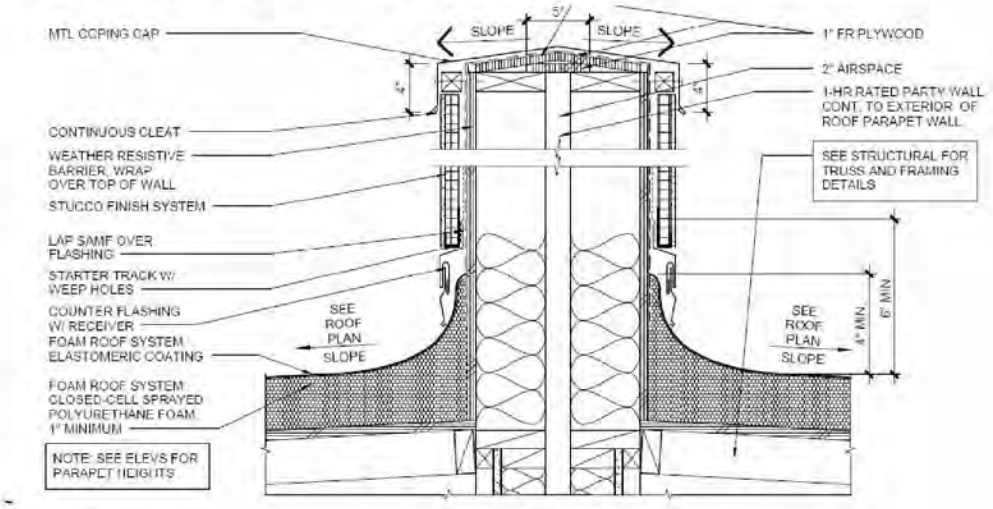
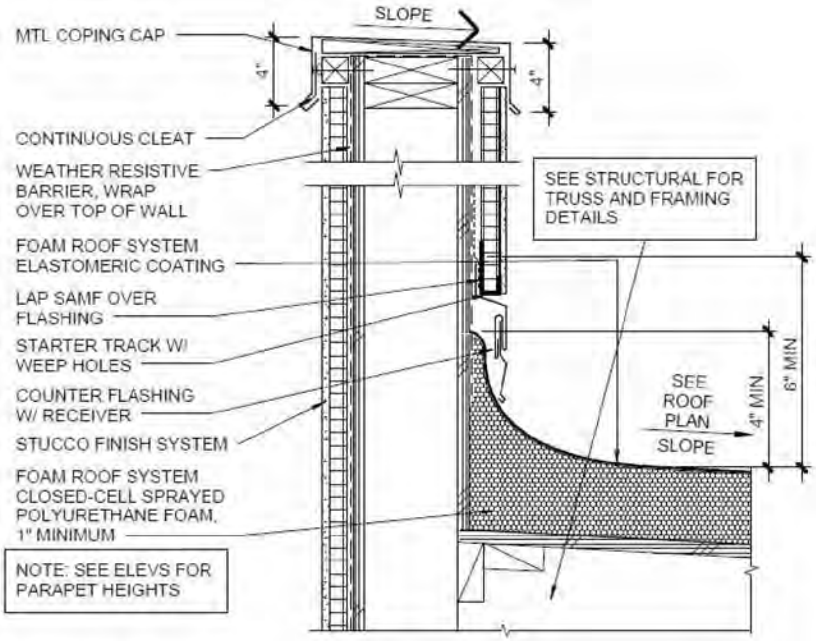
Applicable Code/Industry Standard References/Project-Specific Documents:

Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.05 "Exterior Details," illustrates the following:

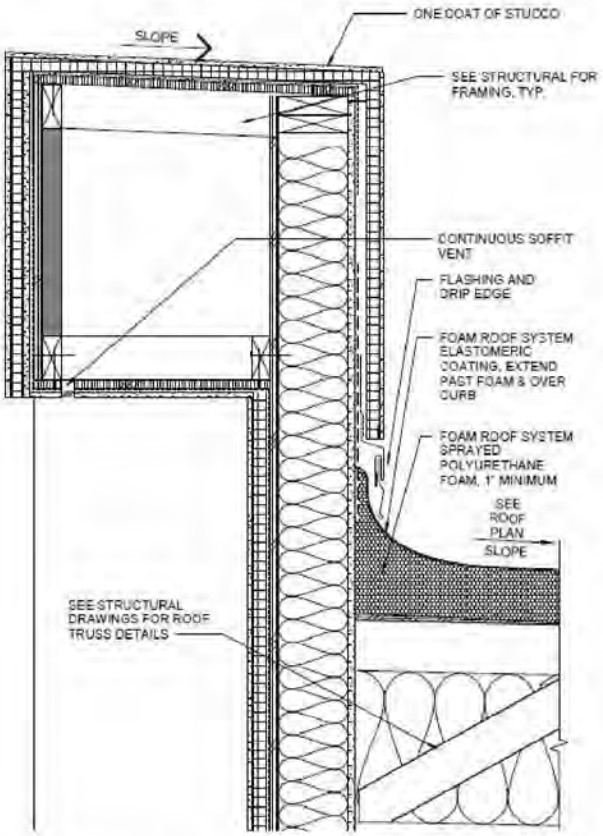
- *"15/A8.05 Roof Party Wall Parapet"*



- *"16/A8.05 Roof Parapet"*



- *"19/A8.05 Roof Parapet At Pop-Out Box"*



Stucco Manufacturers Association (SMA), prepared by the Northwest Wall and Ceiling Bureau, "Portland Cement Plaster Stucco Resource Guide," Third Edition, 1997, Section "Recommendation/Standards for design and installation," states the following:

- *"18. The stucco assembly is not recommended for tops of railings, tops of fences or tops of parapet walls. The minimum slope for a sill-type surface would be 12:6. Surfaces in a plane less than 12:6 must be given special protection from possible of moisture intrusion. Tops of railings, fences, parapet walls, and window sills are segements* [sic] *of a wall. By definition in the building code, a weather-exposed exterior wall must have a slope of 60° or greater from the horizontal plane."*

Example Photographs:

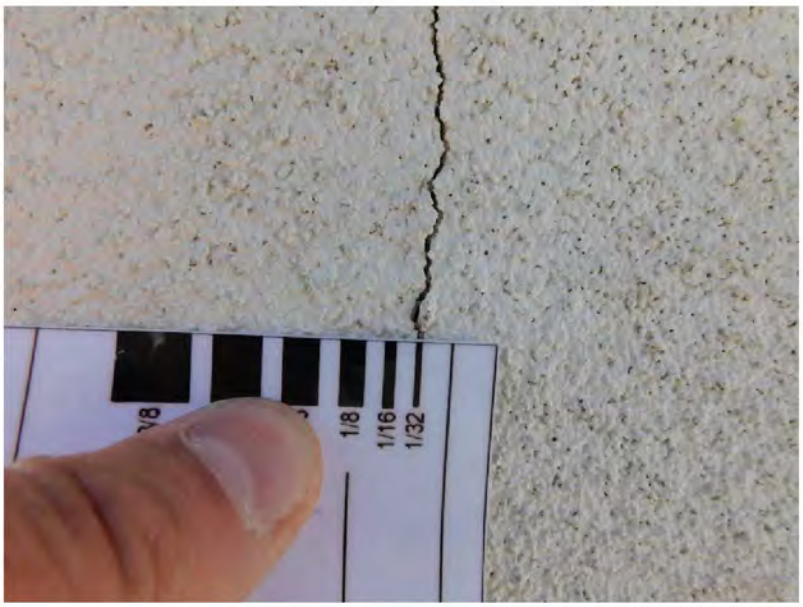
March 11, 2021, Disc IT10, Photograph 3, SSR, Building A, roof parapet wall stucco cracks.

March 9, 2021, Disc IT6, Photograph 56, SSR, Building A, pop-out box stucco cracks.

March 11, 2021, Disc IT10, Photograph 170, SSR, Building B, roof parapet wall stucco cracks.

March 11, 2021, Disc IT10, Photograph 207, SSR, Building B, roof parapet wall stucco cracks.

March 11, 2021, Disc IT10, Photograph 241, SSR, Building B, roof parapet wall stucco cracks.

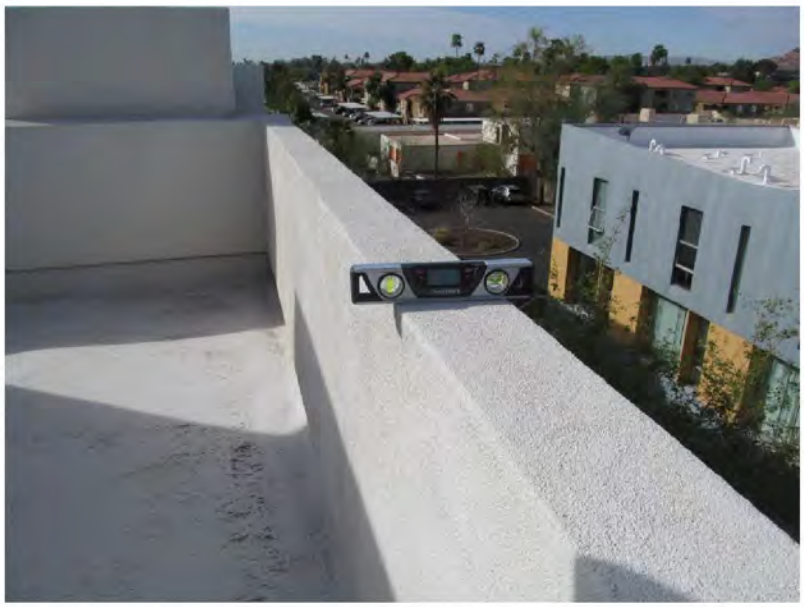


March 11, 2021, Disc OBS7, Photograph 421, PER, Building C, roof parapet wall cracks.

March 10, 2021, Disc IT8, Photograph 54, SSR, Building D, pop-out box stucco cracks.

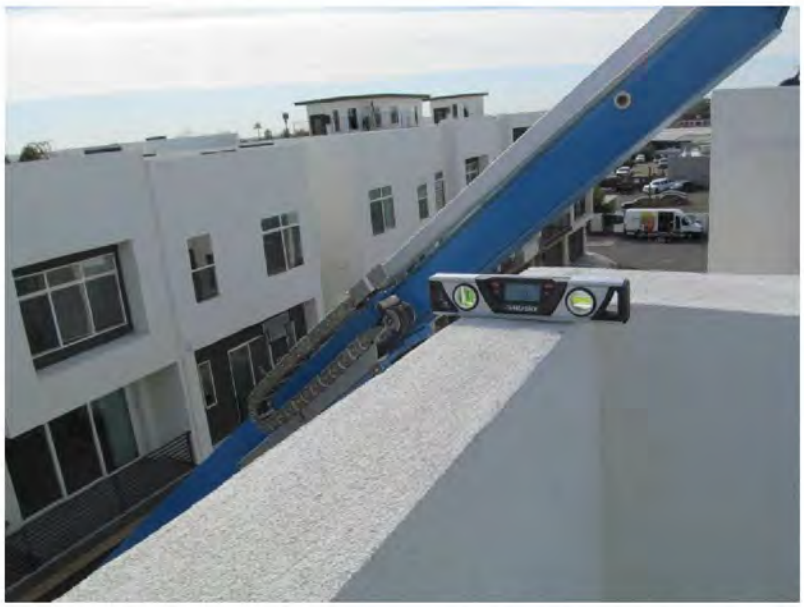
March 11, 2021, Disc OBS7, Photograph 301, PER, Building D, roof parapet wall cracks.

March 11, 2021, Disc IT10, Photograph 70, SSR, Building A, roof parapet wall slopes 6-percent outward.

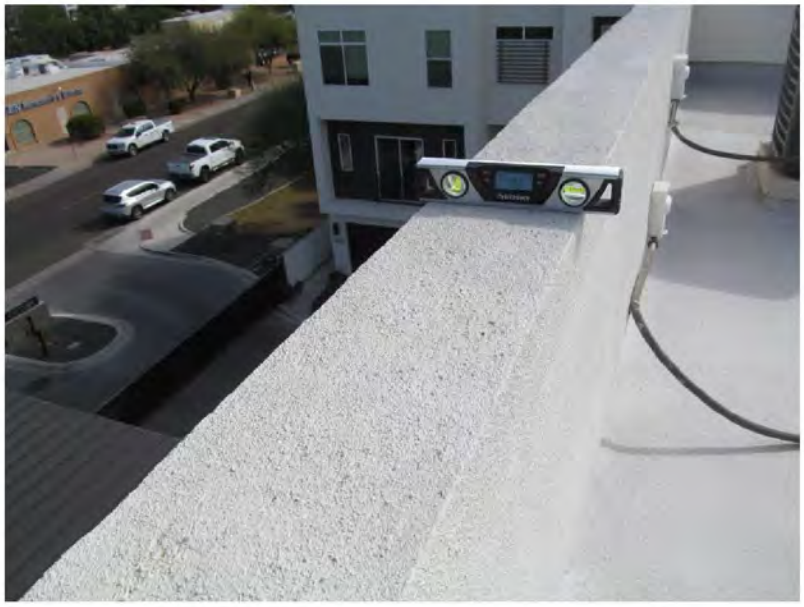


March 11, 2021, Disc IT10, Photograph 71, SSR, Building A, roof parapet wall slopes 0.1-percent inward.

March 11, 2021, Disc IT10, Photograph 76, SSR, Building A, roof parapet wall slopes 0.8-percent inward.



March 11, 2021, Disc IT10, Photograph 136, SSR, Building A, roof parapet wall slopes 0.6-percent outward.



March 11, 2021, Disc IT10, Photograph 146, SSR, Building A, roof parapet wall slopes 0.3-percent outward.

March 11, 2021, Disc IT10, Photograph 227, SSR, Building A, roof parapet wall slopes 2-percent.

March 11, 2021, Disc IT10, Photograph 284, SSR, Building B, roof parapet wall slopes 2.8-percent.

March 11, 2021, Disc IT10, Photograph 313, SSR, Building B, roof parapet wall slopes 5.5-percent inward.

March 9, 2021, Disc IT5, Photograph 313, JJF, Building B, stucco parapet box slopes 3.3-percent outward.

March 11, 2021, Disc OBS7, Photograph 350, PER, Building C, roof parapet wall slopes 0.5-percent outward.

March 10, 2021, Disc IT9, Photograph 25, PER, Building C, stucco pop-out box slopes 2.9-degrees (5-percent) outward.

March 11, 2021, Disc OBS7, Photograph 289, PER, Building D, roof parapet wall slopes 3.3-percent inward.

March 11, 2021, Disc OBS7, Photograph 292, PER, Building D, roof parapet wall slopes 1.9-percent inward.

March 10, 2021, Disc IT8, Photograph 45, SSR, Building D, stucco pop-out box slopes 14-percent outward.

Locations:

Non-compliant slope of horizontal stucco surfaces exist at locations across all buildings at the Gallery site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

e. Deficient Self-Adhered Membrane under Horizontal Stucco System

The stucco system was used at horizontal surfaces of parapet walls and pop-out boxes as discussed in section C.1.d. The architectural drawings detail the WRB to be wrapped over the top of the wall and integrated with the WRB on the vertical face of the wall. SAM was detailed to lap over the flashing or weep system at stucco termination. No clear information was shown regarding the extent of the SAM over the WRB.

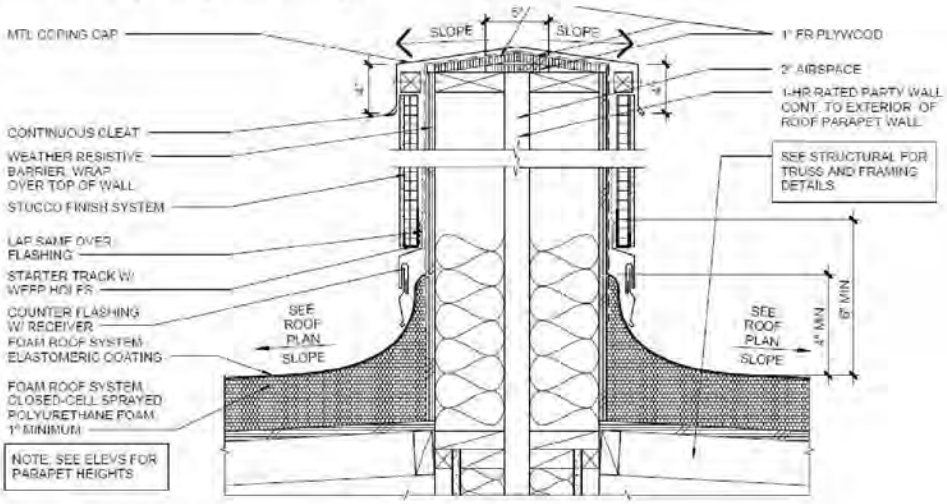
Cracks at horizontally applied stucco surfaces were documented throughout the Gallery site. At intrusive examinations, the top of the stucco parapet walls and pop-out boxes were covered with Xtraflash SAM under the stucco system. Cracks and puncture holes due to the staples and nails used to attach the stucco system were documented through the SAM. Rusted fasteners and stains on the framing below at some of the intrusive examination locations indicate water intrusion had occurred through the puncture holes in the SAM. The Xtraflash SAM installed by the contractor failed to self-seal around fastener holes, which allowed water intrusion resulting in damage to the moisture-sensitive building components. As constructed, the stucco surface cracks and the puncture holes in the deficient SAM have and will allow moisture intrusion and do not comply with the weather-resistance requirements of the applicable building code.

Where breaches in the SAM applied under horizontal stucco surfaces exist, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

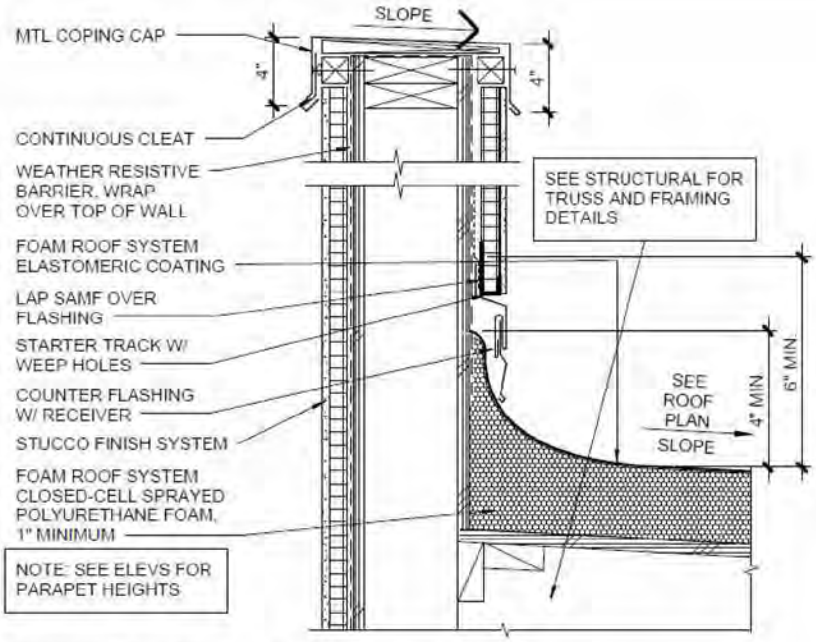
Applicable Code/Industry Standard References/Project-Specific Documents:

Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.05 "Exterior Details," illustrates the following:

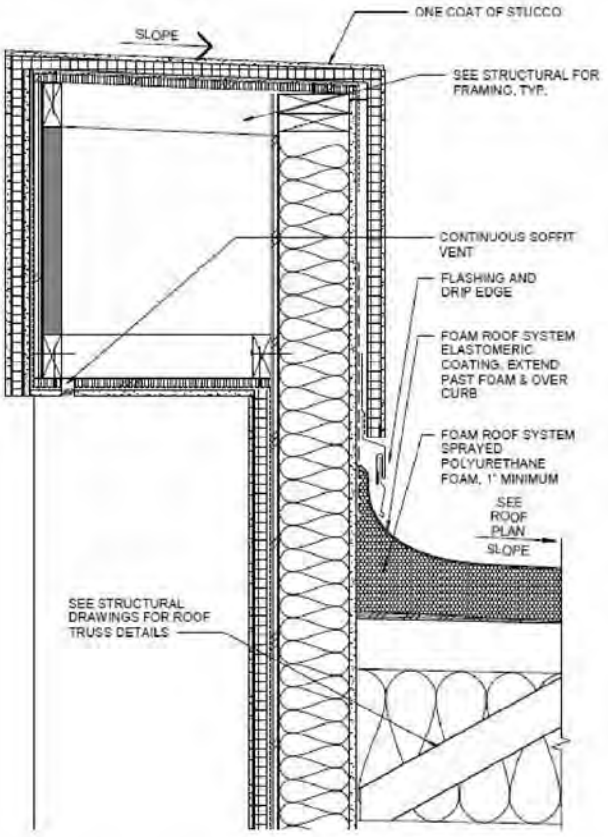
- *"15/A8.05 Roof Party Wall Parapet"*



- *"16/A8.05 Roof Parapet"*



- *"19/A8.05 Roof Parapet At Pop-Out Box"*



Example Photographs:

March 11, 2021, Disc IT10, Photograph 19, SSR, Building A, stucco cracks at parapet wall junction.

March 11, 2021, Disc IT10, Photograph 37, SSR, Building A, stucco cracks at parapet wall junction.

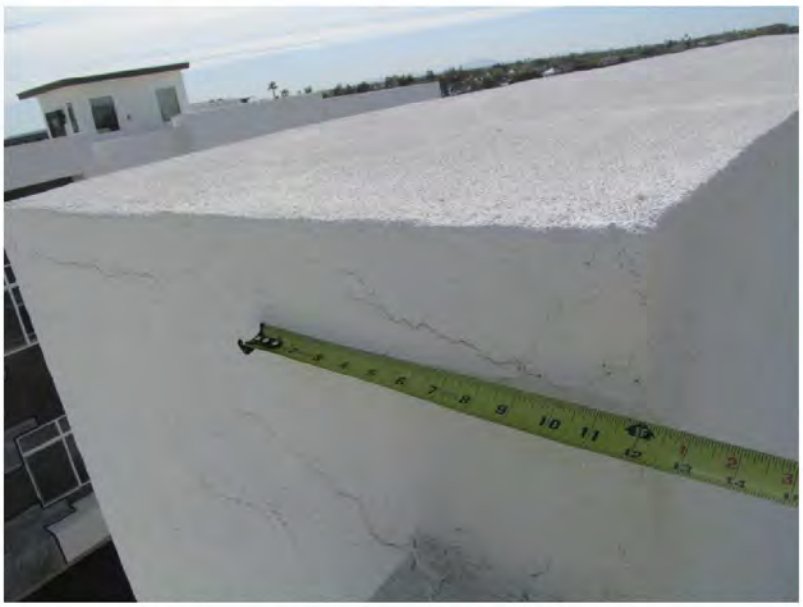
March 11, 2021, Disc IT10, Photograph 67, SSR, Building A, rusted lath, rusted fasteners, and stains on EPS foam board due to moisture intrusion.

March 11, 2021, Disc IT10, Photograph 102, SSR, Building A, holes and stains in Xtraflash SAM allow moisture intrusion.

March 11, 2021, Disc IT10, Photograph 103, SSR, Building A, reverse side of EPS foam board shows stains due to corrosion of fasteners.

March 11, 2021, Disc IT10, Photograph 125, SSR, Building A, top plate under SAM has stains and rusted fasteners.

March 11, 2021, Disc IT10, Photograph 132, SSR, Building A, top plate under SAM has stains and rusted fasteners.

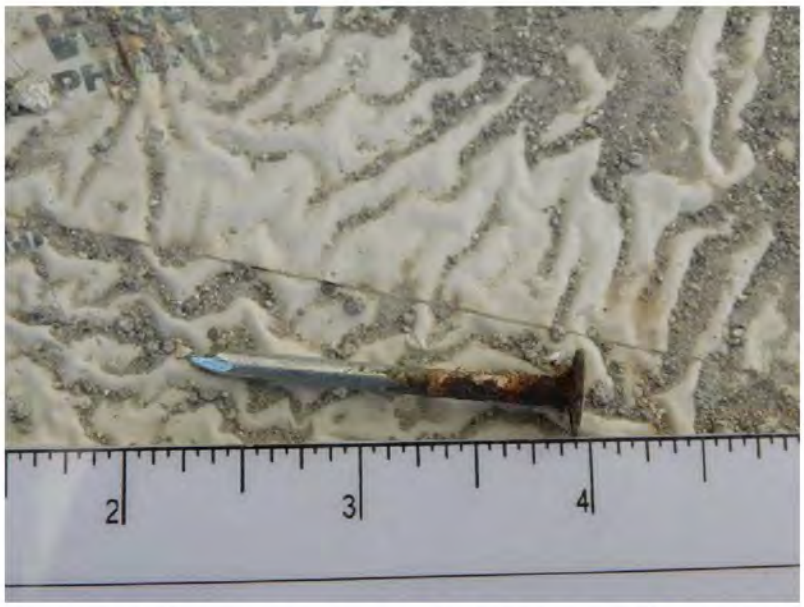


March 11, 2021, Disc IT10, Photograph 172, SSR, Building B, stucco cracks at parapet wall junction.

March 11, 2021, Disc IT10, Photograph 241, SSR, Building B, stucco cracks at parapet wall junction.

March 11, 2021, Disc IT10, Photograph 244, SSR, Building B, cracks at parapet wall allow stucco to peel off due to the elements and have allowed moisture intrusion.

March 10, 2021, Disc IT9, Photograph 185, PER, Building C, holes and stains in Xtraflash SAM allow moisture intrusion.



March 10, 2021, Disc IT9, Photograph 188, PER, Building C, holes and stains in Xtraflash SAM allow moisture intrusion.

March 11, 2021, Disc IT10, Photograph 372, SSR, Building D, rusted nails and lath indicate moisture intrusion through stucco.

March 11, 2021, Disc IT10, Photograph 374, SSR, Building D, rusted staple.

March 11, 2021, Disc IT10, Photograph 378, SSR, Building D, puncture holes in SAM allow moisture intrusion.

Locations:

Holes in SAM underneath the horizontal stucco surfaces exist at intrusively tested locations across all buildings at the Gallery site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

f. Missing Control/Movement Joints

In order to control cracking, industry standards require the installation of control or movement joints to limit the impacts of expected internal stresses within the material, especially at areas where high stresses occur. This includes rectangular penetrations through stucco, such as at the corners of fenestrations, as well as changes in plane and floorlines. Moreover, the areas in the field of the wall between stucco control joints are required to be limited to 144-square-feet to maintain a length-to-width ratio of not more than 2.5 to 1 and to not exceed 18-feet between control joints. With one-coat systems, it is recognized that a higher level of crack control will be necessary than with conventional three-coat systems. Either increased systems of movement joints or admixtures in the cementitious products can be utilized to reduce the system's propensity of cracking.

The architectural drawings include typical vertical control joint and typical sealant joint details for stucco. The architectural details specified 3/8- to 1/2-inch-wide sealant joint with backer rod installed in a width to depth ratio of 1:2. The architectural drawings also allowed for an alternate method using 3/8- to 1/2-inch-wide sealant installed over bond breaker tape. The manufacturer's product specification references ASTM C1063 for lath installation. ASTM C1063 requires control joints spaced a maximum 18-feet in each direction or a length to width ratio less than 2.5 to 1.

The architectural elevations do not specifically locate or identify all the control joints. The architectural side elevations of the buildings illustrate continuous vertical control joints at the window to stucco interfaces and specify typical Detail 1/A8.01, which illustrates the Architect's design intent regarding control joint location. Continuous vertical control joints were generally installed at window jambs on side elevations of all buildings. No horizontal control joints were installed at any of the building elevations and no vertical control joints were installed on the front and rear elevations at any of the buildings. Stucco cracks have been identified on all building elevations of the Gallery site. The contractor should have requested additional information regarding the control joints specified on the architectural drawings as well as the manufacturer's lath installation and control joint requirements. Failure to install compliant control/movement joints violates the manufacturer's installation instructions and industry standards, contributing to the cracking throughout the stucco system.

Where non-compliant control/movement joints exist, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

Applicable Code/Industry Standard References/Project-Specific Documents:

Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A3.11 "Exterior Elevations Building A, 5-Plex, Gallery Site #1," "Elevation Notes," states the following:

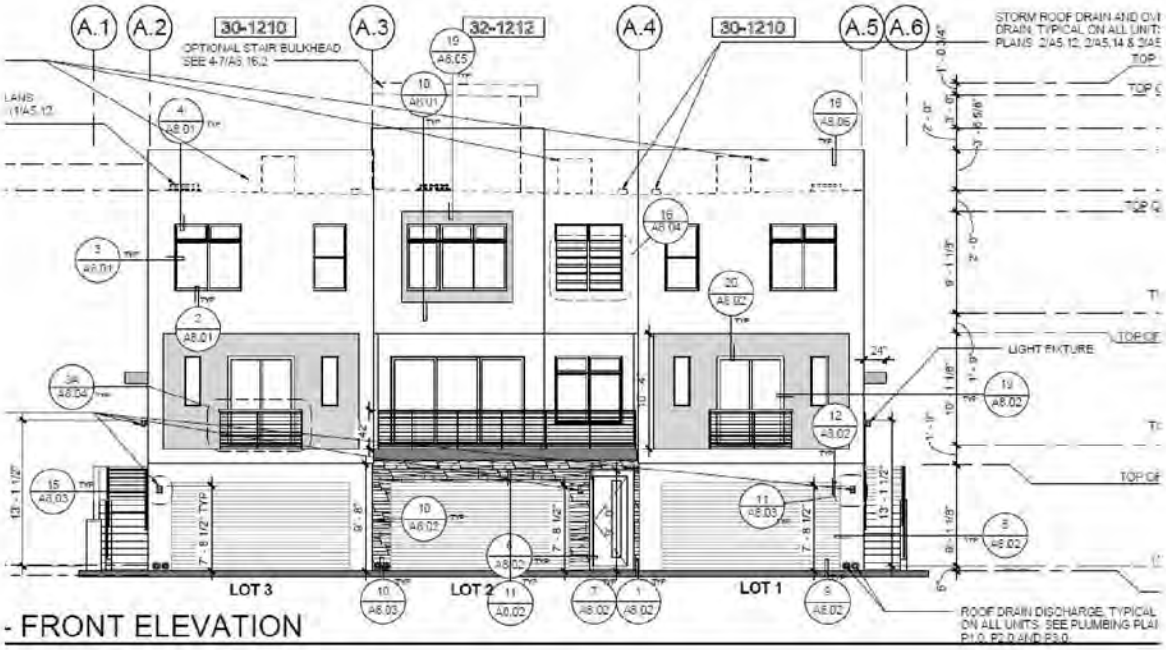
Note: similar note for Buildings B, C, and D.

- *"SEE 5/8.01 FOR TYPICAL SEALANT JOINTS."*

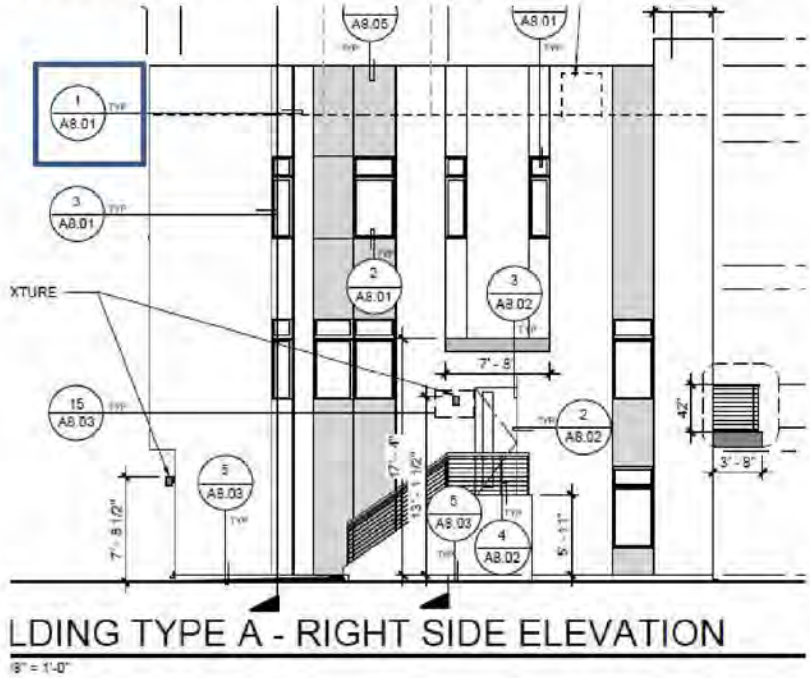
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A3.11 "Exterior Elevations Building A, 5-Plex, Gallery Site #1," illustrates the following:

Note: Buildings B, C, and D have generally similar control joint information.

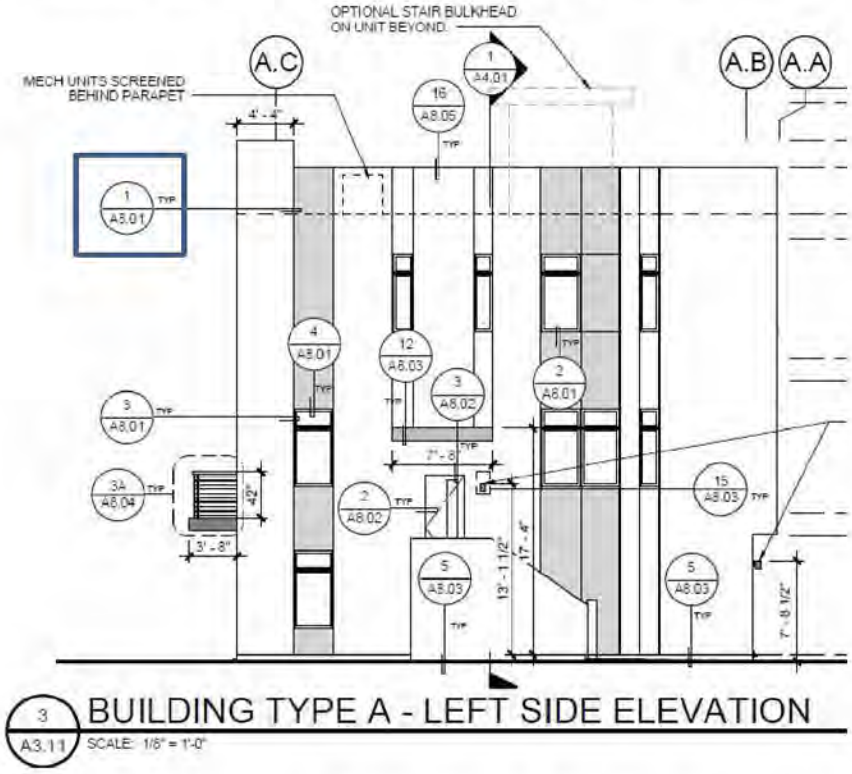
- *"1/A3.11 First Floor Plan – Building Type A – Front Elevation"*



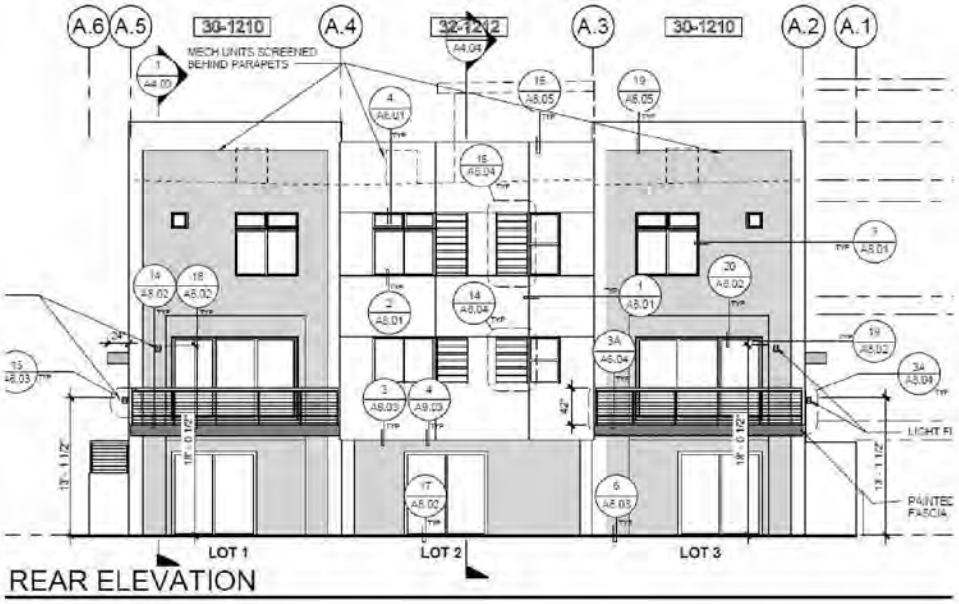
- *"2/A3.11 First Floor Plan – Building Type A – Right Side Elevation"*



- *"3/A3.11 First Floor Plan – Building Type A – Left Side Elevation"*

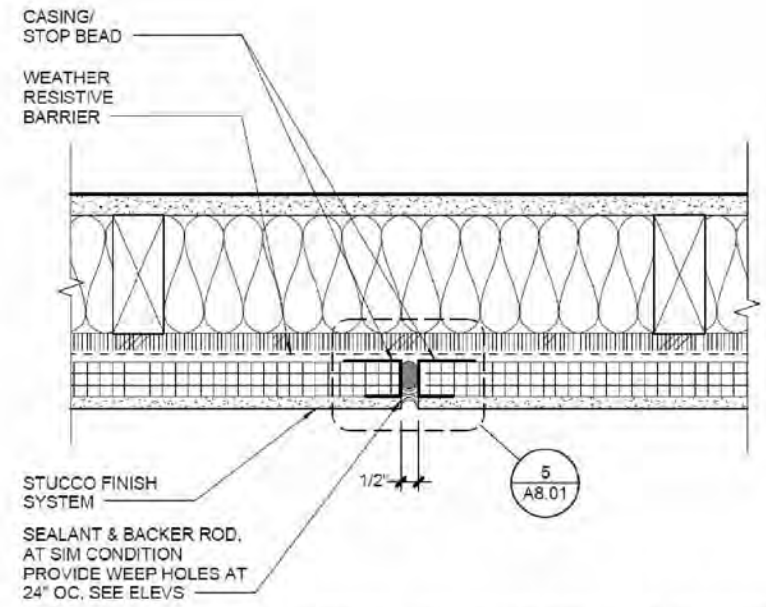


- *"4/A3.11 First Floor Plan – Building Type A – Rear Elevation"*



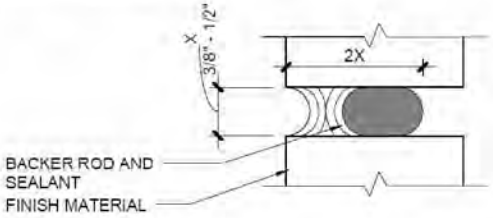
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.01 "Exterior Details," illustrates the following:

- *"1/A8.01 Vertical Control Joint At Stucco Siding"*

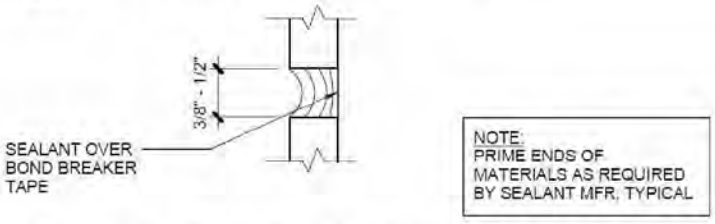


1 / A8.01 VERTICAL CONTROL JOINT AT STUCCO SIDING
SCALE: 3" = 1'-0"

- *"5/A8.01 Typical Sealant Joints"*



A REQUIRED SEALANT JOINT DIMENSION



B ALTERNATE JOINT WHEN DEPTH IS NOT POSSIBLE PER "A" ABOVE

5 / A8.01 TYPICAL SEALANT JOINTS
SCALE: 12" = 1'-0"

Amerimix, "Fiber Base Coat Stucco AMX 750 FBC," Revised June 2016, Section 4 "Installation," states the following:

- *"**Preparation***

  …
  - *Lath must be installed per ASTM C1063."*

American Society of Testing and Materials (ASTM), ASTM C1063-16 "Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster," 2016, Section 7 "Installation," subsection 7.11 "Application of Accessories," subsection 7.11.4 "Control Joints—General," states the following:

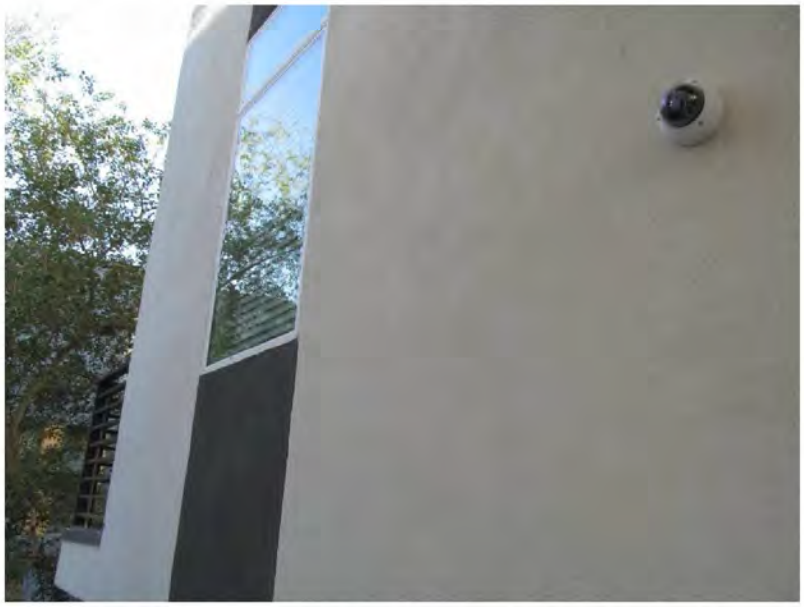
- *"7.11.4 Control Joints-General—Control joints shall be formed by using a single prefabricated member or fabricated by installing casing beads back to back with a flexible barrier membrane behind the casing beads. The separation spacing shall be not less than 1/8 in. (3.2 mm) or as required by the anticipated thermal exposure range and shall be in conformance with 7.10.1.5."*
- *"7.11.4.1 Control Joints—Control (expansion and contraction) joints shall be installed in walls to delineate areas not more than 144 ft² (13.4 m²) and to delineate areas not more than 100 ft² (9.30 m²) for all horizontal applications, that is, ceilings, curves, or angle type structures."*
- *"7.11.4.2 The distance between control joints shall not exceed 18 ft (5.5 m) in either direction or a length-to-width ratio of 2 1/2 to 1. A control joint shall be installed where the ceiling framing or furring changes direction."*

ICC Evaluation Service Report (ESR), Evaluation Report ESR-3529 "Evaluation Subject: Amerimix Fiber Base Coat Stucco," reissued February 2017, Section 4.0 "Installation," subsection 4.7 "Miscellaneous," states the following:

- *"**4.7.2 Control Joints:** Control joints must be installed as specified by the registered design professional, designer, builder, or exterior coating manufacturer, in that order. In the absence of details, conventional three-coat plastering details must be used."*

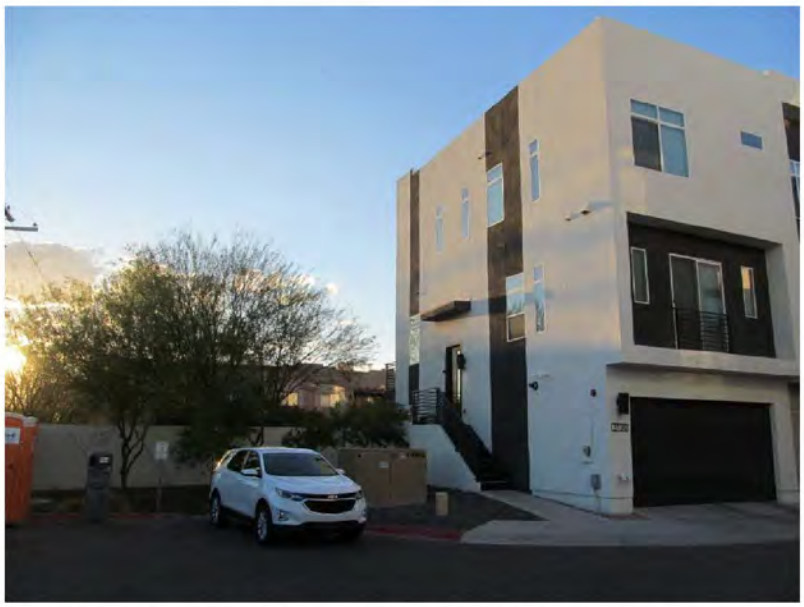
Example Photographs:

March 10, 2021, Disc OBS 5, Photograph 2, SSR, Building A, missing horizontal movement joints at floorlines.

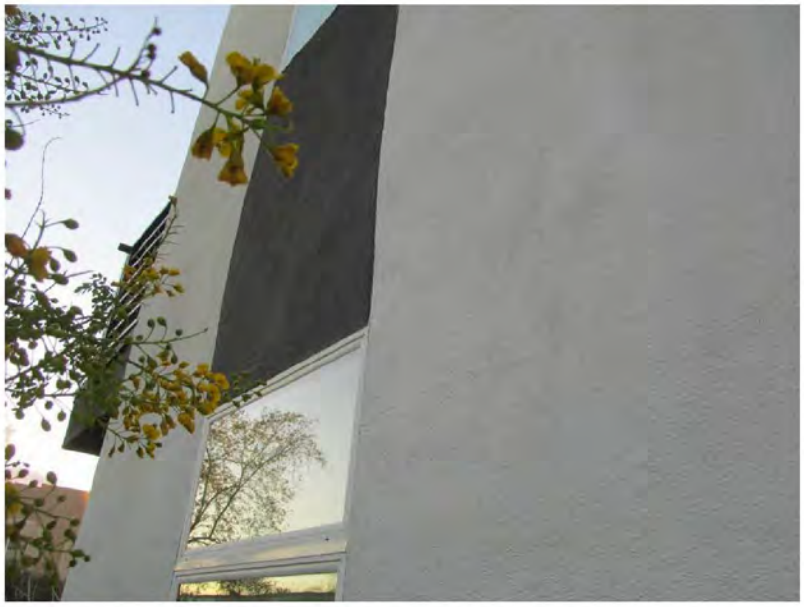


March 10, 2021, Disc OBS 5, Photograph 28, SSR, Building A, horizontal stucco crack. See below photo for close-up view of damage.

March 10, 2021, Disc OBS 5, Photograph 29, SSR, Building A, horizontal stucco crack.



March 10, 2021, Disc OBS 5, Photograph 63, SSR, Building B, missing horizontal movement joints at floorlines.



March 10, 2021, Disc OBS 5, Photograph 95, SSR, Building B, stucco cracks.

March 9, 2021, Disc IT5, Photograph 169, JJF, Building B, missing control joint and horizontal crack in stucco at floorline.

March 11, 2021, Disc OBS 6, Photograph 11, JJF, Building C, missing horizontal movement joints at floorlines.

December 18, 2019, Disc OBS 1, Photograph 71, JJF, Building C, missing horizontal movement joints at floorline.

March 11, 2021, Disc OBS 6, Photograph 30, JJF, Building C, vertical control joints were provided on side elevations at re-entrant corners.

March 11, 2021, Disc OBS 6, Photograph 75, JJF, Building C, stucco cracks.

March 11, 2021, Disc OBS 6, Photograph 209, JJF, Building C, stucco cracks.

March 10, 2021, Disc IT 8, Photograph 6, SSR, Building D, missing horizontal movement joints at floorlines.

March 10, 2021, Disc IT7, Photograph 97, JJF, Building D, missing control joint and horizontal crack in stucco at floorline.

Locations:

Missing control or movement joints for stucco exists at all building elevations across the Gallery Townhomes site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

2. Moisture-Management System (Barriers, Flashings, Drainage, Etc.)

The claddings installed include stucco and adhered masonry veneer (AMV). These claddings are considered moisture-managed systems; therefore, water will penetrate the face of the veneers. Each product also can absorb and release some water to a limited degree. However, the hygrothermal effects of the products should not be relied on as a means to handle wetting and drying. The elevations, solar exposure, and shadows all impact each area and each elevation will behave differently. Proper water shedding detailing is required to allow for durability and performance.

The exterior cladding, as installed, relies on a secondary barrier to minimize air and moisture infiltration past the exterior sheathing and into the wall cavity. This WRB is required by the building code and cladding manufacturers. A WRB is a material that lies behind the façade cladding. When water infiltrates past the cladding, this barrier blocks and redirects the flow of water. When properly installed, the WRB guides the water to a flashing or weep mechanism, which directs the water back out to the exterior of the façade. These components make up the moisture-management system.

A secondary aspect of the WRB is that it performs as an air barrier, limiting infiltration of non-conditioned air and exfiltration of conditioned air. This barrier function improves thermal comfort in the building and reduces energy consumption. Good construction provides the air/thermal and of weather barriers together and is continuous from

foundation to the roof system. Proper water shedding detailing is required to allow the durability and performance of the cladding assembly.

The proper material selection, installation, and integration of the moisture-management system are critical for the long-term performance of the building systems. Non-compliant installation directly affects the effective useful life of the building.

a. Missing Sheet Metal Flashing at Fenestrations

Sheet metal flashings work in conjunction with the surrounding moisture-management system by guiding water away from the WRB and out to the exterior of the façades. Sheet metal flashings are commonly installed at horizontal terminations of façades, including above the foundation line, above fenestrations, above decorative trim, and above lower roofs. Missing or improperly installed sheet metal flashing results in the misdirection of water and prevention of water from exiting the cladding systems.

In order to work as intended, sheet metal flashings need to be installed in a manner that promotes positive drainage and hinders moisture from re-entering the system. This requires shingle-lapped integration with the WRB and the presence of end dams and positive slope (typically 5-degrees). End dams and positive slope direct the water off of the face of the flashing rather than allowing it to pool or run laterally off of the sides back into the assembly. Flashings additionally require unobstructed clearance from claddings.

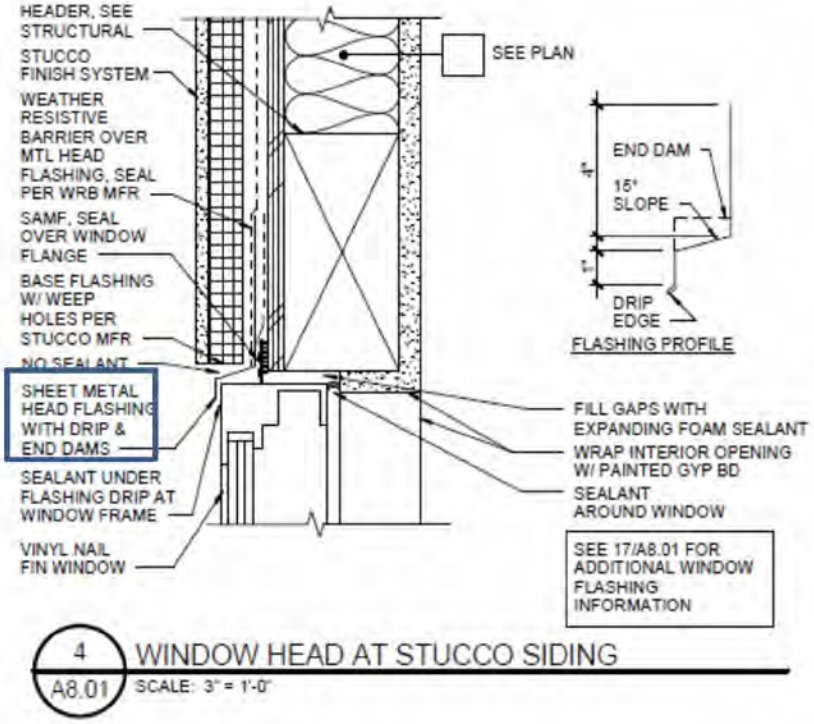
The architectural details specify 4-inch vertical leg sheet metal flashing with 1-inch drip edge and end dams at door and window heads. The flashings were detailed with 10-degree slope at door heads and 15-degree slope at window heads. The architectural details also required the WRB to be shingle-lapped over sheet metal head flashing and sealant under the drip edge to the fenestration frame. At the Gallery site, the sheet metal flashings were generally missing at the fenestration heads. The ineffectiveness of the flashing at fenestration heads is further compounded when cladding is installed tight to fenestration heads without a weep mechanism as discussed in Section C.1.a. This allows water to drain directly onto the fenestration frame and accumulate. As constructed, the moisture-management system at fenestration heads is non-compliant with the architectural drawings. This non-compliant condition, along with the combination of other construction defects of the stucco system, will more likely than not reduce the functionality of the stucco system and the general appearance of the cladding in the foreseeable future.

Where non-compliant issue exists, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

Applicable Code/Industry Standard References/Project-Specific Documents:

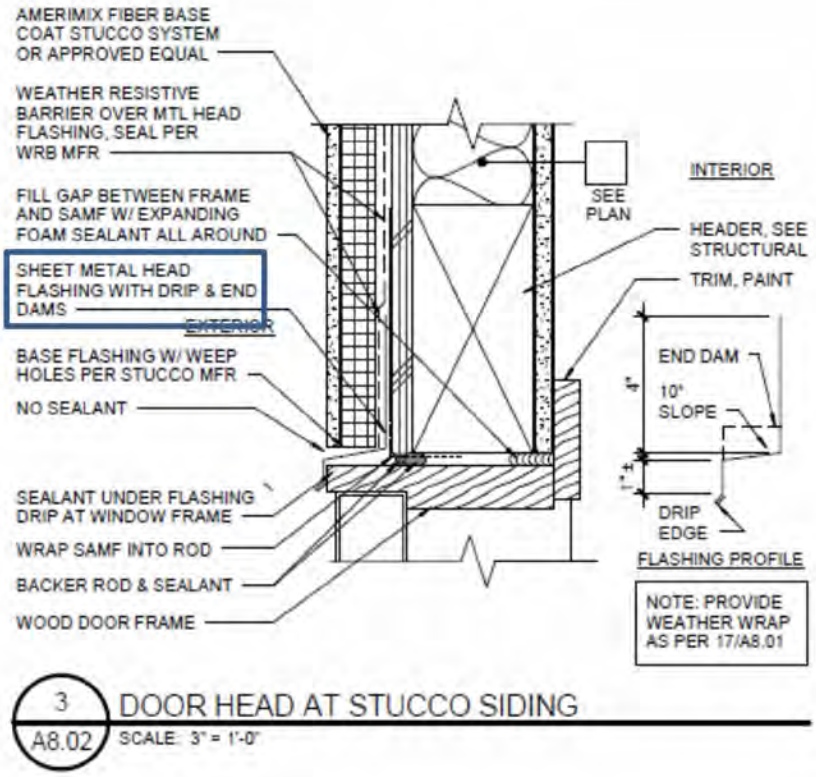
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.01 "Exterior Details," illustrates the following:

- *"4/A8.01 Window Head at Stucco Siding"*



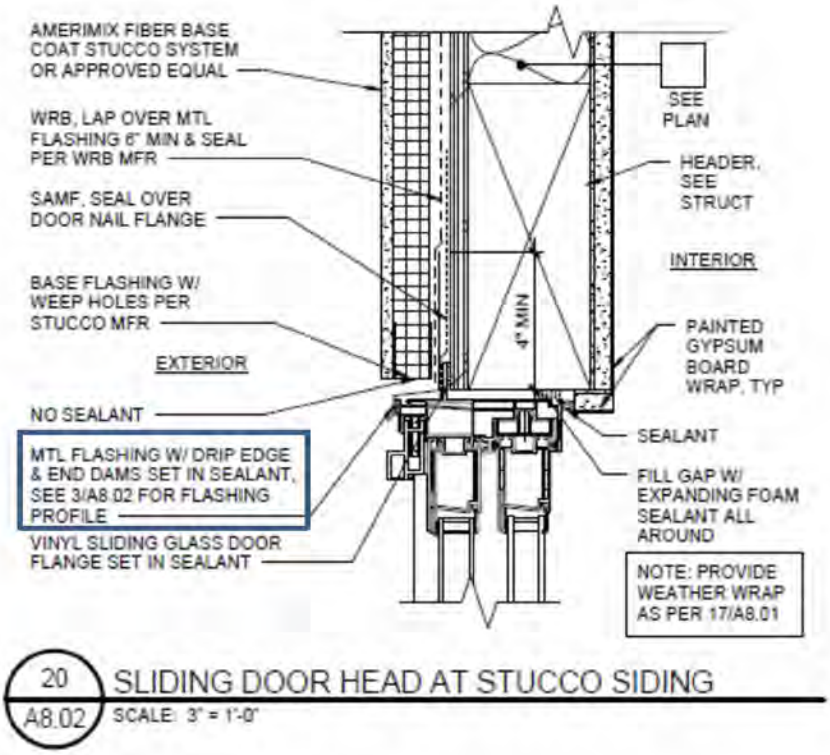
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.02 "Exterior Details," illustrates the following:

- *"3/A8.02 Door Head at Stucco Siding"*



Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.02 "Exterior Details," illustrates the following:

- *"20/A8.02 Sliding Door Head at Stucco Siding"*



International Code Council, Inc. (ICC), "International Residential Code (IRC)," 2012, Chapter 7 "Wall Covering," Section R703 "Exterior Covering," states the following:

Note: No local amendments for this section.

- *"**R703.8 Flashing.** Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at all of the following locations:*

  1. Exterior window and door openings. Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage…."

International Code Council, Inc. (ICC), "International Building Code (IBC)," 2012, Chapter 14 "Exterior Walls," Section 1405 "Installation of Wall Coverings," states the following:

Note: No local amendments for this section.

- *"**1405.4 Flashing.** Flashing shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect it to the exterior. Flashing shall be insta11ed at the*

perimeters of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimneys, porches, decks, balconies and similar projections and at built-in gutters and similar locations where moisture could enter the wall. Flashing with projecting flanges shall be installed on both sides and the ends of copings, under sills and continuously above projecting trim.

1405.4.1 Exterior wall pockets. *In exterior walls of buildings or structures, wall pockets or crevices in which moisture can accumulate shall be avoided or protected with caps or drips, or other approved means shall be provided to prevent water damage."*

Example Photographs:

March 9, 2021, Disc IT5, Photograph 3, JJF, Building A, missing flashing at sliding door head.

March 9, 2021, Disc IT6, Photograph 286, SSR, Building A, missing flashing at sliding door head.

March 10, 2021, Disc IT7, Photograph 139, JJF, Building D, missing flashing at sliding door head.

March 10, 2021, Disc IT7, Photograph 212, JJF, Building C, missing flashing at sliding door head.

March 10, 2021, Disc IT8, Photograph 219, SSR, Building D, missing flashing at window head.

March 10, 2021, Disc IT9, Photograph 269, PER, Building C, missing flashing at window head.

Locations:

Sheet metal flashings are missing at fenestration heads across all buildings at the Gallery site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

b. Non-Compliant Flashing to Stucco Interface

Metal flashing with a drip edge is installed at all deck perimeters and the perimeters of the cantilevered awnings above the end unit side doors to divert water away from the cladding below the flashing. Where the metal flashing and cladding interface is built incorrectly, the flashings cannot perform their intended function to divert water away from the cladding. Water is allowed to penetrate behind the claddings at the metal flashing interface, which results in damage to the underlying building components.

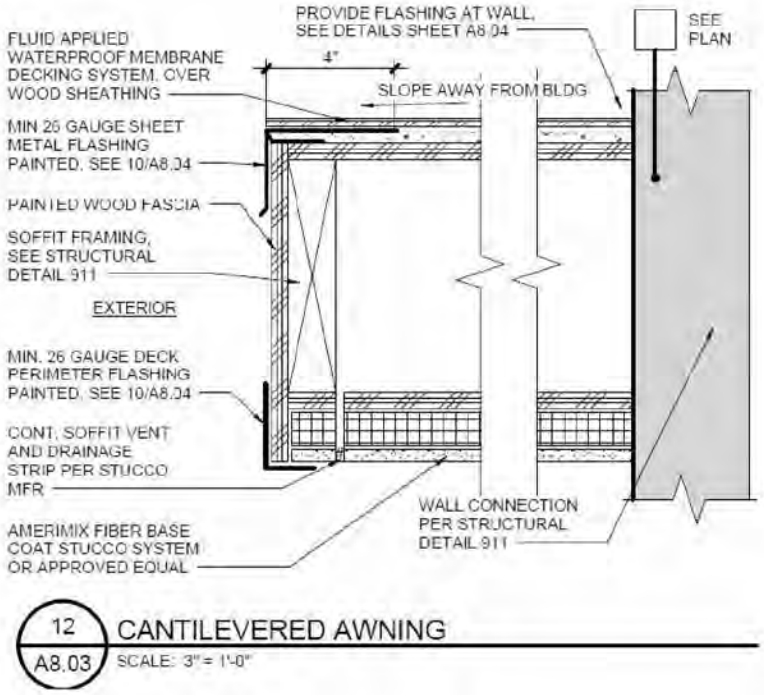
At the Gallery site, the metal flashing at the perimeter of the decks and cantilevered awnings is inset above the stucco and water drains into the stucco system below. The stucco is built out at the deck and cantilevered awning edges, which prevents the stucco from terminating behind the flashing. The architectural details illustrate stucco and wood fascia behind the metal edge flashing with a drip edge at the deck and cantilevered awnings, respectfully. At the as-constructed cantilevered awning edges, stucco was substituted for the painted wood trim. The architect specifies the edge flashing to be installed per the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and required installation that prevents water from bucking against the cladding. At some locations, the edge flashing is installed over the stucco, which suggests the installer was cognizant of the project specifications. Stains and cracks in the stucco below the edge flashing indicate that water is not diverted away from the stucco.

Where non-compliant flashing to stucco interface exists, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

Applicable Code/Industry Standard References/Project-Specific Documents:

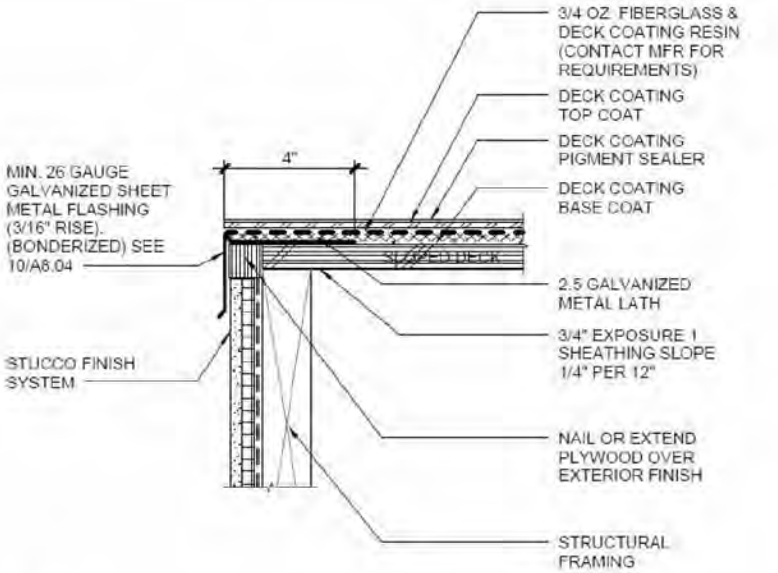
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.03 "Exterior Details," illustrates the following:

- *"12/A8.03 Cantilevered Awning"*



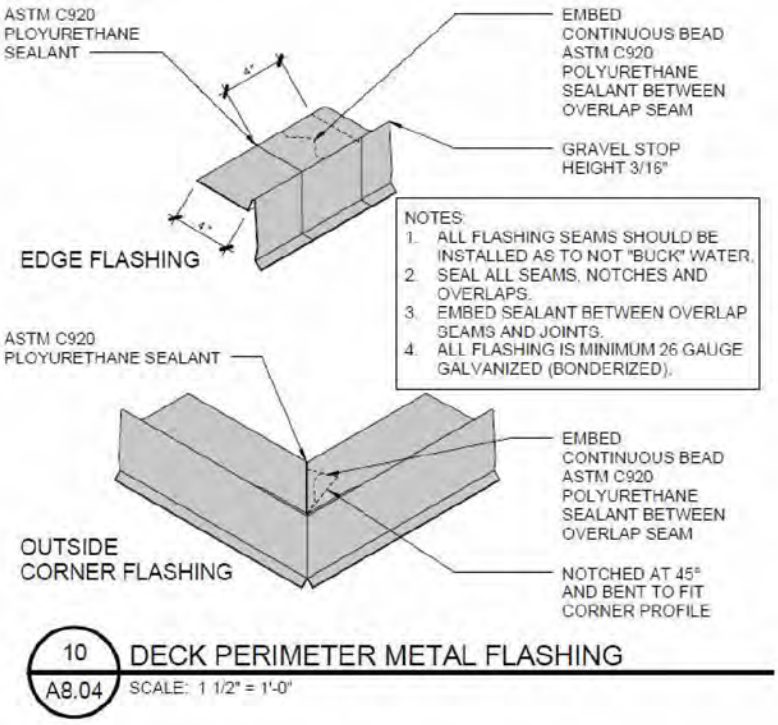
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.04 "Exterior Details," illustrates the following:

- *"5/A8.04 Deck Perimeter Flashing"*

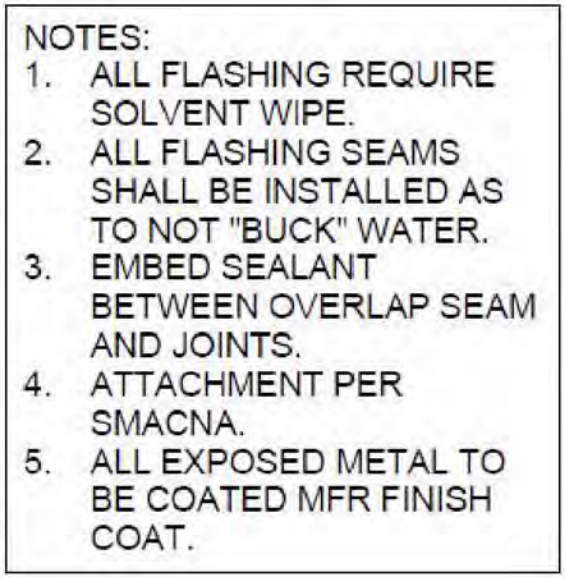


5 / A8.04 DECK PERIMETER FLASHING
SCALE: 3" = 1'-0"

- *"10/A8.04 Deck Perimeter Flashing"*



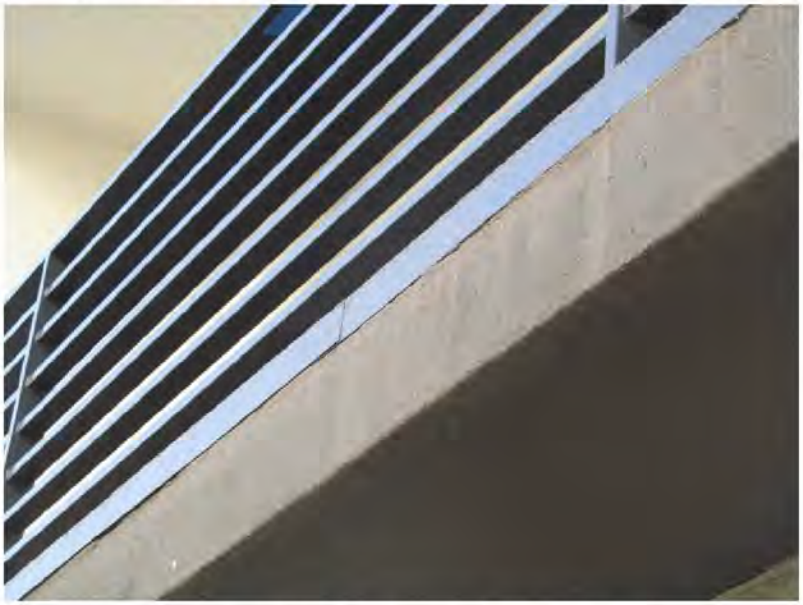
- *"9/A8.04 Deck Sheet Metal Corners"*



Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), "Residential Sheet Metal Guidelines," First Edition, 2001, Chapter 2 "Decks," subsection 2.2 "Coated Decks," subsection 2.2.1 "Deck to Wall Flashing," states the following:

- *"At the deck edge the sheet metal should extend out over the front face, with a minimum 2 in. (50 mm) coverage, and terminate in a hemmed diverter that is added as a separate attachment or is formed in conjunction with the other flashing."*

Example Photographs:



March 10, 2021, Disc OBS5, Photograph 11, SSR, Building A, deck edge flashing inset at stucco.

March 10, 2021, Disc OBS5, Photograph 23, SSR, Building. A, awning edge flashing inset at stucco.

October 14, 2019, Disc OBS2, Photograph 125, SSR, Building B, deck edge flashing inset at stucco and stains visible.

March 10, 2021, Disc OBS5, Photograph 69, SSR, Building. B, awning edge flashing inset at stucco.

March 10, 2021, Disc OBS5, Photograph 77, SSR, Building B, deck edge flashing correctly installed at stucco.

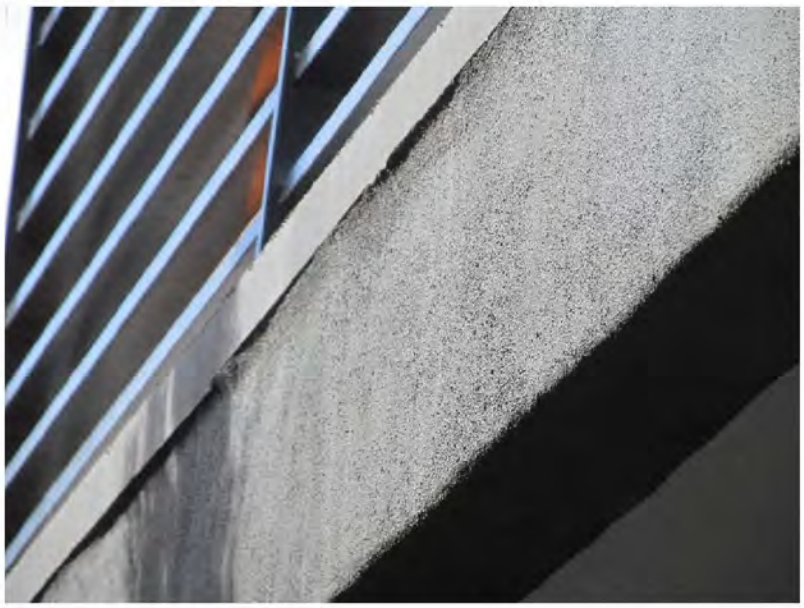
March 10, 2021, Disc OBS5, Photograph 94, SSR, Building B, awning edge flashing inset at stucco.

March 11, 2021, Disc OBS6, Photograph 21, JJF, Building C, awning edge flashing inset at stucco.

March 11, 2021, Disc OBS6, Photograph 58, JJF, Building C, deck edge flashing inset at stucco.

March 10, 2021, Disc IT7, Photograph 182, JJF, Building C, deck edge flashing inset at stucco.

May 13, 2019, Disc IT1, Photograph 176, JBF, east elevation of Building C, metal flashing at leading edge of deck is inset from stucco.



March 11, 2021, Disc OBS6, Photograph 89, JJF, Building D, deck edge flashing inset at stucco.

May 13, 2019, Disc IT1, Photograph 2, JBF, east elevation of Building D, deck edge flashing inset at stucco.

October 14, 2019, Disc OBS3, Photograph 389, SSR, Building D, deck edge flashing inset at stucco and stains visible.

Locations:

Non-compliant sheet metal flashings to stucco interface is present at all buildings across the Gallery site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

c. Non-Compliant Isolation Joints at Dissimilar Materials

The buildings at the Gallery site feature stucco and AMV. These façade types interface with each other and with other materials, including different claddings, window and door frames, and penetrations such as mechanical vents, electrical outlets, and gas pipes. These dissimilar materials have different thermal properties and will expand and contract at different rates.

Material	Thermal Expansion Coefficient [in/(in*°F)]
Aluminum	1.23E-05
Brick	4.00E-06
Concrete Masonry	5.20E-06
Fiber Cement Siding	6.70E-06
Glass	5.00E-06
Mortar	7.30E-06
Rigid Polyvinyl Chloride	4.40E-05
Stucco	6.50E-06
Wood (across grain)	3.00E-05
Wood (perpendicular to grain)	3.00E-06

Differential movement causes separations or openings between the materials that allow air and water infiltration. Sealant joint design and construction provide the first line of defense against air and water intrusion at the building envelope. Properly sized and constructed sealant joints are required at all of the aforementioned interfaces to properly accommodate movement between dissimilar materials. Backer rod or bond breaker tape is required at isolation joints to prevent three-sided adhesion of the sealant and to allow the sealant to properly accommodate movement between dissimilar materials. Backer rod and bond breaker tape also help to provide the correct sealant profile to accommodate movement without causing excessive stress, which becomes the cause of the sealant joint failure in cohesion (i.e., within the sealant material) or in adhesion (i.e., between the sealant and the substrate).

Proper sealant at joints and penetrations additionally limits uncontrolled air movement through the wall assembly. Not providing protection from air penetration through the wall assembly fails to meet the minimum requirements required by the International Energy Conservation Code (IECC) adopted through the IRC.

The architectural drawings reference compliance with the 2012 IECC and provide typical sealant joint details for the Gallery site. Typical isolation joint details include stucco-soffit joint, stucco-AMV juncture, pipe or cable wall penetration in stucco and AMV, and electrical or mechanical mounting in stucco and AMV. The architectural drawings require backer rod and sealant all around the fenestrations and specify using AAMA 2400-10 or the manufacturer's installation instructions for window installation. AAMA-2400-10 references ASTM E2112-07 "Standard Practice for Installation of Exterior Windows, Doors and Skylights," which also discusses joints between

fenestrations and the building envelope. Interfaces of dissimilar cladding materials with each other, fenestrations, and penetrations were generally installed without a sealant joint and a backer rod. Where installed, the sealant joint width was inadequate. As a result, cracks and open joints exist between materials, which act as direct paths for water to enter the wall assemblies and overwhelm and damage the underlying components. An exception is at a few locations where windows are isolated with full height vertical control joints on the side elevations of all buildings.

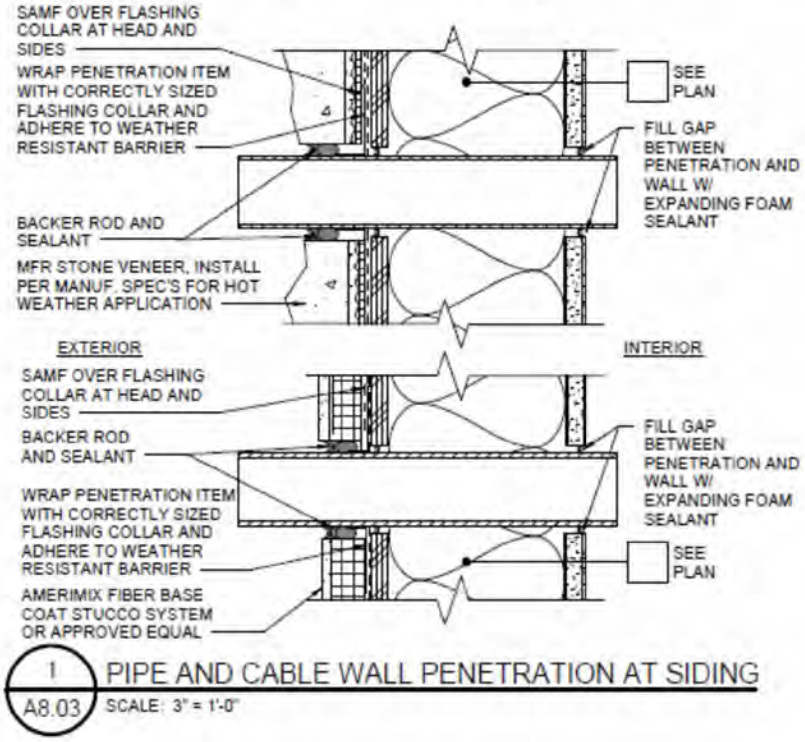
Ultimately, maintenance of sealant joints becomes the responsibility of the Homeowner's Association (HOA) directly after the declarant control ends. Maintenance of properly constructed sealant joints should be the responsibility of the HOA over the life of the property, but improperly constructed joints do not allow for the proper application of the joints or maintenance of the joints; something that was not originally installed cannot be maintained. Furthermore, maintenance of properly installed sealant joints is the responsibility of the declarant until the time of turnover of maintenance responsibilities to the HOA to provide for the effective useful life of the properties. The Association should be funded to properly maintain the joints, typically during paint cycles. Generally, the isolation joints in Arizona are periodically replaced every 5- to 6-years.

Where non-compliant isolation joints at dissimilar materials exist, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

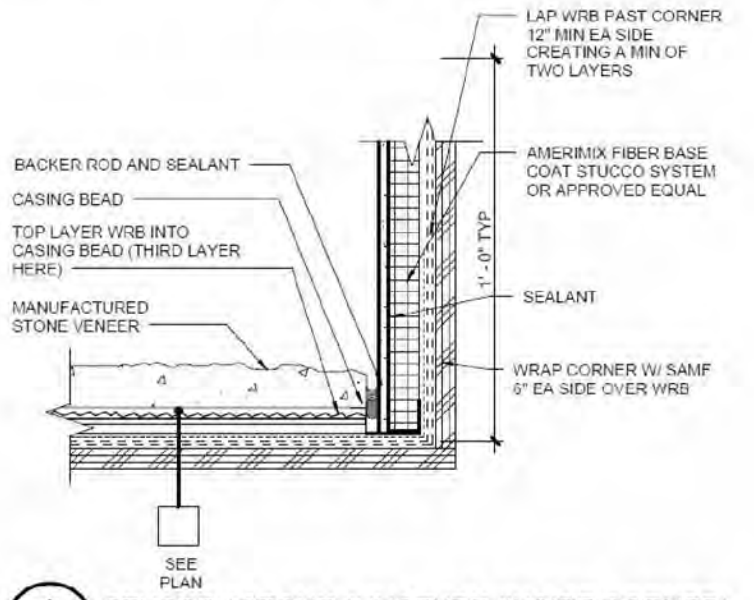
Applicable Code/Industry Standard References/Project-Specific Documents:

Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.03 "Exterior Details," illustrates the following:

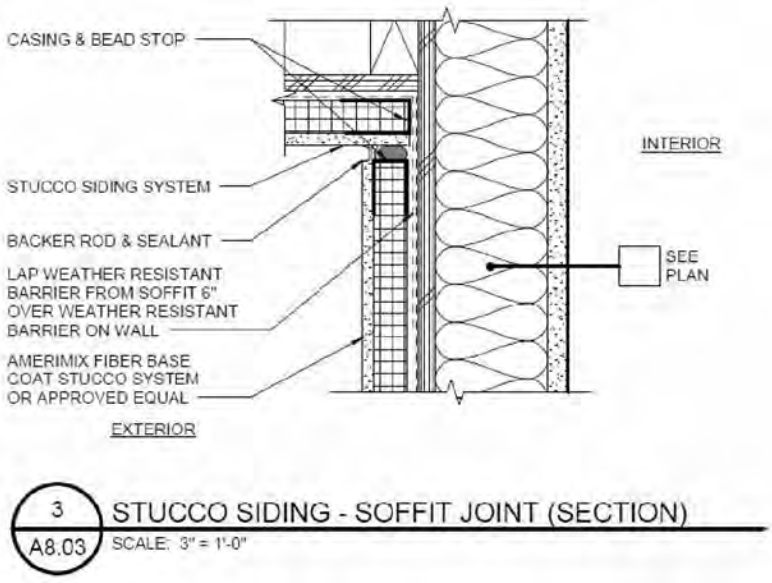
- *"1/A8.03 Pipe And Cable Wall Penetration At Siding"*



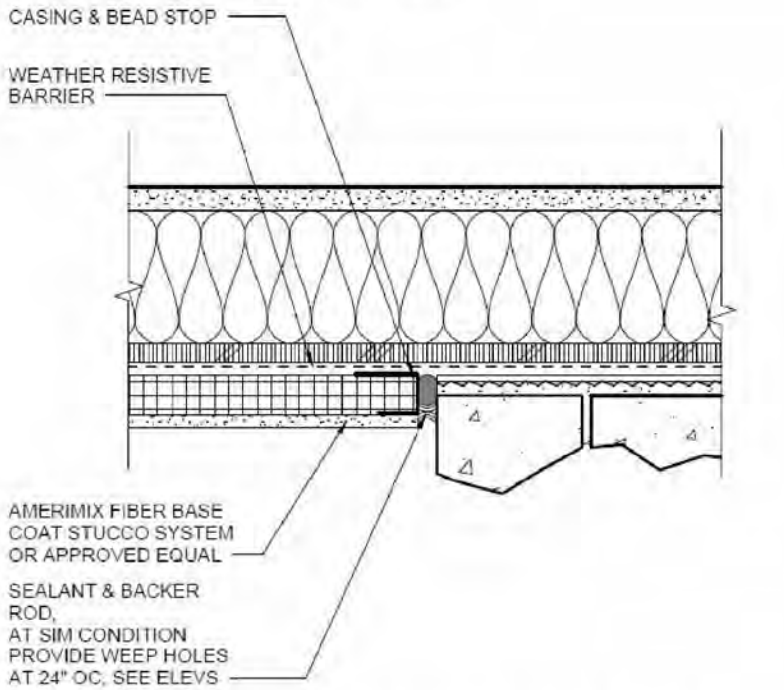
- *"2/A8.03 Stucco / Stone Juncture (Inside Corner)"*



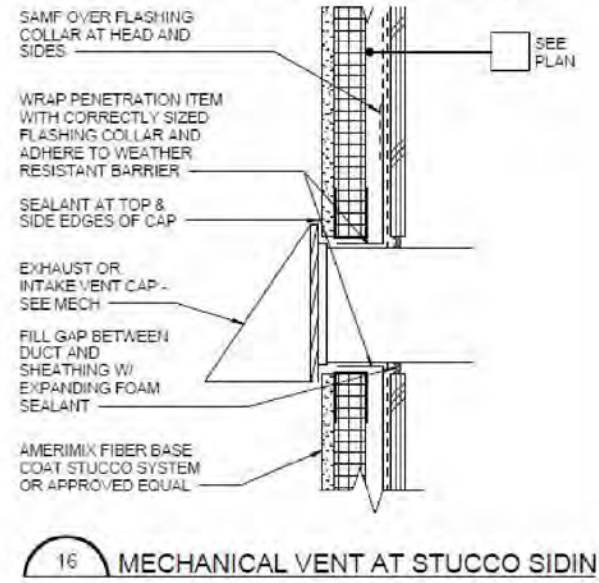
- *"3/A8.03 Stucco Siding – Soffit Joint (Section)"*



- *"8/A8.03 Vertical Stone To Stucco Joint"*

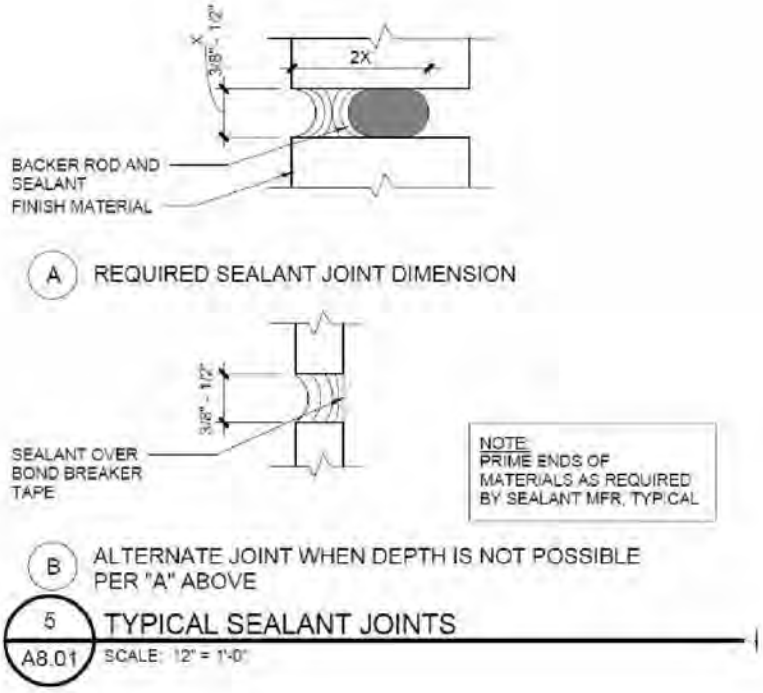


- *"16/A8.03 Mechanical Vent At Stucco Siding"*



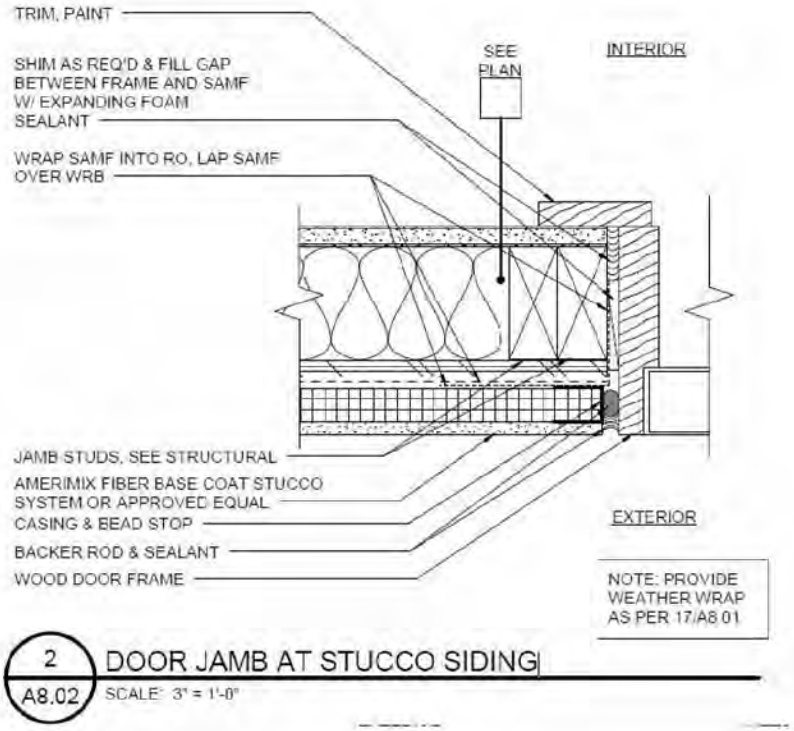
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.01 "Exterior Details," illustrates the following:

- *"5/A8.01 Typical Sealant Joints"*



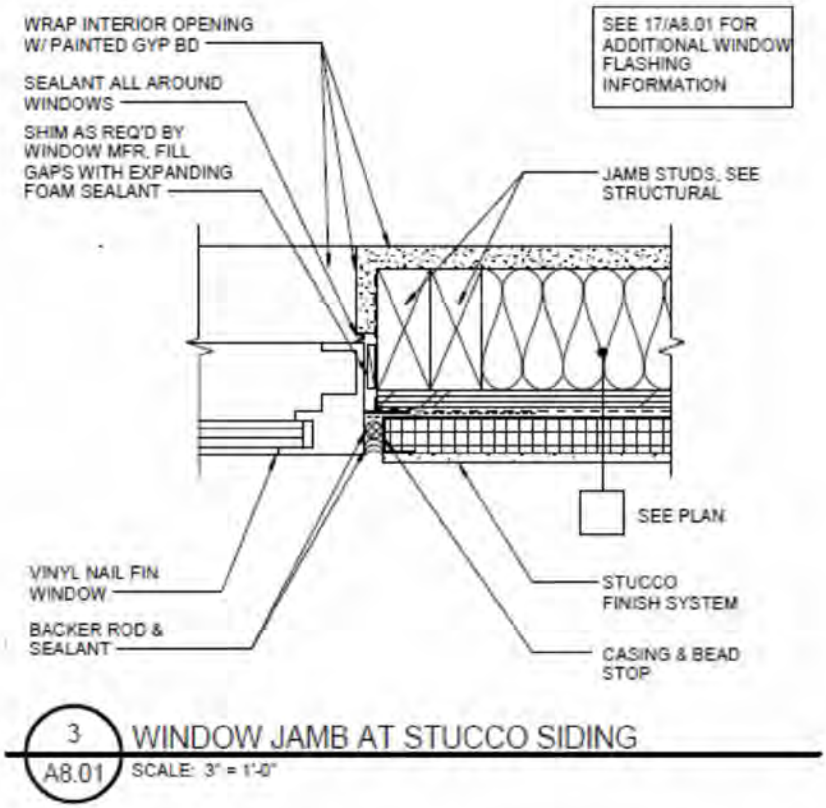
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.02 "Exterior Details," illustrates the following:

- *"2/A8.02 Door Jamb At Stucco Siding"*



Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.01 "Exterior Details," illustrates the following:

- *"3/A8.01 Window Jamb At Stucco Siding"*



Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.01 "Exterior Details," states the following:

- *"17/A8.01 Opening Weather Wrap (Doors & Windows)"*

NOTE: THESE WRAP DETAILS ARE BASED ON AAMA 2400-10 METHOD A. SEE AAMA 2400-10 FOR FULL WRITTEN DESCRIPTION OF SYSTEM INSTALL WINDOWS PER MFR RECOMMENDATIONS, NOTIFY ARCHITECT IF CONFLICTS OCCUR.

International Code Council, Inc. (ICC), "International Energy Conservation Code (IECC)," 2012, Chapter 4 "Residential Energy Efficiency," Section R402 "Building Thermal Envelope," states the following:

- *"**R402.4 Air leakage (Mandatory)**. The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.4.*

  ***R402.4.1 Building thermal envelope.** The building thermal envelope shall comply with Sections R402.4.1.1 and R402.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.*

R402.4.1.1 Installation. *The components of the building thermal envelope as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of construction. Where required by the code official, an approved third party shall inspect all components and verify compliance."*

International Code Council, Inc. (ICC), "International Energy Conservation Code (IECC)," 2012, Chapter 4 "Residential Energy Efficiency," Section R402 "Building Thermal Envelope," states the following:

- ***"Table R402.4.1.1 Air Barrier and Insulation Installation***

TABLE R402.4.1.1
AIR BARRIER AND INSULATION INSTALLATION

COMPONENT	CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed. Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.
Walls	Corners and headers shall be insulated and the junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier. Knee walls shall be sealed.
Windows, skylights and doors	The space between window/door jambs and framing and skylights and framing shall be sealed.
Rim joists	Rim joists shall be insulated and include the air barrier.
Floors (including above-garage and cantilevered floors)	Insulation shall be installed to maintain permanent contact with underside of subfloor decking. The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls. Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.
Narrow cavities	Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air tight, IC rated, and sealed to the drywall.
Plumbing and wiring	Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	Exterior walls adjacent to showers and tubs shall be insulated and the air barrier installed separating them from the showers and tubs.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air sealed boxes shall be installed.
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the sub-floor or drywall.
Fireplace	An air barrier shall be installed on fireplace walls. Fireplaces shall have gasketed doors.

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

American Architectural Manufacturers Association, AAMA 2400-10 "Standard Practice for Installation of Windows with a Mounting Flange in Open Stud Frame Construction for Low Wind/Water Exposure," 2010, Section 2.0 "Referenced Documents," states the following:

- *"**ASTM E2112-07**, Standard Practice for Installation of Exterior Windows, Doors and Skylights"*

American Architectural Manufacturers Association, AAMA 2400-10 "Standard Practice for Installation of Windows with a Mounting Flange in Open Stud Frame Construction for Low Wind/Water Exposure," 2010, Section "Introduction," states the following:

- *"This practice addresses the recommended methods and/or sequences used to apply/modify the water-resistive barrier or other flashing and sealing materials to the open-framed opening. For sheathed wall installations refer to ASTM E2112, 'Standard Practice for Installation of Exterior Windows, Doors and Skylights'."*

American Architectural Manufacturers Association, AAMA 2400-10 "Standard Practice for Installation of Windows with a Mounting Flange in Open Stud Frame Construction for Low Wind/Water Exposure," 2010, Section 5.0 "Procedure," subsection 5.4 "Flashing Requirements," states the following:

- *"Proper flashing and/or sealing is necessary as a barrier to prevent water from infiltrating into the building. Flashing and/or an appropriate method of sealing shall be designed as a part of an overall weather resistant barrier system."*

American Architectural Manufacturers Association, AAMA 2400-10 "Standard Practice for Installation of Windows with a Mounting Flange in Open Stud Frame Construction for Low Wind/Water Exposure," 2010, Section 5.0 "Procedure," subsection 5.5 "Joints and Anchorages," states the following:

- *"Joints and anchorages between the building envelope (WRB assembly) and fenestration product shall be designed to accommodate differential thermal expansion and contraction, as well as the structural requirements within the window/wall assembly."*

American Architectural Manufacturers Association, AAMA 2400-10 "Standard Practice for Installation of Windows with a Mounting Flange in Open Stud Frame Construction for Low Wind/Water Exposure," 2010, Section 6.0 "Post-Installation Procedures," states the following:

- *"6.5 Install appropriate sized open-cell backer rod in the joint between the window frame and the final exterior wall surface (siding, stucco, etc.) then apply sealant per the sealant manufacturer's recommendations."*

American Society of Testing and Materials (ASTM), ASTM E2112-07 "Standard Practice for Installation of Exterior Windows, Doors and Skylights," 2007, Section 5 "Related Issues and Procedures," subsection 5.2 "Joints and Anchorages," states the following:

- *"Joints and anchorages between the building envelope (weather barrier assembly) and fenestration product shall be designed to accommodate differential thermal expansion (see Table 1) and moisture migration within the window/wall assembly."*

Example Photographs:

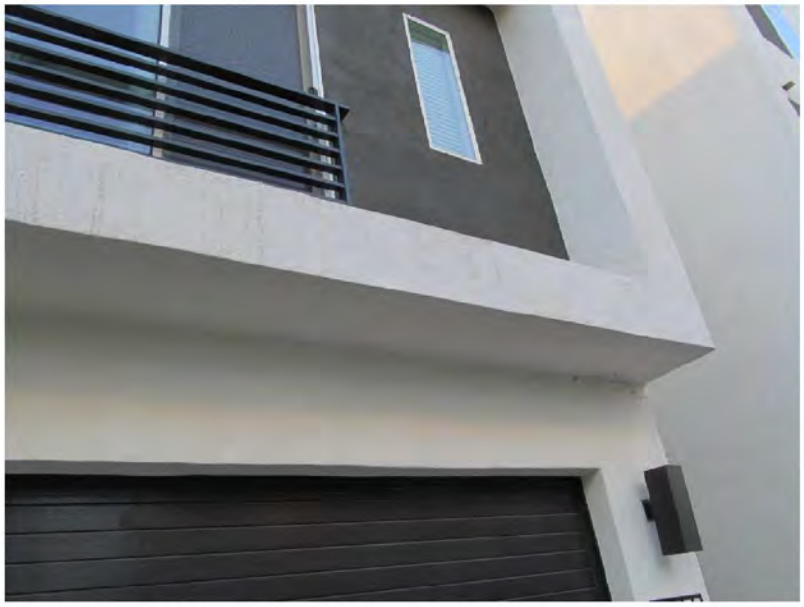
March 9, 2021, Disc IT6, Photograph 12, SSR, Building A, non-compliant isolation joint at window to stucco interface with a diagonal crack at top right corner of window.

March 9, 2021, Disc IT6, Photograph 14, SSR, Building A, non-compliant isolation joint at window to stucco interface with a diagonal crack at bottom right corner of window.

March 9, 2021, Disc IT6, Photograph 27, SSR, Building A, non-compliant isolation joint at penetration to stucco interface with a diagonal crack at top right corner of dryer vent.

March 9, 2021, Disc IT6, Photograph 39, SSR, Building A, non-compliant isolation joint at sliding door to stucco interface with a diagonal crack at top right corner of sliding door.

March 9, 2021, Disc IT6, Photograph 81, SSR, Building A, non-compliant isolation joint at window to stucco interface with a diagonal crack at bottom right corner of window.



March 10, 2021, Disc OBS5, Photograph 72, SSR, Building B, missing isolation joint at stucco siding to stucco soffit

March 10, 2021, Disc OBS5, Photograph 91, SSR, Building B, non-compliant isolation joint at utility box to stucco with diagonal stucco racks.

March 11, 2021, Disc OBS6, Photograph 41, JJF, Building C, non-compliant isolation joint at pipe to AMV interface.

March 10, 2021, Disc OBS6, Photograph 176, JJF, Building C, non-compliant isolation joint at utility box to stucco interface.

March 10, 2021, Disc IT7, Photograph 7, JJF, Building D, non-compliant isolation joint at window to stucco interface and resulting separation at window.

March 10, 2021, Disc IT7, Photograph 149, JJF, Building D, failed sealant joint at door to stucco interface; no backer rod visible.

March 11, 2021, Disc OBS6, Photograph 28, JBF, stairs between Buildings C and D, cracking and separation of stair wall. SBSA understands builder performed repairs at this location.

Locations:

Non-compliant isolation joints at dissimilar materials exist at locations across the Gallery site. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

3. Roofing System Type 1 – Spray Polyurethane Foam (SPF)

The upper low-slope roofs at the Gallery site were detailed as a minimum 1-inch-thick closed-cell SPF and finished with an elastomeric coating. The SPF roof system is installed over roof sheathing supported by pre-engineered roof trusses with tapered top chords to provide 1/4-inch-per-foot or 2-percent slope for drainage. Crickets were required along the lower side of the party wall to promote drainage towards the roof and overflow drains which are installed on both halves of the roof plan. Crickets were also required on the upper side of the mechanical unit pads for drainage around the mechanical pads towards the roof drains. Roof and party wall parapet walls were detailed to direct water towards the interior of the roof.

a. Non-Compliant Slope to Roof Drains

Low-slope roof systems, including those used for waterproofing on roof decks, require positive slope towards the means of drainage to allow for adequate drainage of the system. The architectural drawings and the building codes require a minimum of 1/4-inch-per-foot or 2-percent for the low-slope roof system. Crickets were detailed along walls and at upslope locations of rooftop equipment to promote positive drainage towards the roof drains.

The as-built slope measurements along the roof crickets and adjacent to the drains at the units of the buildings have slopes less than required by the project-specific drawings. In some cases, the roof is sloped away from the means of drainage. No crickets were installed at upslope locations of air-conditioning unit pads. Stains at low spots indicate ponding water on the roofs. Splits and blisters in the roof surface will allow the ponding water that collects on top of the roofing system to deteriorate and percolate below the roof coatings. Homeowners at Units 3110 and 3112 of Building B have reported leaks through the roof, and temporary remedial measures have been performed to mitigate the damage.

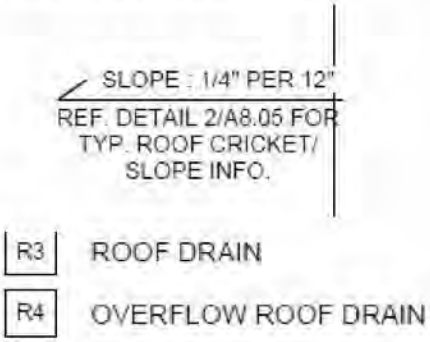
Where non-compliant slope of the roof system exists, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

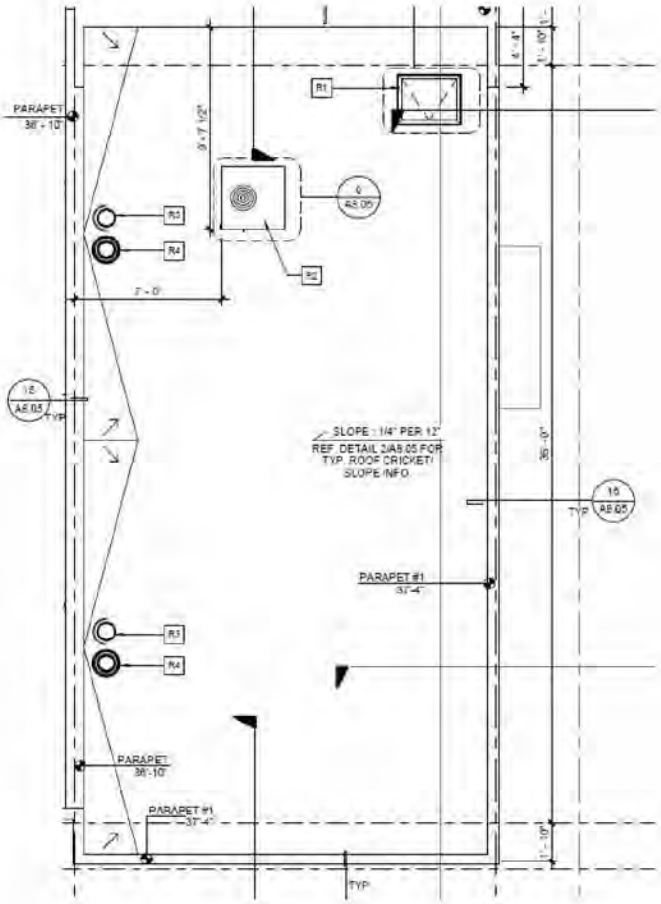
Applicable Code/Industry Standard References/Project-Specific Documents:

Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A5.12 "30-1210 3rd & Roof Plans," illustrates the following:

Note: Similar details for remaining unit types.

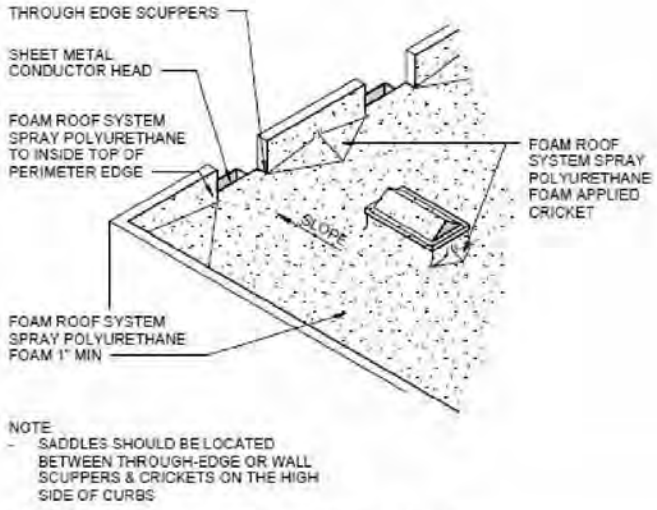
- *"2/A5.12 30-1210-Roof Plan"*




PARAPET
38' - 10"
R1
R3
R4
R2
7' - 0"
SLOPE : 1/4" PER 12"
REF. DETAIL 2/A8.05 FOR
TYP. ROOF CRICKET/
SLOPE INFO.
TYP
PARAPET #1
37' - 4"
PARAPET
38' - 10"
PARAPET #1
37' - 4"
TYP

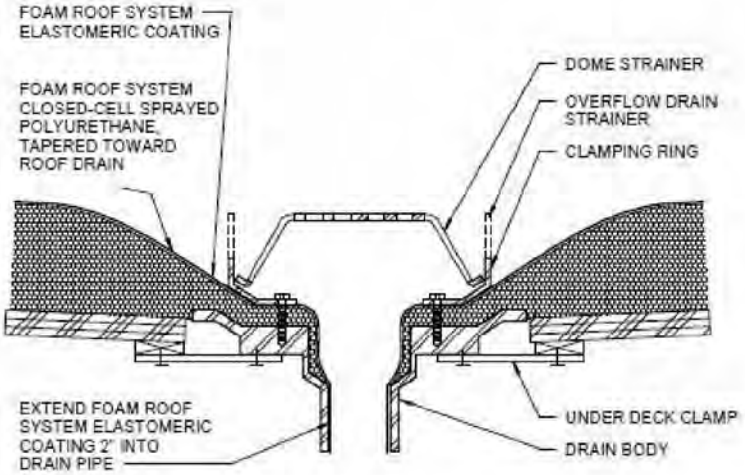
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.05 "Exterior Details," illustrates the following:

- *"2/A8.05 Roof Slopes and Cricket"*



2 / A8.05 ROOF SLOPES AND CRICKET
SCALE: 1/2" = 1'-0"

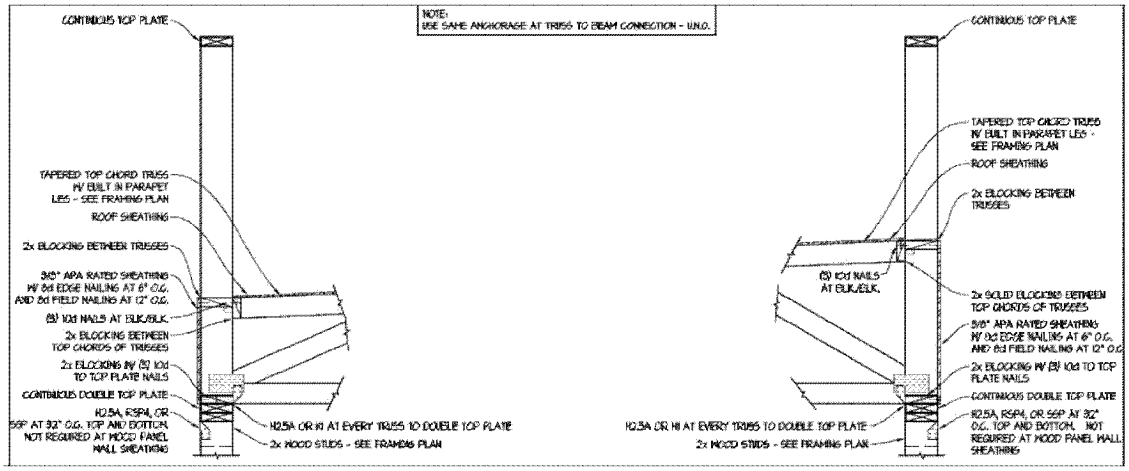
- *"5/A8.05 Roof Drain"*



5 / A8.05 ROOF DRAIN
SCALE: 3" = 1'-0"

Felten Group, "K. Hovnanian Homes, Subdivision Gallery," revised June 8, 2016, Sheet SD "Structural Details," states the following:

- *"701 Perpendicular Truss at Wall w/ Parapet"*



International Code Council, Inc. (ICC), "International Residential Code (IRC)," 2012, Chapter 9 "Roof Assemblies," Section R905 "Requirements for Roof Coverings," states the following:

Note: No local amendments for this section.

- *"**R905.14 Sprayed polyurethane foam roofing.** The installation of sprayed polyurethane foam roofing shall comply with the provisions of this section.*

  ***R905.14.1 Slope.** Sprayed polyurethane foam roofs shall have a design slope of a minimum of one-fourth unit vertical in 12 units horizontal (2-percent slope) for drainage."*

International Code Council, Inc. (ICC), "International Building Code (IBC)," 2012, Chapter 15 "Roof Assemblies and Rooftop Structures," Section 1507 "Requirements for Roof Coverings," states the following:

Note: No local amendments for this section.

- *"**1507.14 Sprayed polyurethane foam roofing.** The installation of sprayed polyurethane foam roofing shall comply with the provisions of this section.*

  ***1507.14.1 Slope.** Sprayed polyurethane foam roofs shall have a design slope of a minimum of one-fourth unit vertical in 12 units horizontal (2-percent slope) for drainage."*

Example Photographs:

Homeowner-disclosed photo, disclosed on June 18, 2021, Building B – Unit 3112, Bates Number GALLERY-CHANG 3112-000006, water stains at ceiling due to previous roof leak event.

Homeowner-disclosed photo, disclosed on June 18, 2021, Building B – Unit 3110, Bates Number GALLERY-LINE 3110-000002, water stains at ceiling due to previous roof leak event.

Homeowner-disclosed photo, disclosed on June 18, 2021, Building B – Unit 3110, Bates Number GALLERY-LINE 3110-000004, water stains at vent due to previous roof leak event.

Nautilus-disclosed photo, disclosed on June 16, 2021, Building B – Unit 3110, Photo Number 6, tear and split of roof surface adjacent to drains.

Nautilus-disclosed photo, disclosed on June 16, 2021, Building B – Unit 3110, Photo Number 14, ponding water at roof.

Nautilus photo, disclosed on June 16, 2021, Building B – Unit 3110, Photo Number 21, temporary repairs to reduce future roof leaks.

March 10, 2021, Disc IT8, Photograph 302, SSR, Building B – Unit 3110, stains at ceiling under the roof.

March 11, 2021, Disc IT10, Photograph 44, SSR, Building A, 0-inch-per-foot slope at cricket towards point of drainage.

March 11, 2021, Disc IT10, Photograph 49, SSR, Building A, 1/8-inch-per-foot slope at cricket towards point of drainage.

March 11, 2021, Disc IT10, Photograph 52, SSR, Building A, 0-inch-per-foot slope at cricket towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 94, SSR, Building A, 0-inch-per-foot slope at cricket towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 99, SSR, Building A, 0-inch-per-foot slope at cricket towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 157, SSR, Building A, 0-inch-per-foot slope at cricket towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 203, SSR, Building B, 1/8-inch-per-foot slope towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 236, SSR, Building B, 0-inch-per-foot slope towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 287, SSR, Building B, 0-inch-per-foot slope at cricket towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 288, SSR, Building B, 1/8-inch-per-foot slope towards point of drainage. Note stains indicate ponding water.

March 11, 2021, Disc IT10, Photograph 331, SSR, Building B, 1/4-inch-per-foot slope towards point of drainage as required by the project-specific drawings. Note stains indicate ponding water.

March 10, 2021, Disc IT8, Photograph 331, SSR, Building B – Unit 3110, 0.7-percent slope at cricket towards point of drainage.

March 11, 2021, Disc IT10, Photograph 264, SSR, Building B, 0-inch-per-foot slope at cricket towards point of drainage.

March 11, 2021, Disc OBS7, Photograph 361, PER, Building C, 0-inch-per-foot slope at cricket towards point of drainage.

March 11, 2021, Disc OBS7, Photograph 365, PER, Building C, no crickets at upslope locations of rooftop equipment. Note stains indicate ponding water.

March 11, 2021, Disc OBS7, Photograph 293, PER, Building D, 0-inch-per-foot slope at cricket towards point of drainage.

March 11, 2021, Disc OBS7, Photograph 303, PER, Building D, no crickets at upslope locations of rooftop equipment.

Locations:

Non-compliantly sloped roofing surfaces exist at locations across all buildings at the Gallery site. Crickets upslope of rooftop equipment are missing across all buildings. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

4. Elevated Decks, Balconies, or Walkways

The architectural drawings specified the decks as CDX plywood sheathing as installed by the framer to slope away from the building. The sheathing was covered with a deck base coat, 2.5 galvanized lath, and 3/4-ounce fiberglass and deck coating resin. The decks were finished with a top coat and pigmented sealer. Polydeck 355 Decking System in light gray color by Roofing Trade Partner was specified on the project specifications.

K. Hovnanian Homes, "Standard Specifications, The Gallery, 18 Lots," dated June 2, 2016, Bates Number "SMC000254" states the following:

Roofing:

- 1" Urethane Foam Roof with 10 year no leak warranty
- Urethane Foam Roof to extend up parapet wall.
- Roof to be finished in a light gray.
- **Roofer to fill roof mounted A/C platform with foam.**
- Balcony coating to be Polydeck 355 Decking System done by the Roofing Trade Partner. Color shall be Light Gray.
- Plumbing company to supply and install roof drain and overflow drains.
- Roof Hatch to be provided and installed by roofing company per plan. Roof hatch to be deleted when optional roof deck selected (applied as a credit).

a. Non-Compliant Slope of Deck

Adequate slope of the surface of the deck waterproofing must be provided on the entire deck surface to allow drainage and to reduce the locations that collect water as a result of the water not being able to freely drain. The architectural drawings are generally silent regarding the degree of slope but detail the deck sections with an arrow noting that the slope should be away from the building, which validates the design intent. The deck perimeter flashing detail requires flashing seams to be installed so as to not "buck" water. The structural plans required the framing to be sloped per architectural drawings. Where information is not specified, the contractor is either required to request for additional information or construct using minimum industry standards and seek for the Architect's approval. No documents have been disclosed to verify if the contractor had requested additional information regarding the construction of the decks. The minimum industry standard for slope is generally 1/4-inch-per-foot or 2-percent away from building. The architectural plans detail the roof deck to slope at 1/4-inch-per-foot towards drainage. It is more likely than not the decks were framed with a minimum slope of 2-percent away from the building.

Where access to elevated decks was provided, the slope of the deck at the deck edge was inadequate to promote positive drainage and allows ponding of water. The homeowner at Unit 3124 (Building A) reported standing water near the deck edge following precipitation events. The homeowner also reported multiple surface repairs to improve the slope of the deck. Slope measurements greater than 2-percent at the deck surface corroborate the previous repairs. However, at some of the accessible elevated decks the deck edge slope was less than 2-percent. The architectural drawings require the horizontal leg of the edge perimeter flashing to be installed over the sloped framing and covered with multiple surface coatings. This increase in the material thickness at the perimeter of the deck impedes the discharge of water, resulting in

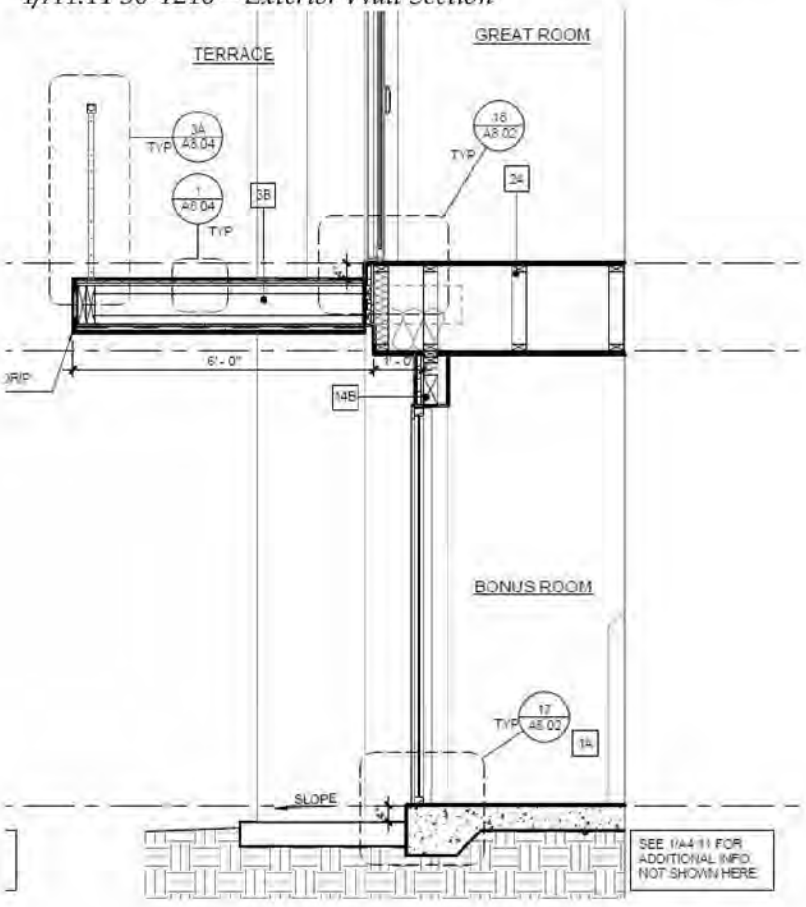
ponding at the edge. Generally, the deck framing is notched at the deck edge to receive the flashing members and accommodate for the additional material thickness. This drop in the surface maintains the slope of the deck and promotes drainage at the edge. As built, the ponding water that collects on top of the membrane system provides an unsafe condition for residents and will lead to premature deterioration and eventual failure of the waterproofing.

Where decks are not compliantly sloped to drain, the as-built condition falls short of the prescriptive requirements of the relevant codes, design, and industry standards and, therefore, the developer, contractor, and subcontractors who performed the work fell below the standard of care.

Applicable Code/Industry Standard References/Project-Specific Documents:

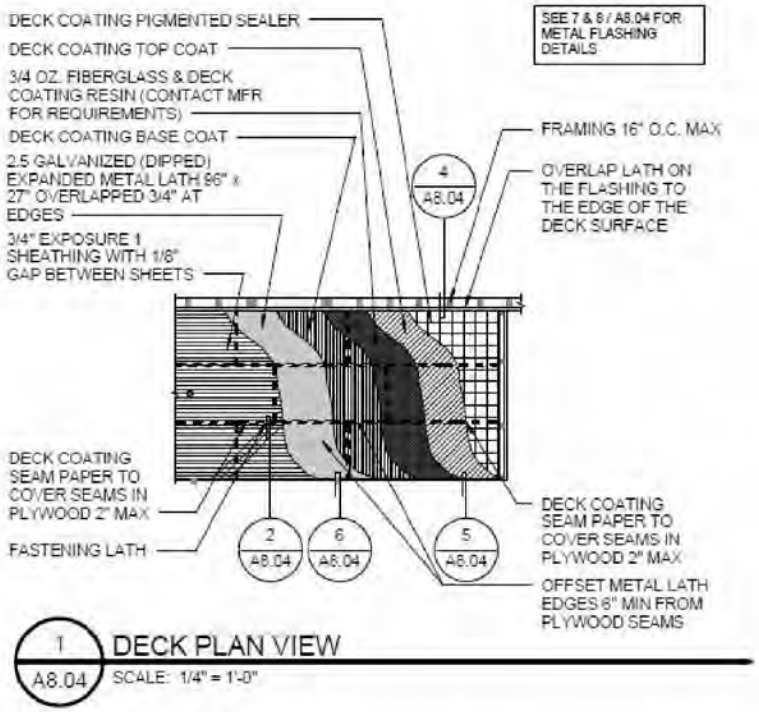
Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A4.11 "30-1210 Wall Sections," illustrates the following:

- *"4/A4.11 30-1210 – Exterior Wall Section"*

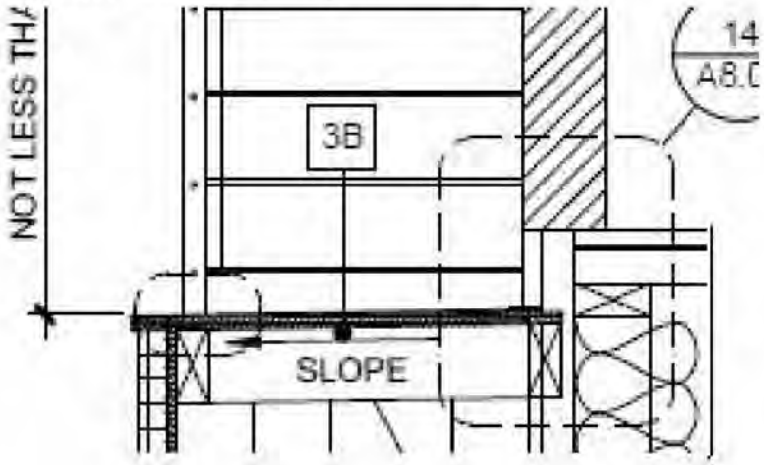


Otak, Inc., "K. Hovnanian Homes, Gallery Townhomes," revised date August 2, 2016, Sheet A8.04 "Exterior Details," illustrates the following:

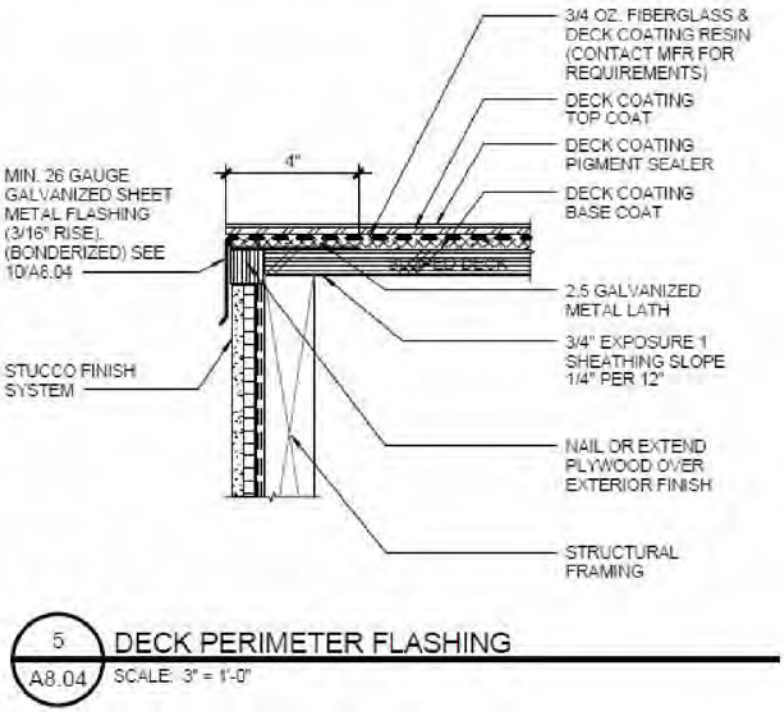
- *"1/A8.04 Deck Plan View"*



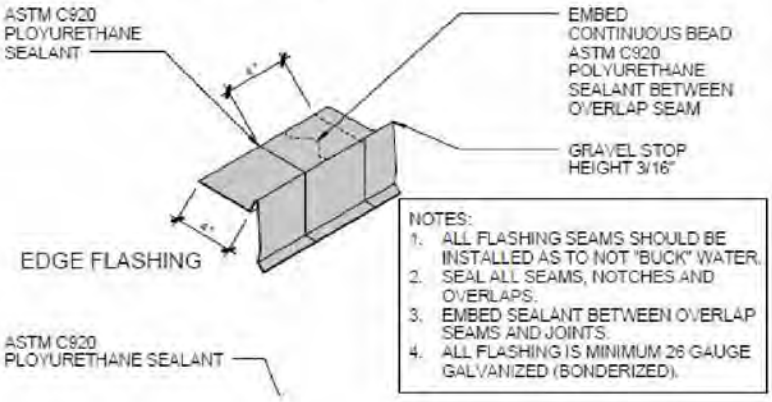
- *"3/A8.04 Balcony & Railing Attachment"*



- *"5/A8.04 Deck Perimeter Flashing"*

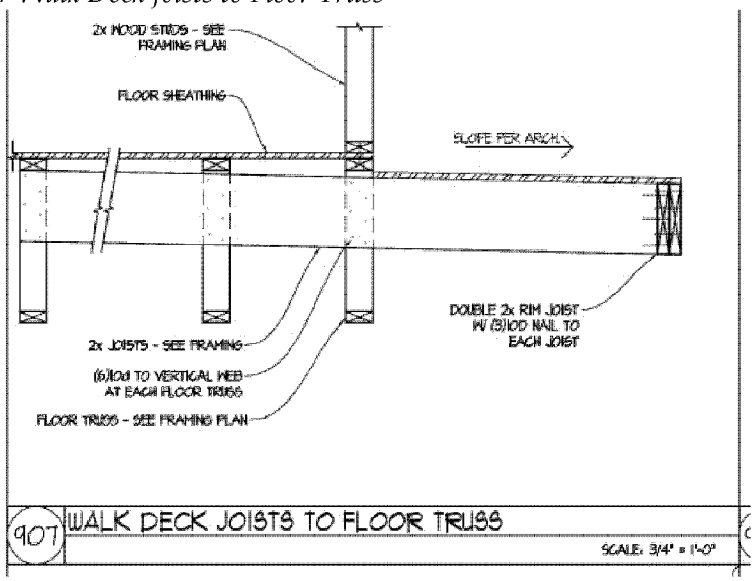


- *"10/A8.04 Deck Perimeter Flashing"*



Felten Group, "K. Hovnanian Homes, Subdivision Gallery," revised June 8, 2016, Sheet SD "Structural Details," states the following:

- *"907 Walk Deck Joists to Floor Truss"*



Structure Magazine, "Low-Slope Roof and Deck Design Considerations Part 2: Mitigate Ponding and Water Intrusion by Scott D. Coffman, PE, SECB," September 2017, states and illustrates the following:

- *"Design professionals, contractors, and perhaps code officials have come to believe a roof or exterior deck surface designed to the 1/4-inch per foot slope is satisfactory because it meets building code intent."*
- *"The 2010 edition of the Minimum Design Loads for Buildings and Other Structures (ASCE 7), published by the American Society of Civil Engineers (ASCE) and referenced by IBC, states in part "surfaces with a slope of at least 1/4-inch per foot toward points of free drainage need not be considered a susceptible bay."*
- *"Water percolates the permeable topping surface to the horizontal plane created by the support members. Free drainage rarely occurs since the support member is level or deflected vertically downward, allowing water to pond. Forensic investigations often encounter damage to support members when water finds a breach in the protective membrane between the topping surface and structural framing."*
- *"Construction practices also contribute to ponding for minimum slope applications. Fascia members are often installed flush to the top edge of the framing member to create a horizontal surface. Detailed fascia members should be shown "dropped" to maintain the slope of the plane (Figure 6)."*

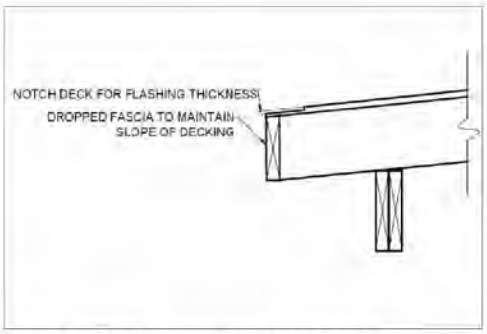


Figure 6. Fascia detail to maintain slope to free drainage edge.

- *"Flashing is often installed at the boundary, with one leg placed on top of the roof or deck substrate. The material thickness at the boundary impedes water discharge (Figure 7). The substrate should be notched to receive flashing members and accommodate material thickness."*

Figure 7. Component thickness prevents free drainage.

- *"A design professional should recognize the limits of building code requirements, standard details or practices; In these cases, it is important to provide "best practice" details within the construction documents to mitigate potential ponding and serviceability issues."*

Example Photographs:

March 10, 2021, Disc IT8, Photograph 351, SSR, Building A – Unit 3124, deck perimeter flashing 2.4-percent slope.

December 19, 2018, Disc OBS1, Photograph 167, JBF, Building A – Unit 3124, stains indicate ponding water at the deck edge.

October 14, 2019, Disc OBS2, Photograph 462, SSR, Building A – Unit 3122, 0.9-percent slope at the deck edge.

October 14, 2019, Disc OBS2, Photograph 64, SSR, Building B – Unit 3116, stains indicate ponding water at the deck edge.

October 14, 2019, Disc OBS2, Photograph 71, SSR, Building B – Unit 3116, 0.9-percent slope at the deck edge.

October 14, 2019, Disc OBS2, Photograph 408, SSR, Building B – Unit 3112, 1.1-percent slope at the deck edge.

October 15, 2019, Disc OBS3, Photograph 175, SSR, Building B – Unit 3106, 0.4-percent slope at the deck edge and stains of water ponding at the edge.

October 15, 2019, Disc OBS3, Photograph 36, SSR, Building C – Unit 3123, 1.4-percent slope at the deck edge.

October 15, 2019, Disc OBS3, Photograph 277, SSR, Building C – Unit 3125, 0.7-percent slope at the deck edge and stains of water ponding at the edge.

October 16, 2019, Disc OBS4, Photograph 22, SSR, Building C – Unit 3127, 0.8-percent slope at the deck edge and stains of water ponding at the edge.

October 15, 2019, Disc OBS3, Photograph 401, SSR, Building D – Unit 3105, stains of water ponding at the edge.

October 15, 2019, Disc OBS3, Photograph 414, SSR, Building D – Unit 3105, 0.3-percent slope at the deck edge and stains of water ponding at the edge.

Locations:

Non-compliant deck slope at edge flashing exists at Unit 3122 of Building A, Units 3106, 3112, and 3116 of Building B, Units 3123, 3125, and 3127 of Building C, and Unit 3105 of Building D. Additional units may be identified during repairs. Refer to the attached Observation Drawings and Defect Matrix for locations and details of findings.

GENERAL RECOMMENDATIONS FOR REPAIR

All comments made are based on conditions seen at the time of these observations. SBSA does not accept any responsibility for unknown or unknowable conditions within the existing site or structures that are typically encountered during the rehabilitation process. The repair recommendations herein are conceptual and are intended for cost estimating purposes only. They are intended to provide repairs in conformance with the applicable building code and industry standard of care. These repairs are not intended for construction or for use on this project or extensions of the project unless completed, adapted, stamped, or acknowledged by SBSA. Any and all designs, repair recommendations, or work provided herein is an instrument of service of SBSA. Instruments of service are intended to work in a full system property/fully integrated system approach and should not be used individually without adaptation and completion by or from SBSA. Any unauthorized use of instruments of service shall be at the sole risk of the user and SBSA shall not be liable in any way for such use. The intent of the following is that all repairs will be provided in whole. It will be necessary for qualified design professionals to perform additional work to prepare proper construction documents, details, calculations, and specifications suitable for construction of the repairs described herein.

The repair cost is a Level Two (Schematic/Conceptual Design) estimate as defined in the Standard Estimating Practice, 9th Edition, by the American Society of Professional Estimators. The estimation for this level may range from -20 to plus 10-percent of accuracy.

Contingencies: Normal reconstruction contingencies are 10-percent of the unburdened construction services total, and have some relation to the general conditions of the project. The general conditions should be reviewed for both contingency and design fees and should be burdened appropriately to those items that require review and work with the design team and that require relation to the discovery, measurement, scheduling, and repair of the work for contingent items. Based on SBSA's findings on this project; damage to flatwork and asphalt, of misapplied materials, damage to substrates, WRB and interstitial spaces, SBSA believes that the burden for contingent items (known/unknowns) should be set at 10-percent.

All repairs shall be performed per applicable building codes, project-specific details, manufacturer installation guidelines, and industry standards.

A. STRUCTURAL

1. COMPLIANCE WITH GEOTECHNICAL REPORT

- The original geotechnical report presents recommendations for overexcavation, soil stabilization, and drainage on the site. Review the original geotechnical report for applicable design and construction recommendations for informational purposes.

2. LATERAL FORCE RESISTING SYSTEM (LFRS)

a. Non-Compliant LFRS

- All LFRS repairs shall be performed per the braced/shear wall and holddown schedule provided on Sheets S3.1 through S3.6 of the Felten structural plans as designed by the Structural EOR.
- For Unit 3111 of Building D, perform the following repairs to the LFRS.

- Remove existing stucco to coordinate with repairs recommended in Sections C.1 and C.2 of this report.
- Repair contractor to verify and confirm the extent of repairs to the LFRS.
- Where exterior sheathing is identified as missing, install new 3/8-inch minimum-rated sheathing using specified nails spaced to provide minimum shear resistance of 306-plf per the braced/ shear wall schedule.
- Where existing strap is identified as installed incorrectly, remove and replace with new strap per the holddown schedule. Install according to the manufacturer's installation requirements.
- Reinstall cladding per the repairs recommended in Sections C.1 and C.2 of this report.

- Repair contractor to include 10-percent of the stucco repair costs for use as a contingency for the repairs for the non-compliant LFRS. The as-built construction of the LFRS will be compared with LFRS design on the Felten structural plans as designed by the Structural EOR after the stucco system is removed.

B. CIVIL

1. GRADING AND DRAINAGE

a. Drainage Bounded by Concrete Flatwork

- Perform repairs at all locations noted in the Civil Repair Drawings.
- Coordinate sidewalks, curbs, and roadway to allow for proper site geometric integration in all new construction. A full topographical survey from the curb line to the face of the building will be required due to the limited site elevation difference to enable design to correct the deficient construction.
- Construct concrete aprons below roof drain terminations. Where sidewalks exist, remove sidewalk to nearest joint and provide sidewalk chase. Where no sidewalks are constructed, construct curb cut to allow flow out of bounded area, and regrade unpaved area to drain.
- Place rocks (4- to 6-inch diameter) in concrete aprons.
- Adjust existing electrical and irrigation boxes as required.

b. Non-Compliant Management of Concentrated Flows

- Perform repairs at all locations noted in the Civil Repair Drawings.
- Construct concrete aprons below roof drain terminations. Where sidewalks exist, remove sidewalk to nearest joint and provide sidewalk chase. Where no sidewalks are constructed, construct curb cut to allow flow out of bounded area.
- Place rocks (4- to 6-inch diameter) in concrete aprons.
- Adjust existing electrical and irrigation boxes as required.

2. CONCRETE FLATWORK

a. Non-Compliant Cross-Slope of Sidewalks

- Remove and replace concrete as noted in Civil Repair Drawings. Coordinate between asphalt roadway, curb profile, and sidewalks to achieve geometric integration.
- Concrete removal shall be to the nearest construction/control joint.
- Ensure that subgrade is prepared in compliance with the recommendations of a geotechnical engineer prior to the placement of concrete.
- Ensure grading and drainage direct runoff away from flatwork subbase.
- Ensure all new flatwork meets slope requirements set forth in the current applicable building code as amended by the City of Scottsdale, MAG Standard Details, and ADA/ANSI standards.
- At all locations where new concrete flatwork is to be constructed directly adjacent to vertical building elements, provide full-depth, 1/2-inch expansion joints in compliance with applicable codes and/or industry standards.

b. Non-Compliant Longitudinal Slope of Sidewalks

- Remove and replace concrete as noted in Civil Repair Drawings.
- Concrete removal shall be to the nearest construction/control joint.
- Ensure that subgrade is prepared in compliance with the recommendations of a geotechnical engineer prior to the placement of concrete.
- Ensure grading and drainage direct runoff away from flatwork subbase.
- Ensure all new flatwork meets slope requirements set forth in the current applicable building code as amended by the City of Scottsdale, MAG Standard Details, and ADA/ANSI standards.
- Verify final geometry using topographic survey. If required, construct code-compliant stairs at entrances to buildings or at bottoms of existing stairways.
- At all locations where new concrete flatwork is to be constructed directly adjacent to vertical building elements, provide full-depth, 1/2-inch expansion joints in compliance with applicable codes and/or industry standards.

c. Non-Compliant Landings

- Remove and replace concrete as noted in Civil Repair Drawings.
- Concrete removal shall be to the nearest construction/control joint.
- Ensure that subgrade is prepared in compliance with the recommendations of a geotechnical engineer prior to the placement of concrete.
- Ensure grading and drainage direct runoff away from flatwork subbase.

- Ensure all new flatwork meets slope requirements set forth in the current applicable building code as amended by the City of Scottsdale, MAG Standard Details, and ADA/ANSI standards. Maximum slope of landings to be 2-percent.
- Verify final geometry using topographic survey. If required, construct code-compliant stairs at entrances to buildings or at bottoms of existing stairways.
- At all locations where new concrete flatwork is to be constructed directly adjacent to vertical building elements, provide full-depth, 1/2-inch expansion joints in compliance with applicable codes and/or industry standards.

C. BUILDING ENVELOPE

1. FAÇADE (EXTERIOR CLADDING AND SEALANTS) TYPE 1 – STUCCO

a. Missing Weep Mechanism in Stucco

- Coordinate with replacement of the WRB and the stucco system as described in Sections C.1.b and C.1.c of this report.
- Install new weep mechanisms at the following horizontal terminations.
- At window heads, slider door heads, swing door heads, and garage door heads, terminate the weep casing bead 1/4-inch above sheet metal head flashing.
- At soffits, install weeps per the architectural Detail 4/A8.03 and manufacturer's requirements.
- Shingle-lap WRB with new weep mechanisms.
- Coordinate repair with related stucco and underlying moisture-management repair recommendations as well as all adjacent civil repair recommendations.

b. Non-Compliant WRB for Stucco System

- Full removal and replacement of the stucco and the exterior insulation is required to address the non-compliant installation of the WRB for the existing stucco system. Remove existing WRB to perform following repairs.
- Install missing exterior sheathing and straps, as necessary, per the LFRS repairs recommended in Section A.2 of this report.
- Install sheet metal flashings per Section C.2.a of this report.
- Ensure that the WRB above is shingle-lapped with the sheet metal flashing.
- Install new WRB per the requirements of ESR-3529 for the existing stucco system.
    - Repair contractor to estimate using between two layers of Grade D kraft building paper or one layer of Grade D kraft paper with minimum water-resistance rating of 60-minutes or using Tyvek products such as StuccoWrap or DrainWrap as specified in Section 3.2.4 and Section 3.2.10 of ESR-3529.
- Ensure all WRB terminations shingle-lap with all surrounding rigid and flexible flashings, weeps, and accessories.
- Install EPS foam boards per repairs recommended in Section C.1.c of this report.

- Install new stucco system to comply with the current requirements of ESR-2359.
- Install lath per the stucco manufacturer and ASTM C1063.
- Install control joints at fenestration corners, floorlines, top plate/truss lines, and within the field of the wall to comply with ASTM C1063 and the stucco manufacturer.
- Install weep casing beads with 3-1/2-inch vertical legs at all stucco terminations Ensure that the WRB shingle-laps with the new weep casing beads.
- Coordinate with adjacent repairs, including underlying moisture-management and stucco repair recommendations.

c. Non-Compliant EPS Foam Board for Stucco System

- Full removal and replacement of the stucco is required to address the non-compliant installation of the EPS foam board for the existing stucco system.
- Where installed over solid substrates, remove existing EPS foam board to perform the following repairs. Also refer to other stucco repairs in this report.
- Ensure all EPS foam boards have 3/8-inch projecting tongues with compatible grooves at horizontal joints.
- At solid substrates, install new minimum 1/2-inch-thick EPS foam board with vertical grooves spaced at a maximum 12-inches on-center on the back face of the boards. The vertical grooves should be a minimum 1/4-inch wide by 1/8-inch deep as required by ESR-3529.
- As an alternative to EPS foam boards with vertical grooves, flat-faced EPS foam boards may be installed over the solid substrates provided the WRB recommended in Section 3.2.4 of ESR-3529 is used.
- Coordinate with adjacent repairs, including underlying moisture-management and stucco repair recommendations.
- Where EPS foam board repairs are necessary at open stud framing, use minimum 1-inch-thick EPS boards installed in compliance with ESR-3529.

d. Non-Compliant Slope of Horizontal Stucco Surfaces

- Repair to be performed at all stucco parapet walls and pop-out boxes sloped less than 2:1.
- Remove existing stucco, lath, and building paper as required to perform the repair as described below.
- Install continuous shims to provide a 2:1 minimum slope on stucco wall caps.
- Install new self-sealing SAM that reduces the potential for water intrusion due to fastener holes. Install new SAM over the top of the continuous shim, ensuring SAM shingle-laps over the adjacent WRB on all sides and forms a continuous saddle at the intersections with the adjacent wall.
- Reinstall stucco as described in Repair Section C.1.c.

- Coordinate repair with related cladding, flashing, and underlying moisture-management recommendations.

e. Deficient Self-Adhered Membrane under Horizontal Stucco System

- Refer to Repair Section C.1.d of this report.

f. Missing Control/Movement Joints

- Refer to Repair Section C.1.b of this report.

2. MOISTURE-MANAGEMENT SYSTEM (BARRIERS, FLASHINGS, DRAINAGE, ETC.)

a. Missing Sheet Metal Flashing at Window Head

- Coordinate with replacement of the WRB and the stucco system as described in the stucco repair sections of this report.
- Where sheet metal flashing is missing at fenestration heads, perform the repair described below.
- Install new pre-finished sheet metal flashings with 4-inch vertical legs and horizontal legs sloped 10- to 15-degrees as detailed on the architectural plans with hemmed drip edges.
- Apply sealant at ends of sheet metal flashing to provide end dams.
- Ensure all flashing joints and corners are sealed.
- Ensure that the WRB above is shingle-lapped with the sheet metal flashing.
- Reinstall cladding per manufacturer instructions with a minimum 1/4-inch clearance between the bottom of cladding and the back of the sloped sheet metal flashing. Gap between the cladding and flashing to remain unsealed.
- Coordinate repair with related cladding and underlying moisture-management repair recommendations.

b. Non-Compliant Flashing to Stucco Interface

- At elevated decks and awnings, remove existing edge flashing and membrane/coating to allow for stucco repairs described below.
- Remove and replace stucco as required by the architectural details 12/A8.03 and 5/A8.04. Coordinate with replacement of the WRB and the stucco system as described in the stucco repair sections of this report.
- Install new edge flashing at decks per Section C.4.a of this report. New deck coating and new awning TPO perimeter edge membrane will be required to facilitate the repairs. Ensure the flashing is integrated with the new deck coating and awning TPO membrane.

c. **Non-Compliant Isolation Joints at Dissimilar Materials**

- At locations where stucco interfaces with dissimilar materials, perform the following repairs. Typical locations for repair include joints at fenestrations, penetrations at all cladding types, vertical joints between cladding types, and joints between all cladding types and wood trim, including fascia trim at re-entrant corners.
- Reinstall cladding as required to address other repair recommendations, providing 3/8- to 1/2-inch-wide gap between dissimilar materials. The depth to width ratio for the joint should be equal to 2:1. At stucco, provide casing bead at edge of joint.
- Install type B backer rod and low-modulus elastomeric sealant to provide compliant butt isolation joint at dissimilar material interfaces with joint widths that are 3/8-inch or greater.
- Install polyethylene bond breaker tape and low-modulus elastomeric sealant to provide compliant fillet isolation joint at dissimilar material interfaces where the existing space is less than 3/8-inch wide or the dissimilar materials are out of plane.
- Following installation of sealant isolation joints at penetrations through the cladding, set surface-mounted objects in continuous sealant against the face of the cladding. Where applicable, profile the sealant at the top of the surface-mounted objects to promote drainage over the top flanges.

3. ROOFING SYSTEM TYPE 1 – SPRAY POLYURETHANE FOAM (SPF)

a. **Non-Compliant Slope to Roof Drains**

- Repairs to be performed at all roof decks with non-compliant drainage.
- Remove and replace membrane and underlying substrates as necessary to perform repairs described below.
- Remove and replace damaged underlying coverboard and structure, if present.
- Install tapered insulation to provide positive drainage (1/4-inch minimum) towards roof drains.
- Slope cricket a minimum of 1/4-inch-per-foot along the valley.

4. ELEVATED DECKS, BALCONIES, OR WALKWAYS

a. **Non-Compliant Slope of Deck**

- Repairs to be performed at all decks with non-compliant slope and drainage at edge flashing.
- Remove existing deck edge flashing, membrane, and underlying substrates as necessary to perform repairs described below. Remove and replace damaged underlying structure, if present.
- Provide a notch equivalent to the thickness of the metal flashing and deck coating for a length equal to the horizontal leg of the flashing. Ensure the notch slopes positively towards the deck edge.

- Install new flashing and deck coating flush to the existing deck surface and sloped a minimum of 2-percent to the deck edge.
- Coordinate with repairs recommended in this report.

REHABILITATION/DESIGN QUALITY ASSURANCE ESTIMATE

For estimating purposes, an amount must be added to allow for the following services in support of the reconstruction work:

Design Services including Preliminary Design Phase documents and Final Drawings indicating the scope, extent, and character of the work to be performed and furnished by the contractor. Specifications will also be prepared to include general contractor conditions, scopes of work, specifications, and construction details. It is estimated that these services are equal to 4.0-percent of the total construction costs, including general conditions, contractor's overhead and profit, and contingency.

Project Coordination Services including both pre-construction services and construction support services. This involves such activities as periodic visits to the site in order to observe the progress and quality of the work, administration of change orders, reviewing of material substitution requests, pay applications, budgets, and schedules. It is estimated that these services are equal to 8.0-percent of the total construction costs, including general conditions, contractor's overhead and profit, and contingency.

It is important to note that the 4.0-percent and the 8.0-percent estimates for these services (cumulatively 12.0-percent) assume that both types of services are procured jointly and with a single provider. These percentages are subject to change otherwise as efficiencies may not be available.

Limitations of Liability:

All comments made are based on conditions seen at the time of these visual observations and review of provided documentation. SBSA does not accept any responsibility for unknown or unknowable conditions within the existing site or structures. In addition, if the professional services of the consultant do not extend to the repair phase, then, by acceptance of this report, it is agreed that the owner will defend, indemnify, and hold harmless SBSA from any claim or suit whatsoever. SBSA agrees to be responsible for its own or its employees' negligent acts, errors, or omissions.

Sincerely,

SBSA, LLC
A Charles Taylor Company
Firm # 16794-0

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Chief Executive Officer

SSR:DMD:JJF:ELF:kn

Attachments: Observation Photographs
Photograph Log
Observation Drawing Set, Sheets G0.00, A1.01-1.04, C1.01-C1.16, C2.01-C2.04, C3.01-C3.08
Repair Drawings, Sheets B1.01-B1.04
Defect Matrix
References

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