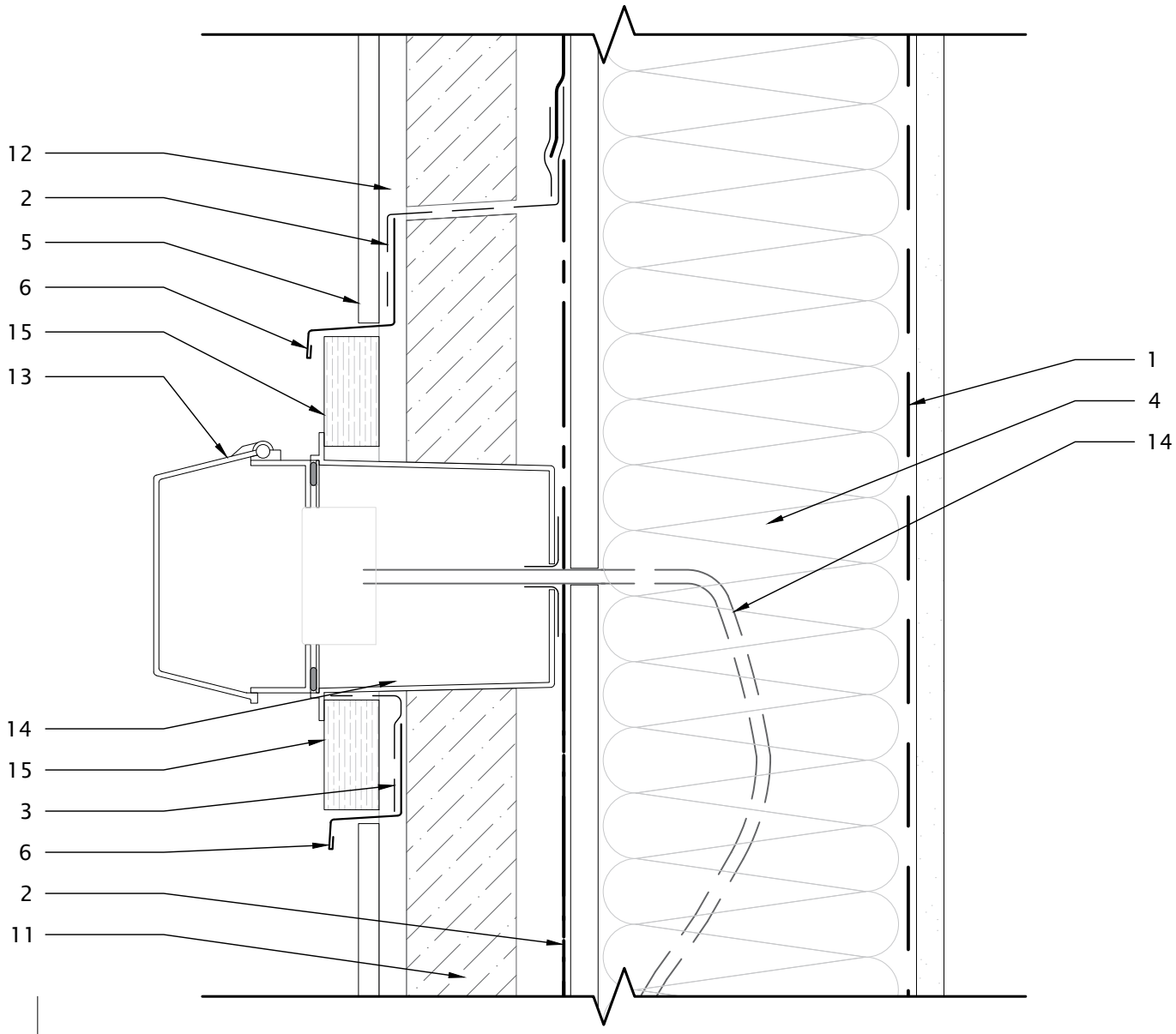
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.02



1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 IN USE RECEPTACLE ASSEMBLY
14 ELECTRICAL WIRE
15 BATTEN

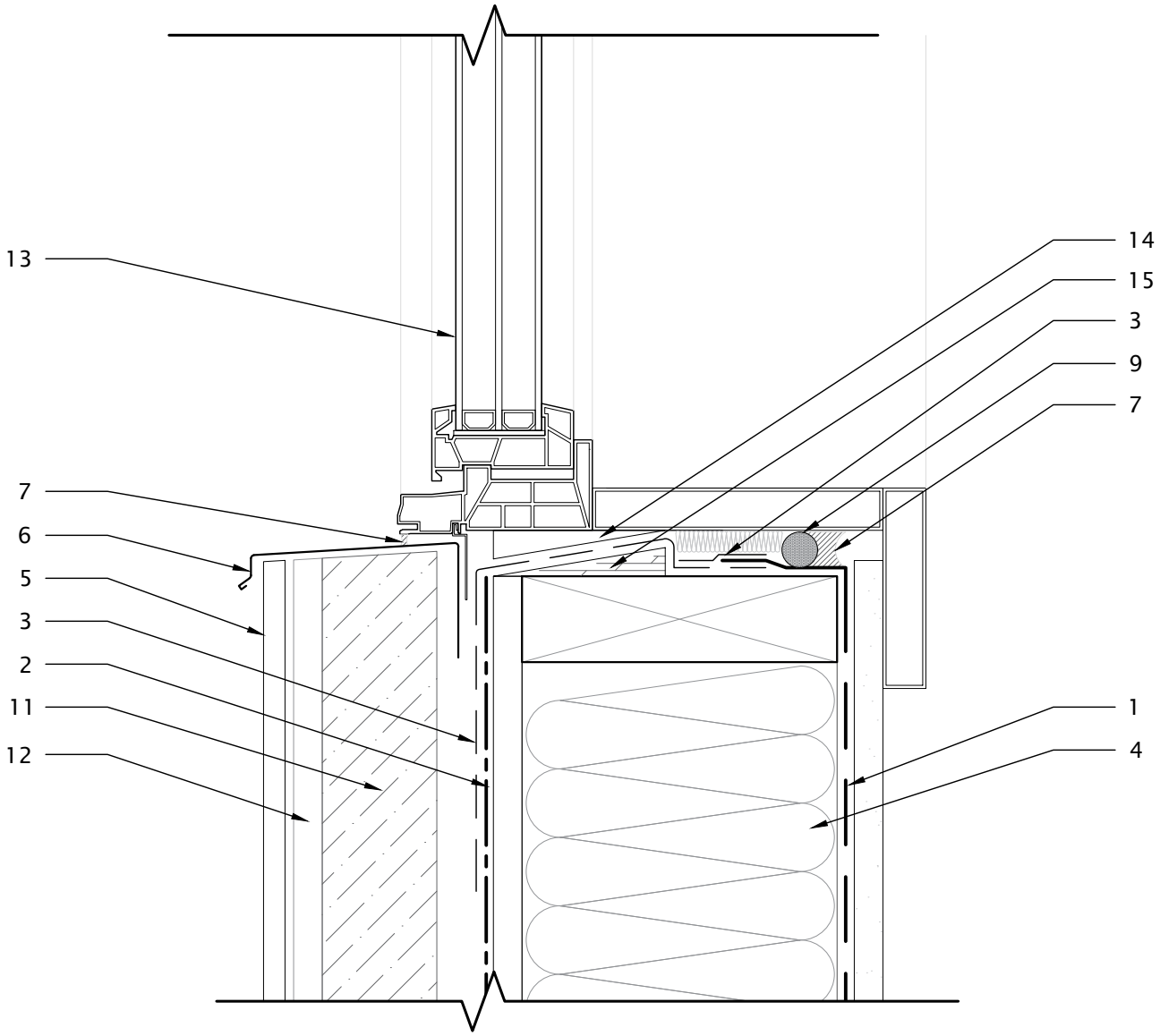
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.03



1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 GLAZING UNIT
14 WINDOW SUPPORT SHIM
15 BEVELED SIDING SLOPED DAM

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH,NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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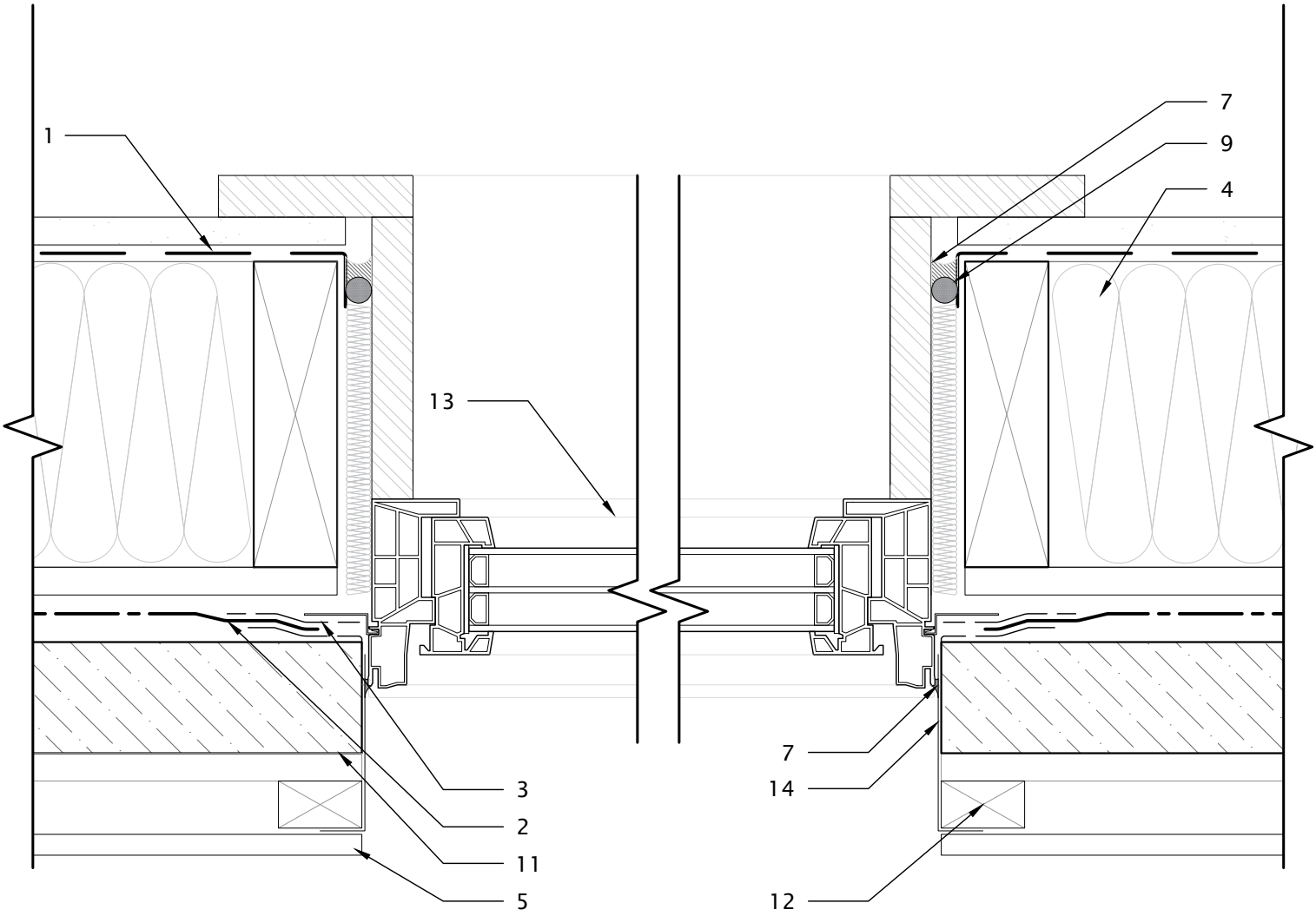


1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 GLAZING UNIT
14 CLOSURE FLASHING

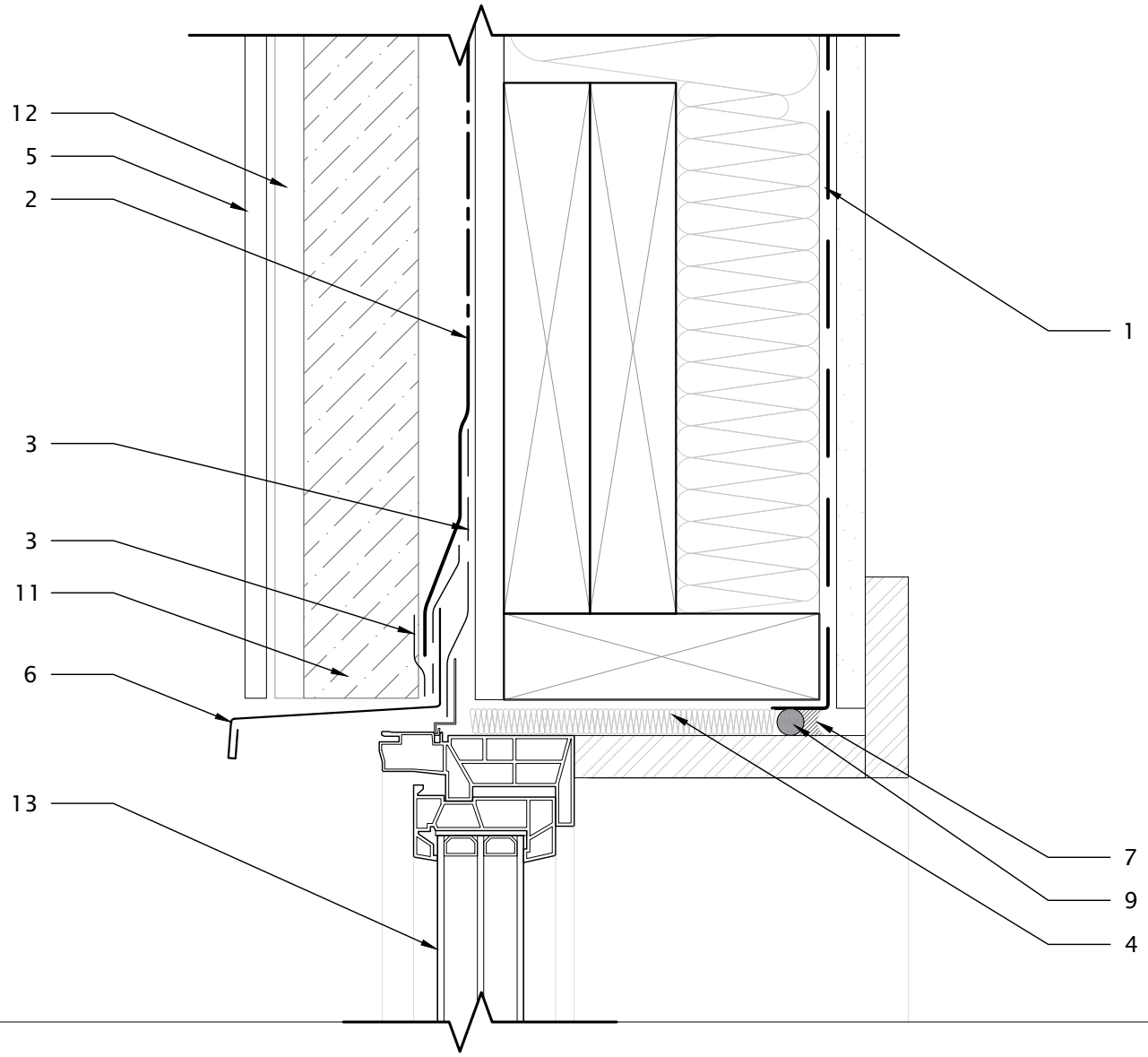
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.05



1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 GLAZING UNIT

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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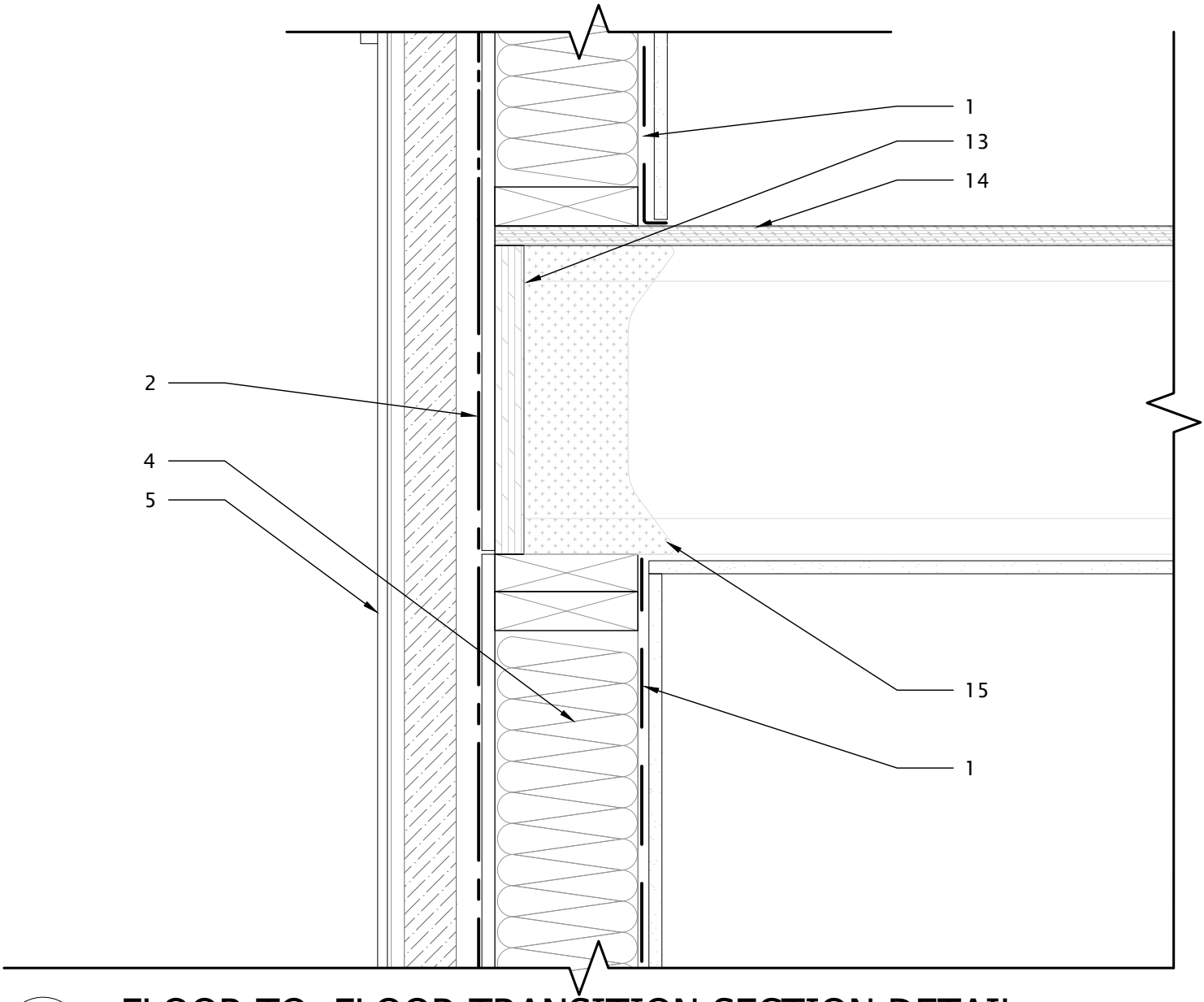

1 FLOOR TO FLOOR TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 RIM BOARD
14 SUBFLOOR
15 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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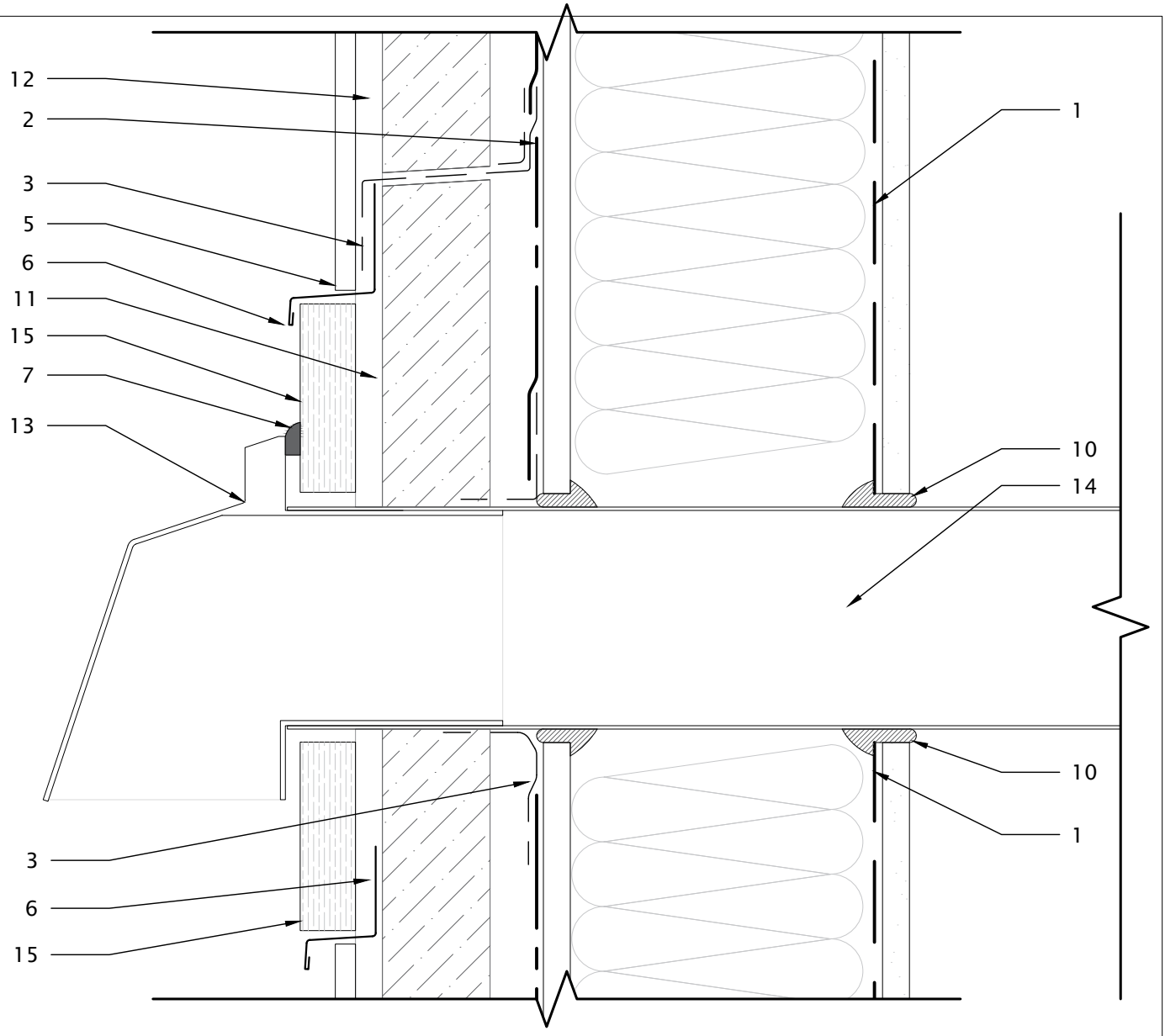

1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 DUCT HOOD
14 DUCT
15 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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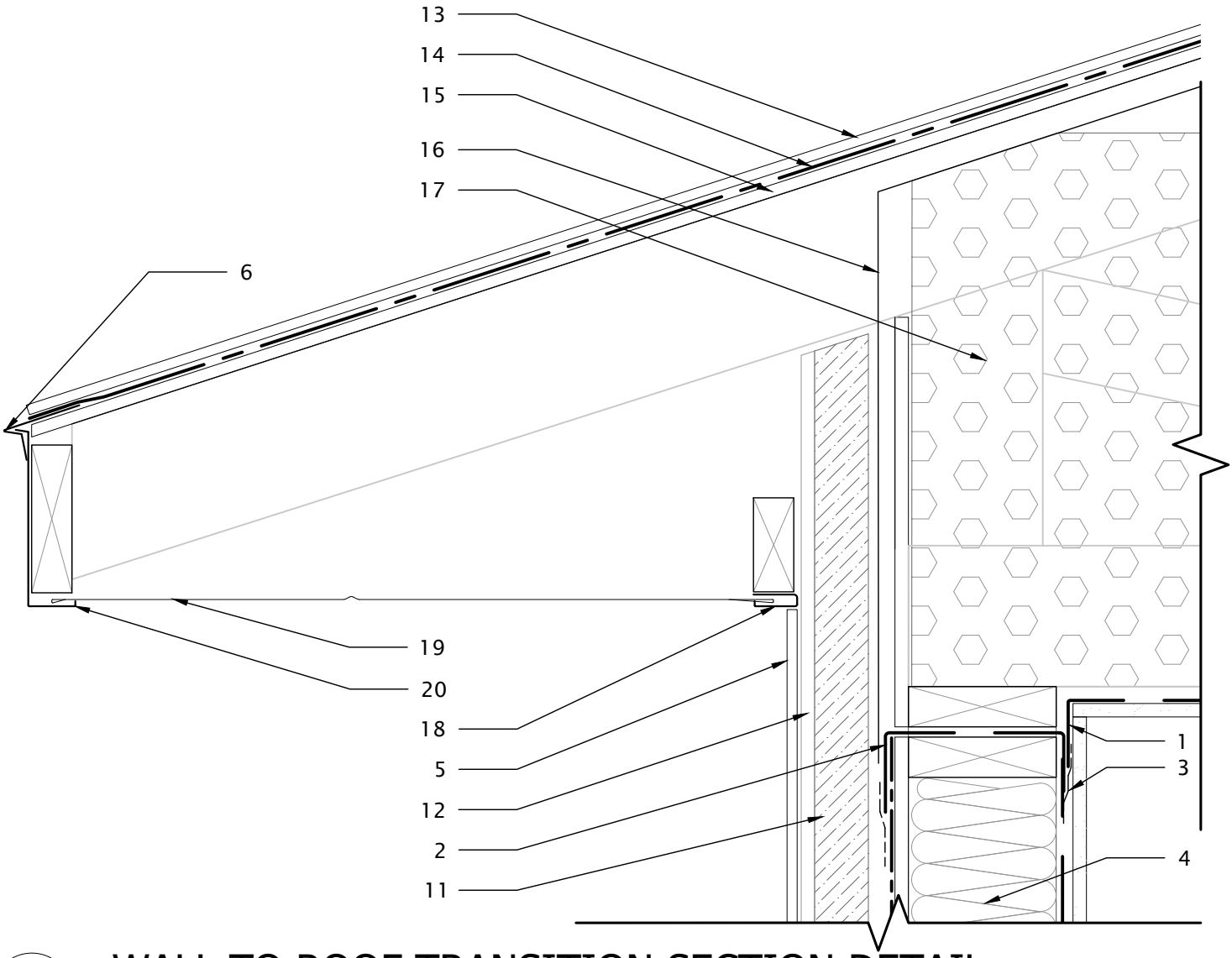


1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 2" MINERAL WOOL INSULATION
12 RAINSCREEN STRAPPING
13 ROOFING SHINGLE
14 ROOFING UNDERLAYMENT MEMBRANE
15 ROOFING SHEATHING
16 INSULATION STOP
17 BLOWN INSULATION
18 J-CHANNEL
19 SOFFIT
20 FASCIA

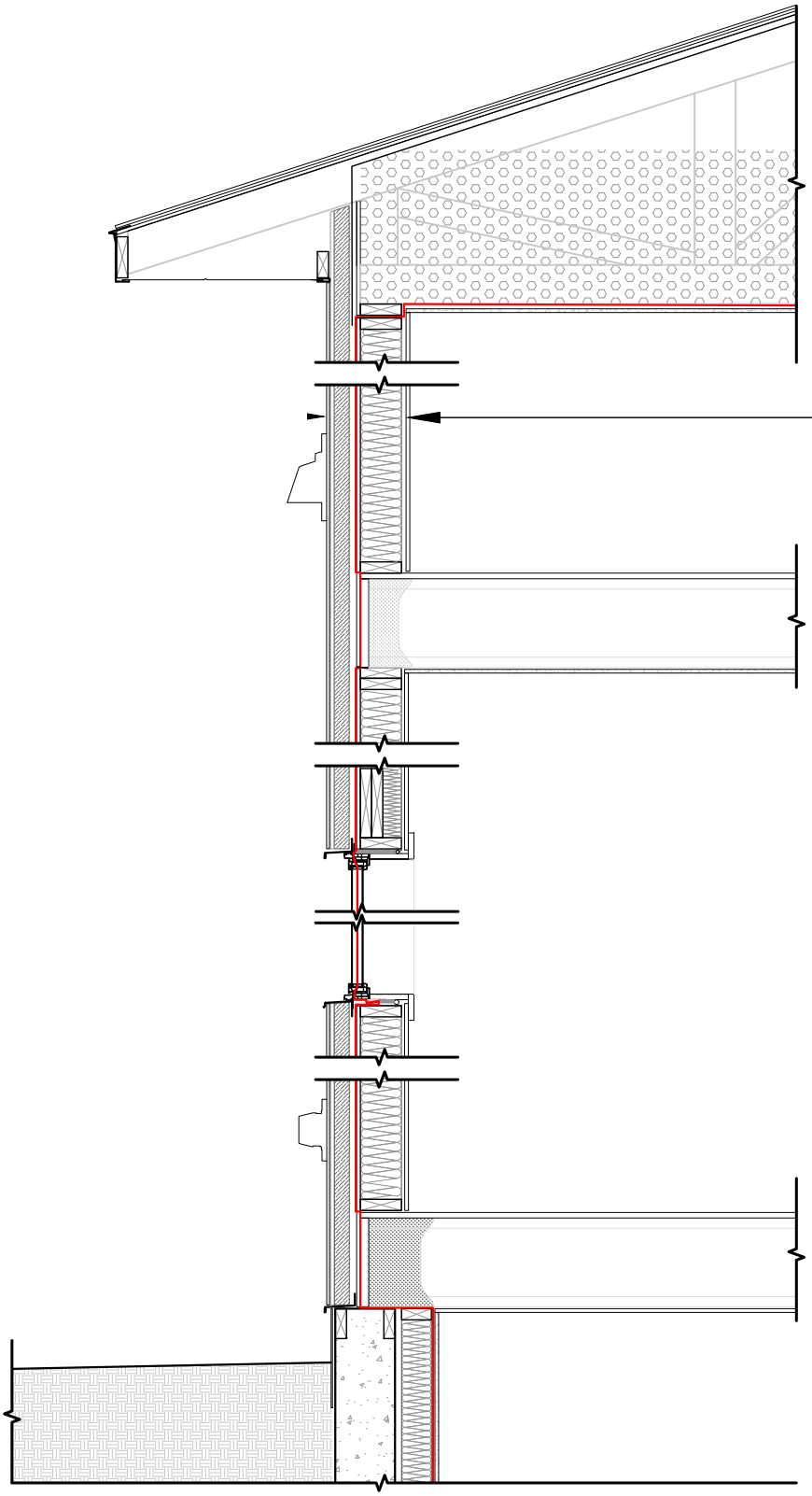
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.09



EXT. MINERAL WOOL T3 WALL ASSEMBLY

EFFECTIVE RSI = 4.58; R-VALUE = 26.01

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 2" MINERAL WOOL INSULATION
  -C/W STRAPPING & SCREWS AS PER SPEC.
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

AIR BARRIER

NOTES

- EXT.= EXTERIOR
- T3= TIER 3

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

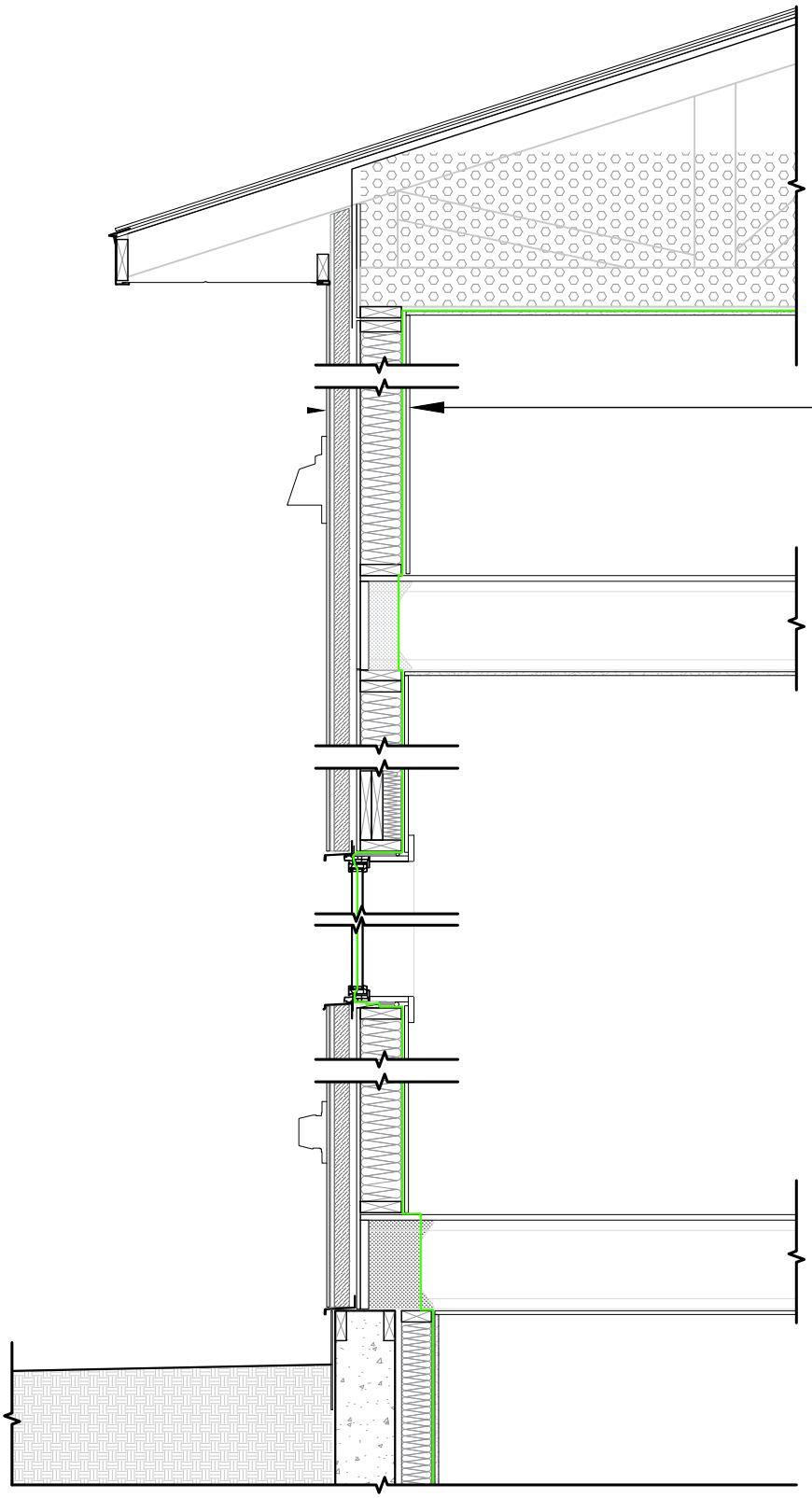
EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"

Project Address N/A

Issued For ALBERTA ECOTRUST FOUNDATION

1.10



EXT. MINERAL WOOL T3 WALL ASSEMBLY

EFFECTIVE RSI = 4.58; R-VALUE = 26.01

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 2" MINERAL WOOL INSULATION
  -C/W STRAPPING & SCREWS AS PER SPEC.
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

VAPOUR BARRIER

NOTES

- EXT.= EXTERIOR
- T3= TIER 3

1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

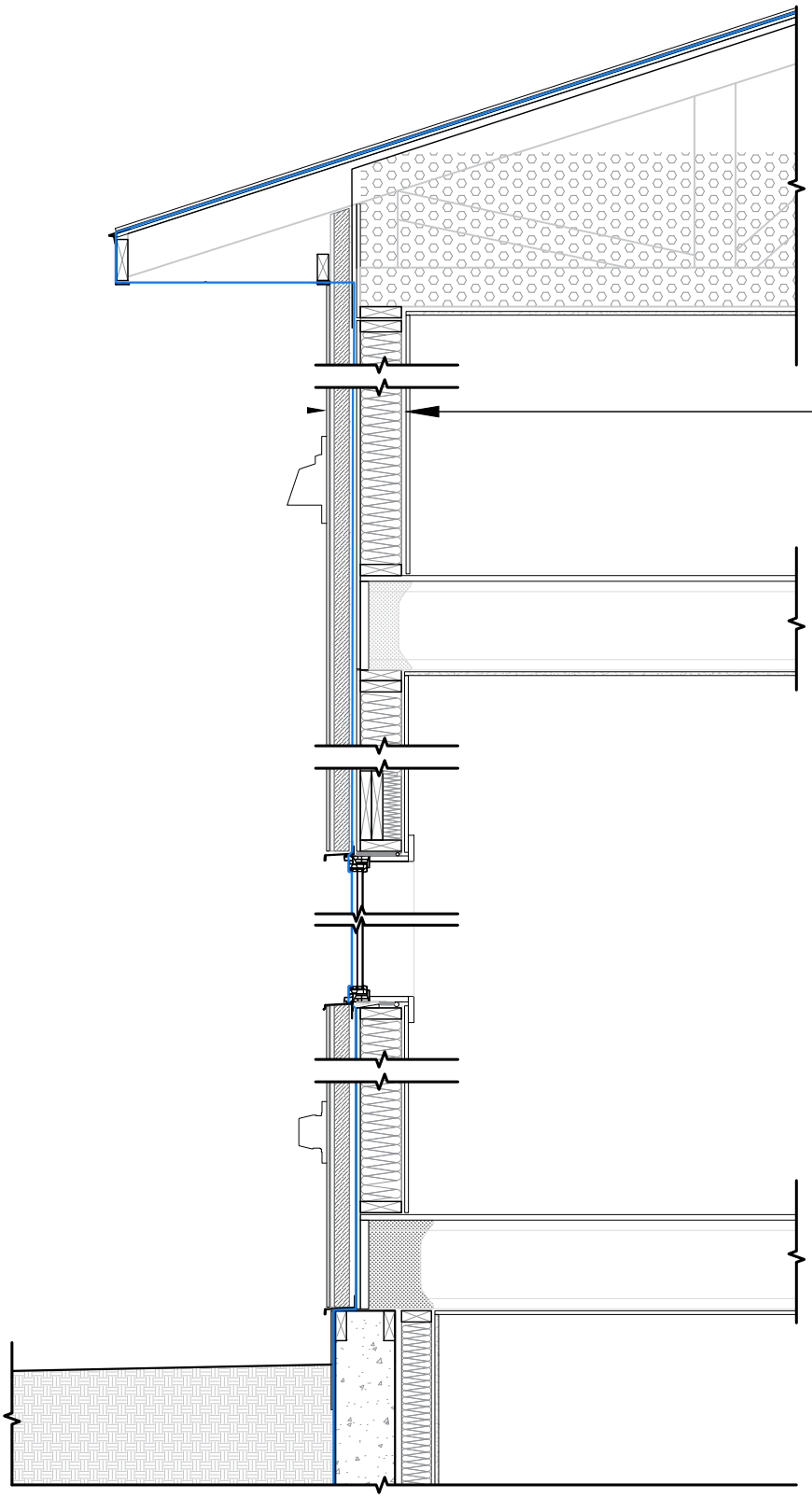
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.11



EXT. MINERAL WOOL T3 WALL ASSEMBLY

EFFECTIVE RSI = 4.58; R-VALUE = 26.01

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 2" MINERAL WOOL INSULATION
  -C/W STRAPPING & SCREWS AS PER SPEC.
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X6 STUD WALL WITH FIBERGLASS BATT CAVITY INSULATION
- VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISH

LEGEND

WATER BARRIER

NOTES

- EXT.= EXTERIOR
- T3= TIER 3

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

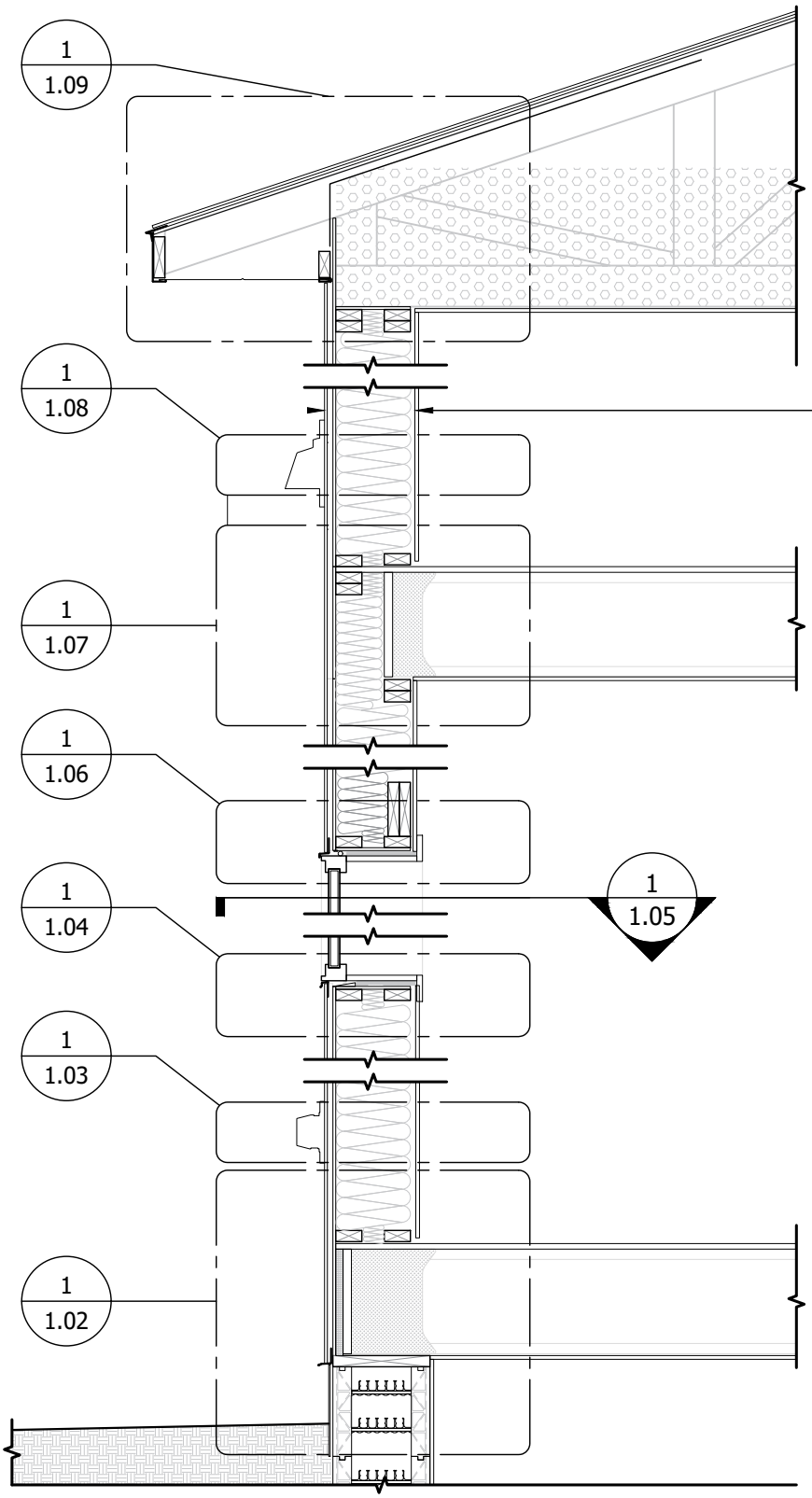
EXT. MINERAL WOOL T3 WALL

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	PY	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.12

Appendix A:

Double Stud Wall Net Zero Assembly Construction Details



1 ENVELOPE SECTION

1/2" = 1'-0"

DOUBLE STUD WALL NZ ASSEMBLY

EFFECTIVE RSI = 5.73; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

NOTES

- NZ = NET ZERO

SAIT

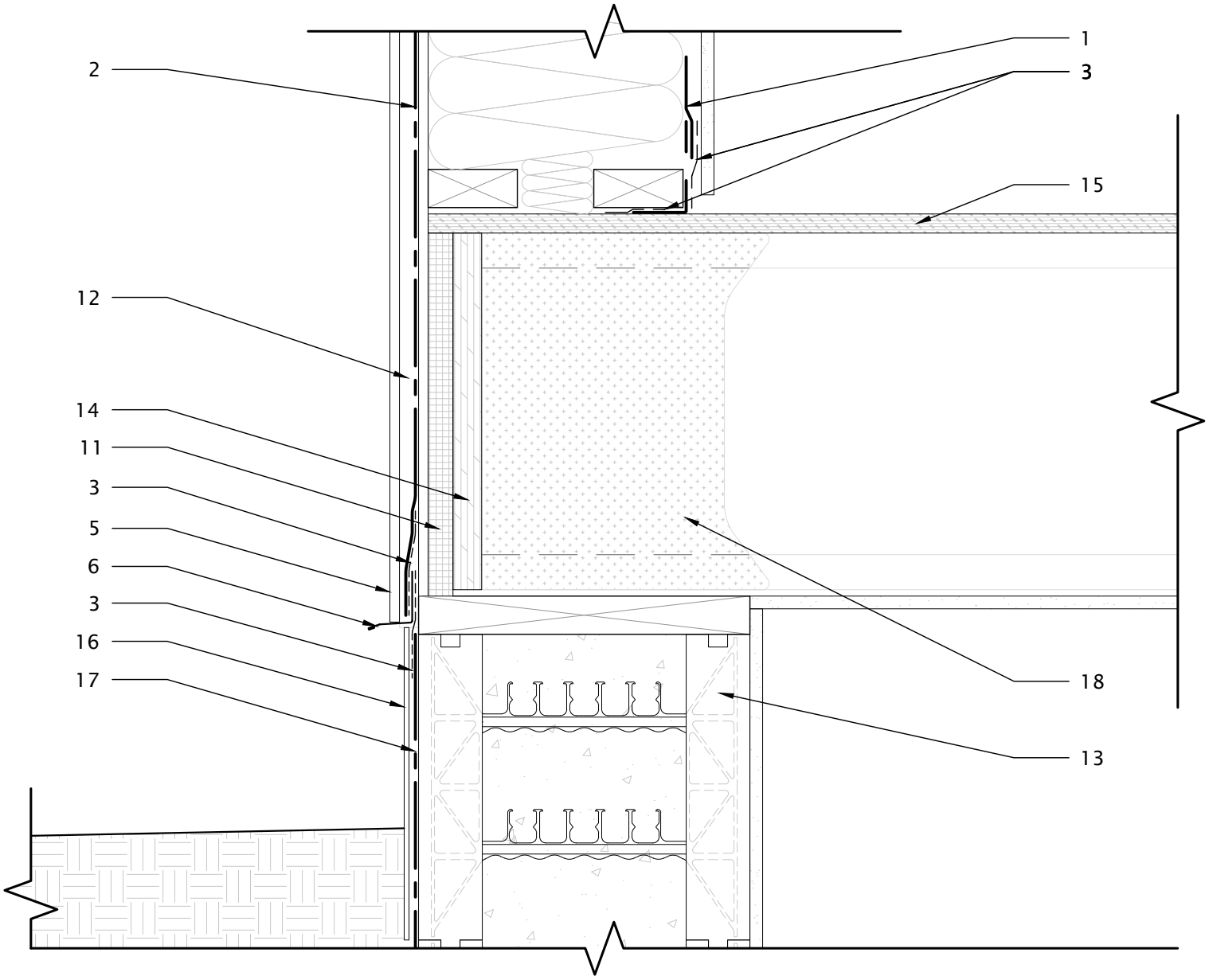
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.01



1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 EPS INSULATION
12 RAINSCREEN STRAPPING
13 ICF BLOCK
14 RIM BOARD
15 SUBFLOOR
16 PARGING
17 DAMPPROOFING
18 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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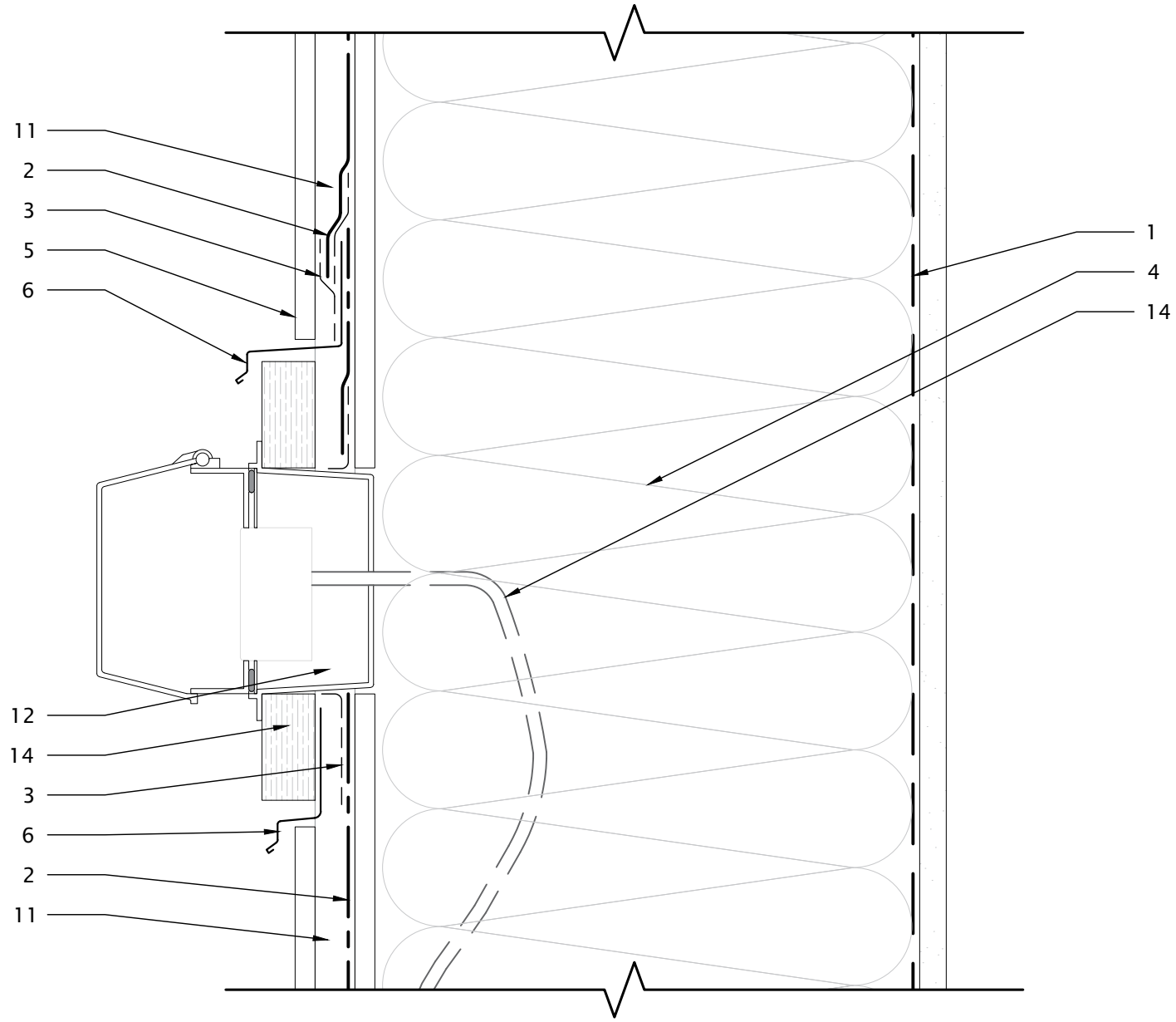

1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 IN USE RECEPTACLE ASSEMBLY
13 ELECTRICAL WIRE
14 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title
DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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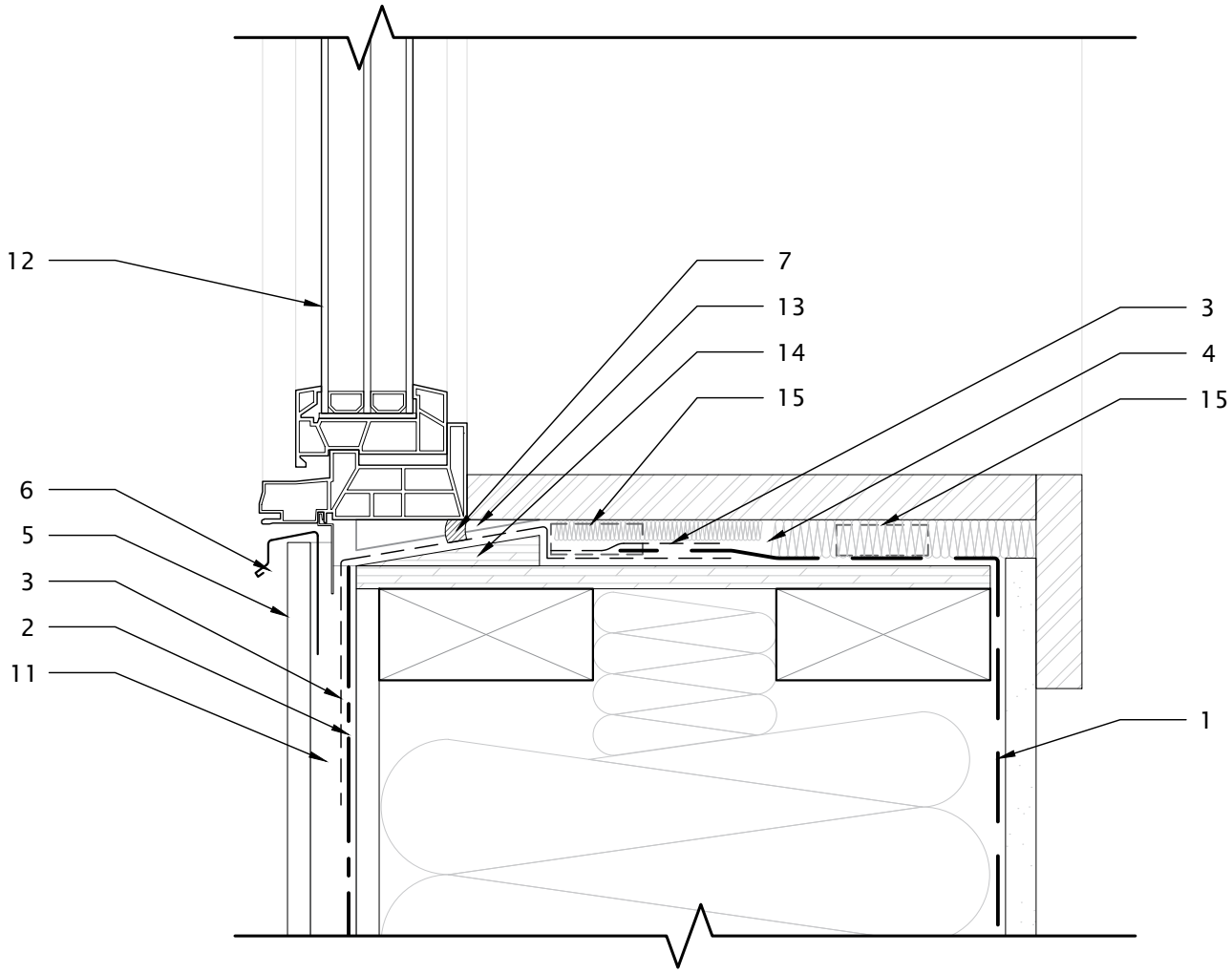


1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

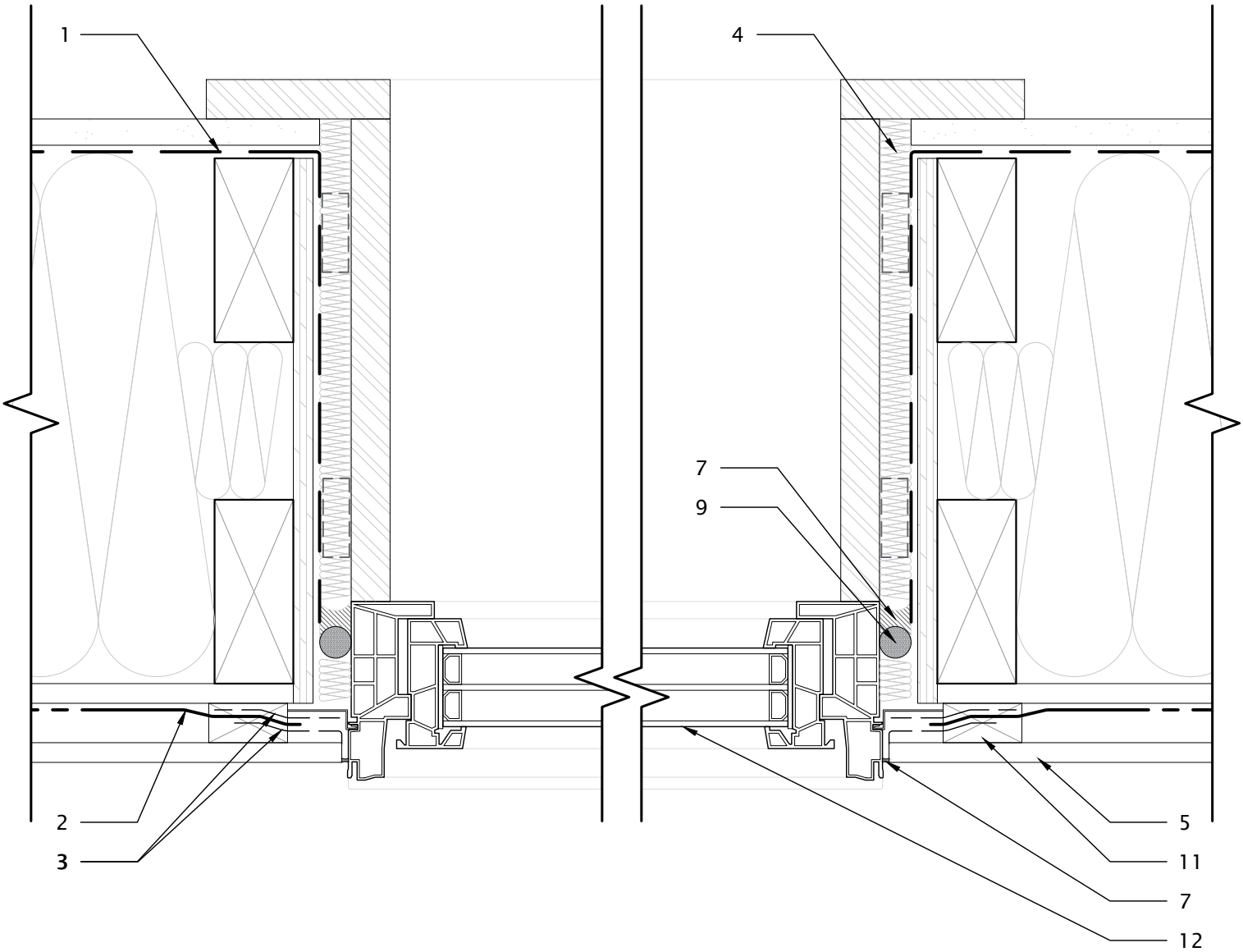
1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 WINDOW SUPPORT SHIM
14 BEVELED SIDING SLOPED DAM
15 BLOCKING

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.04



1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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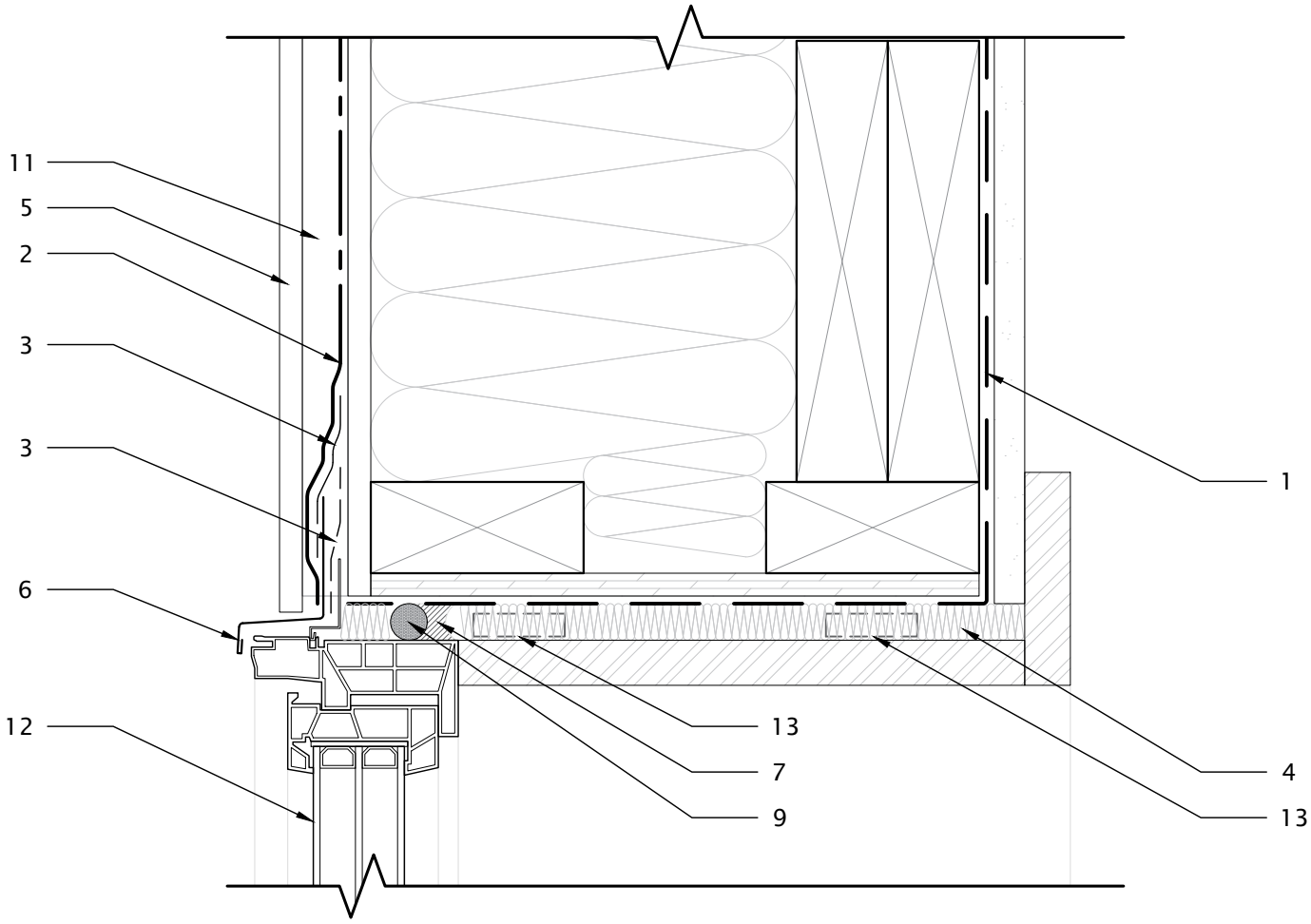

1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 BLOCKING

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title
DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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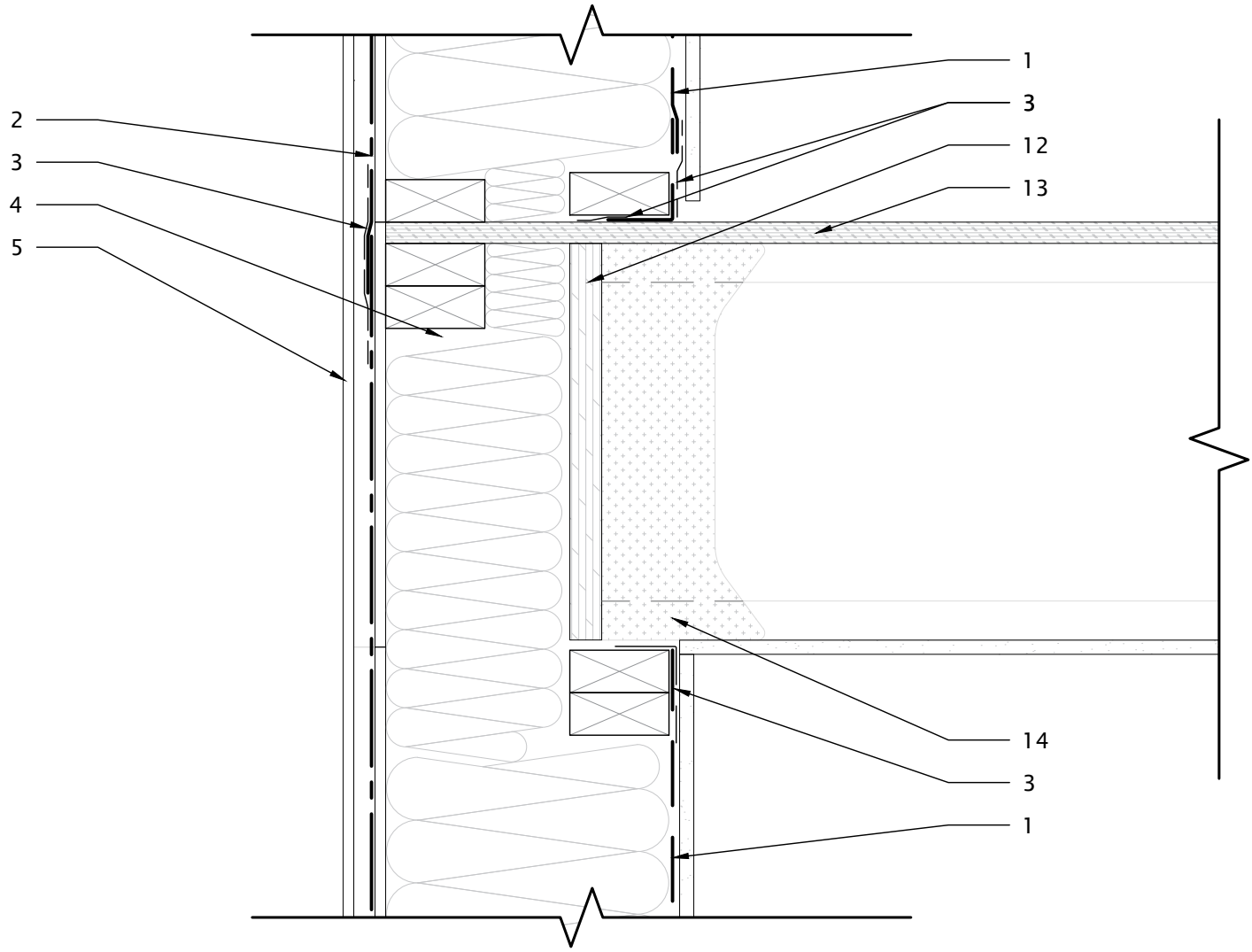

1 FLOOR TO FLOOR TRANSITION SETION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 RIM BOARD
13 SUBFLOOR
14 SPRAY FOAM INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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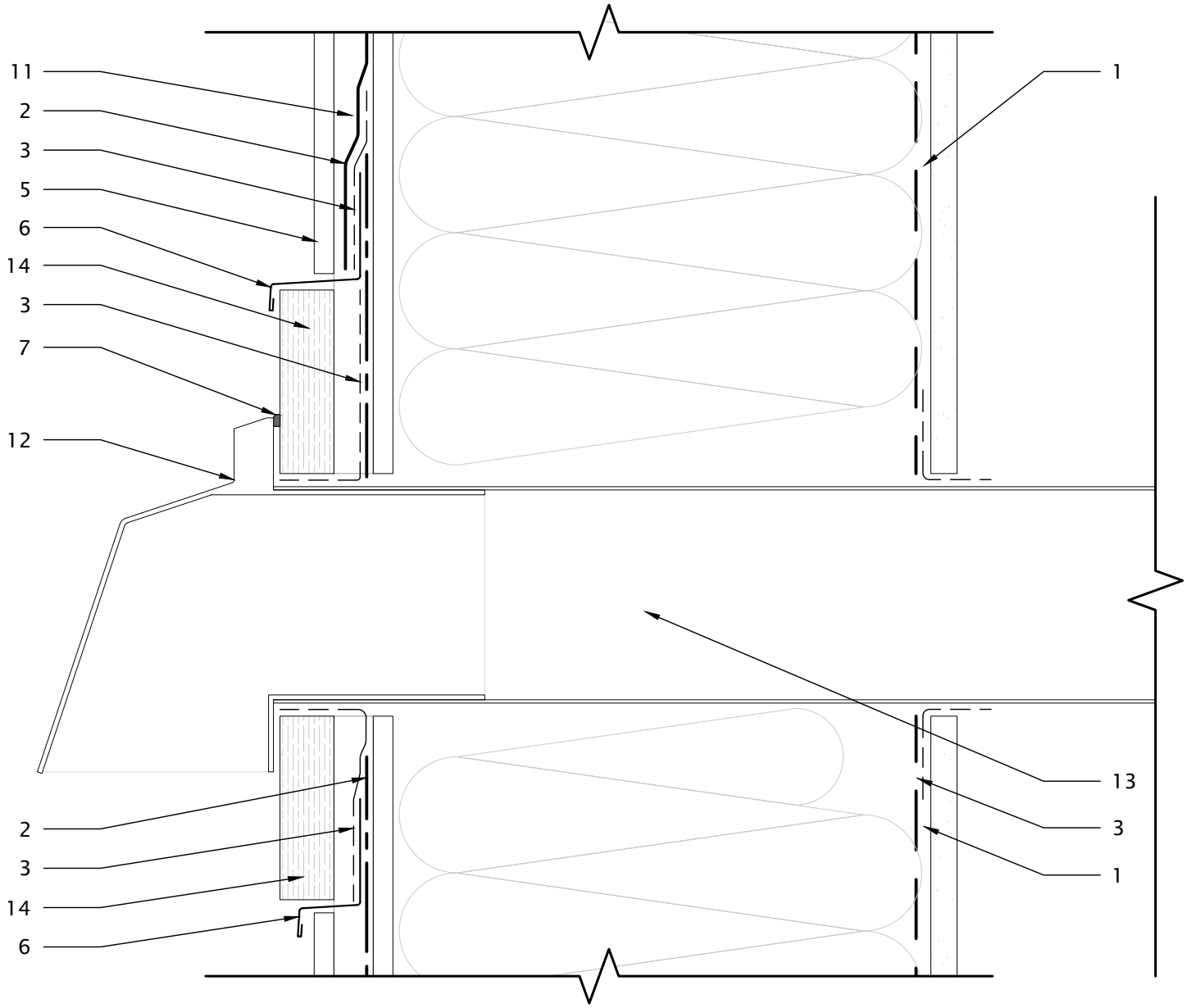

1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 DUCT HOOD
13 DUCT
14 BATTEN OSB CAP

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title
DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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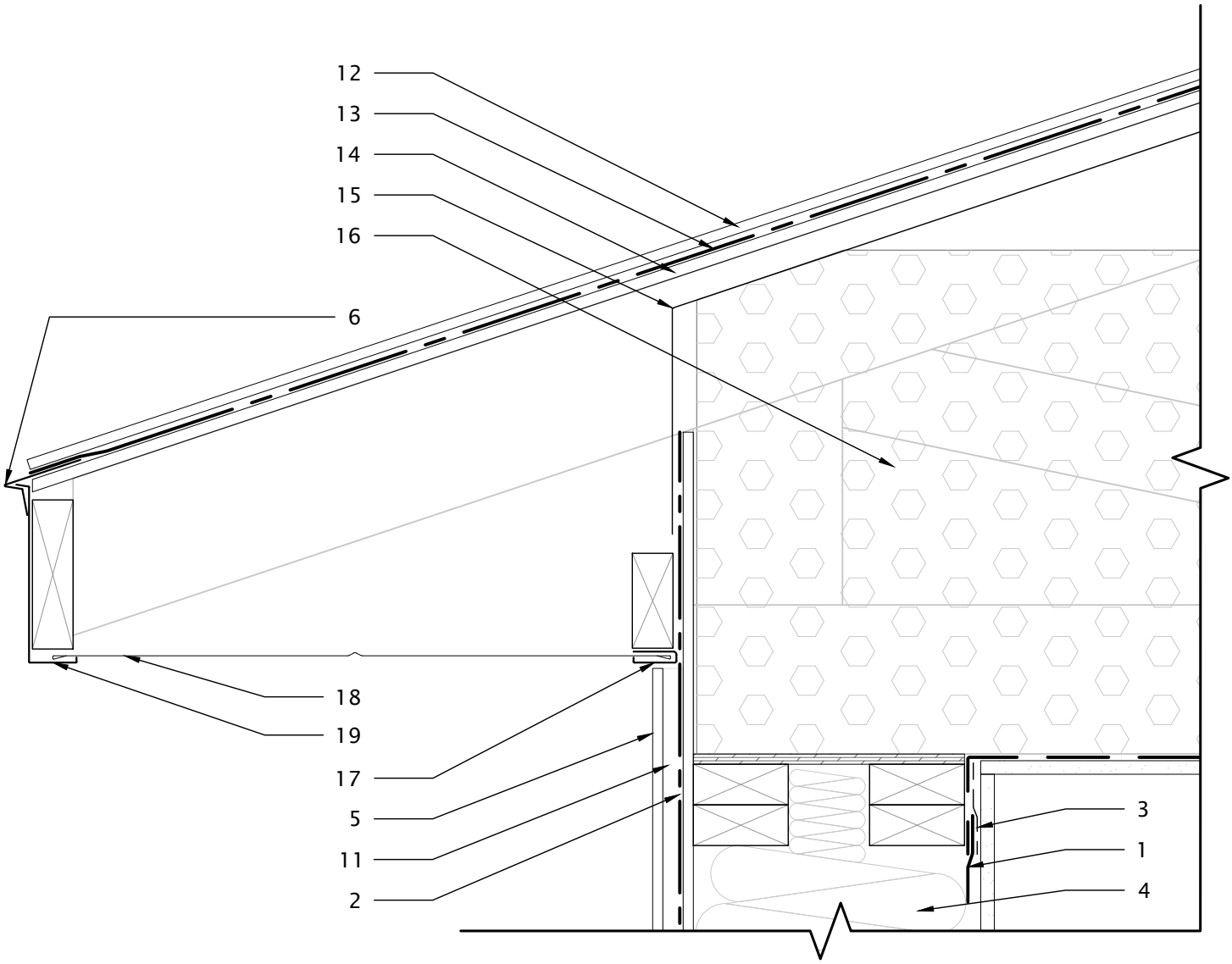

1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 AIRTIGHT VAPOUR BARRIER
2 WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 ROOFING SHINGLE
13 ROOFING UNDERLAYMENT MEMBRANE
14 ROOFING SHEATHING
15 INSULATION STOP
16 BLOWN INSULATION
17 J-CHANNEL
18 SOFFIT
19 FASCIA

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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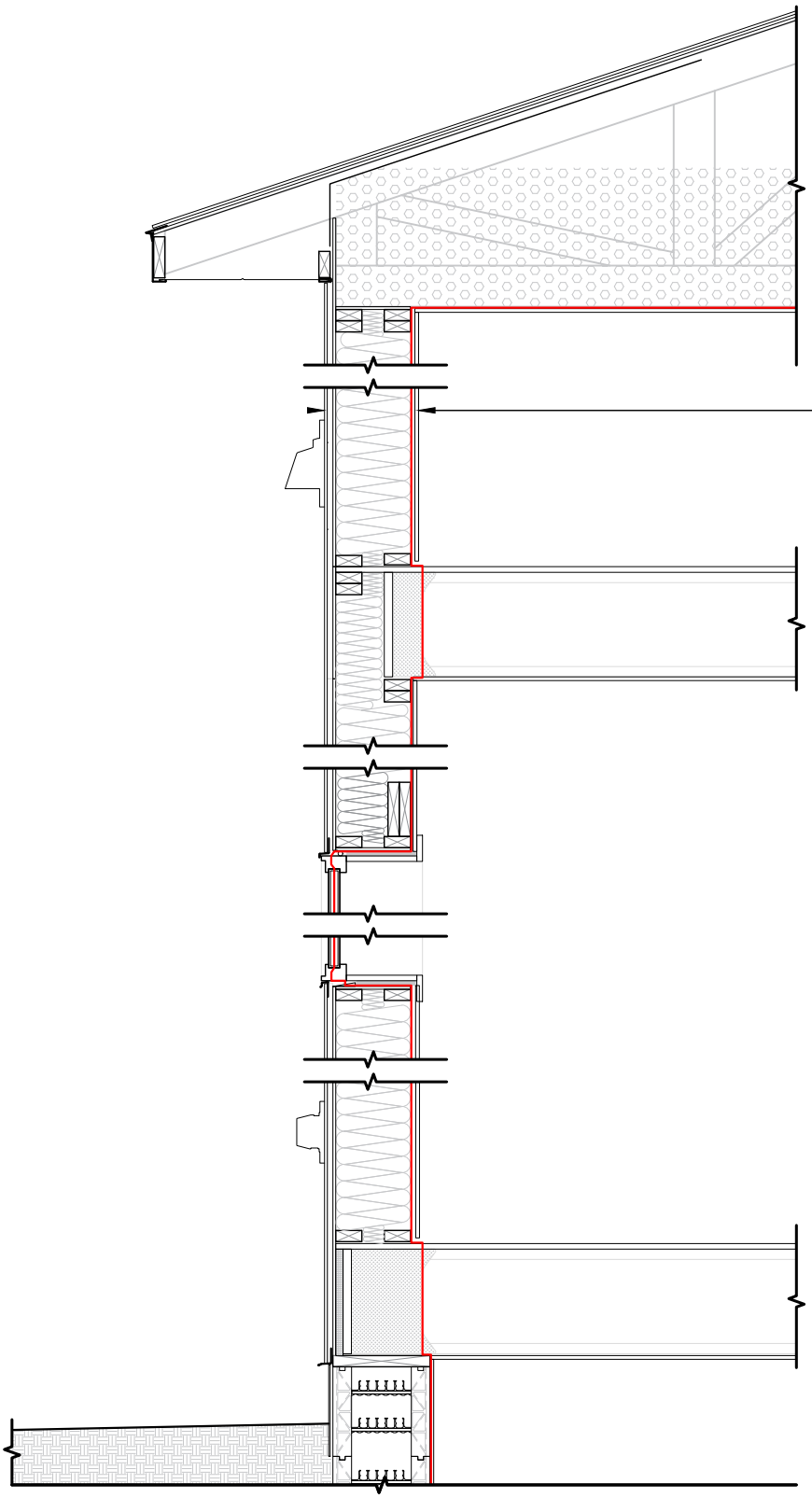

DOUBLE STUD WALL NZ ASSEMBLY

EFFECTIVE RSI = 5.73; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

AIR BARRIER

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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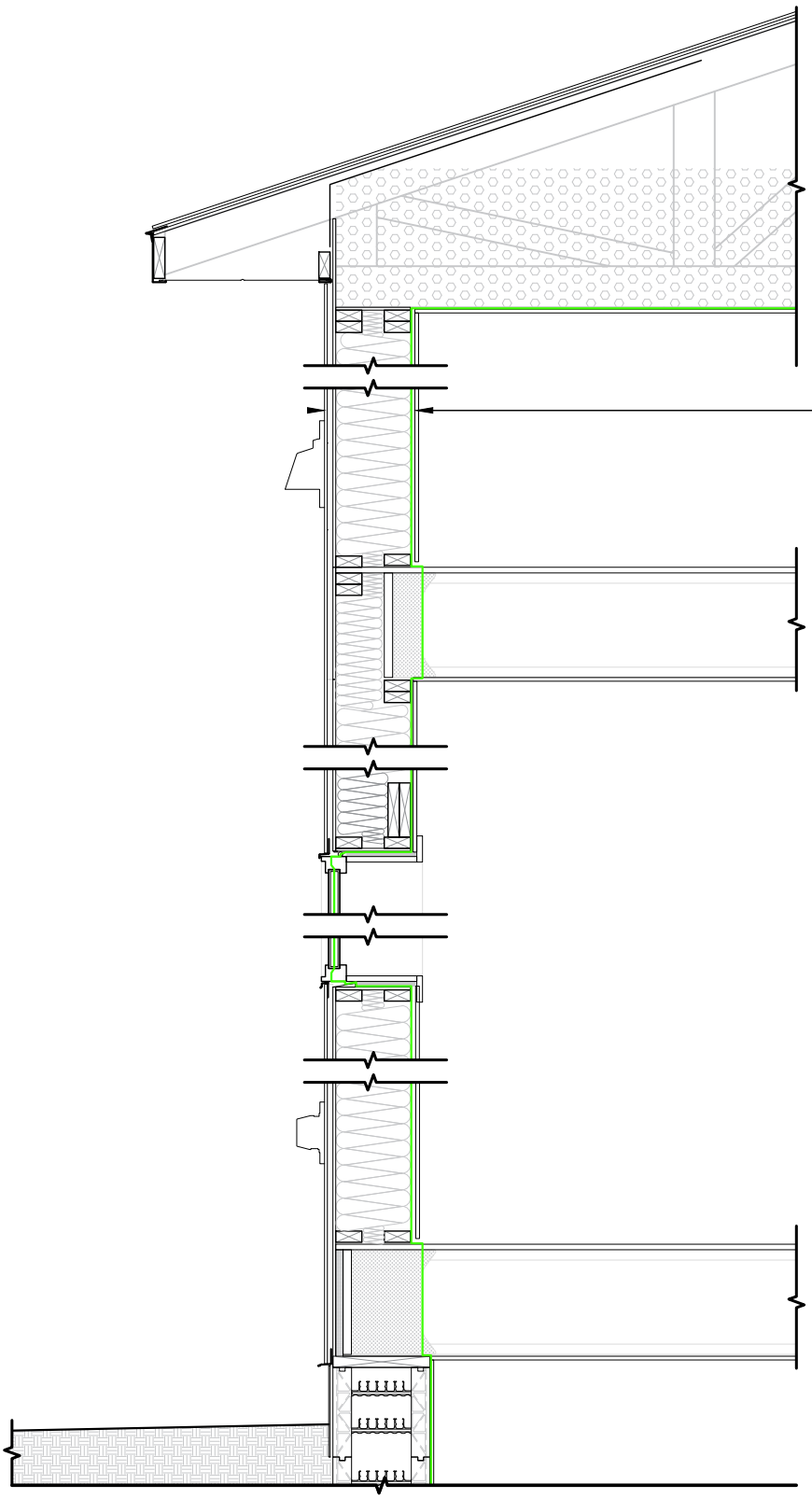


DOUBLE STUD NZ WALL

EFFECTIVE RSI = 5.81; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

VAPOUR BARRIER

1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

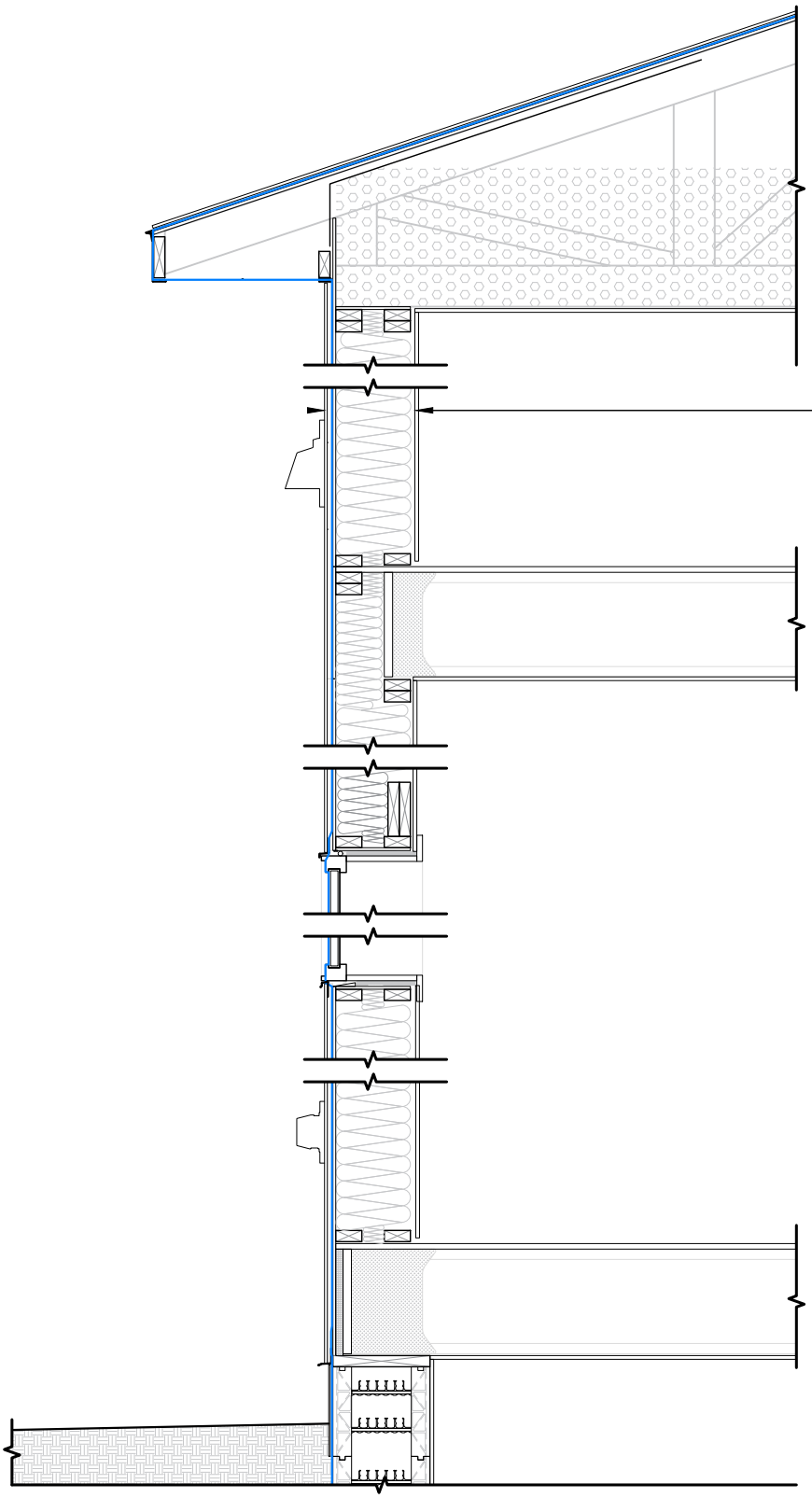
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.11



DOUBLE STUD NZ WALL

EFFECTIVE RSI = 5.81; R-VALUE = 32.52

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING (OPTIONAL)
- WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- ⅜" EXTERIOR SHEATHING
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- 3" VOID w/ FIBREGLASS BATT INSULATION
- 2X4 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- AIRTIGHT VARIABLE VAPOUR BARRIER
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

WATER BARRIER

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

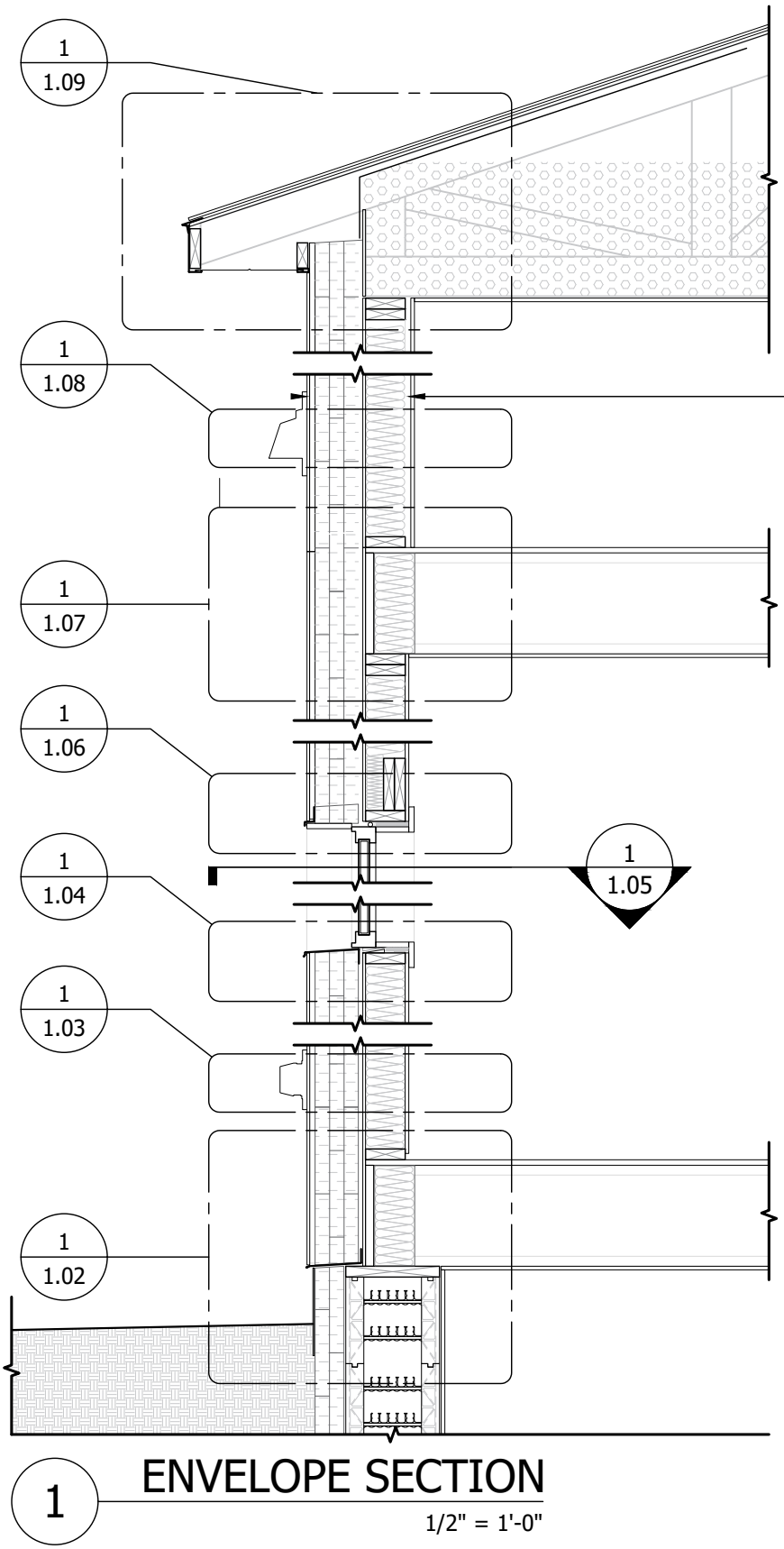
DOUBLE STUD WALL NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.12

Appendix A:

Exterior Foam Net Zero Assembly Construction Details



1 ENVELOPE SECTION

1/2" = 1'-0"

EXT. FOAM NZ ASSEMBLY

EFFECTIVE RSI = 8.21; R-VALUE = 46.62

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 6" XPS INSULATION - VAPOUR BARRIER
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR IMPERMEABLE
- ⅜" EXTERIOR SHEATHING
- 2X6 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- ½" GYPSUM BOARD
- INTERIOR FINISHING

NOTES

- EXT. = EXTERIOR
- NZ = NET ZERO

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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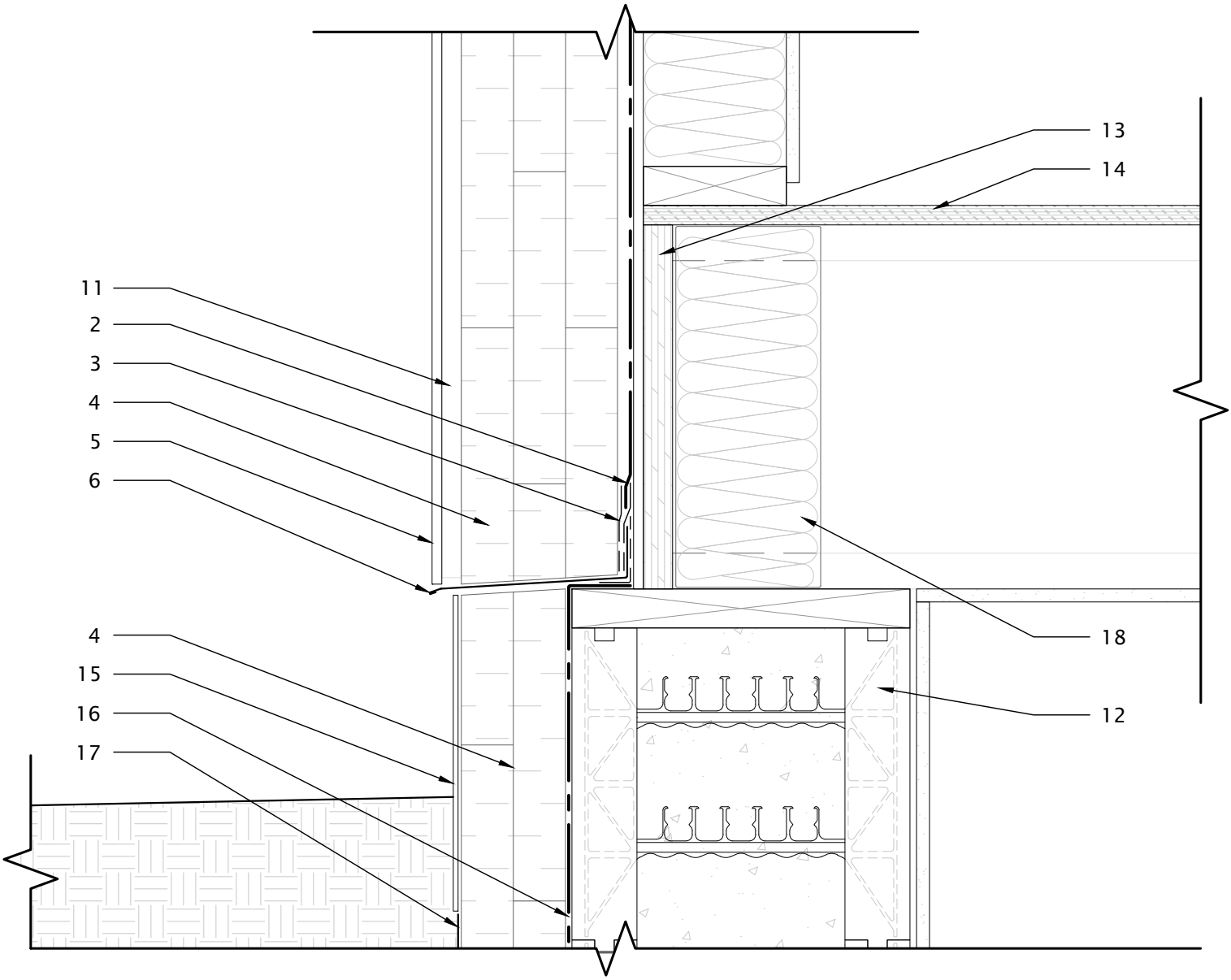


1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

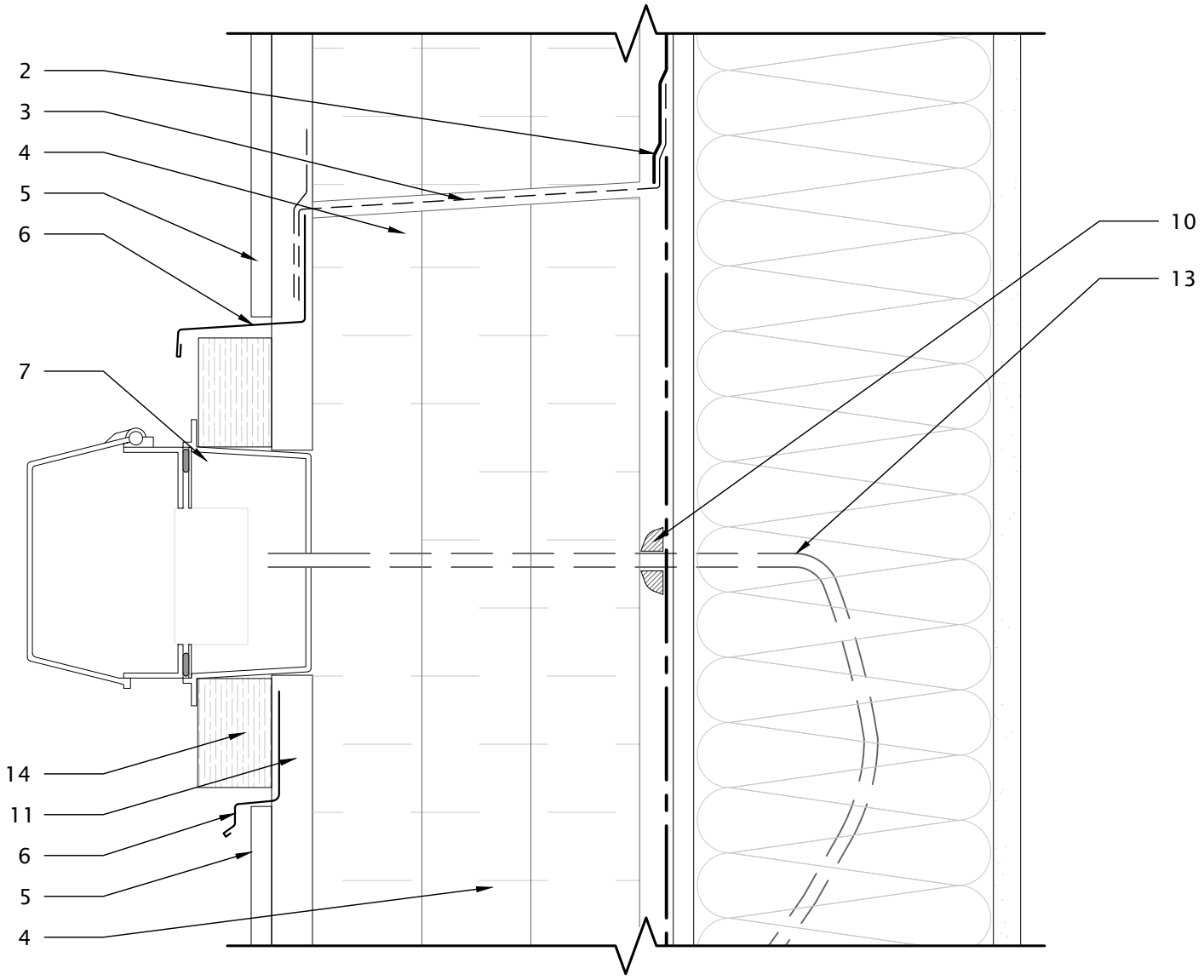
1 VAPOUR IMPERMEABLE BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 ICF BLOCK
13 RIM BOARD
14 SUBFLOOR
15 PARGING
16 DAMPPROOFING
17 DIMPLE WRAP
18 BATT INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.02



1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 IN USE RECEPTACLE ASSEMBLY
13 ELECTRICAL WIRE
14 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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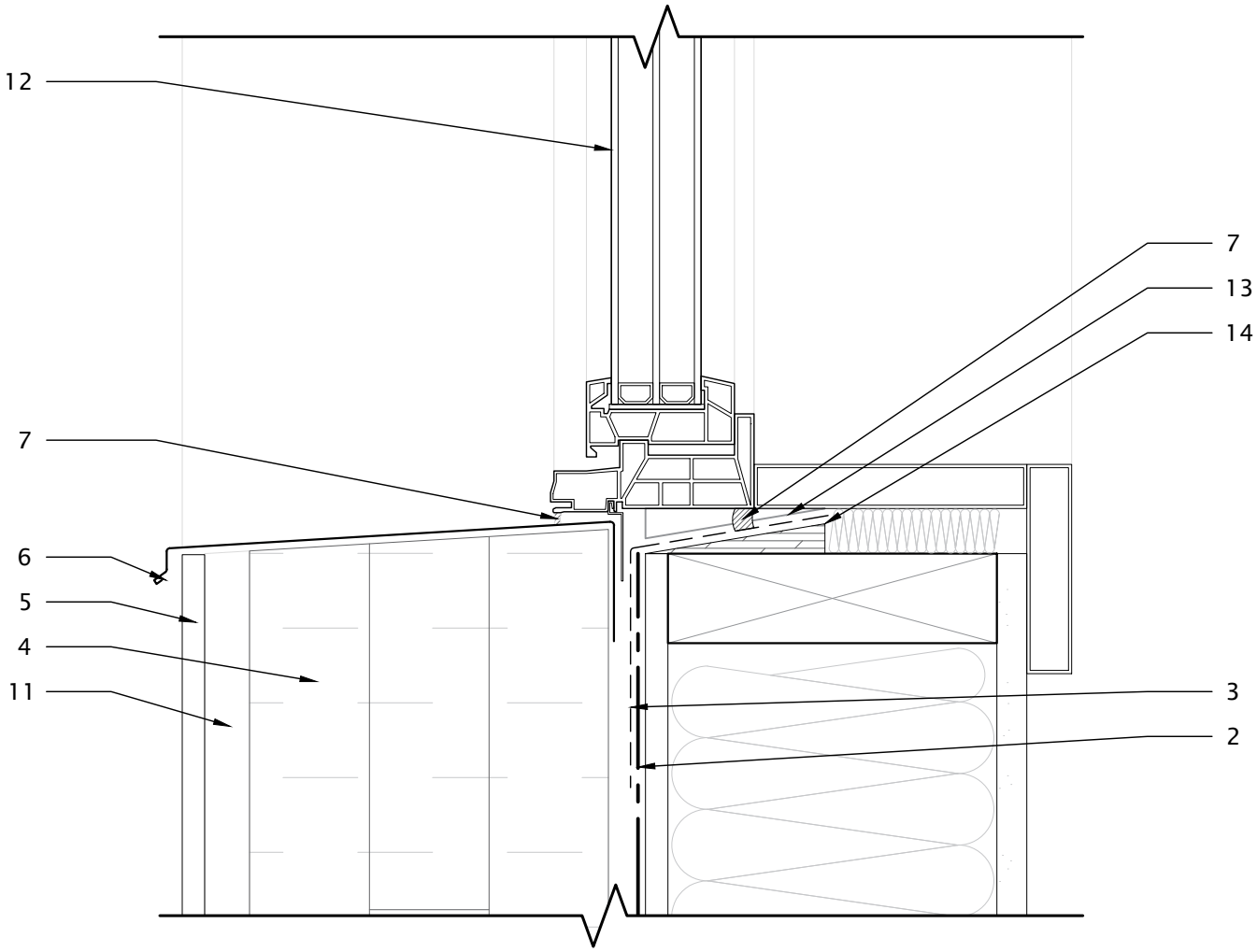


1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 WINDOW SUPPORT SHIM
14 BEVELED SLIDING SLOPED DAM

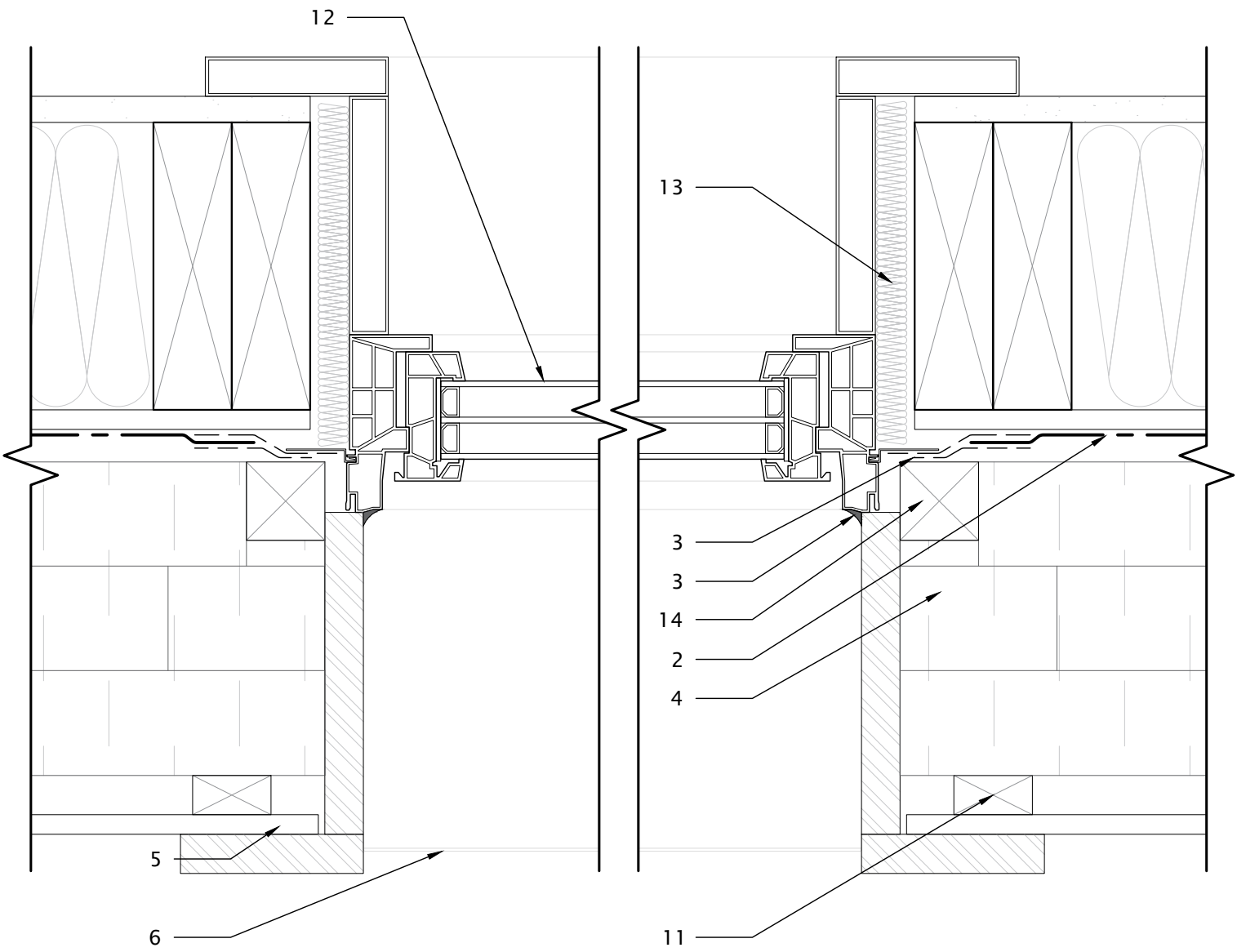
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"

Project Address: N/A
Issued For: ALBERTA ECOTRUST FOUNDATION

1.04



1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 FIBREGLASSBATT INSULATION
14 2X2 BLOCK
15 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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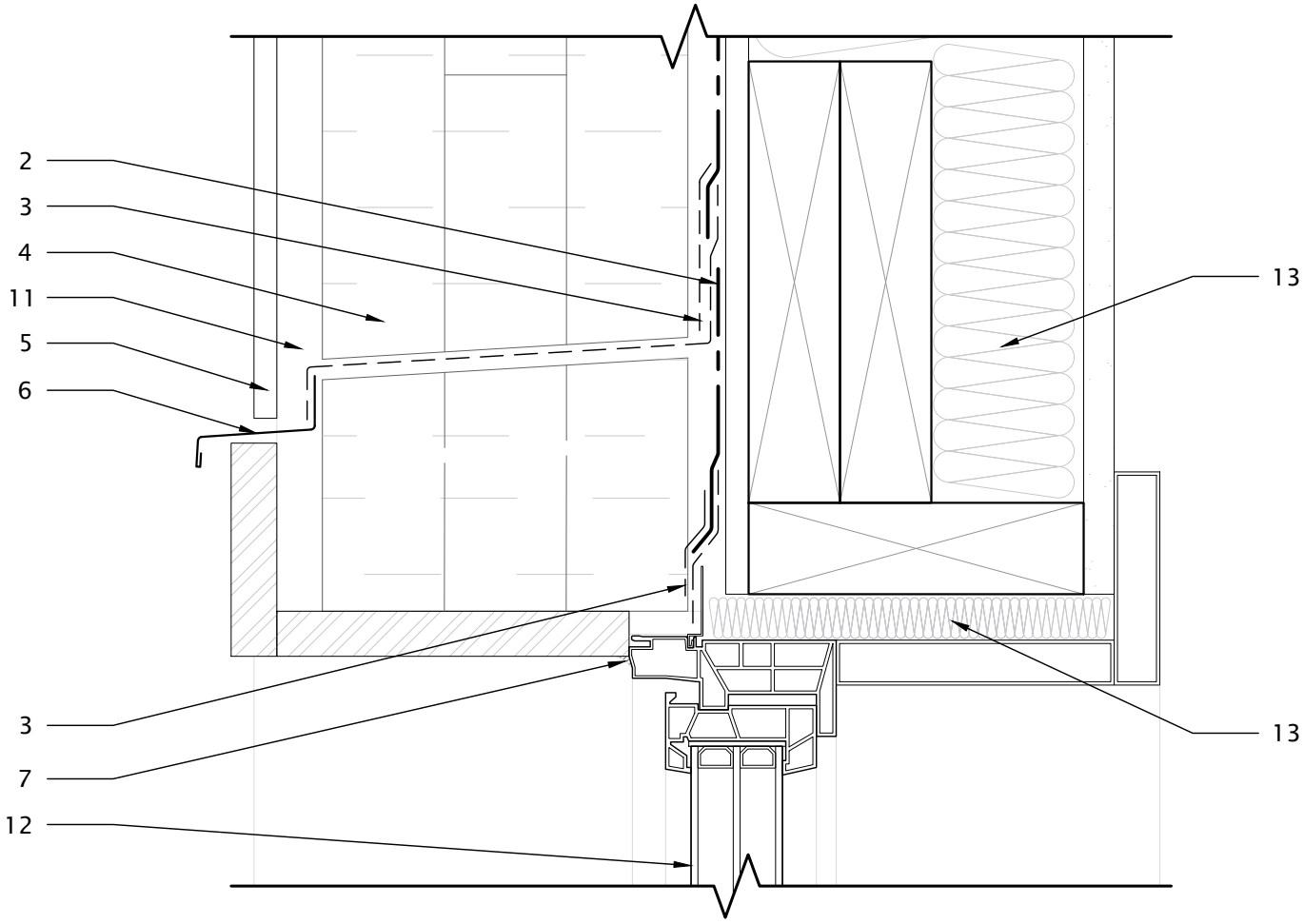

1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 FIBREGLASS BATT INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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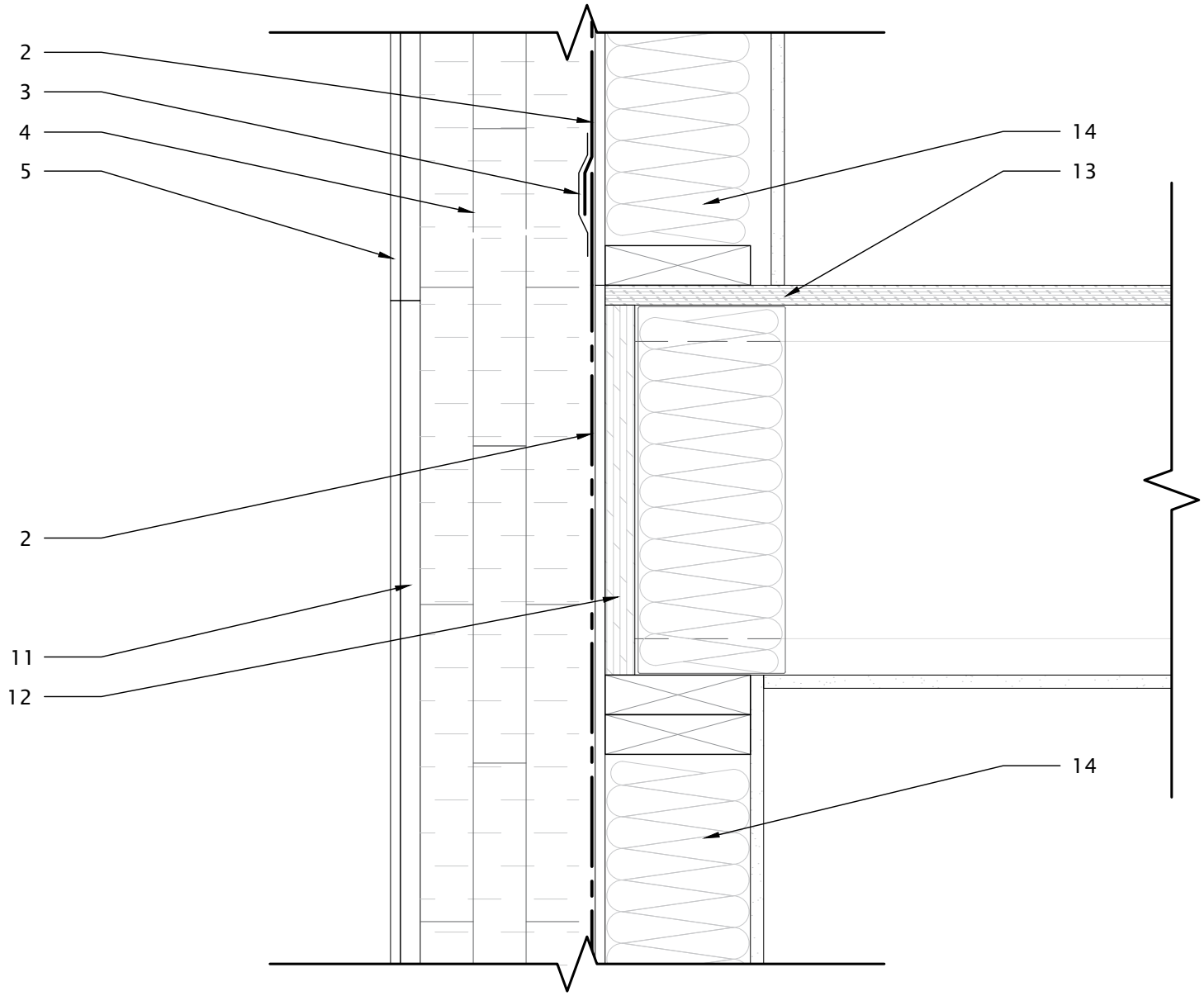


1 FLOOR TO FLOOR TRANSITION SETION DETAIL

2" = 1'-0"

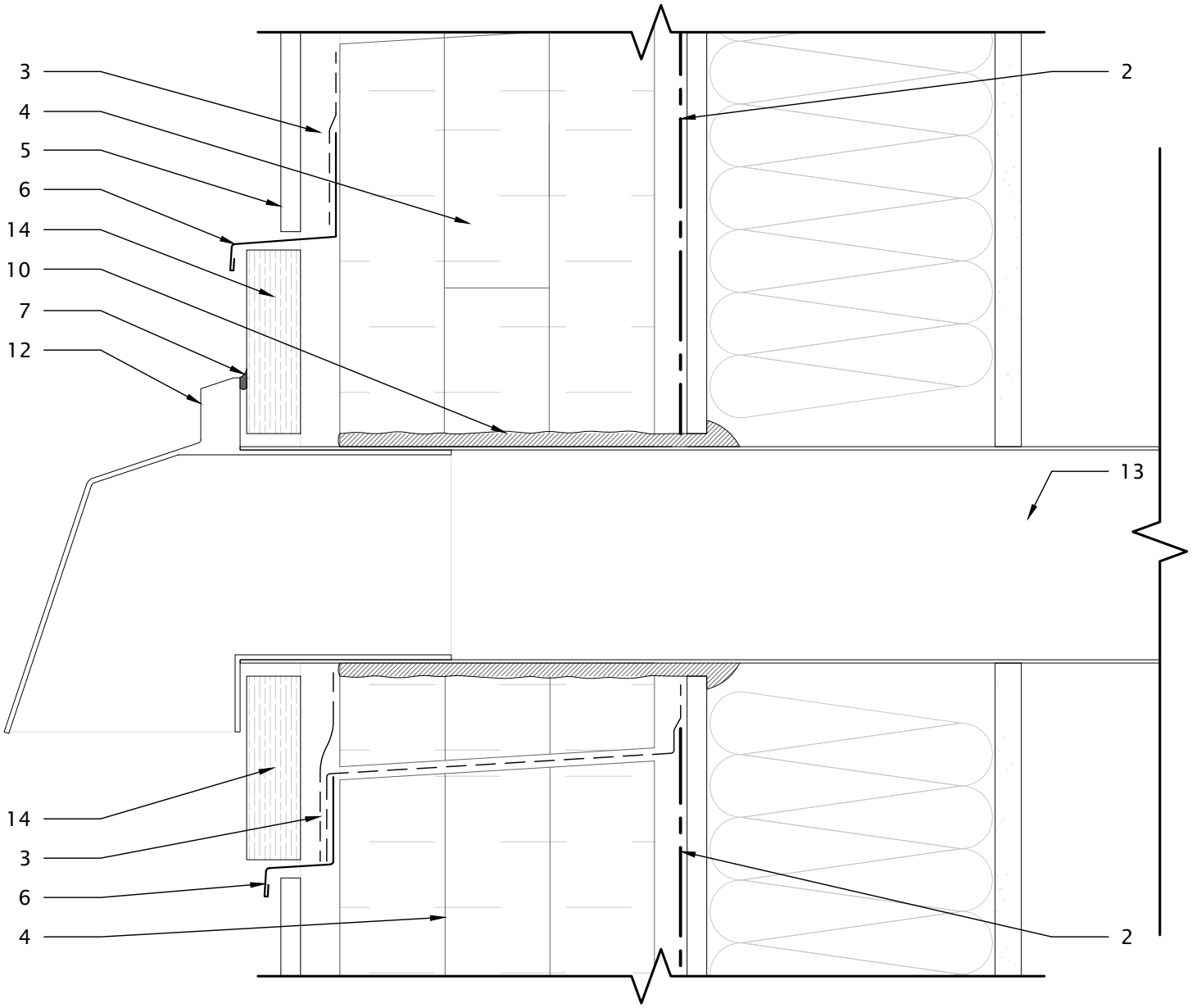
1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 RIM BOARD
13 SUBFLOOR
14 FIBREGLASS BATT INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.07



1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 DUCT HOOD
13 DUCT
14 BATTEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number: 2024-009
Project Name: HIGH PERFORMANCE WALL ASSEMBLY
Drawn by: LL
Checked by: BH, NM
Date: 2025-04-30
Scale: 4" = 1'- 0"
Project Address: N/A
Issued For: ALBERTA ECOTRUST FOUNDATION

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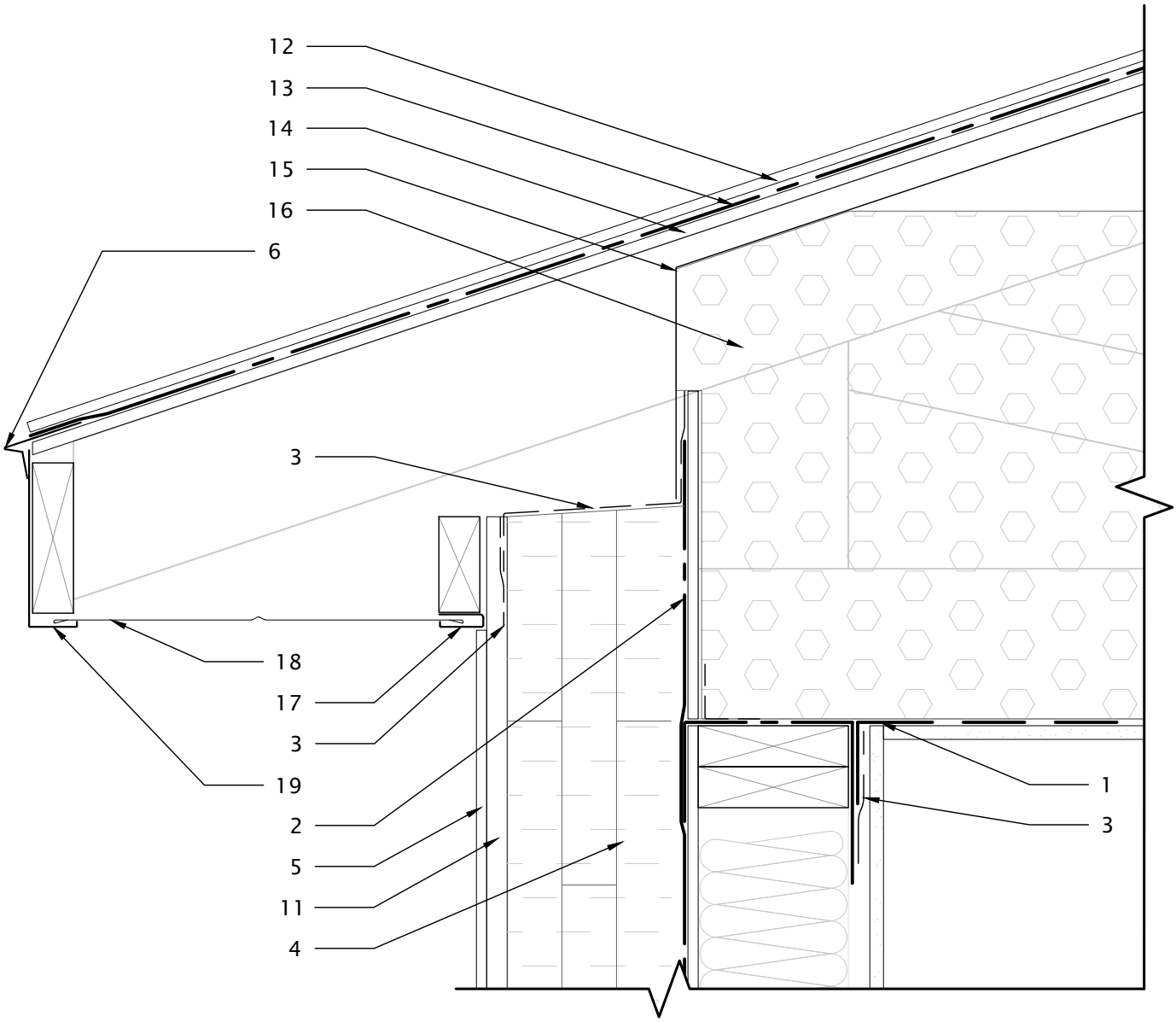

1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 XPS INSULATED BOARD
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 ROOFING SHINGLE
13 ROOFING UNDERLAYMENT MEMBRANE
14 ROOFING SHEATHING
15 INSULATION STOP
16 BLOWN INSULATION
17 J-CHANNEL
18 SOFFIT
19 FASCIA

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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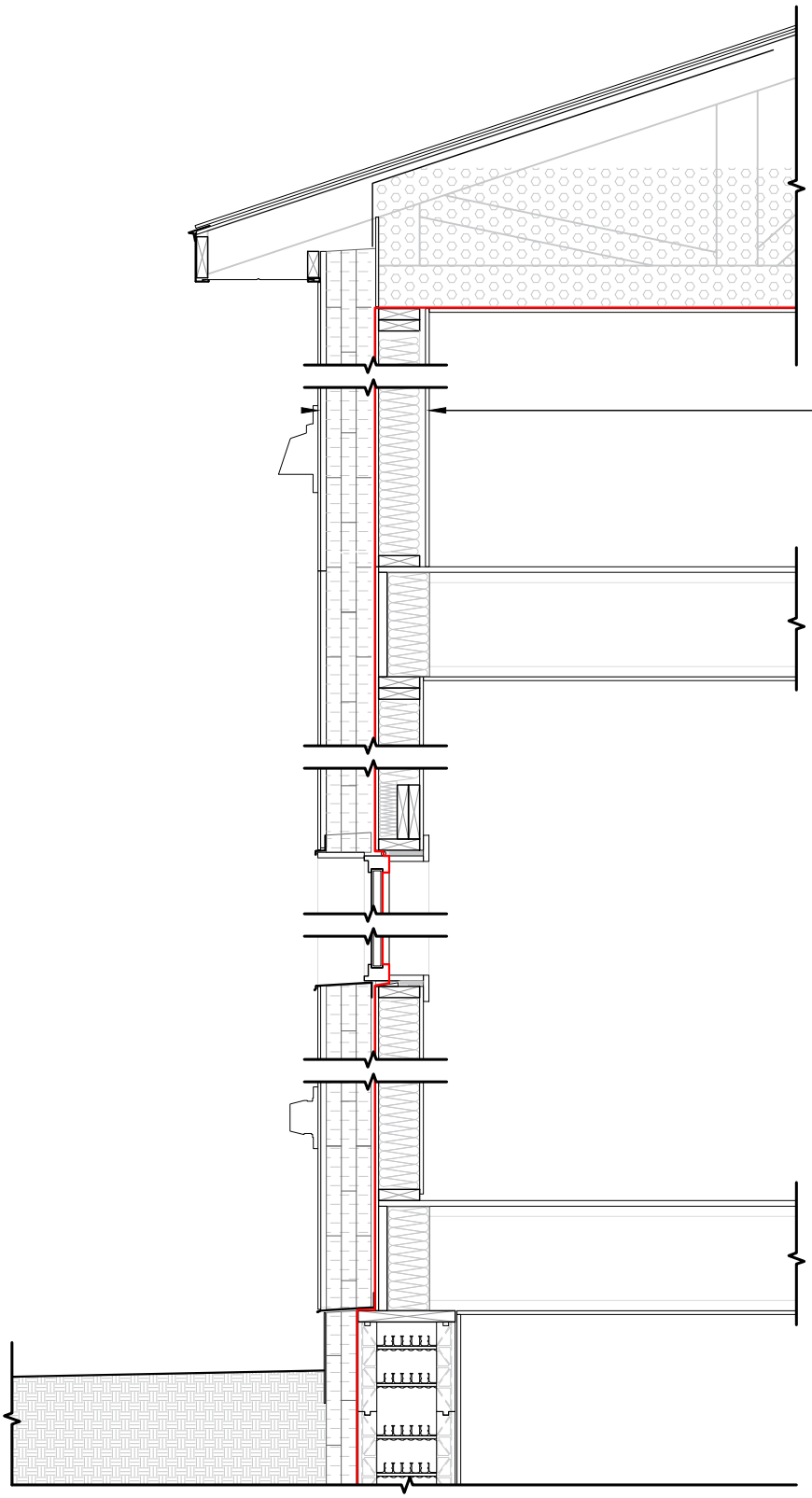


EXT. FOAM NZ ASSEMBLY

EFFECTIVE RSI = 8.21; R-VALUE = 46.62

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 6" XPS INSULATION - VAPOUR BARRIER
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR IMPERMEABLE
- ⅜" EXTERIOR SHEATHING
- 2X6 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

AIR BARRIER

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

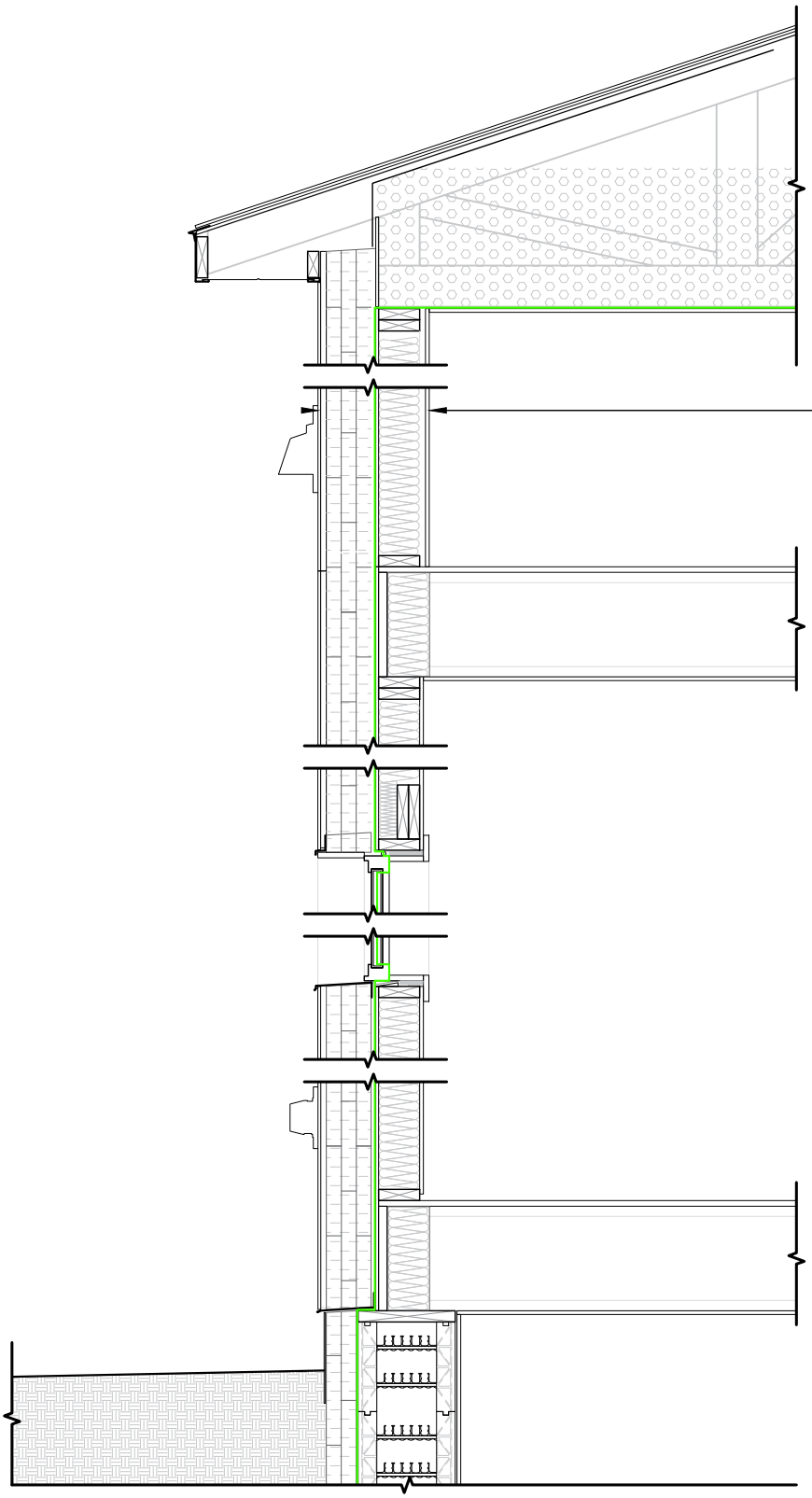
Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"

Project Address: N/A

Issued For: ALBERTA ECOTRUST FOUNDATION

1.10



EXT. FOAM NZ ASSEMBLY

EFFECTIVE RSI = 8.21; R-VALUE = 46.62

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 6" XPS INSULATION - VAPOUR BARRIER
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR IMPERMEABLE
- ⅜" EXTERIOR SHEATHING
- 2X6 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

VAPOUR BARRIER

1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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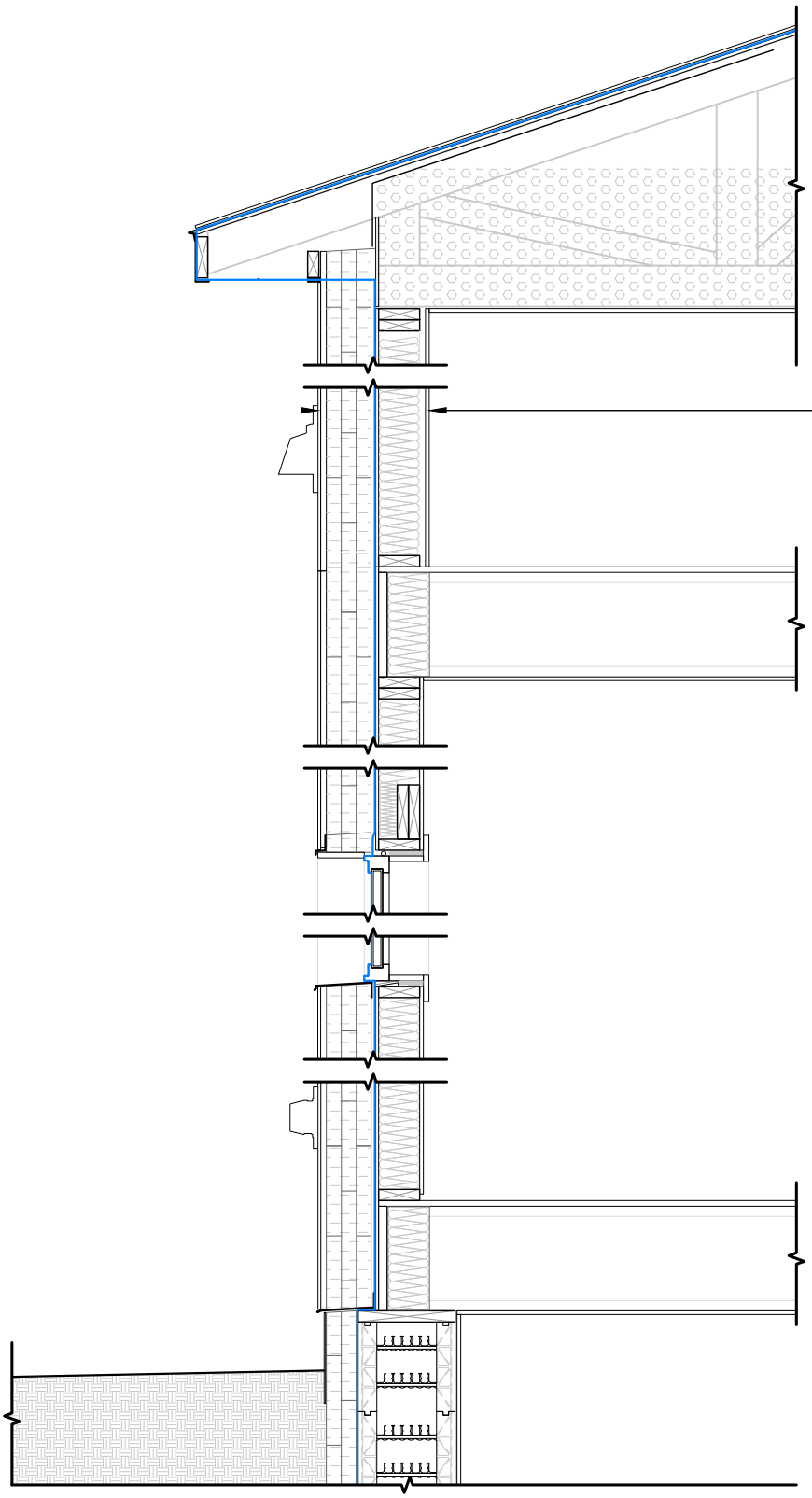


EXT. FOAM NZ ASSEMBLY

EFFECTIVE RSI = 8.21; R-VALUE = 46.62

- EXTERIOR CLADDING
- ¾" RAINSCREEN STRAPPING
- 6" XPS INSULATION - VAPOUR BARRIER
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR IMPERMEABLE
- ⅜" EXTERIOR SHEATHING
- 2X6 WOOD STUDS w/ FIBREGLASS BATT INSULATION
- ½" GYPSUM BOARD
- INTERIOR FINISHING

LEGEND

WATER BARRIER

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: EXT. FOAM NZ

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"

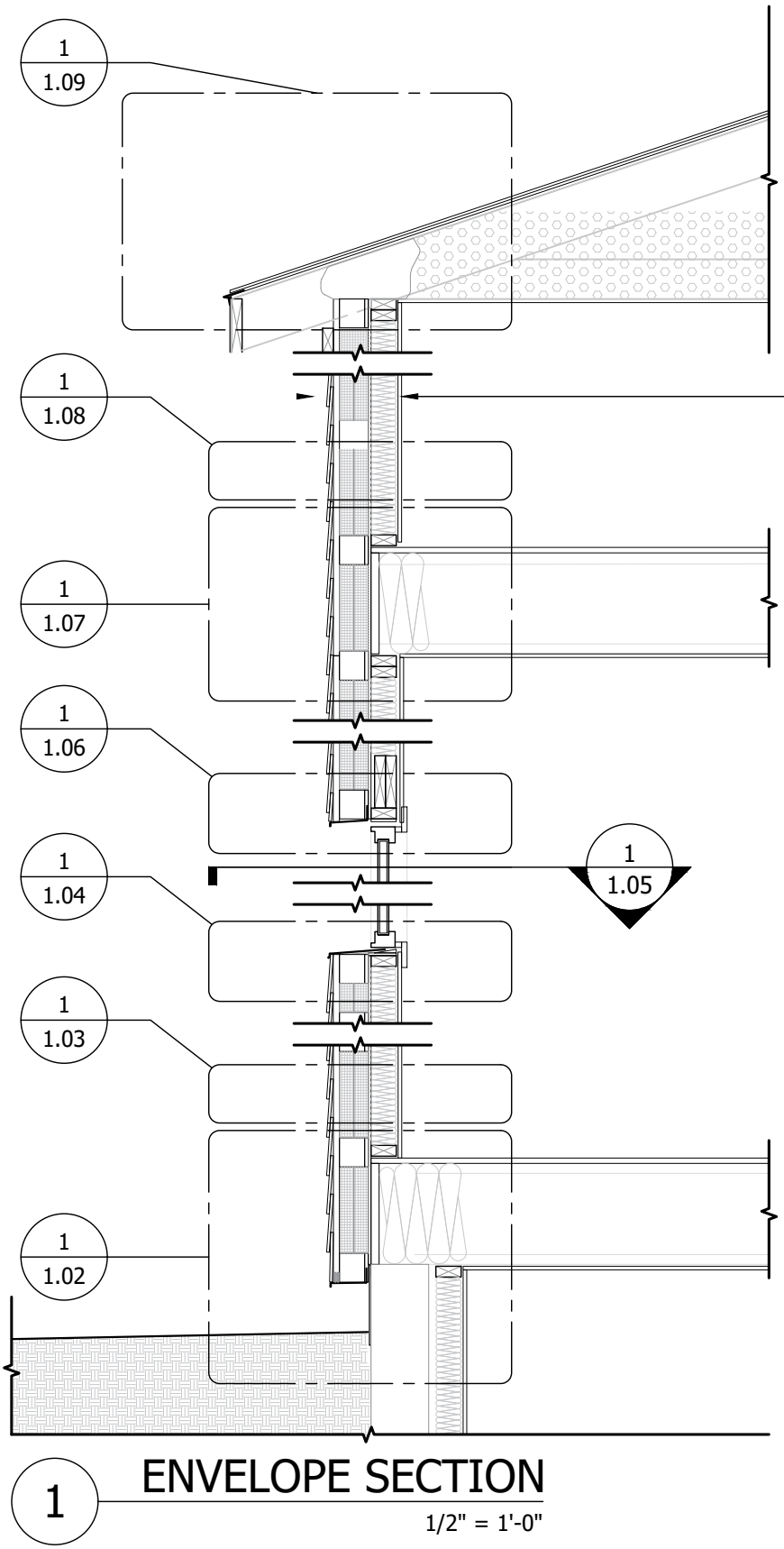
Project Address: N/A

Issued For: ALBERTA ECOTRUST FOUNDATION

1.12

Appendix A:

Fire Resistant Retrofit Assembly Construction Details



FIRE RESISTANT RETROFIT ASSEMBLY

EFFECTIVE RSI = 4.81; R-VALUE = 27.32

- EXTERIOR CLADDING
- 1X3 RAIN SCREEN
- 4" EXTERNAL MINERAL WOOL
- AIRTIGHT WATER RESISTANT BARRIER
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ FIBERGLASS INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISH

1 ENVELOPE SECTION

1/2" = 1'-0"

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS, NM	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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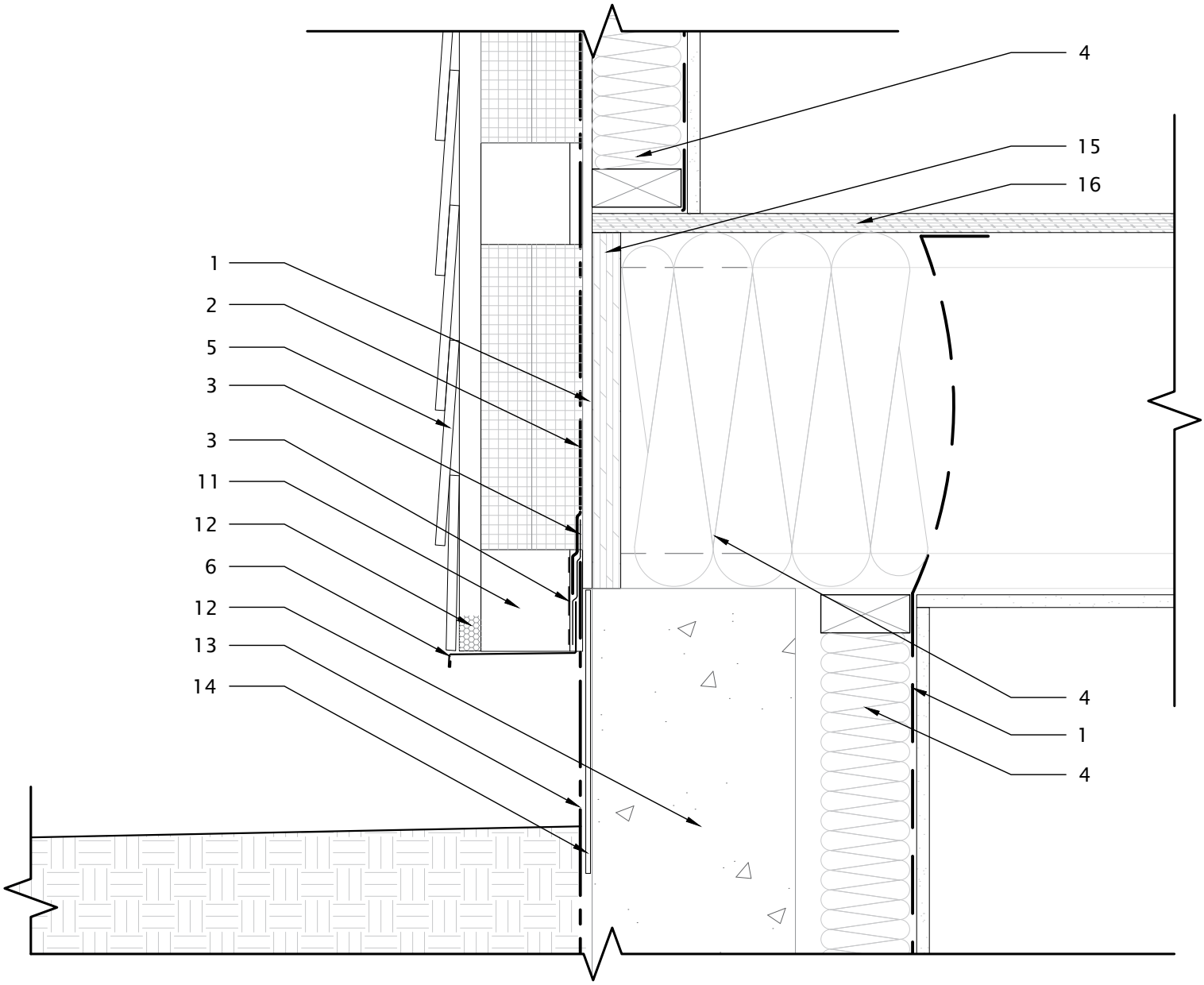


1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 BUG SCREEN
12 CONCRETE FOUNDATION
13 DAMPPROOFING
14 PARGING
15 RIM BOARD
16 SUBFLOOR
17 THERMALLY BROKEN Z GIRT SYSTEM

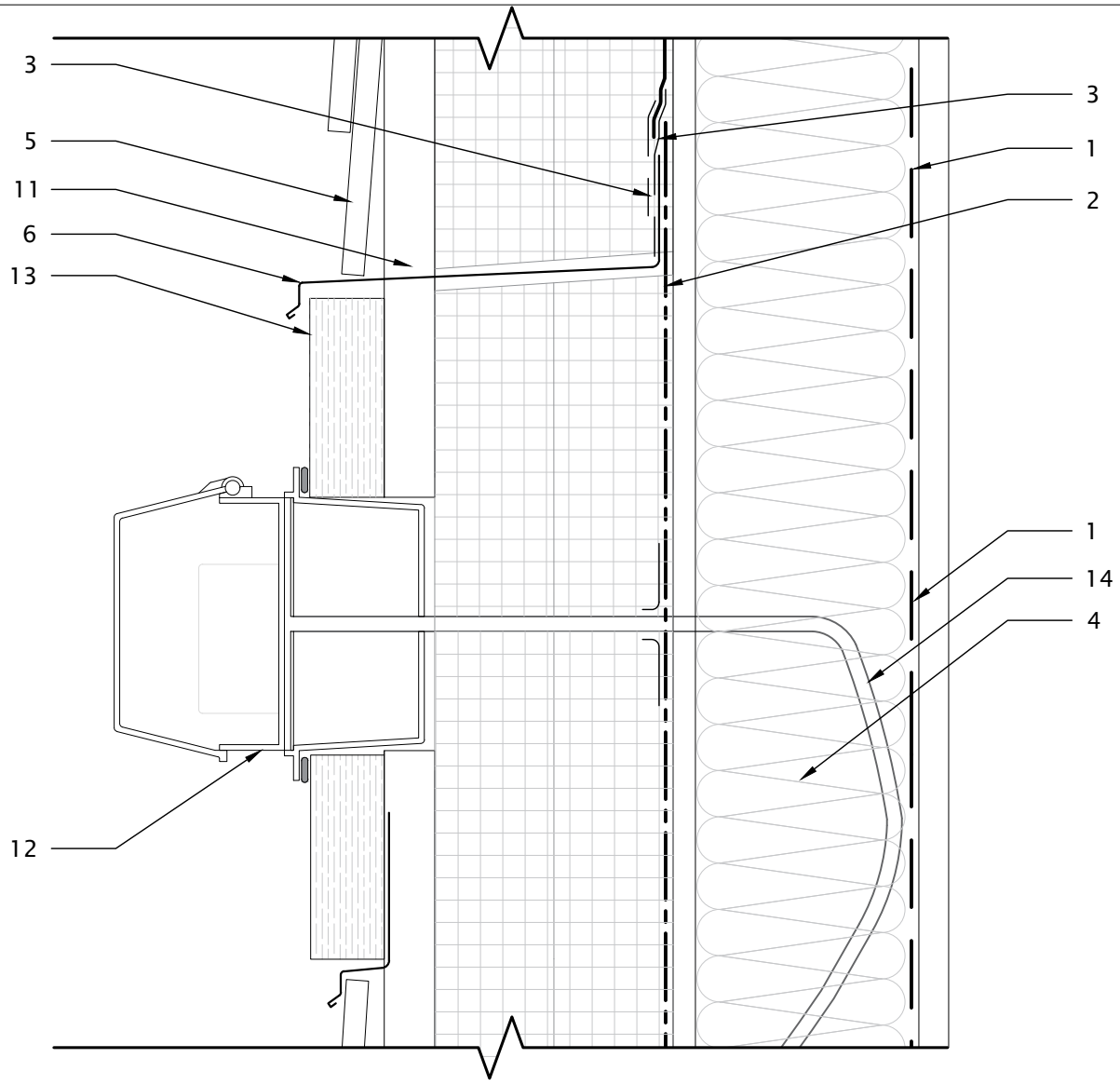
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.02



1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBERGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 IN USE RECEPTACLE ASSEMBLY
13 BATTEN
14 ELECTRICAL WIRE

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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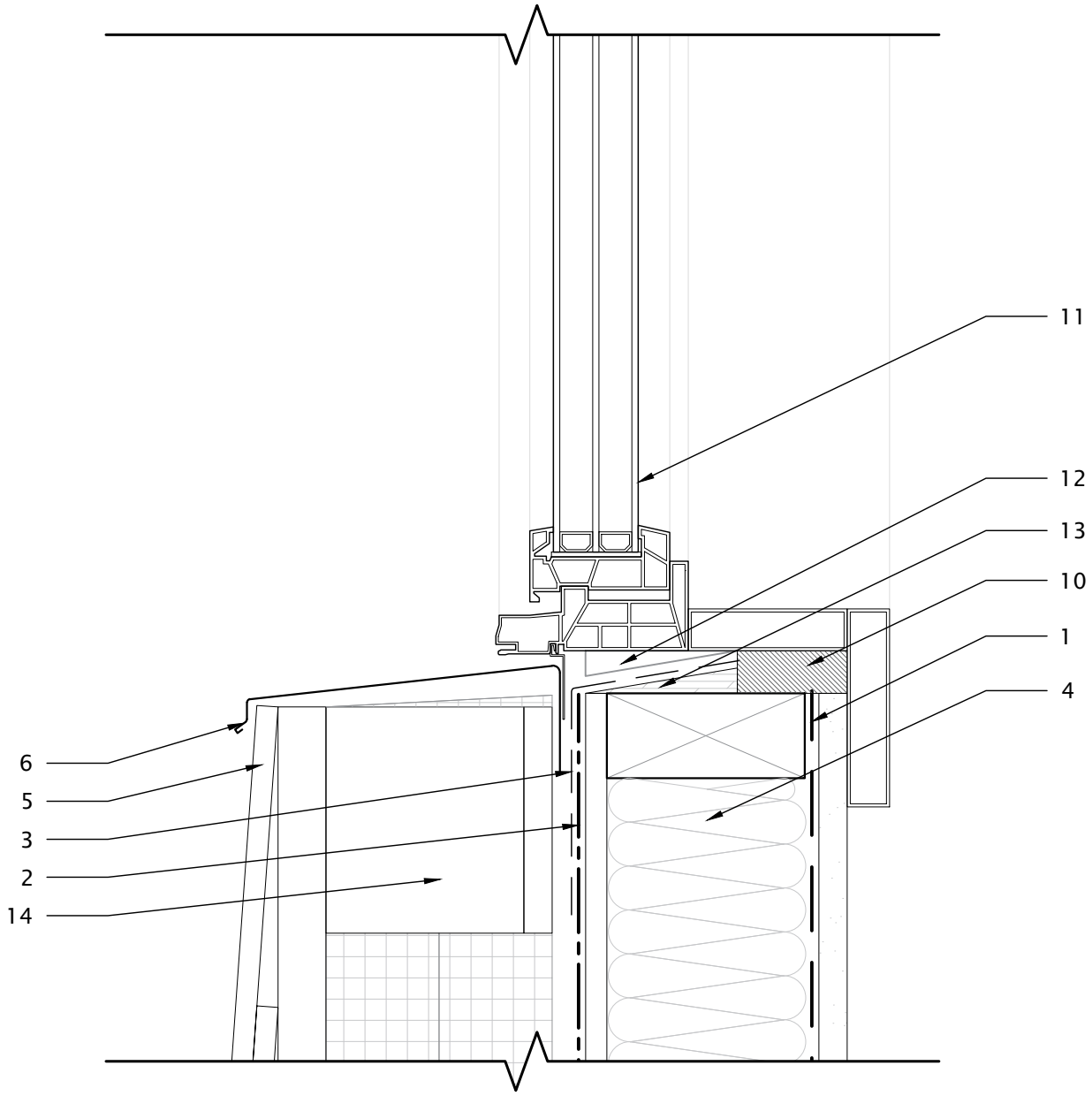


1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

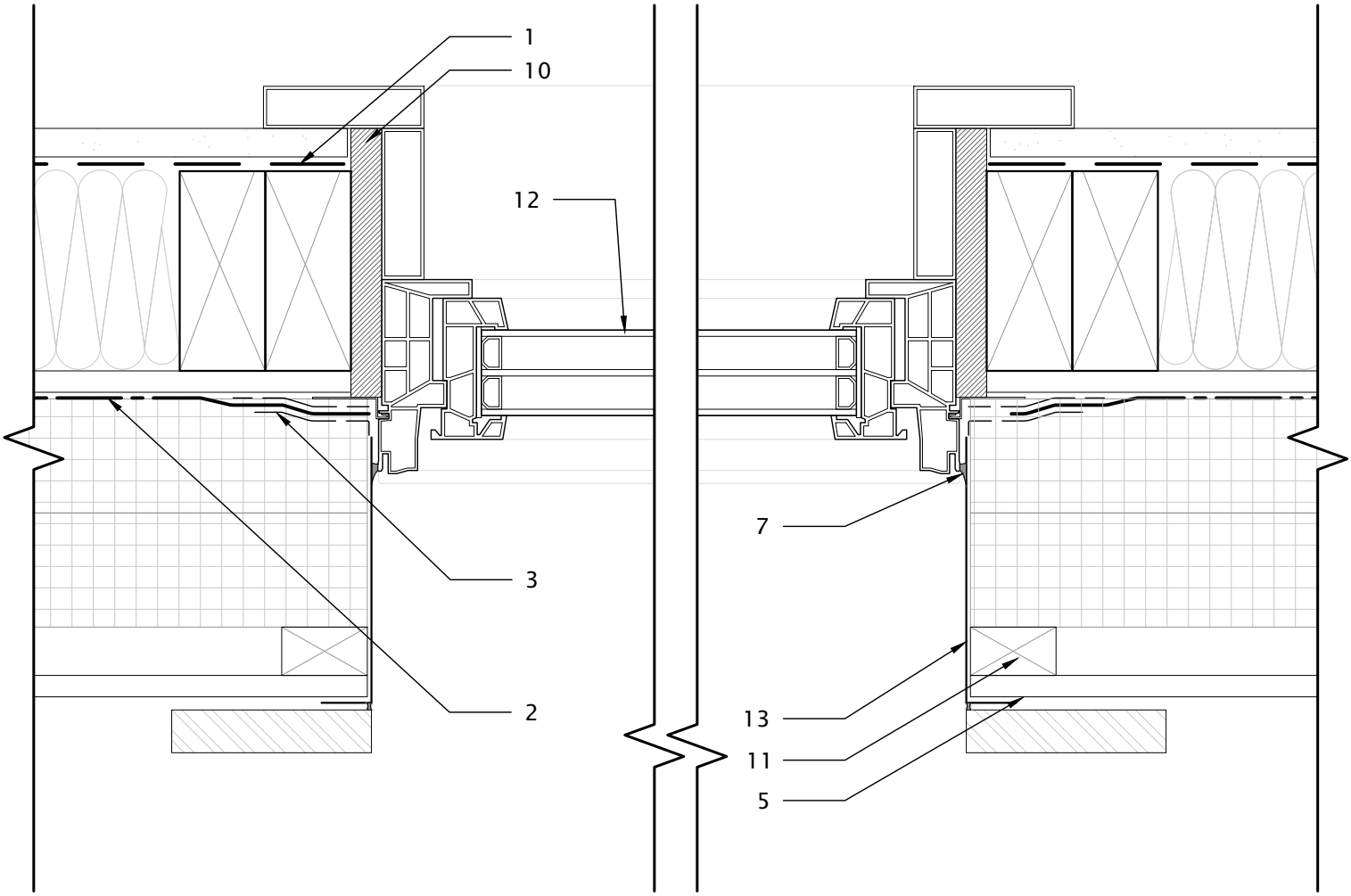
1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBERGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 GLAZING UNIT
12 WINDOW SUPPORT SHIM
13 BEVELED SIDING SLOPED DAM
14 THERMALLY BROKEN Z GIRT SYSTEM

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title: FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.04



1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 CLOSURE FLASHING

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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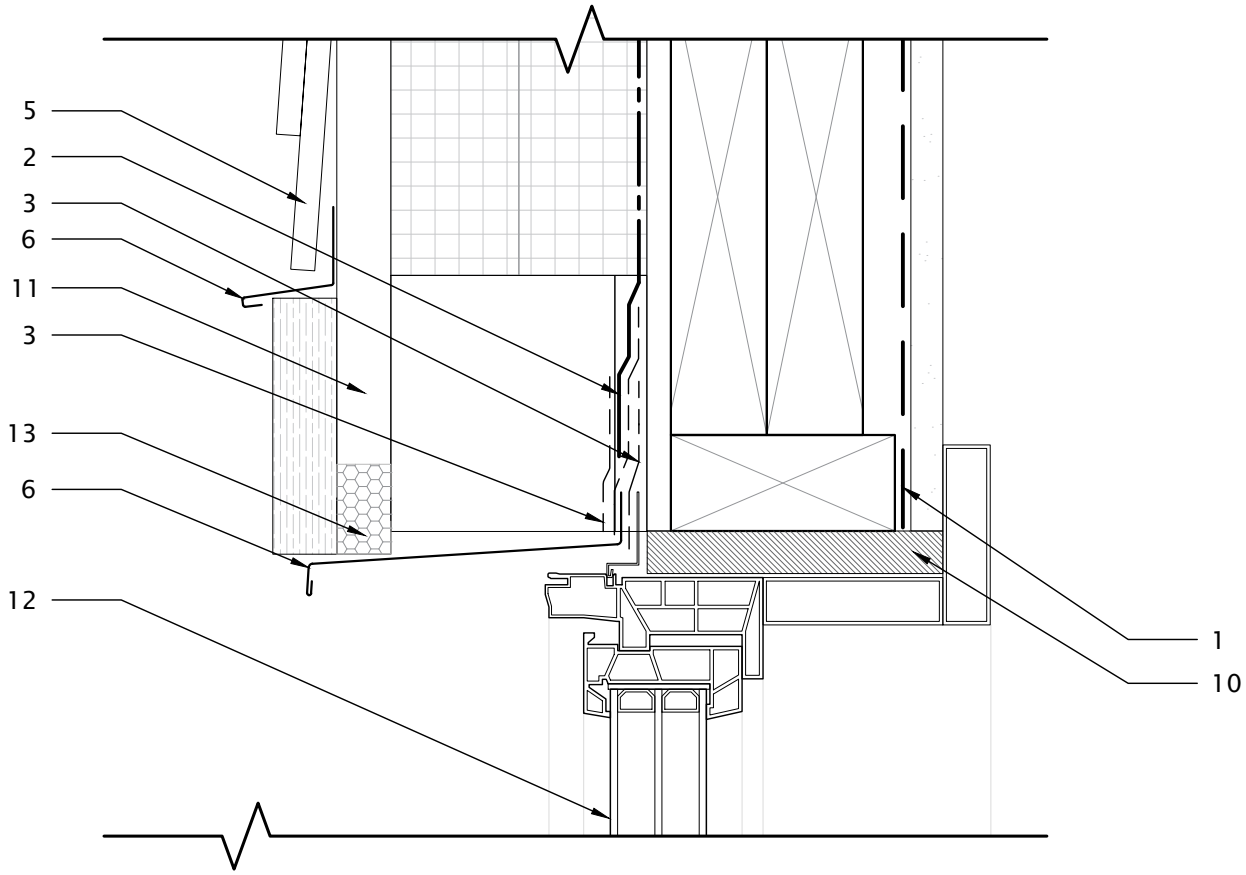

1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 GLAZING UNIT
13 BUG SCREEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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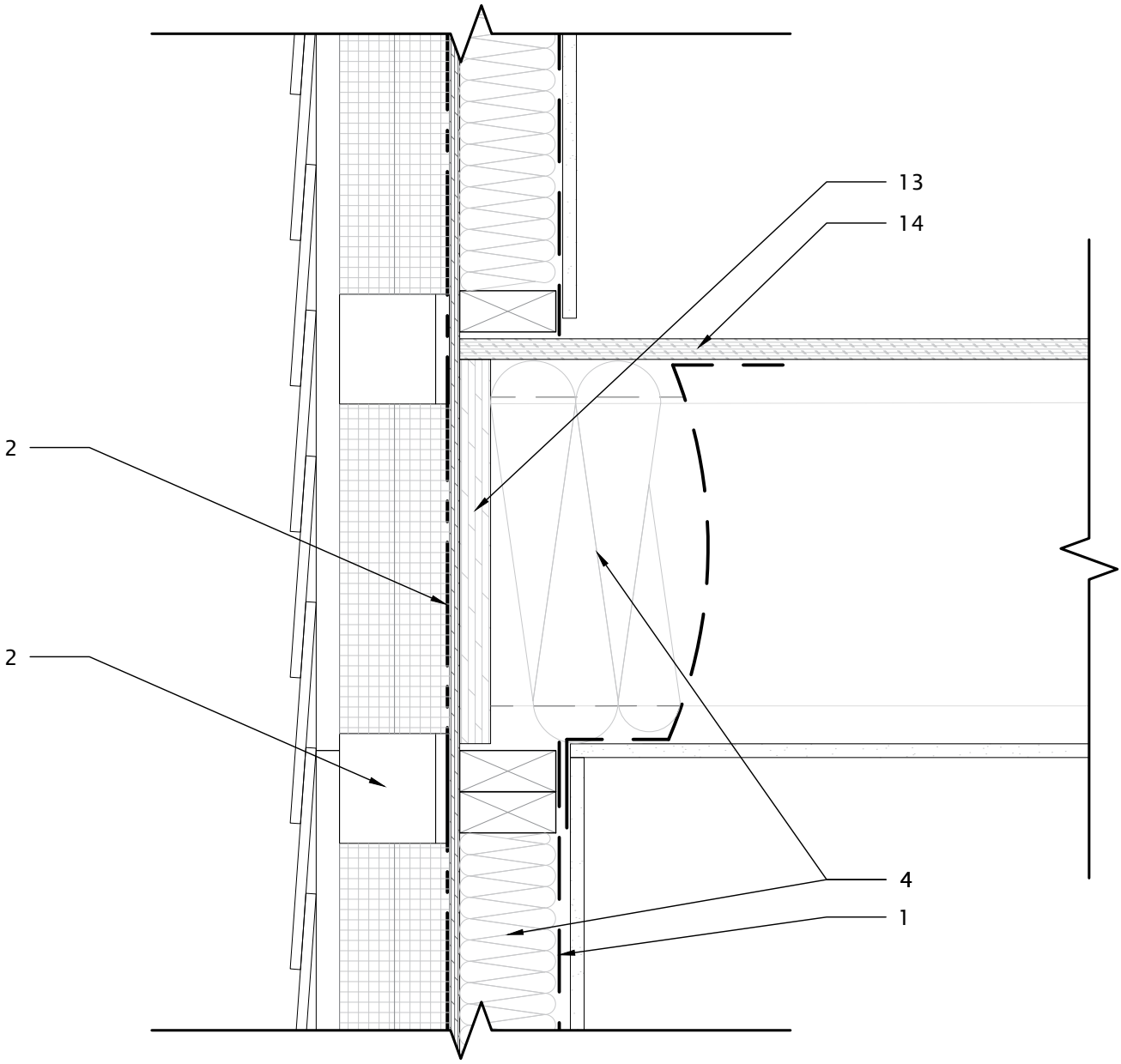

1 FLOOR TO FLOOR TRANSITION SETION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 THERMALLY BROKEN Z GIRT SYSTEM
12 RIM BOARD
13 SUBFLOOR

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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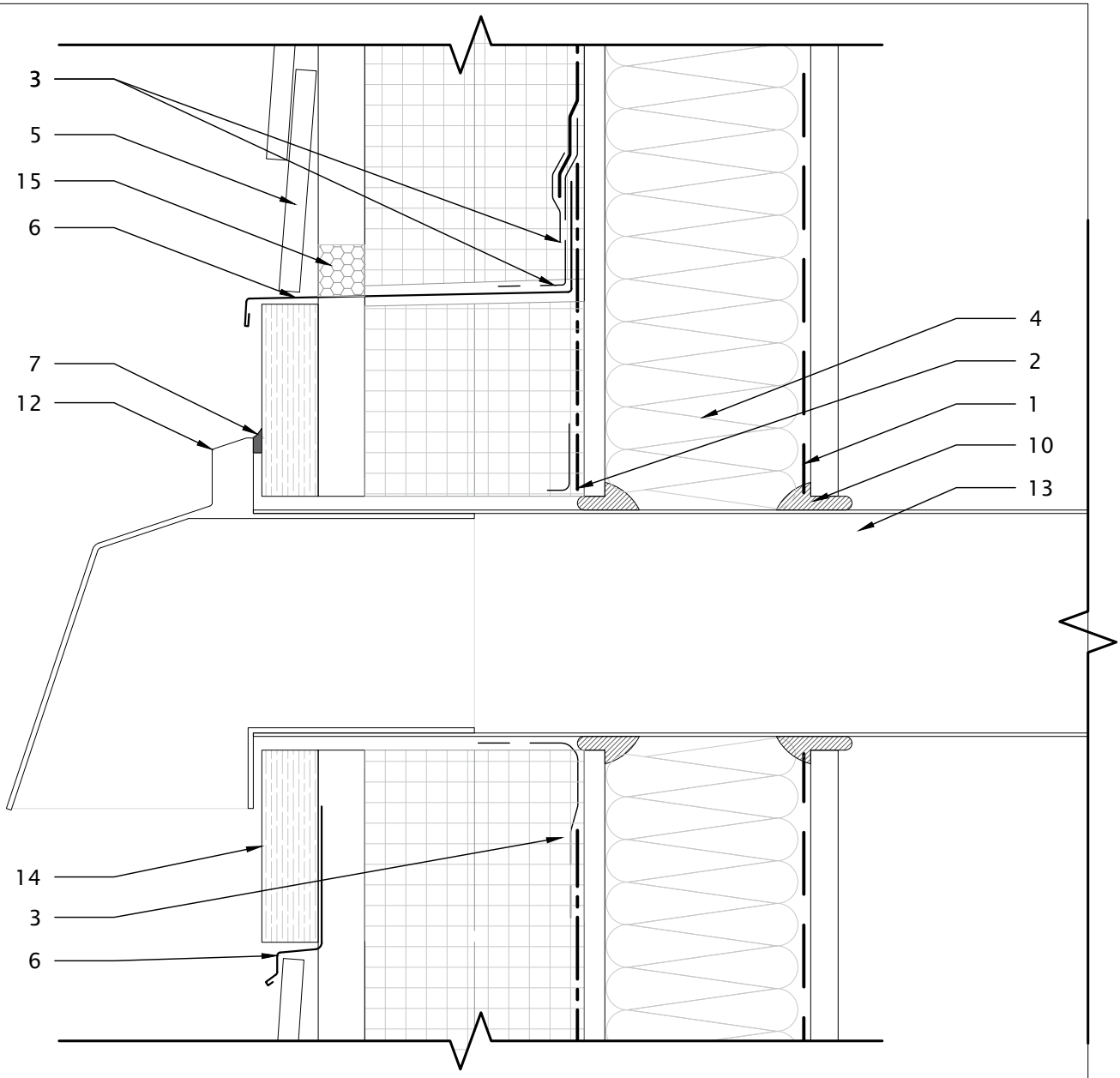

1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING FIBREGLASS BATT INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 DUCT HOOD
13 DUCT
14 BATTEN
15 BUG SCREEN

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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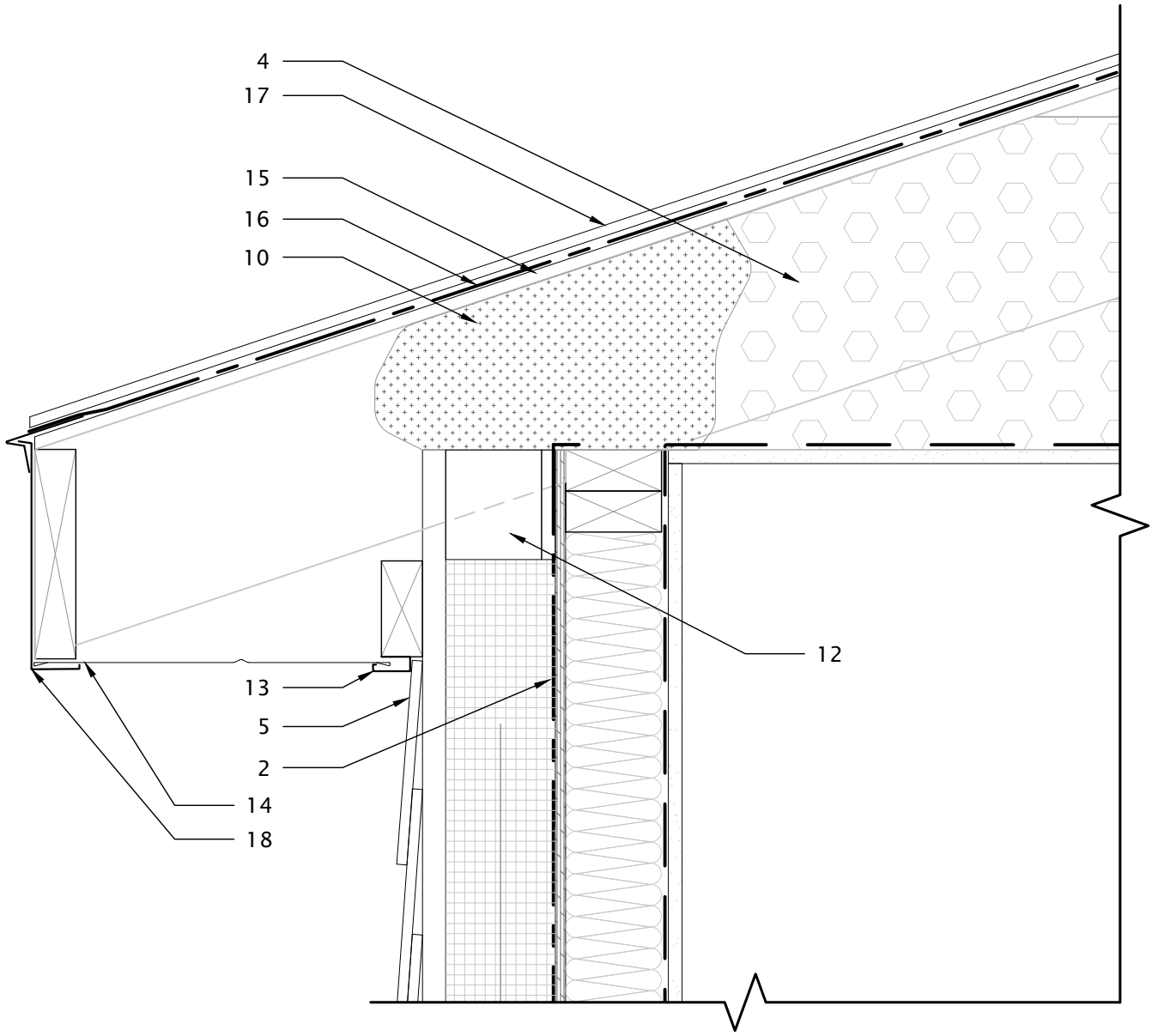

1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 EXISTING ATTIC INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 THERMALLY BROKEN Z GIRT SYSTEM
13 J-CHANNEL
14 SOFFIT
15 ROOFING SHEATHING
16 ROOFING MEMBRANE
17 ROOFING SHINGLE
18 FASCIA

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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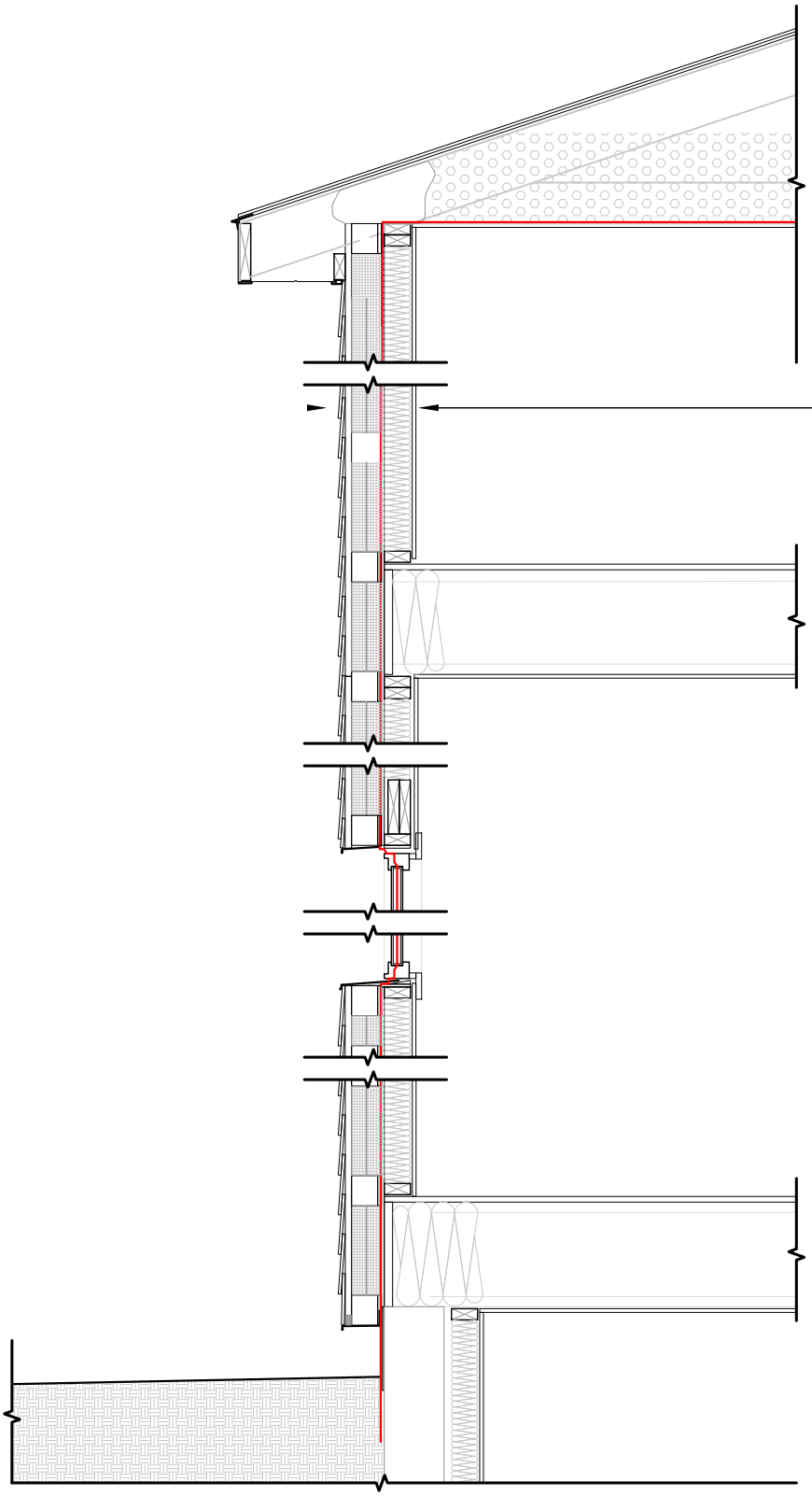

FIRE RESISTANT RETROFIT ASSEMBLY

EFFECTIVE RSI = 4.81; R-VALUE = 27.32

- EXTERIOR CLADDING
- 1X3 RAIN SCREEN
- 4" EXTERNAL MINERAL WOOL
- AIRTIGHT WATER RESISTANT BARRIER
- EXISTING $\frac{3}{8}$" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ FIBERGLASS INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING $\frac{1}{2}$" GYPSUM BOARD
- EXISTING INTERIOR FINISH

LEGEND

AIR BARRIER

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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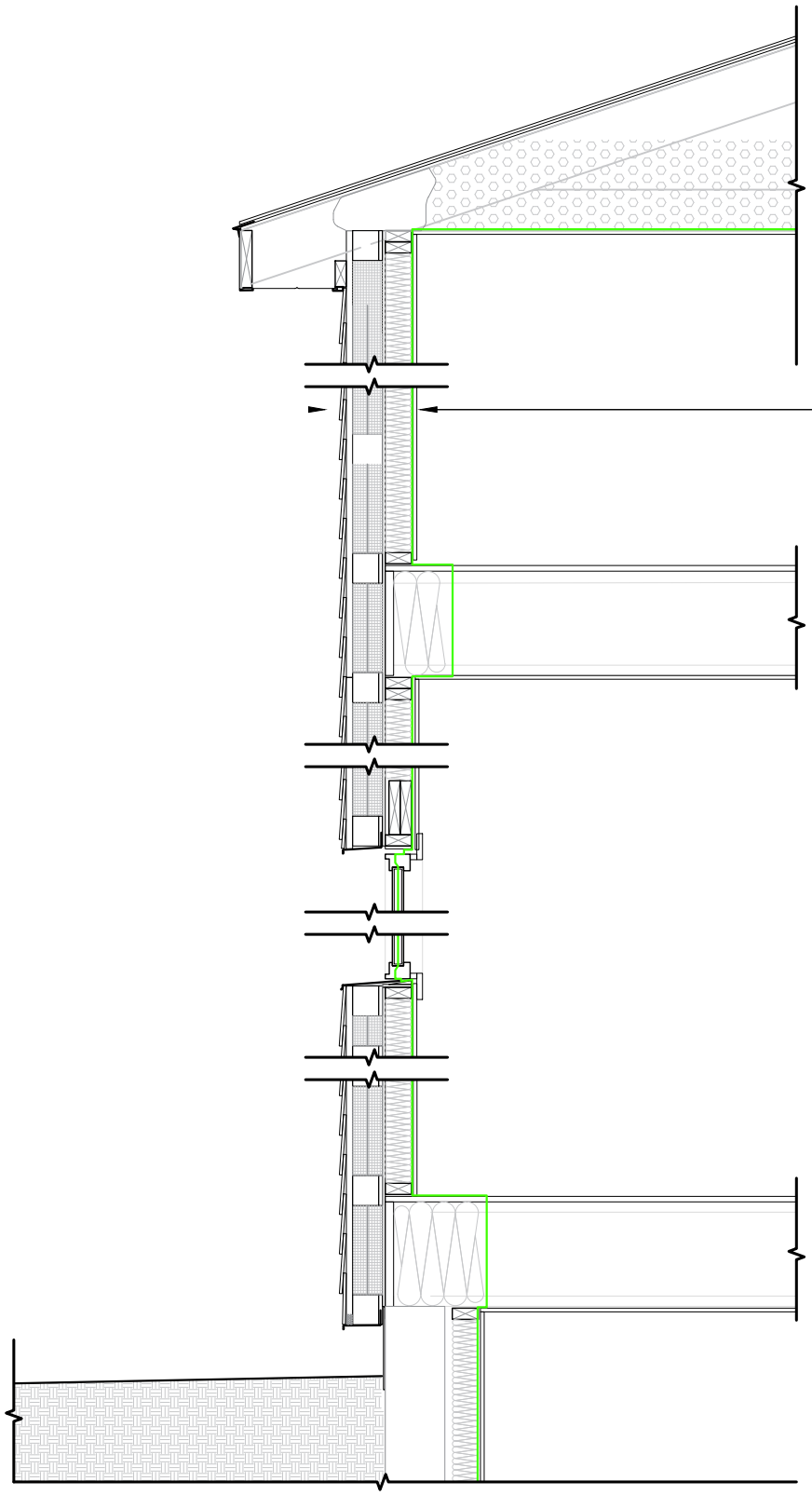

FIRE RESISTANT RETROFIT ASSEMBLY

EFFECTIVE RSI = 4.81; R-VALUE = 27.32

- EXTERIOR CLADDING
- 1X3 RAIN SCREEN
- 4" EXTERNAL MINERAL WOOL
- AIRTIGHT WATER RESISTANT BARRIER
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ FIBERGLASS INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISH

LEGEND

VAPOUR BARRIER

1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

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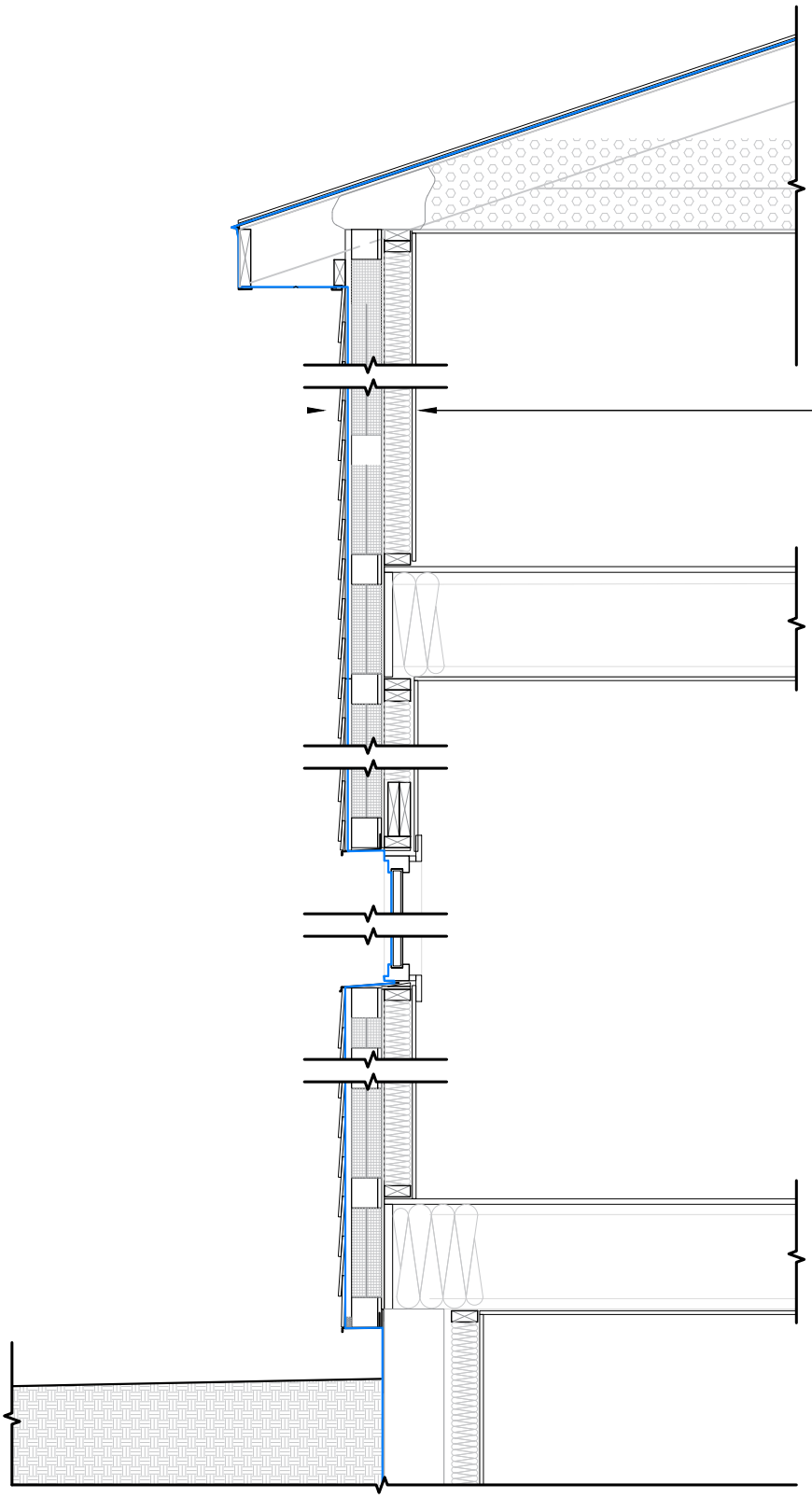


FIRE RESISTANT RETROFIT ASSEMBLY

EFFECTIVE RSI = 4.81; R-VALUE = 27.32

- EXTERIOR CLADDING
- 1X3 RAIN SCREEN
- 4" EXTERNAL MINERAL WOOL
- AIRTIGHT WATER RESISTANT BARRIER
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ FIBERGLASS INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISH

LEGEND

WATER BARRIER

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

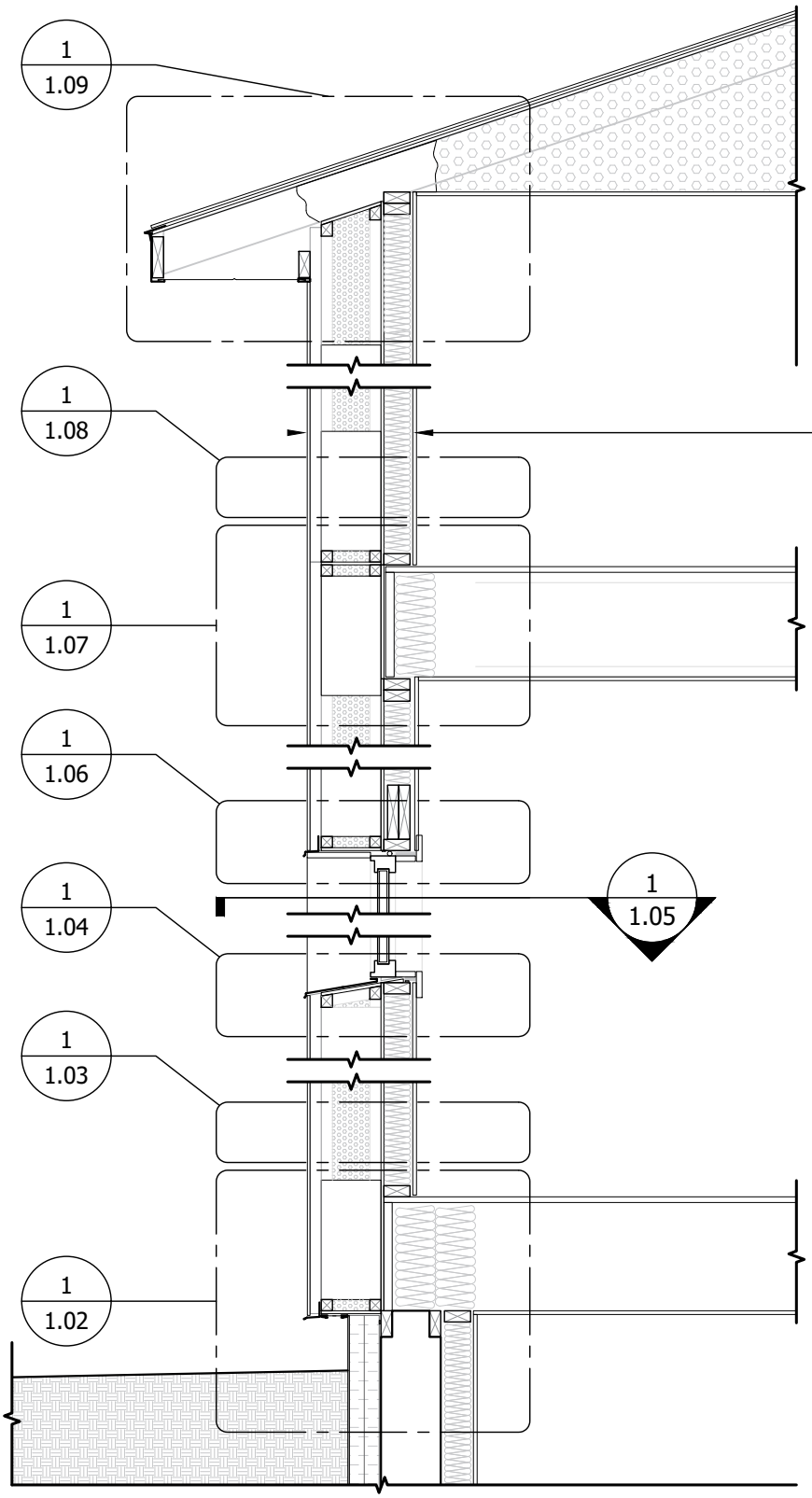
FIRE RESISTANT ASSEMBLY

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	MS	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.12

Appendix A:

Larsen Truss Retrofit Assembly Construction Details



1 ENVELOPE SECTION

1/2" = 1'-0"

LT[1] RETROFIT ASSEMBLY

EFFECTIVE RSI = 6.52; R-VALUE = 37.03

- EXTERIOR CLADDING
- 1 ½ " RAINSCREEN STRAPPING
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[1]
- LARSEN TRUSS - 5" DENSE PACK CELLULOSE INSULATION
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[2]
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ BATT FIBREGLASS BATT INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISHING

NOTE

1. LT = LARSEN TRUSS
2. 16" X 8" X ¾" PLYWOOD GUSSETS CONNECTING INTERIOR AND EXTERIOR 2 X 2 OF LARSEN TRUSS

SAIT

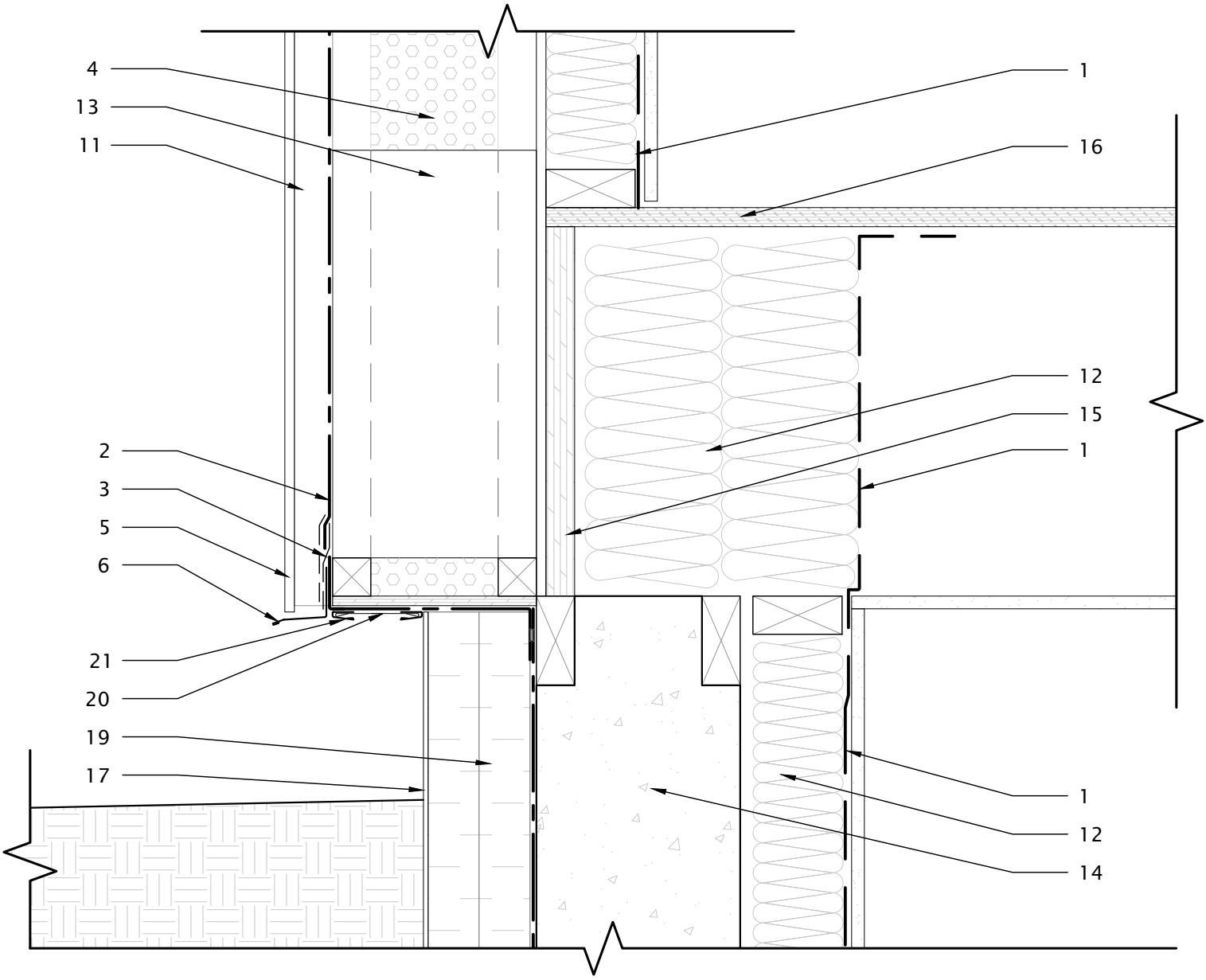
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.01



1 FOUNDATION TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 FIBREGLASS BATT INSULATION
13 PLYWOOD GUSSET
14 CONCRETE FOUNDATION WALL
15 RIM BOARD
16 SUBFLOOR
17 PARGING
18 DAMPPROOFING
19 XPS RIGID INSULATION
20 SOFFIT
21 J-CHANNEL

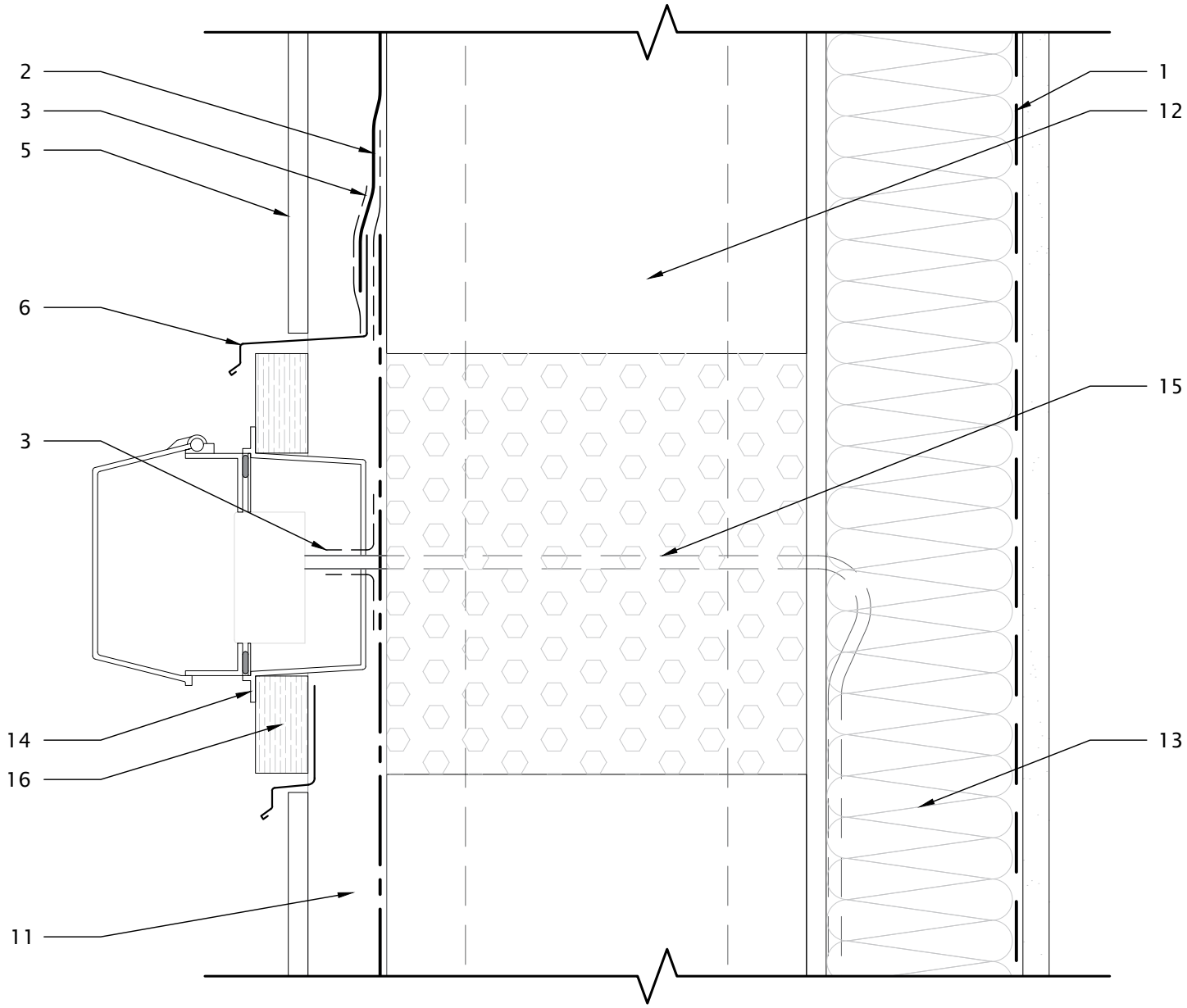
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.02



1 RECEPTACLE SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 FIBREGLASS BATT INSULATION
14 IN USE RECEPTACLE ASSEMBLY
15 ELECTRICAL WIRE
16 BATTEN

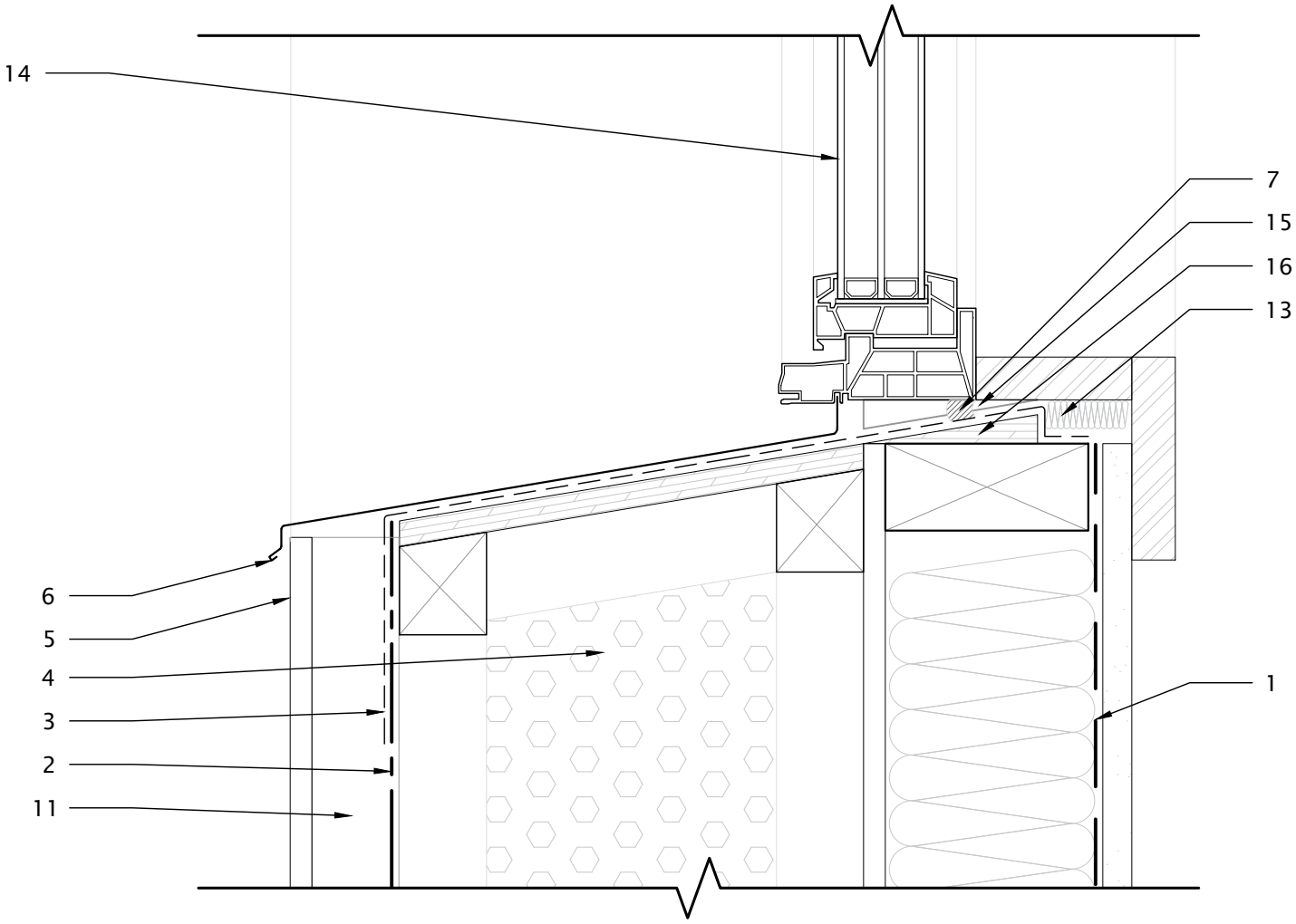
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.03



1 WINDOW SILL SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 FIBREGLASS BATT INSULATION
14 GLAZING UNIT
15 WINDOW SUPPORT SHIM
16 BEVELED SIDING SLOPED DAM

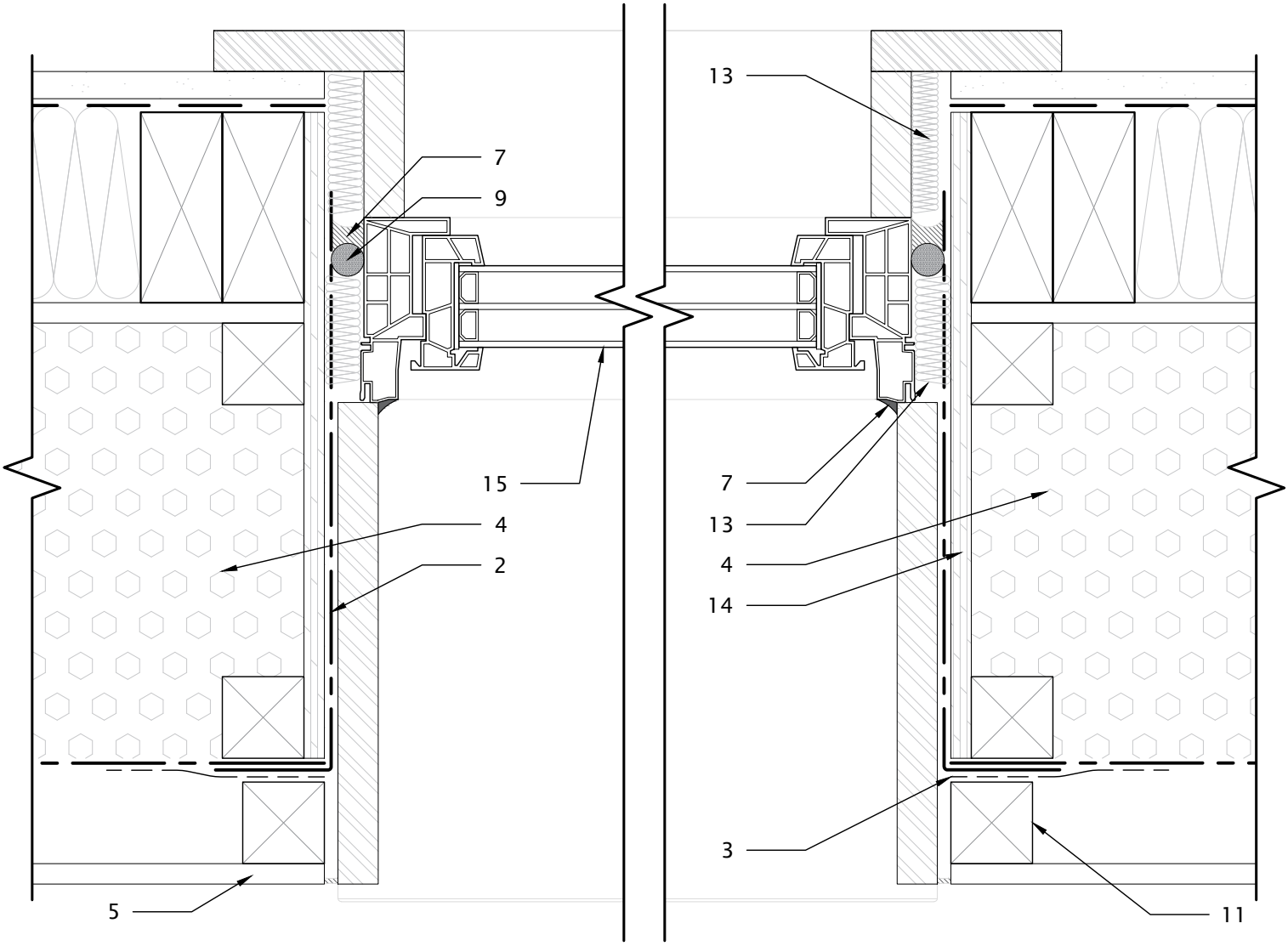
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.04



1 WINDOW JAMB PLAN DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 FIBREGLASS BATT INSULATION
14 - ¾ PLYWOOD BUCK
15 GLAZING UNIT

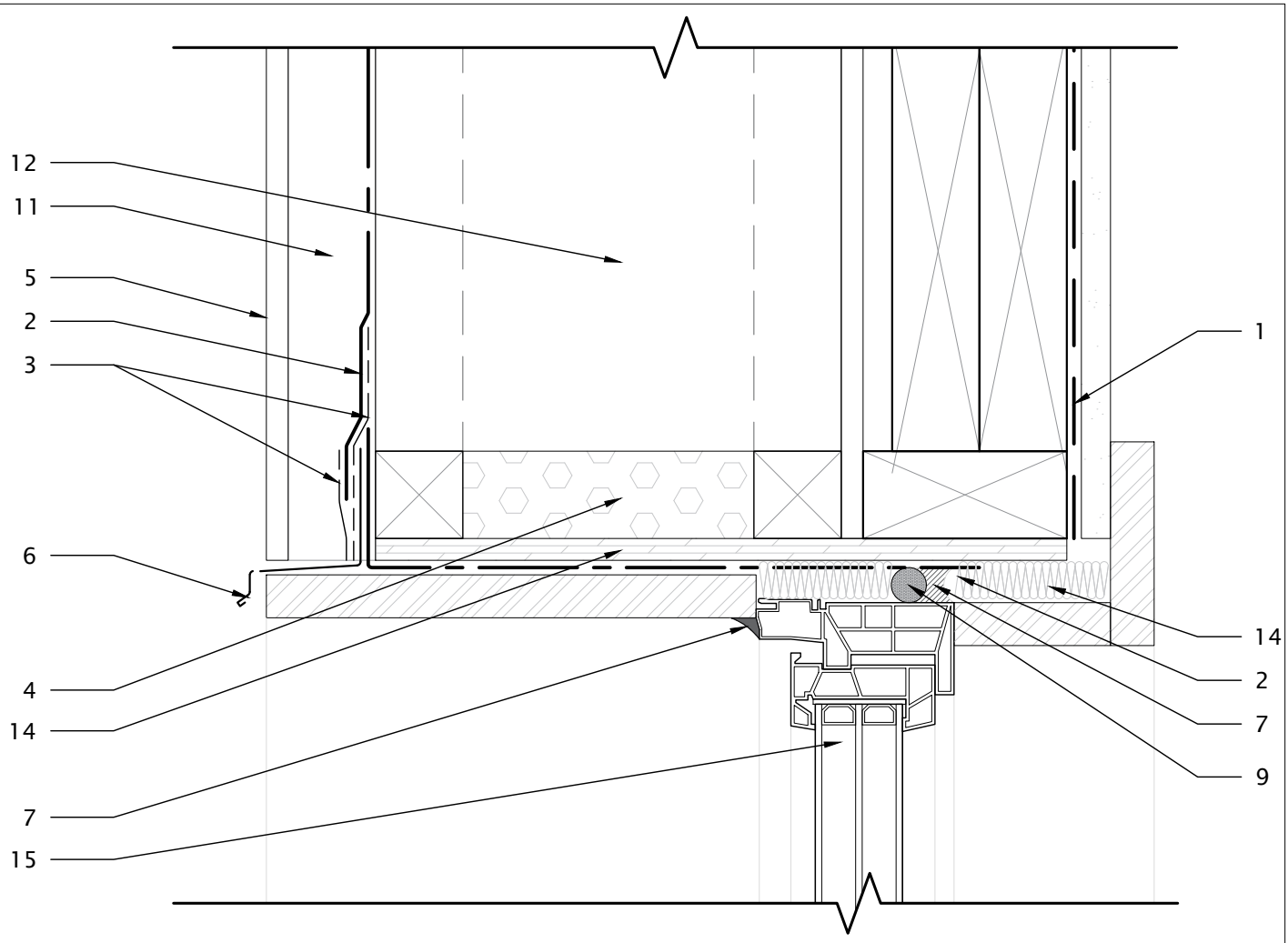
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.05



1 WINDOW HEAD SECTION DETAIL

4" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 FIBREGLASS BATT INSULATION
14 - ¾" PLYWOOD BUCK
15 GLAZING UNIT

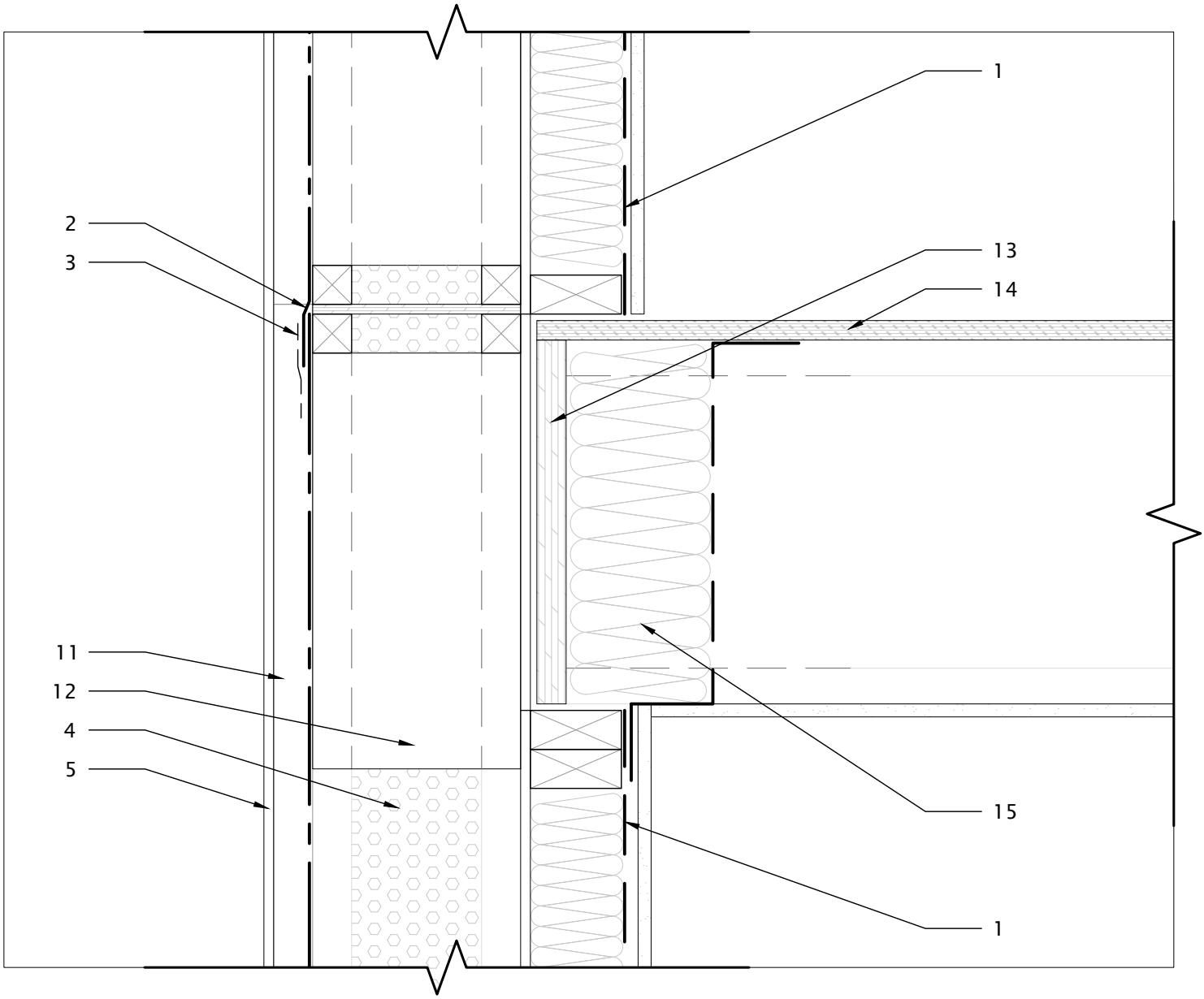
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.06



1 FLOOR TO FLOOR TRANSITION SETION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 RIM BOARD
14 SUBFLOOR
15 FIBREGLASS BATT INSULATION

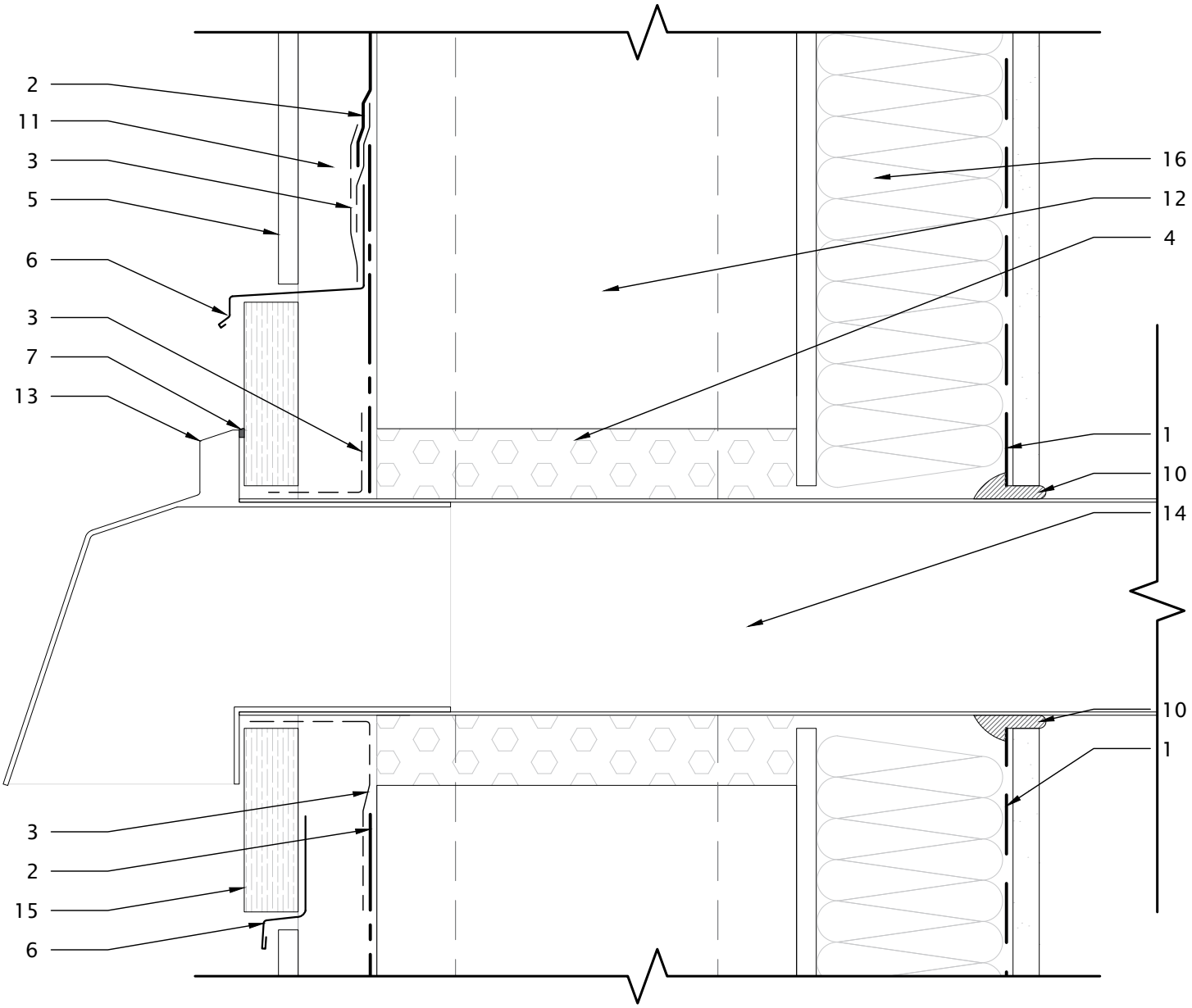
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.07



1 DUCT OPENING SECTION DETAIL

4" = 1'-0"

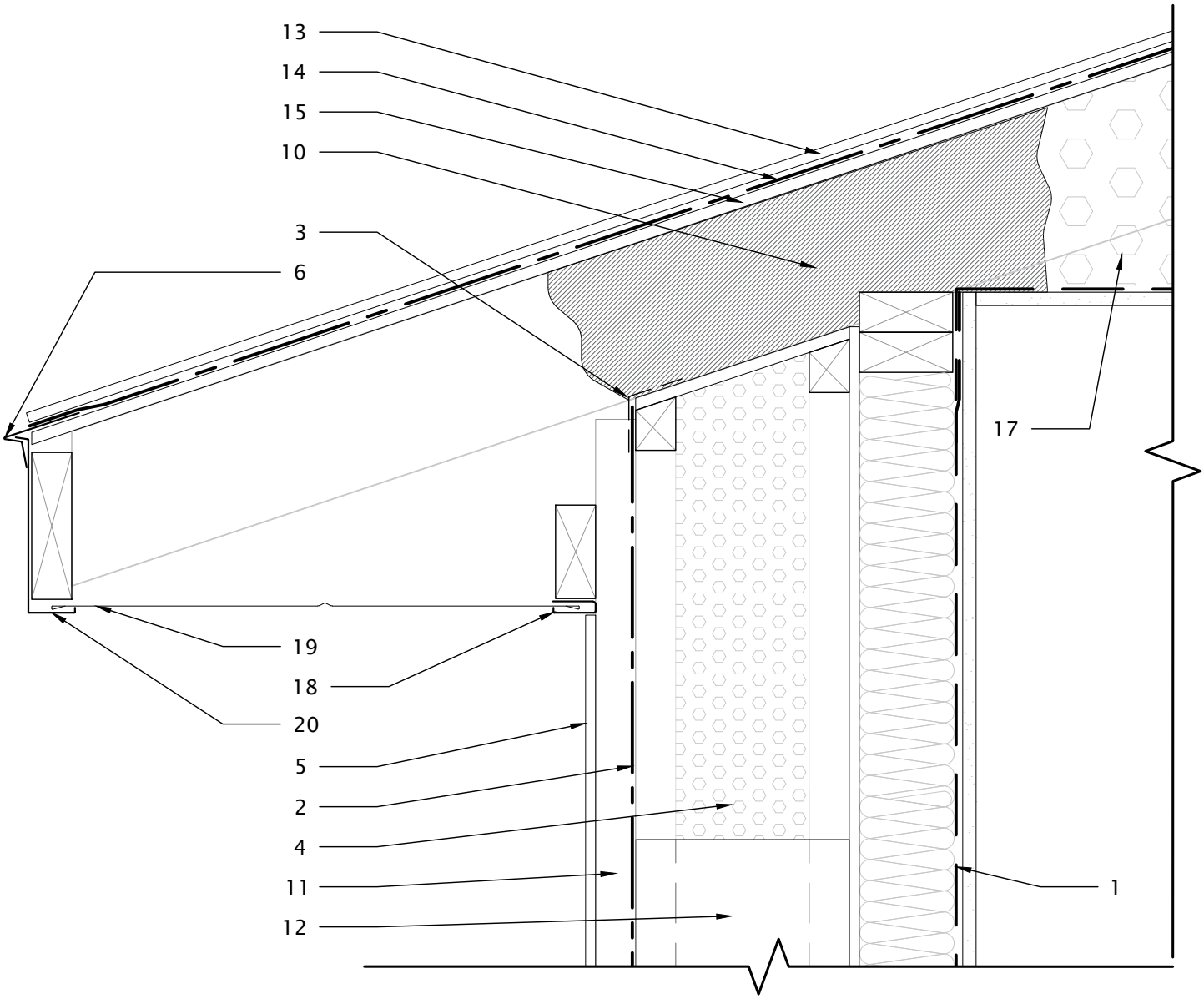
1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 DUCT HOOD
14 DUCT
15 BATTEN OSB CAP
16 FIBREGLASS BATT INSULATION

SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title
LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	4" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.08



1 WALL TO ROOF TRANSITION SECTION DETAIL

2" = 1'-0"

1 VAPOUR BARRIER
2 AIRTIGHT WATER RESISTANT BARRIER
3 SELF ADHERED MEMBRANE
4 DENSE PACK CELLULOSE INSULATION
5 CLADDING
6 FLASHING
7 SEALANT
8 NON-HARDENING SEALANT
9 COMPRESSED FOAM ROD
10 EXPANDING POLYURETHANE SPRAY FOAM
11 RAINSCREEN STRAPPING
12 PLYWOOD GUSSET
13 ROOFING SHINGLE
14 ROOFING UNDERLAYMENT MEMBRANE
15 ROOFING SHEATHING
16 INSULATION STOP
17 BLOWN INSULATION
18 J-CHANNEL
19 SOFFIT
20 FASCIA

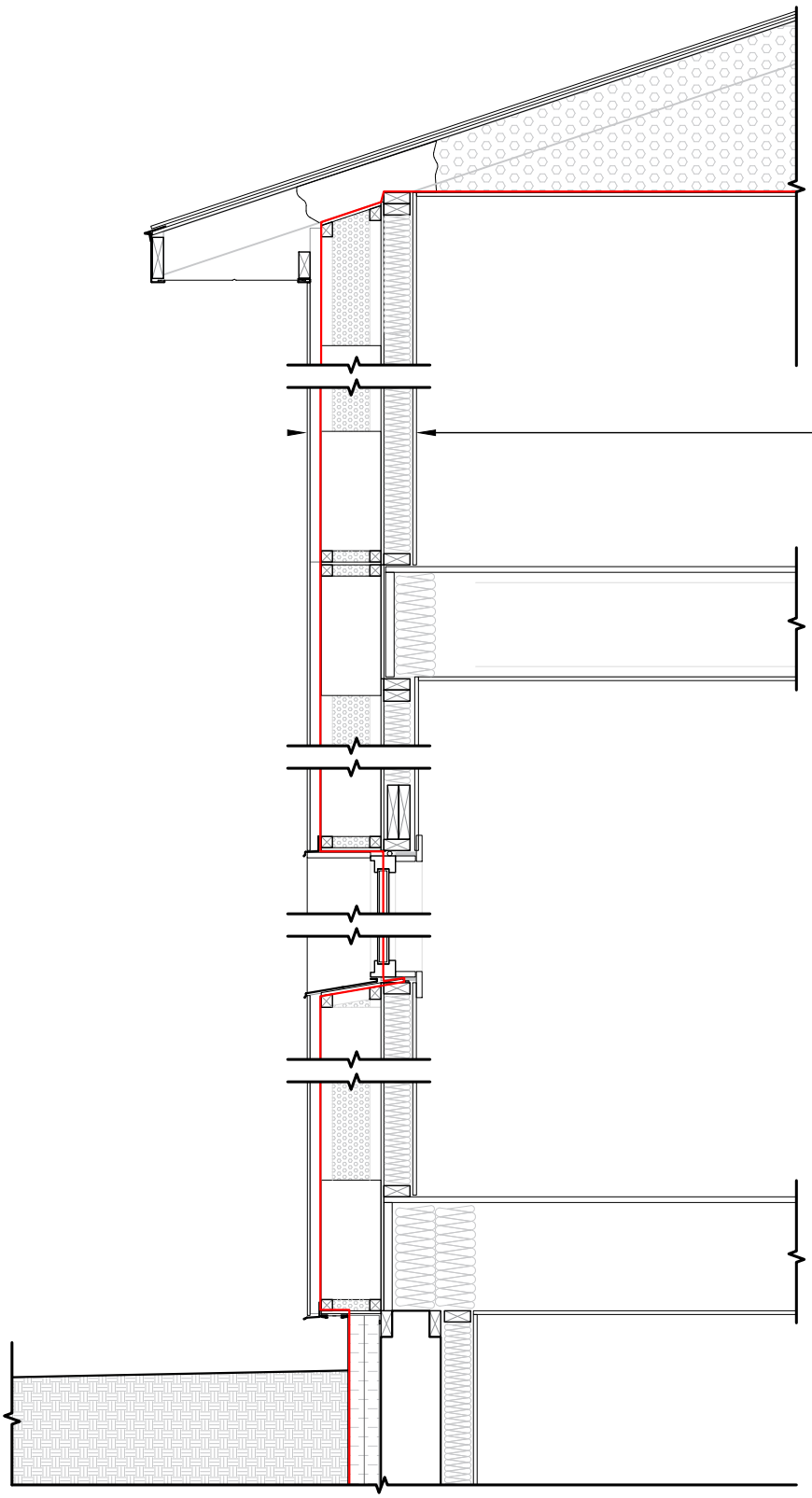
SAIT
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.09



LT[1] RETROFIT ASSEMBLY

EFFECTIVE RSI = 6.52; R-VALUE = 37.03

- EXTERIOR CLADDING
- 1 ½ " RAINSCREEN STRAPPING
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[1]
- LARSEN TRUSS - 5" DENSE PACK CELLULOSE INSULATION
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[2]
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ BATT FIBREGLASS BATT INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISHING

NOTE

1. LT = LARSEN TRUSS
2. 16" X 8" PLYWOOD GUSSETS ACROSS THE TWO 2X2 STUDS

LEGEND

AIR BARRIER

1 AIR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

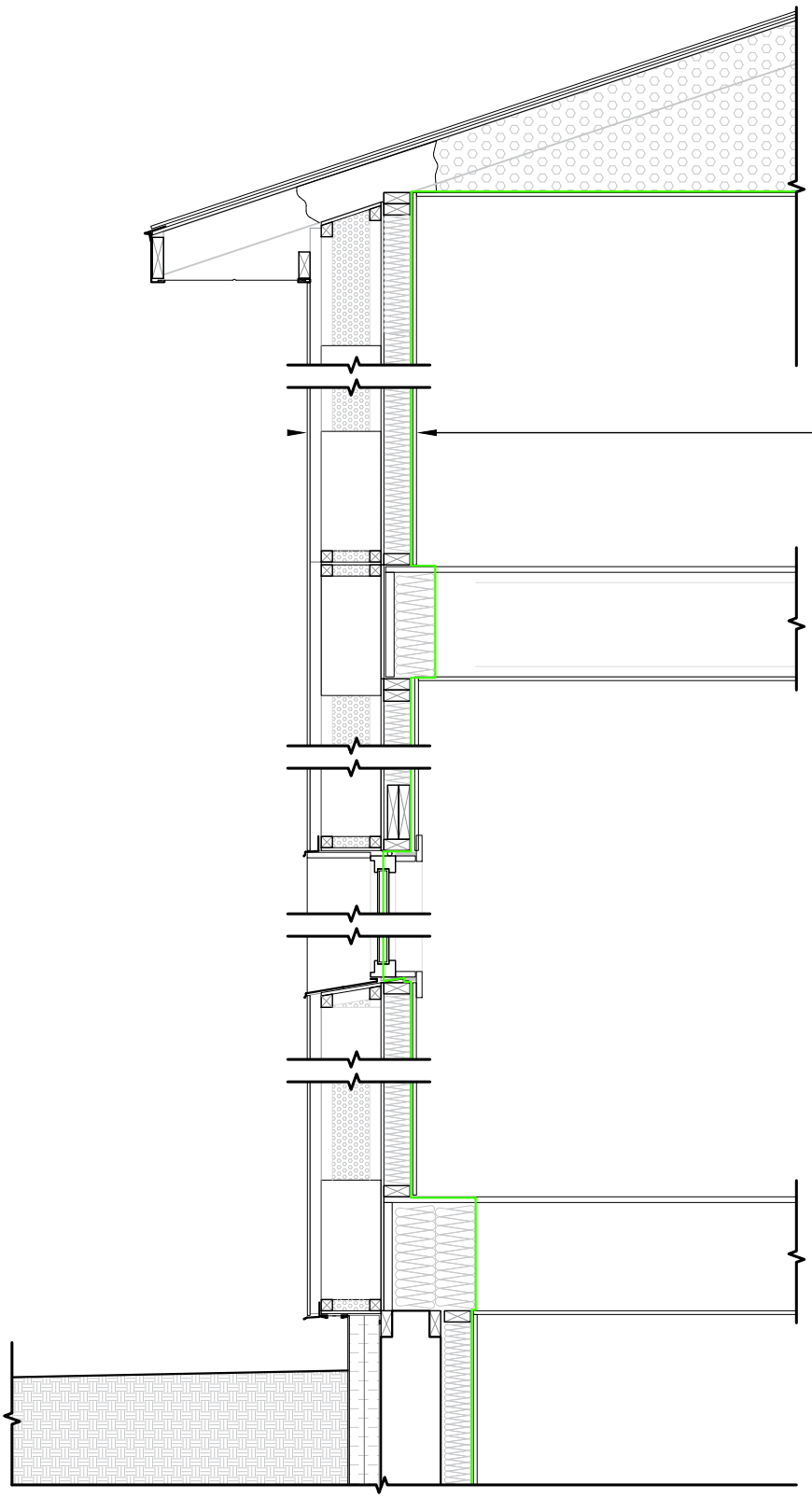
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.10



LT[1] RETROFIT ASSEMBLY

EFFECTIVE RSI = 6.52; R-VALUE = 37.03

- EXTERIOR CLADDING
- 1 ½ " RAINSCREEN STRAPPING
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[1]
- LARSEN TRUSS - 5" DENSE PACK CELLULOSE INSULATION
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[2]
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ BATT FIBREGLASS BATT INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISHING

NOTE

1. LT = LARSEN TRUSS
2. 16" X 8" PLYWOOD GUSSETS ACROSS THE TWO 2X2 STUDS

LEGEND

VAPOUR BARRIER

1 VAPOUR BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

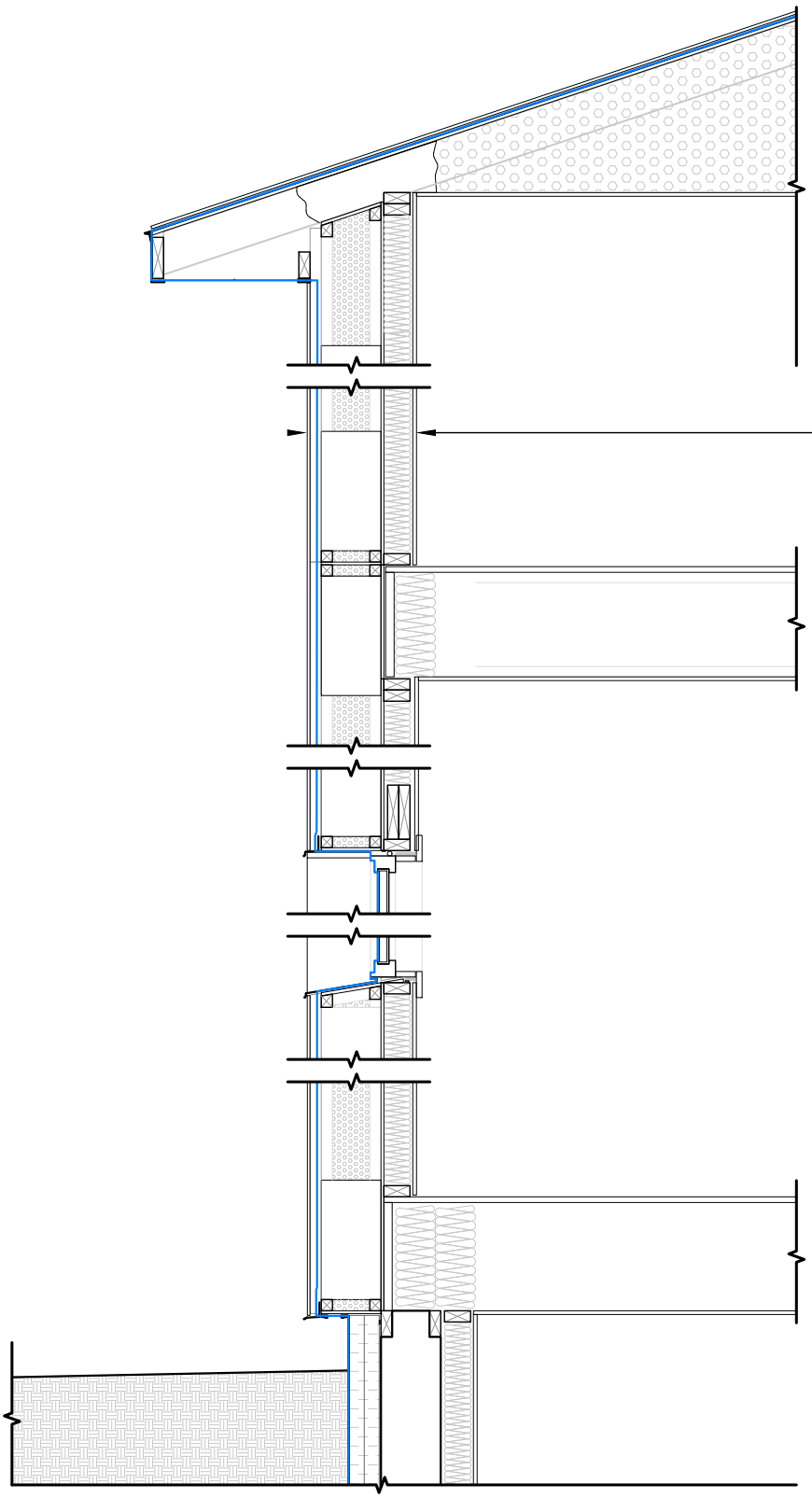
1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.11



LT[1] RETROFIT ASSEMBLY

EFFECTIVE RSI = 7.69; R-VALUE = 44

- EXTERIOR CLADDING
- 1 ½ " RAINSCREEN STRAPPING
- AIRTIGHT WATER RESISTANT BARRIER, SHEET APPLIED MEMBRANE, VAPOUR OPEN
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[1]
- LARSEN TRUSS - 5" DENSE PACK CELLULOSE INSULATION
- LARSEN TRUSS - 2X2 STUD w/ DENSE PACK CELLULOSE INSULATION[2]
- EXISTING ⅜" EXTERIOR SHEATHING
- EXISTING 2X4 STUD w/ BATT FIBREGLASS BATT INSULATION
- EXISTING VAPOUR BARRIER
- EXISTING ½" GYPSUM BOARD
- EXISTING INTERIOR FINISHING

NOTE

1. LT = LARSEN TRUSS
2. 16" X 8" PLYWOOD GUSSETS ACROSS THE TWO 2X2 STUDS

LEGEND

WATER BARRIER

1 WATER BARRIER CONTINUITY

1/2" = 1'-0"

SAIT

1301-16 AVENUE NW CALGARY AB, T2M 0L4

Drawing Title

LARSEN TRUSS RETROFIT

Project Number	2024-009	Project Name	HIGH PERFORMANCE WALL ASSEMBLY				
Drawn by	LL	Checked by	BH, NM	Date	2025-04-30	Scale	1/2" = 1'- 0"
Project Address	N/A						
Issued For	ALBERTA ECOTRUST FOUNDATION						

1.12

Appendix B:

Wall Assembly Effective Thermal Resistance Calculations

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Tier 1 2x6 Wall Assembly**

Materials in Assembly					RSI, (m^2*K)/W	R-Value
Outside Air Film					0.03	0.17
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 610 (140mm x 0.0085 RSI/mm)	RSI_F =	1.19	% area of framing =	20	$RSI_{Parallel}$=	
Batt Insulation (R22)	RSI_C =	3.87	% area of cavity =	80	2.67	15.15
(Vapour Barrier					0.00	0.00
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**2.99**	**16.98**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

140mm stud with Batt Insulation (R22)

$$RSI_{Parallel} = \frac{100}{\frac{20}{1.19} + \frac{80}{3.87}} = 2.67 \text{ (m2*K)/W}$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Exterior Mineral Wool Tier 3 Wall Assembly**

Materials in Assembly					RSI, $(m^2*K)/W$	R-Value
Outside Air Film					0.03	0.17
Rainscreen Framing (20mm x 0.0085 RSI/mm)	RSI_F =	0.17	% area of framing =	20	$RSI_{Parallel}$=	
Rainscreen Air Cavity (20mm)	RSI_C =	0.18	% area of cavity =	80	0.18	1.02
Exterior Mineral Wool (51mm)					1.41	8.02
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 610 (140mm x 0.0085 RSI/mm)	RSI_F =	1.19	% area of framing =	20	$RSI_{Parallel}$=	
Batt Insulation (R22)	RSI_C =	3.87	% area of cavity =	80	2.67	15.15
Vapour Barrier					0.00	0.00
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**4.58**	**26.01**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

140mm stud with Batt Insulation (R22)

$$RSI_{Parallel} = \frac{100}{\frac{20}{1.19} + \frac{80}{3.87}} = 2.67 \text{ (m2*K)/W}$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Double Stud Wall Net Zero Wall Assembly**

Materials in Assembly					RSI, $(m^2*K)/W$	R-Value
Outside Air Film					0.03	0.17
Rainscreen Framing (20mm x 0.0085 RSI/mm)	RSI_F =	0.17	% area of framing =	20	$RSI_{Parallel}$=	
Rainscreen Air Cavity (20mm)	RSI_C =	0.18	% area of cavity =	80	0.18	1.02
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 610 (89mm x 0.0085 RSI/mm)	RSI_F =	0.76	% area of framing =	20	$RSI_{Parallel}$=	
Batt Insulation (R12)	RSI_C =	2.11	% area of cavity =	80	1.56	8.84
76mm space with Batt Insulation (R12)					2.11	11.98
Stud @ 610 (89mm x 0.0085 RSI/mm)	RSI_F =	0.76	% area of framing =	20	$RSI_{Parallel}$=	
Batt Insulation (R12)	RSI_C =	2.11	% area of cavity =	80	1.56	8.84
Vapour Barrier					0.00	0.00
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**5.73**	**32.52**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

89mm stud with Batt Insulation (R12)

$$RSI_{Parallel} = \frac{100}{\frac{20}{0.76} + \frac{80}{2.11}} = 1.56 \quad (m2*K)/W$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Exterior Foam Net Zero Wall Assembly**

Fibreglass Batt Insulation filled 2x6 Cavity

Materials in Assembly					RSI, $(m^2*K)/W$	R-Value
Outside Air Film					0.03	0.17
Rainscreen Framing (20mm x 0.0085 RSI/mm)	RSI_F =	0.17	% area of framing =	20	$RSI_{Parallel}$=	
Rainscreen Air Cavity (20mm)	RSI_C =	0.18	% area of cavity =	80	0.18	1.02
Exterior XPS (152mm)					5.04	28.62
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 610 (140mm x 0.0085 RSI/mm)	RSI_F =	1.19	% area of framing =	20	$RSI_{Parallel}$=	
Batt Insulation (R22)	RSI_C =	3.87	% area of cavity =	80	2.67	15.15
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**8.21**	**46.62**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

140mm stud with 140mm Batt Insulation (R22)

$$RSI_{Parallel} = \frac{100}{\frac{20}{1.19} + \frac{80}{3.87}} = 2.67 \text{ (m2*K)/W}$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Exterior Foam Net Zero Wall Assembly** Uninsulated 2x6 Cavity

Materials in Assembly					RSI, $(m^2*K)/W$	R-Value
Outside Air Film					0.03	0.17
Rainscreen Framing (20mm x 0.0085 RSI/mm)	RSI_F =	0.17	% area of framing =	20	$RSI_{Parallel}$=	
Rainscreen Air Cavity (20mm)	RSI_C =	0.18	% area of cavity =	80	0.18	1.02
Exterior XPS (152mm)					5.04	28.62
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 610 (140mm x 0.0085 RSI/mm)	RSI_F =	1.19	% area of framing =	20	$RSI_{Parallel}$=	
Air Cavity (140mm)	RSI_C =	0.18	% area of cavity =	80	0.22	1.23
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**5.76**	**32.70**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

140mm stud with 140mm Air Space

$$RSI_{Parallel} = \frac{100}{\frac{20}{1.19} + \frac{80}{0.18}} = 0.22 \text{ (m2*K)/W}$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Fire Resistant Retrofit Wall Assembly**

Materials in Assembly					RSI, $(m^2*K)/W$	R-Value
Outside Air Film					0.03	0.17
Rainscreen Framin (20mm x 0.0085 RSI/mm)	RSI_F =	0.17	% area of framing =	23	$RSI_{Parallel}$=	
Rainscreen Air Cavity (20mm)	RSI_C =	0.18	% area of cavity =	77	0.18	1.02
Exterior Mineral Wool (102mm)					2.81	15.96
Building Paper					0.00	0.00
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 406mm O.C. (89mm x 0.0085 RSI/mm)	RSI_F =	0.76	% area of framing =	23	$RSI_{Parallel}$=	
Batt Insulation (89mm)(R12)	RSI_C =	2.11	% area of cavity =	77	1.50	8.51
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**4.81**	**27.32**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

89mm stud with 89mm Batt Insulation (R12)

$$RSI_{Parallel} = \frac{100}{\frac{23}{0.76} + \frac{77}{2.11}} = 1.50 \quad (m2*K)/W$$

Project Name: **High-Performance Wall Assembly Project**

Project Address:

Assembly Name: **Larsen Truss Retrofit Wall Assembly**

Materials in Assembly					RSI, (m^2*K)/W	R-Value
Outside Air Film					0.03	0.17
Rainscreen (38mm x 0.0085 RSI/mm)	RSI_F =	0.323	% area of framing =	23	$RSI_{Parallel}$=	
Rainscreen Air Cavity (38mm)	RSI_C =	0.18	% area of cavity =	77	0.20	1.14
Building Paper					0.00	0.00
Exterior Larsen Truss Framing (38mm x 0.0085 RSI/mm)	RSI_F =	0.323	% area of framing =	23	$RSI_{Parallel}$=	
Exterior Larsen Truss Cavity Dense Pack Cellulose (38mm)	RSI_C =	0.95	% area of cavity =	77	0.66	3.75
Larsen Truss Cavity Dense Pack Cellulose (127mm)					3.18	18.06
Interior Larsen Truss Framing (38mm x 0.0085 RSI/mm)	RSI_F =	0.323	% area of framing =	23	$RSI_{Parallel}$=	
Interior Larsen Truss Cavity Dense Pack Cellulose (38mm)	RSI_C =	0.95	% area of cavity =	77	0.66	3.75
OSB Sheathing (9.5mm)					0.0930	0.53
Stud @ 406mm O.C (89mm x 0.0085 RSI/mm)	RSI_F =	0.76	% area of framing =	23	$RSI_{Parallel}$=	
Batt Insulation (R12)	RSI_C =	2.11	% area of cavity =	77	1.50	8.51
Gypsum (12.7mm)		0.8			0.08	0.45
Interior Air Film		57.6			0.12	0.68
			Calculated RSI_{EFF}=		**6.52**	**37.03**
			9.36 Prescriptive RSI Required =		3.08	17.49
			W/HRV		2.97	16.86

Parallel Path Flow Calculations

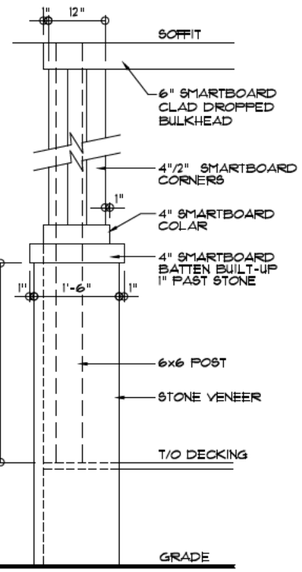
89mm stud with 89mm Batt Insulation (R12)

$$RSI_{Parallel} = \frac{100}{\frac{23}{0.76} + \frac{77}{2.11}} = 1.50 \quad (m2*K)/W$$

Appendix C:

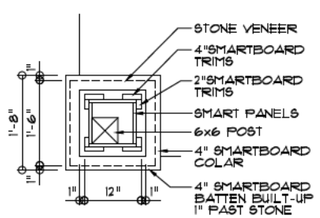
Cost Analysis Model Home

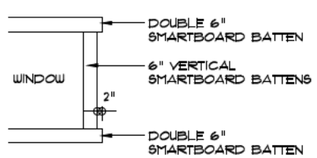
[redacted]



COLUMN DETAIL

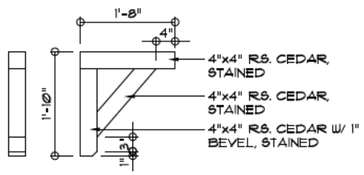
SCALE: 3/8" = 1'-0"





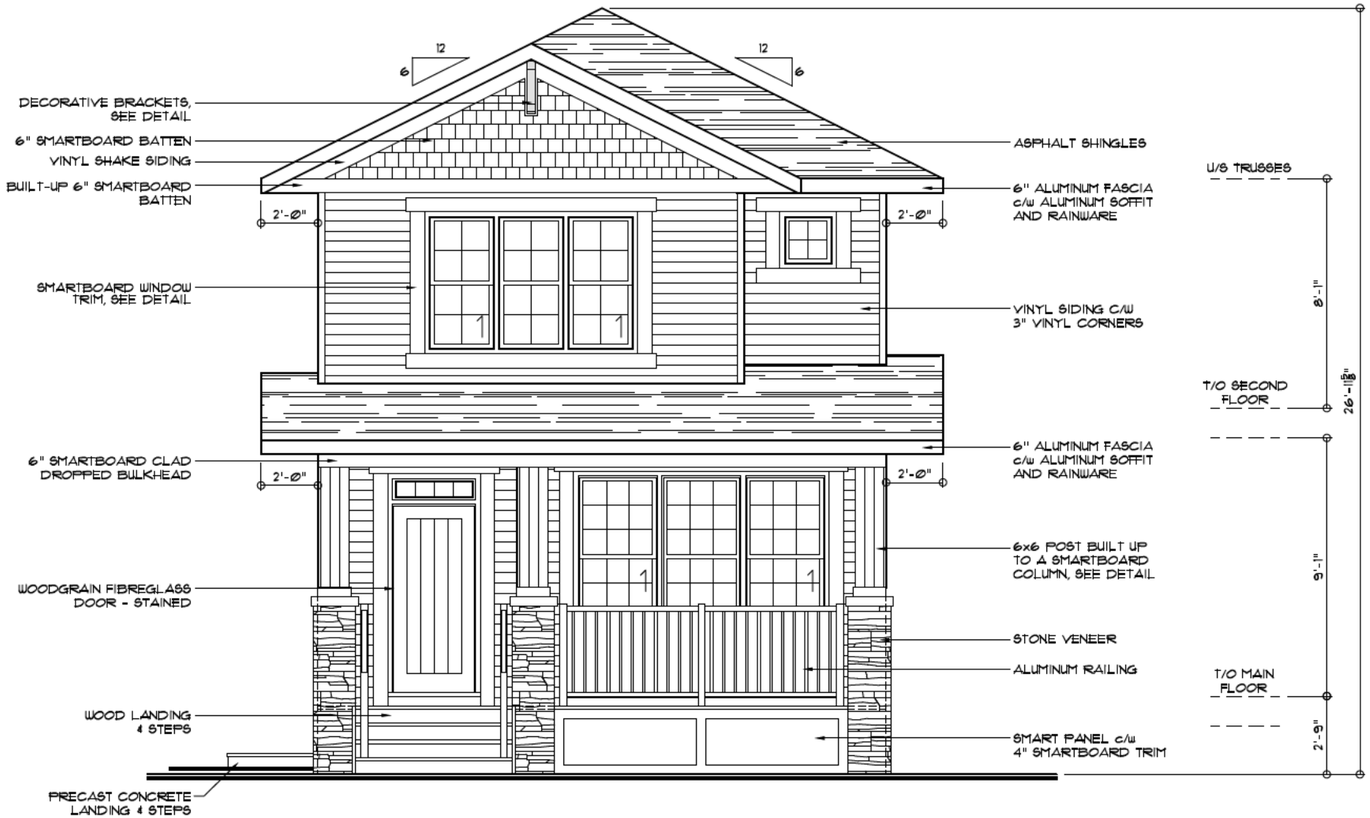
WINDOW TRIM DETAIL

SCALE: 3/16" = 1'-0"



BRACKET DETAIL

SCALE: 3/8" = 1'-0"



FRONT ELEVATION

SCALE: 3/16" = 1'-0"

[redacted]

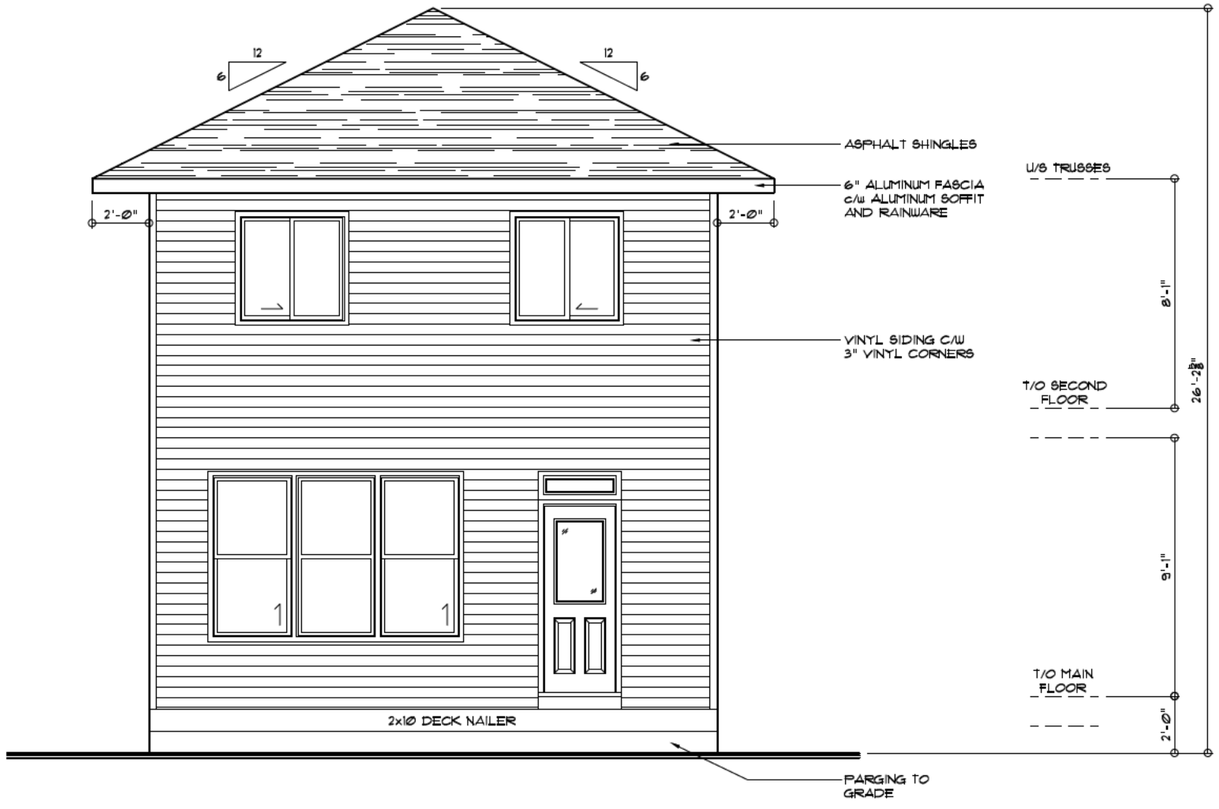
ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN



[redacted]

ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN

UNPROTECTED OPENINGS

LIMITING DISTANCE:	3.08 m
ALLOWABLE OPENINGS:	9.00 %
EXPOSED BUILDING FACE:	743.33 sq.ft.
UNPROTECTED OPENINGS:	46.84 sq.ft.
ACTUAL OPENINGS:	6.30%

[redacted]

ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

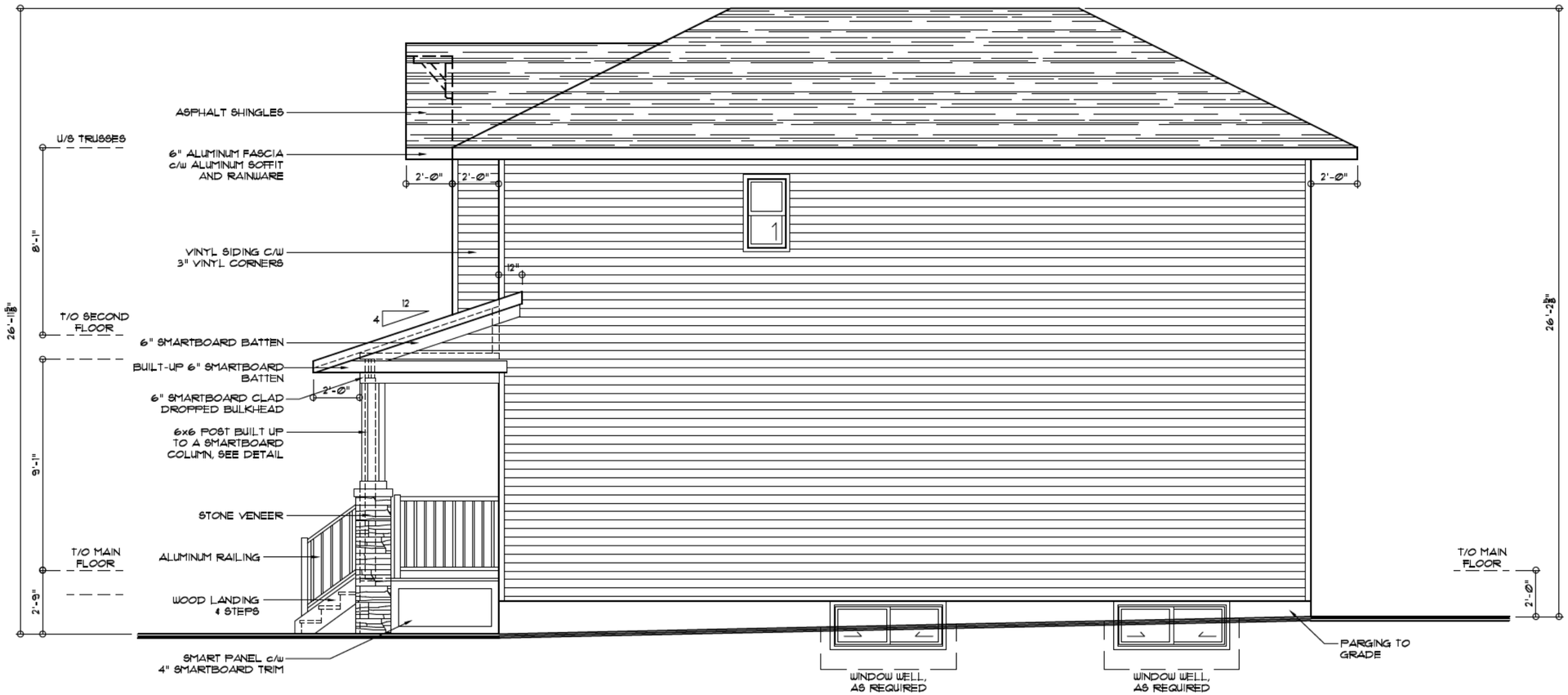
REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN

UNPROTECTED OPENINGS

LIMITING DISTANCE:	1.22 m
ALLOWABLE OPENINGS:	7.00 %
EXPOSED BUILDING FACE:	739.05 sq.ft.
UNPROTECTED OPENINGS:	27.50 sq.ft.
ACTUAL OPENINGS:	3.72%



RIGHT ELEVATION

SCALE: 3/16" = 1'-0"

[redacted]

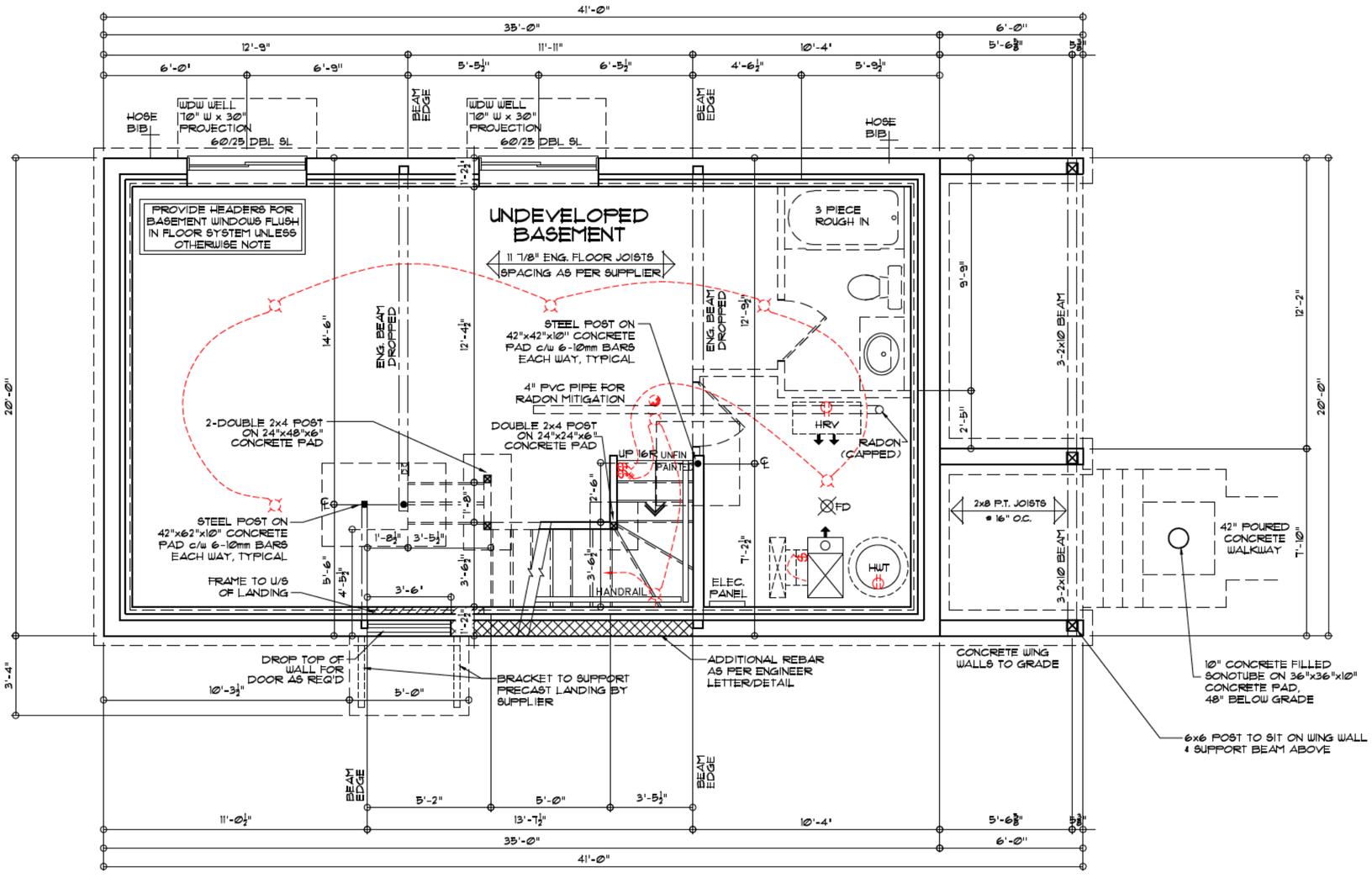
ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY

ELEVATION: CRAFTSMAN



FOUNDATION PLAN

SCALE: 3/16" = 1'-Ø"

STANDARD WALL SCONCE HEIGHT AT LANDING OR RISERS: 6'-8"

[redacted]

ADDRESS: [redacted]

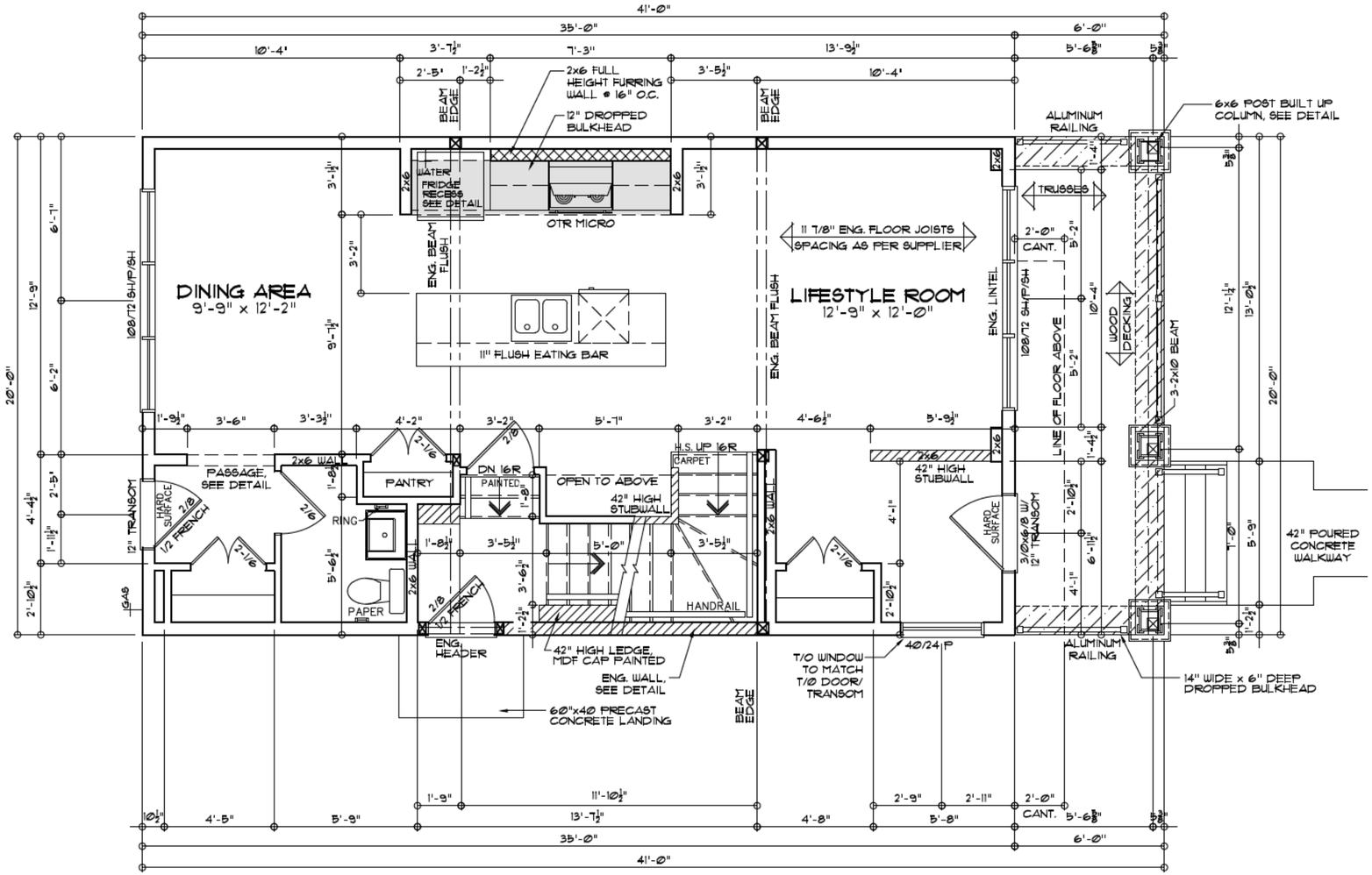
TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY

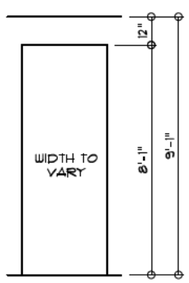
ELEVATION: CRAFTSMAN

NOTE:
MAIN FLOOR WINDOWS
TO BE 7'-11" HIGH UNLESS
OTHERWISE NOTED



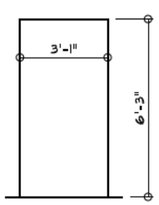
MAIN FLOOR PLAN

SCALE: 3/16" = 1'-0"



PASSAGE DETAIL MAIN

SCALE: 3/16" = 1'-0"



NOTE:
DIMENSIONS ARE
TO FINISHED MATERIAL

FRIDGE RECESS DETAIL

SCALE: 3/16" = 1'-0"

[redacted]

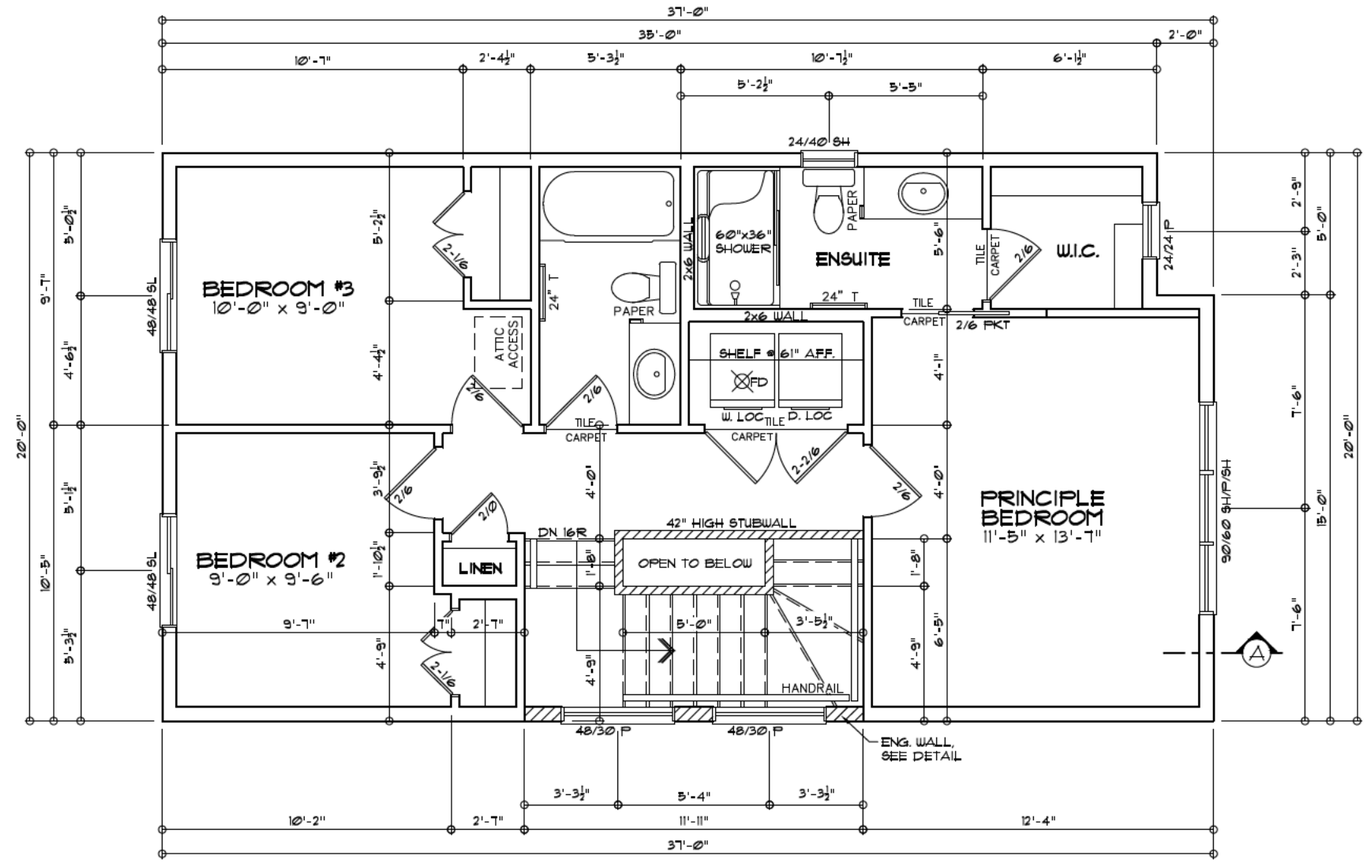
ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY
ELEVATION:
CRAFTSMAN

NOTE:
UPPER FLOOR WINDOWS
TO BE 6'-11" HIGH



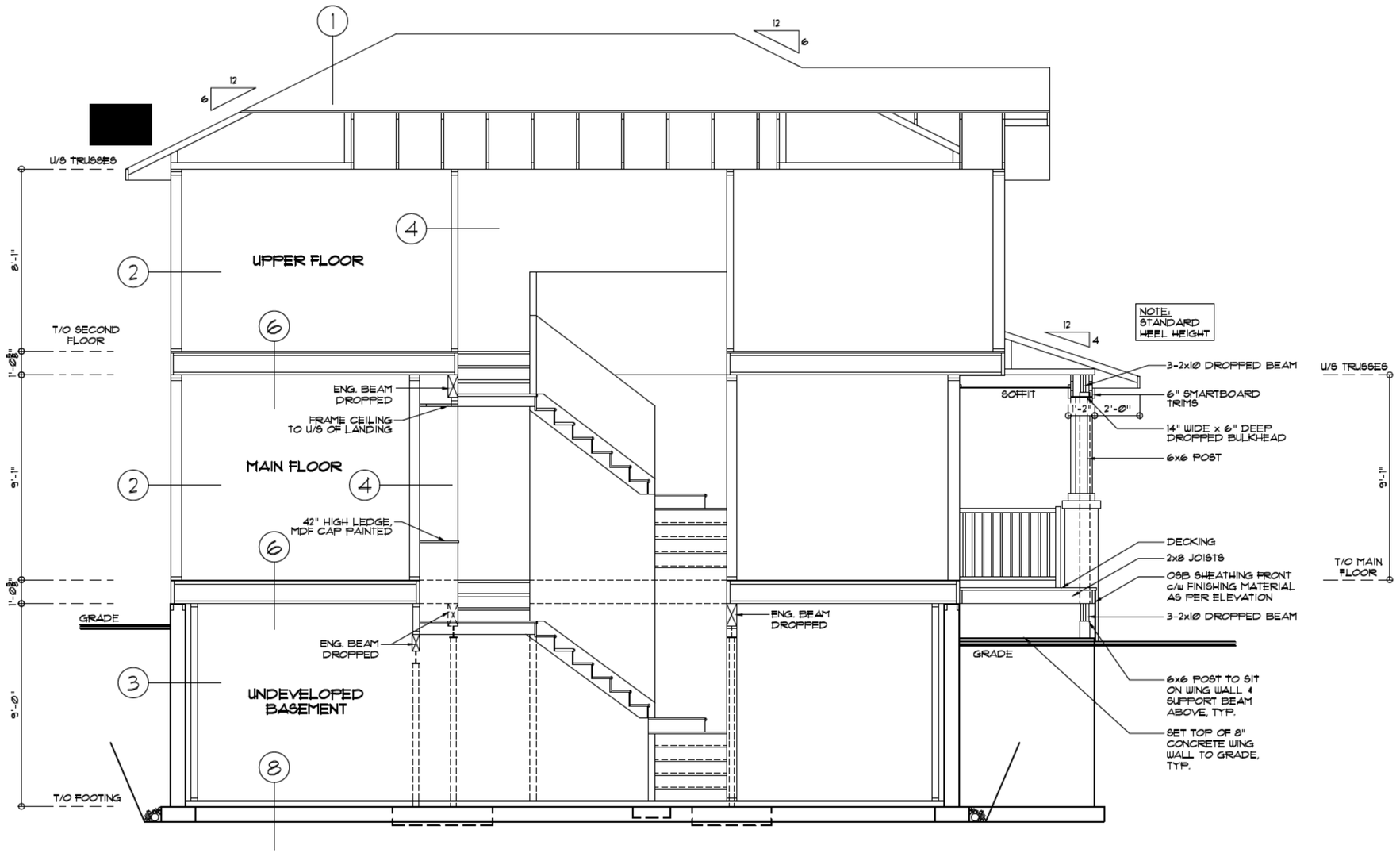
UPPER FLOOR PLAN

SCALE: 3/16" = 1'-0"

[redacted]	ADDRESS: [redacted]		
	TOTAL AREA: 1440 sq.ft. MAIN FLOOR: 700 sq.ft. UPPER FLOOR: 740 sq.ft. GARAGE: N/A sq.ft. BSMNT DEV: N/A sq.ft. DECK: N/A sq.ft.	REVISIONS:	MODEL: 2 STOREY ELEVATION: CRAFTSMAN PAGE 7 OF 10

NOTE:
MAIN FLOOR WINDOWS TO BE 7'-11" HIGH UNLESS OTHERWISE NOTED

UPPER FLOOR WINDOWS TO BE 6'-11" HIGH UNLESS OTHERWISE NOTED



CROSS SECTION A

SCALE: 3/16" = 1'-0"

GENERAL NOTES

-ALL CONSTRUCTION TO CONFORM TO CURRENT A.B.C., FIRE CODES AND 9.36 PERFORMANCE ENERGY MODEL DETAILS
-SPECIFICATIONS, CHANGE REQUESTS SHALL OVERRIDE PLANS
-FINAL GRADING AND SITE CONDITIONS MAY VARY EXTERIOR APPEARANCE
-SECTION NOTES ARE GENERAL AND MAY VARY OR NOT APPLY TO ALL PLANS
-ALUMINUM FASCIA AND EAVESTROUGH AS NOTED
-ALUMINUM VENTED SOFFIT ON FRONT AND REAR ELEVATIONS ONLY.
-NON-VENTED ALUMINUM SOFFIT ON SIDE ELEVATIONS
-TRUSS MANUFACTURER TO VERIFY ALL ROOF SLOPES AND TRUSS DESIGN PRIOR TO FABRICATION

LINTEL NOTES:
-ALL EXTERIOR LINTELS TO BE 2-2x10 SPF UNLESS NOTED
-ALL LINTELS OVER 6'-0" MUST HAVE A DOUBLE CRIPPLE
-INSULATE & DRYWALL WALLS WITHIN 4'0" OF FURNACE & HWT
-INSULATE & DRYWALL WALLS ADJACENT TO STAIRS AND LANDING
-INSULATE AND DRYWALL WALLS AT BASEMENT LAUNDRY WHEN APPLICABLE
-ANY DISCREPANCIES TO BE REPORTED TO THE DESIGNER PRIOR TO CONSTRUCTION

[redacted]

ADDRESS: [redacted]

TOTAL AREA:	1440	sq.ft.
MAIN FLOOR:	700	sq.ft.
UPPER FLOOR:	740	sq.ft.
GARAGE:	N/A	sq.ft.
BSMNT DEV:	N/A	sq.ft.
DECK:	N/A	sq.ft.

REVISIONS:

MODEL: 2 STOREY
ELEVATION: CRAFTSMAN

Appendix D:

Wall Assembly Affordability and Constructability Analysis

Cost per sq/ft of Wall Affordability Analysis

Assembly	Cost/sqft of Wall	Notes
Tier 1 2x6	**Baseline Cost**	Assembly built with materials commonly used in current residential construction. These include; • Tyvek WRB. • 6 mil poly vapour barrier.
Exterior Mineral Wool Tier 3	**153%** higher than baseline	Incorporates high-performance building materials at an additional cost. These include; • Siga Majvest WRB (Roughly twice as much per sq/ft coverage of Tyvek). • Siga Majrex vapour barrier (roughly 9x as much per sq/ft coverage of 6 mil poly). • Siga WRB and VB tapes for air sealing. Other Additional Costs: • Exterior mineral wool insulation. • Rainscreen material.
Double Stud Net Zero	**64%** higher than baseline	Incorporates a combination of more commonly used construction materials and high-performance building materials at an additional cost. These include; • Typar WRB (similar in price to Tyvek). • Siga Majrex vapour barrier (roughly 9x as much per sq/ft coverage of 6 mil poly). • Siga VB tapes for air sealing. Other Additional Costs: • Framing of 2 walls. • Additional insulation to fill wall cavity.
Exterior Foam Net Zero	**465%** higher than baseline	Incorpotates high-performance building materials at an additional cost. These include; • Soprema Sopraseal Stick WRB (Roughly 11x as much per sq/ft coverage of Tyvek). •Soprema sill flashing. Other Additional Costs: • Exterior XPS insulation. • Rainscreen material. • Fasteners for screwing through a large amount of insulation.
Fire Resistant Retrofit	**206%** higher than baseline	Incorporates high-performance building materials at an additional cost. These include; • ProClima Mento WRB (Roughly 3x as much per sq/ft coverage of Tyvek. • ProClima tapes for air sealing. Other Additional Costs: • Exterior mineral wool insulation. • Rainscreen material. • Thermal Clips.
Larsen Truss Retrofit	**165%** higher than baseline	Incorporates common building materials similar to the baseline home; • Typar WRB (similar cost as Tyvek). Additional Costs: • Framing material for the Larsen Truss. • Rainscreen material. • WRB tape for air sealing. • Insulation for Larsen Truss cavity. • Soprema liquid applied membrane for window bucks and air sealing.

• No monetary value has been noted as there are many variables that could impact the comparability of these costs.
• This chart is a direct comparison of the cost of the material to construct ***ONLY*** *the wall assembly of the model home.*
• This chart only compares the materials selected for each physical mock-up. It cannot be considered a 1 to 1 comparison as different materials selected have different costs, possibly resulting in inflated prices for certain assemblies.

Constructability Analysis

Assembly	Material Availability	Difficulties/Issues	Constructability Rating (1-5)
Tier 1 2x6	• All material used was available at common hardware/construction material supply stores. • Material was all readily available as this is a commonly built assembly across Alberta.	• Accoustical sealant can be messy and inconsistent.	**1** **Baseline** •Easiest to construct.
Exterior Mineral Wool Tier 3	• Framing and cavity insulation materials were readily available at common hardware/material supply stores. • SIGA WRB, VB and tapes was not readily available and needed to be ordered in. This required a small lead time. • Exterior mineral wool insulation was not readily available and needed to be ordered. This required a significant lead time. • Rainscreen framing material and fasteners were readily available at common stores. • Custom made flashing was required. GBTAC made these on site with the use of a Break. If GBTAC did not have this tool, this material would need to be custom ordered.	• WRB was the air control layer, so ensuring continuous membrane behind flashings and penetrations increased the difficulty of installing the WRB. • Ensuring the screws that hold on the rainscreen strapping properly embed in a structural member of the wall. • Ensuring proper flashing installation and detailing around the window. • Custom exterior window trim detail was required. • Order of operations for the framer. WRB membrane was required to transfer into the interior at the roof so as to transfer the air control layer to the underside of the roof ceiling.	**2.5** • Relatively simple to construct. • Exterior insulation is the major change from the baseline that makes it more difficult
Double Stud Net Zero	• All materials used in this assembly were readily available at common hardware/material supply stores aside from the VB. • VB and tapes was not readily available and needed to be ordered in. This required a small lead time.	• Double walls could be heavy and difficult to move around. • Custom window jambs are required to be made to cover the large window rough opening to the interior of the window. • Order of operation for the framer. VB needs to be wrapped under the plates of the walls before the walls are installed. • Proper installation of the 3 layers of insulation in the cavity to ensure there is no settlement.	**2** • Simple Construction . • Not to dissimilar to the baseline with adding a second wall and extra insulation increasing the difficulty.
Exterior Foam Net Zero	• Framing material readily available at common hardware/material supply stores. • WRB was not readily available and needed to be ordered in. This required a small lead time. • XPS and fasteners were readily available at some material supply stores, but had the possibility to need to be ordered in with a small lead time. • Custom flashing needed to be made. This was made onsite with a break, otherwise this would have been needed to be ordered from a supplier.	• WRB was the air control layer, so ensuring continuous membrane behind flashings and penetrations increased the difficulty of installing the WRB. • Ensuring the screws that hold on the rainscreen strapping properly embed in a structural member of the wall. • Ensuring proper flashing installation and detailing around the window. • Custom exterior window trim detail was required. • Installing through flashing in the correct spot at the wall proved difficult. • Peel and stick membrane required at least 2 workers to install as it was difficult to remove the backing without adhering the membrane to itself.	**5** • Most difficult to construct. • Long screws and the amount of exterior insulation made this assembly difficult to construct.
Fire Resistant Retrofit	• ProClima WRB and tapes wer not readily available and needed to be ordered in. This required a small lead time. • Exterior mineral wool insulation was not readily available and needed to be ordered. This required a significant lead time. • Rainscreen framing material and fasteners were readily available at common stores. • Custom made flashing was required. GBTAC made these on site with the use of a Break. If GBTAC did not have this tool, this material would need to be custom ordered. • Soprema thermal clips had to be ordered in with minimal lead time.	• Attaching the rainscreen strapping to the metal thermal clips proved quite difficult at times.	**3** • Somewhat difficult to construct. • If good screws are used that screw into the metal thermal clips well, the construction would be slightly easier.
Larsen Truss Retrofit	• All framing material and the WRB material was readily available at common hardware/material supply stores. • Dense pack cellulose needed to be installed by a professional installer. Lead time for booking the installer was required. • Liquid applied membrane for window bucks was required to be ordered in with a small lead time.	• Installing the liquid applied membrane could not be done at a lower temperature.	**2.5** • Relatively simple to construct. • Amount of labour and correct installation of the Larsen Truss raises the difficulty.

• Constructability values are based on the previous experience of the GTAC Staff and conversations with industry