# **Meadow Wood Condominiums**

### **Exploratory Building Envelope Condition Assessment**



#### PREPARED FOR

Meadow Wood Condominiums c/o: Christopher Tingey Vial Fotheringham, LLP 17355 SW Boones Ferry Road | Suite. A Lake Oswego, OR 97035

#### **PREPARED BY**

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#### **JULY 6, 2015**

Meadow Wood Condominiums c/o: Christopher Tingey Vial Fotheringham, LLP 17355 SW Boones Ferry Road | Suite. A Lake Oswego, OR 97035

#### RE: MEADOW WOOD CONDOMINIUMS | BUILDING ENVELOPE CONDITION ASSESSMENT REPORT

Dear Mr. Tingey:

At the request of the Meadow Wood Condominiums Board of Directors, on May 11th and 12th, 2015, Alliance Project Engineers and Construction Consultants ("Alliance") performed a exploratory building envelope condition assessment (BECA). The BECA focused on the following three (3) objectives:

1) Identify defects in the construction of the exterior envelope components that have reduced the useful life expectancy; 2) Identify locations of moisture ingress resulting in property damage, habitability issues and safety concerns; and 3) Provide a preliminary scope of repair necessary to correct the construction defects and resultant property damage to the underlying structural assemblies.

Property Data		
Property Address	2101 Poplar Dr, in Medford, OR 97504	
Buildings	Sixteen 2-Story Buildings	
Units	85 Condominium Units	
Originally Built	1988	
Condominium Conversion	2005	
Construction Type	Type V-B: Unprotected Wood Frame	

BUILDING ENVELOPE COMPONENTS		
Siding Type	Vinyl / Fiber Cement	
Weather Resistive Barrier (WRB)	Dow WeatherMate	
Roof Type	Asphalt Shingle	
Deck Type	Concrete Topping Slab / Waterproof Coating	
Entry Landings/Decks	Concrete Topping Slab / Waterproof Coating	
Window Type	Vinyl	

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#### **BECA TESTING METHODOLOGY**

Alliance conducted the BECA in general conformance with ASTM E2128 "Standard Guide for Evaluating Water Leakage in Building Walls".

- Prior to conducting the fieldwork, Alliance met with members of the HOA board of directors. The board of directors provided information on recent water intrusion events in the condominium units (which is what prompted the BECA) and maintenance records.
- Alliance walked the subject property with members of the maintenance team and community manager to become familiar with issues of concern.
- Alliance attempted to obtain plans for the condominium conversion from the City of Medford. The
  plans were not available, nor was there a record of permits being pulled for the siding replacement
  and deck repair work.
- Through online research a website for Pulsifer Investments (<a href="http://www.pulsifer.net/projects/meadow-wood-condos/">http://www.pulsifer.net/projects/meadow-wood-condos/</a>) was identified, which purports to be the firm that purchased, the then Meadow Wood Apartments, and converted the property into Meadow Wood Condominiums. The website represents that during the conversion from apartments the property went through extensive renovation. "This cash flow improvement alone, if harvested, would have produced a return in excess of 30% for our investors in a matter of months, however we chose to execute our plan, laid out prior to purchase, to re-configure the property into condominiums in the growth constrained community. **Over \$1M of exterior and interior renovations** have produced a significantly enhanced property, and rapid sales confirm the market opportunity. Our customers are generally first time buyers and down-sizers attracted to the area for its quality of life."
- Once sufficient background information was gathered Alliance completed a visual inspection of the subject property. Based upon the visual observations, the exploratory opening locations were selected.

This report presents the results of our exploratory building envelope condition assessment (BECA) and documentation of deviations from the applicable building code, recognized industry standards and/or manufacturers specifications. The intent of the report is to clearly demonstrate the building envelope performance to you, our client. The photographic appendix, which is a representative sample of photographs taken during the exploratory BECA, and will provide a simple guide to help the reader understand the issues contained in the report. The opinions contained in this report are based upon the sample test locations, and as such we there may be undocumented construction defects and/or property damage concealed behind envelope components that were not removed during the BECA.

#### **MOISTURE CONTENT**

Alliance utilized the Delmhorst BD-2100 Moisture Meter to gather accurate readings of moisture content in wall assemblies.

#### (1) Wood Scale

Readings of 6% to 15% indicate a sufficiently dry moisture content at the time of testing. Readings of -5.8% indicate a moisture content below 6%, which is also sufficiently dry. Readings of 15% to 17% is a borderline elevated moisture content, and indicates the material has been recently exposed to liquid moisture. Readings above 17% indicate material that is too wet for most applications.

#### (2) Gypsum Scale

Readings of 0% to 0.5% indicate a sufficiently dry moisture content. Readings of 0.5% to 1% indicate a borderline elevated moisture content and recent moisture exposure. Readings greater than 1% indicate a moisture content conducive to gypsum sheathing deterioration and recent moisture exposure.

#### **VINYL SIDING**

- The vinyl siding fastener spacing was greater than the maximum 16-inches on center horizontally, as allowed by the building code. Improper fastening patterns in the vinyl siding prevents the siding from being fully secured to the wood wall assembly, which has created avenues for wind driven moisture to intrude behind the siding, resulting in property damage.
- Fasteners used to secure the vinyl siding were not of adequate resistance to corrosion. In numerous locations corroded fasteners were documented.

1998 OSSC Section 1404.2 Application of Vinyl Siding states: "Nails used to fasten the siding and accessories shall have a minimum 3/8"-inch (9.5-mm) head diameter and 0.120"-inch (3.05) shank diameter. The nails shall be corrosion resistant and shall be long enough to penetrate the studs or nailing strip at least 3/4"-inch (19-mm). Where the siding is installed horizontally, the fastener spacing shall not exceed 16"-inches (406-mm) horizontally and 12"-inch (305-mm) vertically".

• In numerous locations along the roofline the "J" channel was installed in direct contact with the asphalt shingle roofing. Distortion of the J-channel was recored in these locations.

Page 20 of the 1999 Vinyl Siding Institute Installation Manual states: "Keep the J-Channel approximately 1/2"-inch from the roof line" - "Note: Vinyl J-channels should not be in direct contact with roofing shingles, since the shingles may transfer enough heat to the vinyl J-channel to cause its distortion."

• Throughout the complex sections of missing siding and/or discontinuous siding were observed. These conditions created avenues for moisture ingress, which has resulted in property damage.

1998 OSSC Section 1401.1 states: "Exterior wall coverings for the building shall provide weather protection for the building at its exterior boundaries."

 Sealant/caulking joints were omitted at penetrations in the vinyl siding and terminations to dissimilar materials. The omission of required sealant joints has resulted in moisture ingress and property damage.

1998 OSSC Section 1307.1.7.2 Sealing Required states: "Exterior joints around windows and door frames, between wall cavities and window or door frames, between wall and foundation, between wall and roof, between wall panels, at penetrations or utility services through walls, floors, and roofs and all other openings in the exterior envelope shall be sealed in a manner approved by the building official."

 Horizontal wood caps installed at the guardrails of the unit access stairs, landings and decks, were not adequately fastened resulting in excessive movement, curling and warping. The openings due to the movement of the wood caps resulted in moisture ingress and decay of the guardrail wall assemblies, creating safety concerns.

#### **WEATHER RESISTANT BARRIER (WRB)**

The wood wall assemblies are covered with a weather resistive barrier (WRB) manufactured by Dow. The following are defects in the installation of the Dow WeatherMate WRB:

- Numerous locations of reverse lapped (that is the lower layer is reverse lapped over the upper layer)
   WRB were identified. The reverse lap of the WRB in these locations catches incidental moisture,
   the moisture then comes into direct contact with the underlying wood wall assemblies, resulting in decay and property damage.
- Voids and tears in the WRB and sections of the WRB that did not overlap exposed the underlying wood wall and structural framing components to moisture ingress and property damage.
- We observed omitted/discontinuous sections of WRB. The omission of the WRB in these location leaves the underlying wall assemblies exposed to moisture ingress resulting in property damage.
- We observed areas in the WRB without the minimum code required horizontal and vertical laps.

1998 OSSC Section 1402.1 states: "Building paper and felt shall be free from holes and breaks other than those created by fasteners and construction system due to attaching of the building paper, and shall be applied over studs or sheathing of all exterior walls. Such felt or paper shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2"-inches (51-mm). Where vertical joints occur, felt or paper shall be lapped not less than 6"-inches (152-MM)."

**Dow WeatherMate Housewrap Installation Instructions state:** "Overlap all vertical seams at least 6-inches. Overlap all horizontal seams at least 2\_inches shingle fashion (the higher piece on the wall should lap over the lower piece)."

 At deck and landing locations the WRB is reverse lapped behind the flashing, trapping moisture, and resulting in property damage.

**Dow WeatherMate Housewrap Installation Instructions state:** "Install windows and doors according to manufacturer's recommendations. Flash windows and doors with WEATHERMATE™ Flashing and Sill Pan according to building code requirements. When flashing windows, doors, roofs, deck connections to walls, etc., be careful to lap WEATHERMATE™ housewrap and flashing so water does not get behind flashing."

#### FENESTRATION/WINDOW INSTALLATION

Fenestration refers to the design, construction, or presence of windows and doors in a building surface/wall. We were unable to identify the manufacturer of the windows and sliding glass doors installed at Meadow Wood Condominiums, in lieu of a manufacturer the American Architectural Manufacturers Association ("AAMA") 2400-02 for installation specifications and requirements.

 Corroded fasteners securing the windows to the wood wall assembly were observed in numerous locations. Fasteners that are not of adequate resistance to corrosion to not provide adequate securement of the window units.

Section 5.2.2 of the AAMA 2400-02 states: "All fasteners shall be corrosion resistant".

 Sealant was omitted between the window flanges and wall assembly in all locations observed, which is a violation of the prevailing building code and recognized industry standards. The omission of sealant behind the window flange has resulted in moisture ingress and also contributes to air leakage, monetarily damaging the condominium unit owners. 1998 OSSC Section 1307.1.7.2 - Sealing Required states: "Exterior joints around windows and door frames, between wall cavities and window or door frames, between wall and foundation, between wall and roof, between wall panels, at penetrations or utility services through walls, floors, and roofs and all other openings in the exterior envelope shall be sealed in a manner approved by the building official."

<u>Section 5.4.3 of AAMA 2400-02 states:</u> "Where wet sealant is used, the installer shall look for the sealant to "squeeze out" or appear along the edge of the flange/flashing to assure a continuous seal. "Squeeze out" shall be promptly troweled smooth."

<u>Section 5.5.3.4 of AAMA 2400-02 states:</u> "for mechanically joined frames, apply sealant at corners the full length of the seam where mounting flanges meet and to the outside of the frame corner joints. (See figure 3A). Apply a continuous seal to the backside (interior) of the window mounting flange in line with any pre-punched holes or slots in the mounting flange. The window shall then be installed in accordance with section 5.6 installation procedures.

Fasteners were improperly installed in the corner weld joints of the window flange and fasteners
were also installed directly through the flange, as oppose to the manufacturers pre-punched nailing
slots.

**AAMA 2400-02 Section 5.6.3 states:** "In each direction from all corners there shall be a fastener within 250-mm (10"-inches), but no closer than 75-mm (3"-inches) to prevent frame distortion or fracture of joint seals."

- At all window locations, the WRB was reverse lapped and tapped over the windowsill nailing flange. This condition has trapped incidental moisture entering between the vinyl siding J-channel and window, gaining direct access to the wood wall assembly.
- At all windows and doors the code required metal head flashing was omitted. The omission of flashing above windows and doors allows for moisture ingress, as well as preventing incidental moisture from exiting the system as intended.

1998 OSSC Section 1402.2 "Flashings and Counter Flashing" states: "Exterior openings exposed to the weather shall be flashed in such a manner as to make them waterproof."

#### **FLASHING**

Flashing is a thin, impervious corrosion resistant sheet of material placed in construction to prevent water penetration and/or direct incidental moisture to the exterior. Flashing is typically installed above windows and doors, at roof valleys, roof penetrations, joints between a roof and a vertical wall, decks and balconies.

- Code required flashing was omitted above window and doors on the subject property. Flashing, in a "Z" profile, is required above windows and doors to prevent moisture from penetrating the siding and direct incidental moisture outboard of the building envelope.
- In numerous locations the flashing was reverse lapped over the WRB, as oppose to integrating it in
  a shingle manner to facilitate drainage. Flashing that is not integrated with the WRB is detrimental,
  in that it effectively catches incidental moisture directing it inboard of the wall assembly. The reverse
  lapped flashing at the subject property has resulted in property damage and decay of structural
  framing members.
- Unsealed fasteners were installed through the horizontal surface of the flashing creating an avenue for moisture ingress.

**1998 OSSC Section 1402.2 "Flashings and Counter Flashing" states:** "Exterior openings exposed to the weather shall be flashed in such a manner as to make them waterproof."

#### THE ROOF SYSTEMS

- Code required diverter flashing were omitted at all roof-to-wall transitions above gutter end conditions. The omission of diverter/kickout flashing has resulted in moisture ingress and property damage.
- Several locations omitted rake flashing at the roof edges, creating avenues for moisture ingress.

**1998 OSSC Section 1402.2 "Flashings and Counter Flashing" states:** "Exterior openings exposed to the weather shall be flashed in such a manner as to make them waterproof."

At roof and wall intersections the underlayment/felt did not extend up the sidewall. The
discontinuous underlayment has allowed incidental moisture that bypasses the step flashing a
direct avenue into the attic and/or wall cavities.

**1998 OSSC Section 1509 "Other Flashing" states:** "At the juncture of the roof and vertical surfaces, flashing and counter flashing shall be provided per the roofing manufactures instructions".

ASTM D226 - "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing" Section 7.3 states: "The finished material shall be free of visible external defects, such as holes, ragged or untrue edges, breaks, cracks, tears, protuberances and indentations, except for intentionally provided perforations and the associated protuberances."

#### **WATERPROOF DECKS AND LANDINGS**

The decks and landings are wood framed, with a concrete topping slab walking surface and waterproofed with a fluid applied polyurethane coating.

• The decks and landings do not have the code required minimum 1/4" per foot of slope away from the buildings. The omission of required slope at the decks and landings has resulted in moisture intrusion and structural impairment of the deck support members.

1998 OSSC Section 1402.3 Waterproofing Weather Exposed Areas states: "Balconies, landings, exterior stairways, occupied roofs and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4" unit vertical in 12 units horizontal (2%) for drainage.

- Flashing installed at the outside deck edge was not properly secured to the concrete topping slab, allowing the flashing to oil can and shift, creating failures/tears in the waterproof membrane. The failures in the waterproof membrane at the outside edge directed moisture on the deck surface behind the vinyl siding and WRB, causing decay and structural impairment of the deck support beams and posts.
- Flashing installed at the perimeter of the decks and landings was discontinuous at inside and outside corners of the walls, and at the posts supporting the guardrail walls. The discontinuous flashing installations have resulted in moisture ingress and structural impairment of the deck support members.
- Fluid applied waterproofing installed on the concrete toping slabs of decks and landings was improperly applied resulting in premature failure. The coating was of insufficient thickness and was not sufficiently bonded, allowing moisture to penetrate the moisture permeable concrete topping slab, gaining access to the underlying wood substrate and framing resulting in decay and structural impairment.

1998 OSSC Section 2306.9 Wood Supporting Roofs or Floors states: "Wood structural members supporting moisture permeable floors or roofs that are exposed to the wether, such as concrete or masonry slabs, shall be approved wood of natural resistance to decay or treated wood unless separated from such floors by an impervious moisture barrier."

 Many of the posts supporting the decks were not approved wood of natural resistance to decay or treated wood (some posts were replaced during the conversion with treated wood (PT) posts), and were installed in direct contact with the concrete slab on grade. The untreated wood posts supporting the decks have decayed due to contact with the concrete slab on grade.

1998 OSSC Section 2306.5 Columns and Posts states: "Columns and posts located on concrete or masonry floors decks exposed to the weather or to water splash or in basements and that support permanent structures shall be supported by concrete piers or metal pedestal projecting above floors unless approved wood of natural resistance to decay or treated wood is used."

#### **BECA SUMMARY AND CONCLUSION**

A complete visual assessment of the property was conducted and 30 exploratory openings were created in an effort to gain a full understanding of the conditions at the subject property. Interviews with the board of directors, homeowners and the management provided background on the project. The information obtained from the City of Medford and the Pulsifer Investment website, it is the understanding that the Meadow Wood conversion from apartments to condominiums in 2005. Exploratory testing revealed construction materials that were not available when the Meadow Wood Apartments were constructed, which is indicative of complete siding replacement in 2005 during the conversion. This is also consistent with the Pulsifer Investments website, which states: "Over \$1M of exterior and interior renovations have produced a significantly enhanced property, and rapid sales confirm the market opportunity." In addition to the construction defects, there was also evidence of partial repairs to structural damage. For example; several exploratory openings at the decks identified sections of support beams that were replaced and strapping hardware was used to connect the new beam to an existing decayed beam.

In conclusion, visual observations and exploratory openings identified widespread construction defects and violations of the 1998 Oregon Structural Specialty Code, recognized industry standards and manufacturers specifications. The construction defects have resulted in moisture ingress causing decay of the wall assemblies and structural impairment of the deck/landing structures. As a result of the structural impairment it was necessary to construct temporary shoring/support to prevent collapse. Based upon the large sampling of exploratory openings, it is the opinion of this author, to a reasonable degree of certainty, that the defects and resultant property damage is systemic.

#### **SCOPE OF REPAIR RECOMMENDATIONS**

The following scope of repair recommendations were prepared to address the construction defects and resultant property damage identified at the subject property. This scope of repair, with the exception of the deck engineering, is conceptual in nature and not intended for construction.

#### **GENERAL CONDITIONS**

- 1. Provide scaffolding and weather protection as necessary
- 2. Provide protective measures for concrete flatwork, roof and landscaping. Any damage to property resulting from construction activity shall be repaired or replaced, including roofing, main entry road, driveway, pathways, and landscaping plantings and materials.
- 3. Provide all dumpsters/disposal for duration of construction.
- 4. Provide all required permits.
- 5. Provide all required temporary restroom facilities.
- 6. Provide general liability insurance.
- 7. Provide daily clean-up of property.
- 8. Provide and maintain a construction schedule.
- 9. All work needed to support the repair work shall be considered part of the scope, including all removal of fixtures, signage, electrical, plumbing, HVAC, painting and clean-up.
- 10. Maintain all utility services at all times to enable occupancy by homeowners/tenants, including electrical, water, heating, data and phone services.
- 11. All work shall be reviewed by Alliance to assure compliance with contract documents, current codes and manufacturers requirements.

#### **EXTERIOR WALL COVERINGS - VINYL SIDING**

- 1. Remove and store for reinstallation all building signage, gutters, downspouts, light fixtures, vents, guardrails, fences, satellite and cable components as required to complete the siding replacement.
- 2. Remove and dispose/recycle all existing vinyl siding and WRB.
- 3. Replace damaged sheathing with CDX plywood of same thickness. Allow for 20% sheathing replacement budget.
- 4. Clean and treat wood framing where salvageable. "Cleaning" wood framing shall consist of abrasively cleaning framing before applying wood preservative per manufacturer instructions. Provide allowances for 5% framing replacement/cleaning budget and 10% insulation replacement.
- 5. Install new FortiFiber Super JumboTex WRB with plastic cap corrosion resistant fasteners (stinger staples, for instance) observing building code and manufacturer required overlaps. Tape all seams with FortiFiber Construction Tape
- 6. Install 3/8" P.T. furring strips at 16" on center in line with framing members to provide a drainage plane. Fasten furring securely with stainless steel fasteners and all necessary insect screening at top and bottom of the wall terminations.

- 7. All fasteners shall be stainless steel ring shank.
- 8. Modify all utilities, guardrails and exterior components scheduled for reinstallation as required to accommodate the addition of the 3/8" drainage plane.
- 9. Install minimum 26-gauge pre-finished head-flashing and membrane flashing of same manufacturer as WRB, properly integrated at all penetrations and transitions to dissimilar materials, creating a continuous drainage plane.
- 10. Install QuickFlash prefabricated flashing sleeves at all utility penetrations.
- 11. New siding materials shall be HardiePlank in same configurations as original construction using all stainless steel fasteners in a blind nailing pattern. All siding shall be installed using the most current manufacturer installation instructions. All cut edges of the siding shall be primed.
- 12. All trim shall be James Hardie fiber cement trim (HardieTrim) installed per manufacturers most current installation instructions. Trim shall be installed at all windows, doors, inside/outside corners, bellybands, utility blocks, deck fascia, etc. All cut ends of the trim shall be primed.
- 13. Solid furring shall be placed behind fiber cement blocks and trim where external fixtures or guardrails are mounted to provide solid backing.

#### **WINDOWS & DOORS**

- 1. Remove and store all windows for reuse.
- 2. Windows and doors shall be reinstalled the same day that they are removed. If repairs cannot be completed during that day, temporarily install window. Work must take place continuously until repairs are completed.
- 3. Install pre-finished L-metal back angle with a ½" back leg, 6" end dams and 2" horizontal leg on the sill plate.
- 4. Reinstall all windows and doors in compliance with FortiFiber High Performance installation instructions and/or AAMA 2400-10.
- 5. All rough opening flashing shall be properly lapped and integrated with the WRB.
- 6. Damaged windows shall be replaced to match existing manufacturer, function, product line, size, type, frame and color.
- 7. Windows shall be replaced if damage to frame is beyond repair using vinyl welding method. Allow 10% replacement budget for damaged windows.

#### **FLASHING ASSEMBLIES & DIMENSIONS**

- 1. Install minimum 26-gauge pre-finished "Z-flashing" at the heads of all horizontal trim, window and door head trim, bellyband and utility blocking.
- 2. Install QuickFlash sleeves at all through wall penetrations (including louver and vent penetrations).
- 3. Install one-piece soldered stainless steel pan flashing below all deck and landing access doors.
- 4. All sheet metal flashing shall be fabricated and installed per SMACNA recommendations, properly supported by substrates, bed in sealant, and terminated with appropriately sized end dams.

#### **DECKS, PATIOS & LANDINGS**

- 1. Demolish/remove all deck, patio and landing guardrail walls, concrete topping slab, plywood substrate and framing.
- 2. Rebuild decks and landings with pressure treated lumber, sloped 1/4" per foot, per attached details.
- 3. Install 3/4" T&G exterior grade plywood (A side up), secured to the deck joists with construction adhesive and exterior grade screws.
- 4. Install Tremco 360Nf/950NF pedestrian traffic coating per manufacturers specifications with all required flashing, primer and reinforcing fabric.
- 5. As oppose to rebuilding the guardrail half walls we have determined it will be more cost effective to install an aluminum guardrail system.
- 6. Drill pilot holes in the HardieTrim deck fascia. Ensure that the fascia mounted guardrail attachment points are located over solid blocking.
- 7. Secure the fascia mount RailPro aluminum guardrails using minimum 5" lag bolts to ensure the fasteners are fully engaged in the framing.

#### **ASPHALT SHINGLE ROOFING**

- 1. Remove shingles directly adjacent to all rake/side walls.
- 2. Integrate new felt with existing and extended up the rake/side wall a minimum of 6".
- 3. Install new step flashing minimum 4" by 4", with a diverter flashing extending out from the last course.
- 4. Weave new shingles (match existing) with the existing shingles.

#### **INTERIOR REPAIRS**

1. Repair all interior damage as a result of water ingress and restoration activities. Carry a \$500 per unit allowance for this work.

**PHOTOGRAPHIC APPENDIX** 

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1.001 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.002 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.003 Exploratory Opening #1 Units 32 - 33 Entry Landing



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## 1.004 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.005 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.006 Exploratory Opening #1 Units 32 - 33 Entry Landing



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1.007 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.008 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.009 Exploratory Opening #1 Units 32 - 33 Entry Landing

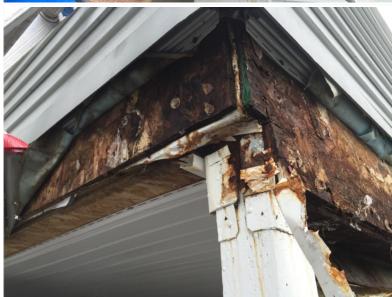


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1.010 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.011 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.012 Exploratory Opening #1 Units 32 - 33 Entry Landing



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1.013 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.014 Exploratory Opening #1 Units 32 - 33 Entry Landing



1.015 Exploratory Opening #1 Units 32 - 33 Entry Landing



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## 1.016 Exploratory Opening #2 Units 34 - 35 Entry Landing



## 1.017 Exploratory Opening #2 Units 34 - 35 Entry Landing





1.018 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.019 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.020 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.021 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.022 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.023 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.024 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.025 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.026 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.027 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.028 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.029 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.030 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.031 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.032 Exploratory Opening #2 Units 34 - 35 Entry Landing



1.033 Exploratory Opening #2 Units 34 - 35 Entry Landing



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1.034 Exploratory Opening #3
Units 36 - 39 Deck Support Beam





1.035 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.036 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



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1.037 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.038 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.039 Exploratory Opening #3
Units 36 - 39 Deck Support Beam

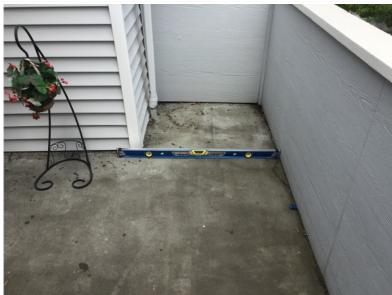


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1.040 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.041 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.042 Exploratory Opening #3
Units 36 - 39 Deck Support Beam

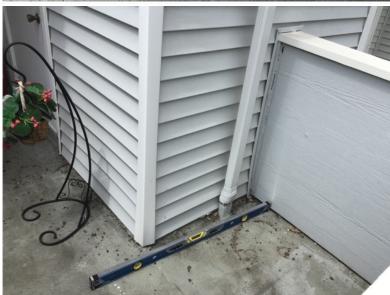


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1.043 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.044 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.045 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



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1.046 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.047 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.048 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



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1.049 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.050 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



1.051 Exploratory Opening #3
Units 36 - 39 Deck Support Beam



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1.052 **Exploratory Opening #4** Unit 43 Roof-to-Wall



1.053 Exploratory Opening #4
Unit 43 Roof-to-Wall



1.054 Exploratory Opening #4
Unit 43 Roof-to-Wall



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1.055 Exploratory Opening #4
Unit 43 Roof-to-Wall



1.056 Exploratory Opening #4
Unit 43 Roof-to-Wall



1.057 Exploratory Opening #4
Unit 43 Roof-to-Wall



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1.058 Exploratory Opening #4
Unit 43 Roof-to-Wall



1.059 Exploratory Opening #4
Unit 43 Roof-to-Wall



1.060 Exploratory Opening #4
Unit 43 Roof-to-Wall



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1.061 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.062 Exploratory Opening #5
Units 40 - 43 Deck Beam





1.063 Exploratory Opening #5
Units 40 - 43 Deck Beam



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1.064 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.065 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.066 Exploratory Opening #5
Units 40 - 43 Deck Beam



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1.067 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.068 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.069 Exploratory Opening #5
Units 40 - 43 Deck
BeamExploratory Opening #5
Units 40 - 43 Deck Beam



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## 1.070 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.071



1.072



1.073



1.074



1.075



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1.076



1.077 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.078 Exploratory Opening #5
Units 40 - 43 Deck Beam

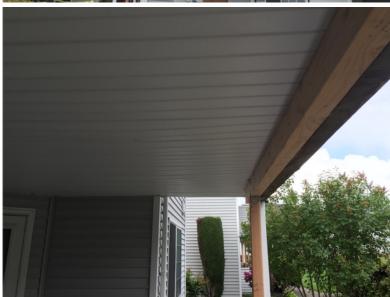


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1.079 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.080 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.081 Exploratory Opening #5
Units 40 - 43 Deck Beam



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1.082 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.083 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.084 Exploratory Opening #5
Units 40 - 43 Deck Beam

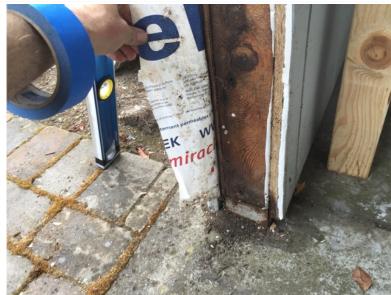


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1.085 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.086 Exploratory Opening #5
Units 40 - 43 Deck Beam



1.087 Exploratory Opening #5
Units 40 - 43 Deck Beam



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## 1.088 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.089 Exploratory Opening #5 Units 40 - 43 Deck Beam



1.090 Exploratory Opening #5
Units 40 - 43 Deck Beam



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1.091 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.092 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.093 Exploratory Opening #6 Units 48 - 51 Deck Beam



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1.094 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.095 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.096 Exploratory Opening #6
Units 48 - 51 Deck Beam



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1.097 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.098 Exploratory Opening #6 Units 48 - 51 Deck Beam



1.099 Exploratory Opening #6 Units 48 - 51 Deck Beam

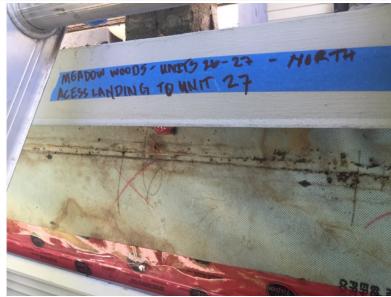


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### 1.100 Exploratory Opening #7 Unit 27 - Access Landing



1.101 Exploratory Opening #7 Unit 27 - Access Landing



1.102 Exploratory Opening #7 Unit 27 - Access Landing



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## 1.103 Exploratory Opening #7 Unit 27 - Access Landing



1.104 Exploratory Opening #7 Unit 27 - Access Landing



1.105 Exploratory Opening #8
Unit 28 - 29 - Access Landing



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1.106 Exploratory Opening #8
Unit 28 - 29 - Access Landing



1.107 Exploratory Opening #9
Unit 24 -25 - Access Landing



1.108 Exploratory Opening #9
Unit 24 -25 - Access Landing



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1.109 Exploratory Opening #10 Units 52 -55 - Deck Beam



1.110 Exploratory Opening #10 Units 52 -55 - Deck Beam



1.111 Exploratory Opening #10 Units 52 -55 - Deck Beam



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1.112 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.113 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.114 Exploratory Opening #11 Unit 56 - 57 - Access Landing



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1.115 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.116 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.117 Exploratory Opening #11 Unit 56 - 57 - Access Landing



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1.118 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.119 Exploratory Opening #11 Unit 56 - 57 - Access Landing



1.120 Exploratory Opening #11 Unit 56 - 57 - Access Landing



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#### 1.121 Exploratory Opening #12 Unit 60 - 61 - Access Landing



1.122 Exploratory Opening #12 Unit 60 - 61 - Access Landing



1.123 Exploratory Opening #12 Unit 60 - 61 - Access Landing



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## 1.124 Exploratory Opening #13 Unit 62 - 63 - Access Landing



1.125 Exploratory Opening #13
Unit 62 - 63 - Access Landing



1.126 Exploratory Opening #13
Unit 62 - 63 - Access Landing



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1.127 Exploratory Opening #13
Unit 62 - 63 - Access Landing



1.128 Exploratory Opening #13
Unit 62 - 63 - Access Landing



1.129 Exploratory Opening #14 Unit 66 - 67 - Access Landing



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# 1.130 Exploratory Opening #15 Unit 68 - 69 - Access Landing



1.131 Exploratory Opening #15
Unit 68 - 69 - Access Landing



1.132 Exploratory Opening #16 Unit 56 - Window



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## 1.133 Exploratory Opening #16 Unit 56 - Window



1.134 Exploratory Opening #16 Unit 56 - Window



1.135 Exploratory Opening #17 Unit 32 - 39 - Entry Landing



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1.136 Exploratory Opening #17 Unit 32 - 39 - Entry Landing



1.137 Exploratory Opening #17 Unit 32 - 39 - Entry Landing



1.138 Exploratory Opening #17 Unit 32 - 39 - Entry Landing

