

Mandatory Fundamental BECx Tests ASTM E2813

Air and Water testing of
Opaque Walls

Air and Water infiltration
testing of Windows

Infrared Roof Scan

AAMA 501.2, ASTM E1105
Water Penetration Test of
Installed Windows, Doors,
Skylight & Curtain Walls

Sealant Test

This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.



Mandatory Enhanced BECx Tests ASTM E2813

Whole Building Air
Test (ASTM E1827)

or

Dynamic Fan testing
(ASTM E779)

Dynamic Water
Penetration test
AAMA 501.1

Air Borne Sound
Attenuation of
Building Facades and
Façade Elements
(ASTM E966)

This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.



Field Tests Common to Enhanced and Fundamental Cx

		ENHANCED	FUNDAMENTAL
Air Leakage Testing of Opaque Walls	ASTM E783	Yes	Yes
Infrared Scan (Roof)	ASTM C1153	Yes	Yes
Horizontal Waterproofing- Water Test	(ASTM D5957)	Yes	Yes
Diagnostic Water Leakage Field Check of Installed Storefront, Curtain Wall, Sloped Glazing	AAMA 501.2	Yes	Yes
Static Water Penetration- Windows	ASTM E1105	Yes	Yes
Sealant Test	ASTM C1193	Yes	Yes



This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

SPECIFICATION REVIEWS

REAL WORLD EXAMPLE

100% Issue

b. Flashing Membrane:

- 60 mil PVC single ply membrane approved equal.
- 60 mil PVC single ply membrane approved equal.
- 60 mil Parasolo PVC single ply membrane approved equal.

c. Exposed Face Color: White

B. Mechanically Fastened Base Sheet

- Johns Manville: Perma Ply #28 mechanically fastened
- Soprema: Sopra G mechanically fastened
- Siplast: Parabase FS mechanically fastened

C. Modified Bitumen Vapor Barrier over mechanically fastened base sheet

- Johns Manville: One ply of DynaBase Ply approved equal.
- Soprema: One ply of Sure MB 90 Smooth S or A/E approved equal.
- Siplast: One ply of Ply of Paradeine 20 P approved equal.

2.03 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing material manufacturer for intended use, covered by the compatible with membrane roofing

- Base sheet fasteners for LWIC roof deck.

Note: drawings do not indicate there

B. Cant Strips: Fiberboard, ASTM C208; minimum on the project drawings.

2.5 ADHESIVE

A. Where specified, for adhering cover board, layer(s) of insulation, tapered insulation system, saddle and cricket construction where indicated, use urethane foam adhesive; product accepted is capable of meeting the specified wind uplift

Suggest incorporate of insulation with staggered per requirements

PART 3 - EXECUTION

3.1 GENERAL

A. Ensure that the substrate has been prepared acceptable to receive insulation materials. Remove all debris, old fasteners, and general work and substrate preparation.

3.2 INSULATION AND COVER BOARD INSTALLATION

A. Lay out and cut insulation boards and roof cover boards to fit the roof deck. Stagger board joints by the maximum dimension.

B. Stagger board joints by the maximum dimension.

C. Neatly cut insulation and roof cover boards to fit the roof deck. At locations where less than a full board is required, use the largest size practical. Avoid numerous small sections of cover board or insulation.

D. Fill gaps between boards, and between boxes and equipment with additional insulation material.

E. Protect all insulation and cover board from weather. Do not install more insulation and cover board until the roofing membrane on the surface is installed and covered with the roofing membrane on the surface.

F. Install temporary water out-offs at the edge of the roof deck.

G. Prior to installing the insulation, inspect the roof deck to determine if objects, such as sprinklers, lights, conduits, fans, or gas lines are attached to the deck. Exercise caution to ensure that insulation fasteners do not penetrate these objects.

Incorporate FM criteria FM 1-135 in corner as shown on drawings, so that base specification 075200 and alternate specification 075410 have same performance criteria

Drawings do not show Existing LWIC. Co-ordinate specs or drawings or both

C. Roofing System Design: Provide membrane roofing system approved by the manufacturer per the design intent to resist uplift pressure calculated according to ASCE 7-16 and complying with the International Building Code (IBC), latest adopted edition for the geographical location of the Project.

Wind Uplift Performance: Roofing system shall be identical to systems provided in the manufacturer's assembly letter and meet or exceed design intent to resist wind uplift pressure calculated in accordance with ASCE 7-16 (For Main Bldg. and Bldg. "K" only - refer to plans for wind uplift pressures for remaining buildings). Contractor is to verify wind uplift pressures and fastening patterns.

- Zone 1= Field-of-Roof Uplift Pressure: -35.3 lbf/sq. ft.
- Zone 1= Field-of-Roof Uplift Pressure: -61.5 lbf/sq. ft.
- Zone 2= Perimeter Uplift Pressure: -48.6 lbf/sq. ft.
- Zone 3= Corner Uplift Pressure: -110.6 lbf/sq. ft.

Check for pressures as shown on Drawings A 0.02. It is not co-ordinated

E. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system. Roofing system must meet the design intent and wind uplift capabilities associated with the uplift rating requirements listed in this specification and that are listed in FM Approvals "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

Fire/Windstorm Classification: Class 1A-90 minimum.
Hail Resistance: SH.

Incorporate appropriate FM classification per project requirements

- F. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1918 based on testing identical products by a qualified testing agency.
- G. Energy Performance: Existing LWIC is being reused-average depth = 8". Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- H. Energy Performance: Provide roofing system with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRR-1.



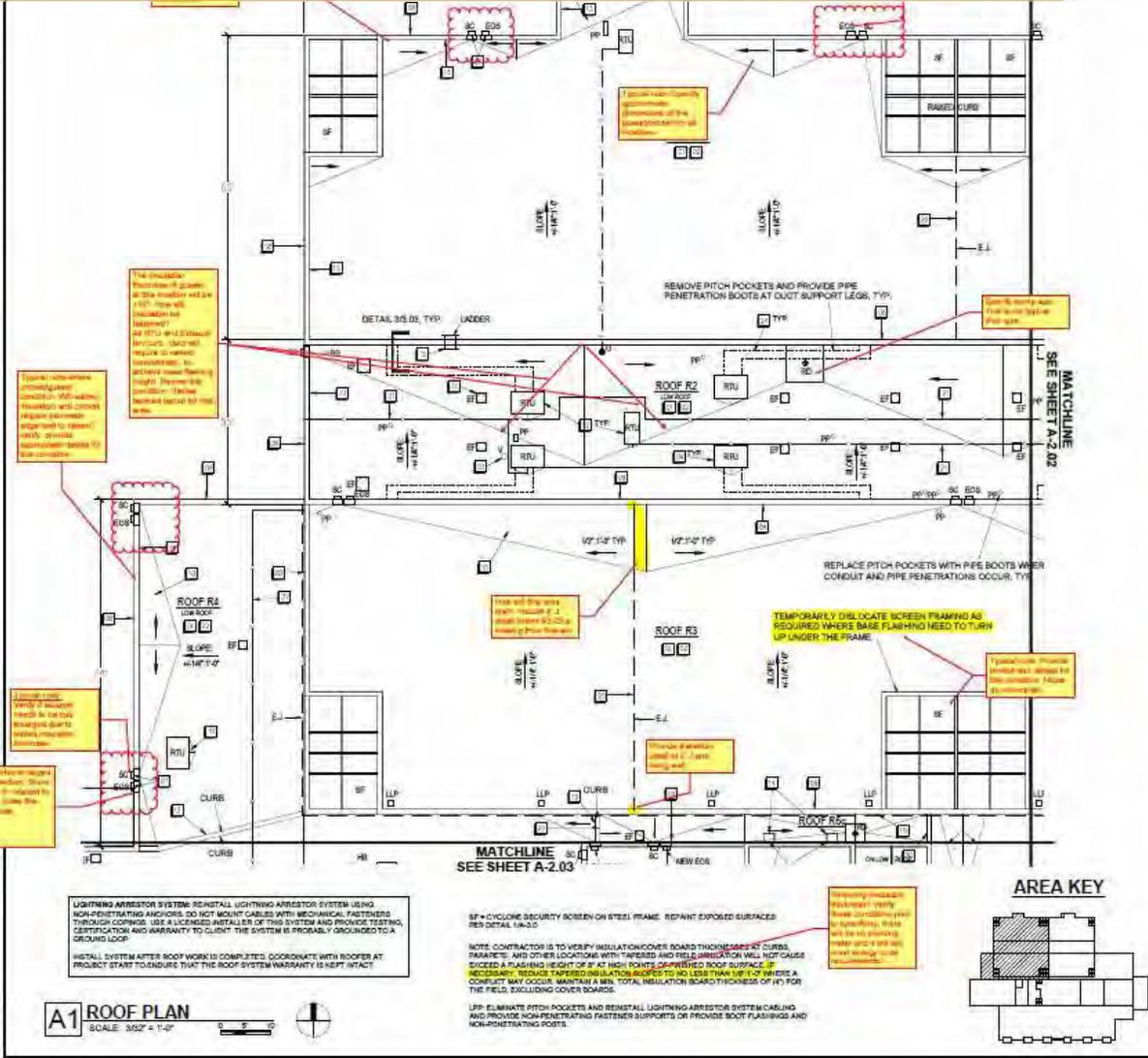
This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

PUSHING THE ENVELOPE
BE COMMISSIONING

DRAWINGS REVIEW

REAL WORLD EXAMPLE

2022, Ventco Design Group, LLC. These drawings are prepared by me, copyright law of the United States and other countries may apply. No part of these drawings may be reproduced or transmitted in any form or by any means without the written permission of Ventco Design Group, LLC.



GENERAL NOTES	
1.	DEMOLITION NOTES ARE FOR THE CONTRACTOR'S CONVENIENCE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXTENT AND TYPE OF ROOF SYSTEM(S) AND RELATED MATERIALS TO BE REMOVED.
2.	CONTRACTOR SHALL TEMPORARILY SALVAGE, PROTECT & STORE EXISTING EQUIPMENT, FIXTURES, OR COMPONENTS REMAINING FOR REINSTALLATION AFTER ROOF REPLACEMENT/RECOVER.
3.	DAMAGED OR DETERIORATED ROOF DECK UNCOVERED DURING ROOFING DEMOLITION SHALL BE DOCUMENTED BY THE ROOFING CONTRACTOR, REFERRED TO TERRASOON IN WRITING, AND REPLACED ON A UNIT PRICE BASIS AS DIRECTED BY TERRASOON.
4.	LIMIT ROOFING SYSTEM REMOVAL TO AN AREA WHICH CAN BE MADE WATER-TIGHT AT THE END OF EACH WORKING DAY OR WHEN RAIN OR SNOW ARE EXPECTED.
5.	ENSURE BUILDING REMAINS WATER-TIGHT THROUGHOUT CONSTRUCTION.
6.	THE CONTRACTOR SHALL DOCUMENT AND PHOTOGRAPH ALL EXISTING ROOFTOP EXHAUST FANS, RTU, AND ANY OTHER EQUIPMENT STATUS PRIOR TO THE START OF WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR OR REPLACE ANY EQUIPMENT FOUND TO BE MALFUNCTIONING OR INOPERABLE AFTER THE PROJECT IS COMPLETED, AT HIS OWN COST TO THE OWNER, IF NOT REPORTED PRIOR TO THE START OF WORK.
7.	TEMPORARILY DISCONNECT AND RECONNECT ANY MECHANICAL/ELECTRICAL LINES AND EQUIPMENT AS NECESSARY TO REMOVE OR REPLACE THE ROOF SYSTEM. COORDINATE DISCONNECTION AND RECONNECTION WITH STORE MANAGEMENT.
8.	THE CONTRACTOR SHALL REMOVE ALL EXISTING ITEMS WHICH INTERFERE WITH THE INSTALLATION OF THE NEW ROOF SYSTEM AND RELATED WORK. ALL SUCH EQUIPMENT AND ITEMS SHALL BE TEMPORARILY RE-ROUTED AS NECESSARY TO STAY IN SERVICE. ANY ITEMS NOT REQUIRED TO STAY IN SERVICE SHALL BE PROPERLY STORED BY THE CONTRACTOR AND REINSTALLED AT THE COMPLETION OF THE WORK. ALL ELECTRICAL, MECHANICAL AND PLUMBING WORK SHALL BE PERFORMED BY LICENSED SUBCONTRACTORS. ALL REINSTALLED WORK SHALL BE REINSPECTED AT HIS ADDITIONAL COST TO THE OWNER. ANY EXISTING WORK WHICH DOES NOT CONFORM TO APPLICABLE CURRENT CODES SHALL BE REFERRED TO TERRASOON.
9.	INSPECT AREAS IMMEDIATELY BELOW ROOF DECK AND NOTE CONDUIT AND/OR PIPING RISERS THAT MIGHT CONFLICT WITH NEW FASTENER LOCATIONS.

KEY NOTE - NEW ROOF	
1	INSTALL A NEW TYPICAL APPROX. 2" PLY WOOD ROOF W/ CAP SHEET OVER A 1/2" INTER-DECK CORNER BOARD ON (FLASHERS OF P POLYISO. INSULATION BOARD) OVER A 1/2" MECHANICAL INSULATION BOARD ON THE EXISTING METAL DECK. PROVIDE NEW FLASHING, CORNGS, DOWNSPOUTS, DRAIN COMPONENTS AND OTHER ELEMENTS THAT PROVIDE A FULL SYSTEM WITH A 20-YR. W.L. WARRANTY.
2	INSTALL A NEW 2" MIN. 30-YEAR W.L. 90/10 TPO ROOF OVER A 1/2" POLYISO. COVER BOARD (OR 1/2" GIBBERCO COVER BOARD IF APPROVED BY TERRASOON) OVER 1/2" POLYISO. INSULATION BOARD ON THE EXISTING METAL DECK. PROVIDE NEW FLASHING, CORNGS, DOWNSPOUTS, DRAIN COMPONENTS AND OTHER ELEMENTS THAT PROVIDE A FULL SYSTEM WITH A 20-YR. W.L. WARRANTY.
3	TURN UP BASE FLASHING AT RTU CURBS AND SET EDGE W/ MECHANICALLY FASTENED TERMINATION BAR SET W/ SEALANT-SEE DETAIL 04A-01.
4	REPLACE EXISTING EXHAUSTS WITH NEW RTU LIGHTS AND MATCHING TRANSLUCENT UNITS. PROVIDE GALVANIZED SOADS, W/ 60% SLOPE/SLIGHT GUARDS BY GARTER ON AND APPROVED EQUIVALENT.
5	INSTALL NEW HOT STACK PER DETAIL 04A-01.
6	INSTALL NEW WEATHER-RESISTANT CLAD SCUPPER UNDER GAUUGE AND RAISE/ COLLECTOR BOXES. SEE DETAIL 04B-01, 04B-02, 04B-03.
7	PROVIDE NEW 0-90 GALVANIZED PREFINISHED 1/2" THK COATED BRIDGE CLEAT TYPE CORNGS-SEE DETAIL 04A-03.
8	NEW COUNTER FLASHING - SEE DETAIL 02B-01.
9	PROVIDE NEW SADDLES AND CRACK SETS. PROVIDE A TAPERED INSULATION LAUNCH FOR TERRASOON APPROVAL.
10	PROVIDE NEW BASE FLASHING AT EQUIPMENT CURBS-SEE DETAIL 04A-01.
11	PROVIDE NEW 1/2" WEDGE SEPARATION CURBS WITH CORNG CAP-SEE DETAIL 04A-01.
12	INSTALL WEATHER-RESISTANT CLAD SCUPPER UNDER GAUUGE AND RAISE/ OVER WOOD BLOCKING AT CORNGS-SEE DETAIL 04A-01.
13	INSTALL NEW HYBRID COATED, 0-90, 24 GA. STEEL METAL CAP OVER RUSHERIZED ADHESIVE BACKED ASPHALT OVER PLASTER.
14	PREPARE AND REPAIR LADDERS AND ROOF PATCH EXTERIOR SURFACE. SEE DETAIL 04A-01.
15	PROVIDE NEW ROOF DRAIN FLASHING (CLAMMING BRGS, BOLTS AND CL. STRAINER-SEE DETAILS 2.8.3A, 3.0).
16	PROVIDE A CORNG COUNTER FLASHING TERMINATION-SEE DETAIL 04A-01.
17	PROVIDE NEW DUCT THROUGH-WALL FLASHING-SEE DETAIL 04A-01.
18	PROVIDE NEW E.I. WALL FLASHING-SEE DETAIL 04A-01.
19	PROVIDE NEW E.I. ROOF FLASHING-SEE DETAIL 04A-01.
20	PROVIDE NEW NON-PENETRATING PIPE SUPPORTS AT CONDENSATE LINES AND OTHER PIPE RUNS-SEE DETAILS 04A-01, 04A-02.
21	PROVIDE COUNTER FLASHING AT EPS WALL-SEE DETAIL 04A-01.
22	PROVIDE NEW STAINLESS STEEL EQUIPMENT CURB METAL CAP AND BASE FLASHING-SEE DETAIL 04A-01.
23	PROVIDE NEW NON-PENETRATING ADJUSTABLE SUPPORTS AT DUCTWORK.

Typical note: Provide enlarged detail (plan and section). Show overflow scupper in relation to primary scupper. Does this meet Building code 1611.1

a) The insulation re thickness of gusset at this location will be +15". How will insulation be fastened? All RTU and Exhaust fan curb, duct will require to raise

Typical note where considerably cricket/gusset achieve base condition. Will added height. Review insulation and cricket require perimeter edge wall to raised? verify. provide appropriate details for this condition

Typical note: Provide enlarged detail (plan and section). Show overflow scupper in relation to primary scupper. Does this meet plumbing code requirements?



This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

PUSHING THE ENVELOPE BE COMMISSIONING

DRAWINGS REVIEW

REAL WORLD EXAMPLE

3 LEVEL 04 - SECTION A AT CW (WEST)
1 1/2" = 1'-0"

AIL AT CW (WEST)

Annotations:

- There is no base flashing ft. Revise this detail and assembly.
- This will void roof warranty.
- How is cast stone anchored to structure. This is big span. Detail shows anchor at one locations only? Specify anchor location per structural requirements. Cast stone is shown right over roof membrane, this will void roof warranty. How will stainless steel key be sealed at roof membrane. Revise this detail. Is TPO appropriate for this application?
- APPLY MEMBRANE WATERPROOFING OVER FLUID APPLIED AIR BARRIER ON ALL HORIZONTAL SURFACES AND EXTEND UNDER SILL AND 6" DOWN ADJACENT WALL. EXTEND UP BEHIND SILL AT CW LOCATION
- CAST STONE SILL - SEE SHEET A30-00 FOR PROFILE DIMENSIONS
- PROVIDE STAINLESS STEEL KEY IN CAST STONE AND ATTACH TO STRUCTURE TO SECURE CAST STONE SILL
- Refer to TNBA document from BIA.org providing recommendation to provide control joint and expansion joint in bricks at or near corner location (20' for multiple opening) and other wall locations (Typical comment)
- Clarify if this is a clad metal for TPO. Note: Water will accumulate at this area and will fail TPO flashing eventually. Revise the detail.
- Is this parapet drip edge part of MCM panel system? How will cap flashing be installed and where is fastened to? Is there a membrane under cap flashing? Is continuous clad required?

Labels: 08 44 13 GLAZED ALUMINUM CURTAIN WALLS, 08 54 13 GLAZED ALUMINUM CURTAIN WALLS, 04 72 00 ARCHITECTURAL CAST STONE 3'-6", 04 20 03 BRICK BEYOND, TYPE R1-2, 07 21 20 EXTRUDED POLYSTYRENE INSULATION BOARD, 07 54 23 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING WITH INSULATION, LAP FLASHING, CRICKET, TYPE R1-3, CAP FLASHING GRAVEL STOP, 02 - CONCRETE, 07 27 20 FLUID MEMBRANE

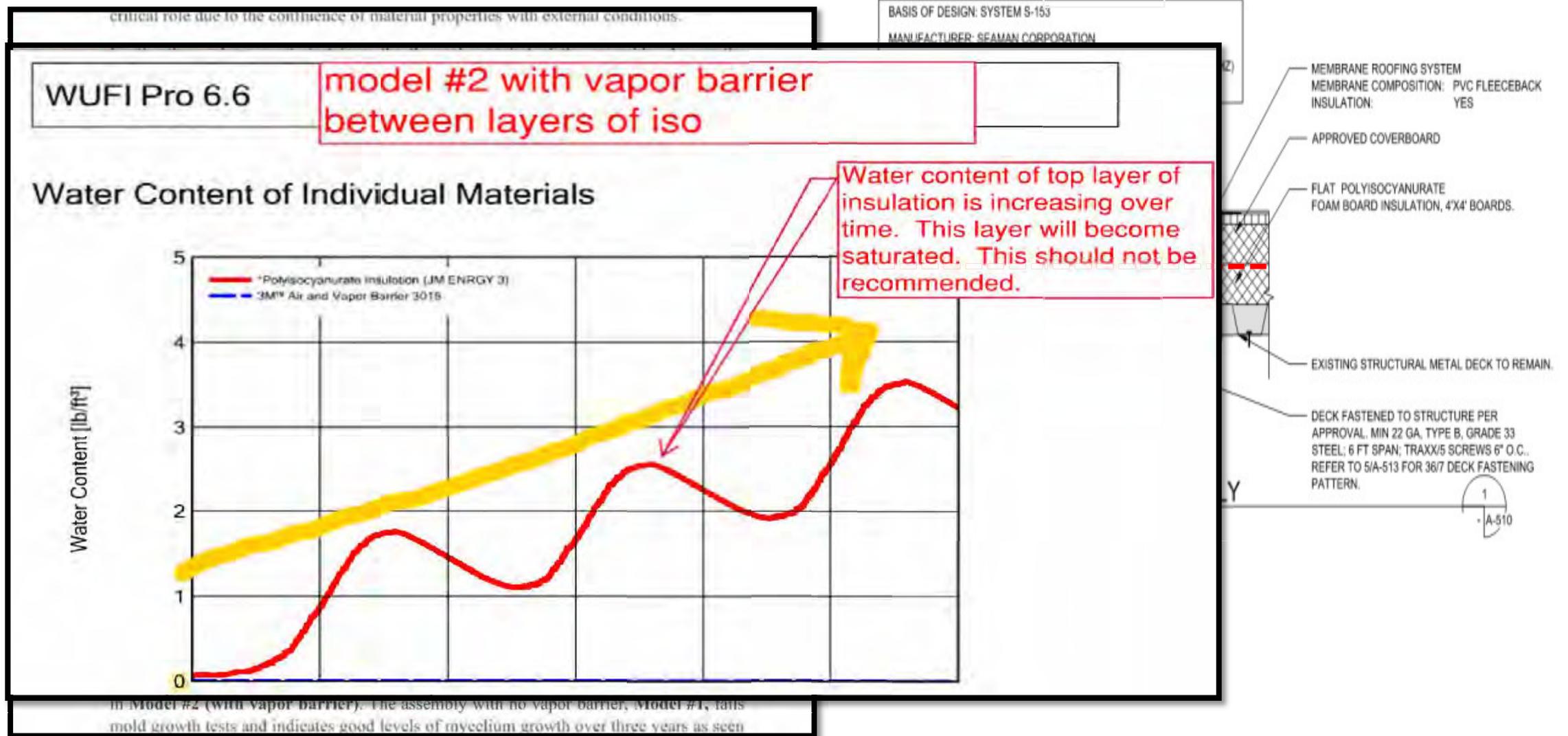
Vertical Label: CONSTRUCT

This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

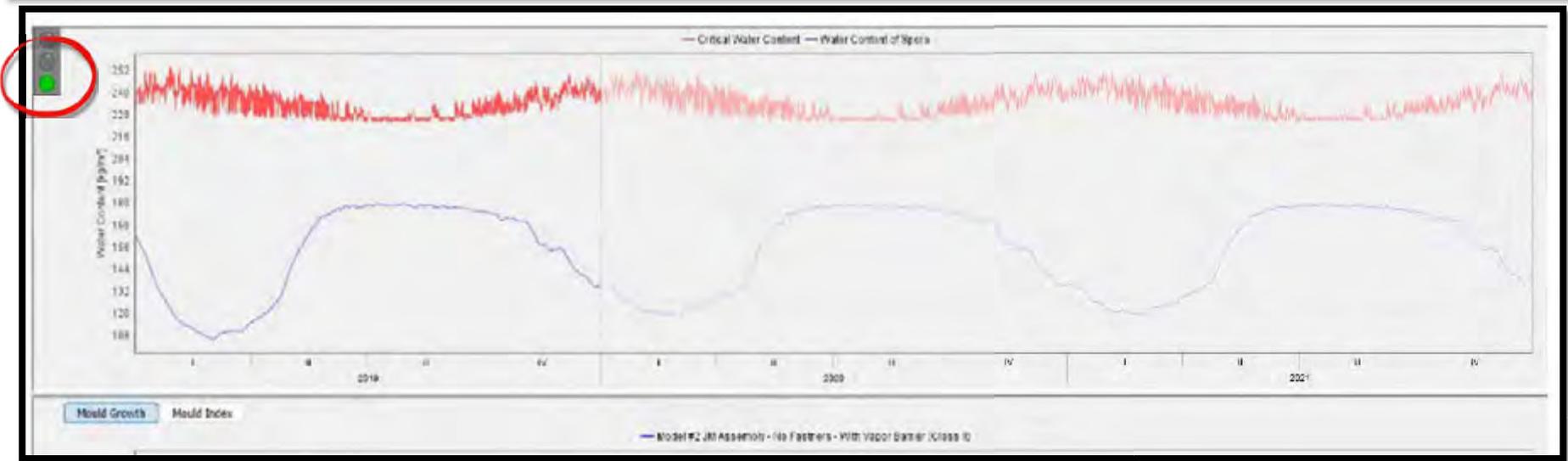
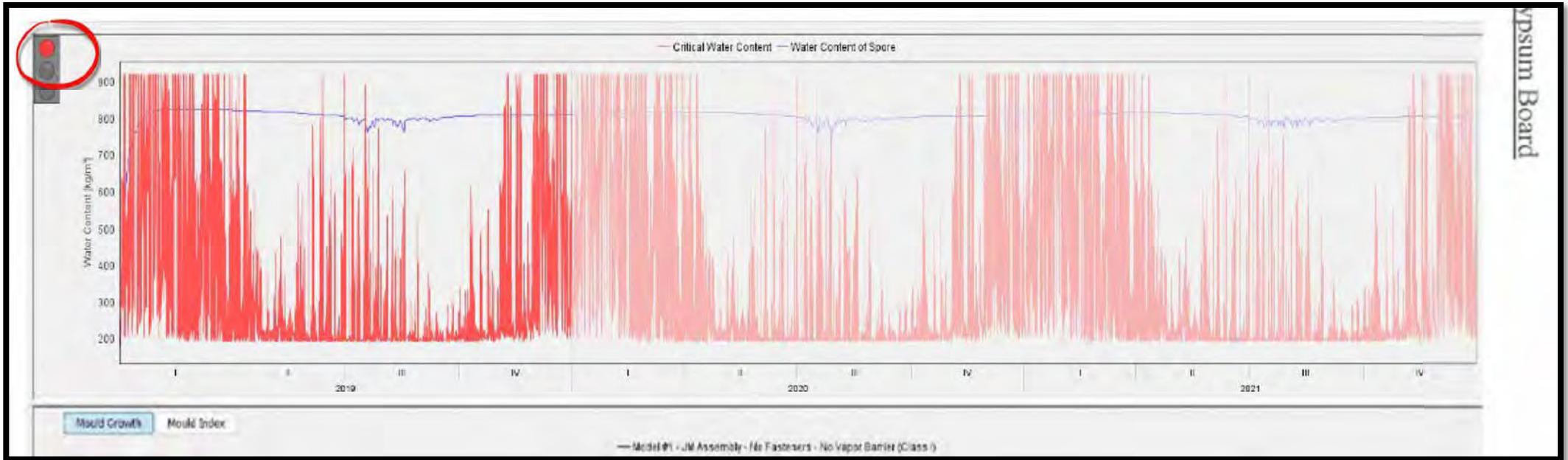


**PUSHING THE ENVELOPE
BE COMMISSIONING**

WUFI ANALYSIS



This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.



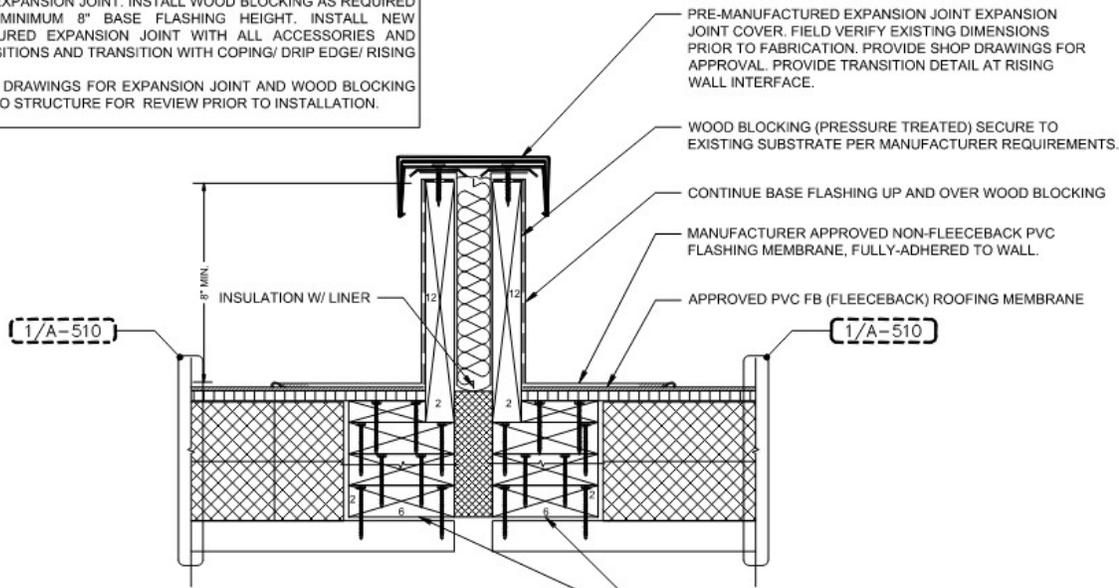
This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.



TARGET BECX OUTCOME

CONSTRUCTABLE DESIGN

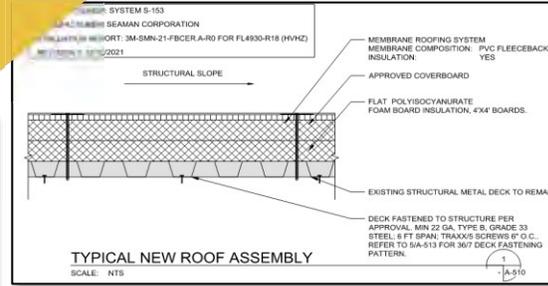
CAREFULLY REMOVE EXISTING METAL COUNTERFLASHING AND EXISTING SHEET METAL EXPANSION JOINT. INSTALL WOOD BLOCKING AS REQUIRED TO PROVIDE MINIMUM 8" BASE FLASHING HEIGHT. INSTALL NEW PREMANUFACTURED EXPANSION JOINT WITH ALL ACCESSORIES AND CORNER TRANSITIONS AND TRANSITION WITH COPING/ DRIP EDGE/ RISING WALL. PROVIDE SHOP DRAWINGS FOR EXPANSION JOINT AND WOOD BLOCKING ATTACHMENT TO STRUCTURE FOR REVIEW PRIOR TO INSTALLATION.



ROOF-TO-ROOF EXPANSION JOINT DETAIL

SCALE: NTS

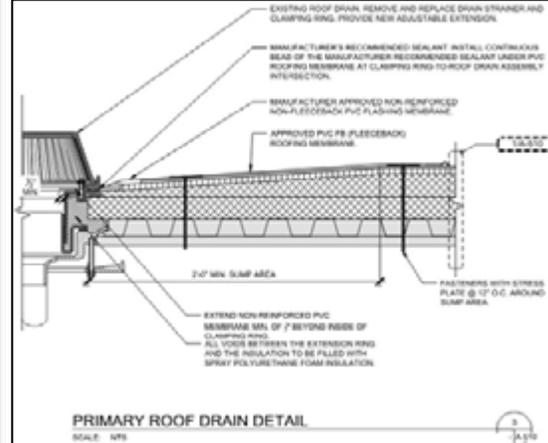
11
-A-512



TYPICAL NEW ROOF ASSEMBLY

SCALE: NTS

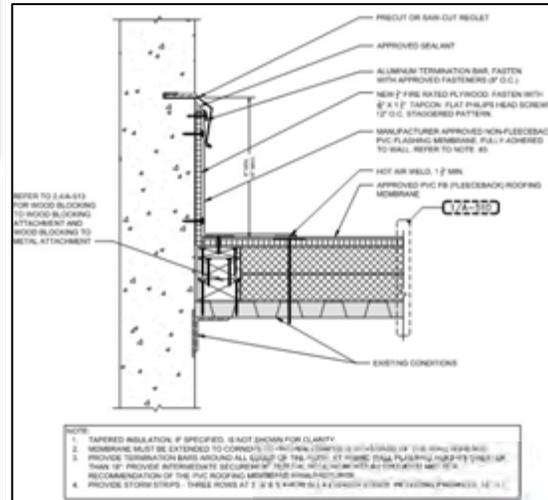
10
-A-510



PRIMARY ROOF DRAIN DETAIL

SCALE: NTS

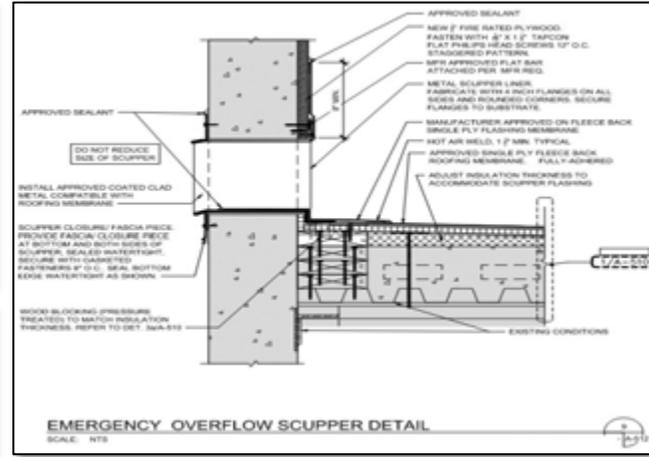
9
-A-513



FLASHING AT RISING WALL DETAIL

SCALE: NTS

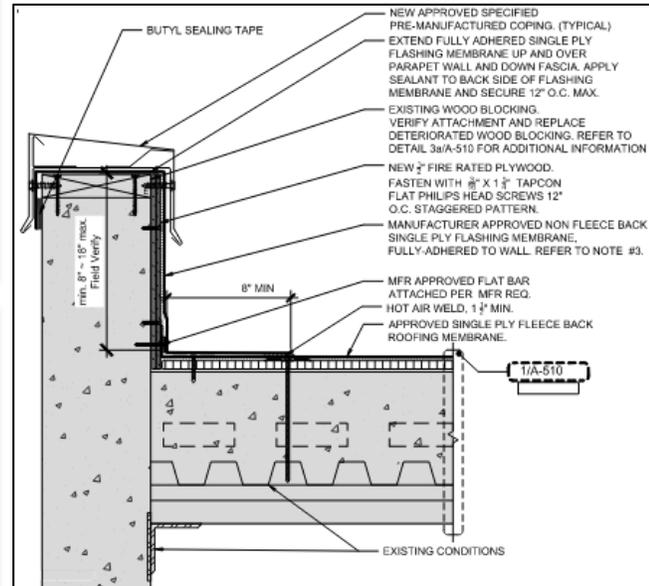
8
-A-511



EMERGENCY OVERFLOW SCUPPER DETAIL

SCALE: NTS

7
-A-514



TYPICAL COPING DETAIL

SCALE: 3\"/>

3
-A-510

- NOTES:
1. TAPERED INSULATION, IF SPECIFIED, IS NOT SHOWN FOR CLARITY. MEMBRANE MUST BE EXTENDED TO CORNERS TO PROVIDE COMPLETE COVERAGE OF THE WALL SURFACE.
 2. AT RISING WALL FLASHING HEIGHTS GREATER THAN 18\"/>

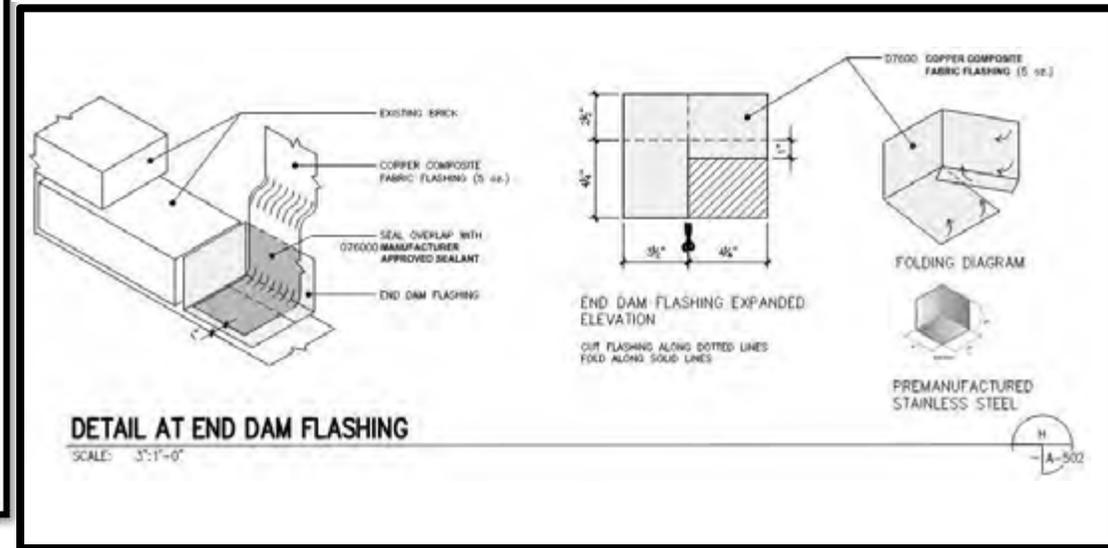
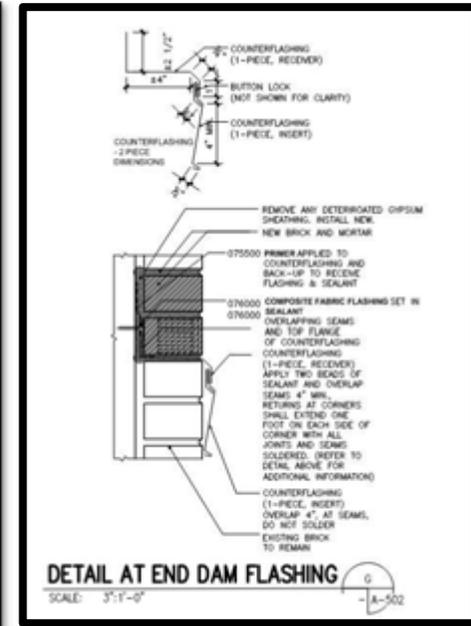
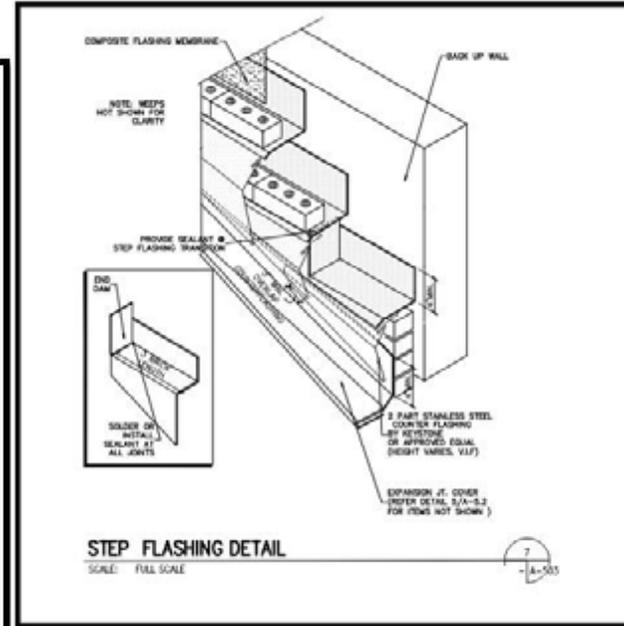
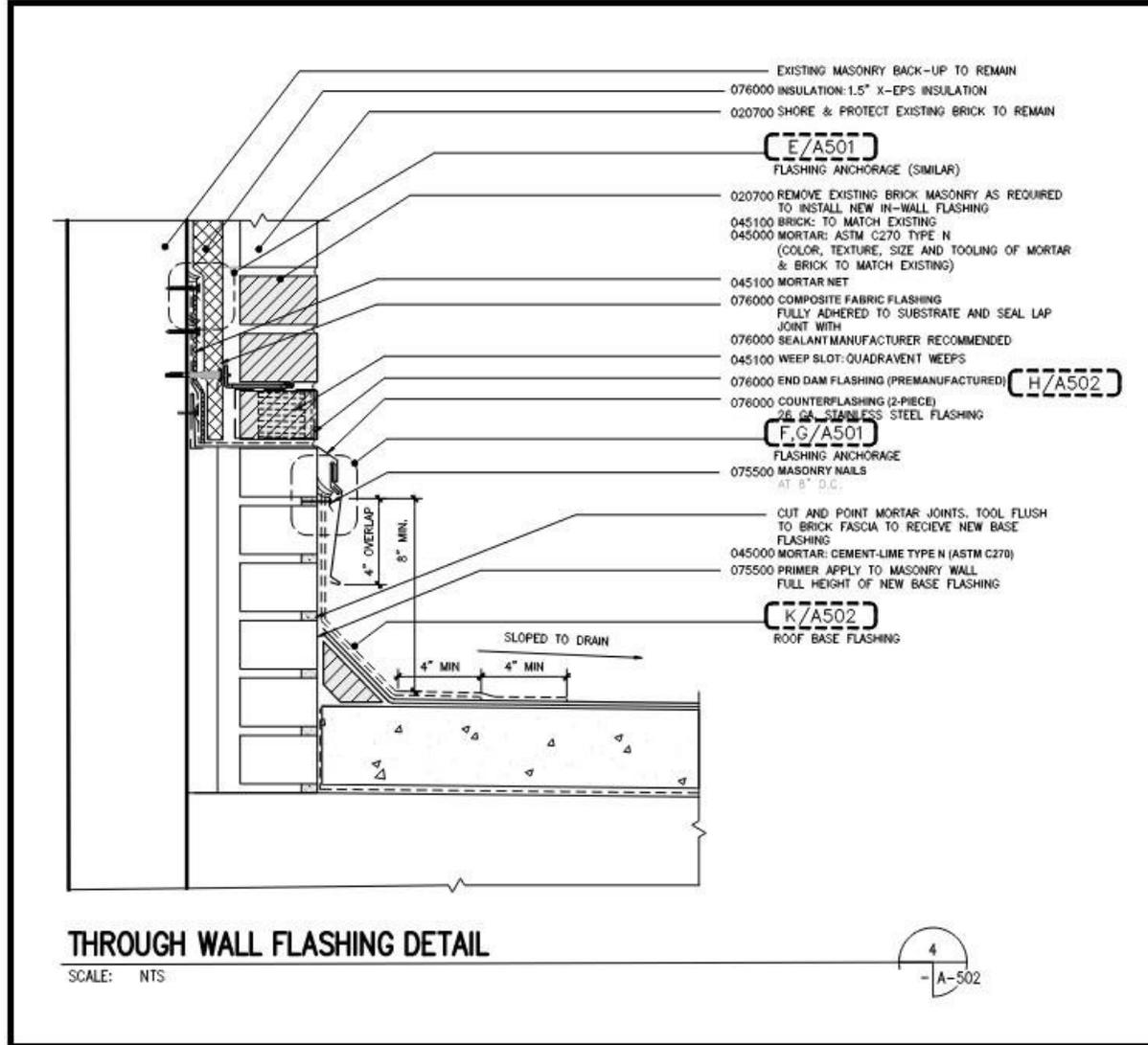


This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

PUSHING THE ENVELOPE BE COMMISSIONING

TARGET BECX OUTCOME

CONSTRUCTABLE DESIGN

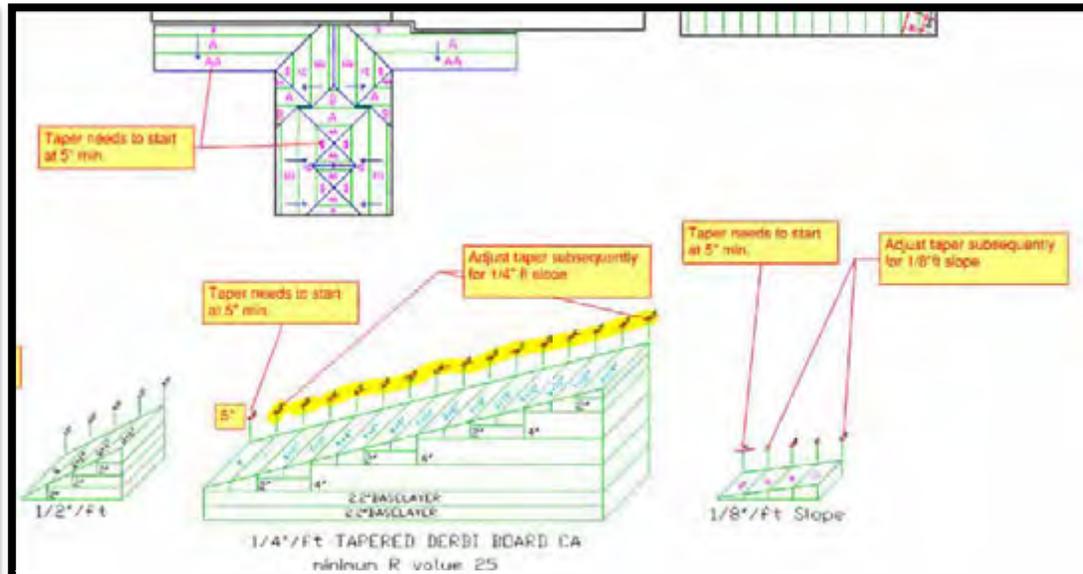
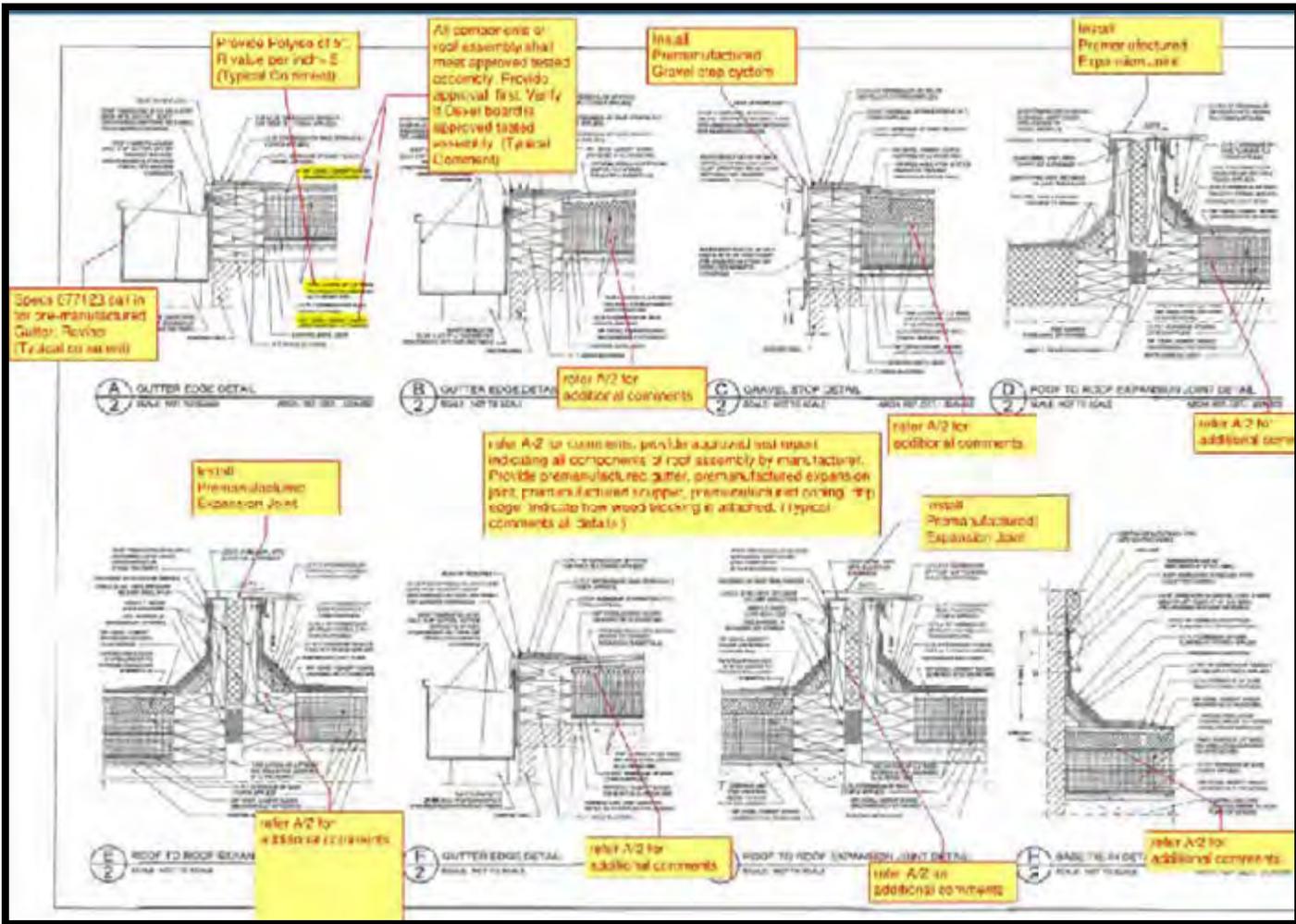


This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.



**PUSHING THE ENVELOPE
BE COMMISSIONING**

Shop Review Drawings



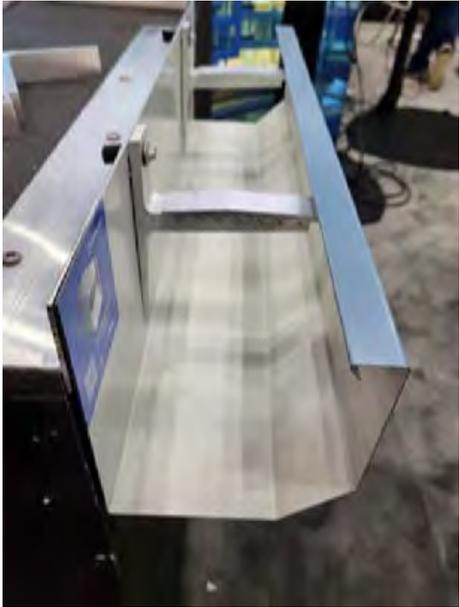
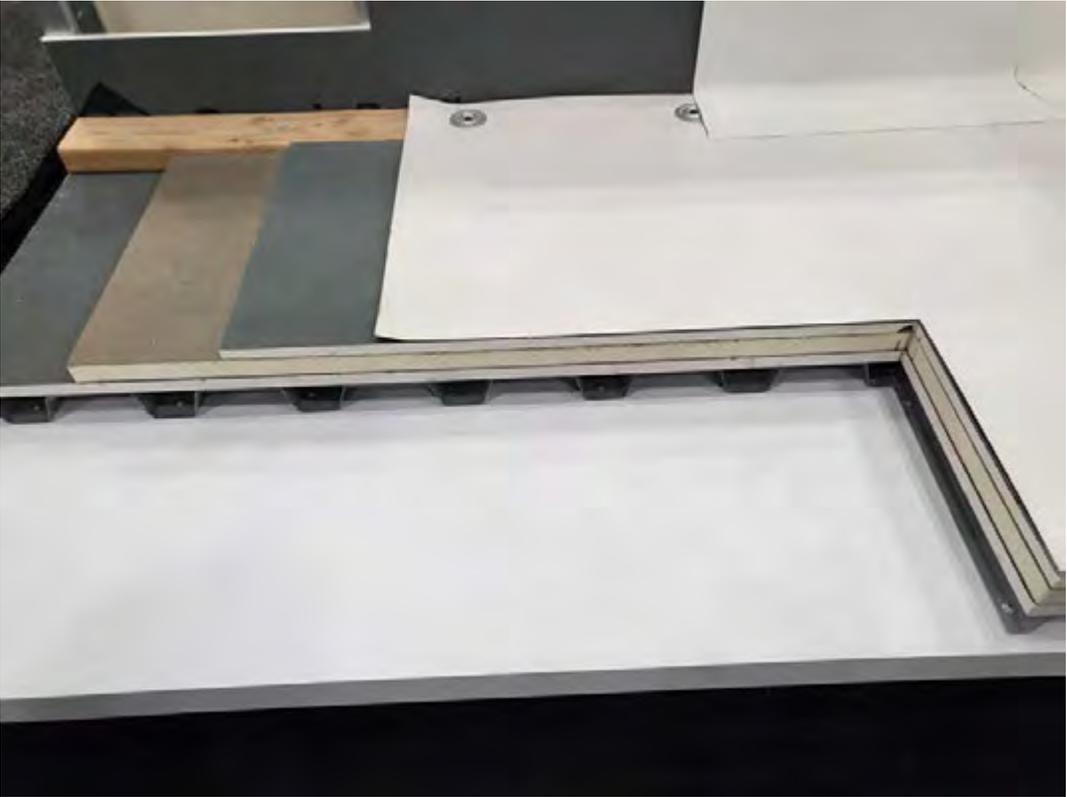
No.	Specification Section	Submitted Item	Date Submitted	Date Reviewed	Status
1	Division 7	1. Shop Drawings: Tapered Layout, Details: 2. Derbigum Approved Contractor Letter, Sample Derbigum Warranty, Schedule of Vluets, Product Data Sheet	4/24/2020	4/28/2020	Revise and Resubmit
1 (resubmit)	Division 7	1. Shop Drawings: Tapered Layout, Details: 2. Derbigum Approved Contractor Letter, Sample Derbigum Warranty, Schedule of Vluets, Product Data Sheet	5/5/2020	5/7/2020	1. Shop Drawings: Tapered Layout, Details: Rejected 2: Revise and Resubmit
2	Division 7	Derbigum System letter	5/6/2020	5/7/2020	Revise and Resubmit
3	Division 7	Premanufactured Gutter	5/6/2028	5/7/2028	Exceptions noted
1 (resubmit)	Division 7	1. Shop Drawings: Tapered Layout 2. Derbigum Approved Contractor Letter, Sample Derbigum Warranty, Schedule of Vluets, Product Data Sheet	5/10/2020	5/11/2020	1. Shop Drawings: Tapered Layout: No Exceptions 2: No exception Noted
2 (resubmit)	Division 7	Derbigum System letter	5/10/2020	5/11/2020	No Exceptions
1 (resubmit)	Division 7	1. Shop Drawings: Details	5/10/2020	5/11/2020	1. Details: No Exceptions
4	Division 7	EIFS	6/26/2020	6/26/2020	No Exceptions
5	Division 7	Steel Framing behind EIFS	6/30/2020	6/30/2020	No Exceptions



This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

PUSHING THE ENVELOPE
BE COMMISSIONING

Mock Up Samples



This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of the speaker is prohibited.

**PUSHING THE ENVELOPE
BE COMMISSIONING**