Bridgeport Condominiums

BUILDING ENVELOPE CONDITIONS ASSESSMENT

PREPARED FOR:

Bridgeport Condominiums
1000 North Holiday Blvd.
Seaside, OR 97138

PROJECT NUMBER:

17-073

REPORT DATE:

June 14, 2017

REVISION DATE:

PREPARED BY:

FORENSIC
BUILDING CONSULTANTS

WWW.FORENSICBUILDING.COM
15 82ND DRIVE, STE. 10
GLADSTONE, OR 97027
(P) 503.772.1114
(F) 503.772.4039

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EXECUTIVE SUMMARY

Client Name:	Paul Plunk Bridgeport Condominiums	**Property Name:**	Bridgeport Condominiums
		Property Address:	1000 North Holiday Blvd Seaside, OR 97138
Report Type:	Building Envelope Condition Assessment (BECA)	**Report Date:**	June 14, 2017

Dear Mr. Plunk

On May 30 and 31, 2017, Forensic Building Consultants (Forensic) performed a BECA at the Property in general conformance with ASTM E2128 "Standard Guide for Evaluating Water Leakage of Building Walls," The intent of Forensic's BECA was to perform a cursory visual review of the existing condition of the Property's accessible building envelope assemblies at limited locations, noting evidence of "nonconforming" construction conditions (i.e., construction "defects"), water leakage-facilitating conditions and evident water leakage pathways, and resultant property damage (if any).

The following report has been prepared to provide some selected representative photographic documentation, discussion, and a summary of Forensic's BECA observations, and to suggest recommendations for further action.

BECA Scope

Forensic's BECA was limited to observation and evaluation of selected as-built construction assemblies or building locations listed below, as they existed at the time of our presence on site at the Property. Our review was not intended to be thorough but informational to provide some selected examples of concerning conditions. All other construction assemblies or building locations not specifically identified below were beyond the scope of our BECA. Note that Forensic's BECA was limited to the following:

- Visual review of exterior wall coverings and fenestration (window and door) assemblies
- Visual review of interior leak locations
- Visual review of roof coverings and surface drainage provisions
- Visual review of deck and walkway coverings and surface drainage provisions
- Visual review of concrete flatwork and soil finish grade adjacent to exterior walls
- Examination of concealed building envelope assemblies at 16 specific inspection opening (IO) locations[1]

[1] *Please refer to "Observations & Discussion" photo sections of this report for additional information regarding IO locations.*

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BECA FINDINGS

Forensic's BECA identified multiple nonconforming and water leakage-facilitating conditions at the Property, which individually or in combination have resulted in property damage or have the potential to result in future property damage. Below, you will find selected examples of conditions observed at the time of our presence on site at the Property and are summarized and analyzed on the following pages. Please refer to the "Observations and Discussion" photo section of this report for information regarding a given condition.

- Structure Description

  The Bridgeport Condominiums building a slab on grade wood-framed 4 level structure, built in 2007, located in Seaside, Oregon. The entire building is clad in a combination of fiber cement lap siding, cedar shake panels, and manufactured stone veneer. There are a series of waterproof concrete walkways that run the length of the building with a single common waterproof deck on the front / east elevation. The rear / west elevation has waterproof concrete decks attached to all units and patios on the ground floor. This building was reported to receive regular maintenance of the paint and sealant. The white wood trims that were installed during original construction have been in the process of deteriorating and have been subject to isolated replacement with a fiber cement material.

- Exterior Visual Examination of Cladding Components
  - *Window and Trim Observations*
    - All of the window to trim transitions observed were installed with out a proper dynamic sealant joint with backer rod. Instead a simple fillet sealant joint has been utilized at the wood trim to vinyl window frame transition. These fillet sealant joints do not withstand the differential thermal movement of the two different types of building material and subsequently fail. In areas where the white wood trims have been replaced with a plastic trim a similar improper sealant joint has been installed.
    - Trims were observed to be installed with out proper clearances to other building components besides vinyl window frames. In addition improper clearances were observed at metal flashings, concrete deck surfaces, and stone water tables. Unprimed or painted field cut trim ends were observed. These conditions can and were observed to be leading to the deterioration of the product.
    - Along the ground level a series of windows are installed with their sills and partial jams and in some instances are fully surrounded by manufactured stone veneer. A piece of light gauge metal is acting as separator to hold the mortar off the vinyl window assembly at the majority of locations observed. There is no observed sealant at these location types leaving a void in-between the two components. This condition has the potential to introduce water behind the cultured stone cladding and begin to deteriorate the moisture sensitive sheathing and framing. One window completely surrounded by cultured stone in the front center tower was observed to have no separation flashing and instead had the mortar directly applied to the vinyl frame. This does not allow for the window to expand and contract with thermal variances. The window frame in this location was observed to be severely cracked and at some point the addition of sealant was introduced to the crack site for improper remediation.
  - *Window and Trim Invasive Observations*
    - Multiple invasive openings were made at windows installed in various cladding types. The majority of the opening locations revealed the white wood trims were unprimed and suffering

sever deterioration. In addition, verification of the lack of dynamic sealant joint was confirmed once trim was removed. What was implemented instead was a rabbet cut to allow siding to tuck behind the trims and a fillet joint at the trim to vinyl frame transition, all of which were observed to be in various stages of failing. All of the concealed building envelope components including WRBs, flexible flashings, were observed to be installed in a similar fashion at all openings. Proper laps at the head and sill were observed with limited tears in the WRB resulting in a reverse lap at an isolated location. One opening located at a window head on a third floor unit at a reported leak location revealed deteriorated OSB sheathing. This water damage was located behind the flexible flashing and was located directly below another window. Failed sealant and deterioration of trims was observed at the fourth floor window above.

- *Cultured Stone Cladding*
  - The cultured stone is installed along the ground floor as a wainscoting with large sections of stone breaking into the super structure as accents of full towers and second floor stairwells. All of the stone was observed to have a white wood trim or cedar shake panel siding installed at the water table concealing a light metal flashing assembly. None of the transitions between the stone and dissimilar materials were observed to have dynamic sealant joints and at multiple locations had voids in the cladding at these locations. Heavy efflorescence was observed to be systemic throughout the cultured stone indicating moisture egress from within the cladding assembly. Areas of specific concern include the water table transitions, louvers at stairwells, walkway transitions, inside corners, and areas at grade with improper clearances.
- *Cultured Stone Cladding Invasive Observations*
  - Removal of the stone was conducted at multiple locations throughout the front/east elevation. These openings include a walkway to wall transition, roof to wall transitions, a water table, and below a window. Interior stairwell openings were conducted below the louver in the fiber cement cladding.
  - The walkway beam transition was conducted at the north tower to walkway transition. Omitted walkway to wall diverter flashings, base of wall flashings, omitted sealant joints at dissimilar claddings, and corrosion staining were observed at this location. Removal of the stone revealed that the stone was installed over a drainage mat and WRB. The water entry point at this location appears to be a combination all of the above defects. These defects allowed water to enter behind the drainage mat and WRB and caused sever deterioration of the OSB sheathing and framing members. FBC instructed the contractor to install shoring at this location due to the extent of the deterioration of the framing members.
  - The roof to wall opening was conducted at the main center tower above the front entry porte cochere. The absence of a diverter flashing, improper clearance of the stone to the roofing surface, and heavy deterioration of the fascia board were observed at this location. Removal of the stone revealed that the stone was installed on a drainage mat assembly. The water was observed to be entering at the omitted diverter and fascia board penetration into the stone and getting behind the drainage mat and WRB. Sever deterioration of the OSB sheathing and framing members was observed at this location. Two subsequent openings were made below this roof to wall transition: one at the flat roof to wall transition and one at a door head below the flat roof. The flat roof to wall transition exhibited similar signs of water intrusion but with less damage to OSB sheathing. The door head opening revealed that water was still traveling down the moisture sensitive building components with elevated Moisture Content (MC) readings observed.

- The water table opening was conducted at the north face of the northern stair tower. Deteriorated trims and failed sealant joints were observed adjacent to the opening. This location is also located below a roof to wall transition at the fourth story where heavy moisture staining was observed to be emanating from this transition. Removal of stone at the water table and cladding above revealed a reverse lap of the metal flashing over the WRB. The drainage mat installed behind the stone was also observed to contain a reverse lap. These defective conditions allows for any incidental water traveling behind the cladding to ingress behind the stone and was observed to be creating sever deterioration of moisture sensitive building components at this location.
- The openings conducted below the louver in the fiber cement was conducted the south stair tower. The exterior louver to stone transitions lacked a dynamic sealant joint at the cladding transition. The removal of the fiber cement at the interior this location revealed sever deterioration to all sheathing and framing components. The rough opening of the louver lacked proper slope at the sill plate and cap and saddle flashings at corner transitions.

- *Cedar Cladding*
  - The cedar shingle panels comprises a large portion of the exposed cladding system. It appears that this siding is installed on a rain screen drainage system. The level of the window trims and the siding are on the same plane and furring strips were observed at select locations although no bug screens were observed at the horizontal termination points. Traditionally this siding installed in direct contact to the wall sheathing allows the window trims to sit proud of the siding wall plane instead of flush.
- *Fiber Cement Cladding*
  - The fiber cement lap siding is located in full elevations of the sides and at covered locations on the front and rear with select towers predominantly clad in fiber cement on the rear only. This cladding does not appear to be installed on a rain screen system like the cedar siding. This creates a stronger possibility of water to become trapped behind the wall assembly and has the potential to create problems with moisture sensitive building component such as sheathing and framing. Improper clearance of fiber cement siding to grade and metal flashings was observed throughout the property
- *Metal Flashings*
  - Flashings were present at the many of the required locations but were deficient in nature. Omitted end dams at flashing terminations, unsealed metal flashing seams and reverse slope of flashings was observed throughout the property. Improperly omitted flashings were absent above all stone wainscoting horizontal trim locations. Door heads at deck locations were observed to be void of any head flashing as well. The omission of diverter flashings at deck and walkway transitions was systemic and has the potential for direct paths into the cladding system. This was evident at stone transitions where heavy staining and efflorescence was observed.

- Exterior Visual Examination of Concrete Walkways and Decks
  - *Walkway Observations*
    - All of the front east elevation walkways, were observed to have clear symptoms of water intrusion as indicated by the active water egress and staining through cedar tongue and groove soffit assemblies and light penetrations. The ingress points may be attributed to but not limited to the rail fasteners and post penetrations through the horizontal surface of the concrete.

- *Walkway Invasive Observations*
  - An opening was conducted in the concrete front walkways at an outside corner post. This location exhibited moisture staining in the soffit below. Removal of the concrete at the post base revealed the isometric flashing assembly was done without the appropriate sealed seams and overlap of waterproofing and flashing components. These conditions allowed for water to access the moisture sensitive decking below creating completely deteriorated sheathing at this location. In addition the horizontal penetrations at the metal rail wall were pulled and measured and were observed to be loose and penetrating into all layers of waterproofing, creating a direct path for water to enter the deck assembly accessing moisture sensitive structural building components.
- *Rear Deck Visual Observations*
  - The decks appear to be composed of a waterproof membrane with a drainage mat with concrete topping slab. A base of wall flashing lies on top of the concrete surface with no observable sealant bedding. Improper clearance of the fiber cement siding and trims was observed at the deck to wall transition, Improperly dimensioned or omitted diverter flashings were observed at the deck to wall outside corners.
- *Rear Deck Invasive Observations*
  - Invasive openings were conducted at multiple deck to wall transitions. All deck to wall locations investigated contained similar defective metal flashing. The metal flashing although present lacked proper diverters and sealed seams. These defective conditions were observed to be the ingress points for the subsequent water damage. All of the openings conducted at these locations contained various levels of water intrusion and resultant damage. This damage ranged from elevated moisture content to deterioration of framing members.

Examination of Roofing Components

- *Roofing Components Visual Observations*
  - A single ridge-to-ridge observation was conducted on site as accessible from a window located in the front elevation towards the center of the structure. Systemic lack of clearance of the cedar shingle panel cladding was observed at multiple locations in this small section. The lack of diverters at these locations elevates the risk for water intrusion at these locations. Omitted crickets at multiple locations were also observed. These conditions in conjunction with staining and areas indicative of water intrusion raise concern for the potential of ingress into the exterior cladding, wall, and roofing assemblies.
- *Roofing Components Invasive Observations*
  - An opening was conducted at a location that was observed to have improper clearance and an omitted diverter flashing similar to the opening done in stone at a similar transition. The removal of shingles revealed deteriorated WRB, gypsum sheathing and severely deteriorated OSB sheathing. The absence of any type of diverter flashing and the improper clearance were both contributing factors to both direct water intrusion and wicking of water up through the moisture sensitive building components where the gypsum sheathing was improperly installed over the roof to wall step flashings.

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RECOMMENDED NEXT STEPS

Forensic believes that the nonconforming and water leakage-facilitating conditions identified in this report need to be remediated in order to help ensure that the longevity and weather-resistance of the Property are not compromised. As such, we recommend pursuing the following course of action in a timely manner:

- Attic Review – At the time of additional investigation, have Forensic perform a visual review of a representative sample of the Property's attic cavities. Visual review of these locations will allow Forensic to more effectively document and evaluate the presence, ventilation concerns, moisture accumulation, and/or microbial growth (if any) at the Property.
- Preliminary Repair Assessment (PRA) –Following additional evaluation of the Property, as described above, have Forensic generate a PRA for the Property, which will provide an outline of the steps necessary to remediate the conditions identified throughout this report. The PRA can then be used to solicit repair bids in order to analyze initial cost assessments provided by bidding contractors.
- Follow-Up Meeting – Meet with Forensic at your earliest convenience to further discuss our investigation findings and recommended next steps, and to begin to develop a plan for further action. The action plan will outline the following:
  - Establish Project remediation goals
  - Prioritize nonconforming conditions according to risk
  - Identify available repair options and strategies
  - Formulate a final repair strategy using established budgets in relation to remediation goals

We appreciate your confidence in Forensic and we look forward to addressing any questions or concerns that you may have regarding the contents of this report. Please do not hesitate to contact Forensic at (503) 772-1114 or info@forensicbuilding.com if we can be of further assistance. Thank you.

Respectfully submitted,

FORENSIC BUILDING CONSULTANTS

Gabe White

Project Manager and Building Science Consultant

Gabe White

Director of Investigative and Litigation Services

Senior Building Science Consultant

Toby C. White,

Vice President and Director of Technical Services

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SUMMARY OF OBSERVATIONS WITH REMEDIATION GUIDELINES

The summary below provides a listing of the conditions noted throughout the "Observations & Discussion" photo sections that follow. Note that this summary also provides bullet-point preliminary remediation recommendations for each observed condition, as applicable. For additional information regarding a specific condition, please refer to appropriate "Observations & Discussion" photo section of this report.

1. Visual Review

1.1. Elevations

1.1.1. Overview of front/east elevation
1.1.2. Overview of rear/west elevation
1.1.3. Overview of right/north elevation
1.1.4. Overview of left/south elevation

1.2. Window and Trim Observations

1.2.1. Less than 1/4" clearance between trim and vinyl fenestration frame
1.2.2. Improperly-constructed and subsequently-failed sealant joint application
1.2.3. Greater than 19% MC in wall assembly components
1.2.4. Moisture staining emanating from within wall assembly
1.2.5. Less than 1/2" clearance between trim and paved surface
1.2.6. Greater than 19% MC in wall assembly components
1.2.7. Less than 1/4"-3/8" clearance between trim and manufactured stone veneer
1.2.8. Moisture-deteriorated wall assembly components
1.2.9. Greater than 19% MC in wall assembly components
1.2.10. Un-primed field cut edges
1.2.11. Less than 1/4"-3/8" clearance between veneer and vinyl fenestration frame
1.2.12. Omitted dynamic sealant joint between stone and vinyl fenestration frame
1.2.13. Less than 1/4"-3/8" clearance between veneer and vinyl fenestration frame
1.2.14. Cracked fenestration frame
1.2.15. Efflorescence or corrosion staining emanating from within wall assembly

1.3. Cultured Stone Cladding

1.3.1. Overview of typical stone wainscoting
1.3.2. Un-sealed metal flashing seam at wainscoting head
1.3.3. Flashing does not extend to the face of the veneer water table
1.3.4. Less than 1/4"-3/8" clearance between trim and manufactured stone veneer
1.3.5. Open void in between wall assembly components
1.3.6. Less than 1/4"-3/8" clearance between trim and manufactured stone veneer
1.3.7. Efflorescence emanating from within wall assembly

1.3.8. Moisture staining emanating from within wall assembly
1.3.9. Less than 4” clearance between veneer and soil finish grade

1.4. Cladding Observations

1.4.1. Less than 6” clearance between siding and soil finish grade
1.4.2. Less than 1/4”-3/8” clearance between siding and metal flashing surface

1.5. Sealant Observations

1.5.1. Improperly-constructed and subsequently-failed sealant joint application
1.5.2. Omitted or discontinuous flashing atop projecting wood trim
1.5.3. Improperly-constructed and subsequently-failed sealant joint application

1.6. Flashing Observations

1.6.1. Omitted up-turned end dam at butted flashing termination
1.6.2. Efflorescence emanating from within wall assembly
1.6.3. Un-sealed metal flashing seam
1.6.4. Less than 5° positive slope on horizontal flashing surface

1.7. Walkway Observations

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1.7.2. Rail fastened through horizontal concrete surface
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1.7.4. Visible water leakage through soffit assembly
1.7.5. Greater than 19% MC in soffit components
1.7.6. Greater than 19% MC in cedar base of wall components
1.7.7. Overview of outside corner of beam penetration
1.7.8. Overview of inside corner of beam penetration

1.8. Deck Observations

1.8.1. Un-sealed metal base of wall flashing
1.8.2. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination

1.9. Roof Observations

1.9.1. Deterioration of roofing material
1.9.2. Additional example of condition shown previously
1.9.3. Omitted or discontinuous kick-out flashing at roof-to-wall step flashing termination

Building code requirements for roof-to-wall step flashing termination, illustrating proper installation of kick-out flashing to convey surface drainage away from roof-to-wall interface.

1.9.4. Discontinuous cricket
1.9.5. Omitted cricket

2. Invasive Opening Observations

2.1. Window Opening Observations

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2.2.23. Moisture- or microbial-affected interior finishes
2.2.24. Moisture-deteriorated framing components
2.2.25. Greater than 19% MC in outside wall OSB sheathing
2.2.26. Moisture-deteriorated framing components
2.2.27. Overview of IO 14
2.2.28. Reverse-lap of flashing vertical back leg over drainage mat and WRB
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2.2.37. Moisture-saturated and deteriorated wall assembly components

2.3. Front Walkway Opening Observations

2.3.1. Overview of IO 11
2.3.2. Soffit view of IO 11
2.3.3. Microbial-affected wall assembly components
2.3.4. Moisture-deteriorated wall assembly components
2.3.5. Omitted WRB behind wall coverings
2.3.6. Moisture-deteriorated beam assembly
2.3.7. Greater than 19% MC in wall assembly components
2.3.8. Moisture-deteriorated gypsum sheathing below structural beam assembly
2.3.9. Greater than 19% MC in front walkway structural beam
2.3.10. Overview of saturated beams below the walkway assembly
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2.3.17. Deteriorated walkway sheathing
2.3.18. Overview of metal rail post attachment point
2.3.19. Un-sealed penetration through horizontal walkway surface

2.3.20. Fastener penetration penetrates waterproofing assembly

2.4. Rear Deck Opening Observations

2.4.1. Overview of IO 5 at rear deck to wall transition
2.4.2. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination
2.4.3. Un-sealed metal flashing seam
2.4.4. Reverse-lap of lower WRB layer over upper WRB layer
2.4.5. Greater than 19% MC in wall assembly components
2.4.6. Moisture-deteriorated wall assembly components
2.4.7. Overview of IO 4
2.4.8. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination
2.4.9. Reverse-lap of flashing vertical back leg over WRB
2.4.10. Moisture-deteriorated wall assembly components
2.4.11. Overview of IO 3
2.4.12. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination
2.4.13. Un-sealed metal flashing seam
2.4.14. Greater than 19% MC in wall assembly components

2.5. Roof Opening Observations

2.5.1. Overview of IO 8
2.5.2. Less than 1’-2" clearance between shingle and roof surface
2.5.3. Moisture-deteriorated gypsum sheathing at roof to wall transition
2.5.4. Microbial-affected wall assembly components
2.5.5. Omitted or discontinuous kick-out flashing at roof-to-wall step flashing termination
2.5.6. Greater than 19% MC in wall assembly components
2.5.7. Moisture-deteriorated wall assembly components

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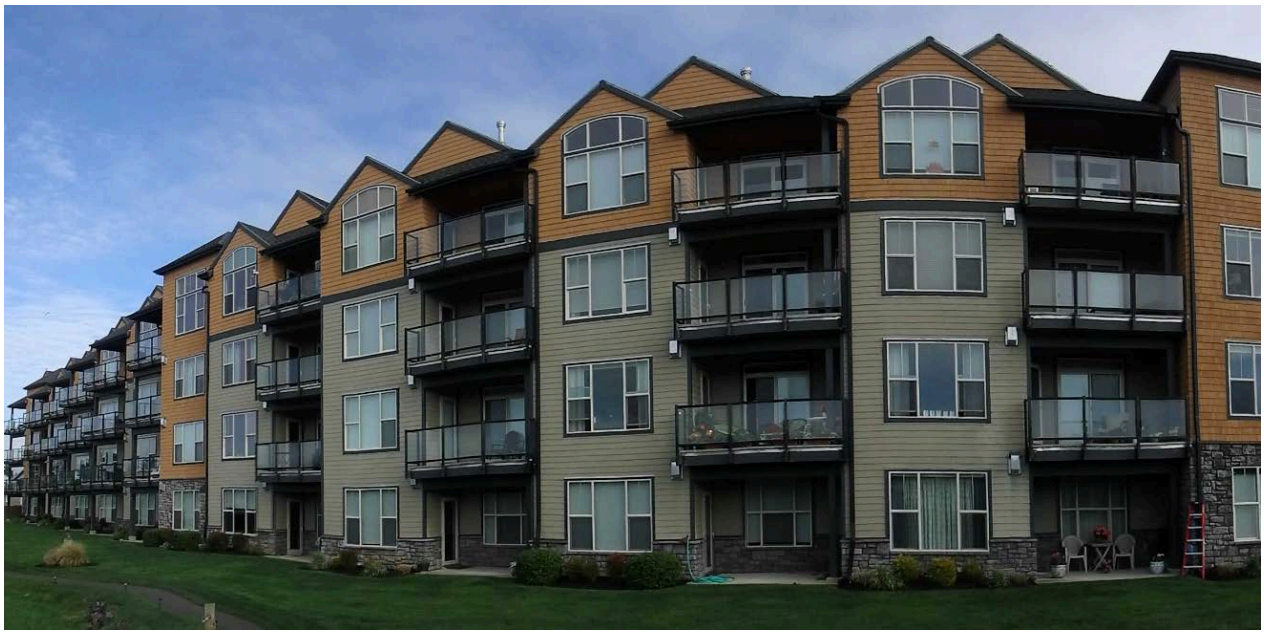
Observations & Discussion

1. *VISUAL REVIEW*

1.1. ELEVATIONS

1.1.1. Overview of front/east elevation



1.1.2. Overview of rear/west elevation

1. *VISUAL REVIEW*

1.1.3. Overview of right/north elevation

1.1.4. Overview of left/south elevation

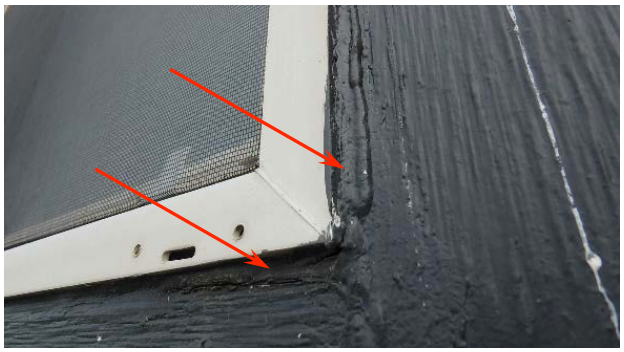
1. *VISUAL REVIEW*

1.2. WINDOW AND TRIM OBSERVATIONS

1.2.1. Less than 1/4" clearance between trim and vinyl fenestration frame

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.



1.2.2. Improperly-constructed and subsequently-failed sealant joint application

Explanatory Notes:

Condition facilitates water infiltration into the wall assembly

1.2.3. Greater than 19% MC in wall assembly components

Explanatory Notes:

25.1% MC measured in trim below failed sealant joint.

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and moisture accumulation within exterior wall assembly.

1. *VISUAL REVIEW*

1.2.4. Moisture staining emanating from within wall assembly

Explanatory Notes:

Condition likely results from moisture egress from within exterior wall assembly.

1.2.5. Less than 1/2” clearance between trim and paved surface

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of trim members.

1.2.6. Greater than 19% MC in wall assembly components

Explanatory Notes:

57.3% MC measured in trim in contact with paved walkway

1. *VISUAL REVIEW*

1.2.7. Less than 1/4”-3/8” clearance between trim and manufactured stone veneer

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.

1.2.8. Moisture-deteriorated wall assembly components

1.2.9. Greater than 19% MC in wall assembly components

Explanatory Notes:

100% MC measured in trim

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and moisture accumulation within exterior wall assembly.

1.2.10. Un-primed field cut edges

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of trim members.

1. *VISUAL REVIEW*

1.2.11. Less than 1/4”-3/8” clearance between veneer and vinyl fenestration frame

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.

1.2.12. Omitted dynamic sealant joint between stone and vinyl fenestration frame

Explanatory Notes:

Condition facilitates water infiltration into exterior wall assembly.

1.2.13. Less than 1/4”-3/8” clearance between veneer and vinyl fenestration frame

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.

1.2.14. Cracked fenestration frame

1. *VISUAL REVIEW*

1.2.15. Efflorescence or corrosion staining emanating from within wall assembly

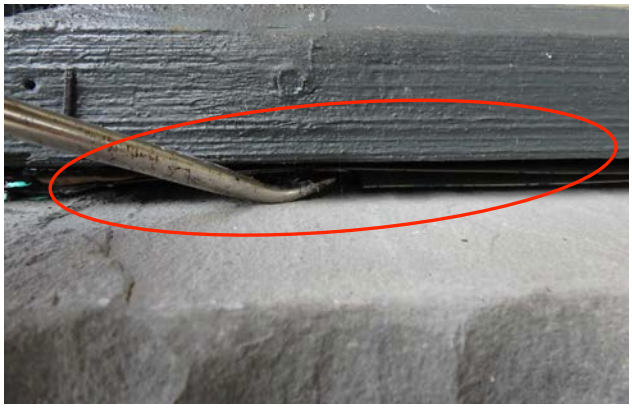
Explanatory Notes:

Condition likely results from moisture egress from within exterior wall assembly.

1.3. CULTURED STONE CLADDING

1.3.1. Overview of typical stone wainscoting

1. *VISUAL REVIEW*



1.3.2. Un-sealed metal flashing seam at wainscoting head

Explanatory Notes:

Condition facilitates water infiltration into roof assembly.

Explanatory Notes:

Additional example of condition shown previously

1.3.3. Flashing does not extend to the face of the veneer water table

1.3.4. Less than 1/4”-3/8” clearance between trim and manufactured stone veneer

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.

1. *VISUAL REVIEW*

1.3.5. Open void in between wall assembly components

Explanatory Notes:

Condition fails to provide adequate incidental water protection for underlying wall assembly components.

1.3.6. Less than 1/4”-3/8” clearance between trim and manufactured stone veneer

Explanatory Notes:

Condition fails to allow for installation of properly-dimensioned dynamic sealant joint to accommodate differential thermal movement between dissimilar materials, resulting in premature sealant failure.

1. *VISUAL REVIEW*

Explanatory Notes:
Close-up of location shown previously, illustrating the gap created in the wall assembly

1.3.7. Efflorescence emanating from within wall assembly

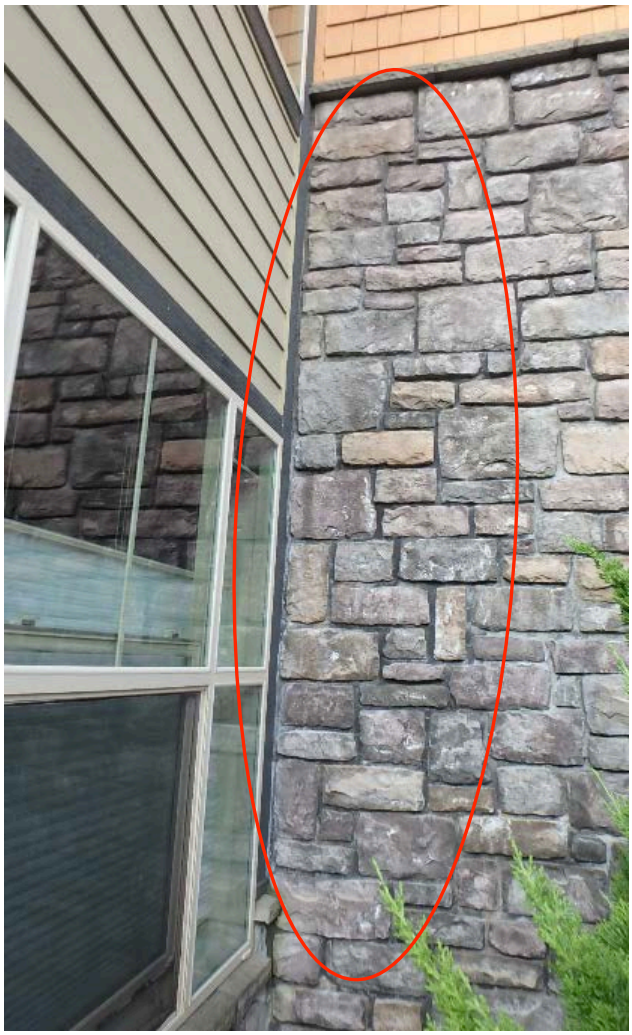
Explanatory Notes:
Condition likely results from moisture egress from within exterior wall assembly.

1.3.8. Moisture staining emanating from within wall assembly

Explanatory Notes:
Condition likely results from moisture egress from within wall assembly.

1. *VISUAL REVIEW*

Explanatory Notes:
Additional example of condition shown previously



Explanatory Notes:
Additional example of condition shown previously

1. *VISUAL REVIEW*

1.3.9. Less than 4” clearance between veneer and soil finish grade

Explanatory Notes:

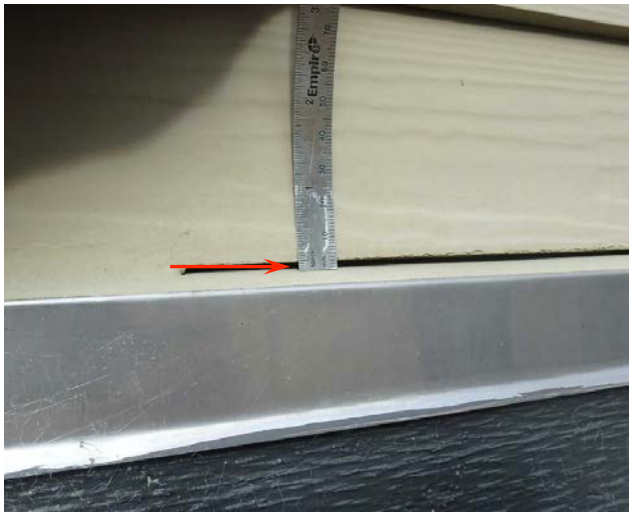
Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

1.4. CLADDING OBSERVATIONS

1.4.1. Less than 6” clearance between siding and soil finish grade

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.



1.4.2. Less than 1/4”-3/8” clearance between siding and metal flashing surface

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

1.5. SEALANT OBSERVATIONS

1.5.1. Improperly-constructed and subsequently-failed sealant joint application

Explanatory Notes:

Condition facilitates water infiltration into wall assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating a failed sealant joint with a MC of 22.6% in the trim below

1.5.2. Omitted or discontinuous flashing atop projecting wood trim

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of unprotected trim members.

1.5.3. Improperly-constructed and subsequently-failed sealant joint application

Explanatory Notes:

Note the condition occurs at both the trim to vinyl window transition and trim to cedar siding transition

1.6. FLASHING OBSERVATIONS

1.6.1. Omitted up-turned end dam at butted flashing termination

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of unprotected trim members.

Explanatory Notes:

Additional example of condition shown previously

1.6.2. Efflorescence emanating from within wall assembly

1.6.3. Un-sealed metal flashing seam

Explanatory Notes:

Condition facilitates water infiltration into roof assembly.

Explanatory Notes:

Additional example of condition shown previously

1.6.4. Less than 5° positive slope on horizontal flashing surface

Explanatory Notes:

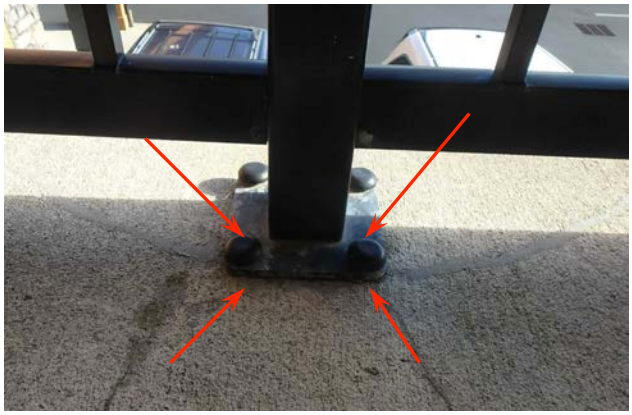
Condition fails to adequately convey surface drainage away from wall surface and increases likelihood of water infiltration into exterior wall assembly.

1.7. WALKWAY OBSERVATIONS

1.7.1. Moisture-stained deck assembly components below the rail penetrations

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage through deck assembly and/or moisture accumulation within deck assembly.



1.7.2. Rail fastened through horizontal concrete surface

Explanatory Notes:

Condition facilitates water infiltration the waterproof membrane of the assembly

1.7.3. Moisture-stained deck assembly components below the beam penetrations

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage through deck assembly and/or moisture accumulation within deck assembly.

1.7.4. Visible water leakage through soffit assembly

Explanatory Notes:

Condition results from water leakage through walkway assembly

1.7.5. Greater than 19% MC in soffit components

Explanatory Notes:

100.0% MC measured in cedar soffit material

Condition results from sustained moisture absorption due to water leakage through walkway

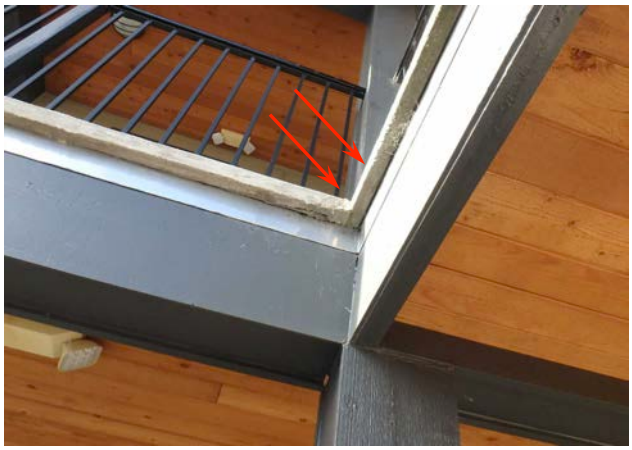
1.7.6. Greater than 19% MC in cedar base of wall components

Explanatory Notes:

49.9% MC measured in cedar siding at the base of wall

Condition results from sustained moisture absorption due to water leakage at walkway

1.7.7. Overview of outside corner of beam penetration



1.7.8. Overview of inside corner of beam penetration

1.8. DECK OBSERVATIONS

1.8.1. Un-sealed metal base of wall flashing

Explanatory Notes:

Condition facilitates water infiltration into the deck assembly.

1.8.2. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

Explanatory Notes:

Additional example of condition shown previously

1.9. ROOF OBSERVATIONS

1.9.1. Deterioration of roofing material

Explanatory Notes:

Condition results from weathering of the composite shingles. Verification of roofing material is needed to asses if the proper material was utilized for costal application.

Explanatory Notes:

1.9.2. Additional example of condition shown previously

1.9.3. Omitted or discontinuous kick-out flashing at roof-to-wall step flashing termination

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

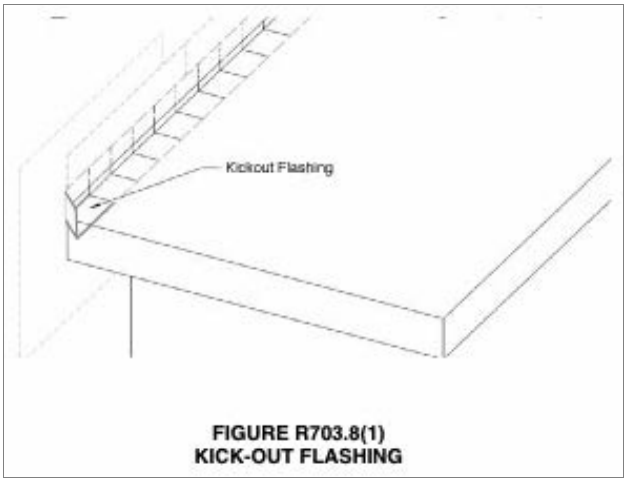


FIGURE R703.8(1)
KICK-OUT FLASHING

Explanatory Notes:

Building code requirements for roof-to-wall step flashing termination, illustrating proper installation of kick-out flashing to convey surface drainage away from roof-to-wall interface.

1.9.4. Discontinuous cricket

Explanatory Notes:

Condition impedes proper conveyance of surface drainage away from structure, increasing likelihood of water infiltration into roof and exterior wall assemblies.

1.9.5. Omitted cricket

Explanatory Notes:

Condition impedes proper conveyance of surface drainage away from structure, increasing likelihood of water infiltration into roof and exterior wall assemblies.

2. *INVASIVE OPENING OBSERVATIONS*

2.1. WINDOW OPENING OBSERVATIONS

2.1.1. Improperly-constructed and subsequently-failed sealant joint application

2.1.2. Deteriorated trim member

Explanatory Notes:

This condition was observed at IO 2. These conditions were observed to be systemic throughout the building

Explanatory Notes:

Additional example of condition shown previously, illustrating a similar condition at IO 3

2.1.3. Greater than 19% MC in wall assembly components

Explanatory Notes:

83.9% MC measured in trim at sill to jamb transition. IO 2

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and/or moisture accumulation within exterior wall assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating a 58.8% MC in the trim at the head of a window at IO 3

2.1.4. Fungal-affected wall assembly components

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly. IO 2

Explanatory Notes:

Additional example of condition shown previously, illustrating the condition at IO 6 at the window head

2.1.5. Rabbet-cut trim board

Explanatory Notes:

Condition relies on an unmaintainable sealant joint and is prone to failure. This condition was observed at all trims at lap siding IOs

2.1.6. Un-primed field cut edges

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of trim members. Condition observed at IO 2

2.1.7. Moisture-deteriorated trim components

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating the above two conditions at IO 3

2.1.8. Reverse-lap of lower WRB layer over upper WRB layer

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly. Condition observed at IO 1

2.1.9. Tears or holes in WRB

Explanatory Notes:

Condition fails to provide adequate incidental water protection for underlying exterior wall assembly components.

2.1.10. Trim fasteners penetrate underlying vinyl fenestration mounting flange

Explanatory Notes:

Condition facilitates cracking of fenestration mounting flange. IO 1

2.1.11. Less than 3” spacing between fastener and mounting flange corner

Explanatory Notes:

Condition facilitates deflection and cracking of fenestration unit. IO 1

2.1.12. Greater than 19% MC in wall assembly components at IO 1

Explanatory Notes:

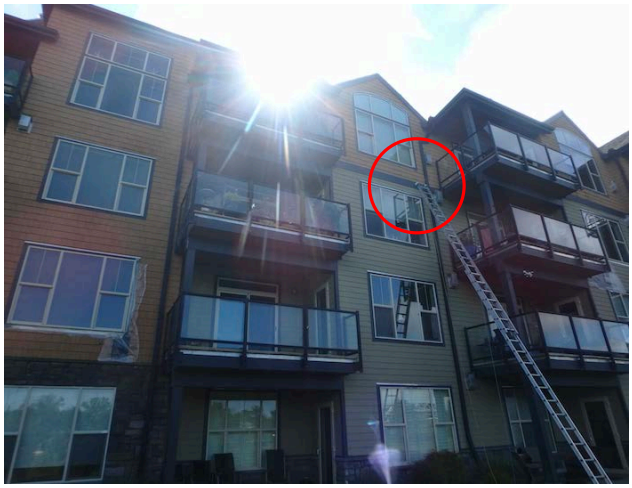
21.8% MC measured in OSB sheathing at window sill

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage within exterior wall assembly.

2.1.13. Greater than 19% MC in wall assembly components at IO 6

Explanatory Notes:

40.2% MC measured in OSB sheathing at window sill.



2.1.14. Overview of IO 15 at third floor window head

2.1.15. Overview of fenestration condition on the fourth floor above IO 15

2.1.16. Improperly-constructed and subsequently-failed sealant joint application

Explanatory Notes:

Condition facilitates water infiltration into roof assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating the condition at the trim to cedar shake siding

2.1.17. Siding sitting proud of trim

Explanatory Notes:

Condition facilitates water infiltration into the wall assembly

2.1.18. Overview of the IO in relation to the above mentioned conditions

2.1.19. Moisture-deteriorated wall assembly components

Explanatory Notes:

OSB sheathing exhibits damage at window head at fastener penetration through WRB and flexible flashing.

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

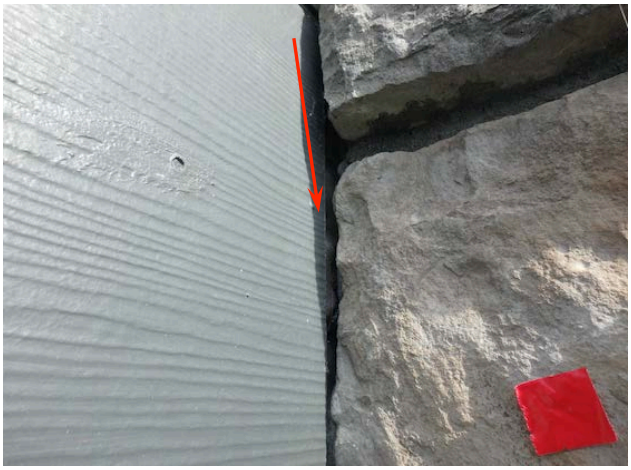
2.2. STONE OPENING OBSERVATIONS

2.2.1. Overview of IO 13

2.2.2. Moisture and corrosion staining emanating from within front walkway beam to stone

Explanatory Notes:

Condition likely results from moisture egress from within front entry and stone assemblies.



2.2.3. Omitted dynamic sealant joint between dissimilar cladding components

Explanatory Notes:

Condition facilitates water infiltration into the wall assembly.

2.2.4. Omitted base of wall and diverter flashing

Explanatory Notes:

Condition facilitates water infiltration into wall assembly.

2.2.5. Overview of drainage mat behind the metal lath of the stone

2.2.6. Moisture-deteriorated wall assembly components

Explanatory Notes:

OSB sheathing and framing exhibits severe damage at below the walkway beam to stone wall transition

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

2.2.7. Overview of IO 12 locations

2.2.8. Moisture staining emanating from roof to wall transition

Explanatory Notes:

Condition likely results from moisture egress from within roof assembly.

2.2.9. Omitted or discontinuous kick-out flashing at roof-to-wall step flashing termination

2.2.10. Improper clearance of stone cladding to roofing surface

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

2.2.11. Moisture-deteriorated fascia board

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

2.2.12. Moisture-deteriorated OSB sheathing

Explanatory Notes:

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

Explanatory Notes:

Close-up of location shown previously, illustrating the severity of the deterioration and moisture damage

2.2.13. Overview of the second opening in IO 12

Explanatory Notes:

Opening was created at the base of wall to the flat roof transition below the above roof to wall opening

2.2.14. Reverse-lap of flashing vertical back leg over metal lath drainage mat and WRB

Explanatory Notes:

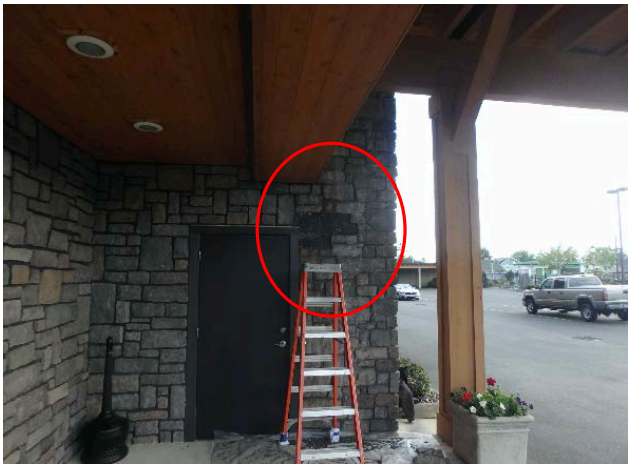
Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

2.2.15. Greater than 19% MC in wall assembly components

Explanatory Notes:

63.9% MC measured in OSB sheathing.

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and/or moisture accumulation within exterior wall assembly.



2.2.16. Overview of the third opening in IO 12

Explanatory Notes:

Opening was created below the above flat roof to wall opening

2.2.17. Greater than 19% MC in wall assembly components

Explanatory Notes:

53.4% MC measured in OSB sheathing.

2.2.18. Overview of the exterior of IO 7

Explanatory Notes:

Louver penetration at the south stair well

2.2.19. Omitted dynamic sealant joint between dissimilar cladding components

2.2.20. Omitted sill flashing assembly

Explanatory Notes:

Condition facilitates water infiltration into the wall assembly.

2.2.21. Overview of IO 7

Explanatory Notes:

Interior of stairwell tower

2.2.22. Organic growth or moisture staining emanating from within wall assembly to the interior of the stairwell tower

Explanatory Notes:

Condition likely results from moisture egress from within exterior wall assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating the condition at the left jamb of the louver

2.2.23. Moisture-deteriorated wall assembly components

2.2.24. Moisture- or microbial-affected interior finishes

Explanatory Notes:

WRB and gypsum sheathing exhibits damage at below the louver rough opening

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

Explanatory Notes:

Close-up of location shown previously, illustrating the extent of the damage

2.2.25. Moisture-deteriorated framing components

Explanatory Notes:

Framing member exhibits damage at below the louver rough opening

2.2.26. Greater than 19% MC in outside wall OSB sheathing

Explanatory Notes:

99.9% MC measured

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and/or moisture accumulation within exterior wall assembly.

2.2.27. Omitted sill pan and saddle flashing assembly

Explanatory Notes:

Condition facilitates water infiltration into the wall assembly.

2.2.28. Moisture-deteriorated framing components

Explanatory Notes:

Framing member exhibits damage at below the louver rough opening

2.2.29. Overview of IO 14

2.2.30. Reverse-lap of flashing vertical back leg over drainage mat and WRB

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

Explanatory Notes:

Close-up of location shown previously, illustrating the reverse lap

2.2.31. Moisture-deteriorated wall assembly components

2.2.32. Moisture and microbial-affected interior finishes

Explanatory Notes:

OSB sheathing exhibits damage at north tower outside wall

Damage results from sustained presence of moisture due to water leakage and/or moisture accumulation within exterior wall assembly.

2.2.33. Greater than 19% MC in wall assembly components

Explanatory Notes:

93.7% MC measured in OSB sheathing

2.2.34. Overview of IO 9, the interior wall to IO 14

2.2.35. Moisture staining emanating from within wall assembly

Explanatory Notes:

Condition likely results from moisture egress from within exterior wall assembly.

Explanatory Notes:

Additional example of condition shown previously, illustrating the extent or the staining

2.2.36. Greater than 19% WME in gypsum-based wall assembly components

Explanatory Notes:

99.9% MC measured in gypsum sheathing at the base of wall

Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage within exterior wall assembly.

2.2.37. Greater than 19% MC in OSB sheathing

Explanatory Notes:

99.9% MC measured behind the gypsum wall

2.2.38. Microbial-affected wall assembly components

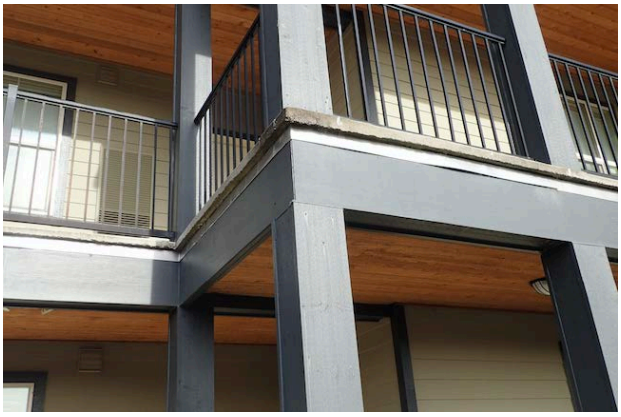
2.2.39. Moisture-saturated and deteriorated wall assembly components

Explanatory Notes:

Removal of the interior wall OSB exposed the exterior wall OSB to be saturated, deteriorated and containing heavy microbial growth.

Explanatory Notes:
Close-up of location shown previously

2.3. FRONT WALKWAY OPENING OBSERVATIONS

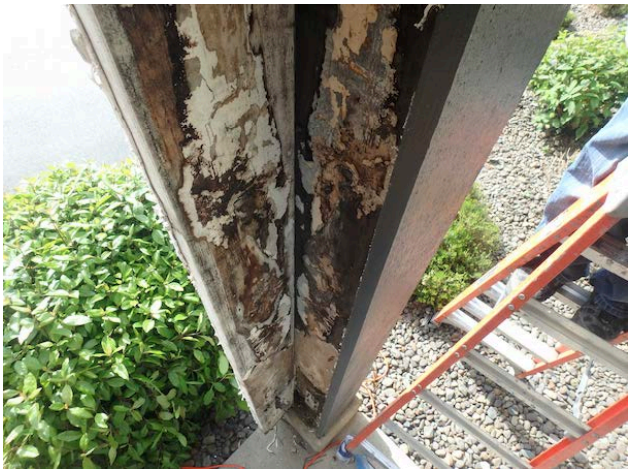


2.3.1. Overview of IO 11

Explanatory Notes:
Opening conducted below a front walkway beam penetration

2.3.2. Soffit view of IO 11

Explanatory Notes:
Note the staining on the soffit boards



2.3.3. Microbial-affected wall assembly components

2.3.4. Moisture-deteriorated wall assembly components

Explanatory Notes:

Front walkway support post's trim and gypsum sheathing exhibits damage at IO 11

Damage results from sustained presence of moisture due to water leakage within exterior wall assembly.

2.3.5. Omitted WRB behind wall coverings

Explanatory Notes:

Condition fails to provide adequate incidental water protection for underlying exterior wall assembly components.

2.3.6. Moisture-deteriorated beam assembly

Explanatory Notes:

Front walkway support post itself exhibits damage at IO 11

2.3.7. Greater than 19% MC in wall assembly components

Explanatory Notes:

95.5% MC measured in front entry structural post.

2.3.8. Moisture-deteriorated gypsum sheathing below structural beam assembly

2.3.9. Greater than 19% MC in front walkway structural beam

Explanatory Notes:

99.9% MC measured in structural beam

2.3.10. Overview of saturated beams below the walkway assembly

Explanatory Notes:

Close-up of location shown previously, illustrating the saturation level of the structural beam

2.3.11. Reverse-lap of flashing vertical back leg over gypsum sheathing

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

2.3.12. Omitted WRB behind wall coverings

Explanatory Notes:

Condition fails to provide adequate incidental water protection for underlying exterior wall assembly components.

2.3.13. Overview of IO 16

Explanatory Notes:

A section of concrete was removed to observed the walkway waterproofing components

2.3.14. Drainage mat layer installed over waterproofing membrane

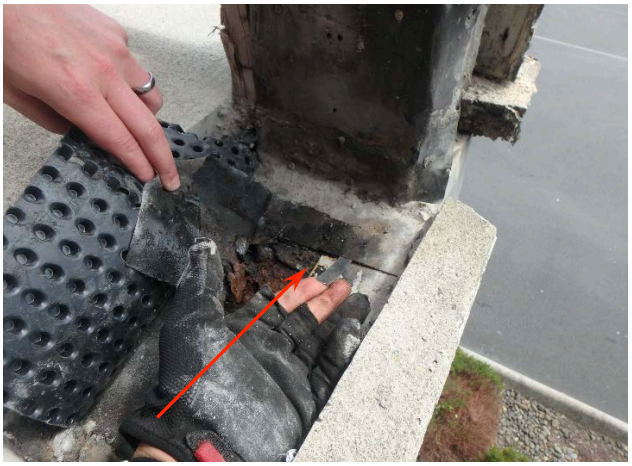
2.3.15. Waterproofing membrane not adhered to drip edge flashing

Explanatory Notes:

Condition fails to provide adequate incidental water protection for underlying walkway sheathing

Explanatory Notes:

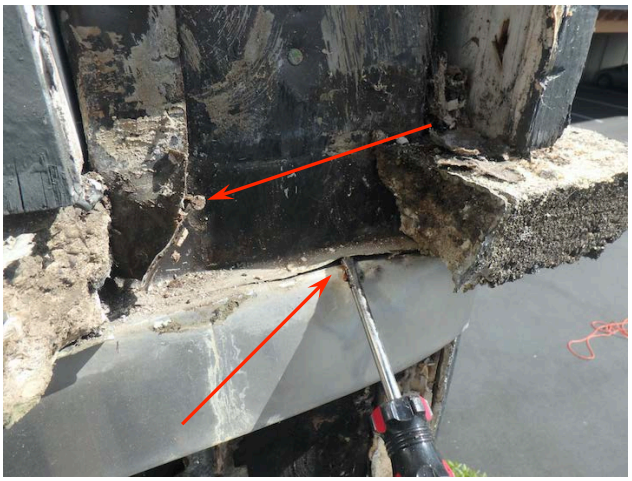
Close-up of location shown previously, illustrating the lack of proper adhesion of the waterproof membrane



2.3.16. Un-sealed metal flashing seam at post saddle

Explanatory Notes:

Condition facilitates water infiltration into walkway assembly.



Explanatory Notes:

Additional example of condition shown previously, illustrating the unsealed seams at both the vertical and horizontal seams

2.3.17. Deteriorated walkway sheathing

Explanatory Notes:

Condition results from improper installation of waterproofing and flashing assemblies within the walkway assembly

2.3.18. Overview of metal rail post attachment point

2.3.19. Un-sealed penetration through horizontal walkway surface

2.3.20. Fastener penetration penetrates waterproofing assembly

Explanatory Notes:

Condition facilitates water infiltration into walkway assembly.

2.4. REAR DECK OPENING OBSERVATIONS

2.4.1. Overview of IO 5 at rear deck to wall transition

2.4.2. Omitted or discontinuous flashing "diverter" at deck-to-wall flashing termination

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

2.4.3. Un-sealed metal flashing seam

Explanatory Notes:

Condition facilitates water infiltration into deck and wall assembly.

Explanatory Notes:

Close-up of location shown previously, illustrating the assembly after trim was removed

2.4.4. Reverse-lap of lower WRB layer over upper WRB layer

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

2.4.5. Greater than 19% MC in wall assembly components

Explanatory Notes:

98.2% MC measured in OSB sheathing below deck to wall transition

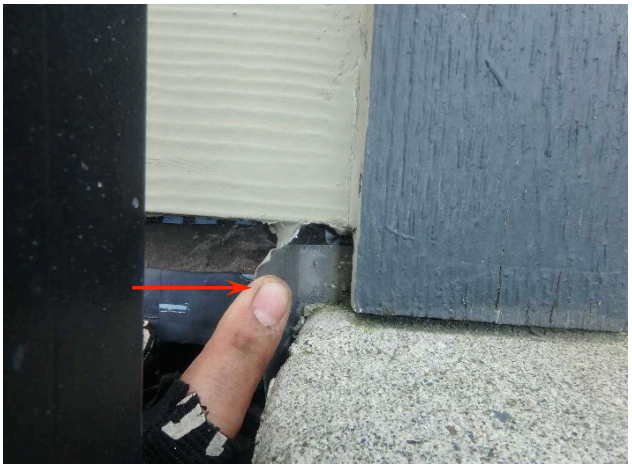
Condition results from sustained moisture absorption by exterior wall assembly components due to water leakage and/or moisture accumulation within exterior wall assembly

2.4.6. Moisture-deteriorated wall assembly components

Explanatory Notes:

OSB sheathing and framing member exhibits damage at further down the wall below the deck to wall transition.

2.4.7. Overview of IO 4



2.4.8. Omitted or discontinuous flashing “diverter” at deck-to-wall flashing termination

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

2.4.9. Reverse-lap of flashing vertical back leg over WRB

Explanatory Notes:

Condition impedes incidental water egress and facilitates moisture accumulation within exterior wall assembly.

2.4.10. Moisture-deteriorated wall assembly components

Explanatory Notes:

OSB sheathing exhibits damage at below the deck to wall transition.

Explanatory Notes:

Close-up of location shown previously, illustrating the extent of the damage

2.4.11. Overview of IO 3

2.4.12. Omitted or discontinuous flashing "diverter" at deck-to-wall flashing termination

2.4.13. Un-sealed metal flashing at concrete surface

Explanatory Notes:

Close-up of location shown previously, illustrating the assembly after trim was removed and flashing was pushed to the side

2.4.14. Greater than 19% MC in wall assembly components

Explanatory Notes:

42.1% MC measured in OSB sheathing below deck to wall transition

2.5. ROOF OPENING OBSERVATIONS

2.5.1. Overview of IO 8

Explanatory Notes:

Close-up of location shown previously, illustrating the moss growth and wicking of water into the cedar cladding

2.5.2. Less than 1’-2" clearance between shingle and roof surface

Explanatory Notes:

Condition facilitates moisture absorption and premature deterioration of cedar shingles.

2.5.3. Moisture-deteriorated gypsum sheathing at roof to wall transition

Explanatory Notes:

Damage results from sustained presence of moisture due to wicking of water

Note the gypsum was installed over the roof to wall step flashing

2.5.4. Microbial-affected wall assembly components

Explanatory Notes:

Cedar shake siding exhibits damage at roof to cladding.

Note the elevated MC of 89.6%.

2.5.5. Omitted or discontinuous kick-out flashing at roof-to-wall step flashing termination

Explanatory Notes:

Condition fails to adequately convey surface drainage away from wall interface and increases likelihood of water infiltration into exterior wall assembly.

2.5.6. Greater than 19% MC in wall assembly components

Explanatory Notes:

99.9% MC measured in OSB sheathing at roof to wall juncture

2.5.7. Moisture-deteriorated wall assembly components

Explanatory Notes:

OSB sheathing exhibits damage at at roof to wall junction.

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Appendix A: Important Information

APPENDIX A1: DISCLOSURES AND LIMITATIONS

1. **Nonconforming Conditions:** Forensic defines "nonconforming conditions" as construction conditions that fail to conform with the Property's applicable building code requirements, "project documents" available for Forensic's review, referenced standards and other industry association standards, as well as sound construction and weatherproofing principles.
2. **Review of Project Documents:** Project documents were not made available for Forensic's review at the time of our presence on site at the Property or prior to the time that this report was generated. As such, Forensic was unable to sufficiently evaluate the design intent or product manufacturers' requirements for the installed construction assemblies at the Property.
3. **Service History Information:** Within the scope of Forensic's services at the Property, "service history information" includes (but is not necessarily limited to) the following: accounts of previous water leakage or symptoms of leaks reported by building owners or occupants, maintenance or repair records, or previous investigation reports by others.
4. **Review of Service History Information:** Service history information was not made available for Forensic's review at the time of our presence on site at the Property or prior to the time that this report was generated. As such, Forensic was unable to sufficiently evaluate the previous occurrence of water leakage through the Property's building envelope assemblies (if any).
5. **Investigation Methodology:** Forensic's investigation techniques consisted of examining select building components and/or systems throughout the Property's building envelope assemblies at locations where our experience has shown us that nonconforming construction conditions, water leakage, and/or property damage have a high likelihood of existing or developing. However, because Forensic's investigation did not include the complete removal of the Property's exterior wall coverings, roof coverings, fenestration (door & window) assemblies, and any other building components or systems overlaying the Property's underlying structure, water-resistive barrier (WRB), and other concealed building envelope assemblies, there remains the possibility of the existence of concealed property damage, water leakage, and/or nonconforming construction conditions that Forensic could neither detect, document, nor report on.
6. **Visual Review:** In general conformance with the investigation methods described by ASTM E 2128 "Standard Guide for Evaluating Water Leakage of Building Walls," Forensic performed a visual review of the unconcealed and accessible surfaces of the building components, systems, and locations included within the scope of Forensic's services at the Property. The objectives of Forensic's visual review were to document the existing construction conditions at the Property, to identify workmanship and/or building product deficiencies that have the potential to compromise the weather resistance of the Property's building envelope assemblies, and to formulate an initial hypotheses regarding the causes of evident weather resistance deficiencies or damage at the Property.
7. **Inspection Openings:** In general conformance with the investigation methods described by ASTM E 2128 "Standard Guide for Evaluating Water Leakage of Building Walls," Forensic also examined concealed building envelope assemblies at multiple limited inspection opening (IO) locations at the Property. Such investigation enabled Forensic to better verify the presence of concealed conditions within the Property's building envelope assemblies while documenting and evaluating the condition, sequencing, and integration of concealed building envelope components and systems.
8. **Preliminary Building Envelope Investigation Limitations:** Note that the findings of Forensic's preliminary building envelope investigation (PBEI) of the Property are limited and preliminary in nature. As such, additional investigation of the Property by a qualified building envelope consultant will be necessary in order to sufficiently document and evaluate the Property's building envelope assemblies in preparation for litigation.
9. **Report Revisions:** Forensic reserves the rights to amend, modify, and/or re-issue this report as more information becomes available for Forensic's review, or as additional investigation proceeds. This report is intended solely for use by Forensic's client and should, in any event, be reproduced only in its entirety, with this disclaimer included.

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