

# **Finding Closure:**

## **Detailing Weather Resistive Barriers at Rough Openings**

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*Simpson Gumpertz & Heger, Inc.*

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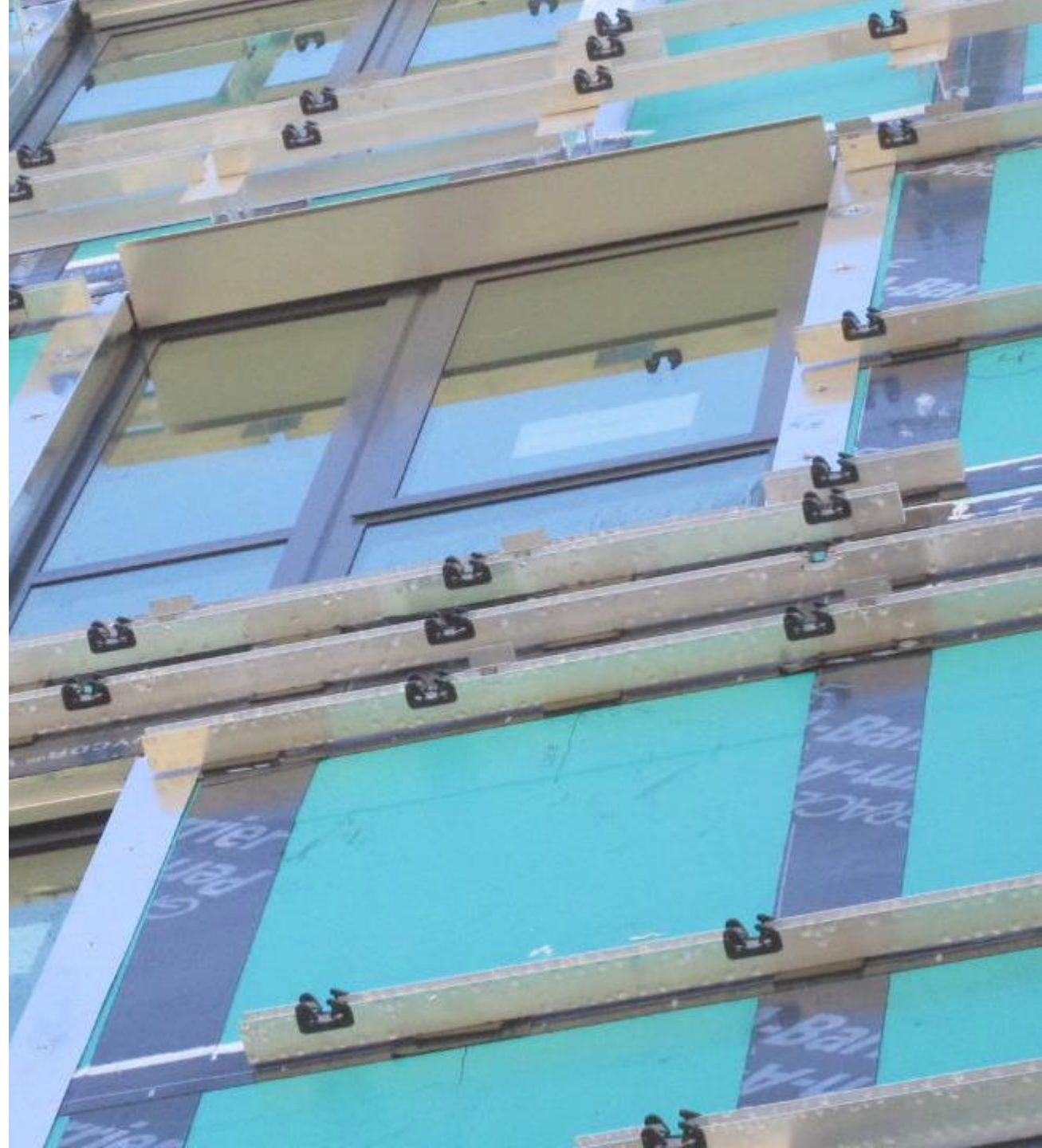
## Course Description

This presentation will review common issues with detailing the perimeter of a rough opening and focus on connecting the weather resistive barrier and the fenestration assembly. This presentation will also explore the design decision that drives the need for cavity closure flashings in contemporary building construction.

1. Define the conditions that require closure flashings and understand common performance requirements
2. Anticipate common issues during construction, both prior to and during the flashing installation, that can impact the flashing system performance.
3. Strategies for preparing design documents and reviewing shop drawings to address common issues with closure flashings to set the field installers up for success.
4. Identify coordination issues during preconstruction and mockup review to yield an effective integration between the fenestration and weather resistive barrier.

# Outline

1. Evolution of Performance Requirements
2. Designing Considerations
3. Construction Challenges
4. Take-Aways

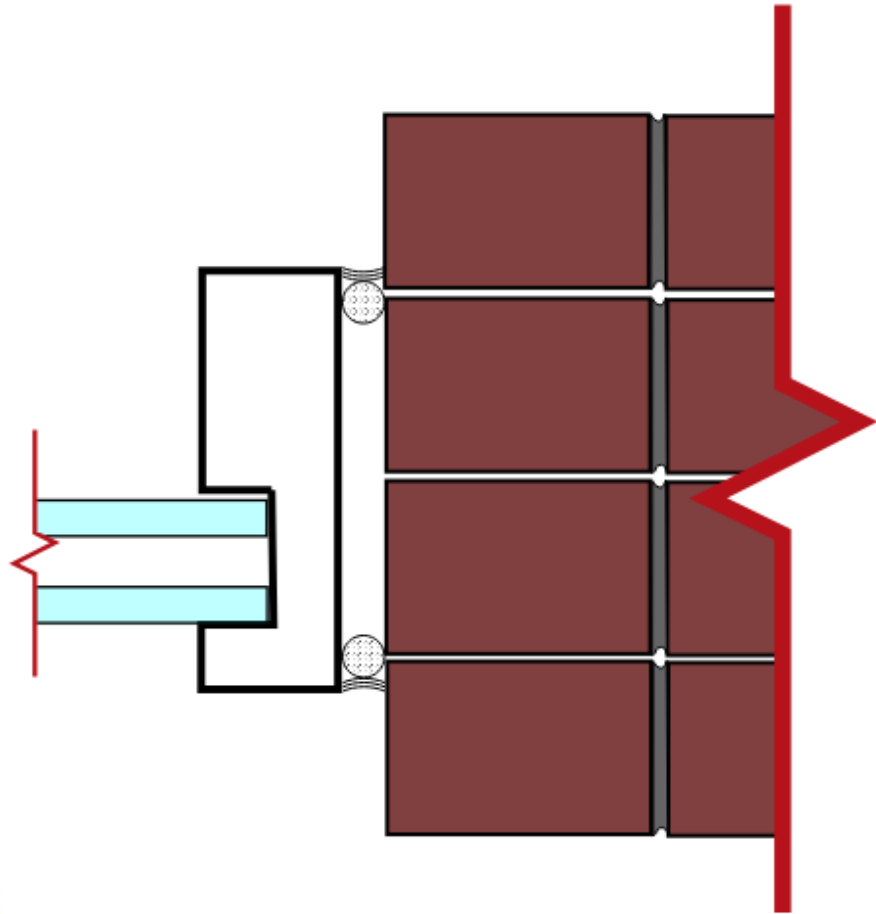




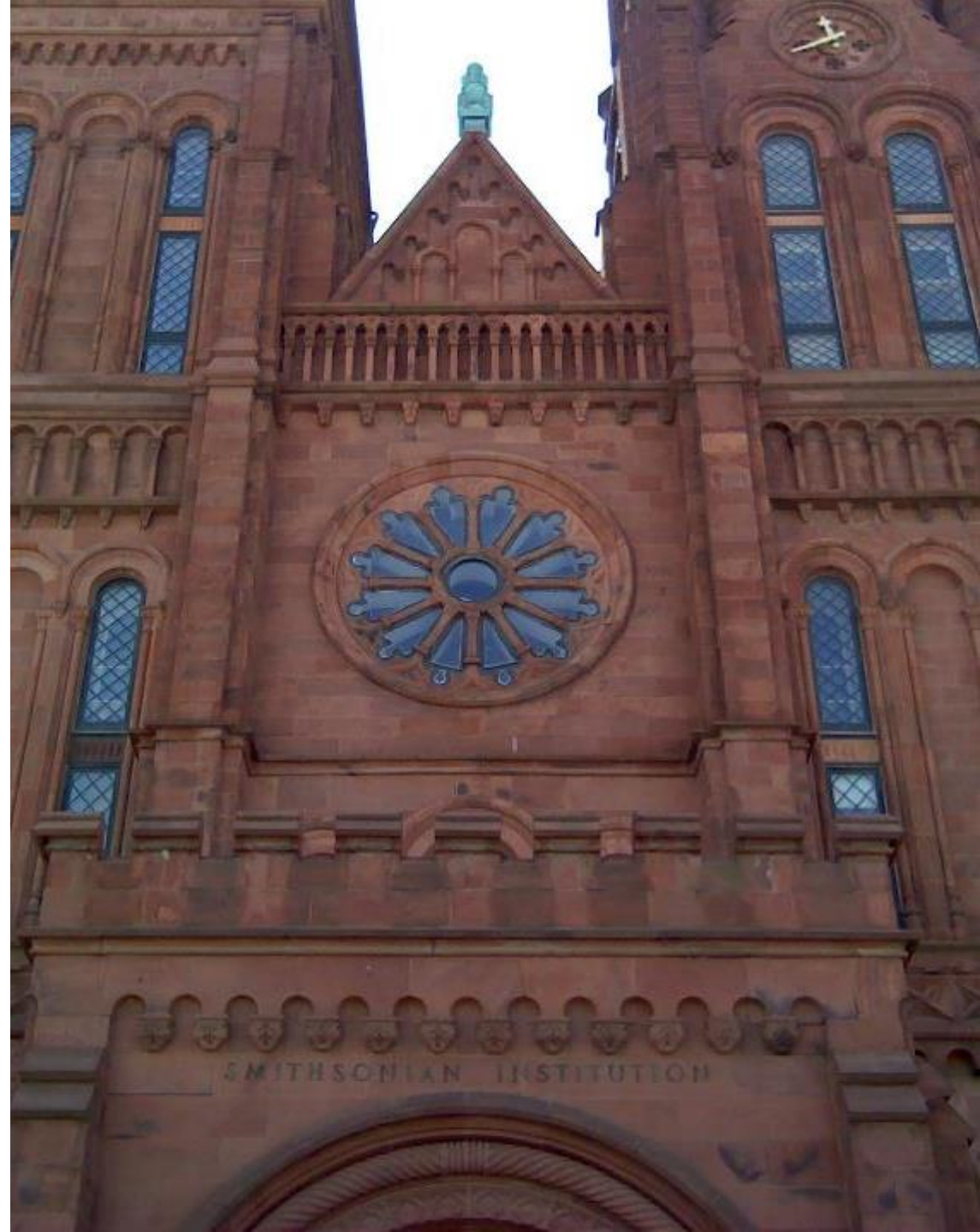
# EVOLUTION OF PERFORMANCE REQUIREMENTS



# Mass Masonry Wall

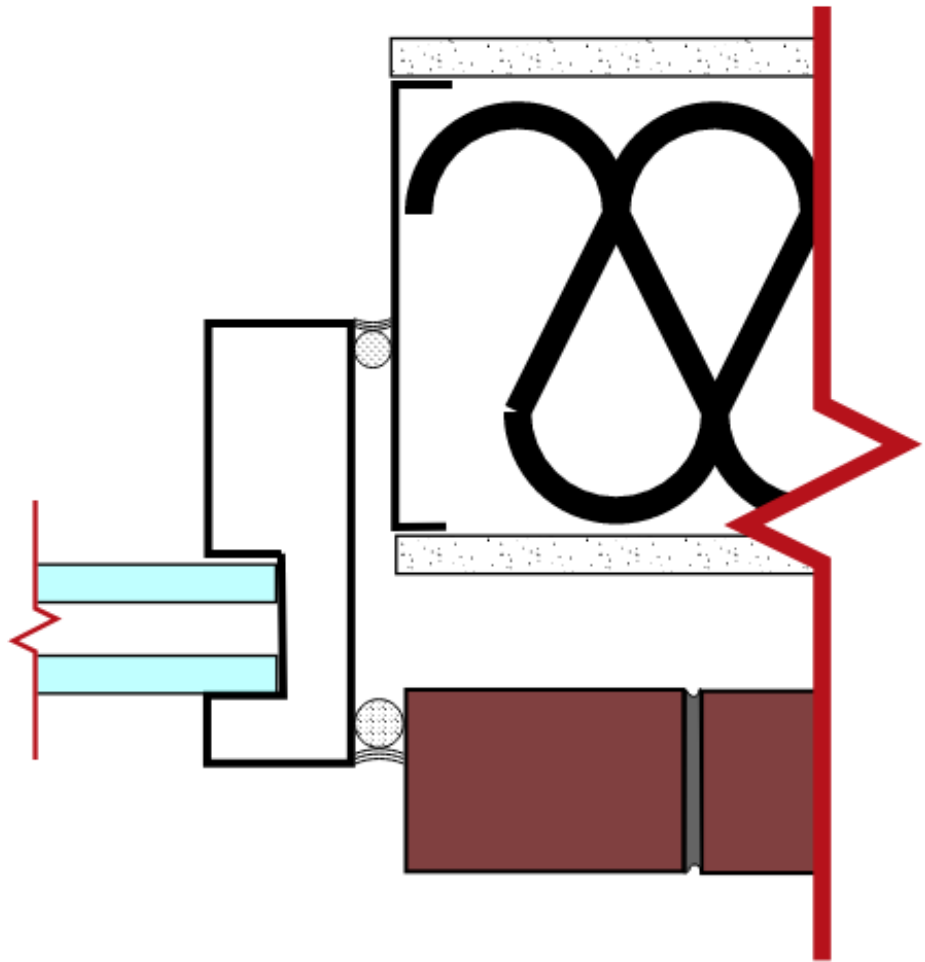


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# Rainscreen Cavity Wall



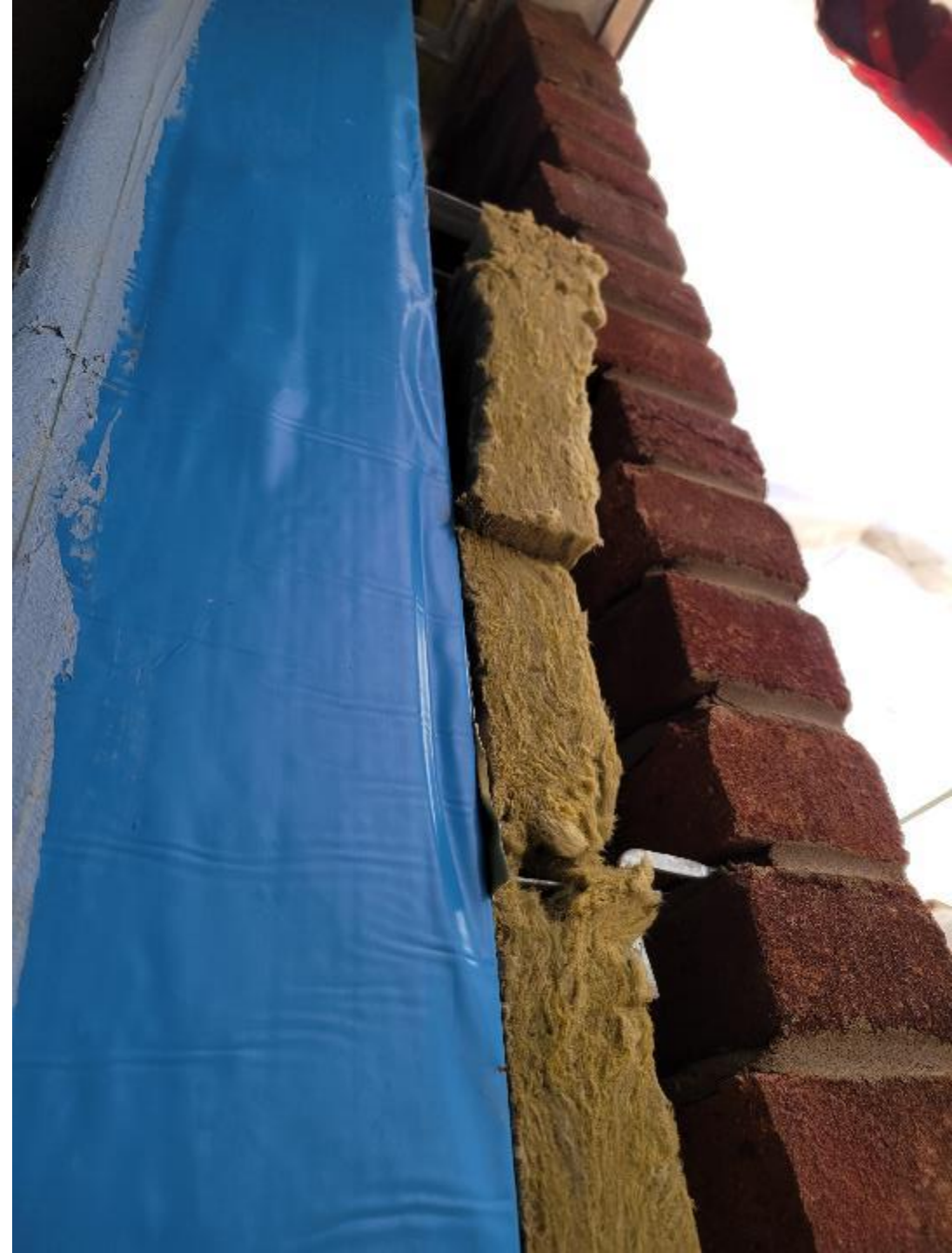
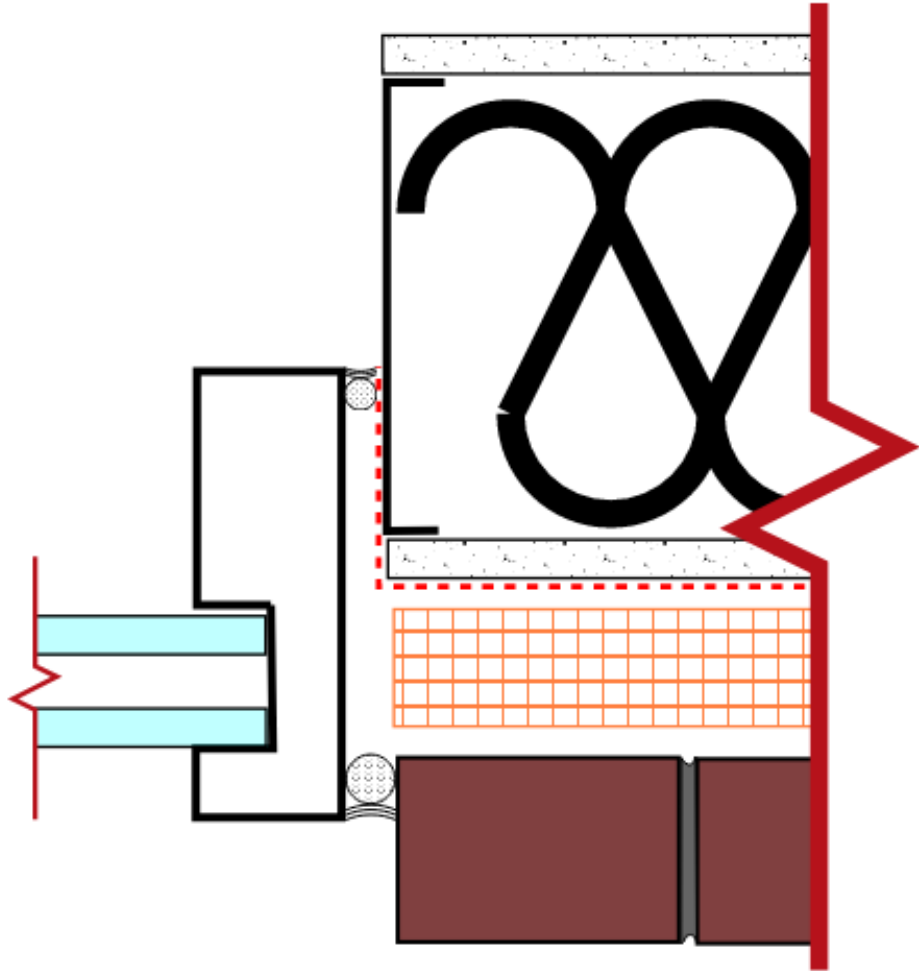
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# Contemporary Cavity Walls



# Code Requirements

| CLIMATE ZONE                        | 1                      |                        | 2                      |                        | 3                      |                        | 4 EXCEPT MARINE        |                        |
|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|                                     | All other              | Group R                | All other              | Group R                | All other              | Group R                | All other              | Group R                |
| Roofs                               |                        |                        |                        |                        |                        |                        |                        |                        |
| Insulation entirely above roof deck | R-20ci                 | R-25ci                 | R-25ci                 | R-25ci                 | R-25ci                 | R-25ci                 | R-30ci                 | R-30ci                 |
| Metal buildings <sup>b</sup>        | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         | R-19 + R-11 LS         |
| Attic and other                     | R-38                   | R-38                   | R-38                   | R-38                   | R-38                   | R-38                   | R-38                   | R-38                   |
| Walls, above grade                  |                        |                        |                        |                        |                        |                        |                        |                        |
| Mass <sup>a</sup>                   | R-5.7ci <sup>c</sup>   | R-5.7ci <sup>c</sup>   | R-5.7ci <sup>c</sup>   | R-7.6ci                | R-7.6ci                | R-9.5ci                | R-9.5ci                | R-11.4ci               |
| Metal building                      | R-13+ R-6.5ci          | R-13 + R-6.5ci         | R-13 + R-6.5ci         | R-13 + R-13ci          | R-13 + R-6.5ci         | R-13 + R-13ci          | R-13 + R-13ci          | R-13 + R-13ci          |
| Metal framed                        | R-13 + R-5ci           | R-13 + R-5ci           | R-13 + R-5ci           | R-13 + R-7.5ci         | R-13 + R-7.5ci         | R-13 + R-7.5ci         | R-13 + R-7.5ci         | R-13 + R-7.5ci         |
| Wood framed and other               | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 |

Reference: Table C402.1.3. Opaque Thermal Envelope Insulation Component Minimum Requirements, R-Value Method

C402.5 Air leakage—thermal envelope (Mandatory).

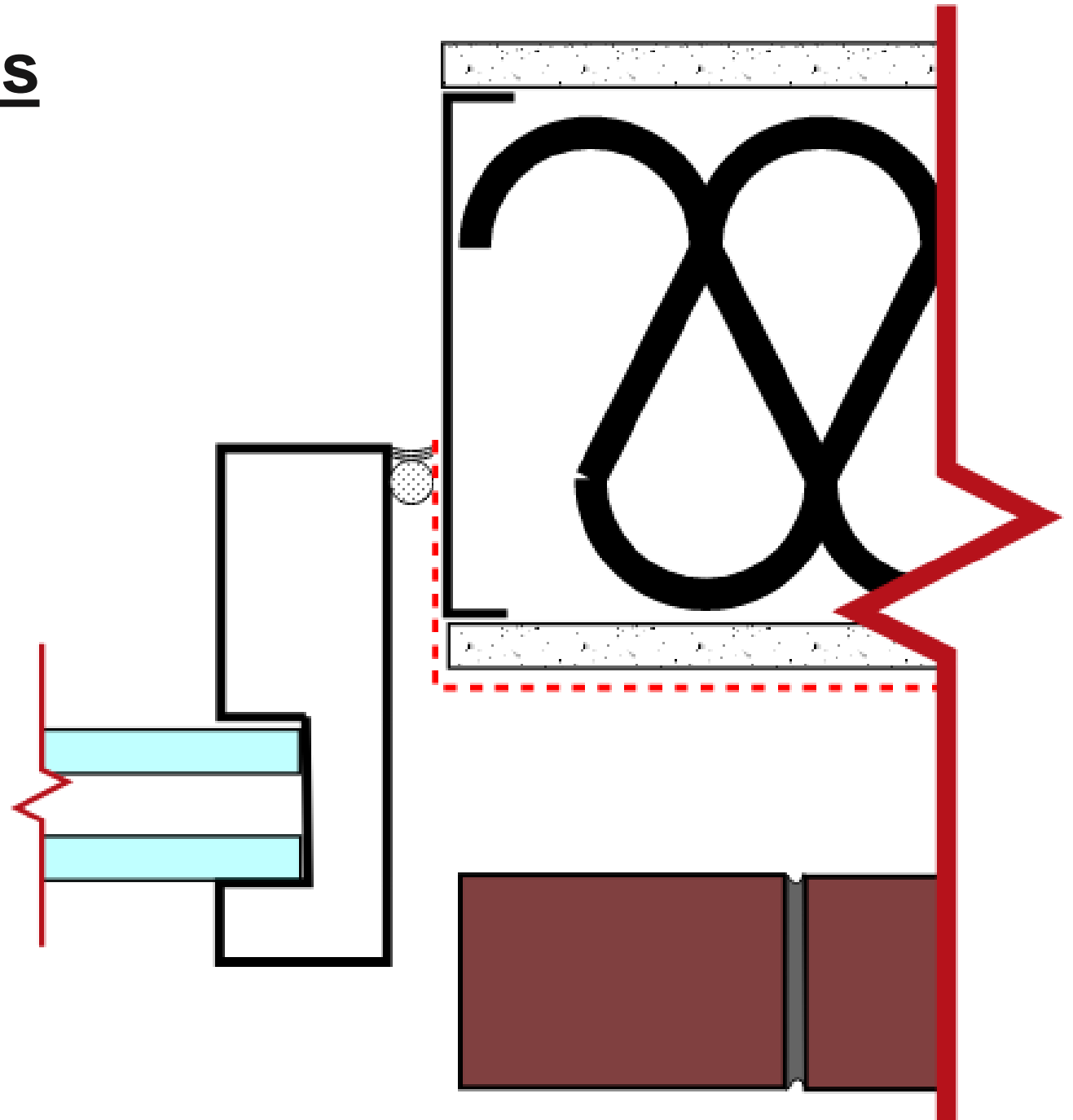


# DESIGN CONSIDERATIONS



# Designing Closure Flashings

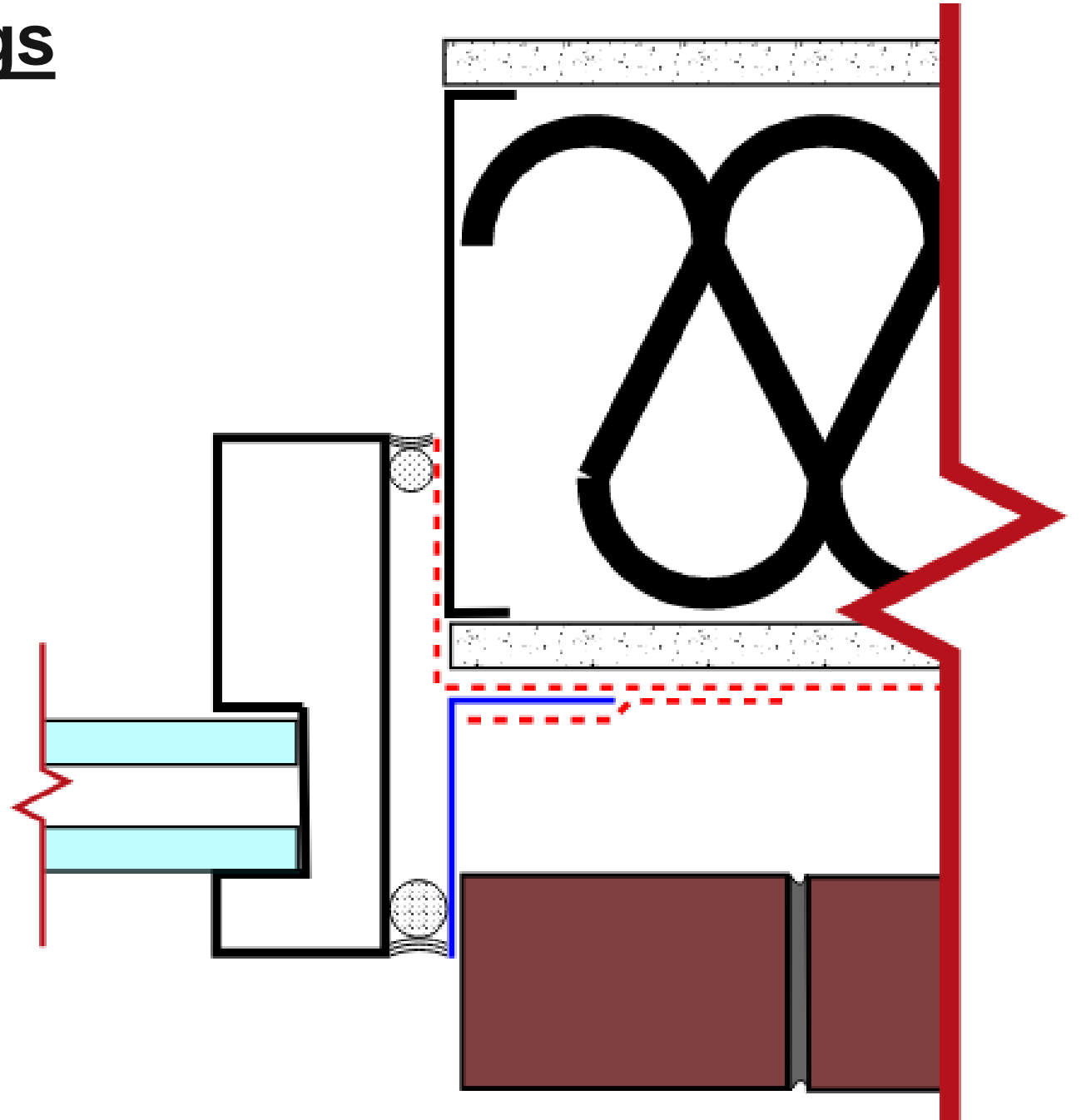
## 1.) Air barrier





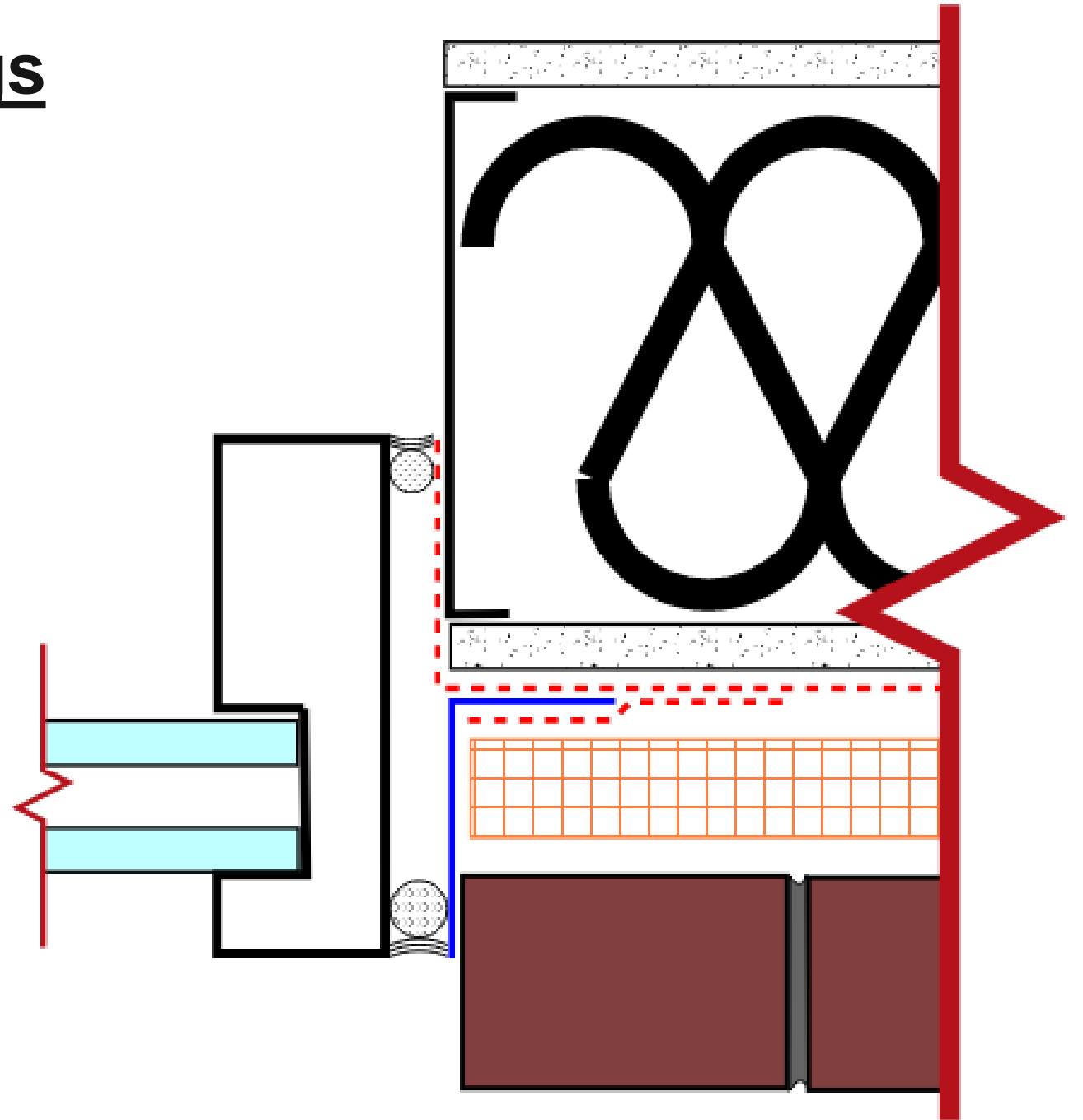
# Designing Closure Flashings

- 1.) Air Barrier
- 2.) Water Barrier



# Designing Closure Flashings

- 1.) Air Barrier
- 2.) Water Barrier
- 3.) Thermal Barrier



# Designing Closure Flashings

- 1.) Air Barrier
- 2.) Water Barrier
- 3.) Thermal Barrier
- 4.) Differential Movement

[Placeholder for Scott Bondi  
differential movement graphic]

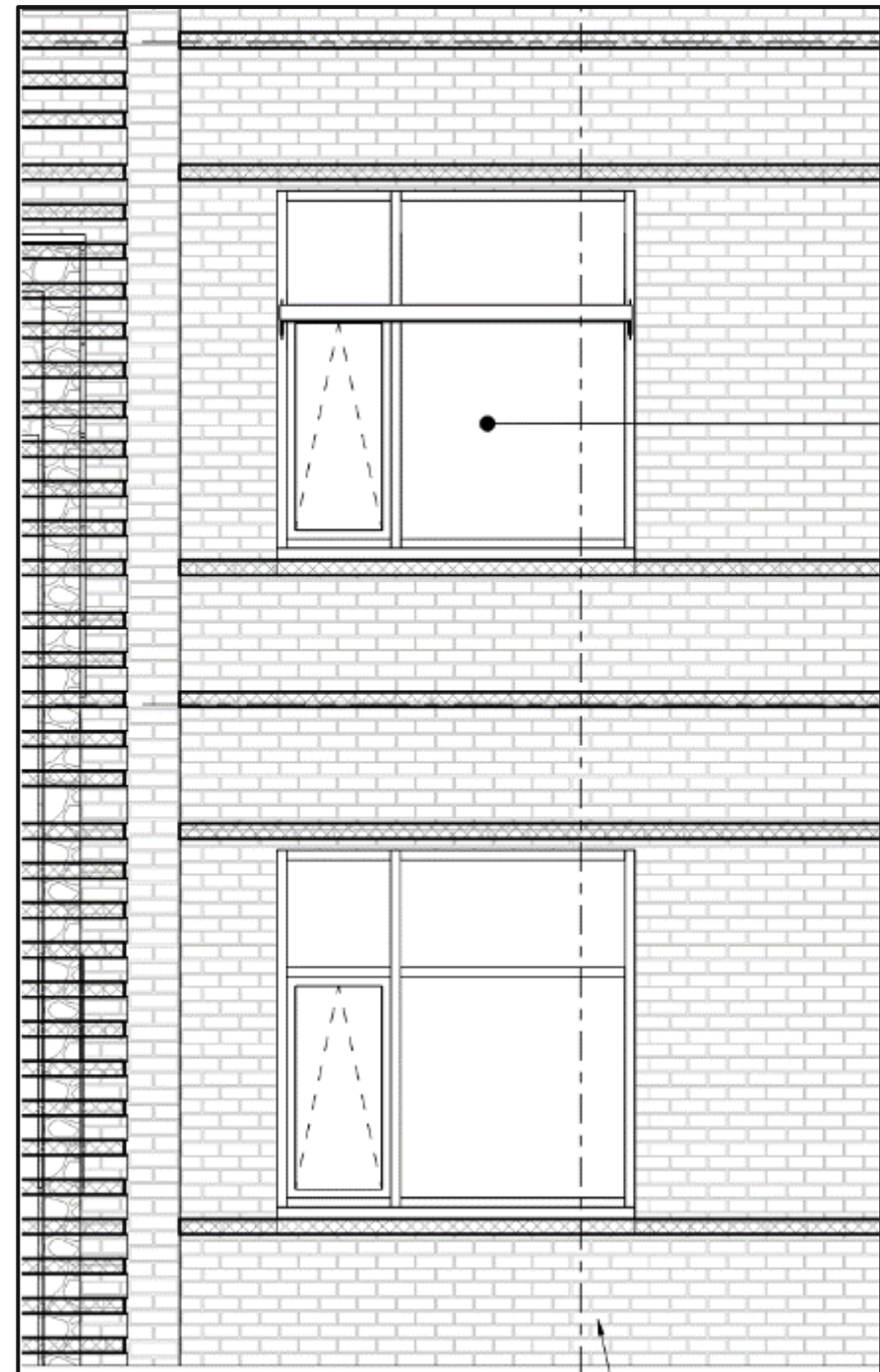
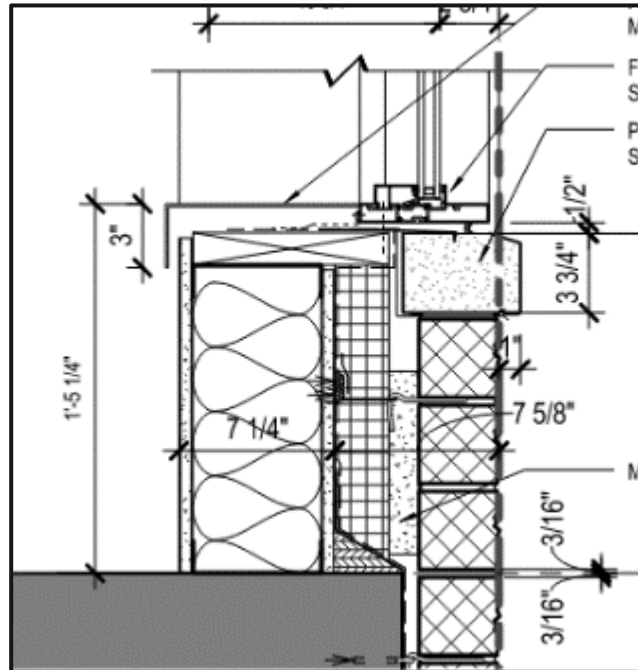
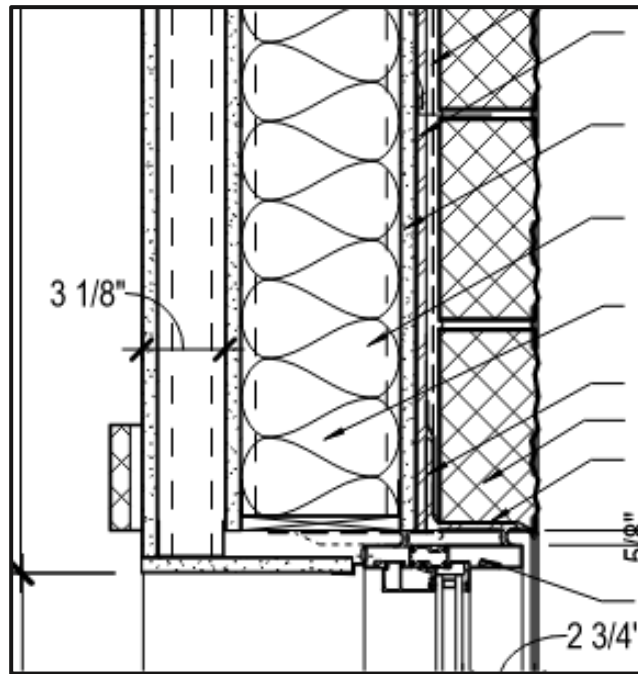




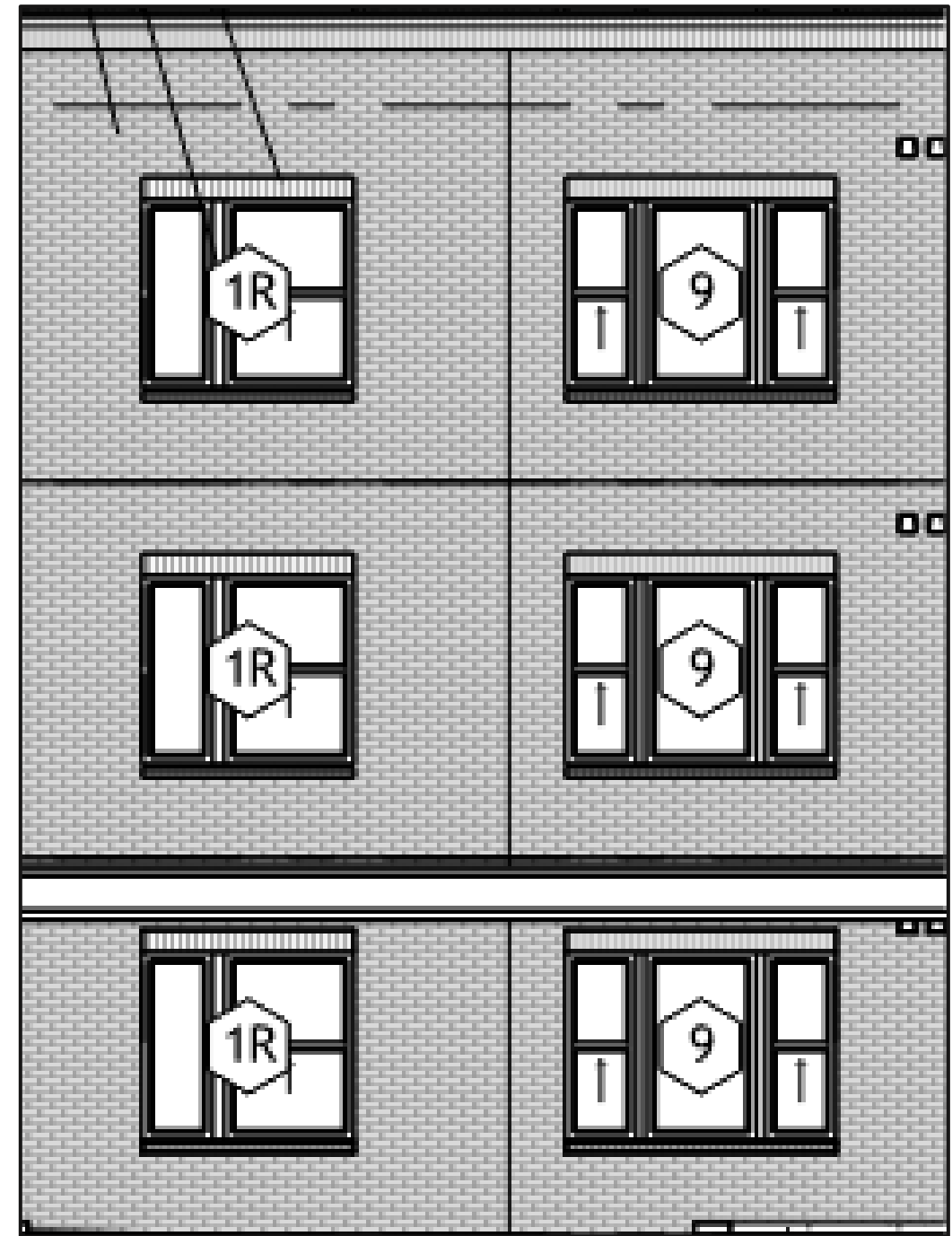
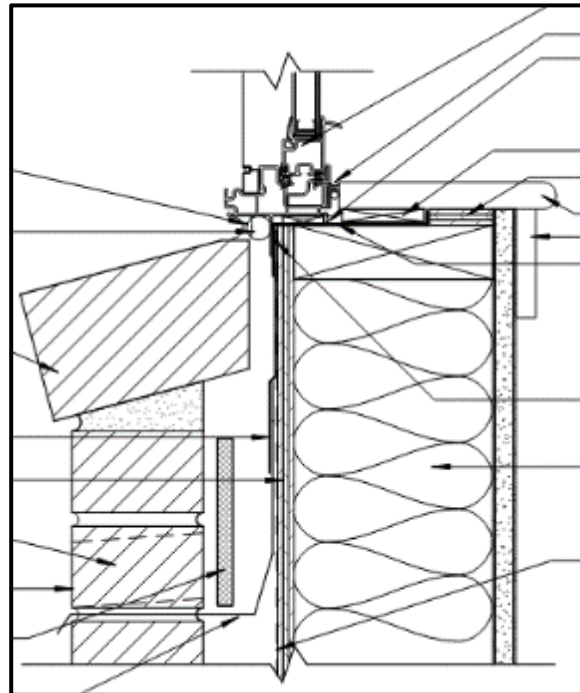
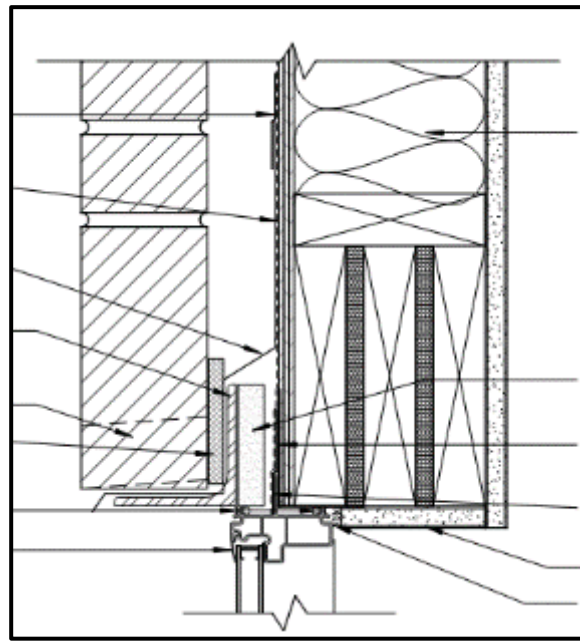
# Punched Window



# Windows



# Flanged Windows

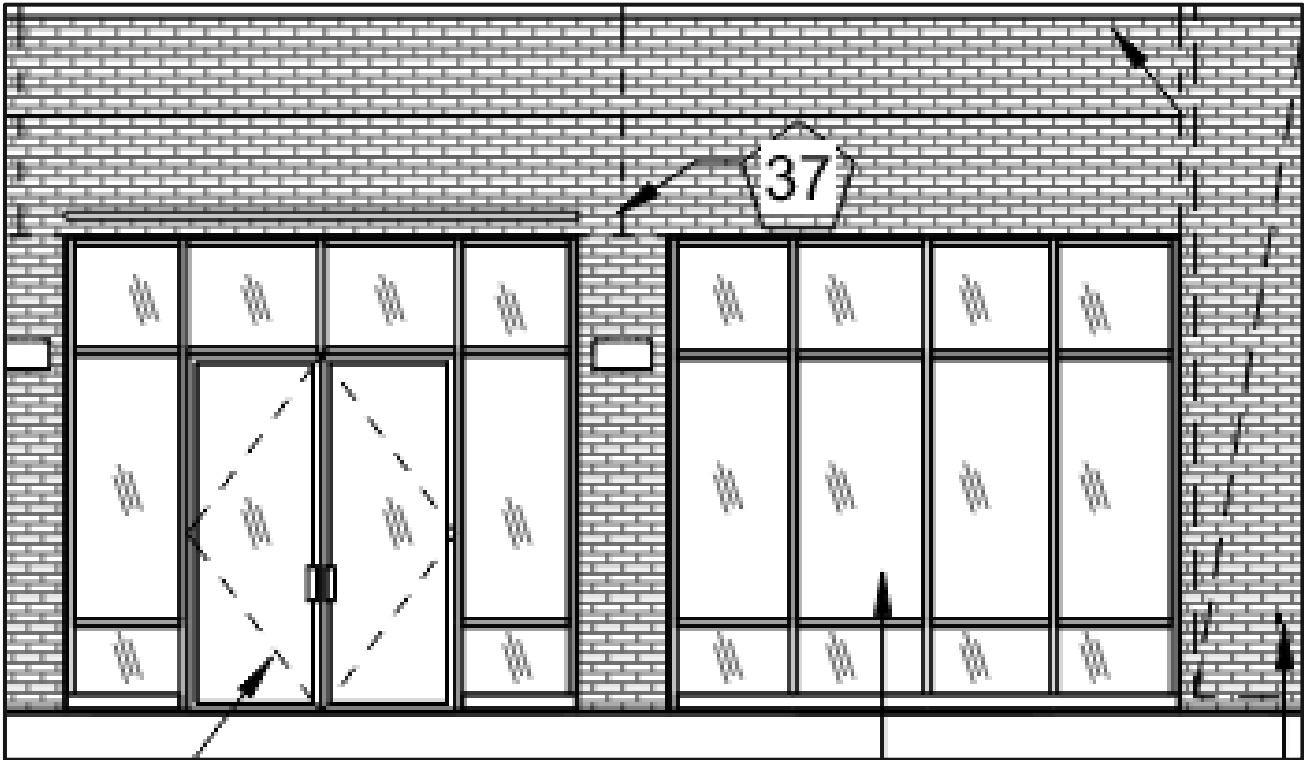
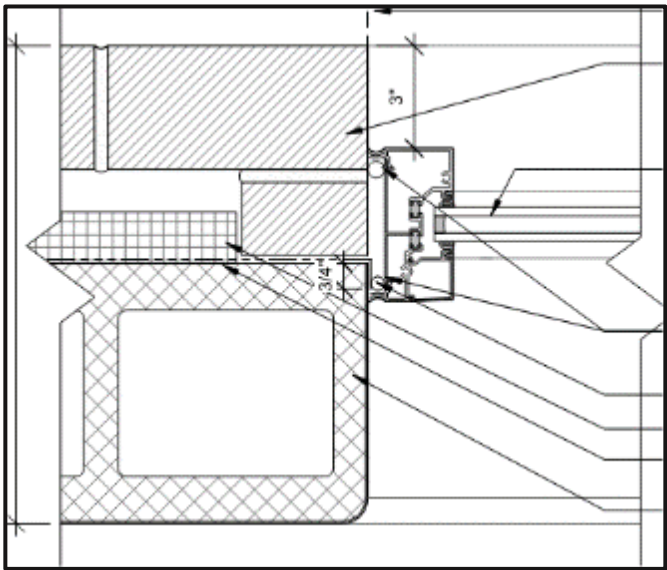
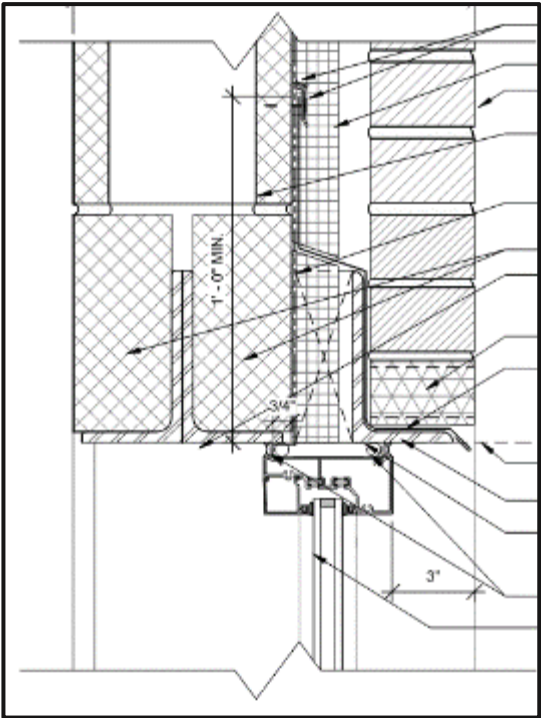




# Storefront



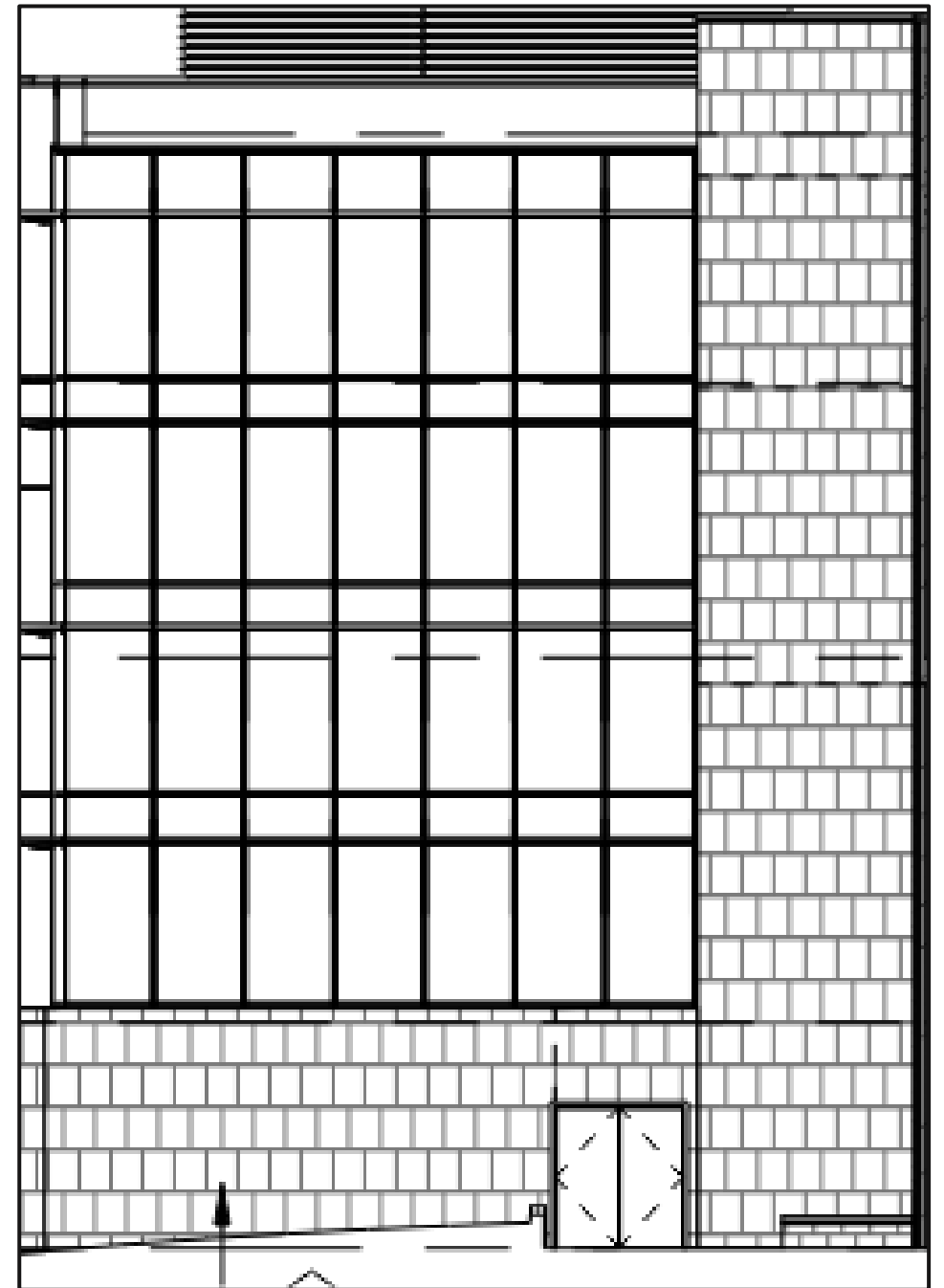
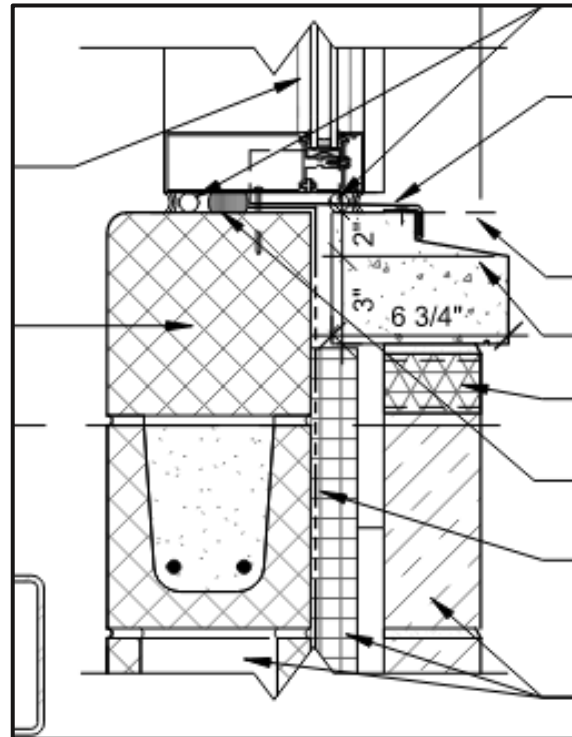
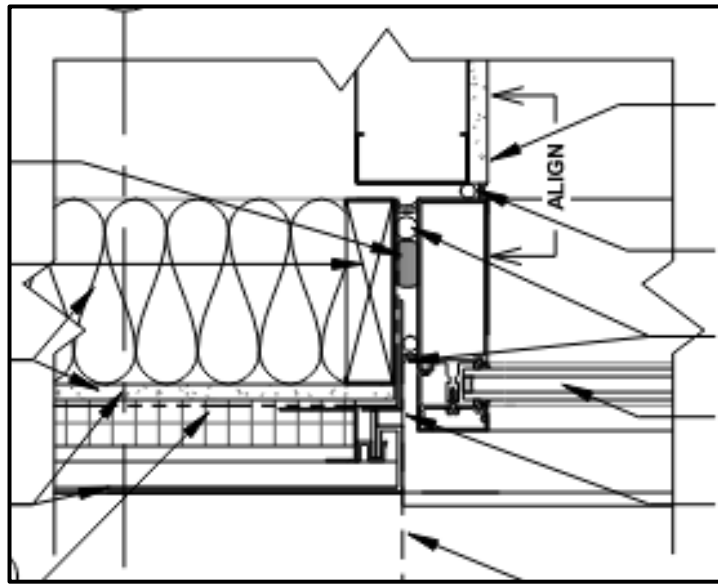
# Storefront



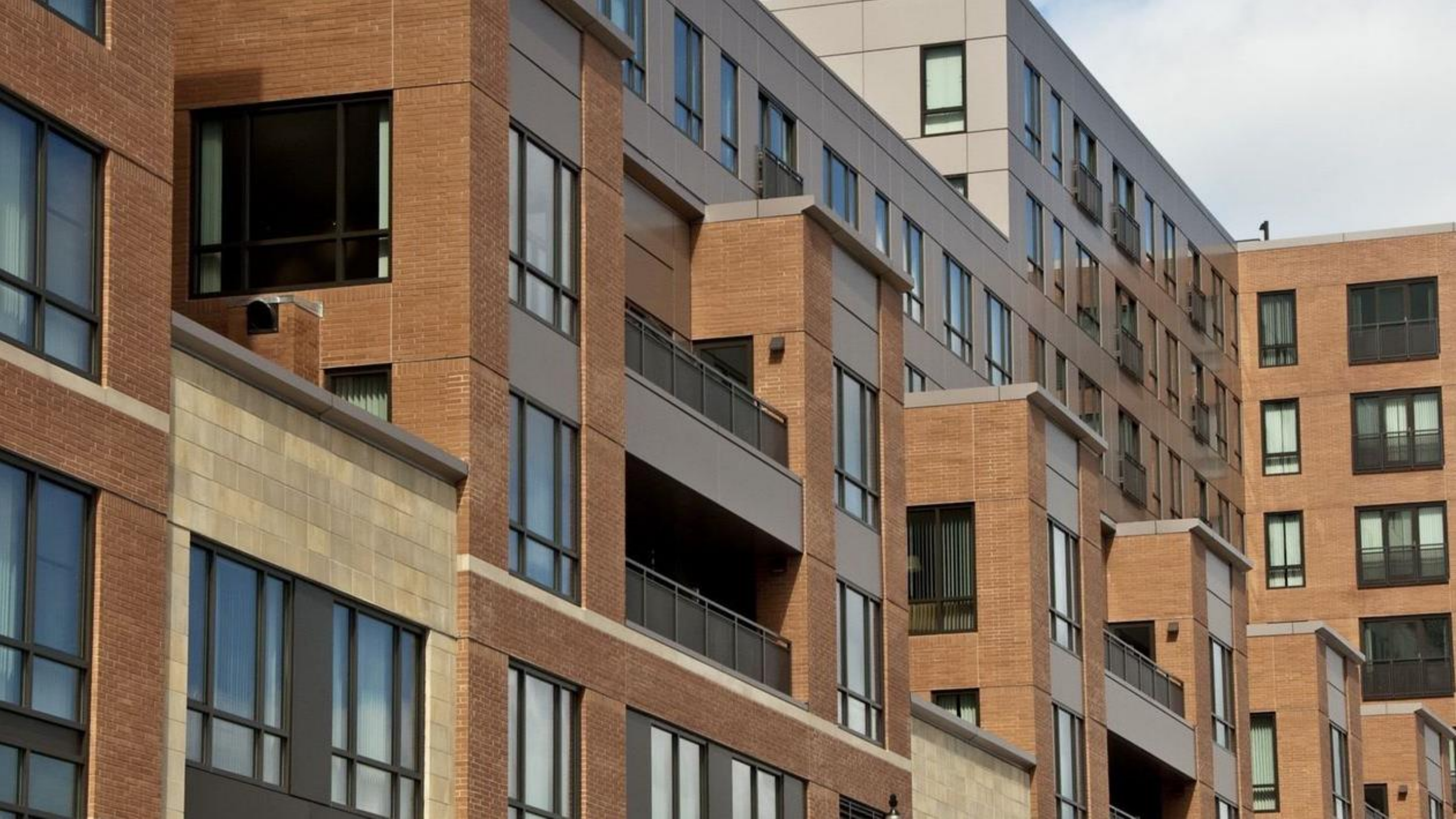
# Curtain Wall

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# Curtain Wall







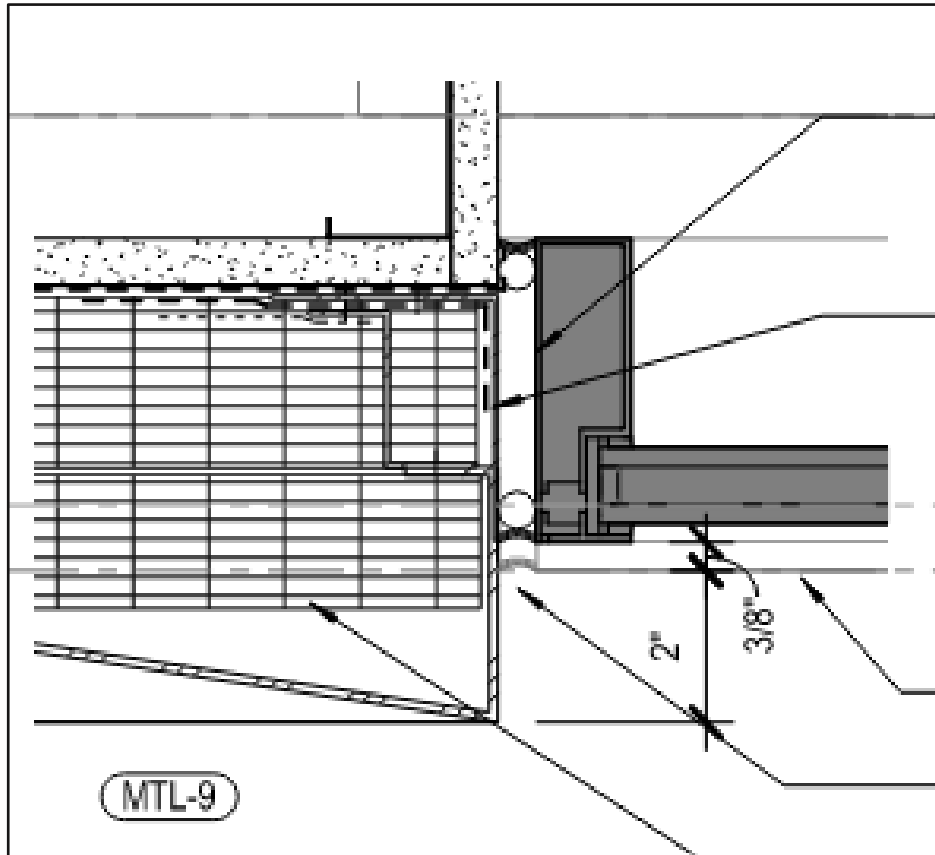


# Materials

- Metal
- Self-Adhering Membrane
- Proprietary Membrane Flashings



# Metal



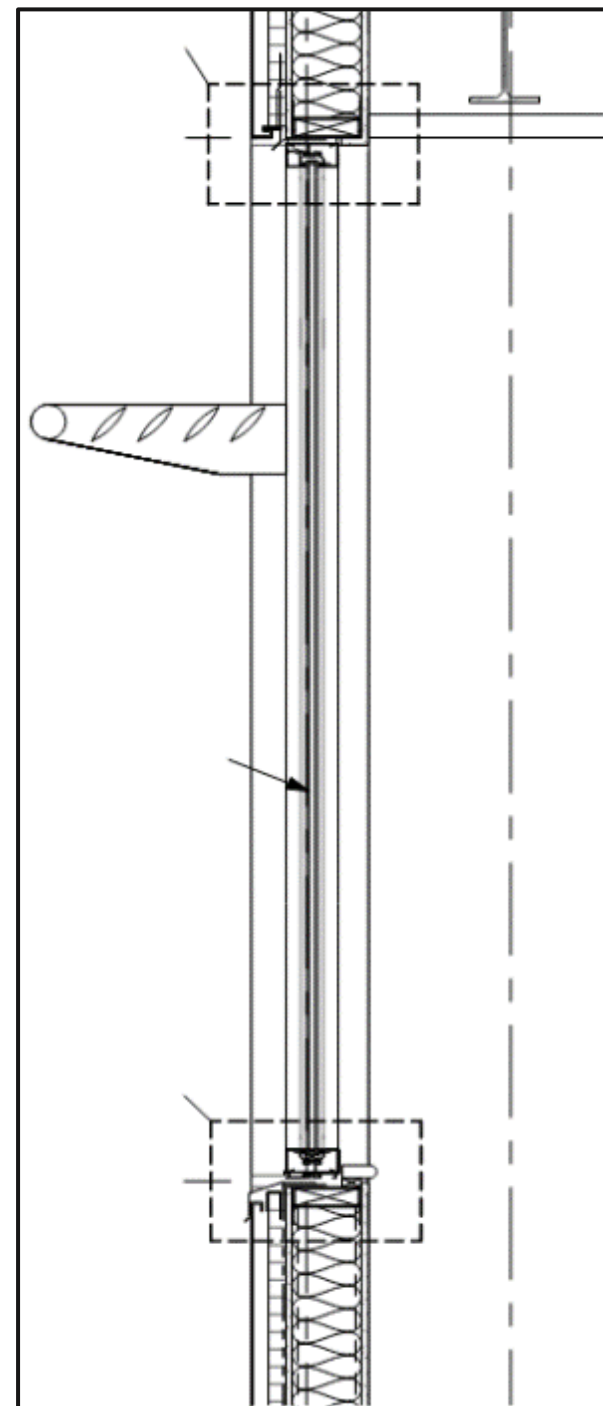
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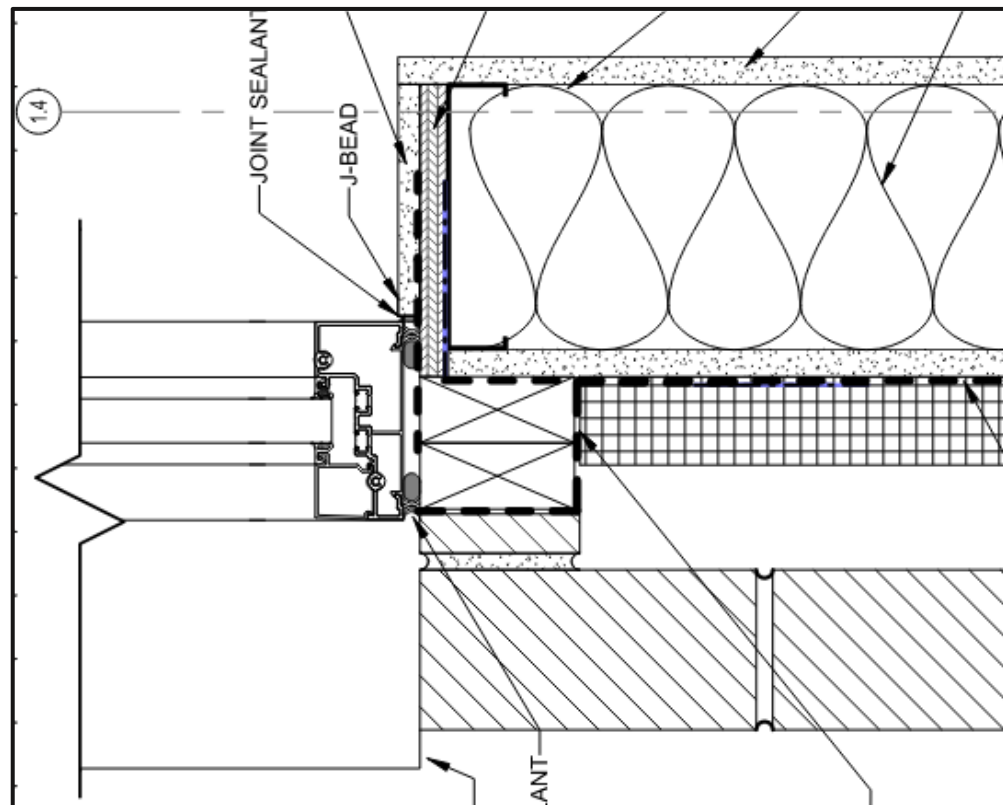




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# Self-Adhering Membrane

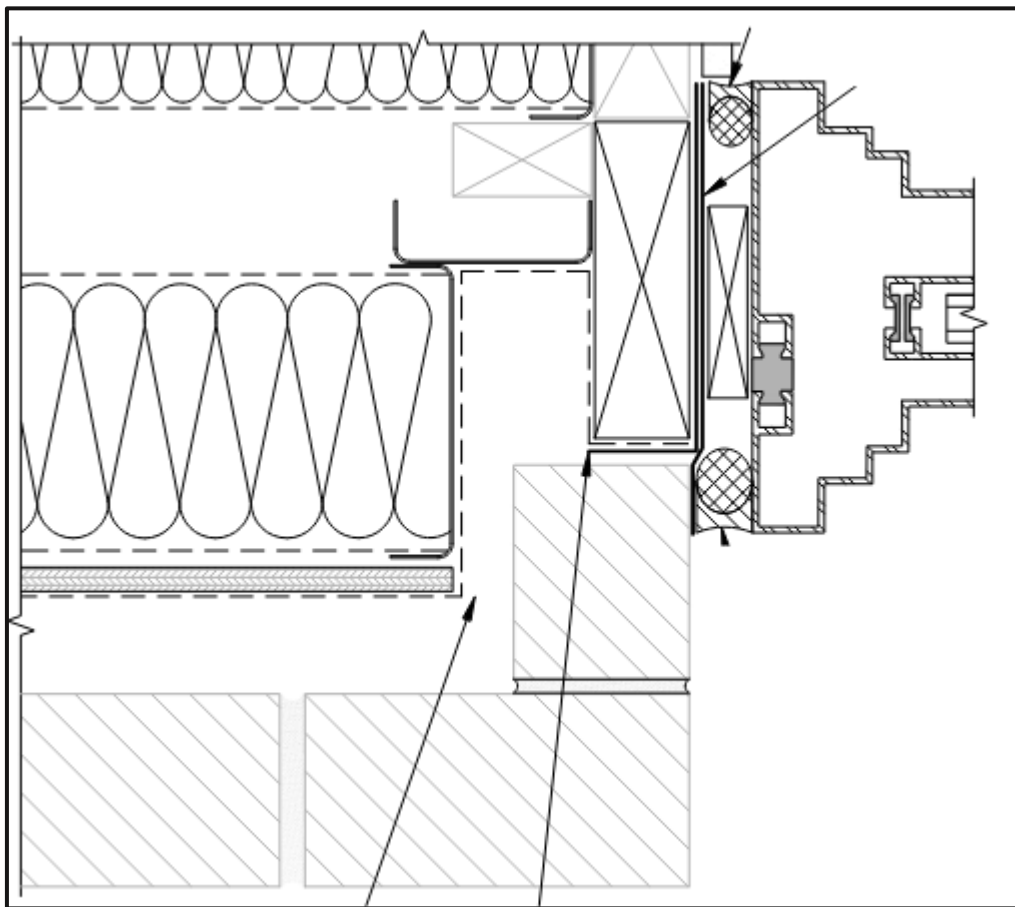


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# Proprietary Membrane Flashing



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# CONSTRUCTION CHALLENGES



A photograph of two men in a workshop or construction site, looking at a set of blueprints on a table. The man on the left is bald, wearing glasses and a light blue button-down shirt, and is pointing at the blueprints. The man on the right has dark hair, is wearing a white button-down shirt, and is holding a pair of glasses. The background shows industrial structures and a bright, overcast sky.

# Shop Drawing Coordination





# Sequencing



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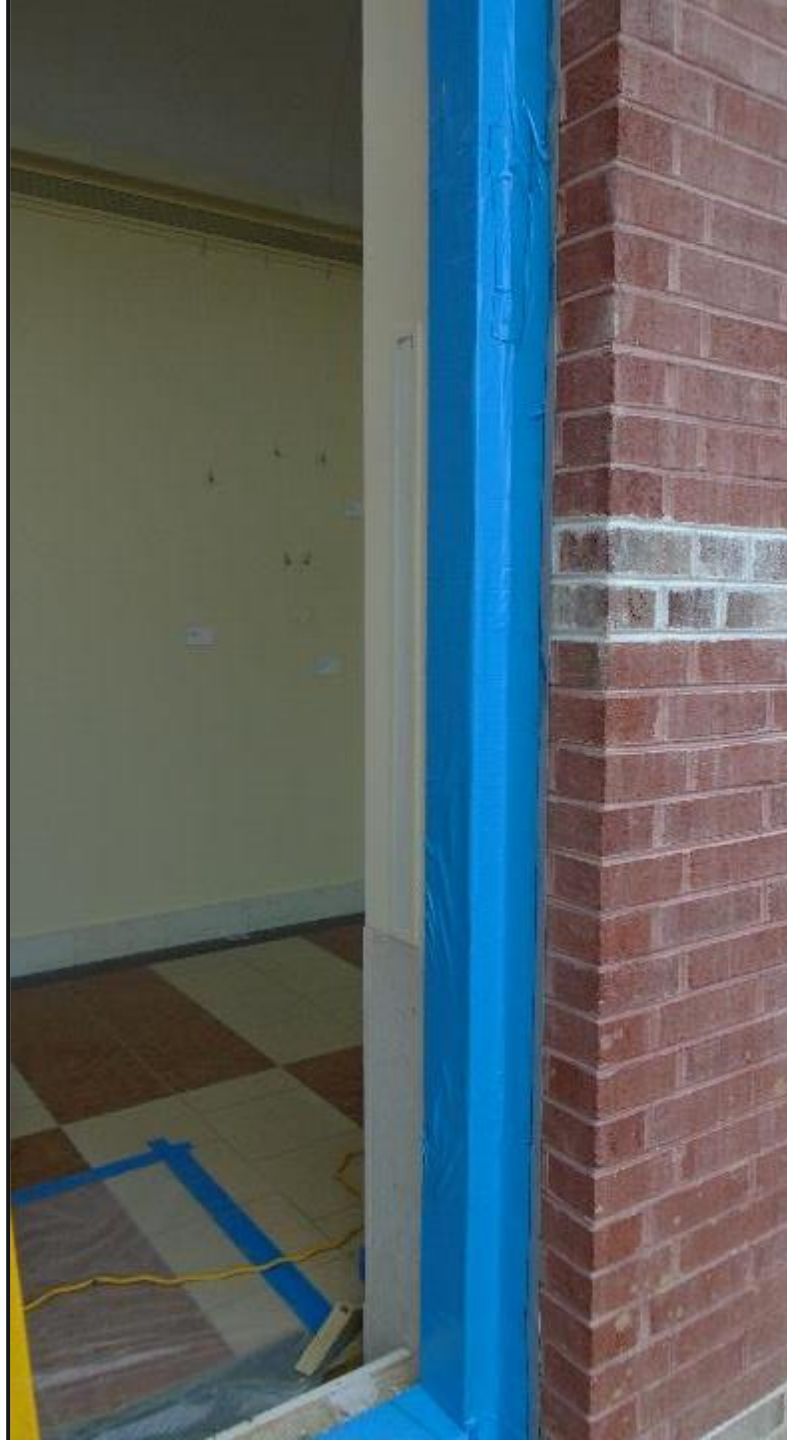
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# Execution

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# TAKE-AWAYS





A grayscale photograph of three men in a professional setting, likely an office or meeting room. They are gathered around a table, looking down at a large set of architectural plans or documents. The man on the left is bald and wearing a light-colored shirt. The man in the center has dark hair and is wearing a striped polo shirt. The man on the right has light-colored hair and is wearing a plaid shirt. The background is slightly blurred, showing what appears to be a doorway or a wall with a framed picture.

# Takeaway for Designers



A photograph of two men in construction safety gear (hard hats, safety glasses, and high-visibility vests) standing on a construction site. The man on the left is wearing a grey hard hat and a green polo shirt under a yellow safety vest. The man on the right is wearing a white hard hat with 'SIMPSON GUMPERTZ & HEGER' written on it, a light blue button-down shirt, and a yellow safety vest. They are both looking at a clipboard held by the man on the left, who is also holding a pen. In the background, there is a multi-story building under construction with concrete columns and other workers visible.

# Takeaway for General Contractors

A low-angle shot of a worker in a dark uniform and safety harness operating a red scissor lift. The worker is positioned on the lift, which is extended upwards towards a building's roof. The building features a series of red, corrugated metal panels that form the roof. A large white bucket is visible on the lift platform. The sky is a clear, bright blue. The text "Takeaway for Installers" is overlaid in the center of the image.

# Takeaway for Installers









# **Brian Rose, P.E. – Senior Project Manager**

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