

**abaa2024** building  
enclosure  
conference

# The Key to a Successful Project: Preconstruction Building Enclosure Coordination Meetings

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Gale Associates, Inc.

AIA  
Continuing  
Education  
Provider



# The Key to a Successful Project: Preconstruction Building Enclosure Coordination Meetings

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An air barrier is a system of materials designed to control the flow of air between conditioned and non-conditioned spaces. While air barriers have been incorporated into wall assemblies for decades, it is important to note that the building envelope includes all sides of the building, including the exterior walls, the lowest-level floor, and the roof or ceiling assembly. Once additional sides of a building are included the detail becomes a challenge because not only is there a transition between air barrier materials, but there are also different trades involved, and sequencing becomes important. This presentation will review the importance of a preconstruction coordination meeting in identifying material transition ownership and installation sequence. The presentation will review how the buy-out process of the sub-contractors can impact the air barrier detailing. The speaker will review case studies and lessons learned from the “by other” syndrome. The speaker will also identify potential gaps between trades that are likely to require further coordination.

## Learning Objectives

1. Review the requirements and process of a coordination meeting
2. Identify how installation sequence impacts detailing and installation of building air barrier components.
3. Learn about unique solutions to improve the construction of a continuous air barrier
4. Review air barrier transitions and the responsibility of multiple sub-trades and their impact on air barrier detailing



How many of you have attended an enclosure coordination meeting?



# Objectives

Coordination Meetings

Setting Up a Successful Project

Building Enclosure Commissioning

Coordination Meetings – Who, When, How

Case Studies

# Why Coordination Meetings?

# Importance

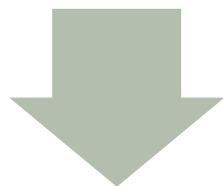
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## Building Enclosure Failures & Challenges

Legal fees, rework, and all forensics involved in investigating building failures account for billions spent in the construction industry annually. **Over 90%** of these failures occur **in 1% of the enclosure**. *These failures are related to issues typically observed at penetrations, fenestrations, roof-to-wall transition, and dissimilar material transitions.*



# 20<sup>th</sup> Century Building Enclosures

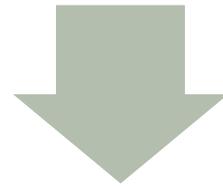


- Simple building materials
- Limited layers
- Trained workforce





# Today's Building Enclosures

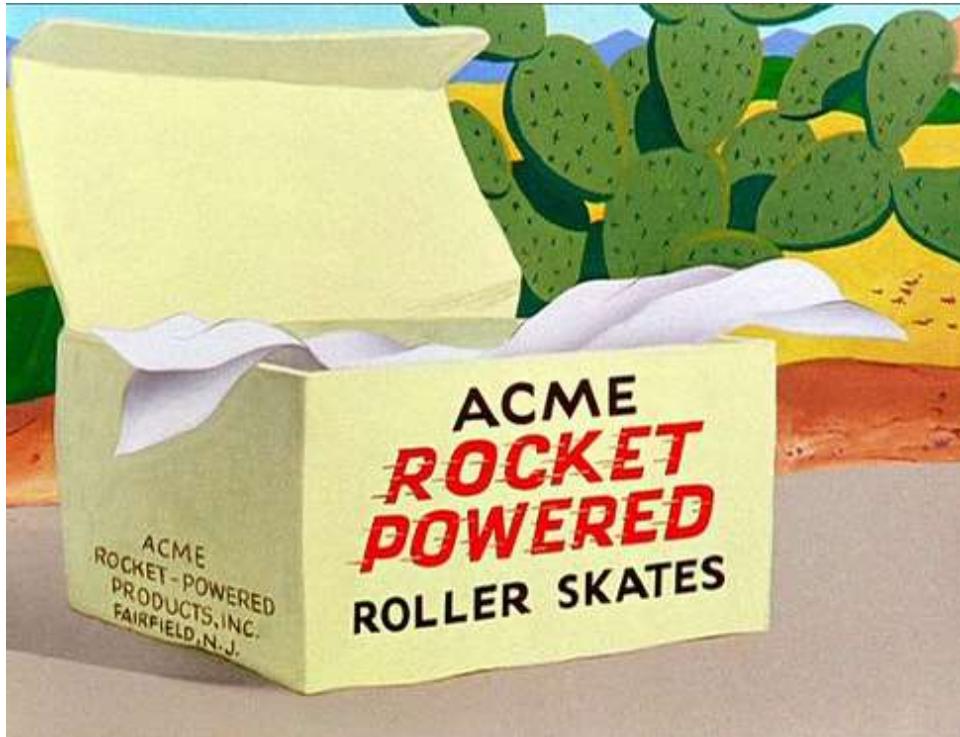


- Complex, new building materials
- Multiple layers/configurations
- Limited designer/contractor experience



# New, untested building materials and assemblies

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# New untested building materials and assemblies

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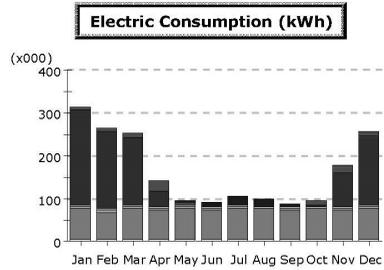


# Repetitiveness of problem details

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# Disconnect between designer and contractor

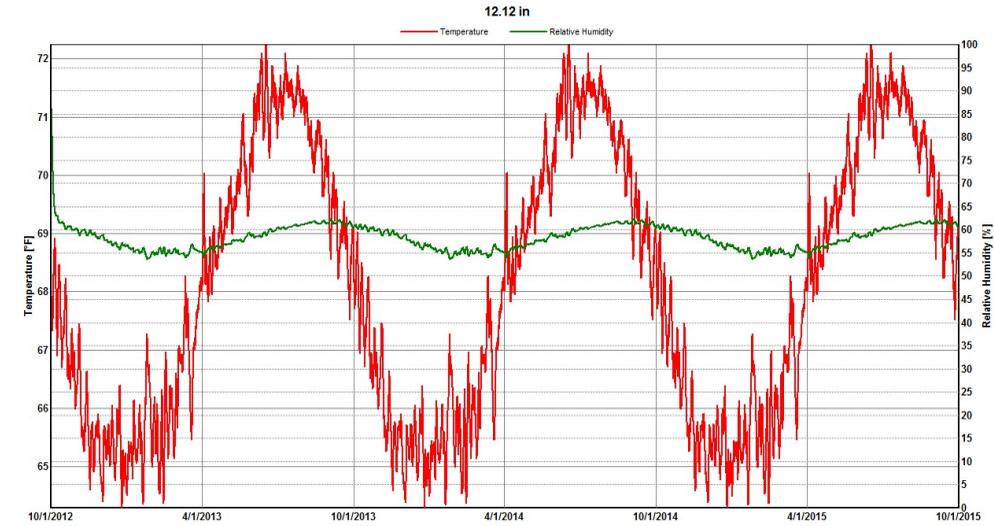
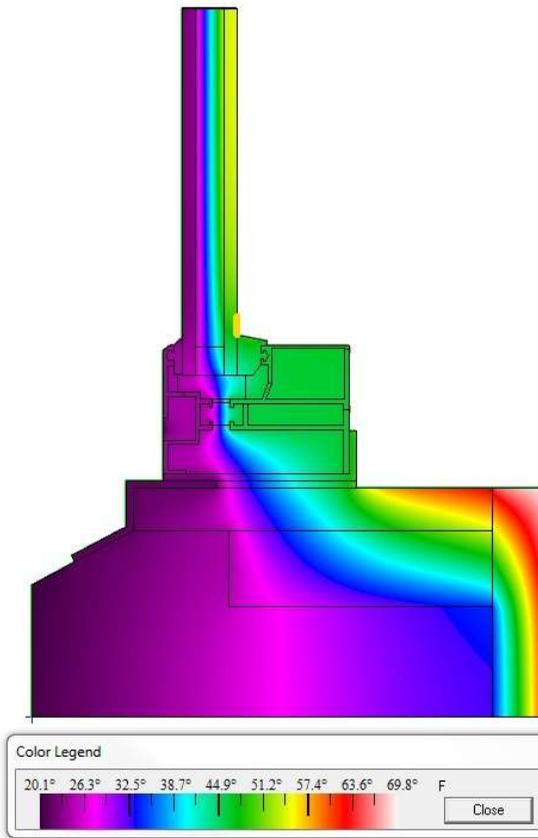


## Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	0.0	0.3	3.4	10.4	22.5	17.9	7.0	0.4	0.1	-	61.9
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	5.3	8.1	10.5	22.9	6.9	0.8	0.0	0.1	1.0	10.9	17.4	11.3	95.1
HP Supp.	220.9	177.9	156.7	36.1	0.7	-	-	-	1.0	77.8	160.1	-	831.1
Hot Water	3.8	3.5	3.9	3.6	3.3	2.9	2.7	2.6	2.6	2.9	3.1	3.6	38.5
Vent. Fans	6.1	5.5	5.7	4.6	3.6	3.7	4.2	4.0	3.5	3.7	4.9	5.7	55.1
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.5
Misc. Equip.	74.8	67.6	74.8	72.4	74.8	72.4	74.8	74.8	72.4	74.8	72.4	74.8	881.1
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	2.1	1.9	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.1	24.5
<b>Total</b>	<b>313.1</b>	<b>264.5</b>	<b>253.8</b>	<b>142.0</b>	<b>95.0</b>	<b>92.4</b>	<b>106.4</b>	<b>101.6</b>	<b>88.6</b>	<b>95.9</b>	<b>177.8</b>	<b>257.7</b>	<b>1,988.8</b>

## Gas Consumption (Btu)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool													
Heat Reject.													
Refrigeration													
Space Heat													
HP Supp.													
Hot Water													
Vent. Fans													
Pumps & Aux.													
Ext. Usage													
Misc. Equip.													
Task Lights													
Area Lights													
<b>Total</b>													



# Lack of coordinated details between construction trades

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# Setting up a Successful Meeting

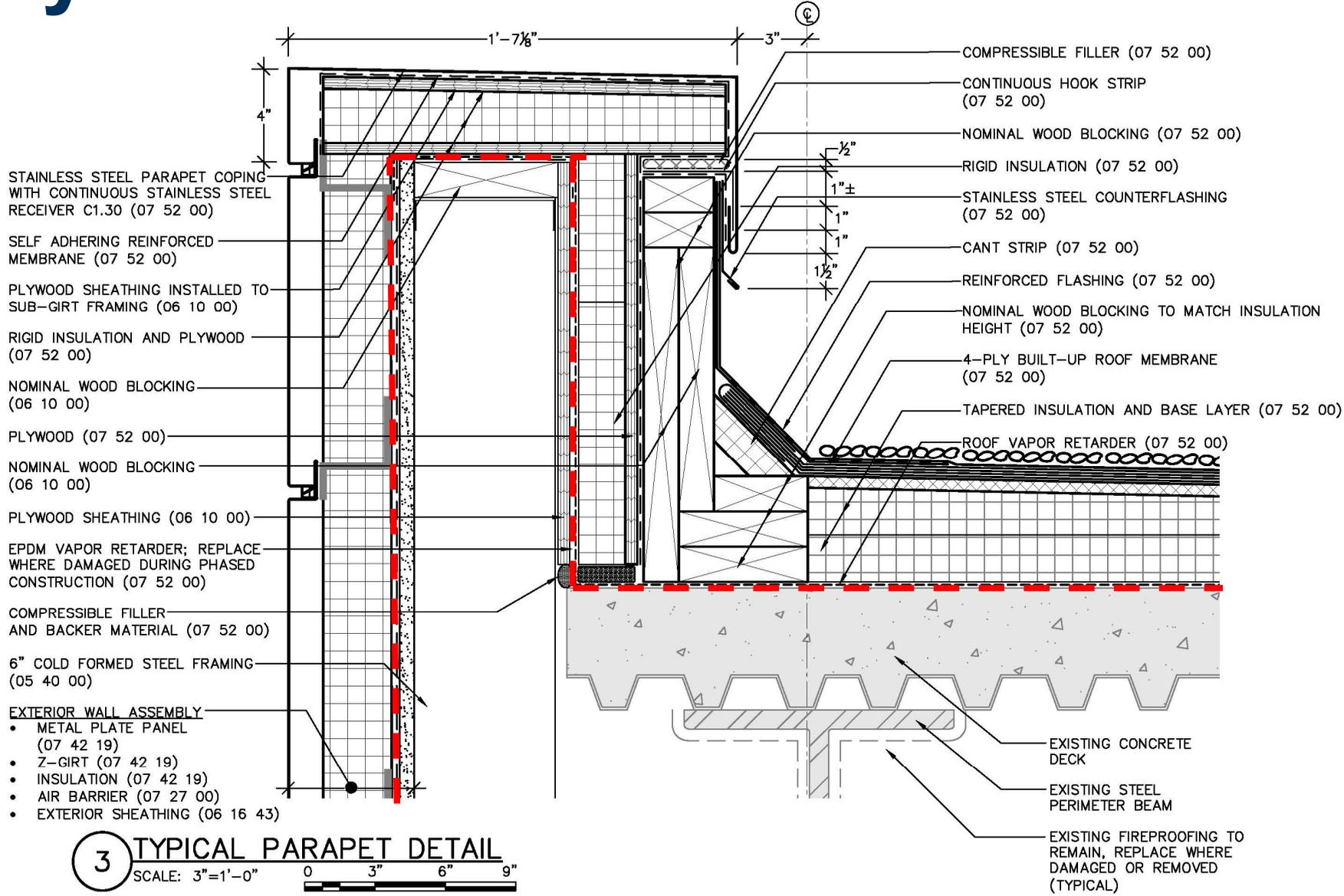
## Know the Fundamentals

# Fundamentals

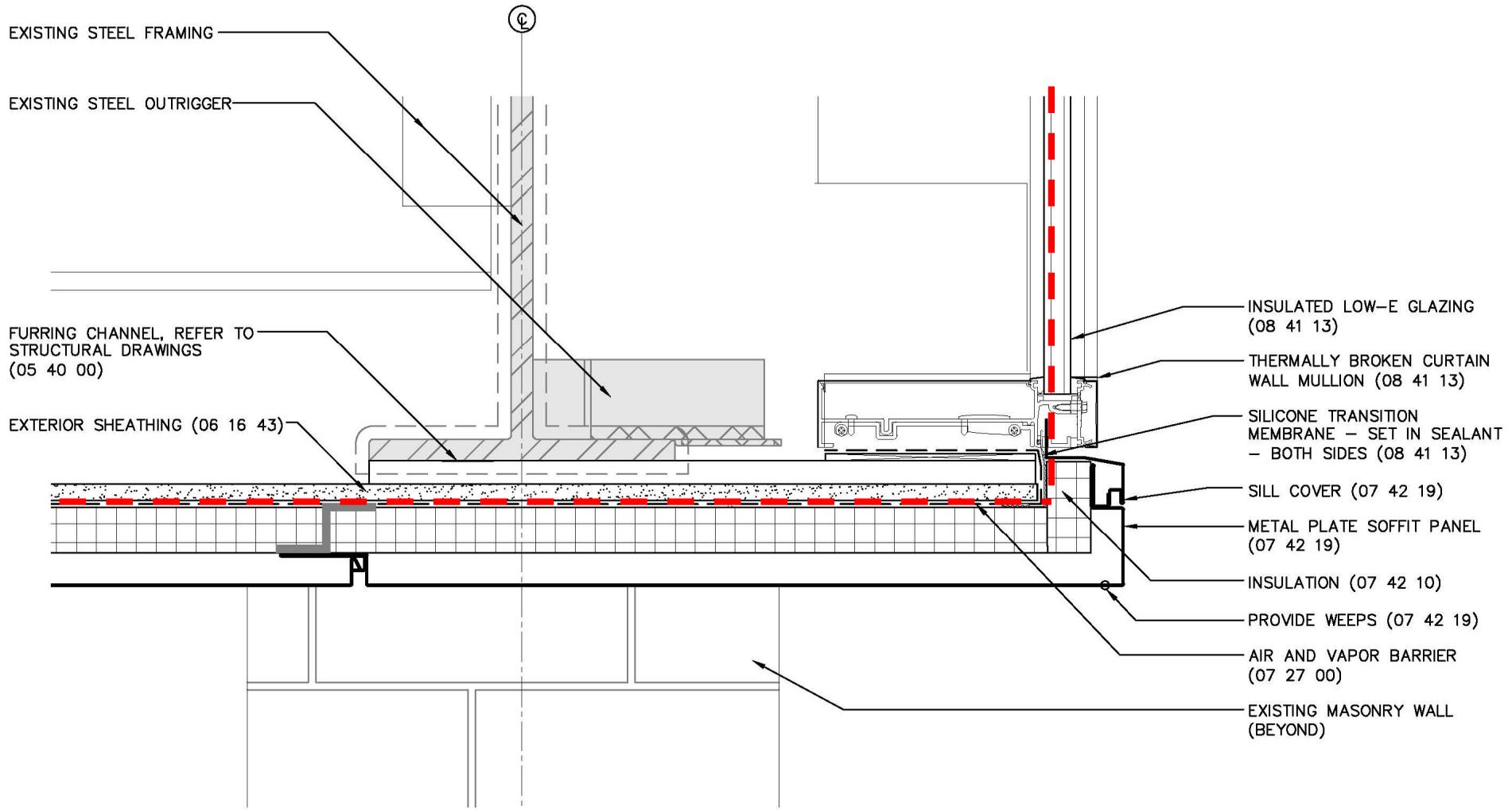
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- **Continuity** – air and moisture control layers must be continuous through the enclosure elements.
- **Redundancy** - Provide multiple point of contact with AVB at connections where possible
- **Constructability** – Construction sequencing and material compatibility need to be considered
- **Appropriateness** – Material is correct for application (ex. permeable vs nonpermeable)

# Continuity

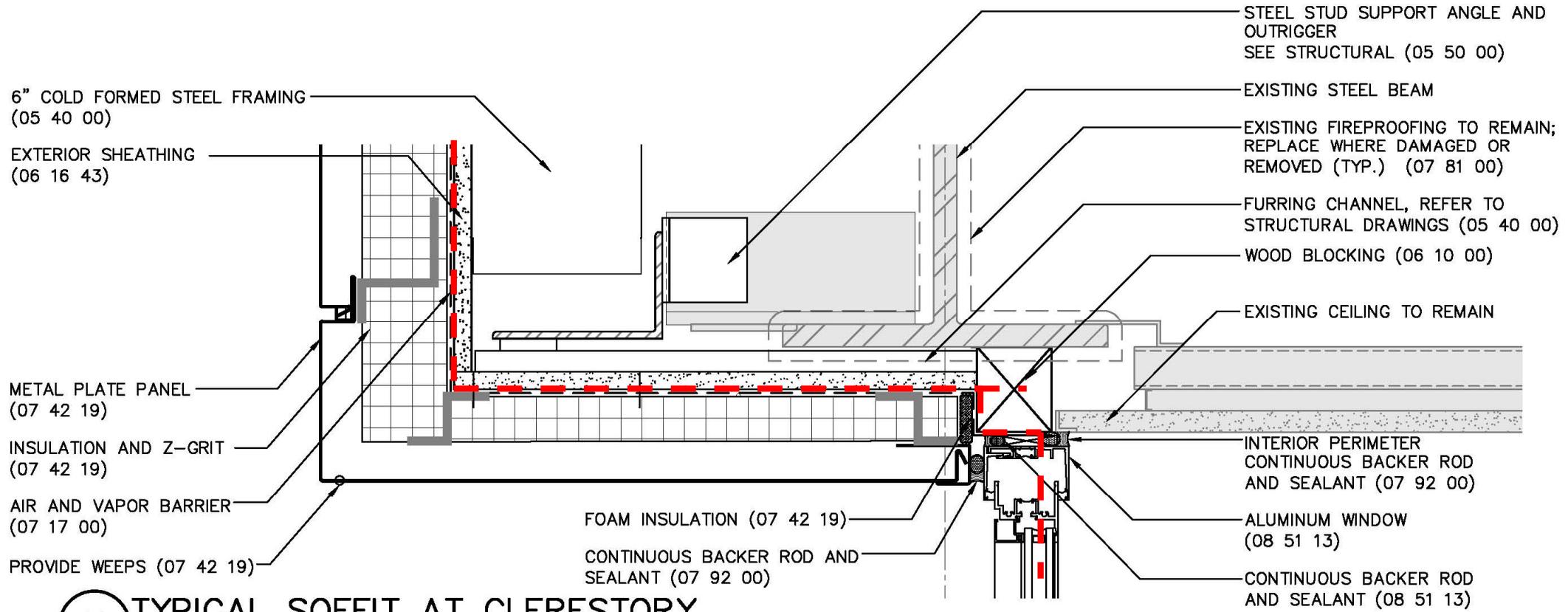


# Continuity



3 TYPICAL SOFFIT AT OVERHANG  
 SCALE: 3"=1'-0" 0 3" 6" 9"

# Redundancy

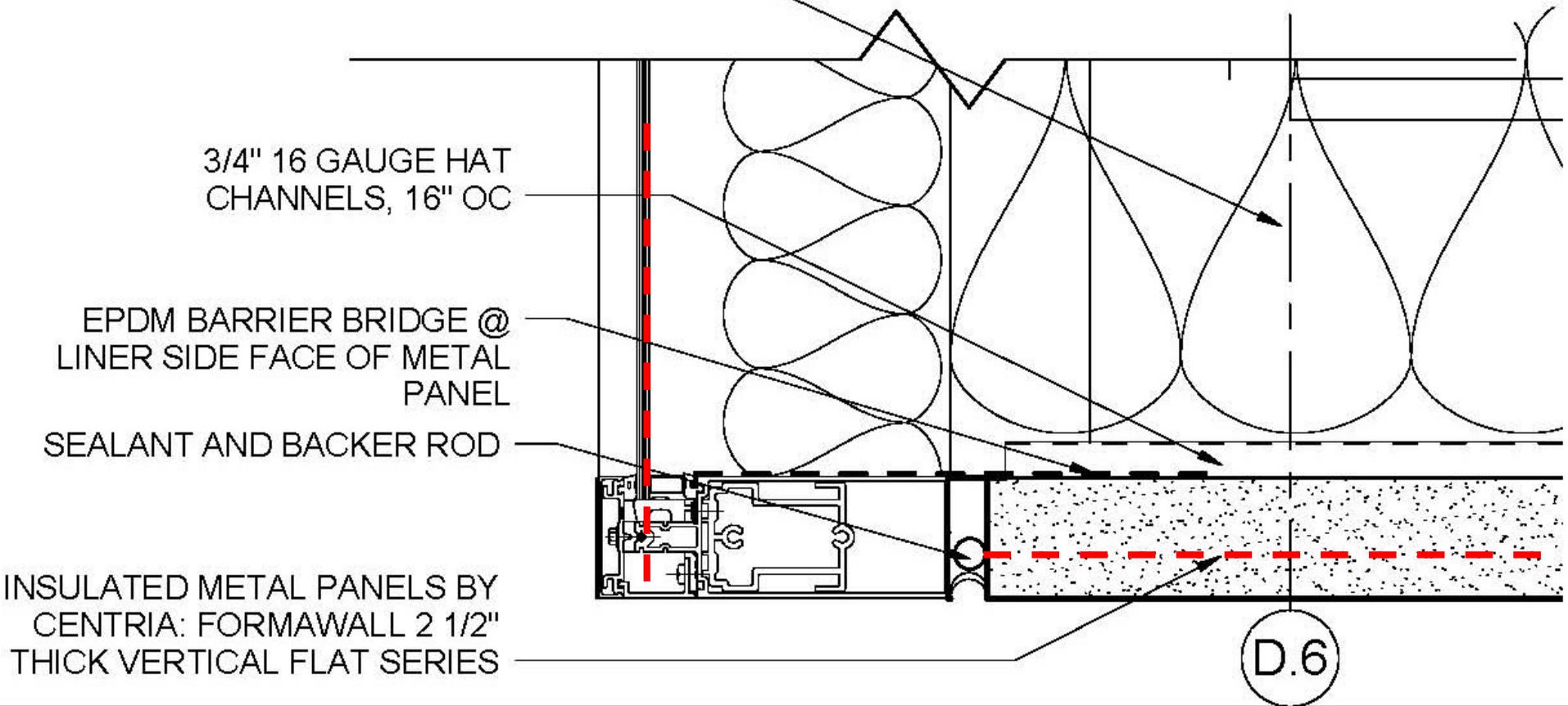


**5** TYPICAL SOFFIT AT CLERESTORY

SCALE: 3"=1'-0"

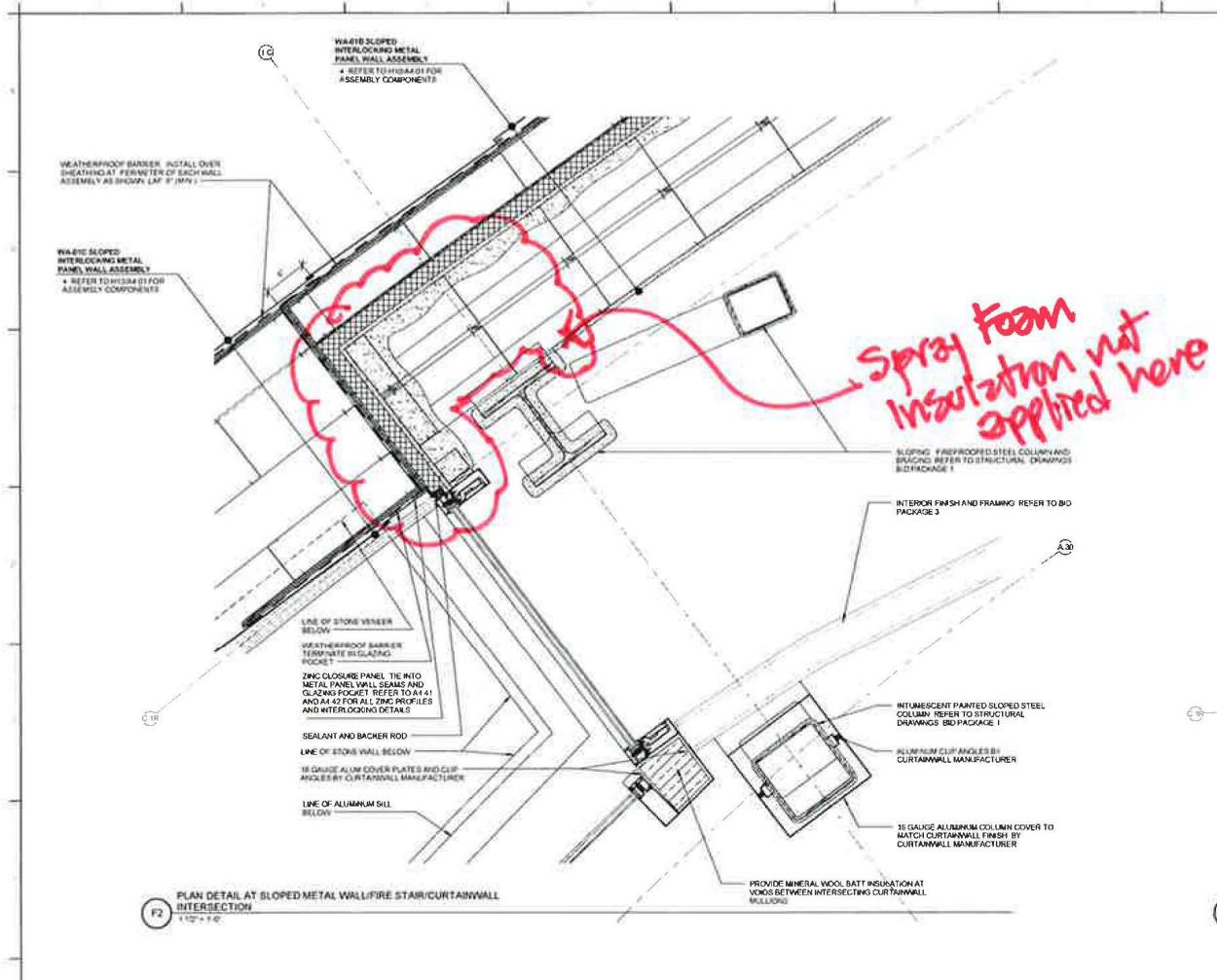
0 3" 6" 9"

# Constructability

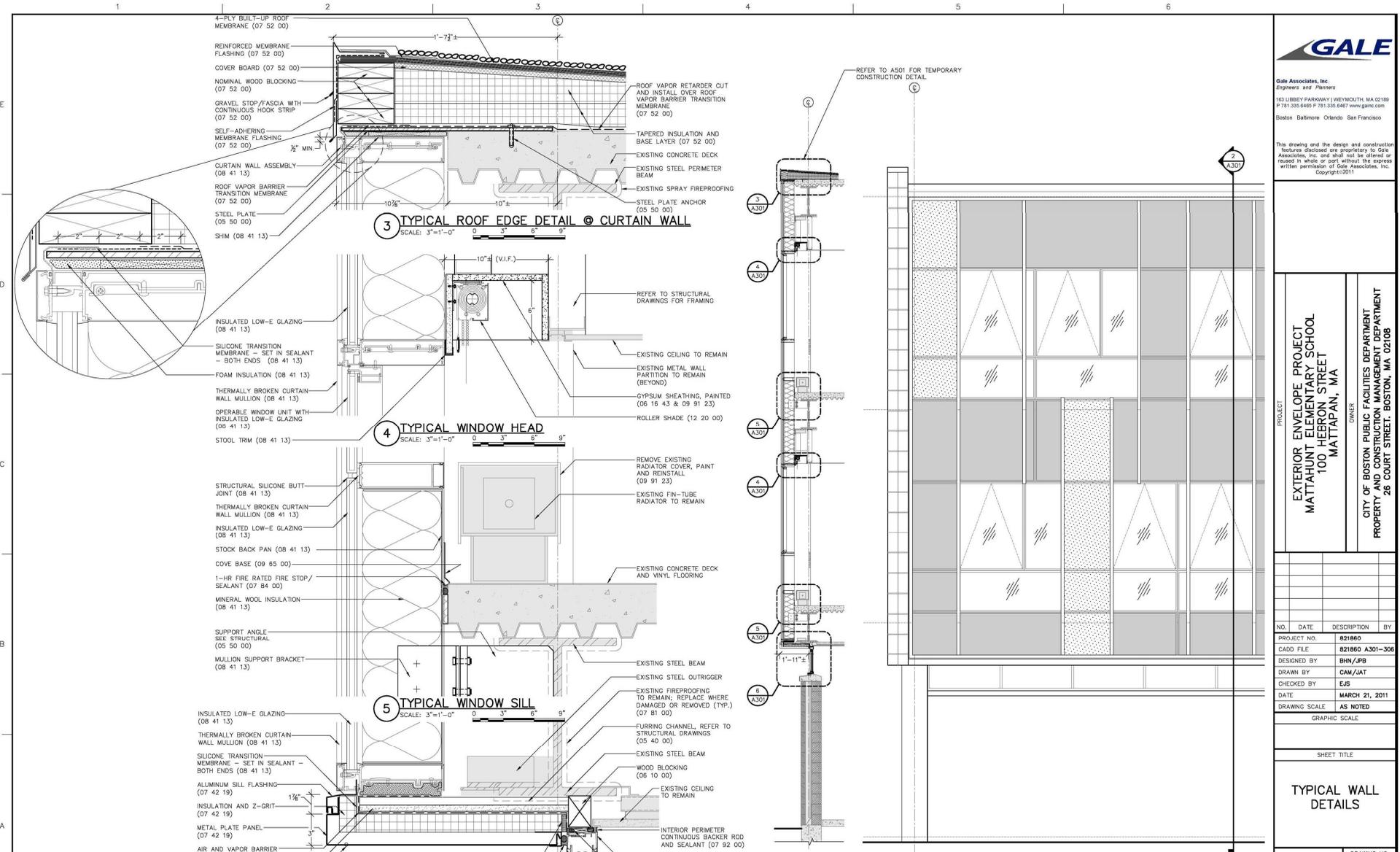


A15	EXTERIOR SECTION DETAIL CURTAIN WALL BASE @ OVERHANG
	3" = 1'-0"

# Constructability



# Level of Detail



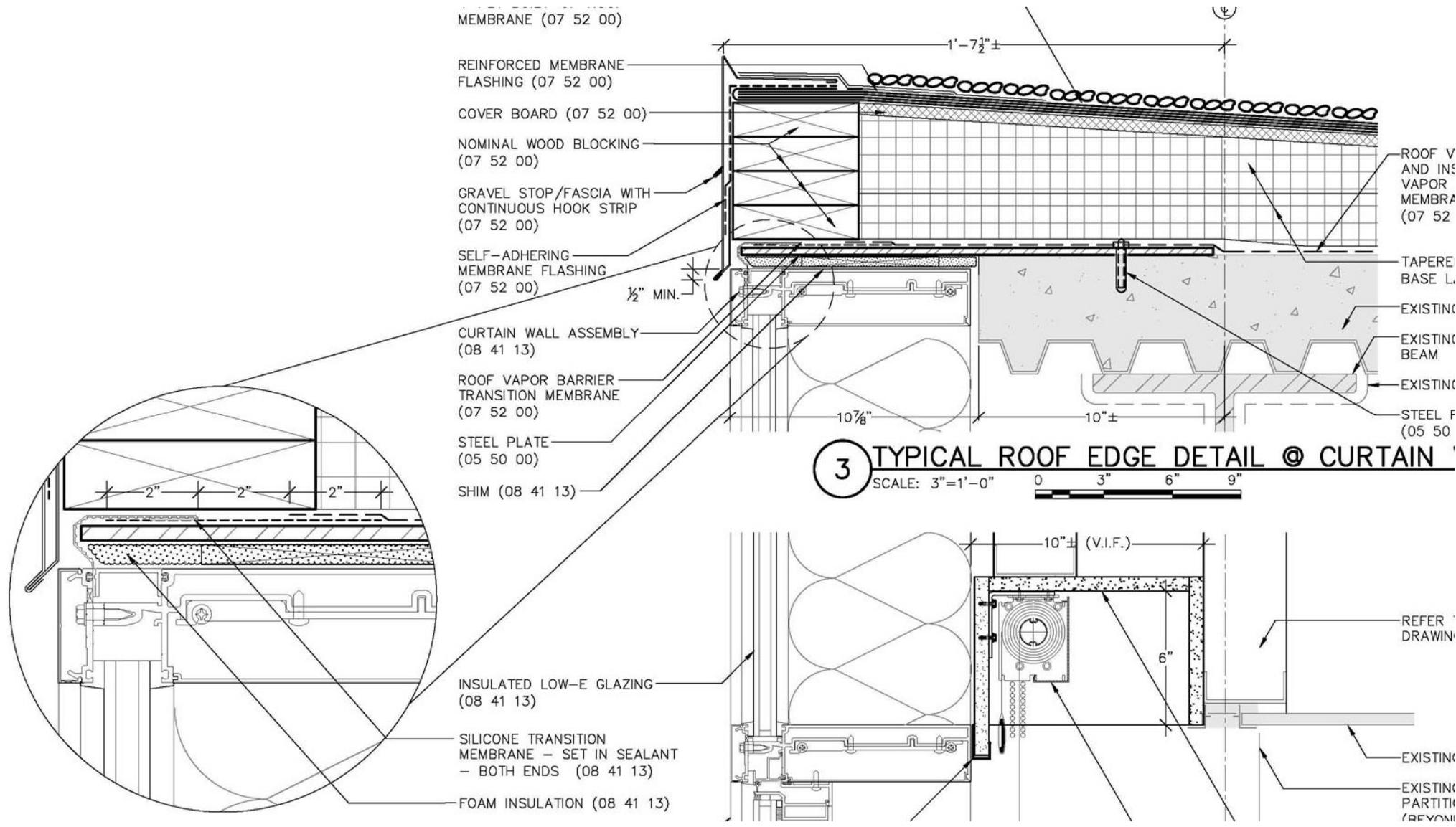
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Boston Baltimore Orlando San Francisco

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PROJECT  
**EXTERIOR ENVELOPE PROJECT  
MATTAPAN ELEMENTARY SCHOOL  
100 HEBRON STREET  
MATTAPAN, MA**

OWNER  
**CITY OF BOSTON PUBLIC FACILITIES DEPARTMENT  
PROPERTY MAINTENANCE DEPARTMENT  
25 COURT STREET, BOSTON, MA 02108**

# Level of Detail



# What is Building Enclosure Commissioning?

“A process that begins with the establishment of the Owner’s Project Requirements and endeavors to ensure that the exterior enclosure and those elements intended to provide environmental separation within a building meet or exceed the expectations of the Owner as defined in the OPR.”

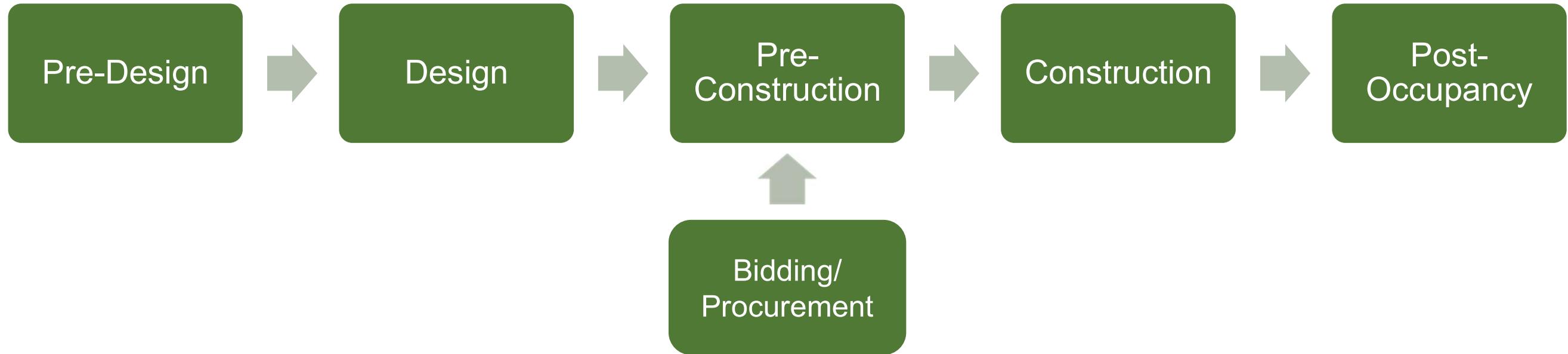
ASTM E2813

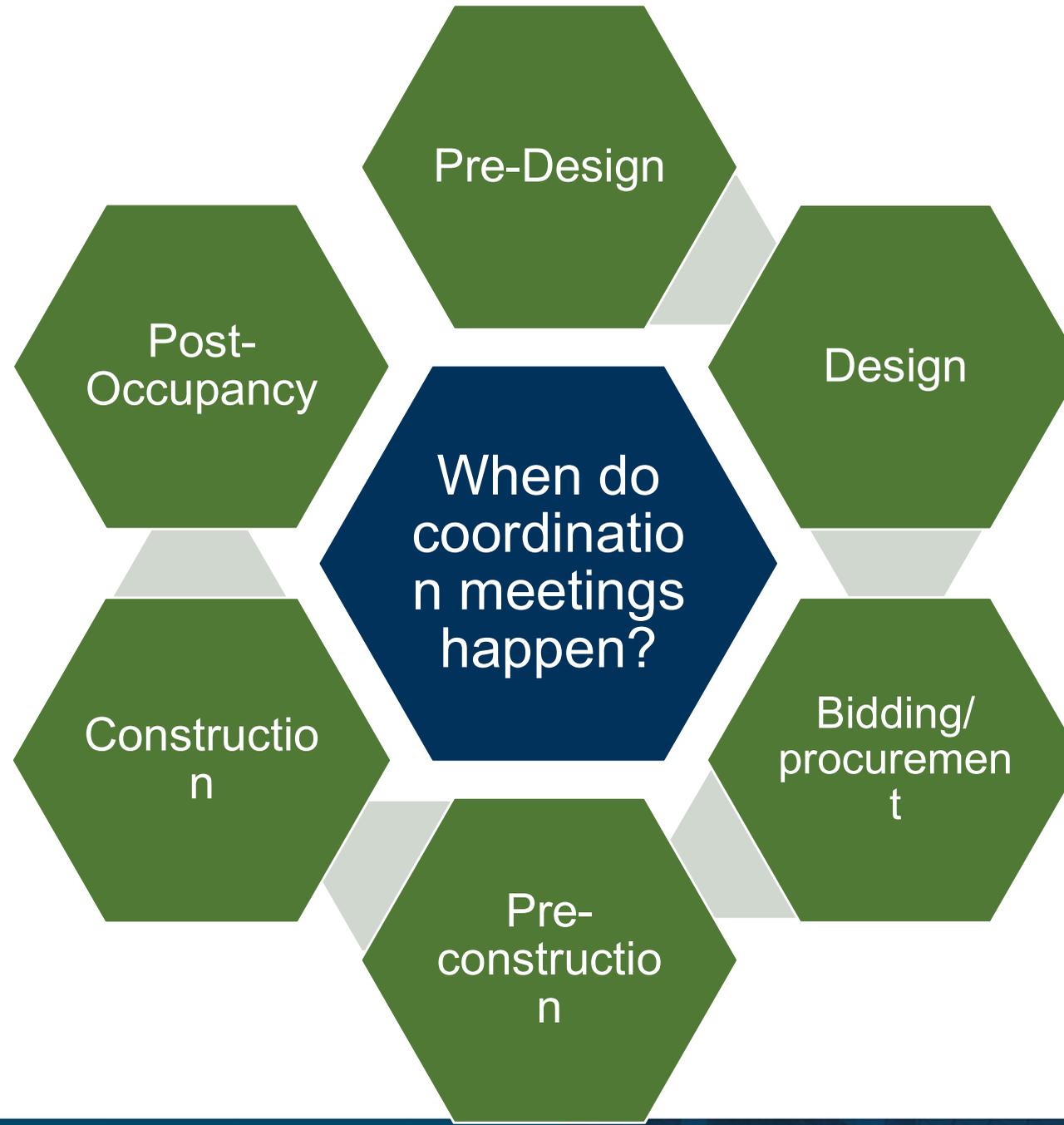
# BECx Standards and Resources

- ASHRAE Guideline 0
- National Institute for Building Science (NIBS) Guideline 3
- ASTM 2813 - Standard Practice for Building Enclosure Commissioning
- ASTM E2947 - Standard Guide for Building Enclosure Commissioning
- ASHRAE 202 - Commissioning Process for Buildings and Systems LEED V4
- International Green Construction Code (IGCC)
- AIA Best Practices: Building Enclosure Commissioning: An Introduction



# The Building Enclosure Commissioning Process





# Pre-Construction Phase

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Review Shop Drawings and Submittals

Mock-Up Review and Testing

Conduct Enclosure coordination meetings

Update Testing Matrix and Commissioning Plan

Implementation of the BECx Plan

Review Construction Sequencing and Scheduling

GC – PM, QC Manager, Superintendent

Architect – PM

Subcontractor – PM, Superintendent/Foreman for each sub (Glazing, Air Barrier, Roofing, Waterproofing, Cladding)

BEC/BECxA

# Objectives

Coordination Meetings

Setting Up a Successful Project

Building Enclosure Commissioning

Coordination Meetings – Who, When, How

Case Studies

# Meeting Agenda

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1. Introductions
2. Page turn
  - Review drawings for constructability, confirm product selection is appropriate
  - Review sequencing of trades
  - Review by-others
3. Mockups
4. Testing



# Drawing Review

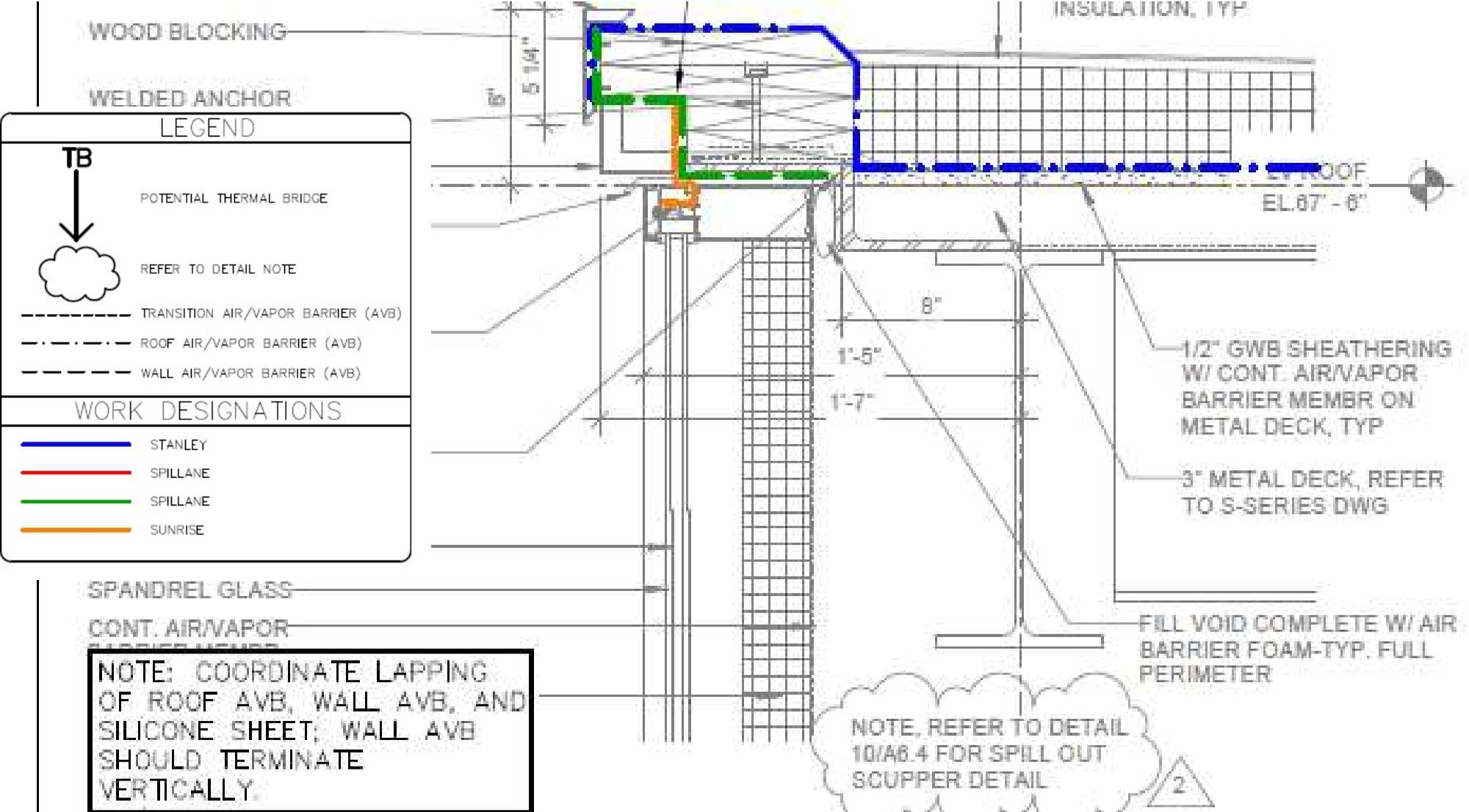
## Areas of Interest

- Roof to AVB tie-in (parapets and roof to wall interfaces)
- Windows/Storefronts/Curtainwall tie-in to AVB particularly jamb flashing and covers
- Through wall flashing
- Cladding attachments
- Expansion Joints

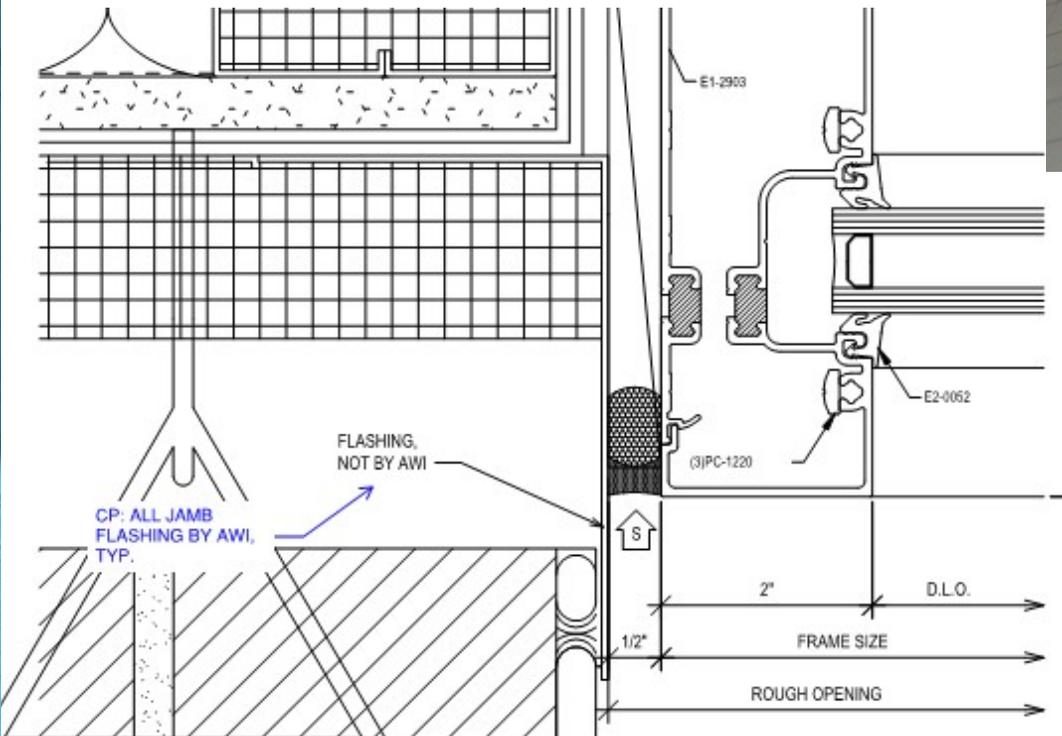
# Material Selection



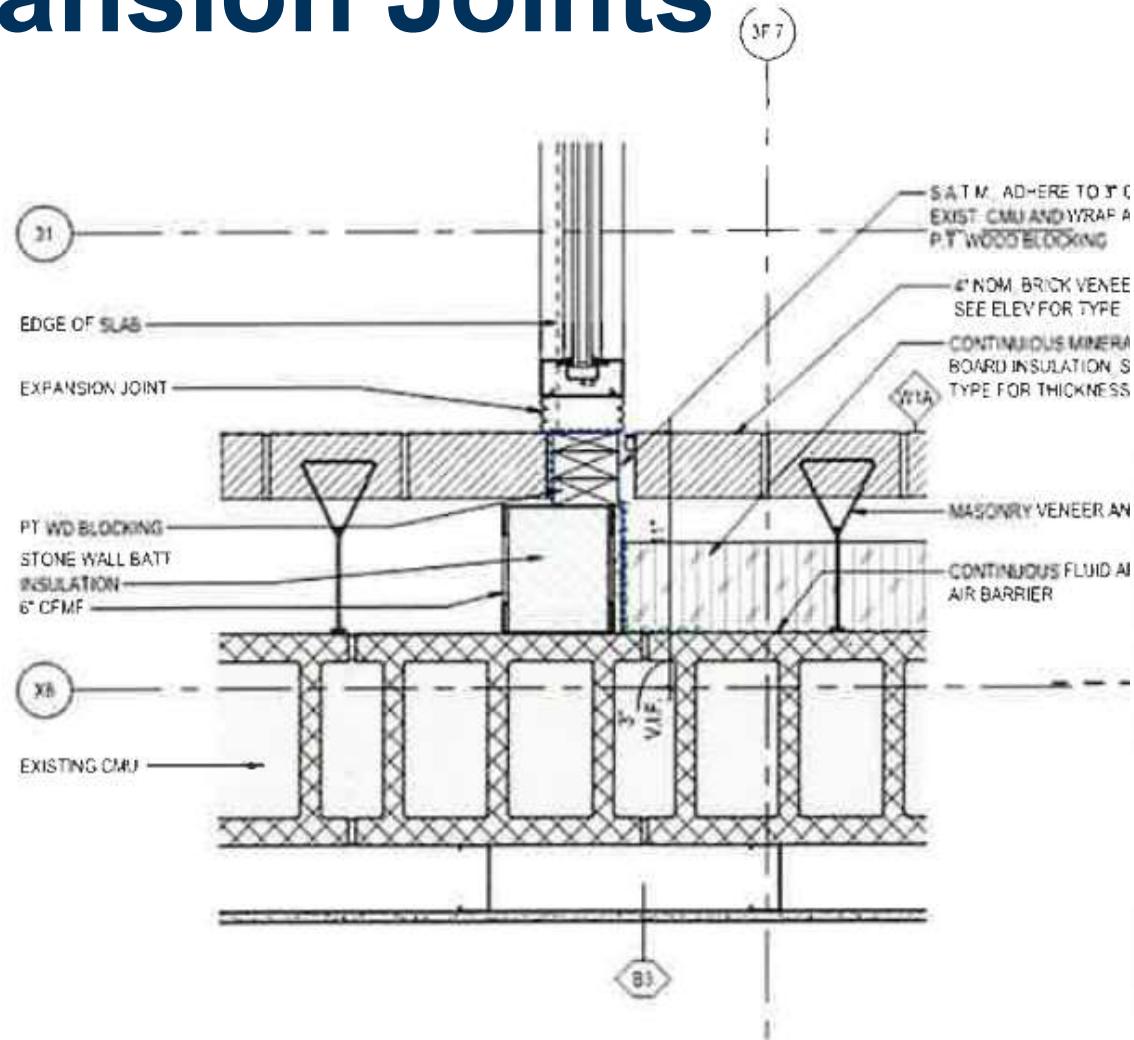
# Roof Tie-In



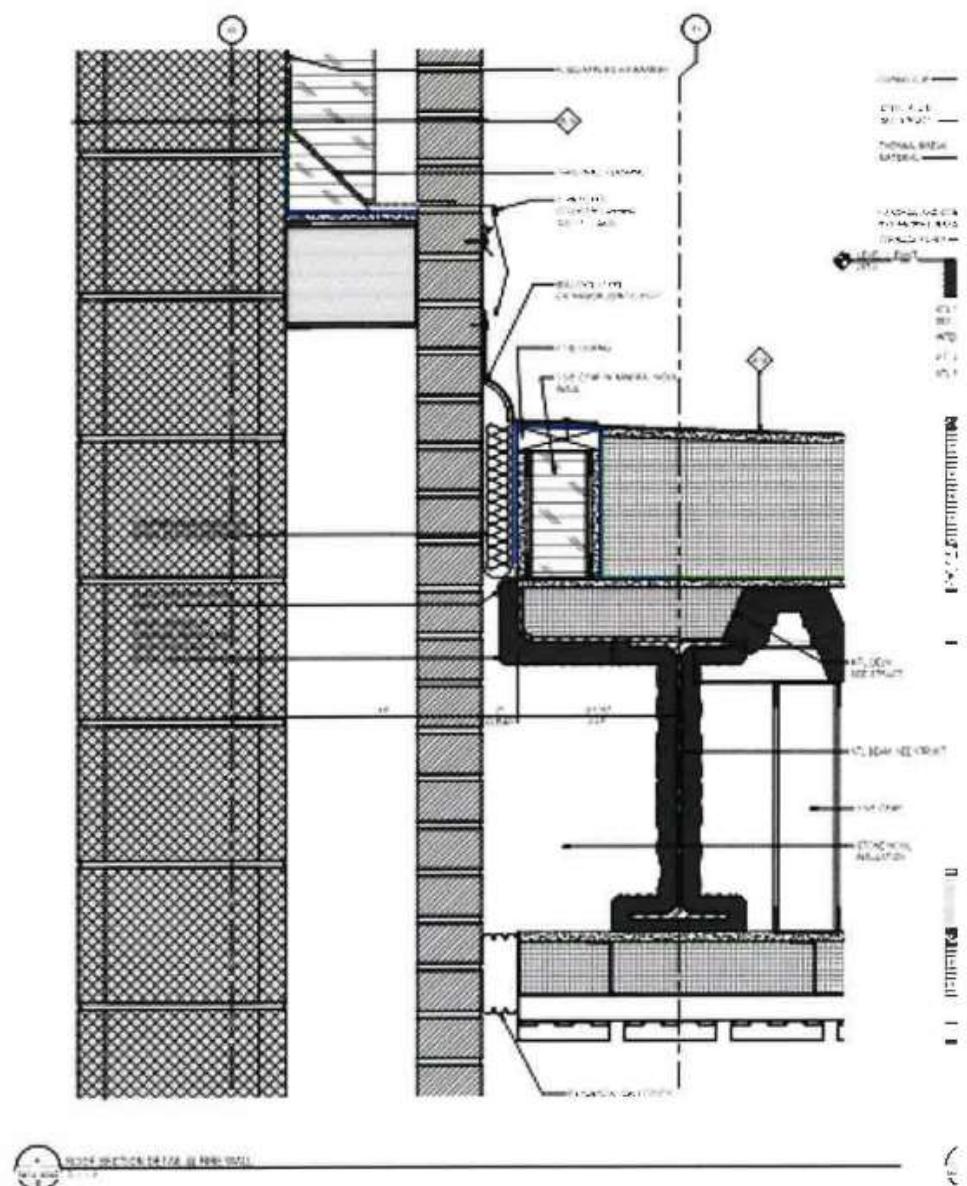
# Jamb Flashing



# Expansion Joints



10/2014 SECTION 05120 - MASONRY  
 10/2014 SECTION 05120 - MASONRY  
 10/2014 SECTION 05120 - MASONRY



# Expansion Joints

Location 1: Storefront expansion joint

EM SEAL TO EXTEND FROM 1st LEVEL TO UNDERSIDE OF ROOF BELLOWS. SEE SK-07



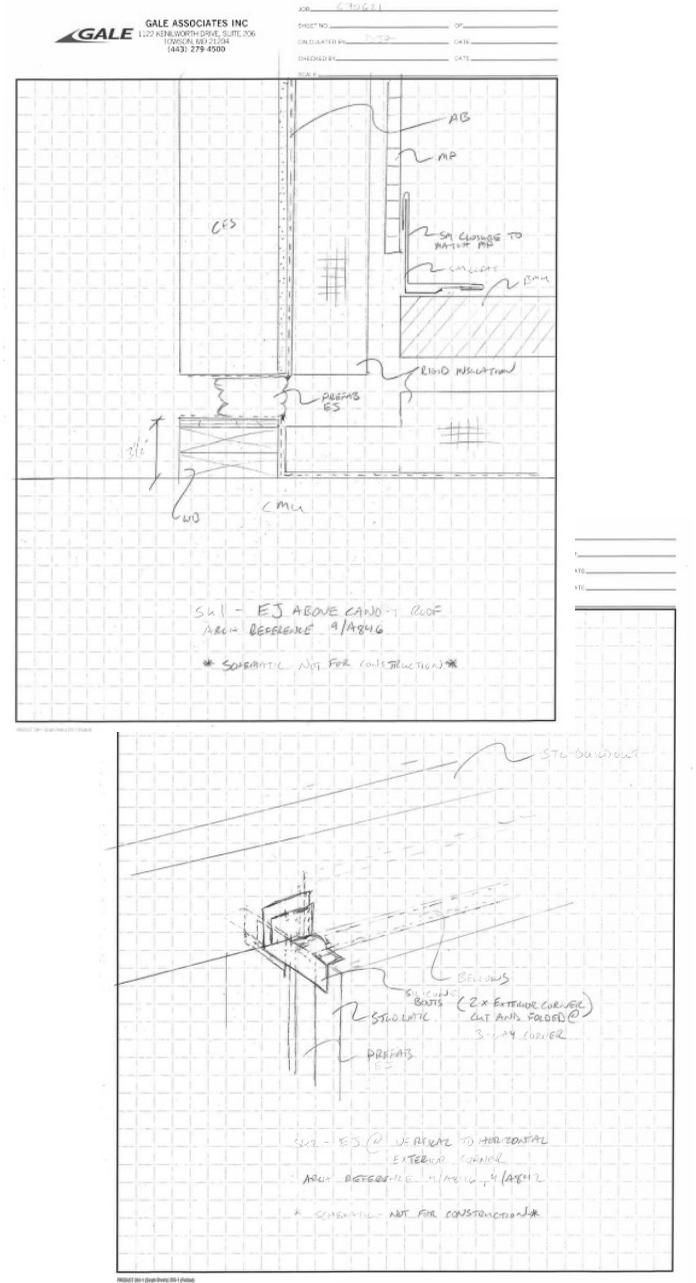
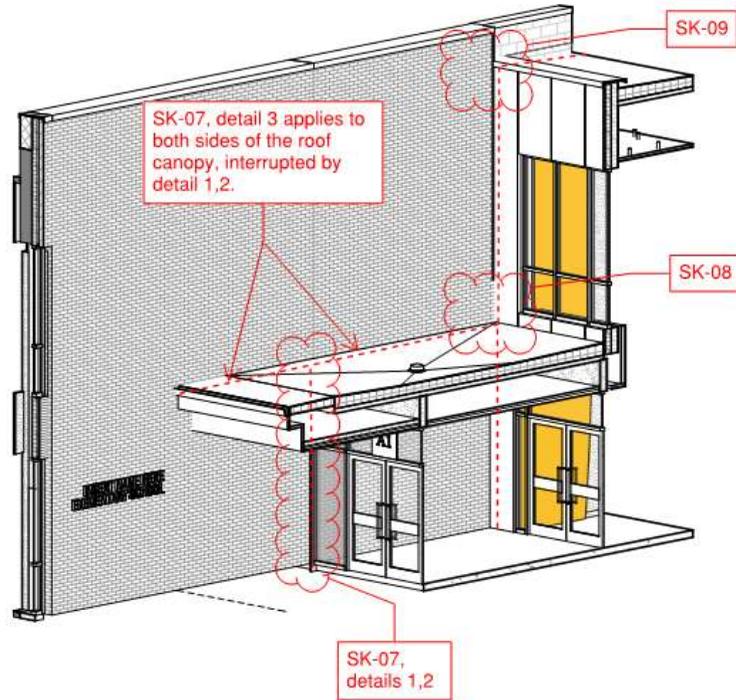
Location 2: Expansion joint at canopy

BELLOWS JOINT AT ROOF CANOPY TO TIE-IN LATERALLY TO VERTICAL EM SEAL ON 2ND LEVEL. SEE SK-08



Location 3: Vertical expansion joint

EM SEAL TO RUN VERTICALLY IN WALL TO UNDERSIDE OF ROOF BELLOWS JOINT. SEE SK-08 AND SK-09



# Mock-Up

To include as many typical details as possible

To be tested for compliance with established standards

Access for modifications to address potential problems

Troubleshoot potential problems

Establishes standard of care for trades

# Mock-Up



# Mock-Up Testing



# Case Studies

## Not Coordinated

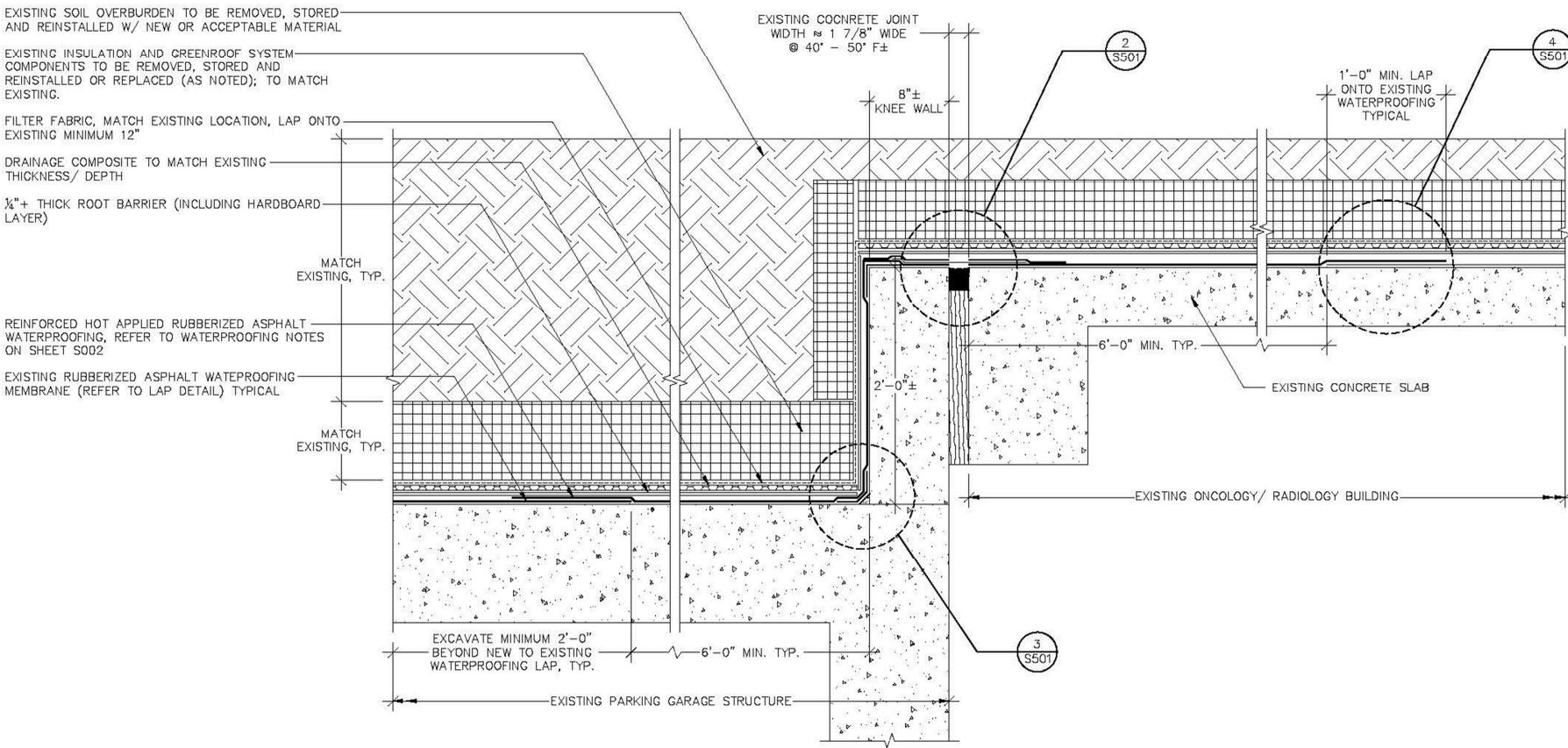
# Setting up a Successful Meeting

## Know the Fundamentals

# Case Study 1

## Expansion Joints

# Design Detail

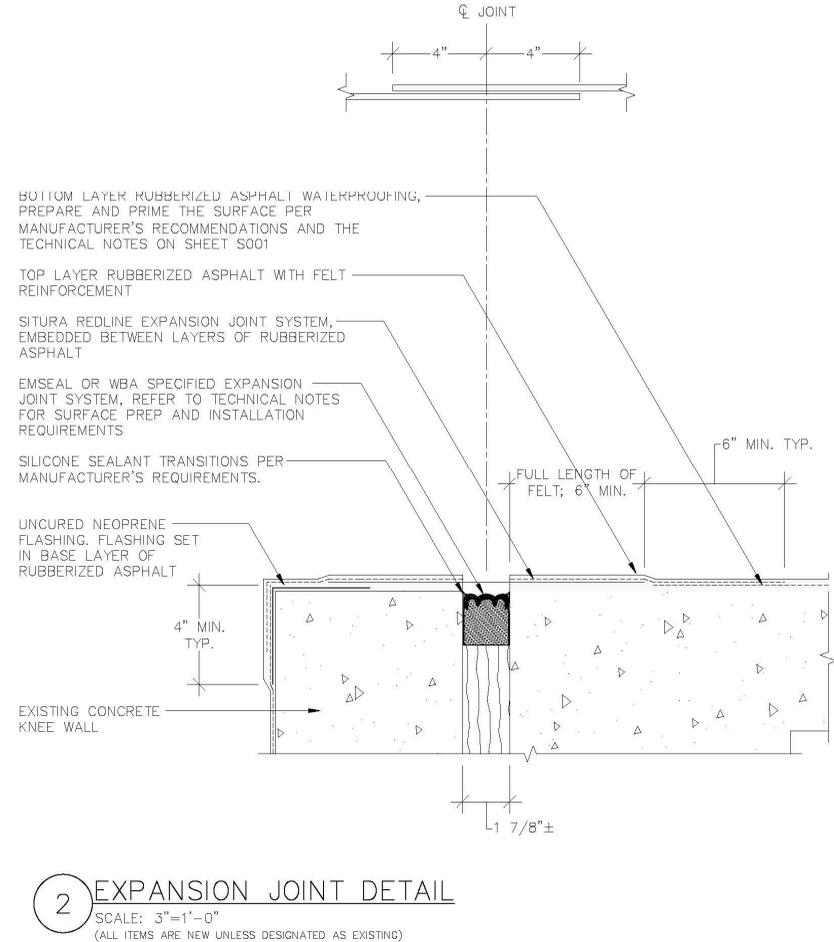
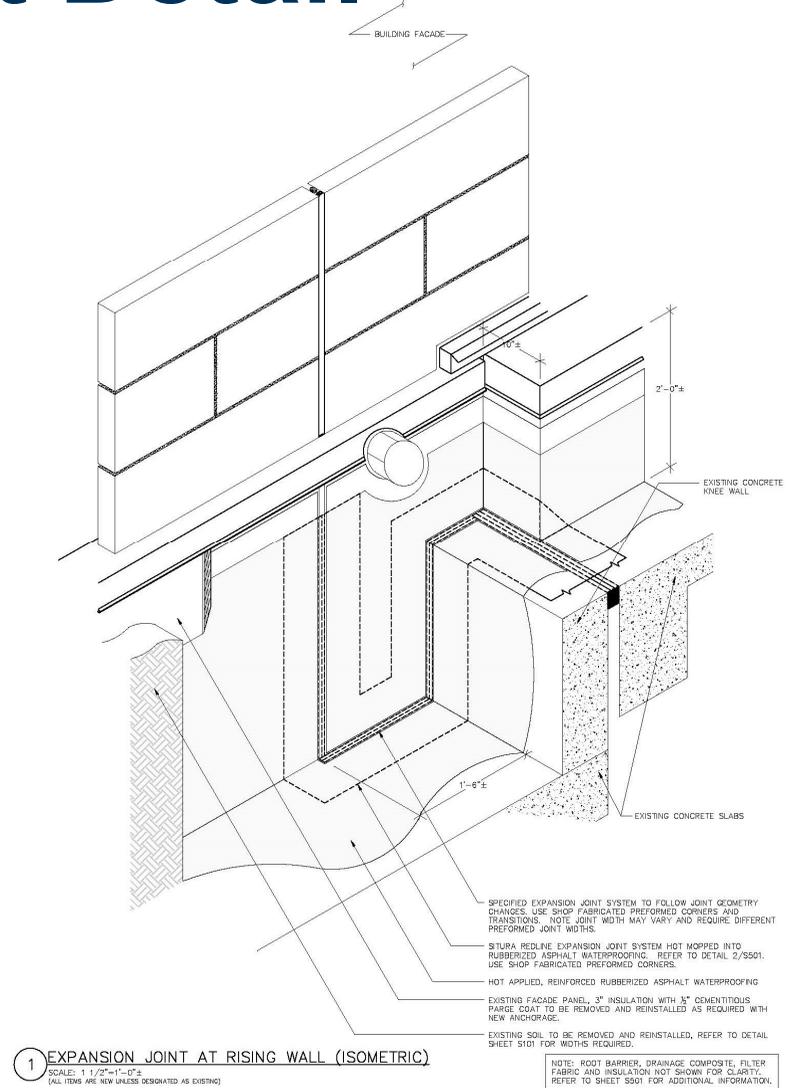


1 EXPANSION JOINT WATERPROOFING  
 SCALE: 1 1/2"=1'-0"  
 (ALL ITEMS ARE NEW UNLESS DESIGNATED AS EXISTING)

# Construction Photo



# As-Built Detail



# Final Installation Photo



# Case Study 1

## Expansion Joints

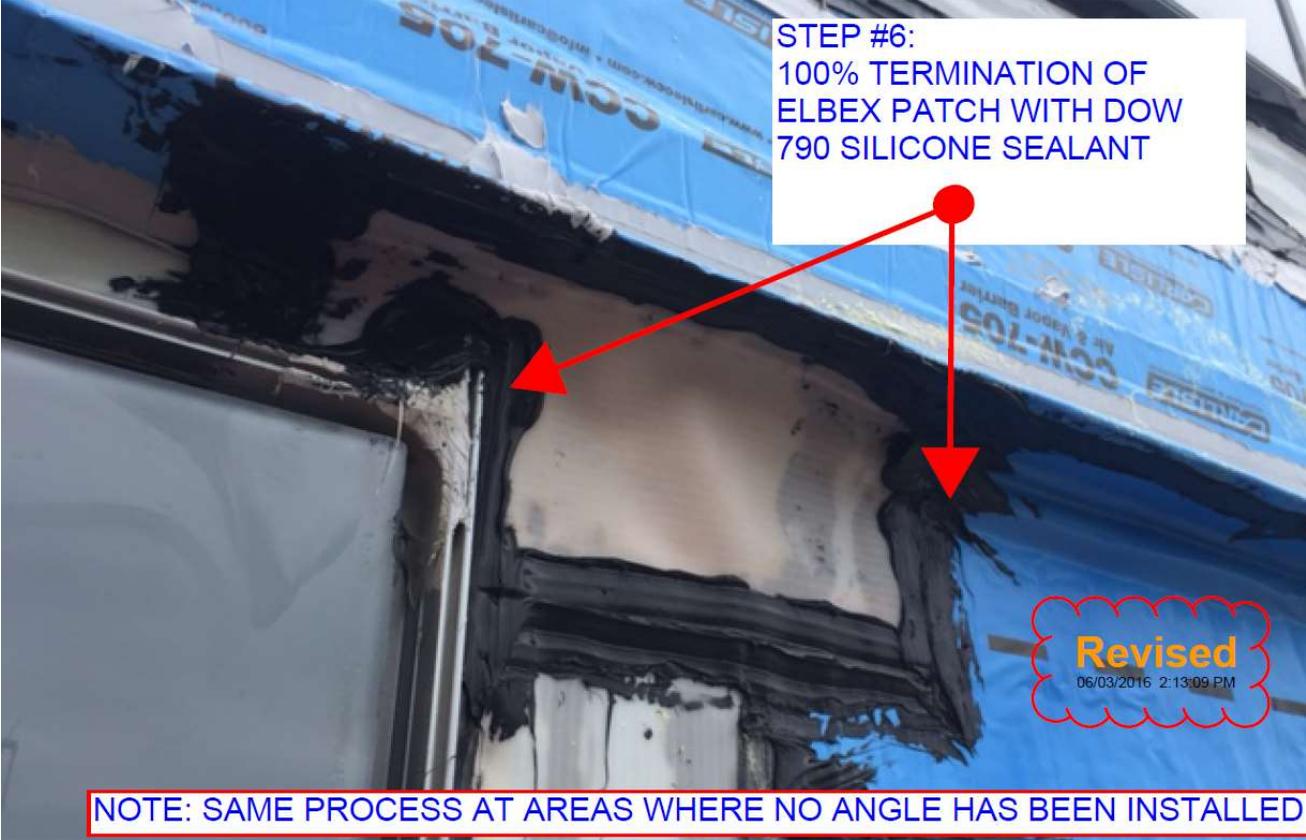
# Sequencing



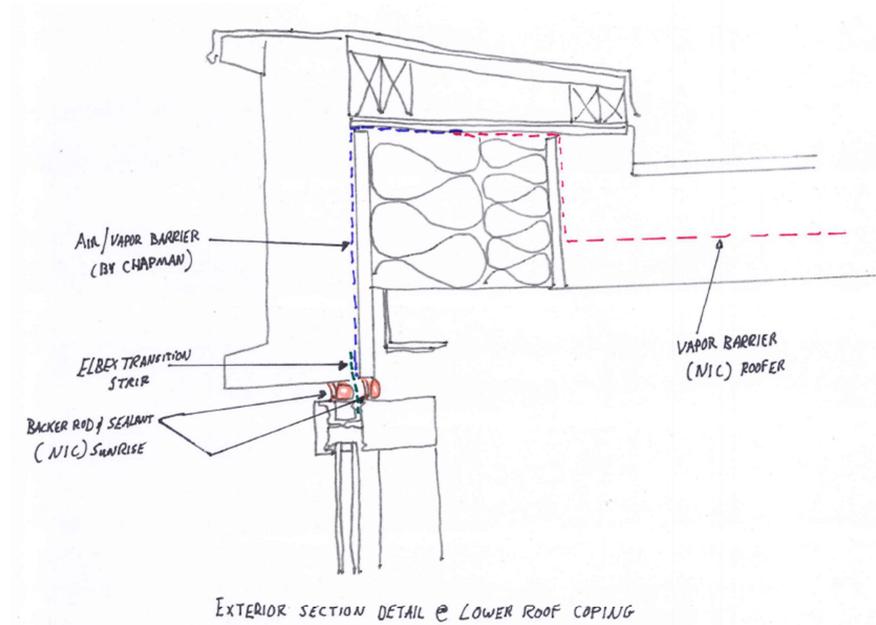
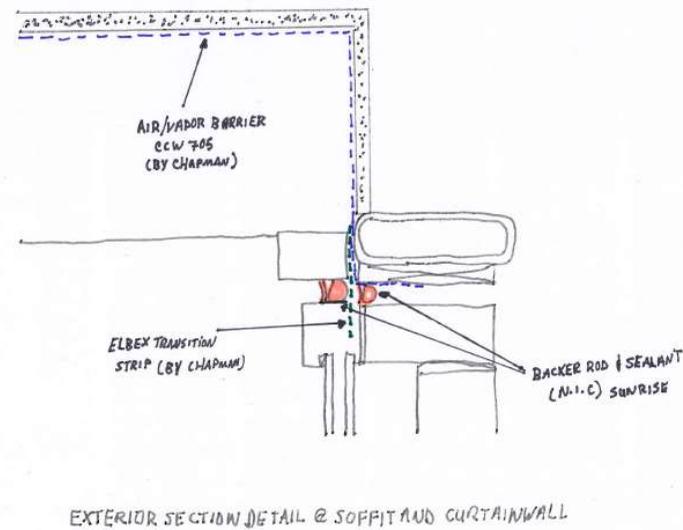
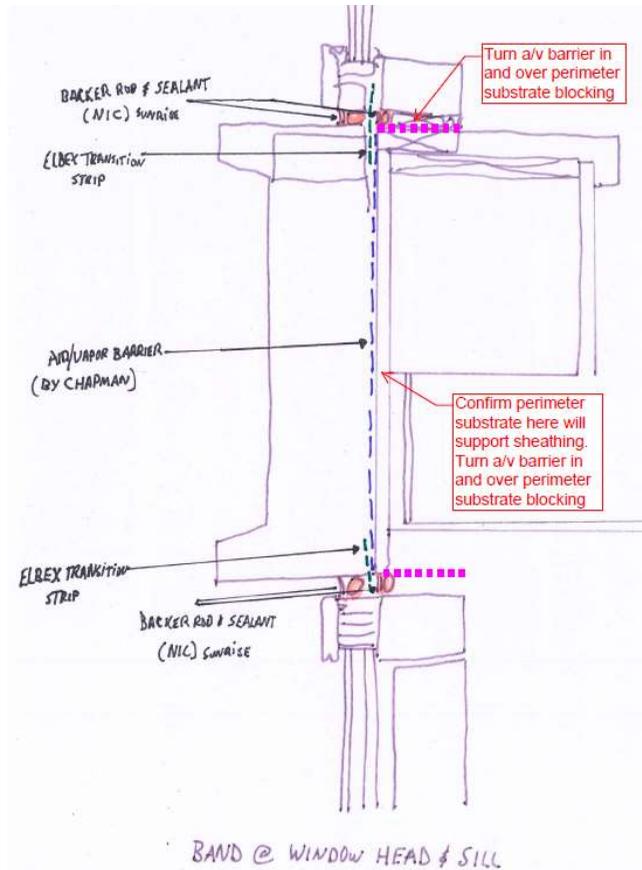
# Sequencing



# Sequencing



# Coordination Drawings



General Comments for all proposed details are as follows:

1. Per the Membrane Air Barrier Product Data Submittal Review, dated Oct. 28, 2015, the proposed Elbex transition strip was returned as "not acceptable". Recommend contractor confirms acceptance of this product. If not, recommend a product conforming to the specifications be submitted for review by the Architect.
2. Recommend that the a/v barrier be turned in and extend over the perimeter substrate (eg. blocking, sheathing, etc.), prior to installing the transition strip.
3. Confirm transition strip is to be set into the CW glazing pocket by indicating this on all applicable details.
4. Confirm the method of sealing the a/v barrier to the transition strip. Confirm that the sealant used is compatible with both the a/v barrier and transition strip.
5. Confirm the locations of both the permeable and non-permeable a/v barriers. Note: The design intent was that all a/v barriers will be non-permeable types, with the only exception being the entry vestibule canopy soffits which are to receive a permeable type a/v barrier. Therefore, details should indicate which type is to be provided.

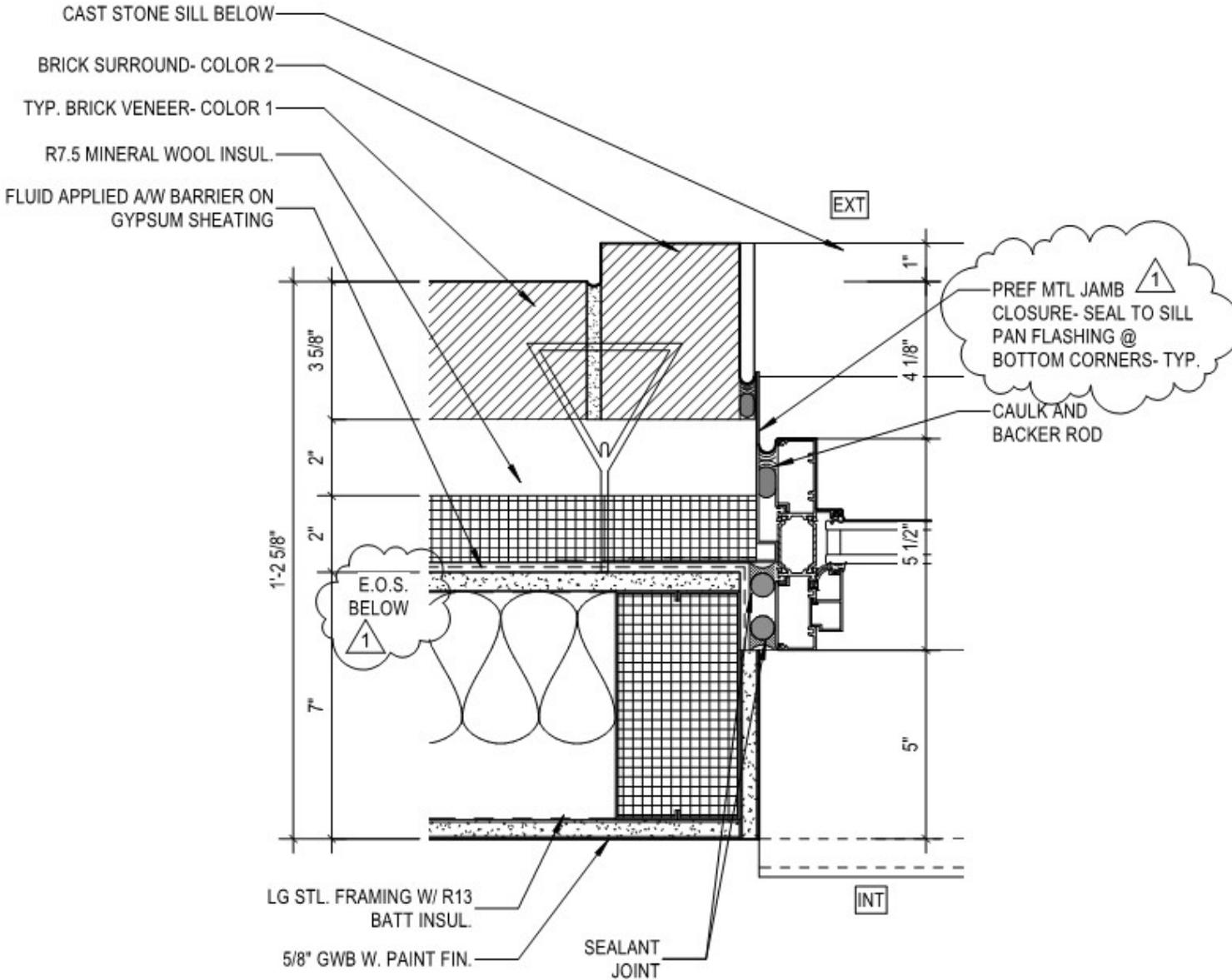
**GALE**  
**PEER REVIEW COMMENTS**  
 By Jason Wagner Jan 05, 2016

Note: Gale's services are limited to provide commentary on design and construction documents prepared by others. The Architect of Record is solely responsible for all aspects of the design, including drawings, details, specifications, and product selection. Our services do not include preparation of plans, details, and specifications or approval of submittals.

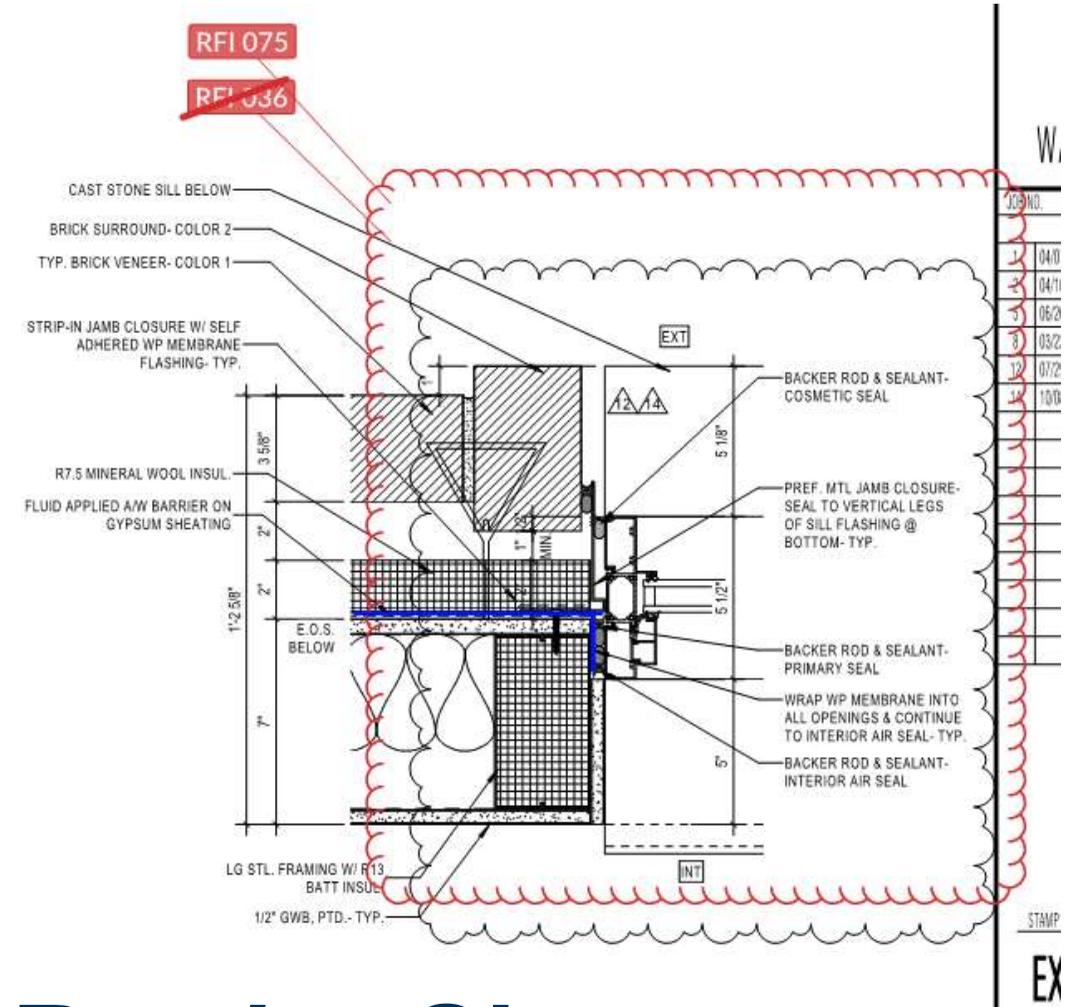
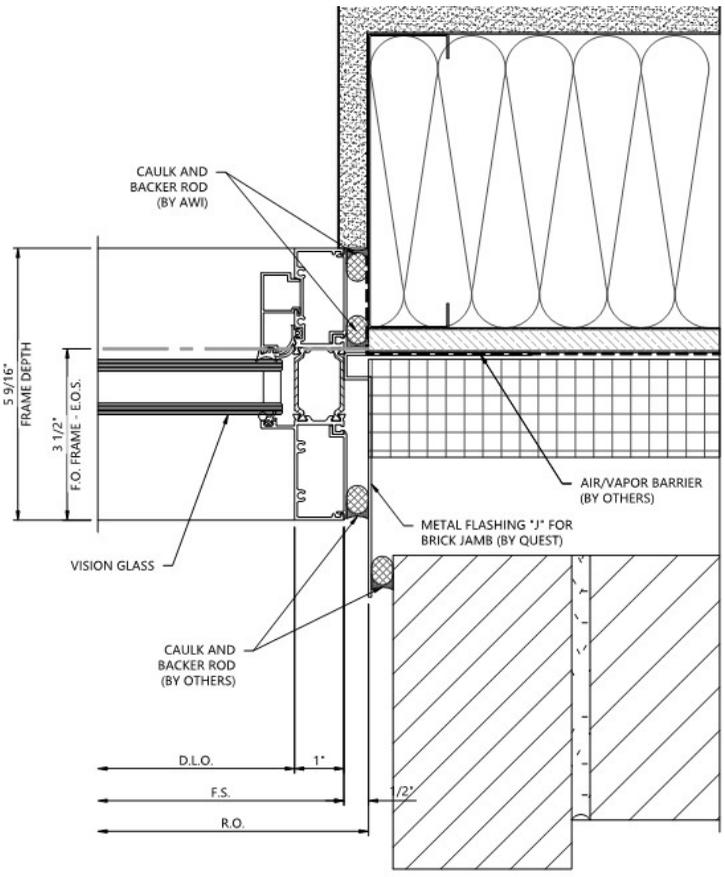
# Case Study 3

## Sequencing (Access)

# Design Detail



# Window Wall Shops



# Air Barrier Shops

# As-built Conditions



# Case Study 4

## Atypical Details

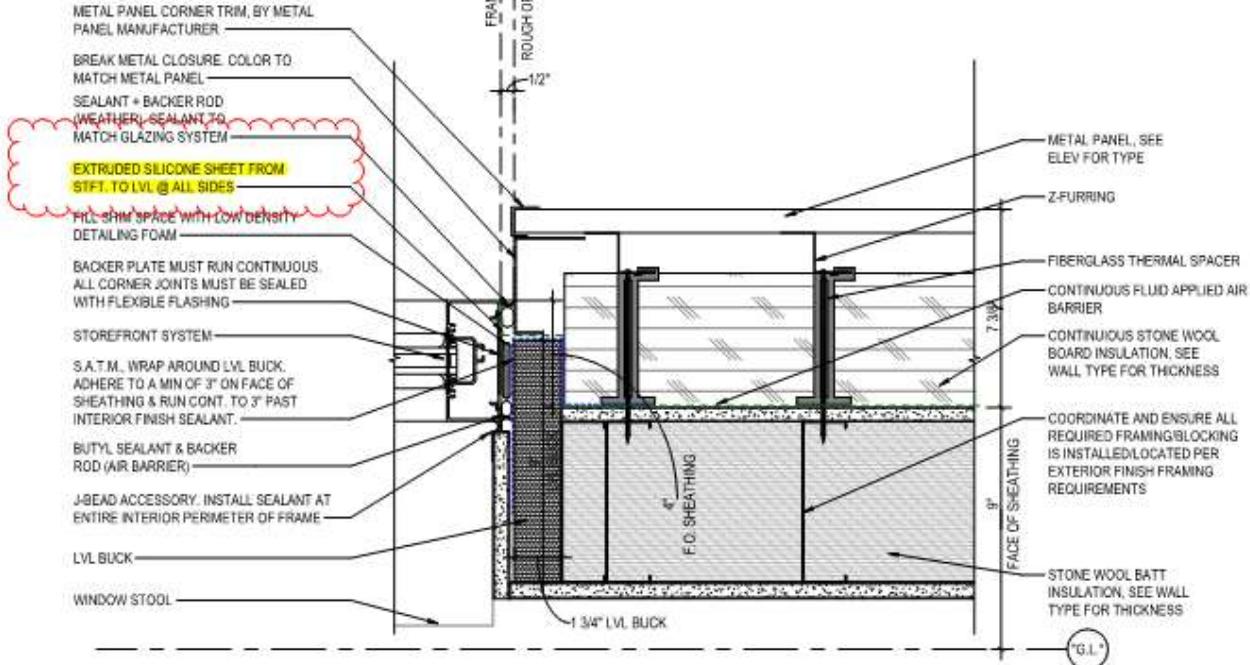
# Difficult Detailing



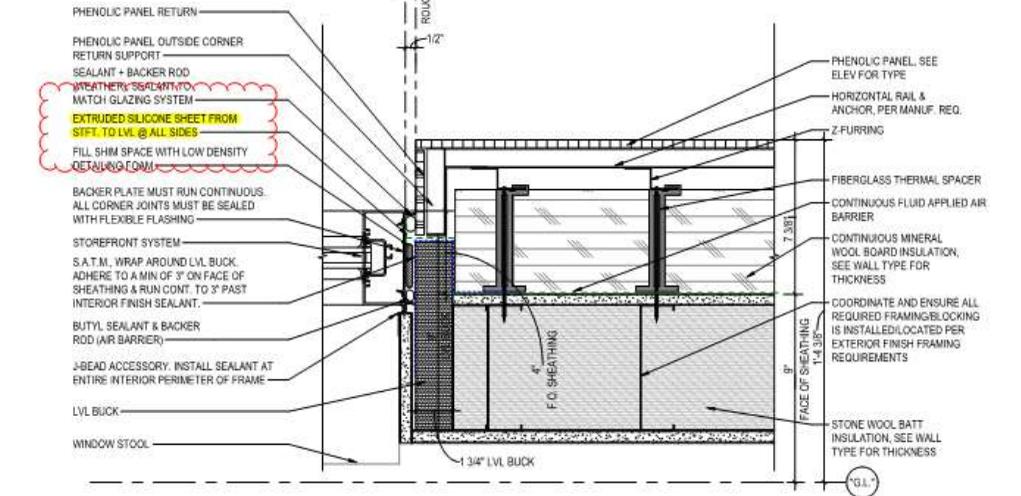
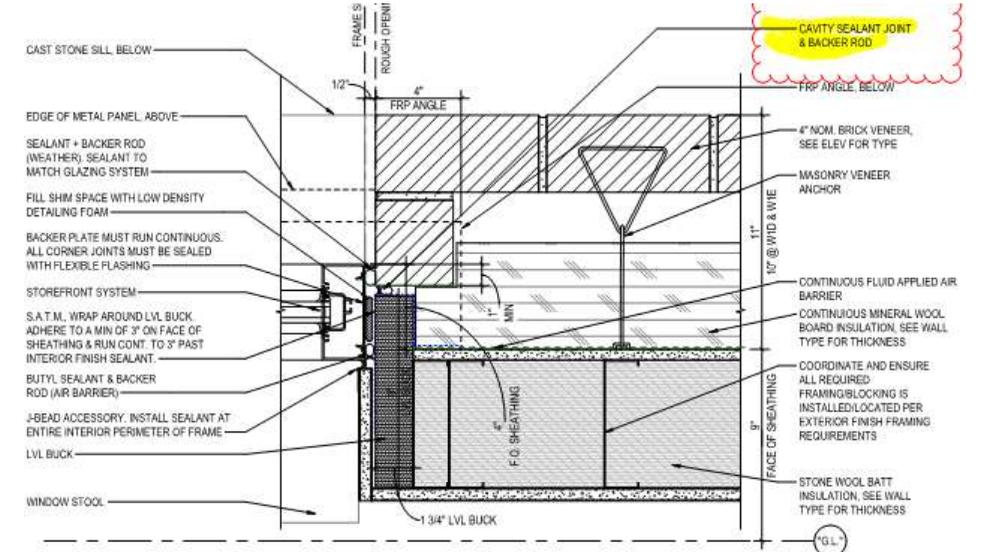
# Case Study 5

## Closures

# Jamb Flashing

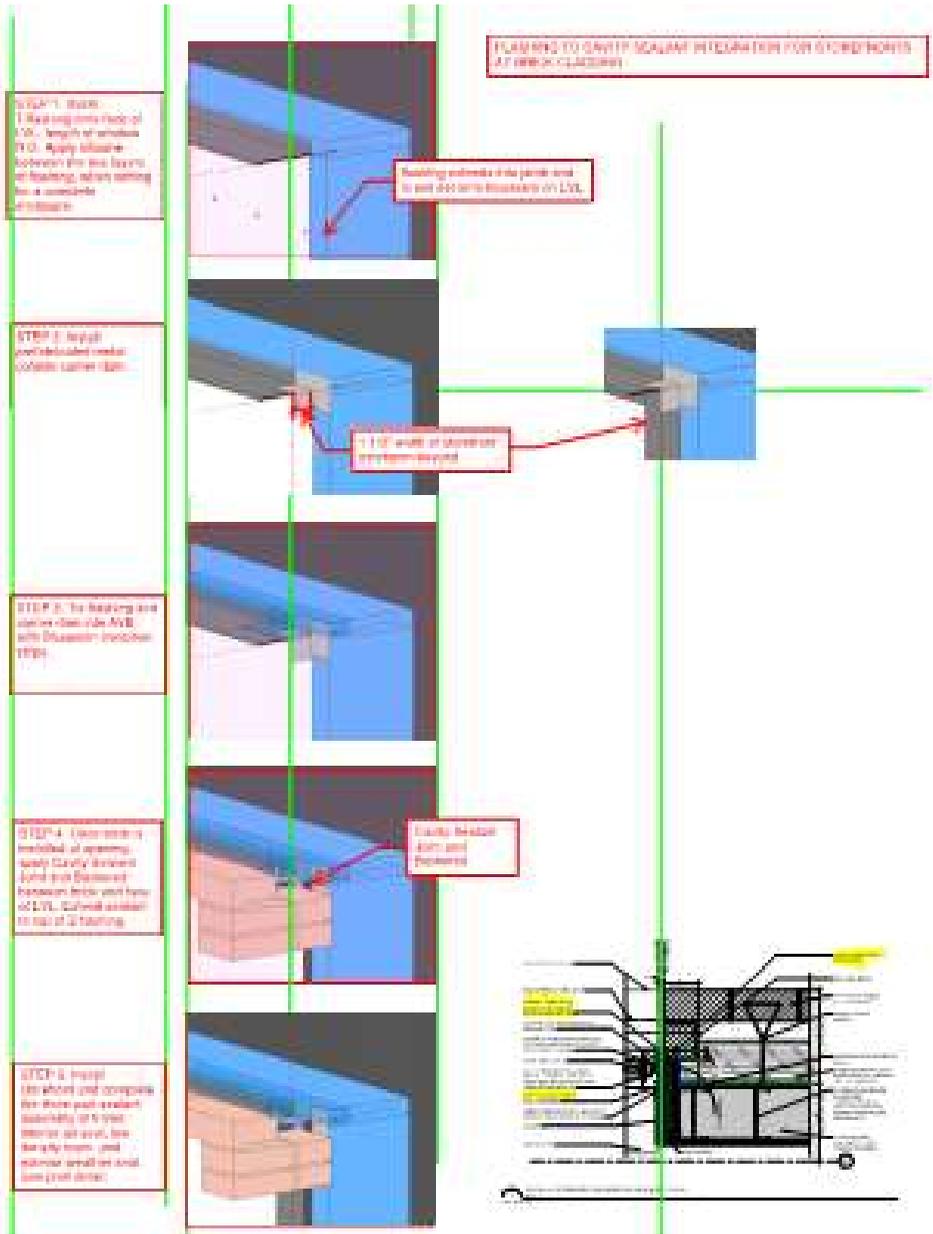


9  
 A131 A830  
 TYPICAL 4.5" STOREFRONT JAMB @ METAL PANEL @ WALL TYPES "W4"  
 3" = 1'-0"



6  
 A111 A830  
 TYPICAL 4.5" STOREFRONT JAMB @ PHENOLIC PANEL @ WALL TYPES "W3"  
 3" = 1'-0"

# Jamb Flashing



# Jamb Flashing



**Questions?**

**Derek J. Ziese, PE,  
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Senior Project Manager

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