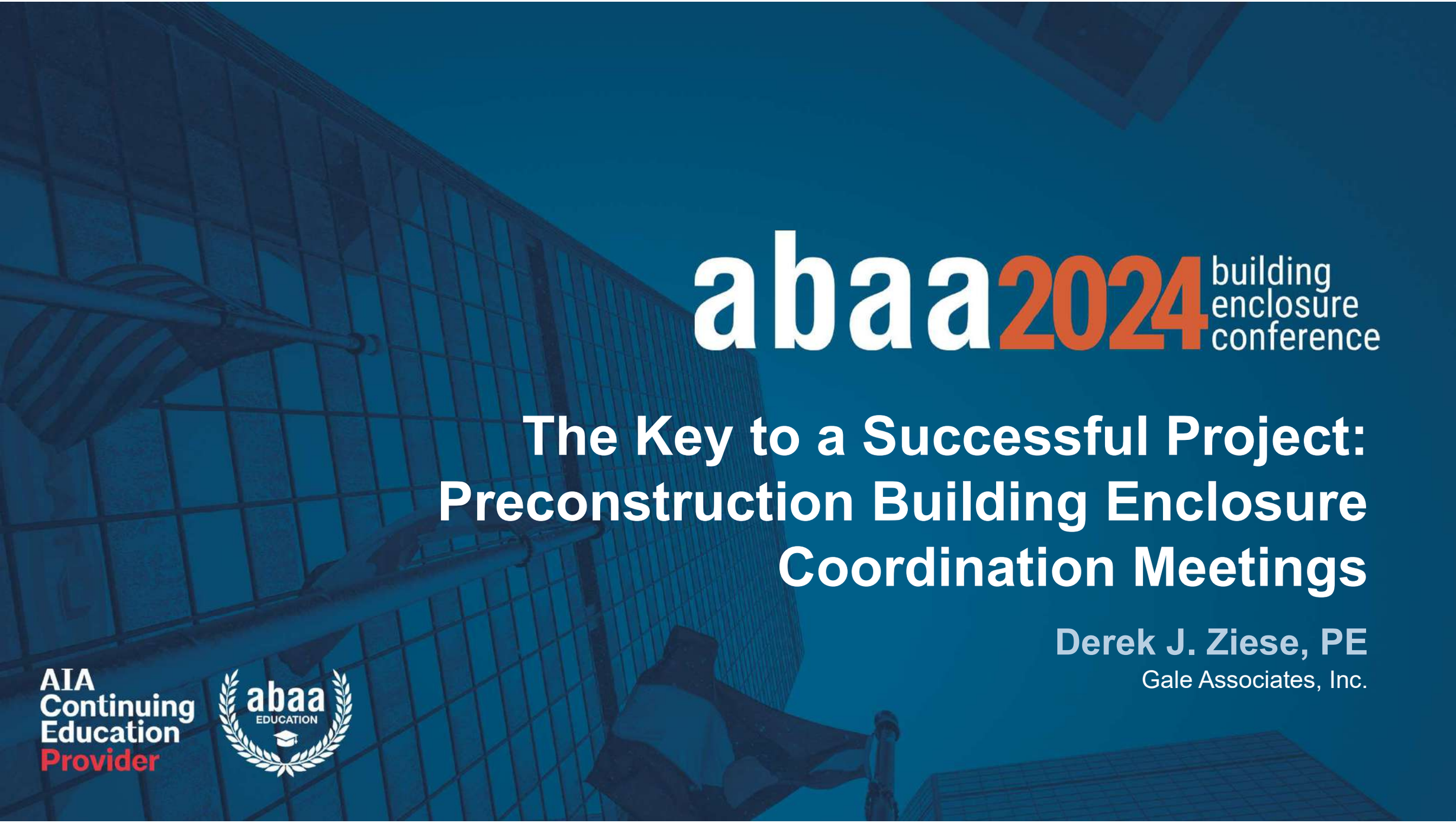

abaa2024 building enclosure conference
The Key to a Successful Project: Preconstruction Building Enclosure Coordination Meetings
Derek J. Ziese, PE
Gale Associates, Inc.
AIA Continuing Education Provider
abaa EDUCATION

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

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. 2. Identify how installation sequence impacts detailing and installation of building air barrier components.
3. 3. Learn about unique solutions to improve the construction of a continuous air barrier
4. 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

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.

IBEC
International Institute of Building Enclosure Consultants

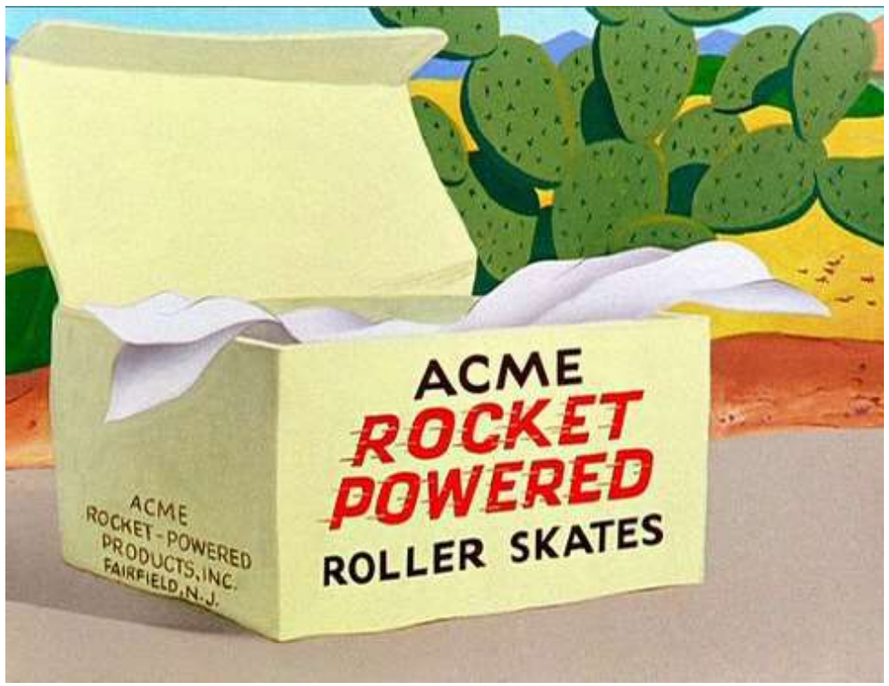
20th Century Building Enclosures

- Simple building materials
- Limited layers
- Trained workforce

Today's Building Enclosures

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

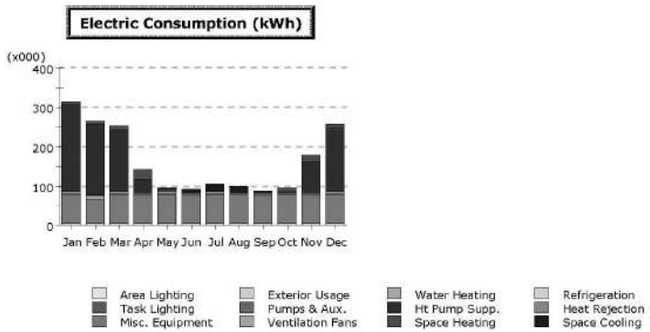
New, untested building materials and assemblies



New untested building materials and assemblies

Repetitiveness of problem details

Disconnect between designer and contractor

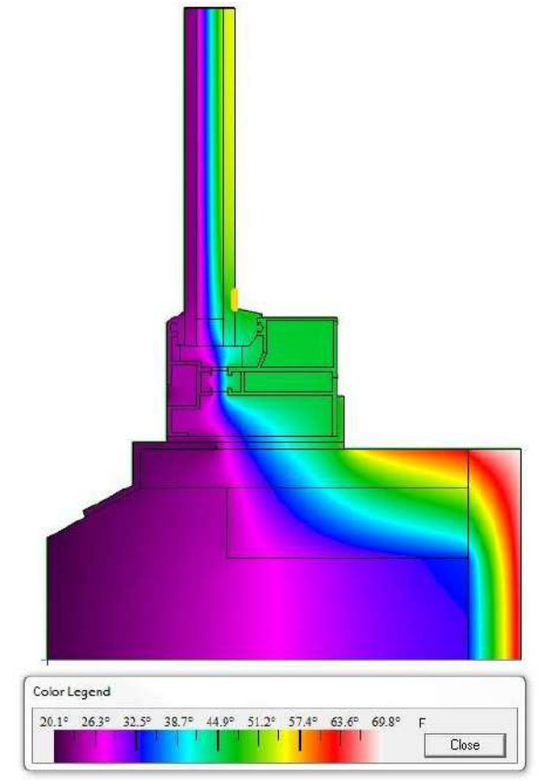


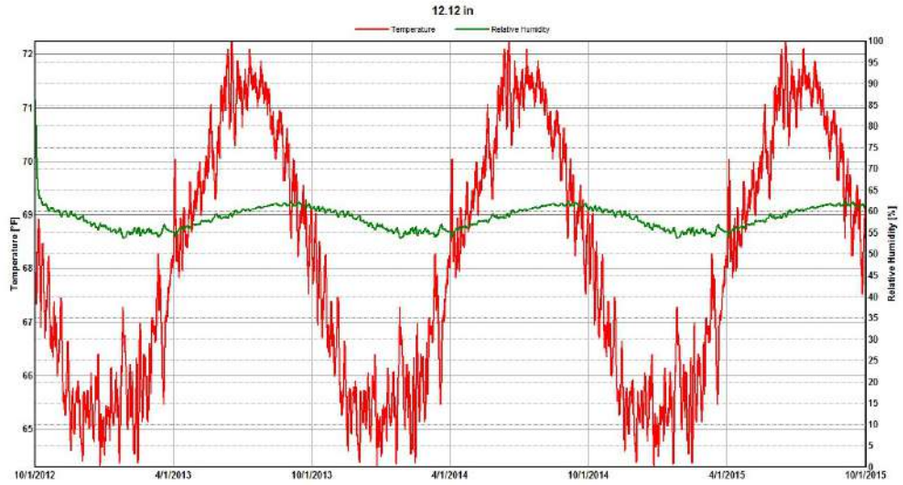
Electric Consumption (kWh x000)

	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
Total	313.1	264.5	253.8	142.0	95.0	92.4	106.4	101.6	88.6	95.9	177.8	257.7	1,988.8

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													
Total													





Lack of coordinated details between construction trades

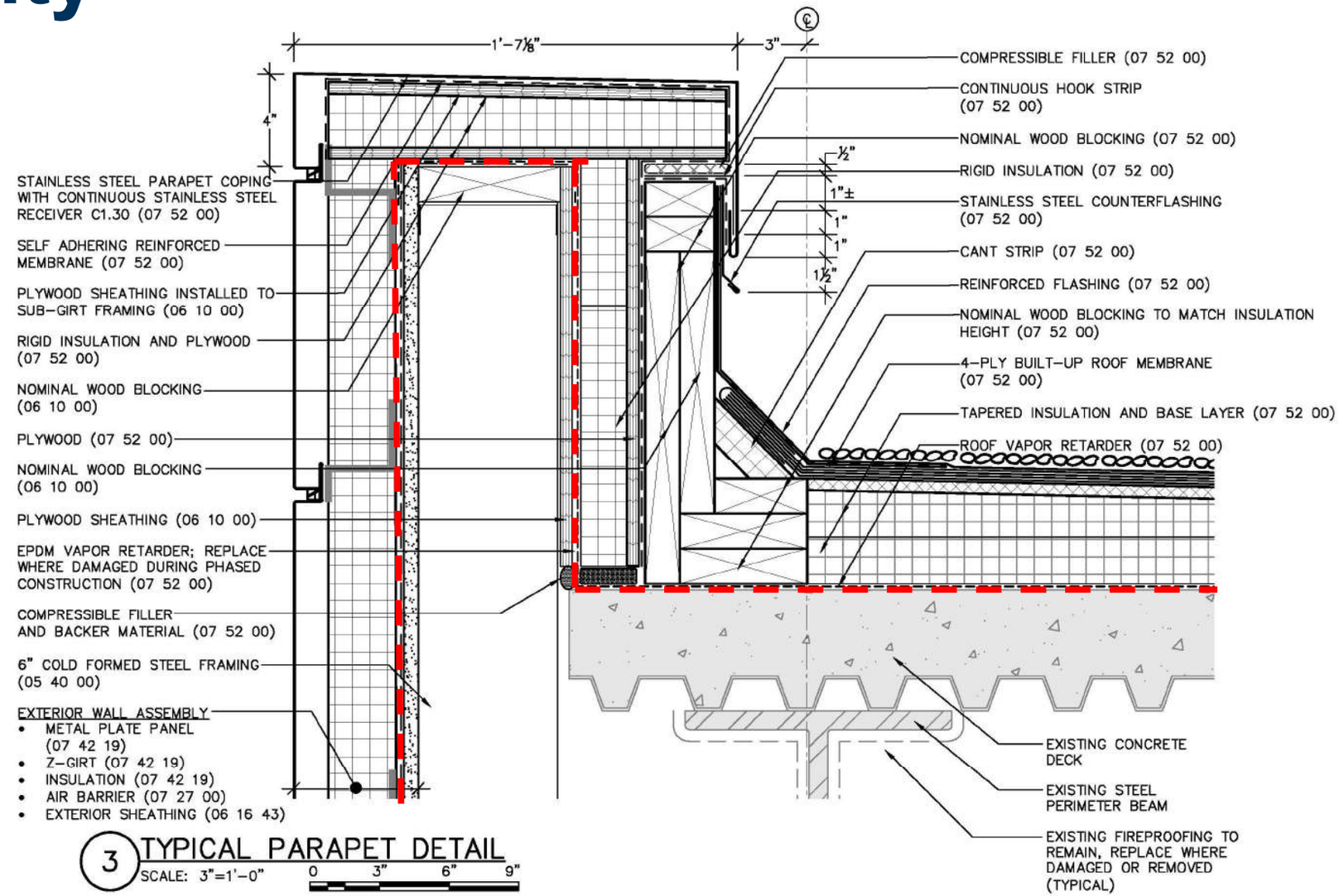
Setting up a Successful Meeting

Know the Fundamentals

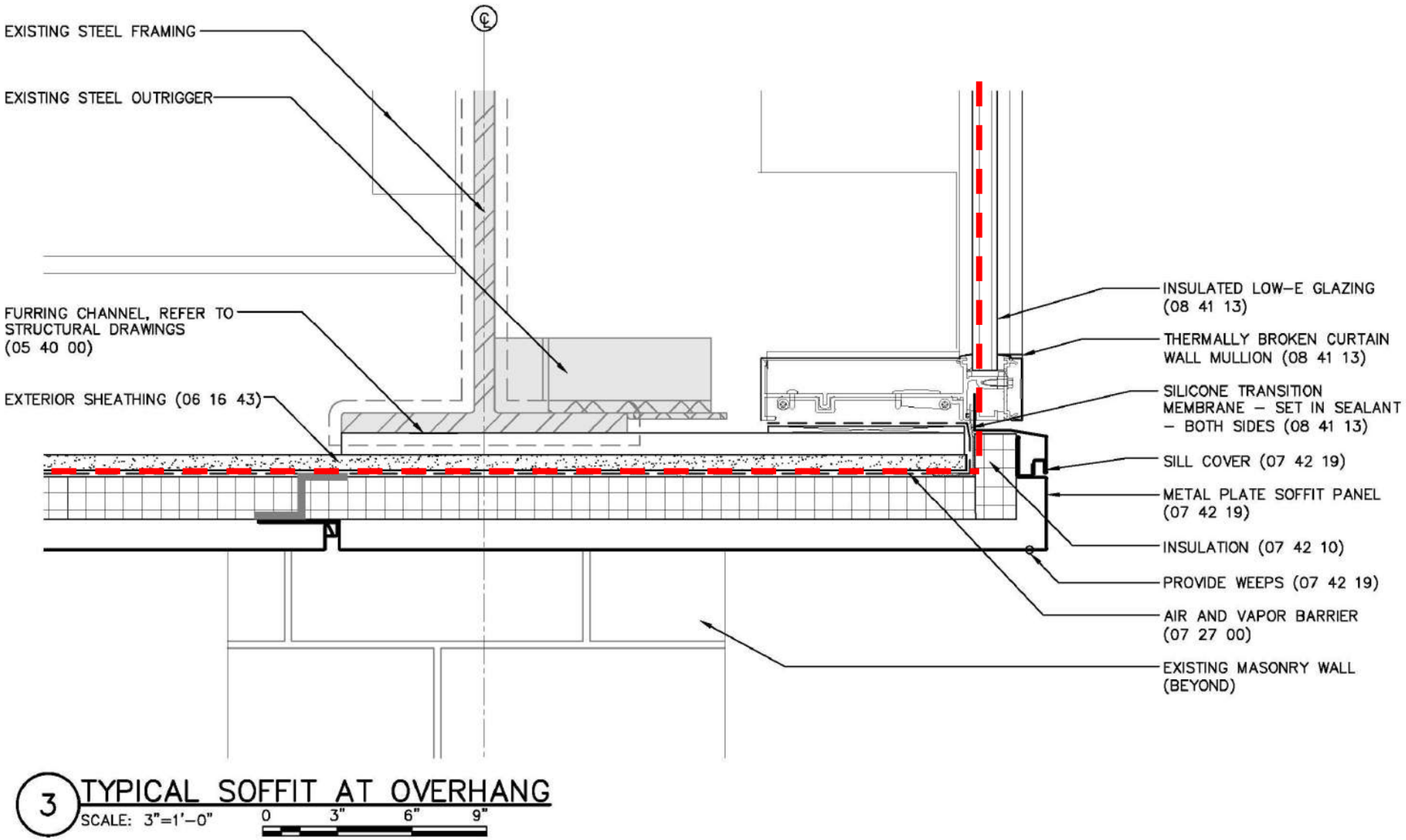
Fundamentals

- **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)

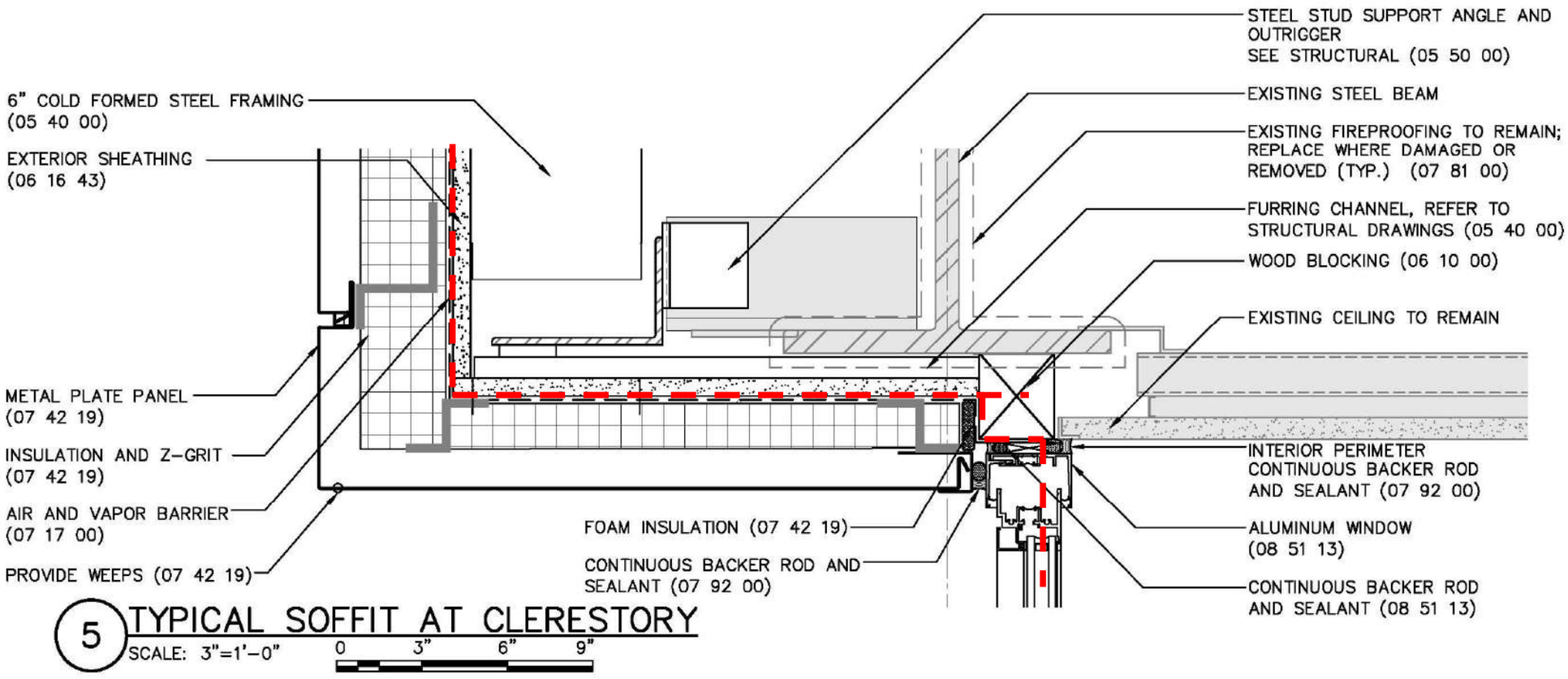
Continuity


1'-7⅛"
3"
℄
4"
½"
1"±
1"
1"
1½"
STAINLESS STEEL PARAPET COPING WITH CONTINUOUS STAINLESS STEEL RECEIVER C1.30 (07 52 00)
SELF ADHERING REINFORCED MEMBRANE (07 52 00)
PLYWOOD SHEATHING INSTALLED TO SUB-GIRT FRAMING (06 10 00)
RIGID INSULATION AND PLYWOOD (07 52 00)
NOMINAL WOOD BLOCKING (06 10 00)
PLYWOOD (07 52 00)
NOMINAL WOOD BLOCKING (06 10 00)
PLYWOOD SHEATHING (06 10 00)
EPDM VAPOR RETARDER; REPLACE WHERE DAMAGED DURING PHASED CONSTRUCTION (07 52 00)
COMPRESSIBLE FILLER AND BACKER MATERIAL (07 52 00)
6" COLD FORMED STEEL FRAMING (05 40 00)
EXTERIOR WALL ASSEMBLY
• METAL PLATE PANEL (07 42 19)
• Z-GIRT (07 42 19)
• INSULATION (07 42 19)
• AIR BARRIER (07 27 00)
• EXTERIOR SHEATHING (06 16 43)
COMPRESSIBLE FILLER (07 52 00)
CONTINUOUS HOOK STRIP (07 52 00)
NOMINAL WOOD BLOCKING (07 52 00)
RIGID INSULATION (07 52 00)
STAINLESS STEEL COUNTERFLASHING (07 52 00)
CANT STRIP (07 52 00)
REINFORCED FLASHING (07 52 00)
NOMINAL WOOD BLOCKING TO MATCH INSULATION HEIGHT (07 52 00)
4-PLY BUILT-UP ROOF MEMBRANE (07 52 00)
TAPERED INSULATION AND BASE LAYER (07 52 00)
ROOF VAPOR RETARDER (07 52 00)
EXISTING CONCRETE DECK
EXISTING STEEL PERIMETER BEAM
EXISTING FIREPROOFING TO REMAIN, REPLACE WHERE DAMAGED OR REMOVED (TYPICAL)
3 TYPICAL PARAPET DETAIL
SCALE: 3"=1'-0"
0 3" 6" 9"

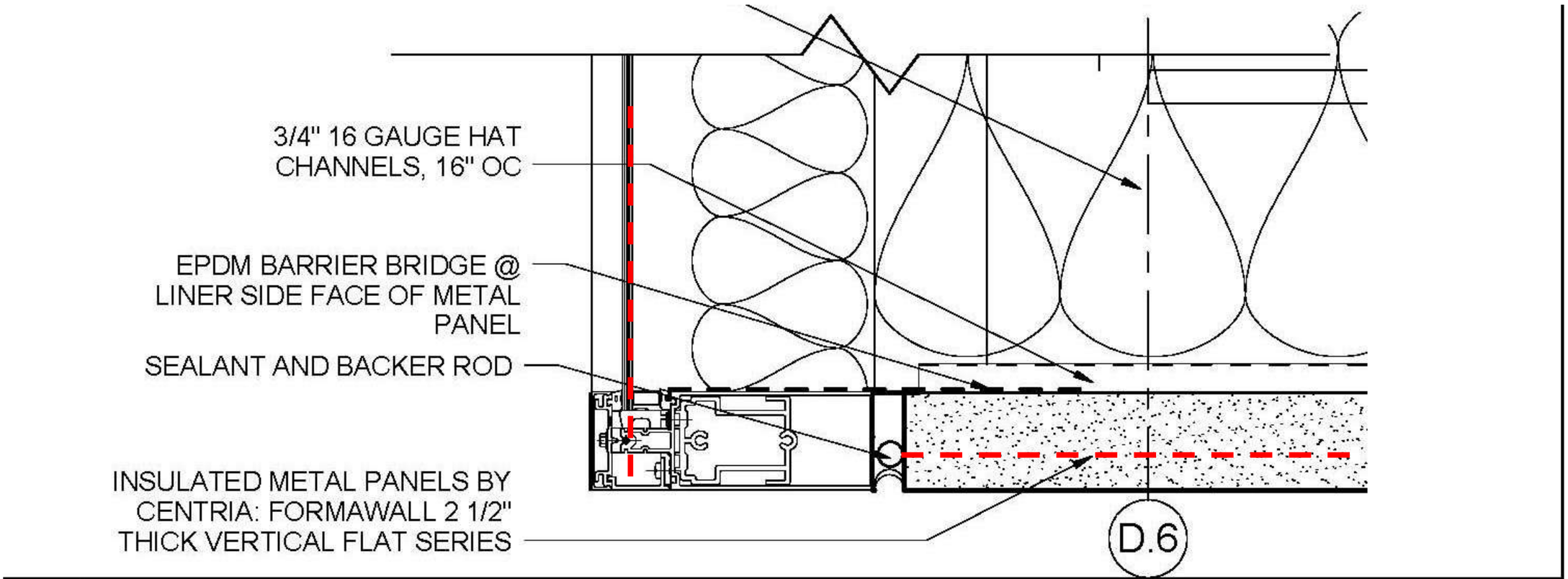
Continuity


EXISTING STEEL FRAMING
EXISTING STEEL OUTRIGGER
FURRING CHANNEL, REFER TO STRUCTURAL DRAWINGS (05 40 00)
EXTERIOR SHEATHING (06 16 43)
INSULATED LOW-E GLAZING (08 41 13)
THERMALLY BROKEN CURTAIN WALL MULLION (08 41 13)
SILICONE TRANSITION MEMBRANE – SET IN SEALANT – BOTH SIDES (08 41 13)
SILL COVER (07 42 19)
METAL PLATE SOFFIT PANEL (07 42 19)
INSULATION (07 42 10)
PROVIDE WEEPS (07 42 19)
AIR AND VAPOR BARRIER (07 27 00)
EXISTING MASONRY WALL (BEYOND)
3 TYPICAL SOFFIT AT OVERHANG
SCALE: 3"=1'-0"
0 3" 6" 9"

Redundancy

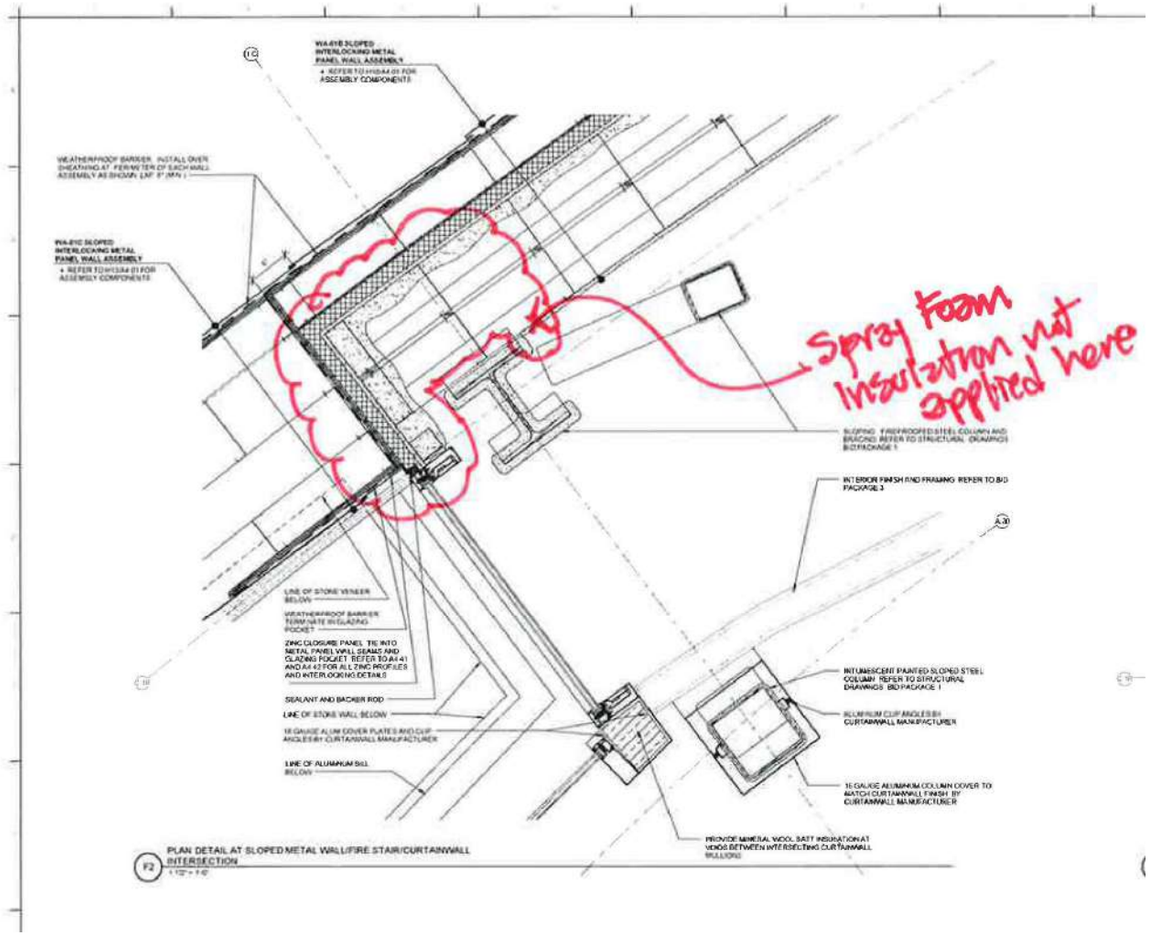

6" COLD FORMED STEEL FRAMING (05 40 00)
EXTERIOR SHEATHING (06 16 43)
METAL PLATE PANEL (07 42 19)
INSULATION AND Z-GRIT (07 42 19)
AIR AND VAPOR BARRIER (07 17 00)
PROVIDE WEEPS (07 42 19)
FOAM INSULATION (07 42 19)
CONTINUOUS BACKER ROD AND SEALANT (07 92 00)
STEEL STUD SUPPORT ANGLE AND OUTRIGGER SEE STRUCTURAL (05 50 00)
EXISTING STEEL BEAM
EXISTING FIREPROOFING TO REMAIN; REPLACE WHERE DAMAGED OR REMOVED (TYP.) (07 81 00)
FURRING CHANNEL, REFER TO STRUCTURAL DRAWINGS (05 40 00)
WOOD BLOCKING (06 10 00)
EXISTING CEILING TO REMAIN
INTERIOR PERIMETER CONTINUOUS BACKER ROD AND SEALANT (07 92 00)
ALUMINUM WINDOW (08 51 13)
CONTINUOUS BACKER ROD AND SEALANT (08 51 13)
5 TYPICAL SOFFIT AT CLERESTORY
SCALE: 3"=1'-0"
0 3" 6" 9"

Constructability

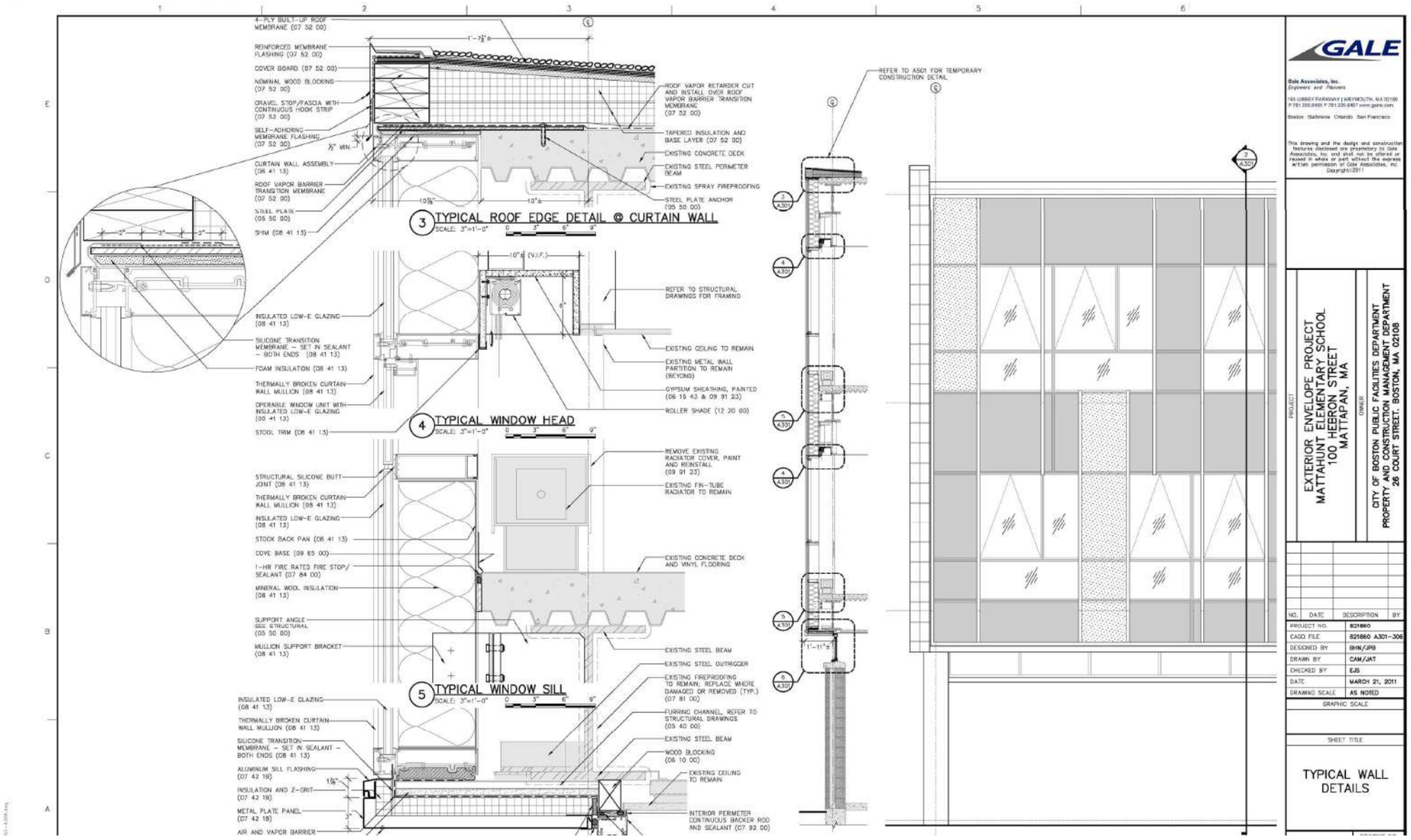


A15	EXTERIOR SECTION DETAIL_ CURTAIN WALL BASE @ OVERHANG
	3" = 1'-0"

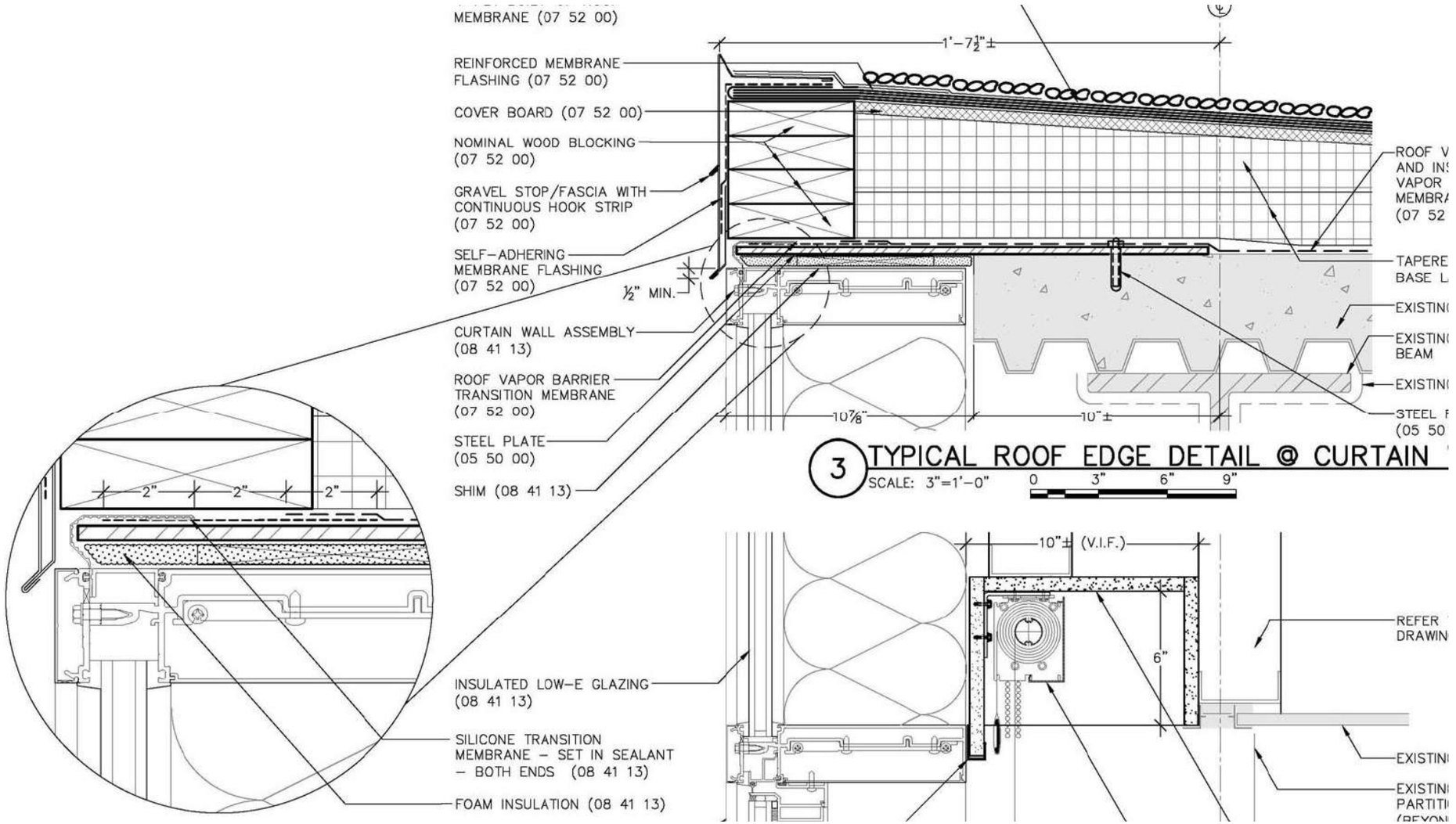
Constructability



Level of Detail



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.”

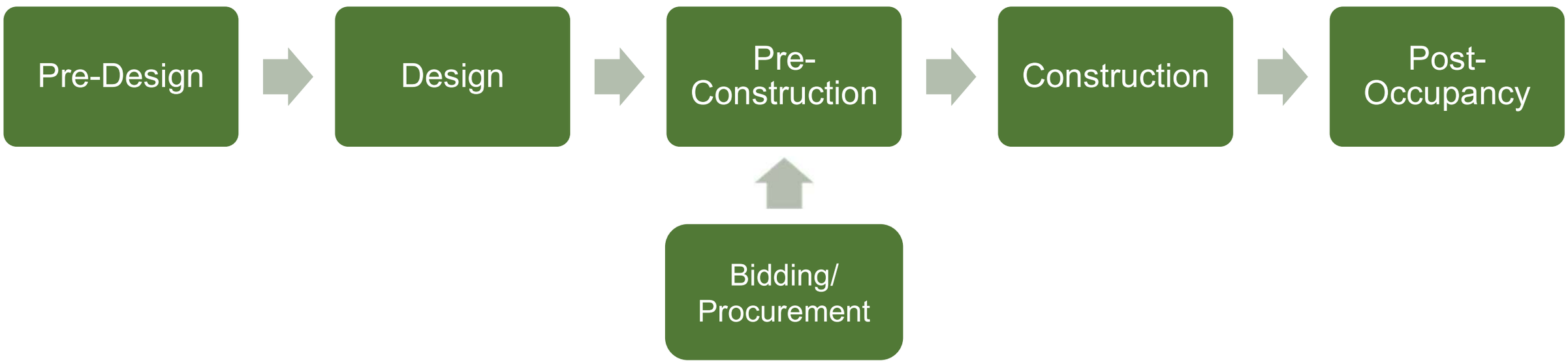
ASTM E2813

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

IBEC
International Institute of Building Enclosure Consultants

The Building Enclosure Commissioning Process




When do coordination meetings happen?
Pre-Design
Design
Bidding/ procurement
Pre-construction
Construction
Post-Occupancy

Pre-Construction Phase

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

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

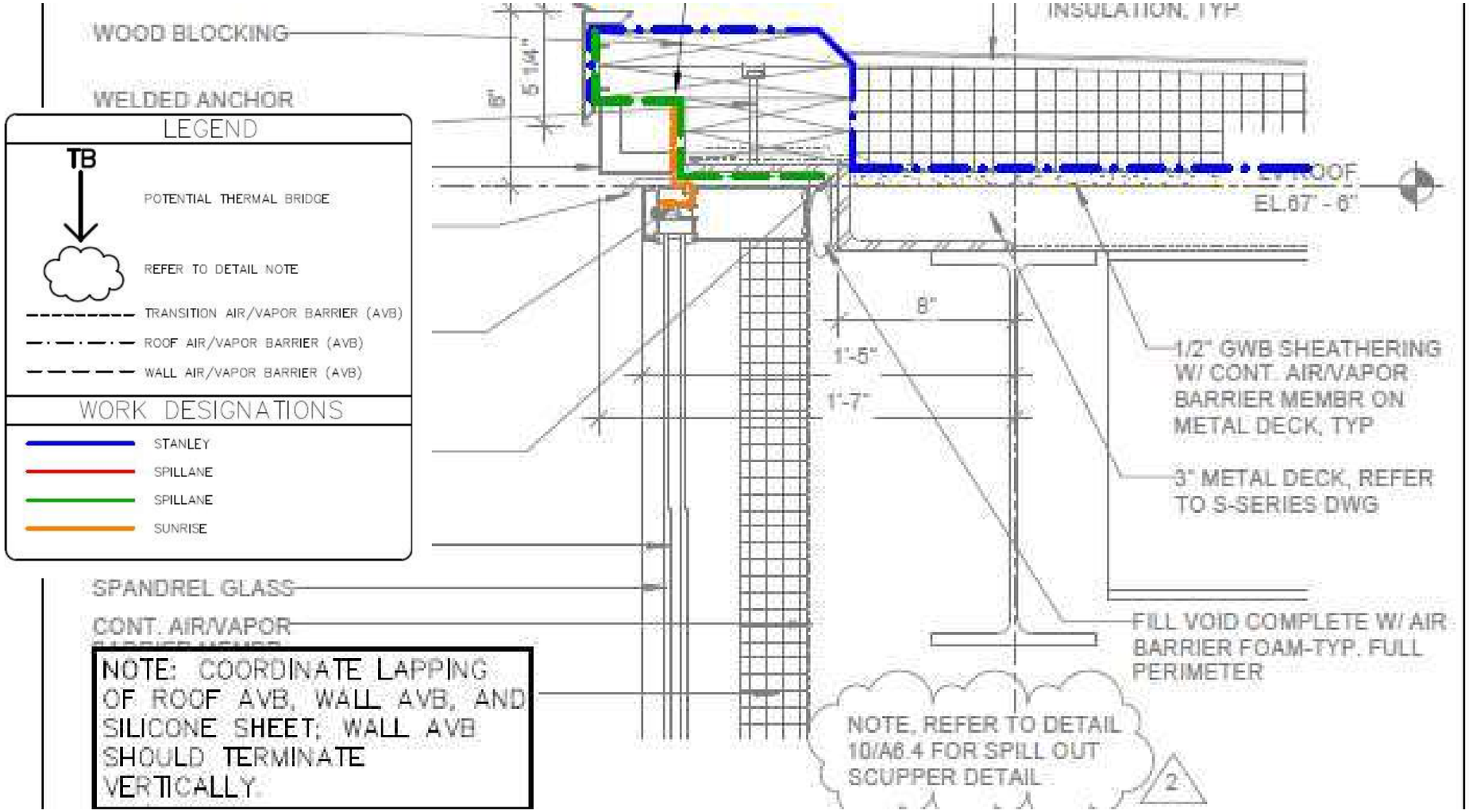
Drawing Review

Areas of Interest

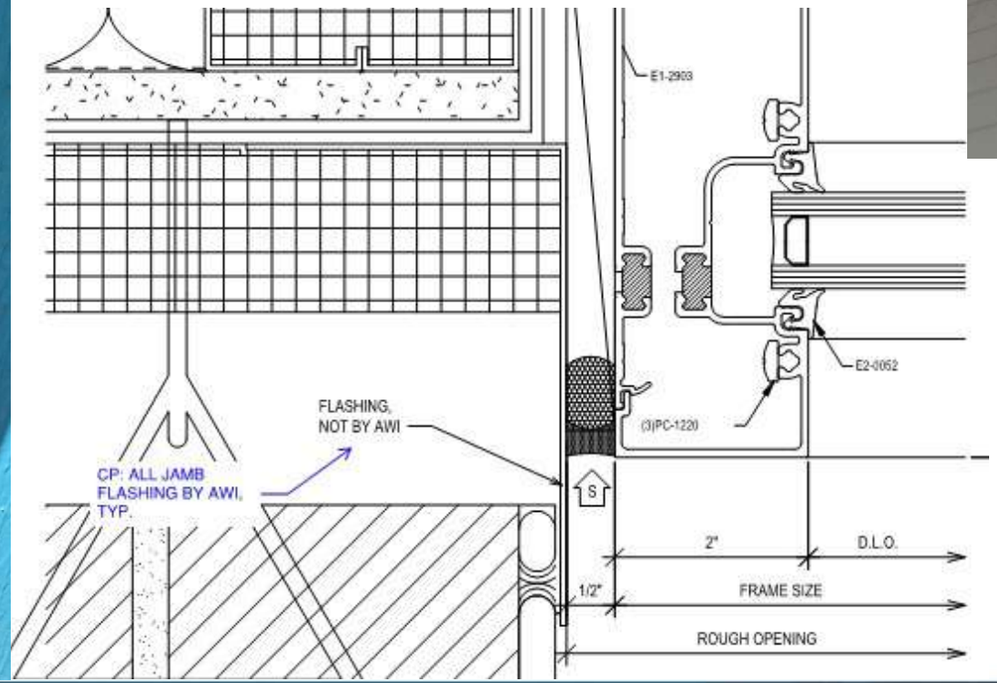
- Roof to AVB tie-in (parapets and roof to wall interfaces)
- Windows/Storefronts/Curtainwall tie-in to AVB particularly jamb flashing and covers
- Through wall flashing
- Cladding attachments
- Expansion Joints

Material Selection

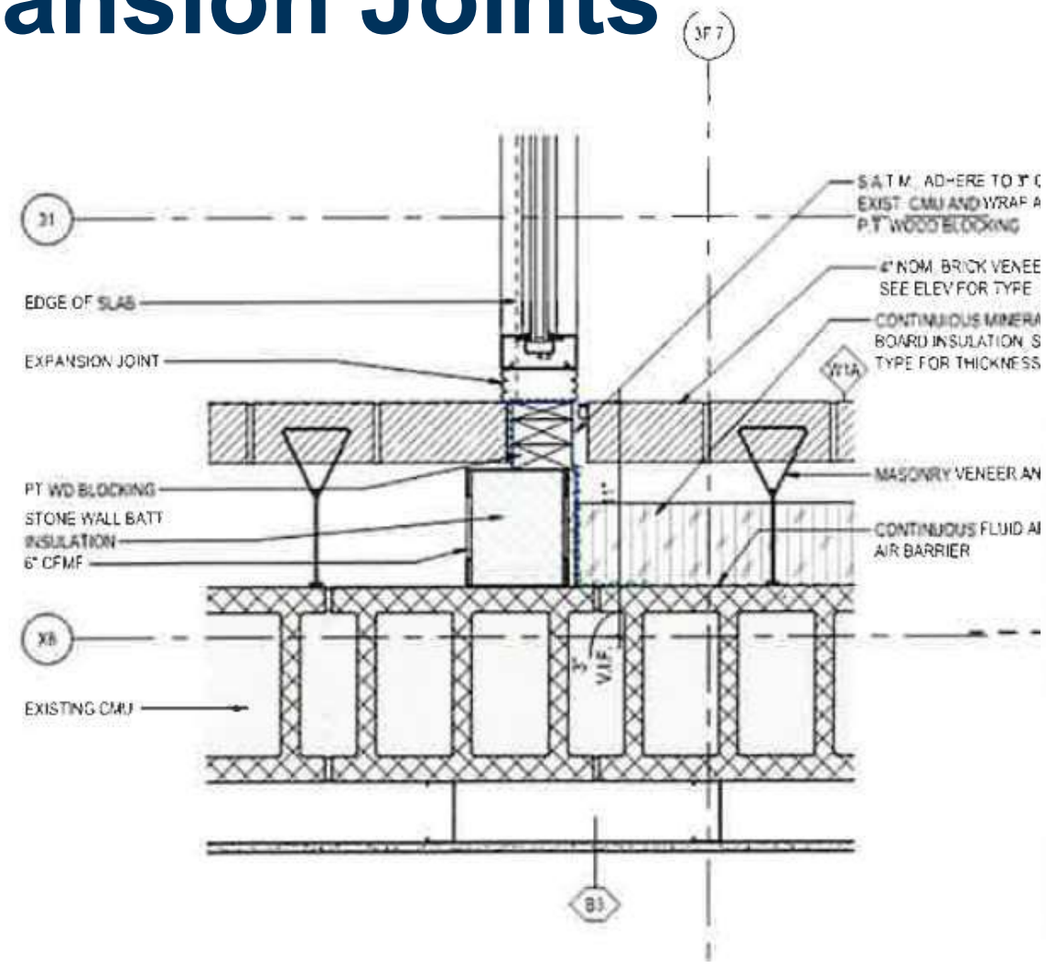
Roof Tie-In

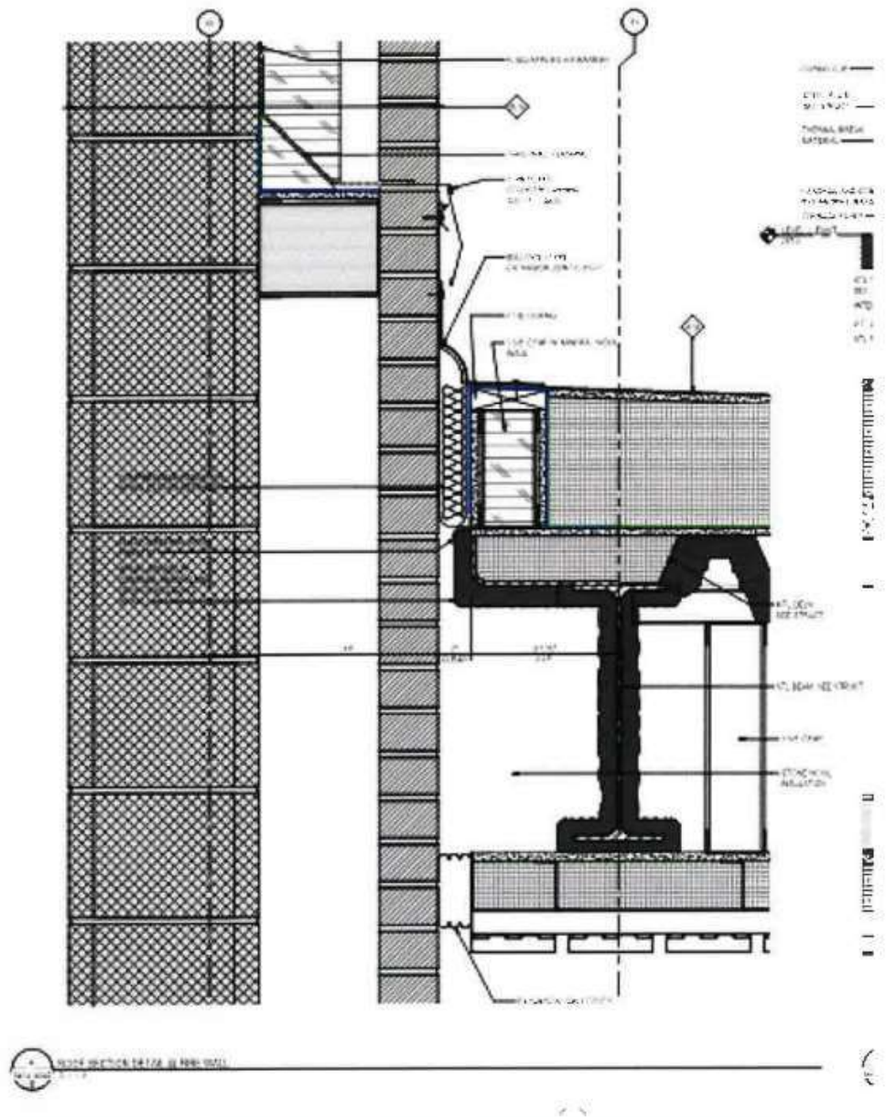

WOOD BLOCKING
WELDED ANCHOR
LEGEND
TB
POTENTIAL THERMAL BRIDGE
REFER TO DETAIL NOTE
TRANSITION AIR/VAPOR BARRIER (AVB)
ROOF AIR/VAPOR BARRIER (AVB)
WALL AIR/VAPOR BARRIER (AVB)
WORK DESIGNATIONS
STANLEY
SPILLANE
SPILLANE
SUNRISE
SPANDREL GLASS
CONT. AIR/VAPOR
NOTE: COORDINATE LAPPING OF ROOF AVB, WALL AVB, AND SILICONE SHEET; WALL AVB SHOULD TERMINATE VERTICALLY.
INSULATION, TYP.
6"
5 1/4"
8"
1'-5"
1'-7"
1/2" GWB SHEATHERING W/ CONT. AIR/VAPOR BARRIER MEMBR ON METAL DECK, TYP
3" METAL DECK, REFER TO S-SERIES DWG
FILL VOID COMPLETE W/ AIR BARRIER FOAM-TYP. FULL PERIMETER
NOTE, REFER TO DETAIL 10/A6.4 FOR SPILL OUT SCUPPER DETAIL
2

Jamb Flashing

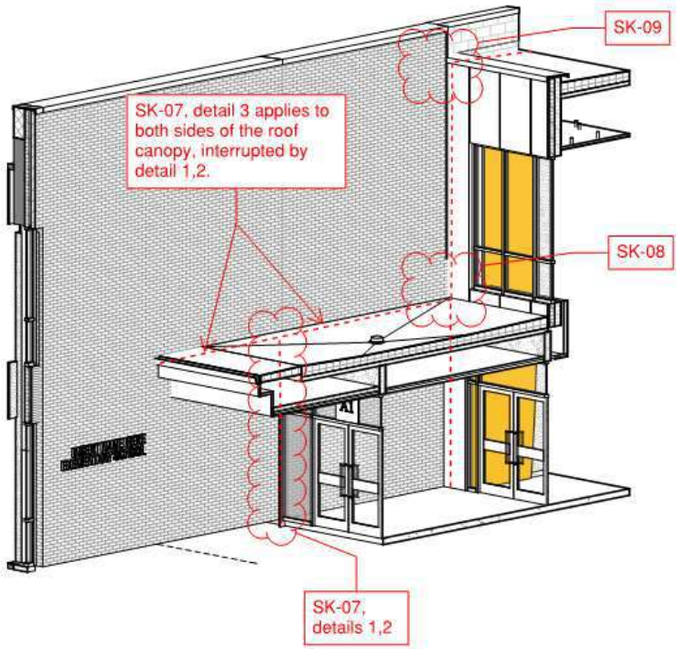


Expansion Joints





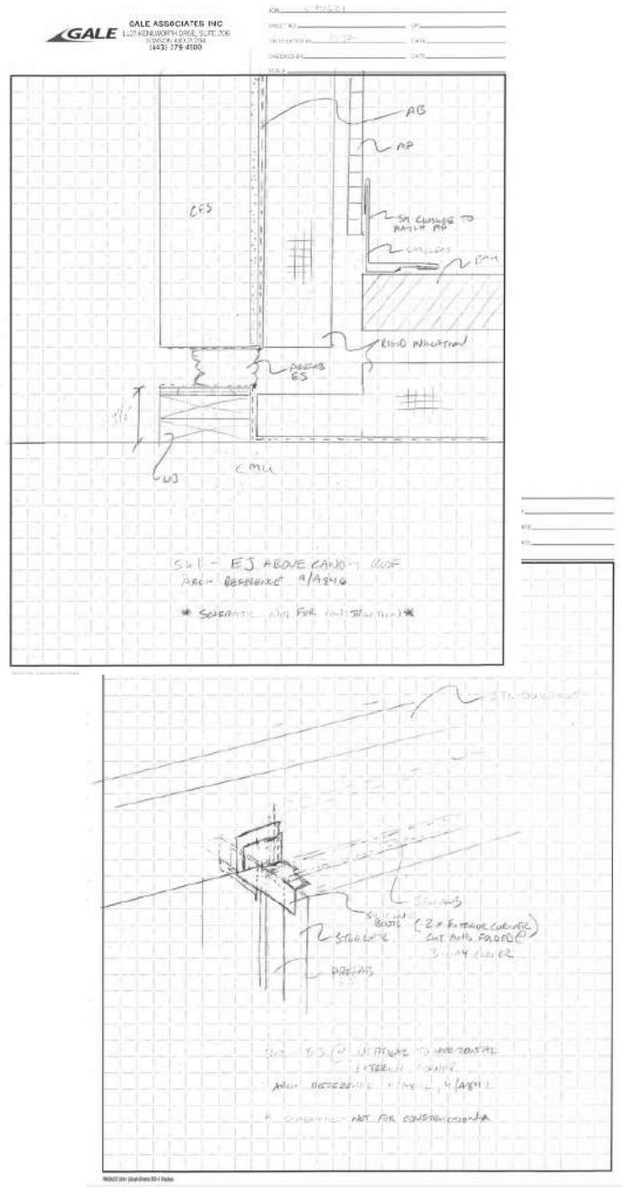
Expansion Joints



Location 1: Storefront expansion joint

Location 2: Expansion joint at canopy

Location 3: Vertical expansion joint



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

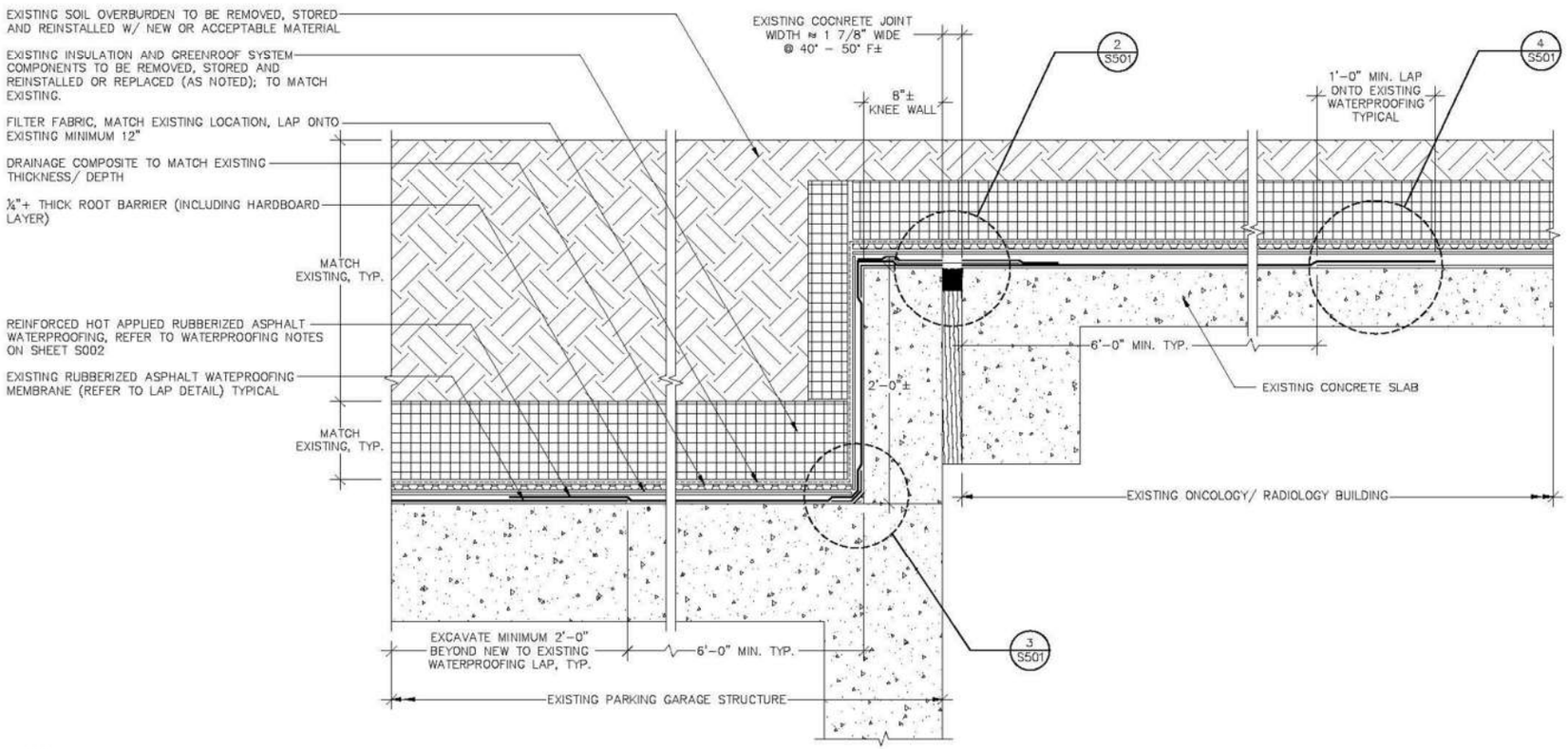
Case Studies
Not Coordinated

Setting up a Successful Meeting

Know the Fundamentals

Case Study 1
Expansion Joints

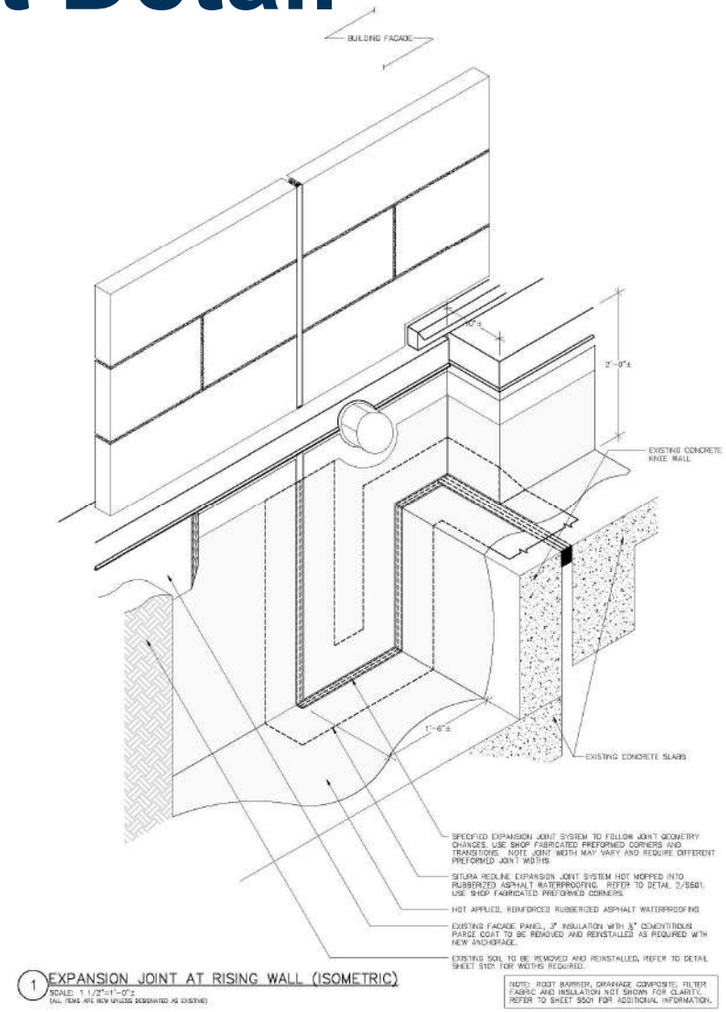
Design Detail



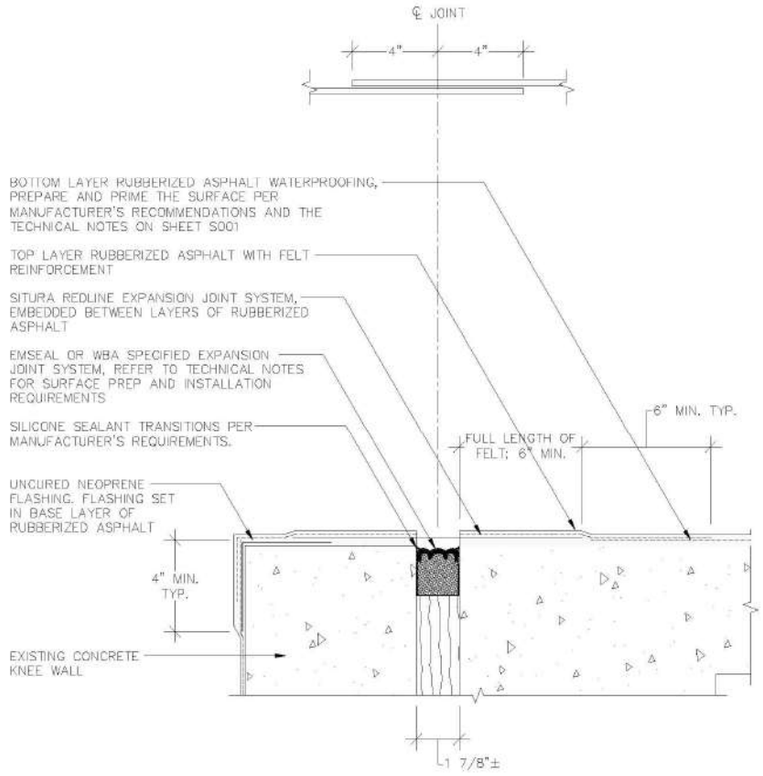
1 EXPANSION JOINT WATERPROOFING
SCALE: 1 1/2"=1'-0"
(ALL ITEMS ARE NEW UNLESS DESIGNATED AS EXISTING)

Construction Photo

As-Built Detail



1 EXPANSION JOINT AT RISING WALL (ISOMETRIC)
SCALE: 1 1/2"=1'-0"±
(ALL ITEMS ARE NEW UNLESS DESIGNATED AS EXISTING)



2 EXPANSION JOINT DETAIL
SCALE: 3"=1'-0"
(ALL ITEMS ARE NEW UNLESS DESIGNATED AS EXISTING)

Final Installation Photo

Case Study 1
Expansion Joints

Sequencing


ANGLE SUPPORT FOR ACM BAND PANEL
STEP #1:
CUT IN NEW EXP/CONTROL JOINT
ELBEX SILICONE
SHEET
NOTE: SAME PROCESS AT AREAS WHERE NO ANGLE HAS BEEN INSTALLED
Revised

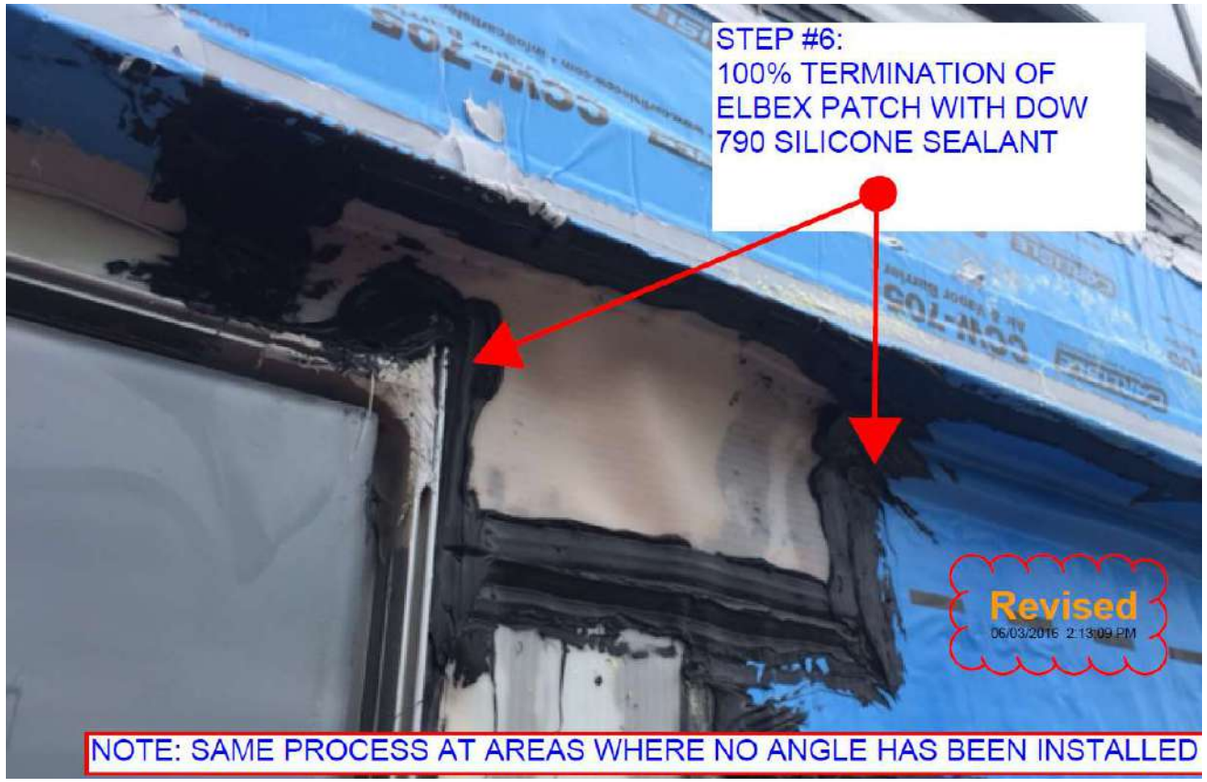

STEP #2: INSTALL BACKER ROD FOR NEW "BELLOWS"
NOTE: SAME PROCESS AT AREAS WHERE NO ANGLE HAS BEEN INSTALLED
Revised

Sequencing

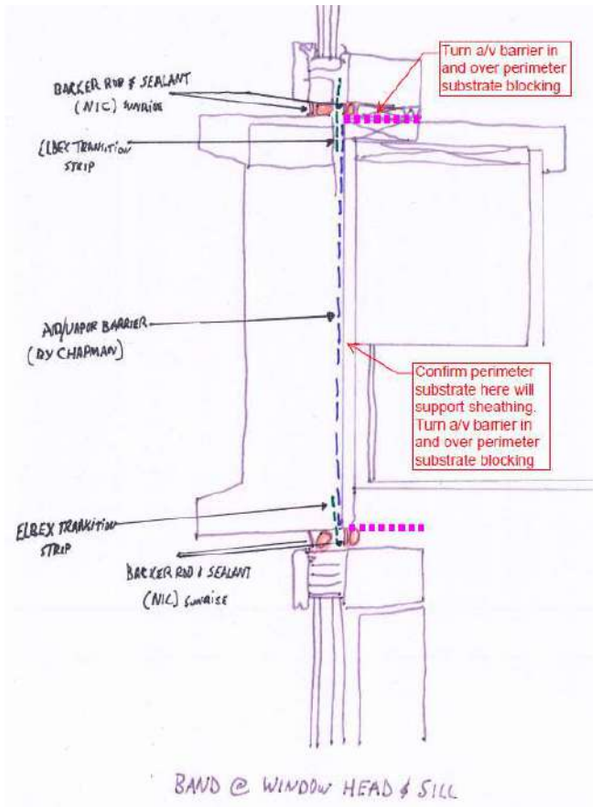

STEP #3:
STRIP NEW AVB OVER BACKER ROD @ THE EXP/CONTROL JOINT ONTO BOTTOM ON ACM SUPPORT ANGLE
NOTE: SAME PROCESS AT AREAS WHERE NO ANGLE HAS BEEN INSTALLED
Revised


STEP #5:
TERMINATION OF AVB PATCH WITH DOW 790 SILICONE SEALANT
STEP #4:
INSTALL ELBEX "PATCH" IN BED SEALANT FROM AVB ON EXISTING ELBEX
NOTE: SAME PROCESS AT AREAS WHERE NO ANGLE HAS BEEN INSTALLED
Revised

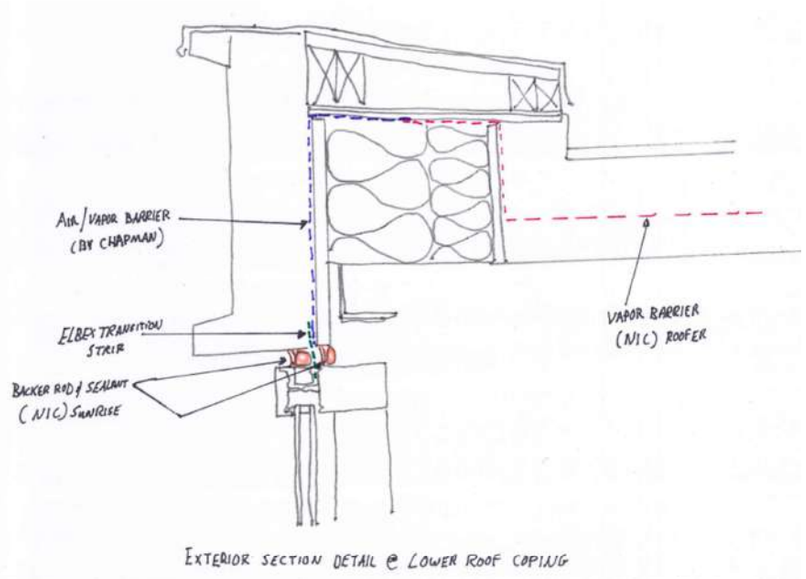
Sequencing


STEP #6:
100% TERMINATION OF
ELBEX PATCH WITH DOW
790 SILICONE SEALANT
Revised
06/03/2016 2:13:09 PM
NOTE: SAME PROCESS AT AREAS WHERE NO ANGLE HAS BEEN INSTALLED

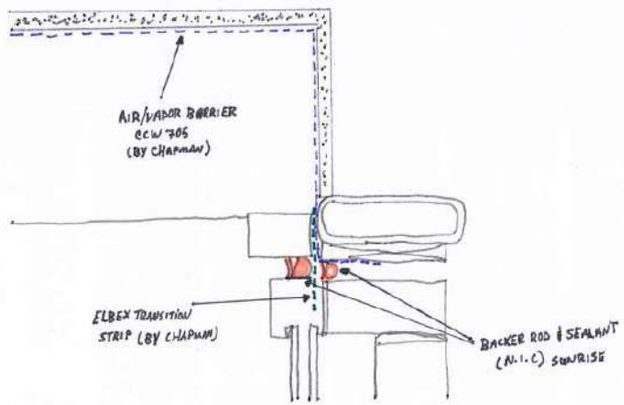
Coordination Drawings



BAND @ WINDOW HEAD & SILL



EXTERIOR SECTION DETAIL @ LOWER ROOF COPING



EXTERIOR SECTION DETAIL @ SOFFIT AND CURTAINWALL

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

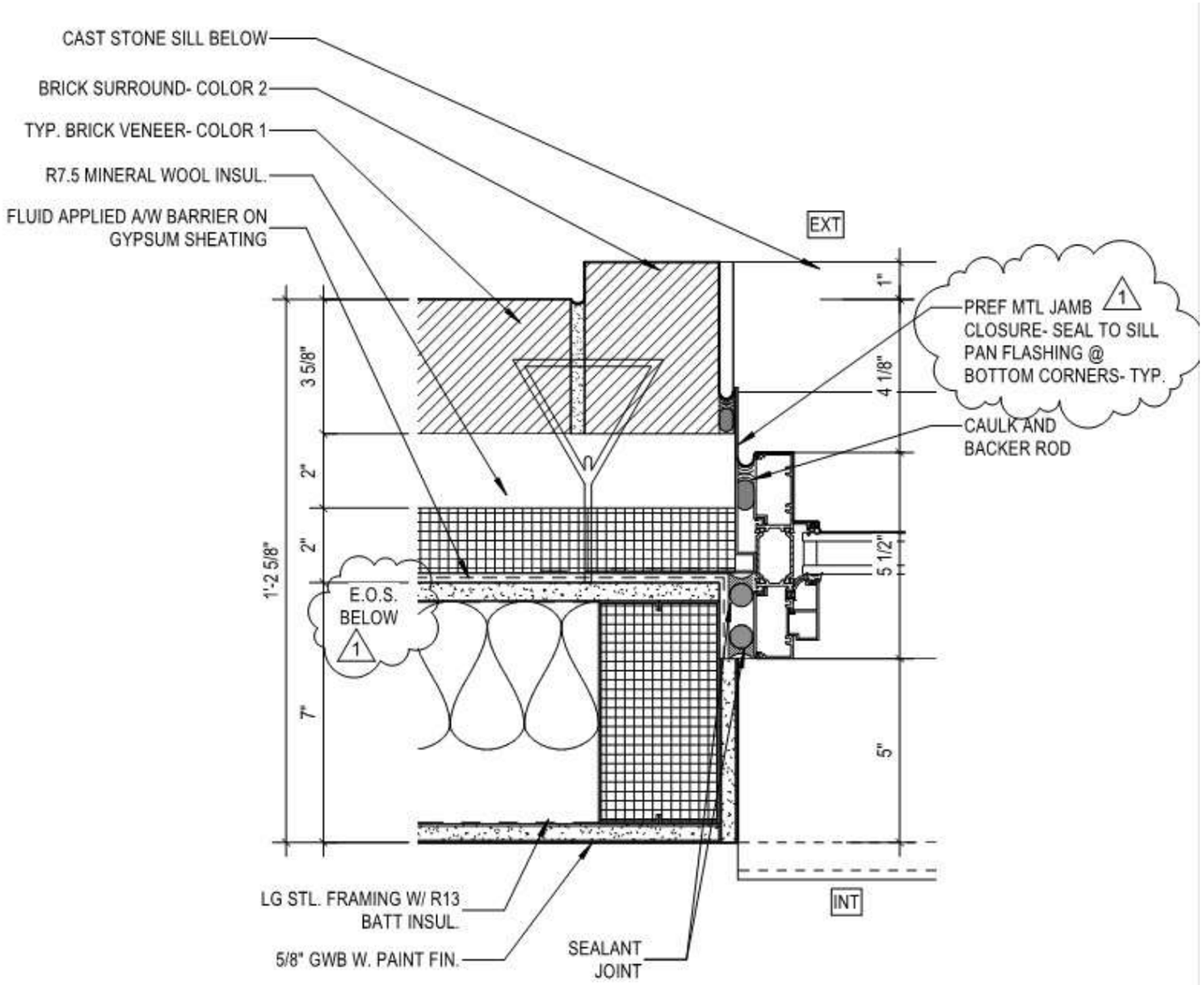
PEER REVIEW COMMENTS

By Jason Wagner Jan 05, 2016

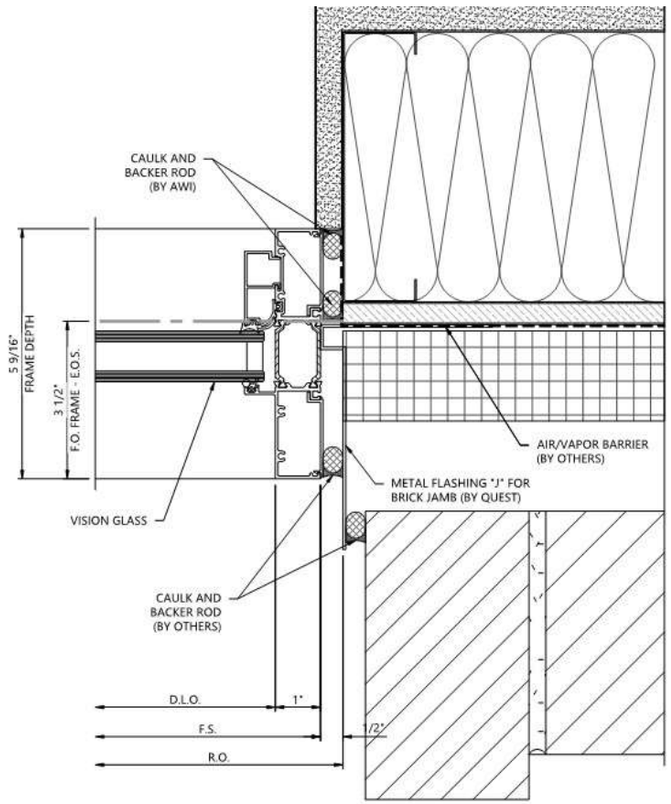
Note: Gale's services are limited to provide commentary on design and construction documents prepared by others. The Architect of Record is solely responsible for all aspects of the design, including drawings, details, specifications, and product selection. Our services do not include preparation of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

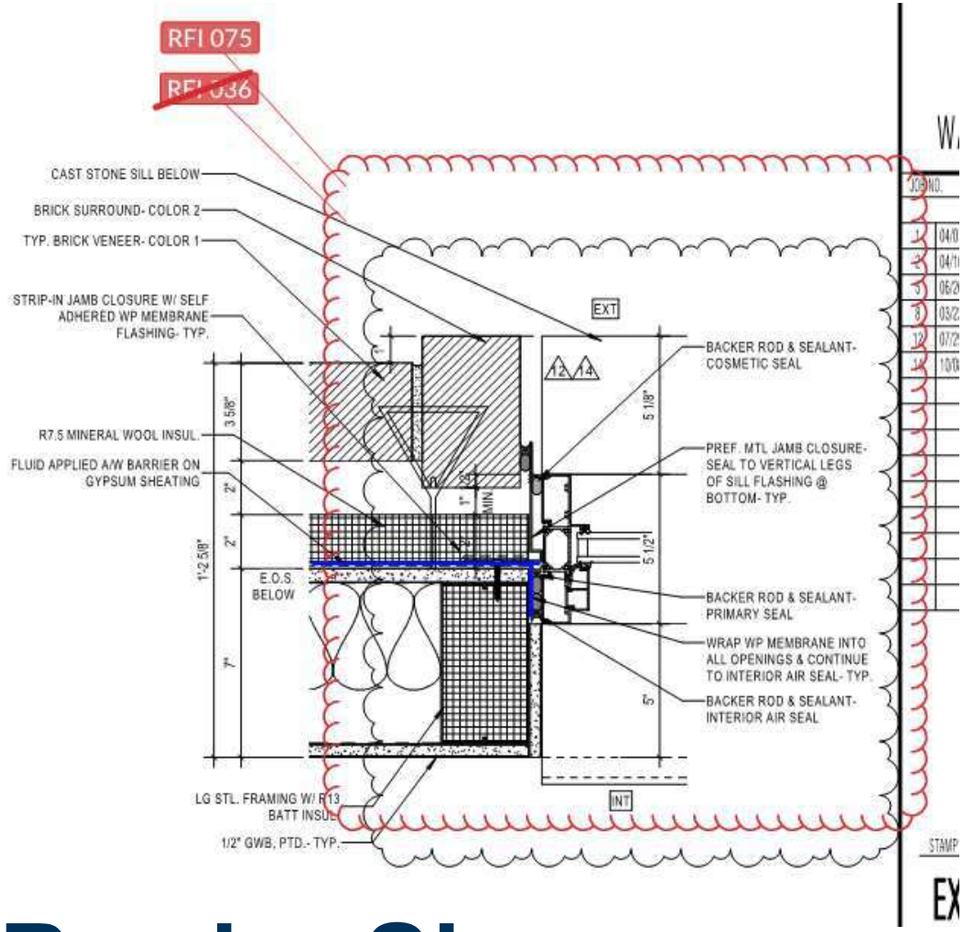
Case Study 3
Sequencing (Access)

Design Detail



Window Wall Shops





Air Barrier Shops

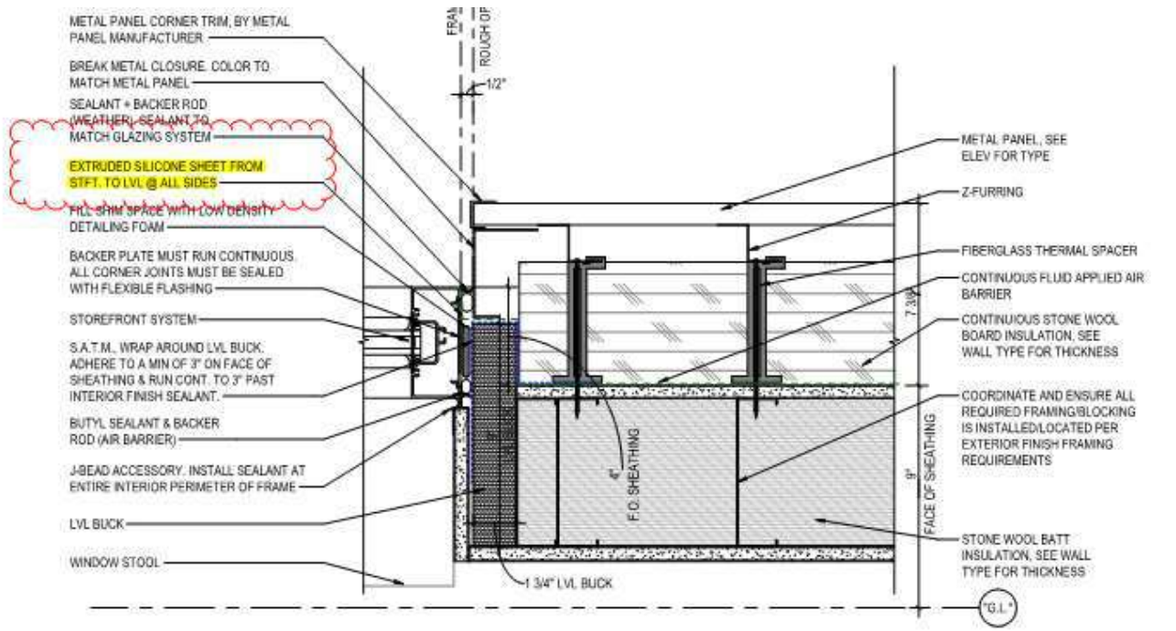
As-built Conditions

Case Study 4
Atypical Details

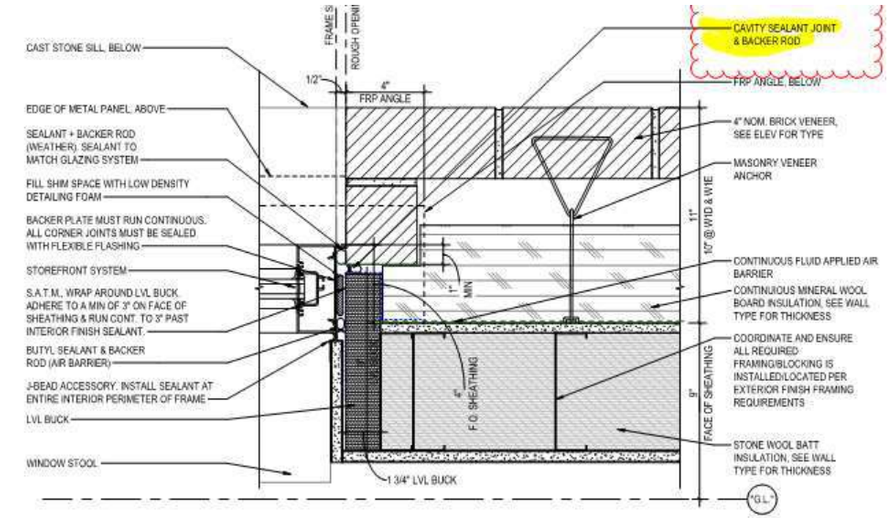
Difficult Detailing

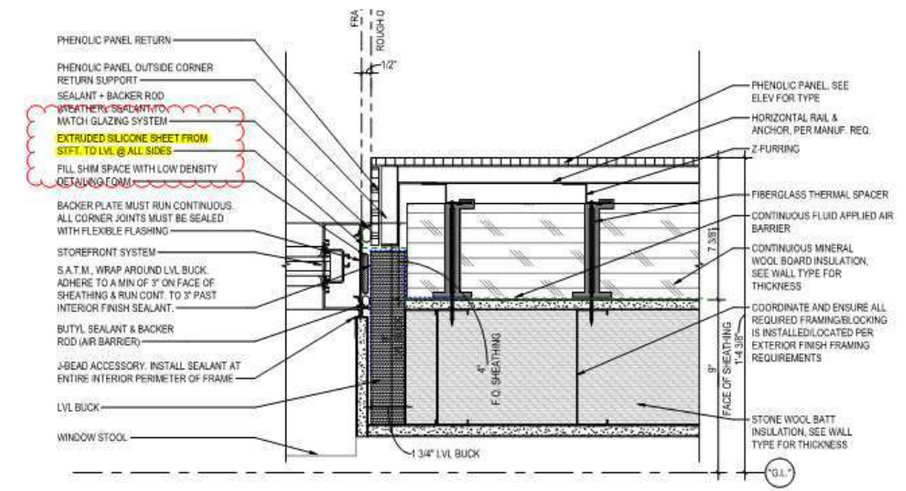
Case Study 5
Closures

Jamb Flashing



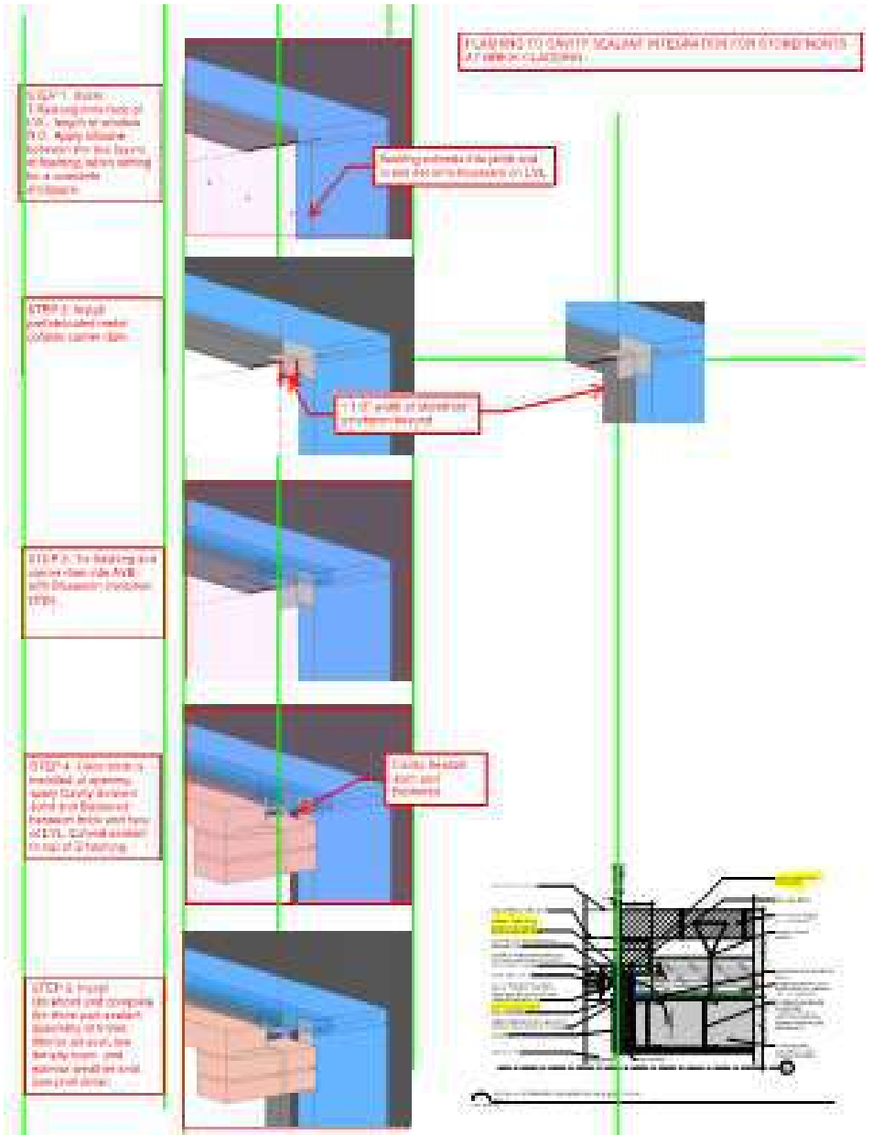
9 A131 A830 TYPICAL 4.5" STOREFRONT JAMB @ METAL PANEL @ WALL TYPES "W4 "
3" = 1'-0"



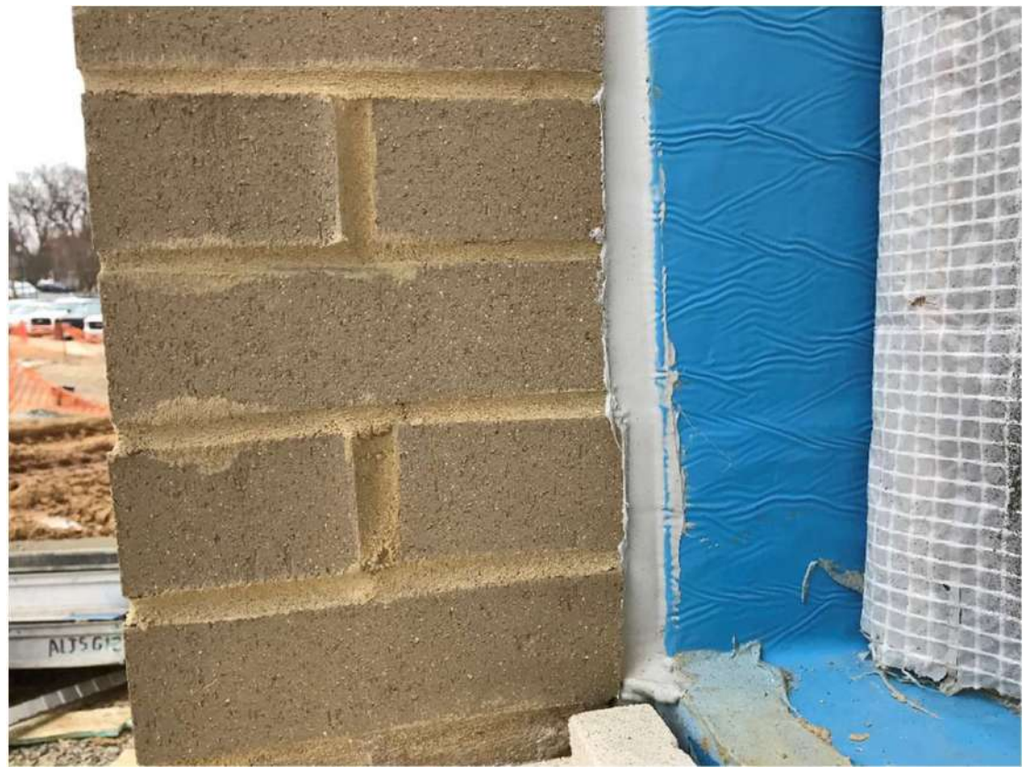


6 A111 A830 TYPICAL 4.5" STOREFRONT JAMB @ PHENOLIC PANEL @ WALL TYPES "W3 "
3" = 1'-0"

Jamb Flashing



Jamb Flashing



Questions?

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building
enclosure
conference