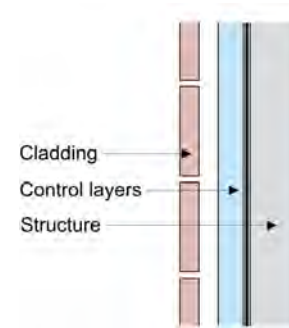


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Rain Control

presented by www.buildingscience.com



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– Rain Control 2

Rain Control Layer
Air Control Layer
Vapor Control Layer
Thermal Control Layer

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– Rain Control 3

Rain

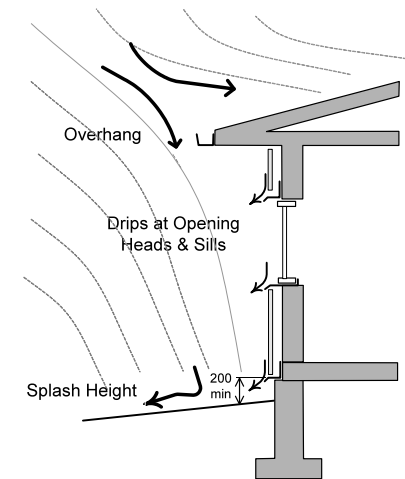
- Rain is the largest source of moisture
- We need better control for better insulation and airtightness
- Rain penetration control
 - Site and massing
 - Surface features
 - Enclosure wall strategy

Controlling Rain Penetration

- **Deflection**
 - reduce water on building
 - redirect water away
 - slope surfaces, use flashing
- **Drainage / Exclusion / Storage**
 - enclosure design
 - provide drainage, or storage or barrier
- **Drying**
 - allow any remaining water to dry

Deflection

- **Surface & site features are also important**



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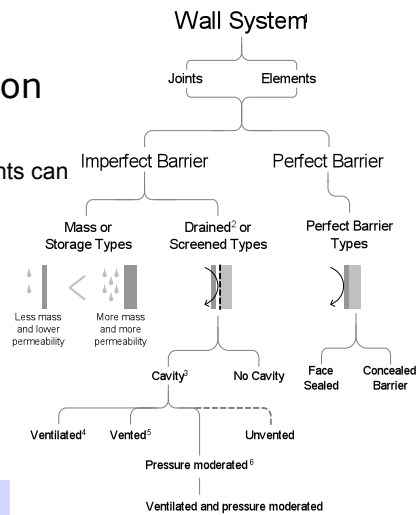
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Categorization

- Elements and joints can be different





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Claddings that leak

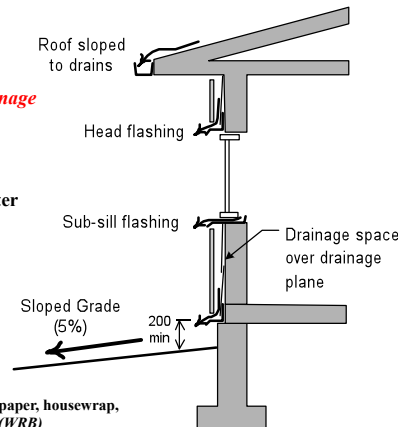
- Brick
- Stucco
- Wood, vinyl, fiber cement
- Adhered veneer
- EIFS
- Metal panels, metal roofs
- Shakes, shingles

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Drainage

- Must have **continuous drainage plane**
- Drainage plane must be:
 1. Water tolerant
 2. Capillary inactive (water repellent / non-wicking)
- Small **gap** required
 - As small as 1 mm
- **Flashing** is very important
- Weep **holes**



Terms: sheathing membrane, building paper, housewrap,
Stupid terms: weather resistant barrier (WRB)

Requirements Drained Walls

- Drainage plane
 - Water repellent, continuous
- Drainage gap
 - 1/16" is enough!
- Flashing
 - Waterproof to direct water outward
- Weep holes
 - Above grade

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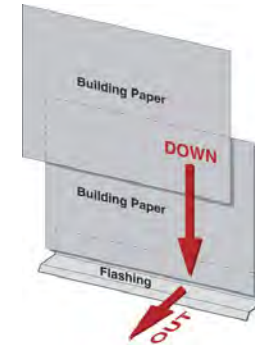
Drainage Plane



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- Rain Control 17

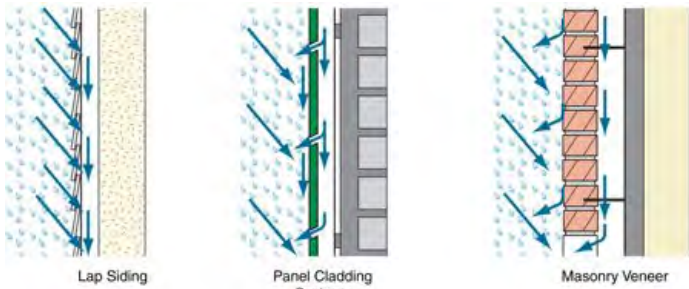
Lapped Housewrap, paper



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Drained Walls



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Laps are the most reliable

Laps are the most reliable



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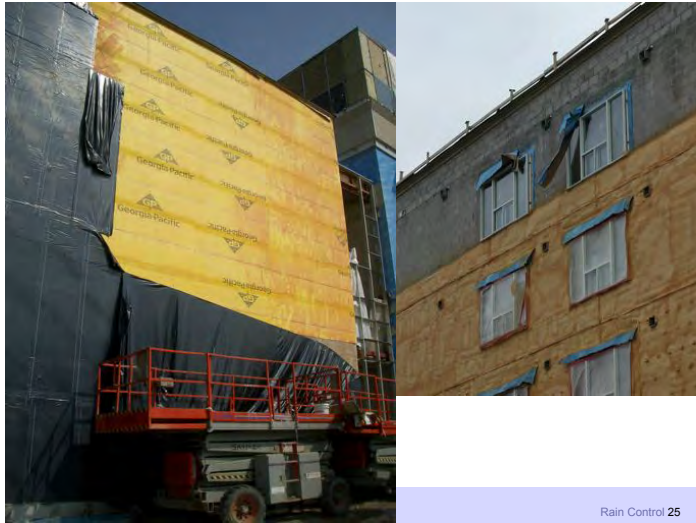
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Laps are the most reliable

Avoiding Fishmouths



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Liquid applied = continuous

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Beware: These are vapor barriers!!!



Drainage Gaps

- Gap avoids hydrostatic pressure
 - drains away water
 - Requires only small gap, e.g. 1/16"
- Reduces time of wetness on housewrap sheathing membrane
- *May allow ventilation drying if >1/8" - 1/2"*

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Drained gap behind brick



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Stucco sticks to paper/
housewraps





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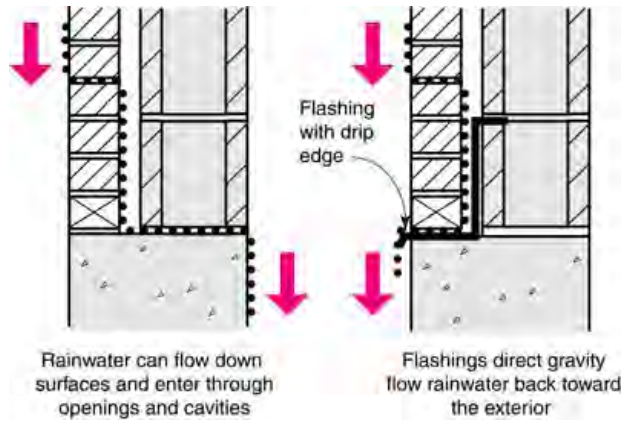
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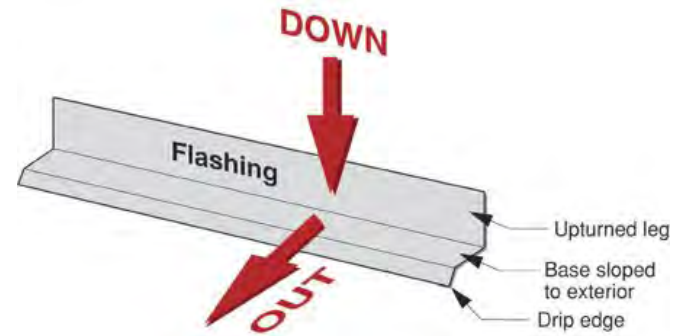


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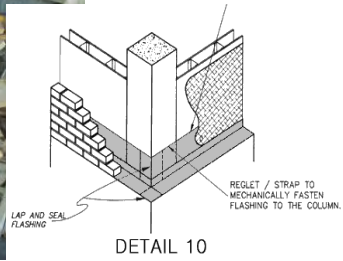
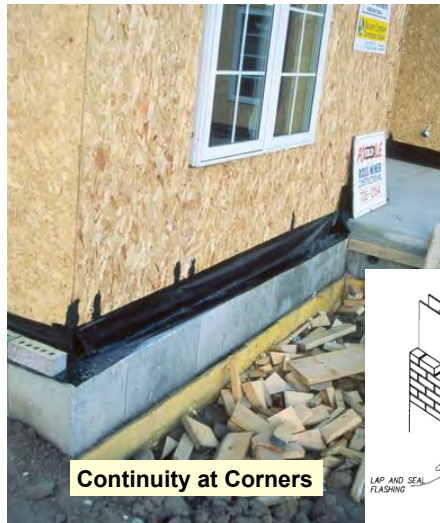
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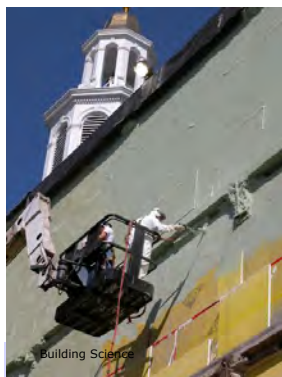
Water can build up here -- we need a waterproof barrier

Note standing water

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New materials



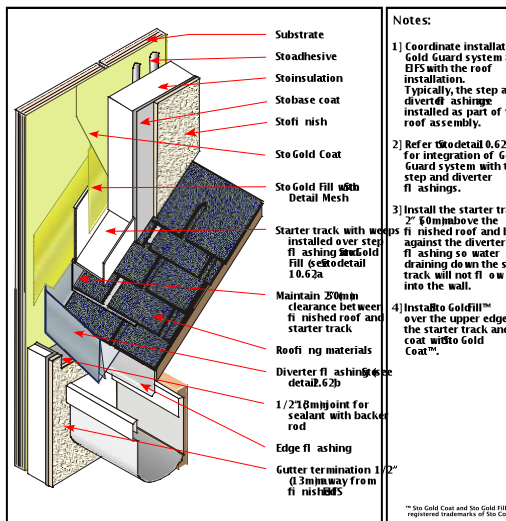
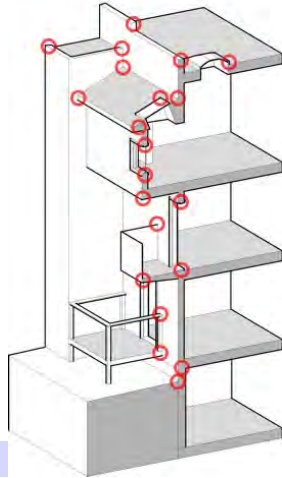
- Huber ZIP



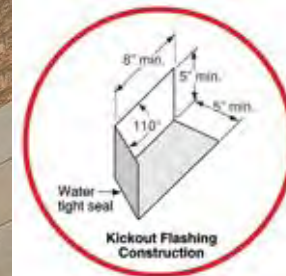
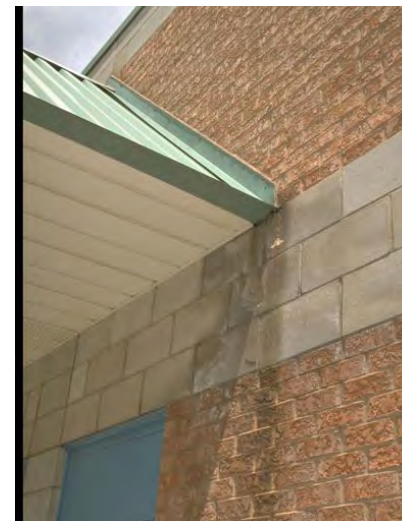
• Taped Foam



"House of Horrors"



E.g. StoCorp Diverter Flashing

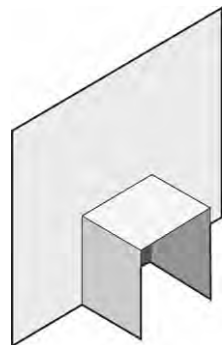




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Saddle flashing



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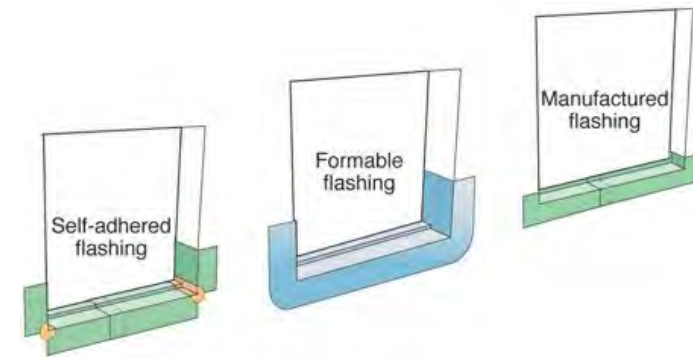
Building Science University of Waterloo

Rain



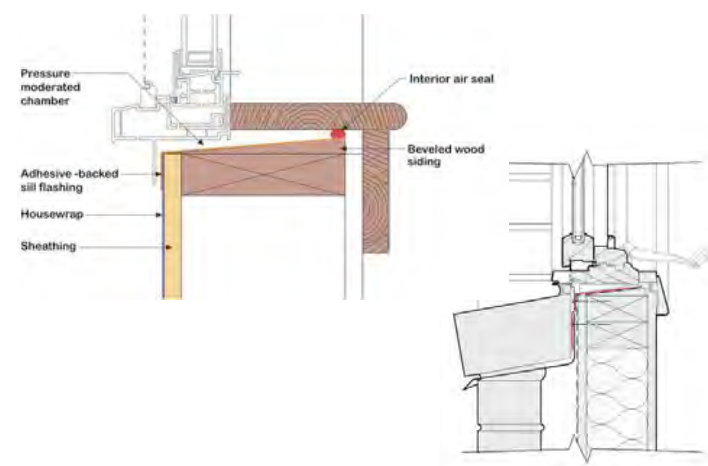
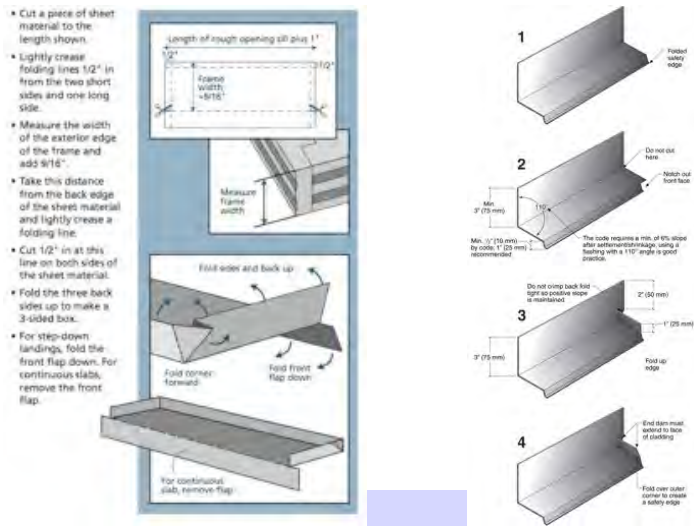
Leaky windows

- Moisture sensitive substrates are a problem



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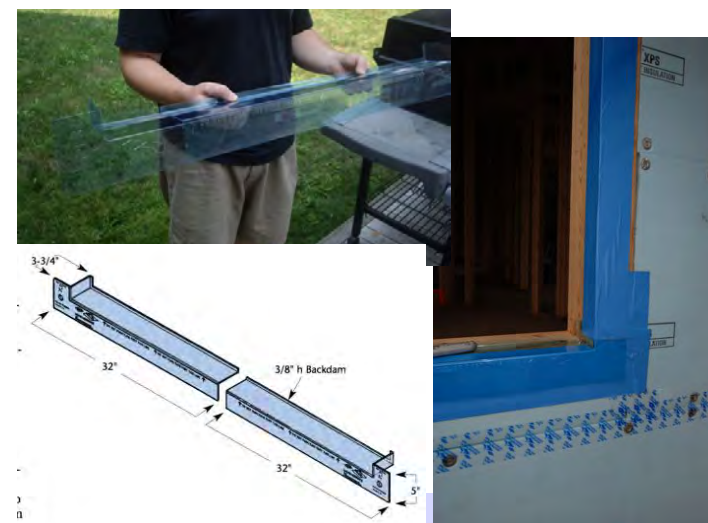


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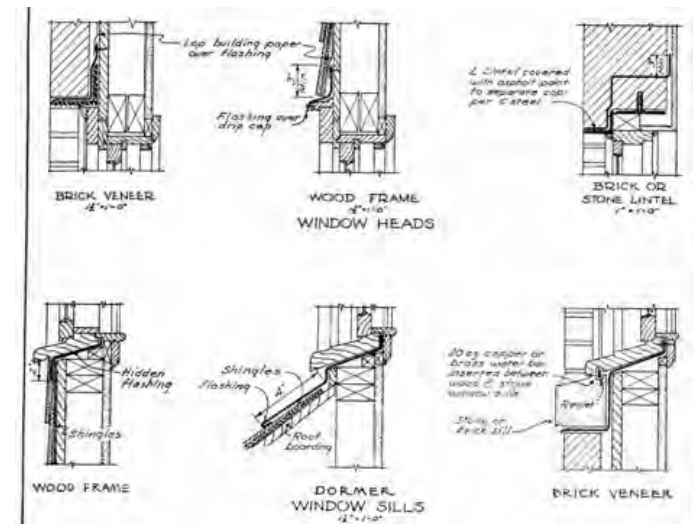


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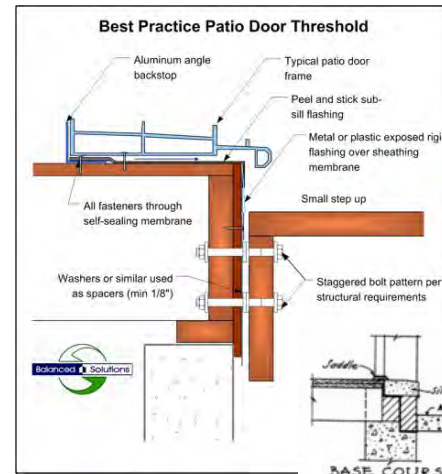




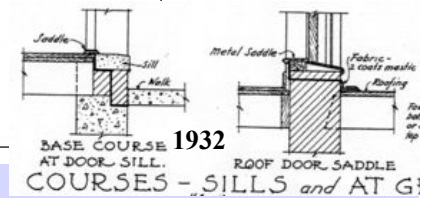
Door Sills



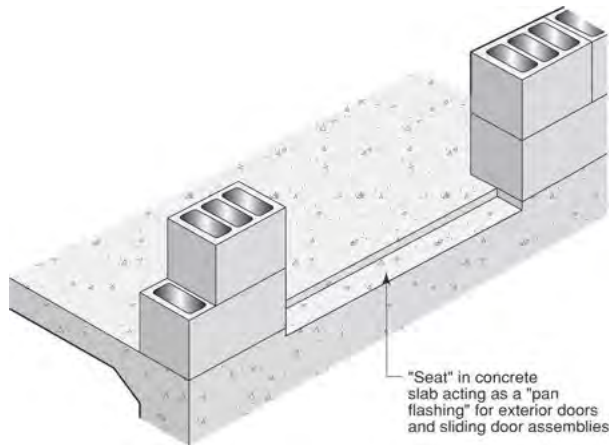
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Door sill

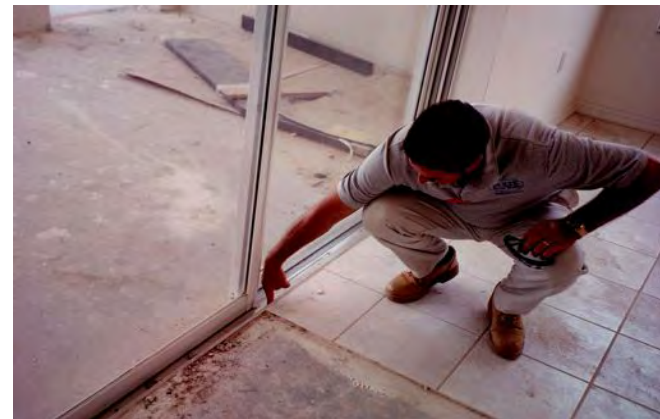


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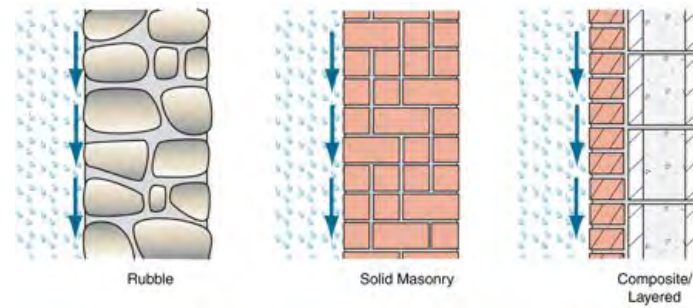
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Storage/Mass Walls

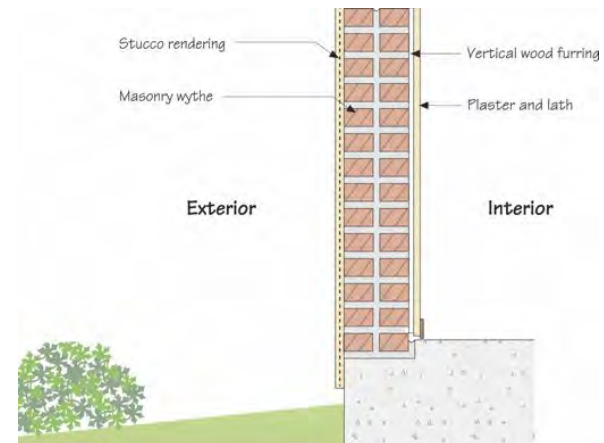


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Old EIFS



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Substrate + moisture = problem

- Moisture sensitive substrates are a problem



**EIFS & Rain Control:
Recent lessons on how to fail**

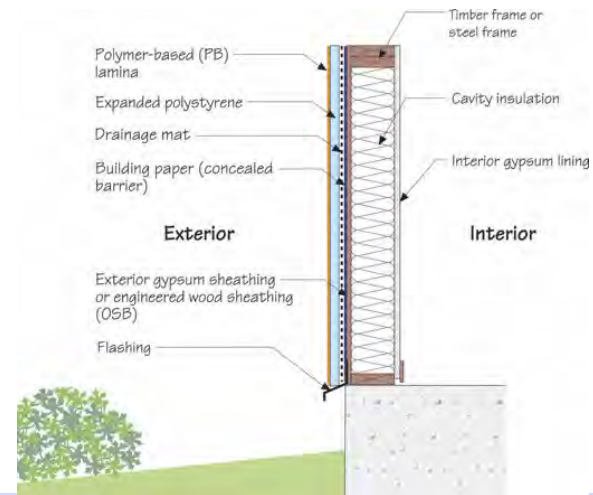
Kitchener, ON



Grand Rapids, MI

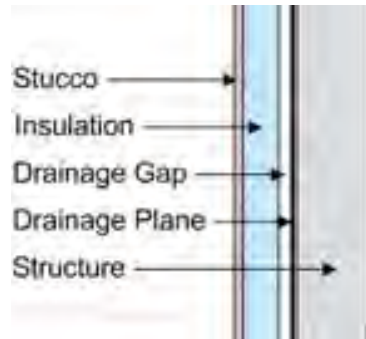


EIFS



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Perfect EIFS / Stucco wall



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Conclusions

- Drainage is the key, cladding leaks
- All penetrations need to be drained!
- Beware flashing, it needs to waterproof
- Understand older systems are different

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