Project Name: Panama City Resort & Club Milestone Inspection

Consulting Engineer: MK Weber Structural Engineering

MK Weber Project #: 22233

Project Address: 16709 Front Beach Road, Panama City Beach, FL 32413

Year Built: 1968

Flood Zone: VE11, AE8

Square Footage: 29ea. 400Sqft. units, 11ea. 850Sqft. units

Foundation Type: Concrete Pile Deep Foundation

Wall Construction Type: Site Cast Concrete and Masonry Shear Walls

Roof Construction Type: Concrete with TPO Membrane Roofing

Date of Inspection: 9/20/22 **Time of Inspection:** 9:00am

Note: This information is according to the Bay County Property Appraiser's Website.

Present on Site: Grey Davis, Manager
Aaron Rizzuto, Structural Engineer (MK Weber Engineering)
Jared Hammerle, Structural Engineer (MK Weber Engineering)

Reason for Inspection: 25-year Milestone Inspection as required by Florida State law

Attachments: ☒ **Photo(s)** ☒ **Chart(s)** ☒ **Other:** Building Diagram, Material data sheets

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Preface

MK Weber Engineering conducted this structural evaluation pursuant to Senate Bill 4-D (SB 4-D, “The Surfside Bill”) that became effective on May 26, 2022 requiring all condominium structures that are three stories or more in height to have a “milestone inspection” performed by a FL Licensed Professional Engineer or Architect by December 31 of the year in which the building reaches 30 years of age (and every 10 years after) and, in the case of buildings located within 3 miles of a coastline, by December 31 of the year the building reaches 25 years of age (and every 10 years after). Please see the pertinent SB 4-D excerpt regarding the milestone inspection and report attached as Appendix A.

This report was prepared for a “Phase One” milestone inspection only as defined in Appendix A.

Introduction

A “Phase One” Milestone inspection consisting of a visual evaluation as defined in Appendix A was performed at The Panama City Resort & Club. This visual evaluation was limited to observations structural in nature and did not include an inspection of any superficial cosmetic damage, or mechanical, electrical, or plumbing.

This inspection includes the following building areas: Lobby, East and West Stairwells, Unit Interiors, Walkways, Balconies, mechanical rooms and, the roof.

For the purpose of this report, the subject structure is considered to face north toward Front Beach Road and is located in Exposure “D” wind zone due to its proximity to open water. This structure is also located within 3 miles of a coastline and was built in 1969.

Observations

All exterior and interior observations have been broken down in chart format with their respective recommended repairs and have corresponding photos that can be found later in this report.

Any observations that are considered substantial structural deterioration and/or unsafe/dangerous conditions as defined by the Florida Building Code (Appendix C) conditions will be itemized under a separate section of this report.

	Observations & Cause	Required Repairs	Time-Frame	Photos
Roof	• Some blisters and minor peeling in the roof membrane were found during the inspection of the roof.	• Clean the surface of the existing roof and apply another layer of liquid applied roof membrane.	2yr	3-4
	• There are several corroded fasteners at the metal fascia around the perimeter of the roof. • Corrosion is likely due to exposure in the salt rich coastal environment. • The inside edge of the fascia is not sealed over with the roof membrane.	• Replace all rusted fasteners with new #10 stainless steel gasketed metal roof panel fasteners. • The inside edge of the fascia should be covered by a strip of roofing membrane. • Verify that fascia is sealed at the overlapped seams.	2yr	5-6
	• There is a void behind the metal fascia at the western edge of the roof that could be a potential water intrusion point.	• Fasten the inside edge of the fascia return to the roof base. • Cover the inside edge of the fascia with a strip of membrane roofing material.	2yr	6
	• A roof drain screen is missing at the west end of the roof possible due to corrosion. • Roof drain screen will prevent drains from clogging and causing water to pool on the roof.	• Replace roof drain screen.	1yr	7
	• The gutter downspout at the lower lobby roof is filled with debris.	• Remove trash and debris from gutter and downspouts.		8
	• The masonry walls have some areas where the stucco has delaminated from the masonry walls. • Stucco delamination is likely due to poor bonding of stucco to the masonry walls • The masonry wall may not have been properly prepared prior to the application of the stucco. • On the east side of the building, an overflowing gutter system may be causing water to enter behind the stucco at the top of the wall and form the blisters located directly below the gutter. • The cracks in the stucco below the gutter are possibly from water pressure behind the blisters in the stucco.	• Remove loose stucco material. • Clean masonry surface and treat with a stucco bonding agent. • patch blistered area with scratch coat, brown coat in a final texture stucco coating. • For best results the entire outer coating should be reworked over the entire wall for consistent stucco texture. • Rework the gutter at the east wall of the building making sure that the edges are sealed to the gutter and downspouts are free flowing.	5yr	10
	• There are cracks in the stucco at the perimeter of the wood panel insert for the utility room below the stairwell. • The cracks are likely due to the dimensional variations in the wood in response to wet and dry conditions.	• Cut a control joint in the stucco between the wood and concrete base materials. • Seal the control joint with a flexible sealant such as SikaHyflex-150LM or an approved equivalent hybrid sealant. • Recoat the area after repair is made.	5yr	14
Windows & Doors	• The original locking hardware and handles on many of the sliding door units on the south side of the building are not operable due to corrosion and general abuse. • The bottom track of several sliding doors has rust scale that appears to be coming from the internal components of the doors. • The fasteners holding the door frames appear to be carbon steel masonry screws and have visible rust scale.	• New doors at middle units will need to have a cladding design pressure rating of 40 psf or better and 50 psf for windows and doors near the corners of the building. • New doors and windows are to be installed per the manufactures published installation instructions found with the Florida Product Approval.	5yr	15-18

	• The door to the storage room on level 3 has separated from the door frame due to wood rot at the door and frame • The masonry door header has a severe spall and there is risk of falling concrete. • The issues at this storage room door are likely due to a water intrusion issue from the level above.	• Repair water intrusion issue at the level above the storage room door. • Repair masonry spall per ICRI repair specification and engineered repair drawings. • Replace door and door frame with a new fiberglass composite exterior door and stainless-steel hardware.	ASAP	19-20
	• The roof access door has water damage and has separated at the styles. This door has a severely weathered coating. • There is another opening at the roof that is covered by a piece of plywood. This opening is subject to water intrusion as the perimeter of the plywood is not sealed.	• Replace door and door frame with a new fiberglass composite exterior door and stainless-steel hardware.	1yr	21-22
Stairwells	• Several of the stair flights have spalls at the inside edges of the flights and at the transition to the landing. • These spalls are due to water intrusion into the stairwell slabs. • The steel reinforcement is bent at the bottom of the stair flights to splice into the landing slab. Rebar is prone to corrosion at the bends which is aggravated by water intrusion that migrates to the bottom of the stair flights and into the landing.	• Concrete spalls will need to be repaired per engineered details and specifications. • Engineering oversight is required for verification of site conditions and preparation for repairs.	2yrs	23-25
	• The masonry walls surrounding the stairwells have some spalling at the steel reinforced edges and corners. • Spalls at these locations could be due to water intrusion entering at the railing connections causing the corrosion at the steel reinforcement.	• Concrete spalls will need to be repaired per engineered details and specifications. • Engineering oversight is required for verification of site conditions and preparation for repairs.	2yrs	26
	• The overhead at the east stairwell has a large blister in the coating likely due to water intrusion occurring at the roof or nearby gutter system. • There is a crack at the mortar joint of the top course of the stair well masonry walls. • The horizontal cracks at the mortar joint are likely the result of differential expansion and contraction between the roof and walls. these cracks probably occurred earlier in the building's history when the roof was bituminous.	• Repair any water intrusion issues that are occurring at the roof or edge of the roof above the blistered coating. • Remove the blister and reapply coating to match existing. • Repair the cracked mortar joint with a flexible mortar joint repair material.	5yrs	27
Balconies	• Several balconies have apparent microbial growth on the surface from standing water produced from AC condensate. • Much of the condensate plumbing is damaged or clogged resulting in the leaking AC units. • In addition to the leaking condensate piping, many of the AC housings are damaged from corrosion or impacts and drain directly to the balcony.	• Replace damaged AC housings and repair any damage caused by water intrusion into the framing around the AC unit, wall penetration. • Condensate piping needs to be replaced with larger diameter piping to prevent excessive clogging.	5yrs	28-30

	• There is apparent microbial growth at cracks in the edge of the waterproof deck layer. • This growth indicates a continuous wet condition that may extend below the waterproof layer.	• Clean microbial growth and stains from the surface of the balconies. • Apply caulking at the wall edges. • Recoat balcony surfaces with a waterproof coating such as MasterSeal pedestrian traffic 1500.	2yrs	31
	• The arrangement of the trim at the second level porch beam is prone to water intrusion and there are areas with loose trim that may indicate wood deterioration behind the trim. • Without flashing or a sloped edge water sits on the trim ledge and exploits any openings in the deteriorated caulk seam.	• Remove upper section of trim and install galvanized flashing over the lower section of trim that extends past the edge of the trim board. • Sloping the lower section of trim will also help prevent damage from water intrusion.	2yrs	32
	• There are some areas of deterioration and paint blisters at the wood trim wrap at the porch beams. • At the lower levels the areas of damage are likely from water intrusion at railing connections. • At the upper level the water intrusion is likely happening at the wall mounted fixtures and at the metal fascia attached at the roof deck above.	• Make repair to the roof flashing mentioned in the roof section of the report. • Seal the edges of wall mounted fixtures to prevent water intrusion at the fasteners.	2yrs	33-36
Flooring	• Some of the units have tiles that have separated from the subfloor. • A possible cause is that the tile simply was not well bonded to the mortar. • At areas near the south side of the units, it is likely that there are concrete spalls beneath the tile that have caused the separation.	• Remove tile and resurface concrete surfaces. • If spalls are present, repair the concrete as directed in the engineered repair plans. • Replace flooring. • If replacing floors with new tile, note that tile requires a flexible membrane to prevent cracking with movement in the structure.	5yrs	40
Walls	• Blisters in paint and cracks in drywall are signs of water intrusion in the walls. • Water is likely entering the walls from the AC units many of which show no signs of draining to the conduit or decks.	• Remove damaged drywall or paneling and replace any water damaged framing or insulation found. • Install flashing at AC wall penetrations. • Replace wall panels with new drywall.	2yrs	43-45
Retaining Walls	• Storm water funneling into openings and carrying sediment coupled with seasonal thermal expansion has resulted in cracks at retaining walls has damaged the concrete.	• Clean out cracks between walkways and retaining walls. • Install a backer rod and seal cracks with a polyurethane sealant. • Repair cracks in retaining walls.	2yrs	47-50
Mechanical Space	• The ceilings in the mechanical space have several spalls and areas of microbial growth likely caused by water intrusion at the deck level above.	• Repair or install waterproof coatings at the floors above damaged areas. • Repair concrete spalls with Sika VOH after proper preparation of the damaged areas.	2yrs	51-52

Substantial Structural Deterioration/Unsafe & Dangerous Conditions

The following items have been evaluated and have been determined to be substantial structural deterioration and/or an unsafe or dangerous condition. A Phase II recommendation will be indicated with a Y (Yes) or N (No) in the appropriate column.

	Observations & Cause	Required Repairs	Time-Frame	Phase II	Photos
Walls	• The edges of the roof top structure have vertical cracks over the full height of the structure. • The cracks in the stucco could be delamination of the stucco layer or an indication of spalled concrete behind the stucco layers.	• A section of the stucco will need to be removed to determine if the cracks stem from an underlying structural issue or defects in the stucco only. • If damage is just at the stucco surface the loose stucco will need to be removed, patched, and recoated. • If spalls are found, structural concrete repairs will be required. • Engineered design and oversight are required for structure concrete repairs.	1yr	N	9
	• Cracks found at the edges of the masonry walls and at overhead beams and lintels are most likely the result of spalling concrete behind the stucco. • When steel reinforcement in the CMU cells and concrete is exposed to the chlorides present in sea salt, the steel corrodes and increases the volume of the reinforcement resulting in cracks at the face of the masonry and concrete. • Concrete spalls are caused by failure of the weatherproof coatings resulting in water intrusion and exposure to the salt rich coastal environment.	• All spall repairs must be repaired per ICRI Structural Concrete Repair specifications. • See Appendix D • Areas with less than 20% loss of reinforcing bar cross section, are to have all rust and scale removed and at least 1” of material removed beyond corroded reinforcement areas. • Areas with loss of more than 20% of the reinforcing bar cross section will need to have additional reinforcement spliced to the existing reinforcement bars.	1yr	N	11-13
Walkways	• There are several concrete spalls in the surface and overhead of the walkways on the north side of the building. • Spalling conditions are due to reinforcing steel corrosion near the surface of the concrete. • This structure was not designed for direct exposure to weather and the resulting spalls are likely due to worn and damaged coatings that allow for exposure to water and chloride ions present in sea spray.	• Loose material at spalls will need to be removed and the spall area prepared per engineered repair drawings. • Repair prep area conditions are required to be verified prior to application of repair mortars. • Once repaired walkways can be resurfaced for application of waterproof walking surface.	1yr	N	38-39
Ceilings	• The ceilings at the south side of many of the units have concrete spalls with loose concrete falling from the overhead. • Most of the concrete spalling in these areas is damage that occurred prior to the enclosure of the original balconies. • Water intrusion from the leaking AC housings has aggravated the existing spalling conditions.	• Spalls at the ceilings will need to be repaired as specified in Appendix D and in a set of engineered repair plans. • Cover and protection in interior spaces will be required to reduce damage to the furniture and floors during repairs. • Repair or replace AC housings and rework AC condensate piping.	1yr	N	41-42

Balconies	• The balconies have variations in the amount of slope from the south wall and some are not level from east to west. • The western most porch has a 2” drop over four feet from one side to the other. • This variation indicates that there may have been some settlement in the wood balcony support structure. • Looking at the relatively small cracks in the trim, settlement appears to have been minimal since the install of the trim. • Most of the settlement likely occurred shortly after construction or during the undermining that occurred with Hurricane Opal.	• A foundation specialist such as alpha foundations should be employed to stabilize the wood supports at the south side of the wood balcony structure. • Installation of helical piers can help to stabilize the post but cannot correct settlement that has occurred without the risk of further damage to the balcony structure. • The balconies would need to be rebuilt to correct the settlement. • Given the serviceable condition of the balconies, stabilization is the better option.	2yrs	Y	36-37

Conclusion

Upon performing the milestone inspection, the overall condition of the major structural components appeared to be in good or serviceable condition. While many of the observations refer to the condition of finishes and seem cosmetic in nature, the purpose of the comment is to notify owners that the damaged finishes are the result of underlying conditions that lead to structural deterioration such as concrete spalling. Several spalls have occurred at the exterior areas of the building and at the enclosed balconies that have remained damp with sea spray for extended periods of time. It is likely that water infiltration is occurring at railing connections, unsealed surfaces and possibly condensate and salt spray leaking from AC housings. This concrete and masonry structure is not designed for direct exposure to weather and chlorides per the guidelines established by the American Concrete Institute (ACI) which is also the basis for Florida and International Building Codes regarding concrete structures and durability. For this reason, maintenance of the weatherproof coatings is mandatory.

Also, the cracks found at the walkways are not indications of structural issues but, if left unsealed, there is the risk of exposing the steel reinforcement in the concrete to the salt rich coastal environment, leading to spalling and eventual structural damage. For clarification, the salt in seawater contains chloride and sulfate ions that attack the concrete bond to steel reinforcement and starts the oxidation process in the steel resulting in increased steel reinforcement volume. The pressure from the increased volume causes the concrete to spall or break away from the steel reinforcement in chunks.

The areas requiring repairs have been tabulated with quantities, totals and locations of damage attached with this report. Engineered repair drawings and project oversight are recommended for spall repairs. Please contact MK Weber for a follow-up proposal as soon as possible.

If any items were recommended for a Phase II inspection, please contact MK Weber for a follow-up proposal to provide these services as soon as possible.

Disclaimer: *This report is based on a structural inspection that was limited to structural integrity and structural components only to ensure safety and excludes any cosmetic damage that may have occurred. Cosmetic damage was not evaluated at the structural inspection and thus MK Weber Engineering is not liable for the evaluation or declaration of any cosmetic damage. This report is not a warranty or guarantee neither expressed nor implied.*

Report By: Aaron Rizzuto & Michael Weber, PE

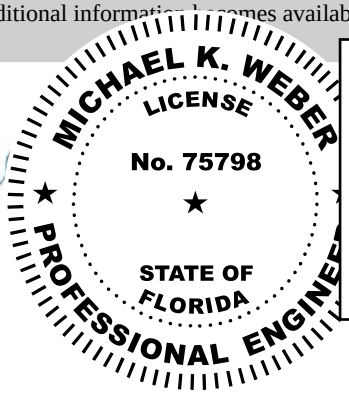
The opinions, conclusions, and recommendations outlined within this document have been developed using a reasonable degree of professional certainty and are not to be solely used for permitting, estimating or repair purposes, nor are they to be relied upon, used or referenced by any third party without the written consent of MK Weber Engineering. MK Weber Engineering reserves the right to revise or update any of the observations, assessments, and/or recommendations as conditions change or additional information becomes available.

Respectfully Submitted,

Aaron Rizzuto
Structural Engineer

Reviewed By:

Michael K. Weber, PE
Structural Engineer
PE # 75798



This item has been digitally signed and sealed by Michael K. Weber, P.E.

Printed copies of this document are not considered signed and sealed and the signature must be verified on the electronic copies.

Photos

Photo 1	North Side

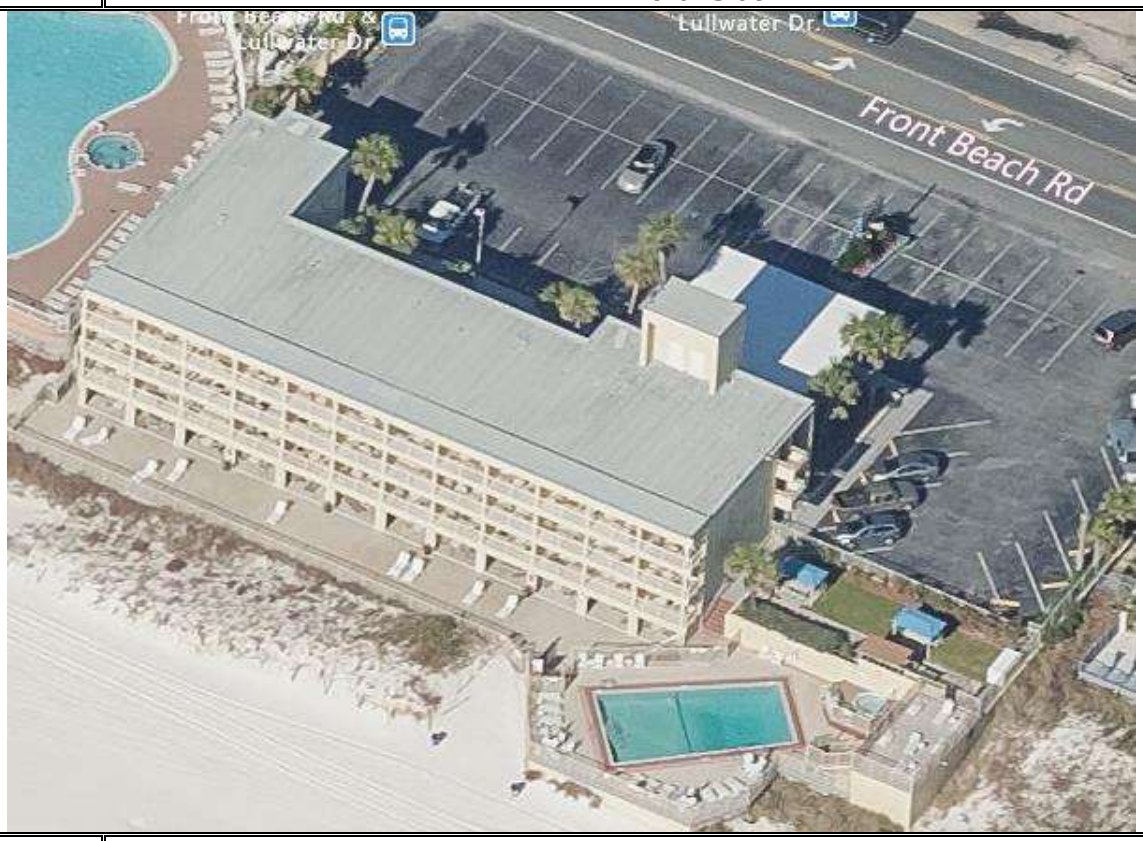


Photo 2	South Side Aerial View

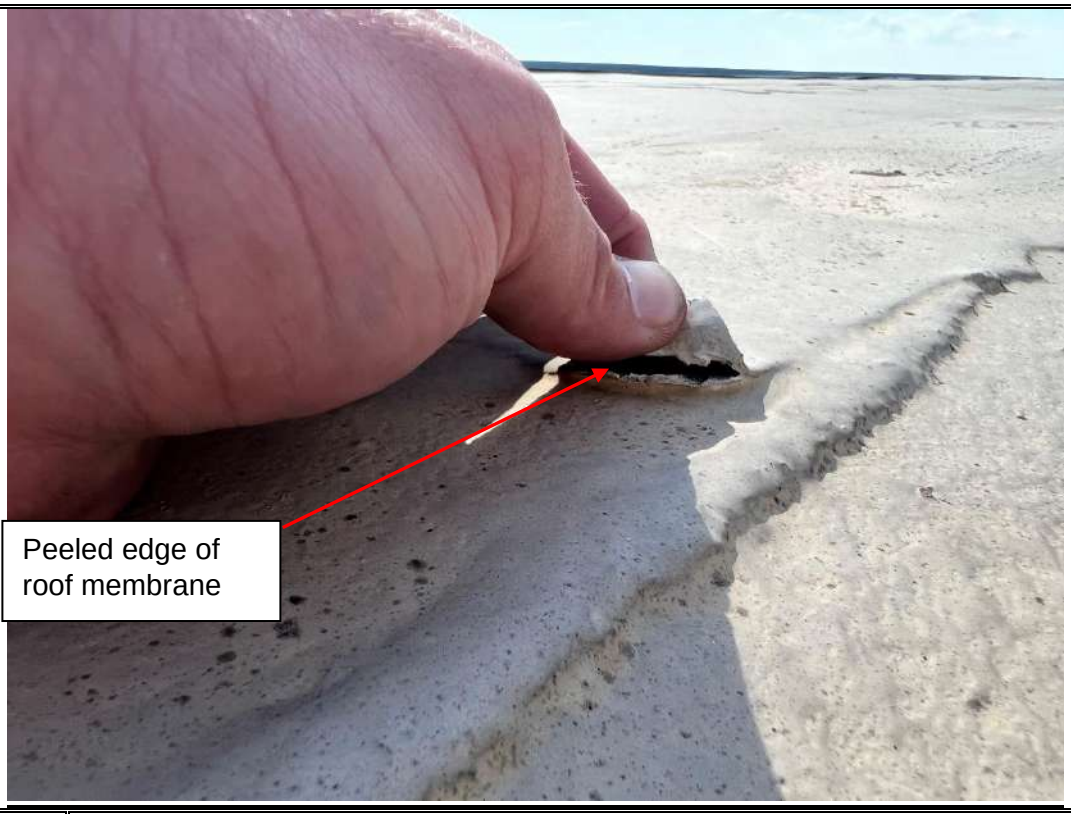


Photo 3	Roof

Photo 4	Roof

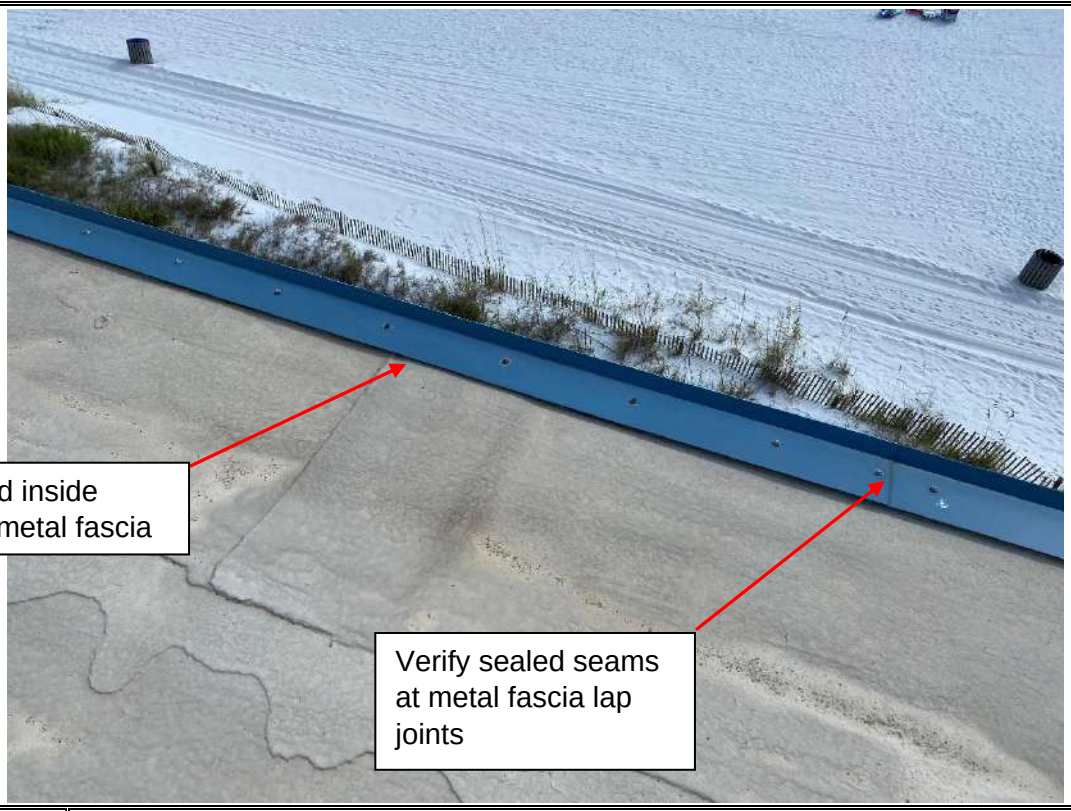


Photo 5	South Edge at Roof

Photo 6	West End of Roof

Photo 7	Roof

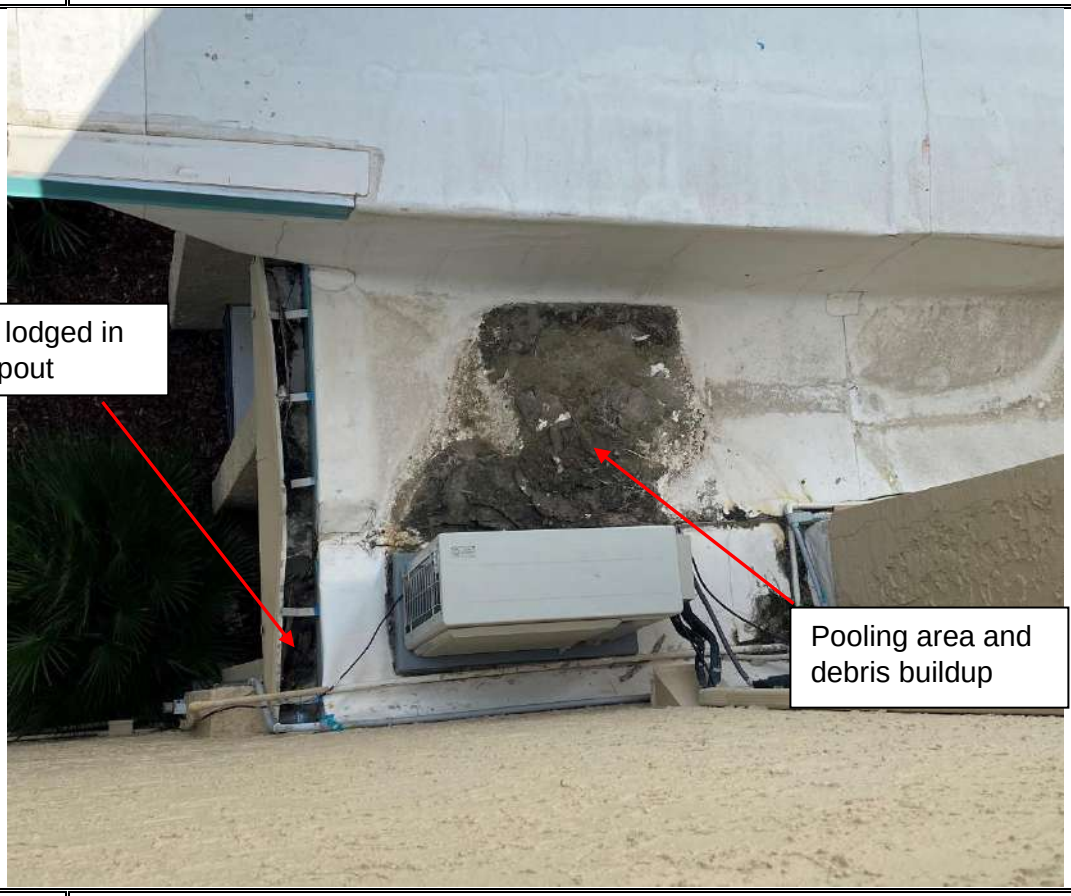


Photo 8	Roof Between Lobby and Main Building

Photo 9	Southeast Corner of Rooftop Structure

Photo 10	East Side

Photo 11	Northwest Corner of Rooftop Structure

Photo 12	2nd Level East Corridor Entry

Photo 13	East Side Concrete Beam at 4th Level Stairwell

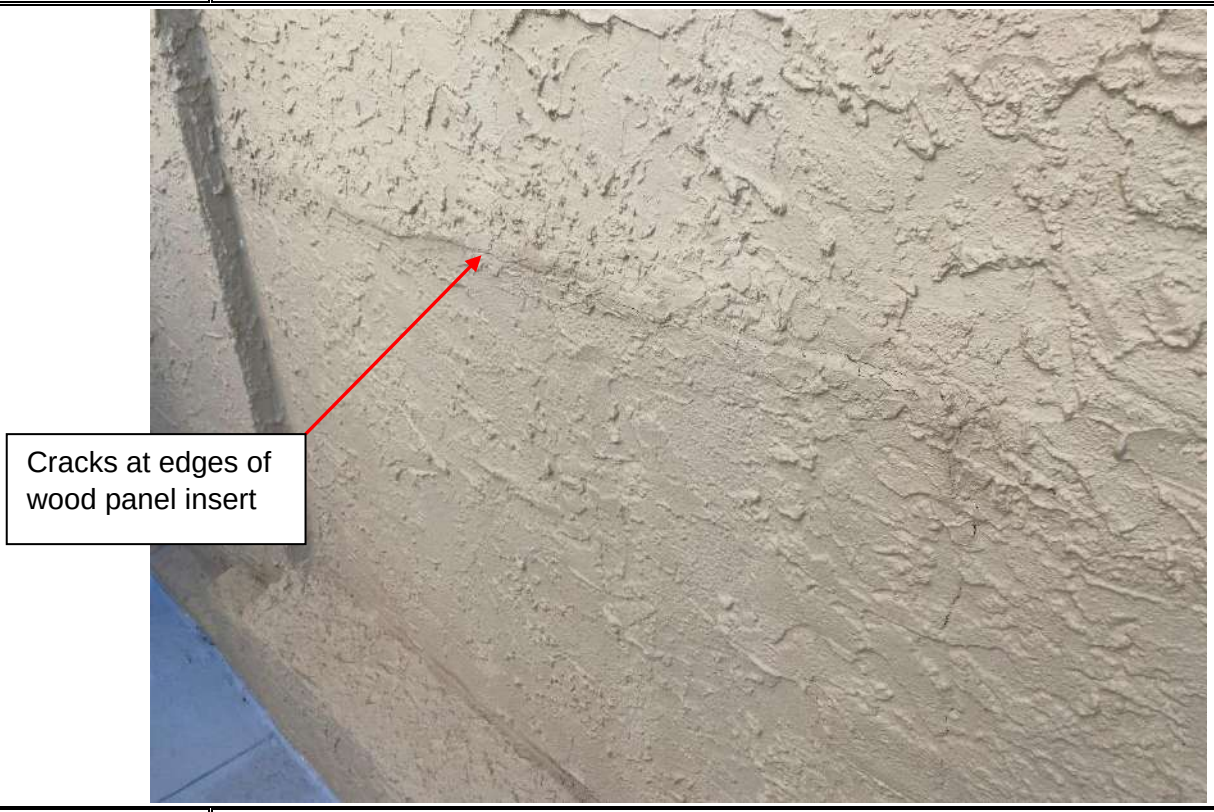


Photo 14	West Side Exterior of Under Stair Storage

Photo 15	Unit 204 Sliding Door (Typical)

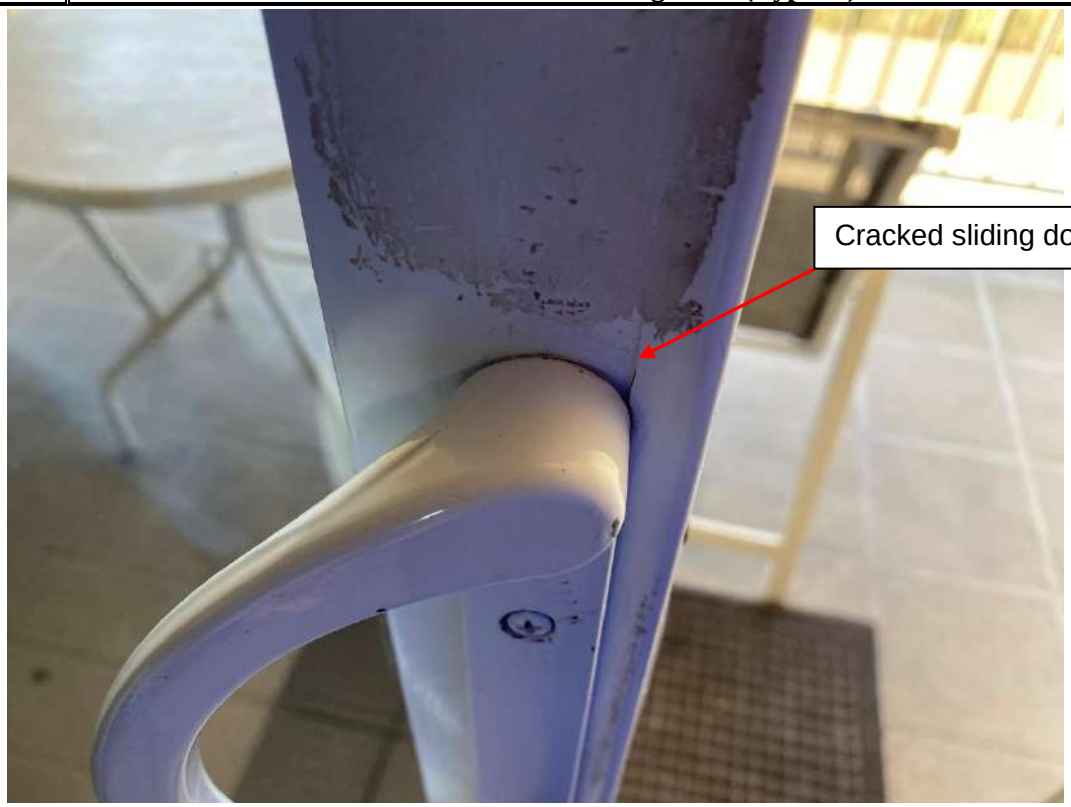


Photo 16	Unit 204 Door Handle

Photo 17	Unit 307 Sliding Door

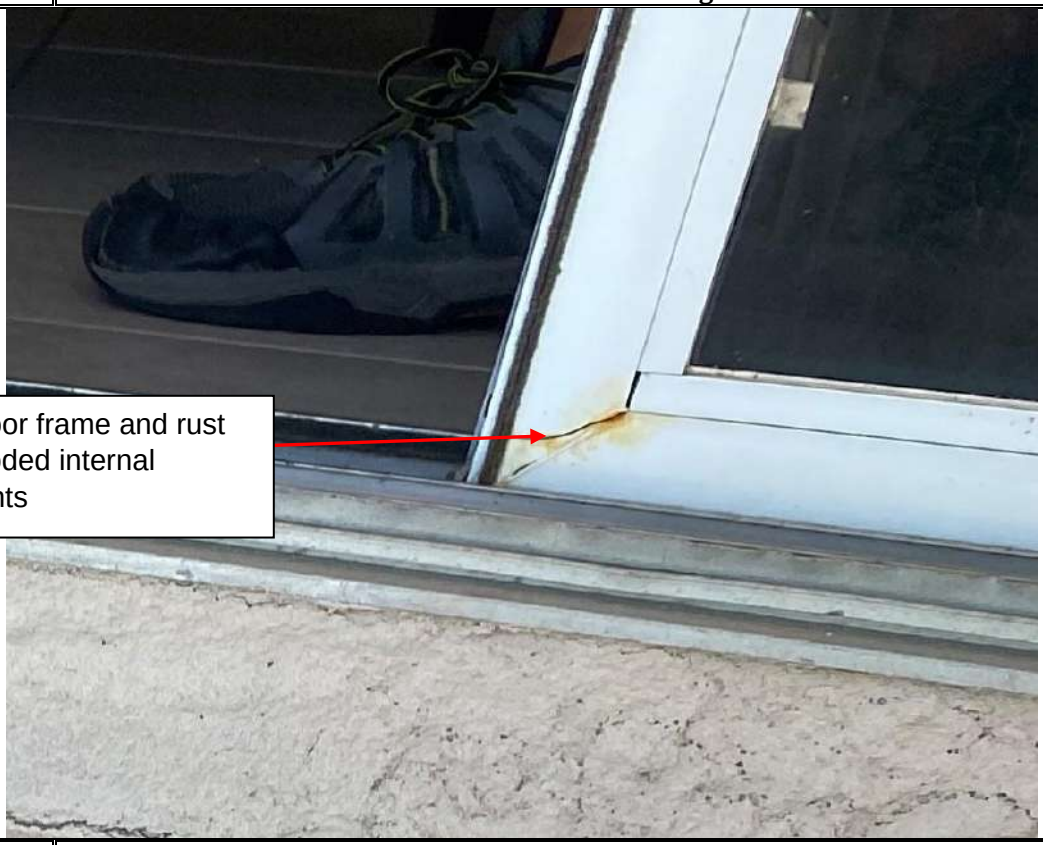


Photo 18	Unit 210 Sliding Door

Photo 19	Door to 3rd Level Storage Room

Photo 20	3rd Level Storage Room

Photo 21	Rooftop Access Door

Photo 22	Abandoned Storage Area at Rooftop Structure

Photo 23	East Stairwell –1st to 2nd Level Stair

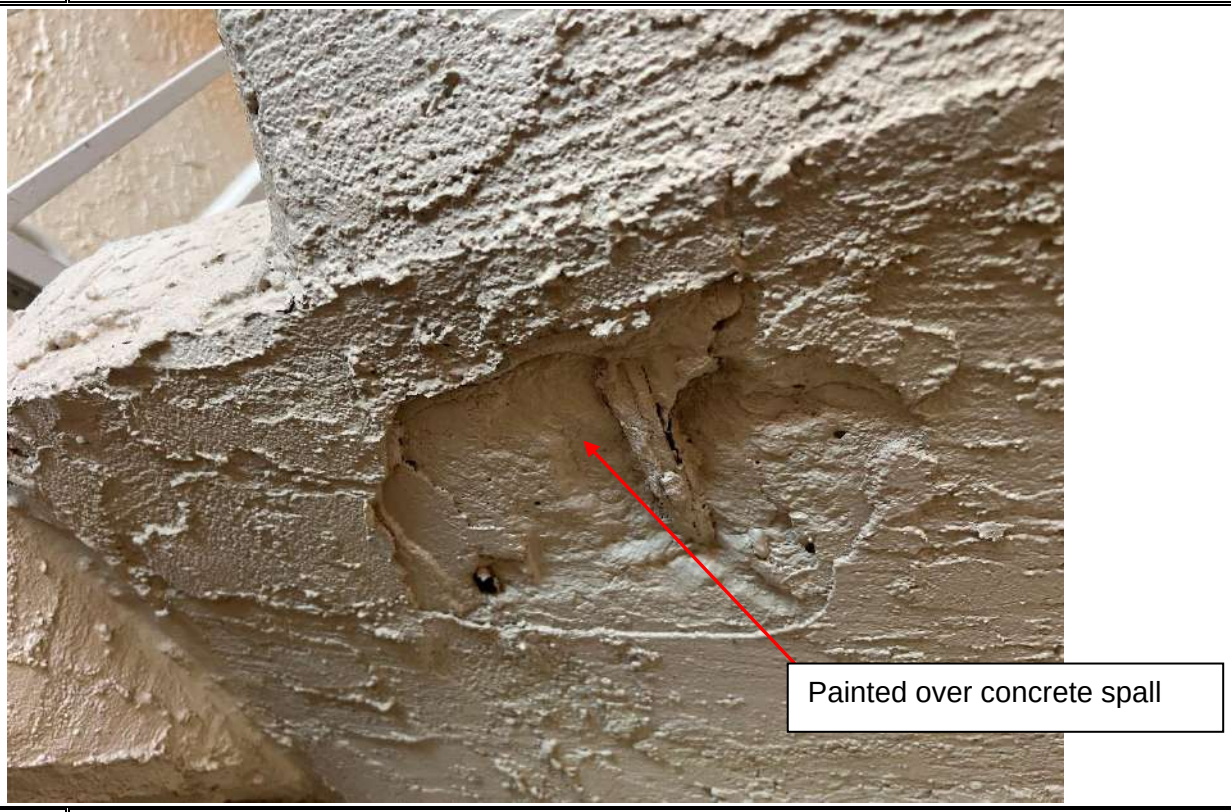


Photo 24	Underside of Stair Landing

Photo 25	West Stairwell to 3rd Level

Photo 26	Exterior at West Stairwell

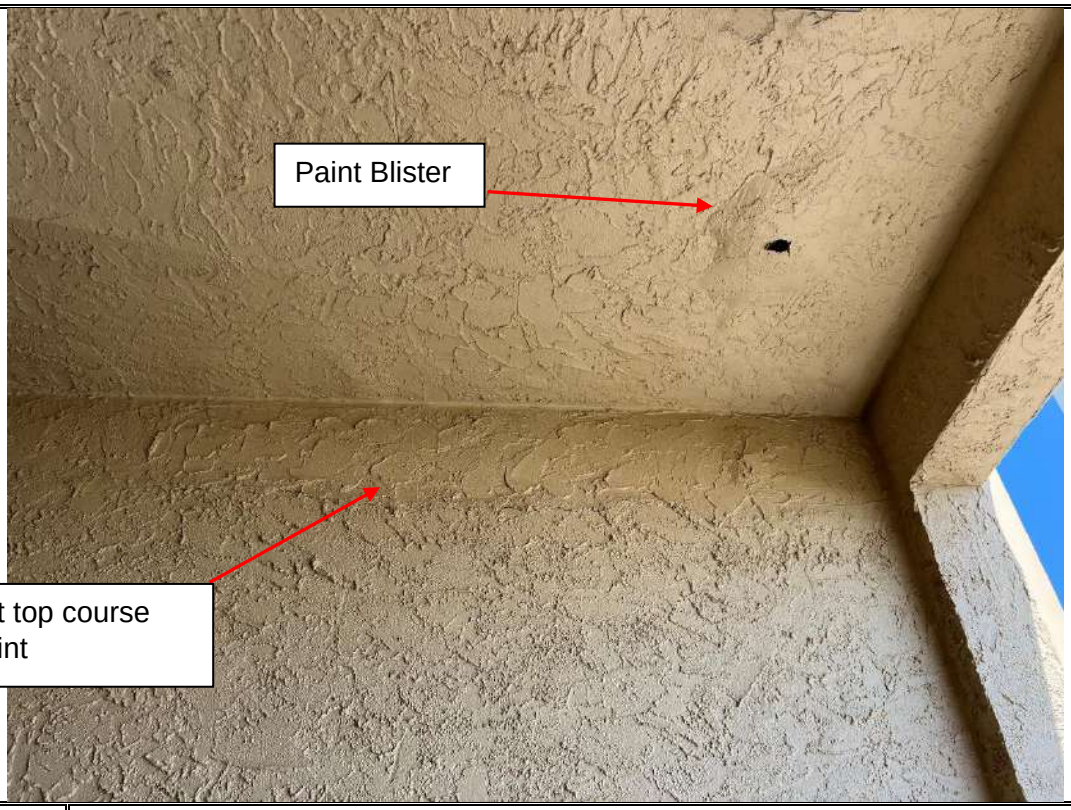


Photo 27	East Side Stairwell Overhead

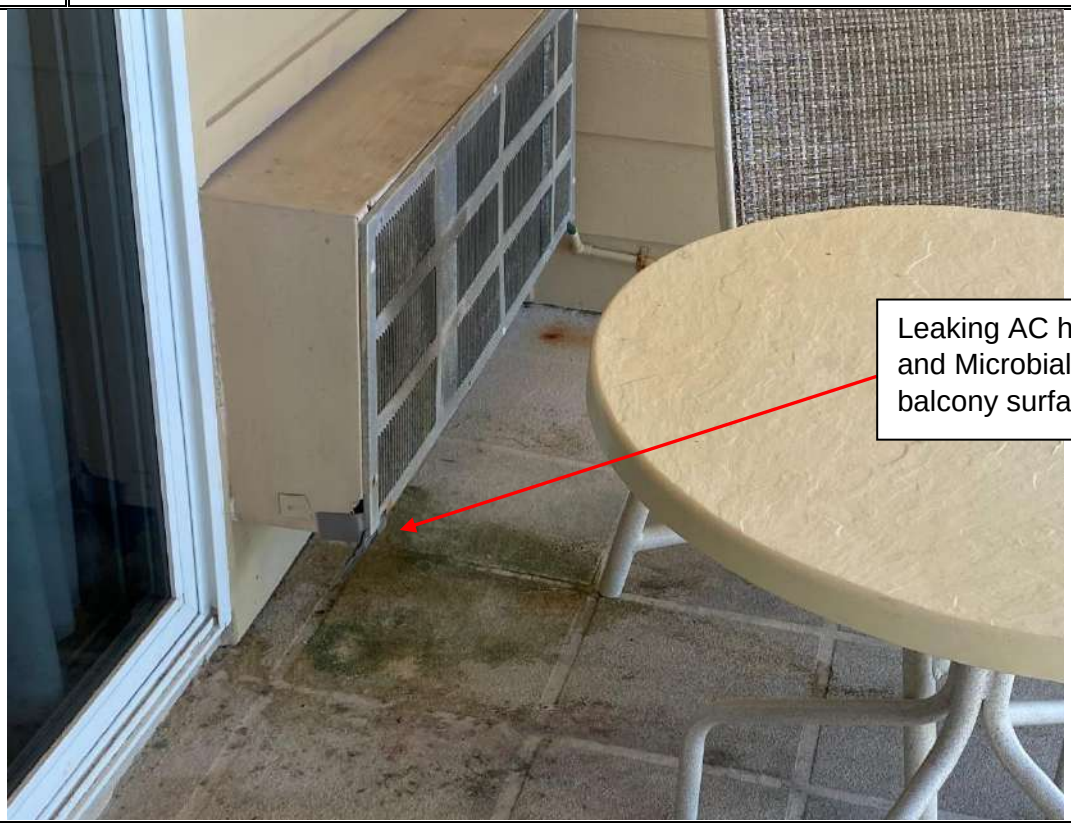


Photo 28	Damaged AC Housing

Photo 29	AC With Damaged Condensate Piping

Photo 30	South Side of Wood Balcony Structure

Photo 31	Worn Balcony Coating

Photo 32	Trim at 2nd Level Porch Beams

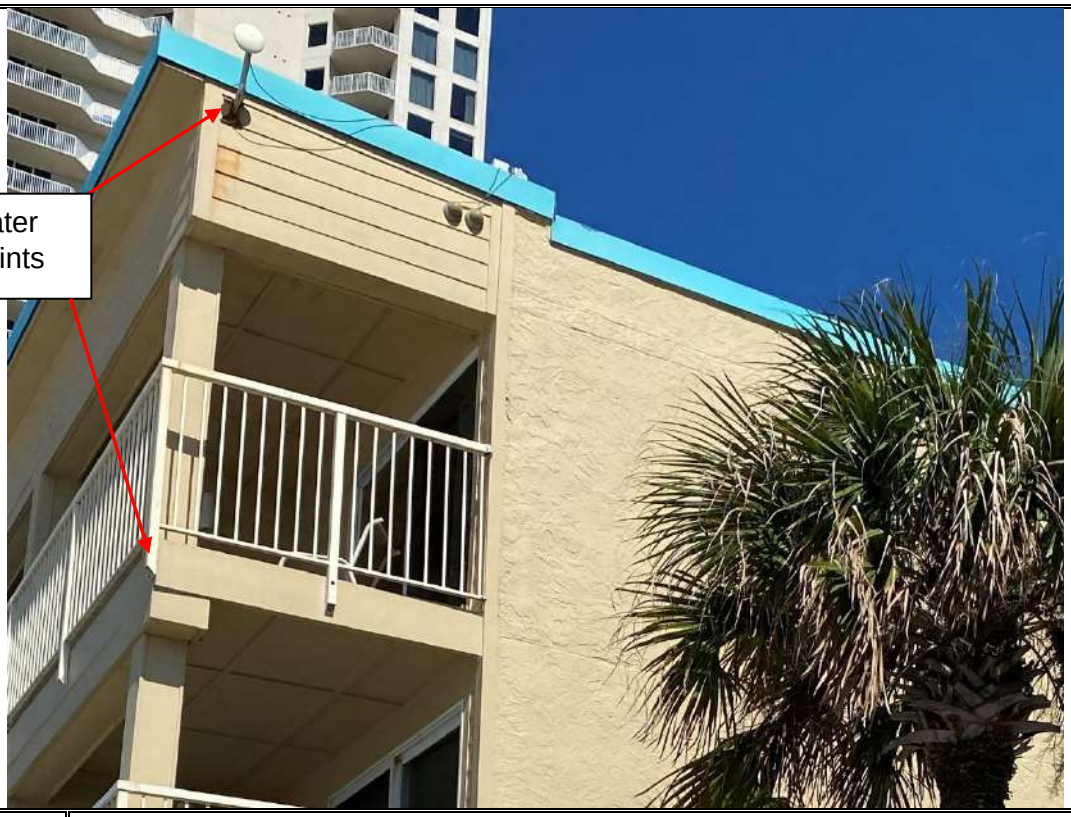


Photo 33	East Side of Upper Porches

Photo 34	Unit 401 Porch

Photo 35	Unit 301 Porch Exterior

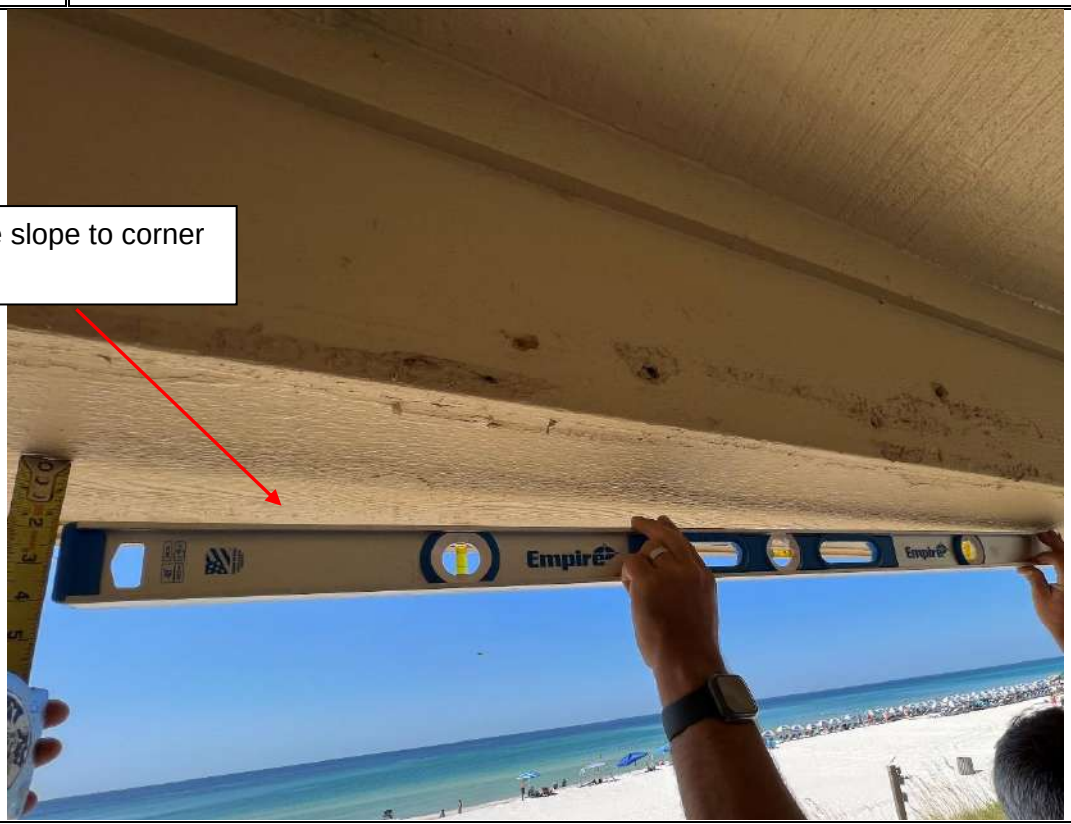


Photo 36	Wood Beam at West End Porch

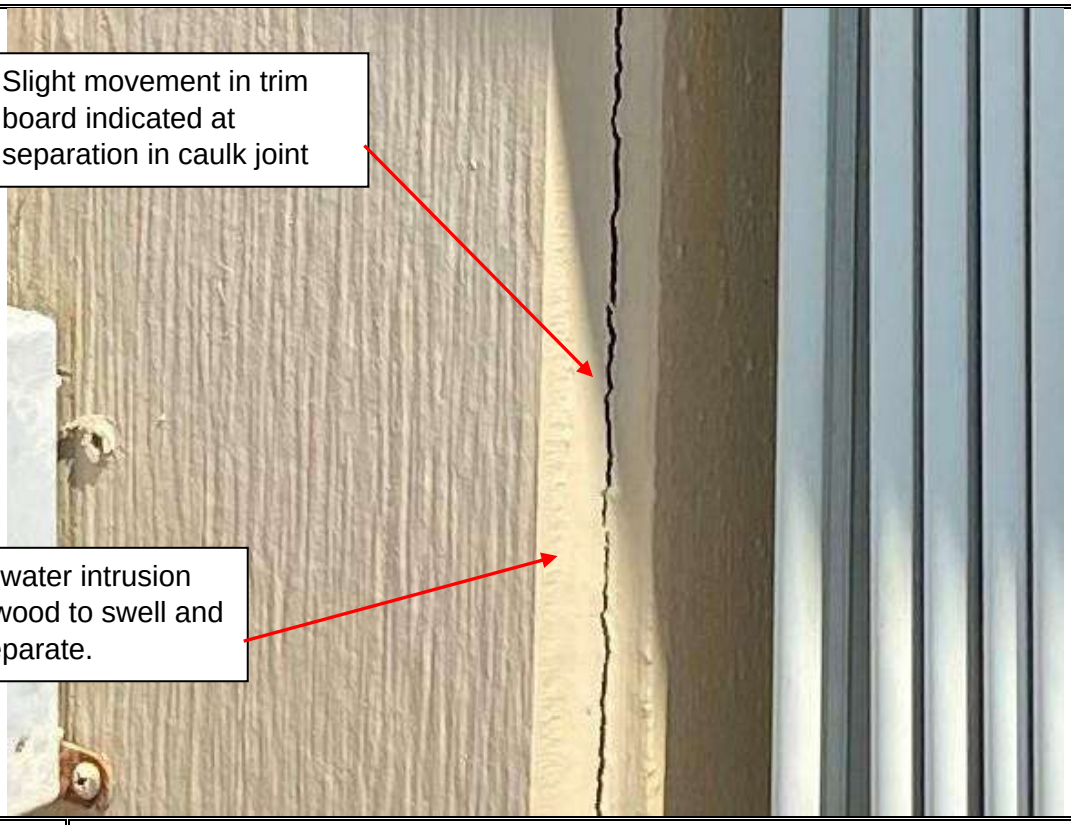


Photo 37	Trim at Unit 107 Porch

Photo 38	North Side Elevated Walkway

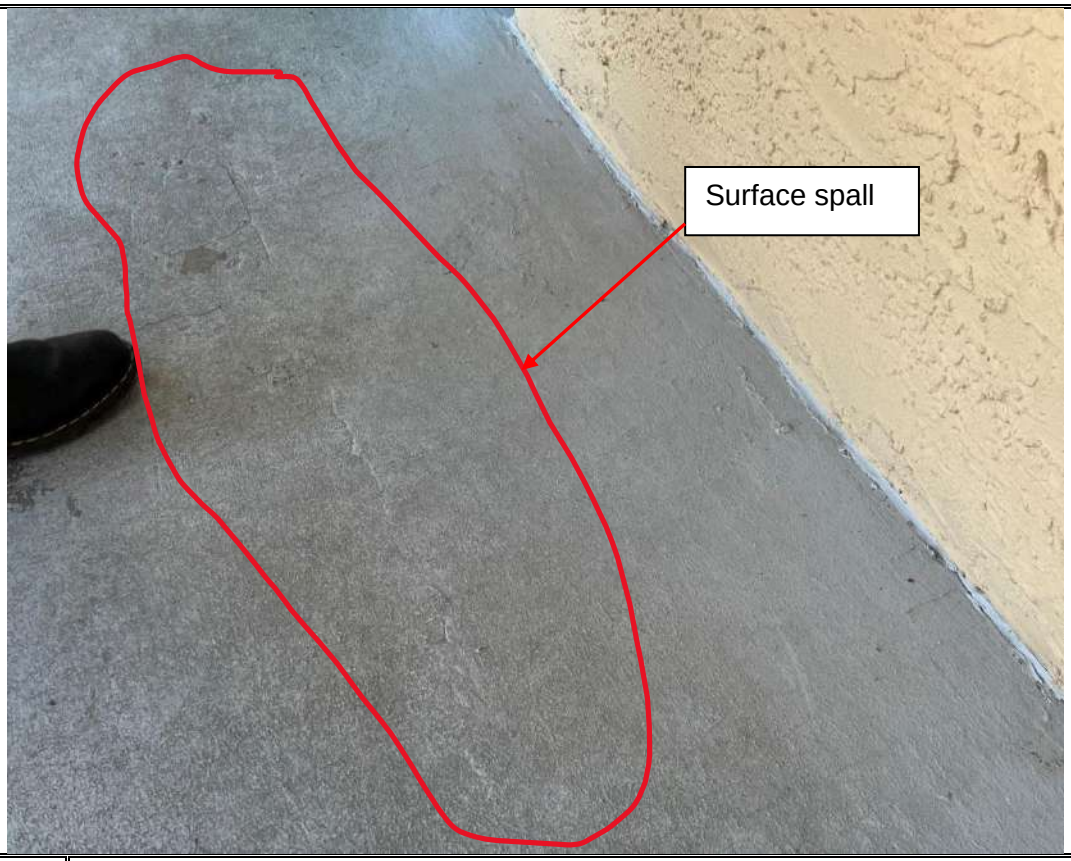


Photo 39	North Side Elevated Walkway

Photo 40	Unit 301

Photo 41	Unit 202 Ceiling

Photo 42	Unit 108 Ceiling

Photo 43	Unit 404 West Wall

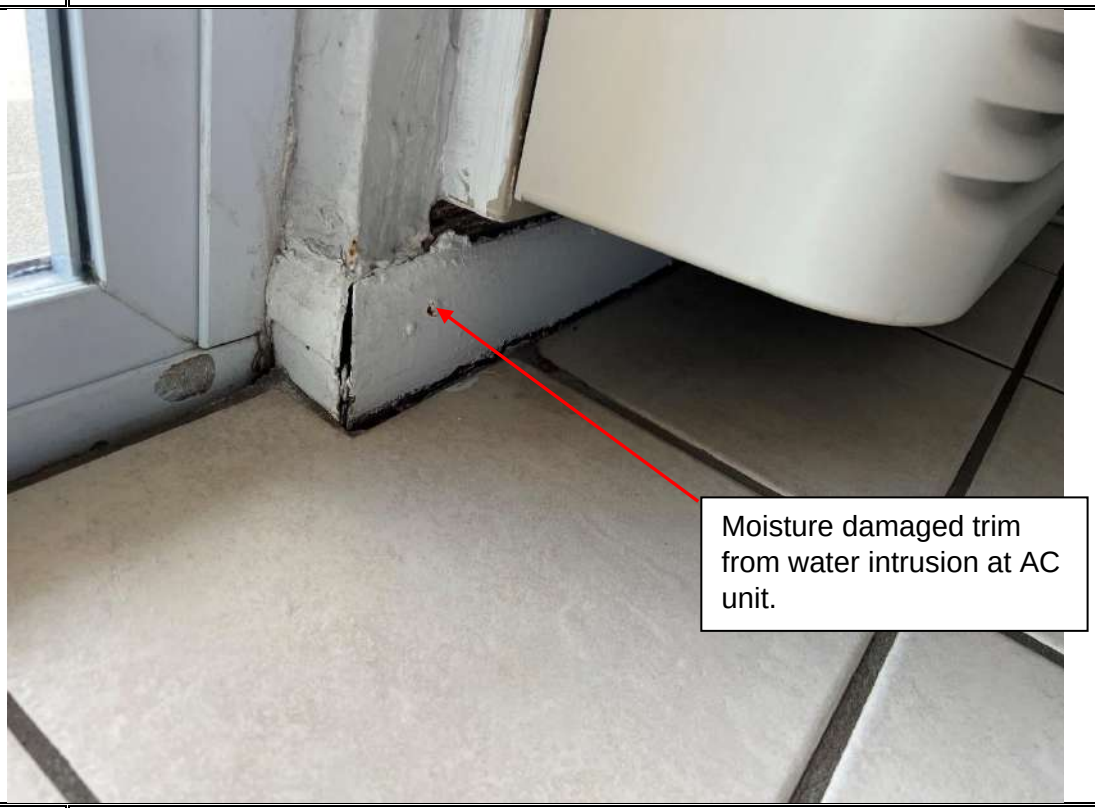


Photo 44	Unit 302

Photo 45	Unit 303

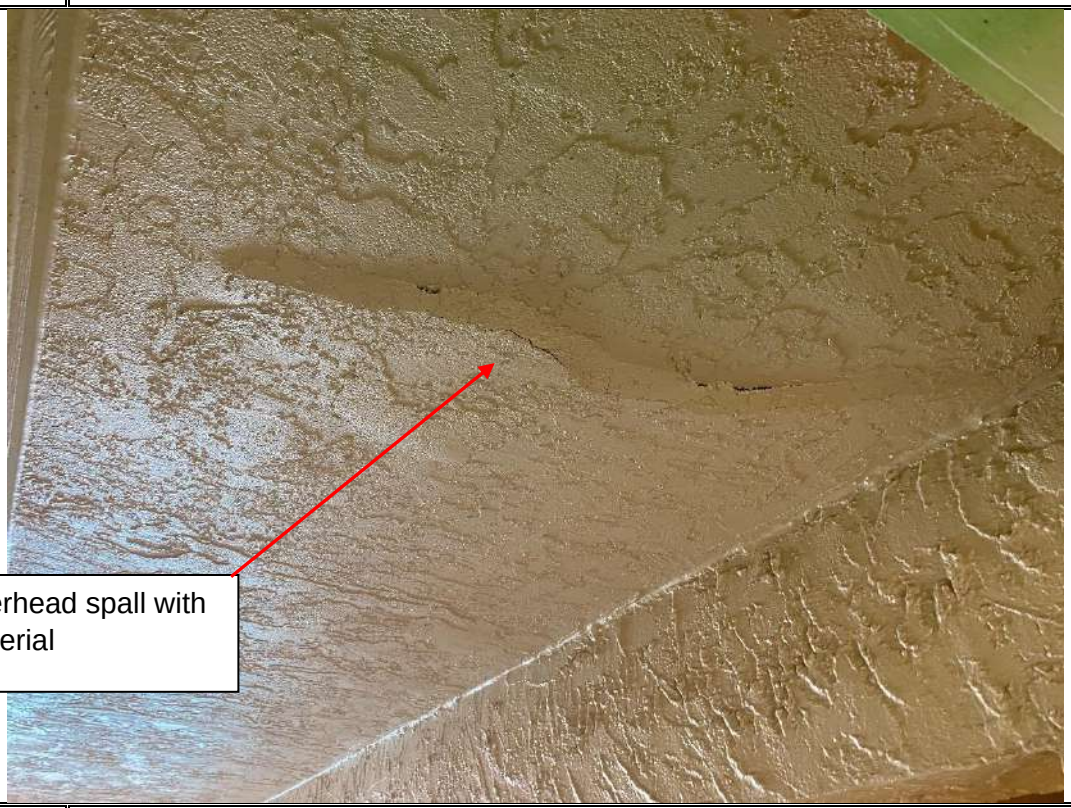


Photo 46	Overhead at West Corridor

Photo 47	East Stair to Pool Deck

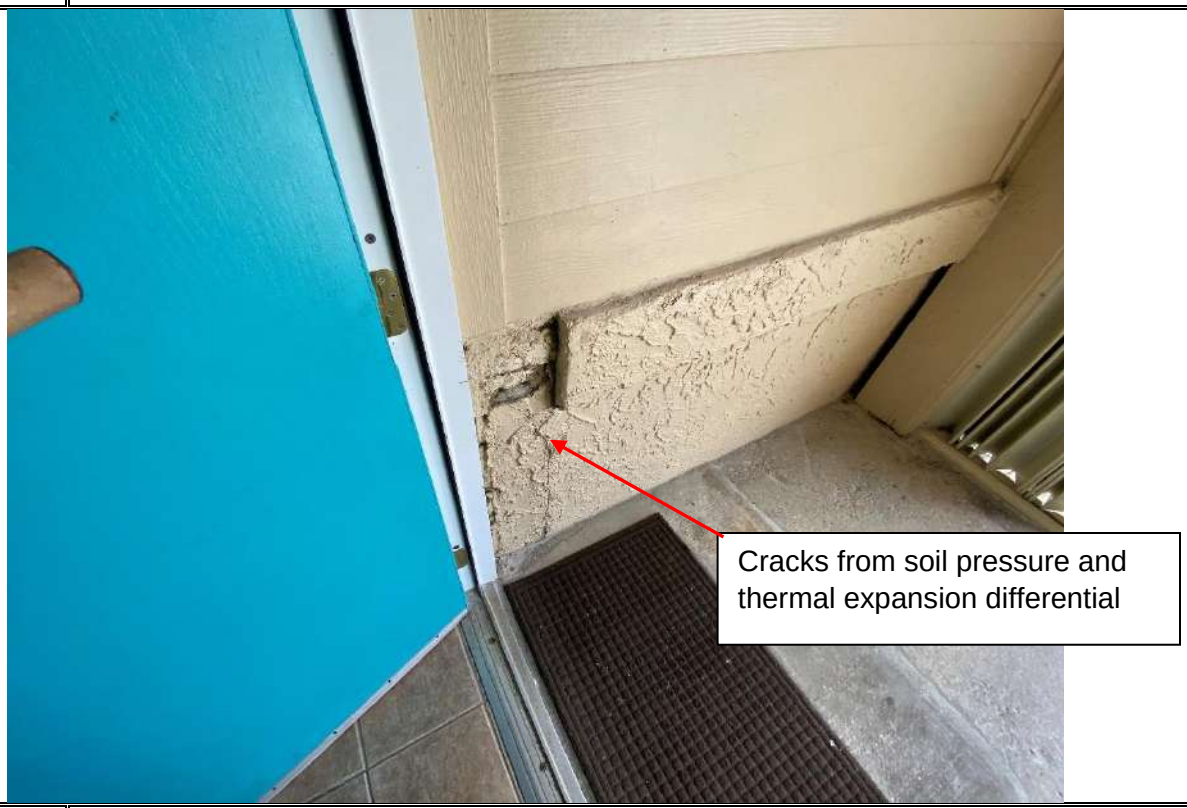


Photo 48	Unit 101 Porch

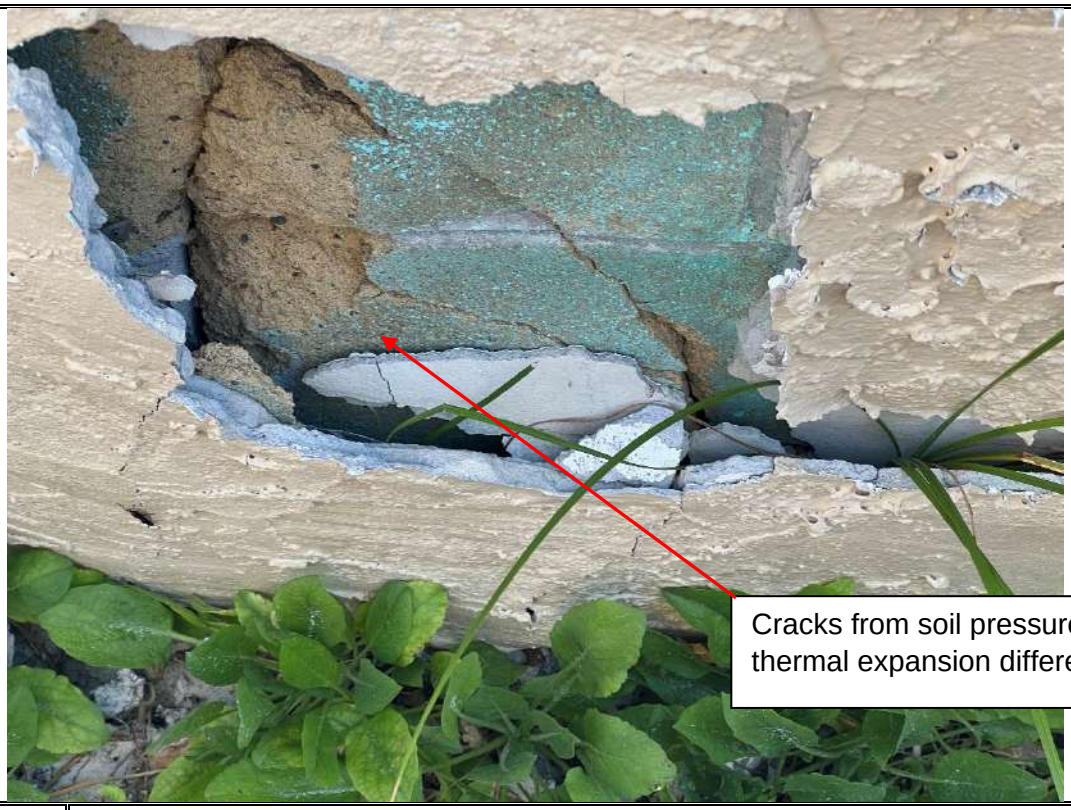


Photo 49	Retaining Wall at West of Property

Photo 50	West End of Walkway Butting into Retaining wall

Photo 51	Mechanical Room Overhead

Photo 52	Mechanical Room Overhead

Appendix A- *Milestone Inspection Excerpt*

From Bill HB-5

report by e-mail, United States Postal Service, or commercial delivery service to the local enforcement agency.

(7) A milestone inspection consists of two phases:

(a) For phase one of the milestone inspection, a licensed architect or engineer authorized to practice in this state shall perform a visual examination of habitable and nonhabitable areas of a building, including the major structural components of a building, and provide a qualitative assessment of the structural conditions of the building. If the architect or engineer finds no signs of substantial structural deterioration to any building components under visual examination, phase two of the inspection, as provided in paragraph (b), is not required. An architect or engineer who completes a phase one milestone inspection shall prepare and submit an inspection report pursuant to subsection (8).

(b) A phase two of the milestone inspection must be performed if any substantial structural deterioration is identified during phase one. A phase two inspection may involve destructive or nondestructive testing at the inspector's direction. The inspection may be as extensive or as limited as necessary to fully assess areas of structural distress in order to confirm that the building is structurally sound and safe for its intended use and to recommend a program for fully assessing and repairing distressed and damaged portions of the building. When determining testing locations, the inspector must give preference to locations that are the least disruptive and most easily repairable while still being representative of the structure. An inspector who completes a phase two milestone inspection shall prepare and submit an inspection report

pursuant to subsection (8).

(8) Upon completion of a phase one or phase two milestone inspection, the architect or engineer who performed the inspection must submit a sealed copy of the inspection report with a separate summary of, at minimum, the material findings and recommendations in the inspection report to the condominium association or cooperative association, and to the building official of the local government which has jurisdiction. The inspection report must, at a minimum, meet all of the following criteria:

(a) Bear the seal and signature, or the electronic signature, of the licensed engineer or architect who performed the inspection.

(b) Indicate the manner and type of inspection forming the basis for the inspection report.

(c) Identify any substantial structural deterioration, within a reasonable professional probability based on the scope of the inspection, describe the extent of such deterioration, and identify any recommended repairs for such deterioration.

(d) State whether unsafe or dangerous conditions, as those terms are defined in the Florida Building Code, were observed.

(e) Recommend any remedial or preventive repair for any items that are damaged but are not substantial structural deterioration.

(f) Identify and describe any items requiring further inspection.

(9) The association must distribute a copy of the inspector-prepared summary of the inspection report to each condominium unit owner or cooperative unit owner, regardless of

Appendix B- *Aerial View*

Per County's Property Appraiser's Website

Bay County Property Appraiser - Dan Sowell, CFA
Main Office | 860 W. 11th St, Panama City, FL 32401 | 850-248-8401
Beach Office | 301 Richard Jackson Blvd, Panama City Beach, FL 32407 | 850-248-8470

Date created: 10/21/2022
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Appendix C- 7th *Edition Florida Building Code, Existing Building*

Section 202, General Definitions

- DANGEROUS- Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

  1.The building or structure has collapsed, has partially collapsed, has moved off its foundation, or lacks the necessary support of the ground.

  2.There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under service loads.

- UNSAFE- Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress facilities, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of "Dangerous," or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed unsafe. A vacant structure that is not secured against entry shall be deemed unsafe.

Appendix D- *Specifications for Structural Concrete Repair*

International Concrete Repair Institute – 2016 Specifications

1. EXAMINATION
   A. Notify the Design Professional at least *24 hours* in advance of times when areas of deteriorated concrete will be located.
   B. Locate areas of delamination using hammer sounding and/or chain-drag sounding in accordance with ASTM D4580, mark boundaries, and arrange for the Design Professional to inspect and approve the layout geometry. Layout geometry shall be performed in accordance with ICRI. 310.1R.

2. FORMWORK AND SHORING
   A. General:
      1. Construct forms to sizes, shapes, lines, and dimensions to match existing adjacent surfaces and textures.
      2. Provide for openings, offsets, moldings, chamfers, anchorages, inserts, and other required features.
      3. Construct forms to accommodate installation of products by other trades.
      4. Provide for easy removal of form without damage to the concrete and adjacent surfaces.
      5. Apply an appropriate form release coating over surfaces of formwork prior to erecting in place before each concrete placement. Form release agents shall not be applied to or come in contact with the concrete substrate or reinforcement at any time.
      6. Provide ports through slabs where required to install repair materials at soffits and beams and to vent air during concrete placement.
      7. Provide ports through the sides of forms where required to install repair materials. Remove and patch ports immediately after removal of forms.
   B. Shoring: Provide shoring and bracing plan for approval prior to performing work.

3. PREPARATION AND BONDING
   A. Partial-depth Concrete Removal: Removal of deteriorated concrete, surface preparation, and provisions for reinforcement in areas to be repaired shall be conducted in accordance with ICRI 310.2R. The surface of the repair area shall be roughened to a minimum surface profile of CSP7, as described in ICRI 310.2.R. In addition, the following criteria shall be met within the repair locations:
      1. Repair configurations should be kept as simple as possible and shall preferably have square/mechanical corners.
      2. The aspect ratio of the repair area for slabs shall be as square as possible, not exceeding 1.25:1 to 1.5:1. Odd shapes shall be avoided. If they cannot be avoided, re-entrant corners shall be mitered or reinforced to limit cracking at these locations.
      3. Remove concrete using power equipment such as impact breakers or as required for hydro-demolition.
      4. Remove all loose and deteriorated concrete from the slabs by breaking up and dislodging concrete to a minimum depth of 3*in.* Extend the repair to beyond the corrosion on the reinforcing bars. Where half or more of the perimeter of reinforcing bar is exposed, bond between the reinforcing bar and surrounding concrete is broken, or the reinforcing bar is corroded, remove concrete from the entire perimeter of the bar to provide at least *0.75 in.* clearance between exposed reinforcing steel and surrounding concrete or *0.25 in.* larger than the coarse aggregate in the repair material, whichever is greater. *Reinforcing bars in both directions shall have the required clearance.*
      5. Remove all loose and deteriorated concrete from the walls by breaking up and dislodging concrete to a max depth of 3 *in.* Extend repairs to beyond the corrosion on the reinforcing bars. Where half or more of the perimeter of the reinforcing bar is exposed, bond between the reinforcing bar and surrounding concrete is broken, or the reinforcing bar is corroded, remove concrete from the entire perimeter of the bar to provide.
      6. Remove all loose and deteriorated concrete from the columns by breaking up and dislodging concrete to a minimum depth of 3 *in.* Extend the repairs to beyond the corrosion on the reinforcing bars. Remove additional concrete at the perimeter of the vertical steel as required to provide a minimum clearance of *0.75 in.* behind the vertical steel.
      7. Remove all loose and deteriorated concrete from the beams by breaking up and dislodging concrete to a minimum depth of *3 in.* Extend the repairs to beyond the corrosion on the reinforcing bars. Remove

additional concrete at the perimeter of the horizontal steel as required to provide a minimum clearance of *0.75 in.* behind the horizontal steel.

8. Test areas where concrete has been removed by tapping with a mason's hammer and remove additional concrete until unsound concrete is completely removed.

B. Full-Depth Concrete Removal: Procedures described previously in the paragraphs for partial depth removal shall be followed except that the depth of removal shall extend through the entire thickness of the concrete section. Saw cuts and chipped edges shall be provided at the perimeter of the repair. In the case of slabs, the saw cuts and chipped edges shall be provided at both the top and at the underside. Special care must be taken to provide shoring around the perimeter of the full-depth removal area in accordance with the approved shoring plan. Precautions regarding falling debris must be taken to prevent damage to structures or other property below the removal area.

C. Concrete Cavity Surface Preparation:
   1. Saw-cut the perimeter of areas indicated for removal and beyond the corrosion on the reinforcement to a depth of approximately *0.5 in.* All edges shall be straight. Care must be taken to avoid cutting reinforcing bars, including the adjustment of the *0.5in.* saw cut in areas with less than *0.5 in.* concrete cover. Make cuts perpendicular to concrete surfaces, or slightly undercut, and no deeper than the existing cover over reinforcement. Provide chipped vertical edges for the full depth of the repair. Roughen saw-cut edges.
   2. Remove bruised concrete substrate weakened by microcracking by abrasive blasting or high-pressure water blasting with or without abrasive. When water blasting, provide 5000 psi water pressure or higher if required to satisfy the tensile bond requirements. Keep nozzle not less than 6 in. and no more than 12 in. away from the surface.

D. Reinforcing Bar Preparation: Remove concrete fragments, corrosion product, mill scale, and other contaminants from reinforcing bars by *commercial blast cleaning in accordance with SSPC-SP 6 until a bare metal finish* has been achieved on the reinforcing bars.
   1. Where section loss of reinforcing bars is more than *20%* of the cross-sectional area, splice replacement bars to existing bars as directed by the Design Professional. Remove additional concrete as necessary to provide at least a 0.75 in. clearance beyond existing and replacement or supplemental bars. Splice replacement bars to existing bars according to ACI 301 by lapping, welding, or using noncorrosive, mechanical couplings. Welding, when approved by the Design Professional, shall be in accordance with AWS D1.4/D1.4M.
   2. At areas around the repair perimeters where the development length cannot be achieved within the repair, drill into sound concrete as shown on the drawings or directed by the Design Professional to provide the required bar development and splice length or remove additional concrete to allow for the splice. Reinforcement shall be bonded to the existing concrete with the dowel bonding material in accordance with the approved manufacturer's recommendation.
   3. Replace existing reinforcing bars were shown or directed by the Design Professional.
   4. Provide support chairs, slab spacers, and holding bars properly spaced and with sufficient strength to carry loads of reinforcement and deposited concrete without collapsing or allowing bars to sag. All accessories used at exposed concrete must have plastic tips capable of resisting concrete stains.
   5. Place reinforcing bars accurately and tie firmly in place. Replace or supplement reinforcing bars in accordance with the size and spacing noted on the repair drawings.
   6. Provide the minimum concrete cover as specified on the repair drawings. In areas where the minimum concrete cover for outer mat reinforcement cannot be achieved without mounding of the repair concrete, the outer mat reinforcing bars are permitted to be bent, if practical, to achieve the required cover. Alternately, the Contractor is permitted, with the Design Professional's acceptance, to extend the limits of concrete removal to expose the entire bar to allow for lowering of the bars.

E. Protect prepared surfaces from the elements until ready to place repair materials.

F. Cleaning:
   1. Remove bond-inhibiting materials (dirt, concrete slurry, loosely bonded aggregates, etc.) by abrasive blasting or low-pressure water blasting with or without abrasive. When water blasting, provide 3000 psi or greater water pressure. Keep nozzle not less than 6 in. and no more than 12 in. away from the surface to be cleaned.
   2. Confine, collect, and dispose of broken concrete, sandblast grit, dust, debris, removed reinforcement, and other waste material resulting from removal operations and surface preparation in a safe and legal manner.

3. Check concrete surfaces after cleaning to ensure they are free of loose aggregate, microcracking, and additional delamination.
4. *Thoroughly clean removal areas of loose concrete, dust, and debris using high-pressure, oil-free air.*

G. Bonding:
1. Saturated Surface-Dry Substrate: Pre-dampen concrete substrate surfaces to saturated surface-dry condition immediately prior to placement.
2. Mortar Scrub Coat: Install a mortar scrub coat onto saturated surface-dry substrate just to placing the repair material. Agitate thick slurry periodically to avoid settling of components in the container.
3. Proprietary Bonding Agent: Just prior to the installation of the bonding agent, thoroughly clean the repair area with oil-free compressed air. Install the bonding agent in accordance with the manufacturer's recommendations. *The bonding agent shall be installed immediately prior to the placement of the repair material.*
4. *The bond strength shall be a minimum of 2,4080psi).*

H. Select appropriate means and methods of concrete removal, cleaning of reinforcement, and preparation of the concrete substrate as defined in these specifications. Obtain acceptance from the Design Professional as to the type of equipment to be used. The following equipment or approved equivalent are permitted to be used.
1. Chipping hammers with a total weight not to exceed: 30 lb and equipped with appropriate chipping bits for initial demolition of repair areas.
    a. 30 lb chipping hammers may be used at full-depth repairs. In no case shall they be used to extend removal further than 2 in. from the bond line for a repair.
    b. 15 lb with sharp pointed tools for the removal of concrete from partial-depth repairs, beneath reinforcing bars and around repair edges.
2. Dry abrasive blast cleaning equipment capable of removing rust from the exposed steel reinforcement and cleaning the surface of the exposed concrete substrate. Cleaning shall include the removal of damaged paste and aggregate.
3. Pressure-washing equipment capable of delivering at least 3000 psi nozzle pressure for cleaning loose material from repair areas.
4. Water-blasting equipment capable of delivering pressures of 5000 psi to 10,000 psi for concrete surface preparation.
5. Compressed air equipment capable of delivering compressed air free of oil for cleaning loose material from repair areas.
6. Adjustable depth concrete saw for saw cutting the edges of repair areas.

I. If hydro-demolition equipment is to be used, submit a Work plan to the Design Professional for acceptance, including temporary water connections, slurry filtration and treatment, pH monitoring, and calibration procedures. Cost impacts such as the burden of water use, depth of removal ranges, charges for additional depth, and minimum repair size must be clarified in the Work plan.

J. Select appropriate means and methods of placing concrete. Obtain acceptance from the Design Professional as to the type of equipment to be used.

4. BONDING AGENTS

A. Mortar Scrub Coat: The mortar scrub coat shall be one part *portland cement complying with ASTM C150/C150M), Type I (CSA A3000, GU)* and one part fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 sieve, mixed with water to form a thick slurry. For packaged repair mixtures, a scrub coat of the material itself is permitted, and if required by the manufacturer, must be used.

B. *Epoxy Bonding Agent: Conform to ASTM C881/C881M Type 5 Grade 1, Grade 2, or Grade 3. Duralprep A.C. as manufactured by Euclid Chemical*

C. *Cementitious/Epoxy Emulsion Bonding Agent:*
Armatec-110 EpoCem as manufactured by Sika

5. PACKAGED REPAIR MATERIAL

A. Polymer-Modified Cementitious Proprietary Repair Material:

B. Packaged polymer-modified cementitious repair material shall have a minimum compressive strength of 5000 psi at 28 days.
C. Packaged polymer-modified cementitious concrete mixture shall contain aggregate gradation appropriate for the depth of concrete repair specified. For repairs greater than 1 in. in depth, unless stated otherwise by the manufacturer, coarse aggregate shall be used. If coarse aggregate is to be added to a repair mortar, the mixture ratio, gradation, and type must be in accordance with the manufacturer's specifications, and the following: Aggregate shall comply with ASTM C33/C33M and the manufacturer's requirements. Add only as permitted by the packaged repair mortar manufacturer.
D. Air-entraining admixtures shall conform to ASTM C260. Air entrainment shall conform to ACI 301 requirements for Exposure Class F3, very severe exposure, based on the coarse aggregate size, or evidence of equal freezing-and-thawing durability shall be submitted to the Design Professional, along with the material data submittal for review and acceptance.
E. A corrosion-inhibiting admixture shall be included in the mixture.
F. Maximum Water-Soluble Chloride Content shall be 0.06% by weight of cement.
G. Maximum Shrinkage: 0.06% tested in accordance with ASTM C157.
H. For partial-depth repairs: SikaTop - 123 as manufactured by Sika
I. For full-depth repairs: Sikacrete - 211 as manufactured by Sika
J. For full-depth repairs: SikaQuick - 1000 as manufactured by Sika
K. For overhead patch repairs: SikaQuick VOH as manufactured by Sika

6. READY MIXED CONCRETE
A. Portland Cement: Comply with ASTM C150/C150M Type I/II, III
B. Supplementary Cementitious Materials
1. Ground-Granulated Blast-Furnace Slag (GGBFS) conforming to ASTM C989/C989M Grade [80] [100] [120] may be used as a supplementary cementitious material. The maximum quantity of GGBFS shall not exceed 50% of the total cementitious material by weight.
2. Silica Fume conforming to ASTM C1240 may be used as a supplementary cementitious material. The maximum quantity of silica fume shall not exceed 10% of the total cementitious material by weight.
3. Fly Ash conforming to ASTM C618 may be used as a supplementary cementitious material. The maximum quantity of fly ash shall not exceed 25% of the total cementitious material by weight.
4. The maximum quantity of total cementitious material by weight for combinations of supplementary cementitious materials shall not exceed 50% for fly ash or other pozzolans, slag, and silica fume, and 35% for fly ash or other pozzolans and silica fume.'

7. ADMIXTURES:
Admixtures shall be used where specified. Admixtures may also be used to enhance handling and consolidation, improve hardened repair material properties, and to reduce cost of repairs. All admixtures shall be free from chloride ions.

C. Corrosion-Inhibiting Admixture: Corrosion-inhibiting admixture shall conform to ASTM C1582/C1582M. DCI Corrosion inhibitor as manufactured by GCP Applied Technologies at the dosage rate of 2.0 gal./yd3.

D. Fiber Reinforcement:
a. Microfiber Reinforcement: Microfiber reinforcement shall conform to ASTM C1116/C1116M, Type III. Microfiber 0.5-0.75in. long as manufactured by Sika

E. Concrete Mixture
1. Concrete mixture shall conform to exposure classes C-1 and the following:
2. Minimum Compressive Strength: *5000 psi*
3. Maximum Water-Cement Ratio: *0.40*
4. Maximum Water-Soluble Chloride Content: 0.06 % by weight of cement
5. Air Content: *7.5 ± 1.5%*
6. Nominal Maximum Aggregate Size: *0.375 in.*
7. Minimum Cementitious Material Content: *600 lb/yd3*

8. *Maximum Shrinkage: 0.06% tested in accordance with ASTM C157/C157M.*
9. *Fiber Reinforcement: Fibers shall be used and dosed in strict accordance with the manufacturer's written recommendations, but not less than at a rate of 1.25 lb/yd3*
10. Minimum Compressive Strength: *5000 psi*
11. Maximum Water-Cement Ratio: *0.40*
12. Maximum Water-Soluble Chloride Content: 0.06 % by weight of cement
13. Air Content: *7.5 ± 1.5%*
14. Nominal Maximum Aggregate Size: *0.375 in.*
15. Minimum Cementitious Material Content: *600 lb/yd3*

8. STEEL REINFORCEMENT AND ACCESSORIES

Steel Reinforcing Bars and Accessories for replacement of corroded reinforcement: Reinforcing bars shall be ASTM A775/775M, Grade 60, epoxy-coated deformed bars.

1. Chairs, holding bars, slab spacers, and all accessories shall be *epoxy-coated conforming to ASTM A775/A775M. Epoxy Coating Repair Material: Repair damaged epoxy-coated areas with a repair material compatible with the coating as supplied by the epoxy resin manufacturer.*
2. Fabrication: Comply with reference standards and general notes on the repair drawings.
    a. Do not field-bend bars. All bars shall be shop fabricated.
    b. All bends and hooks shall conform to bend standards noted in CRSI's *Manual of Standard Practice* unless otherwise noted on repair plans. Cold bend all reinforcement.

A. Steel Reinforcing Bars and Accessories for replacement of corroded reinforcement: Reinforcing bars shall be ASTM A615, Grade 60, deformed.
    1. Chairs shall have plastic feet or shall be plastic coated.
    2. Fabrication: Comply with reference standards and general notes on the repair drawings.
        a. Do not field-bend bars. All bars shall be shop fabricated.
        b. All bends and hooks shall conform to bend standards noted in the CRSI *Manual of Standard Practice* unless otherwise noted on repair plans. Cold bend all reinforcement.

B. Epoxy-Coated Welded Wire Reinforcement shall conform to ASTM A884/A884M.

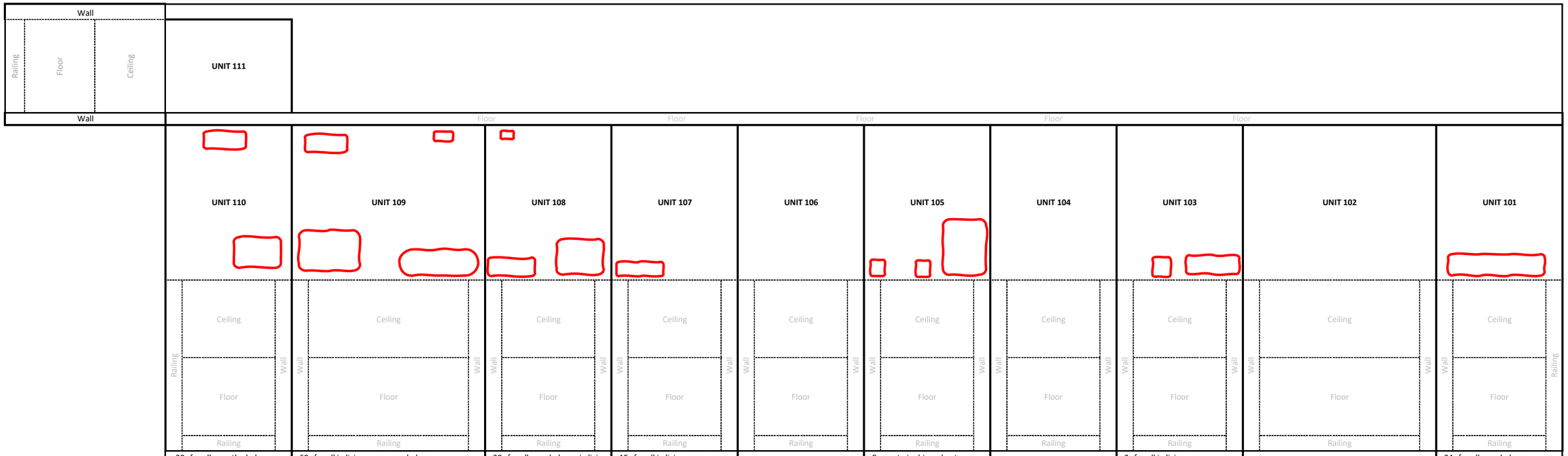
C. Plain-Steel Welded Wire Reinforcement shall conform to ASTM A1064/A1064M.

9. Curing Materials

A. Curing Materials For Packaged Repair Material:

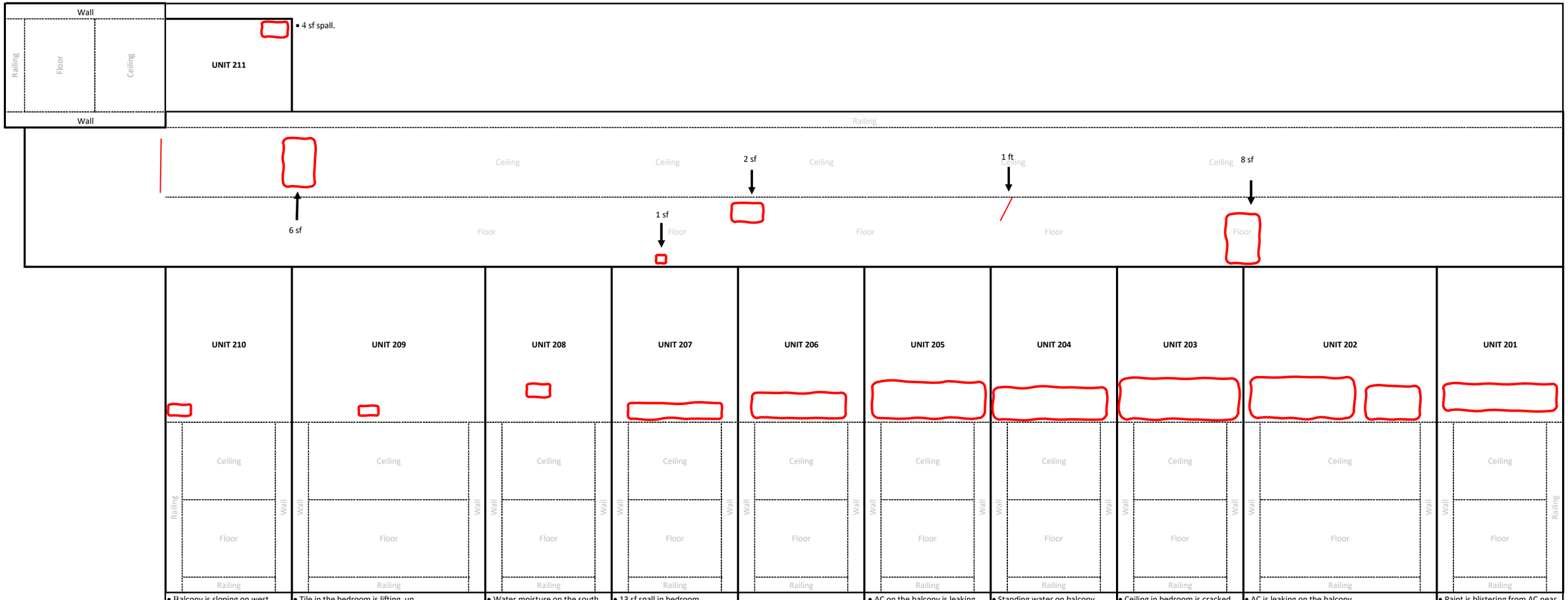
1. *Moisture Retention Cover Cure with polyethylene film or plastic covered fabric, including burlap. Sheets shall comply with ASTM C171.*
2. *Wet Cure with Absorbent Cover meeting AASHTO M 182, Class 2, such as Burlap.*
3. *Moisture Retention Cure with a curing compound conforming to ASTM C309: KUREZ DR VOX as manufactured by Euclid Chemical.*
4. *Comply with manufacturer's written requirements regarding repair materials with special curing instructions where wet cure or curing compounds could be detrimental to the material performance.*

Panama City Resort Club
Damaged Areas Survey



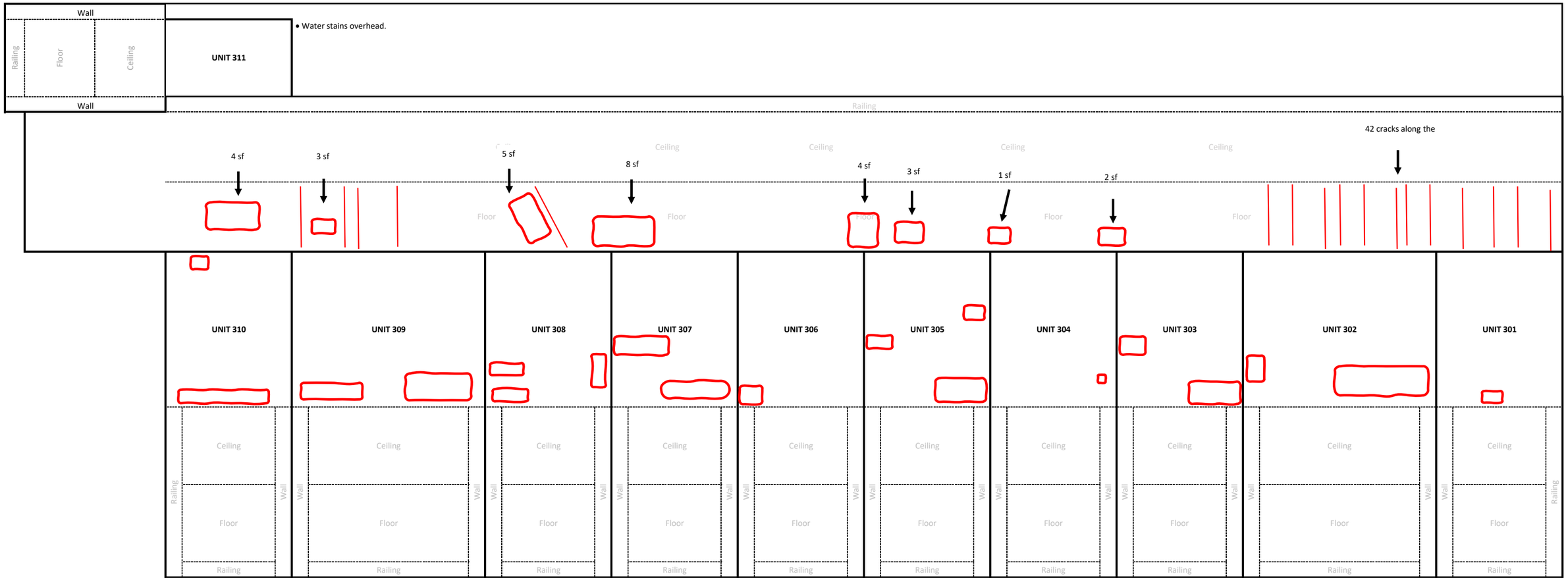
• 30 sf spall near the balcony. • 10 sf spall near the north wall.	• 60 sf spall in living room near balcony. • 8 sf spall near the north wall in living room. • 30 sf spall near the balcony in bed room. • 1 sf spall overhead in bedroom bathroom.	• 38 sf spall near balcony in living room. • 60 sf spall in bedroom. • 1 sf spall near front door.	• 15 sf spall in living room near balcony.		• Concrete is chipped out overhead at the water pipes near the north wall. • 10 sf spall in each corner of the living room. • 60 sf spall in bedroom.		• 2 sf spall in living room. • 24 sf spall in bedroom.		• 24 sf spall near balcony.

Panama City Resort Club
Damaged Areas Survey



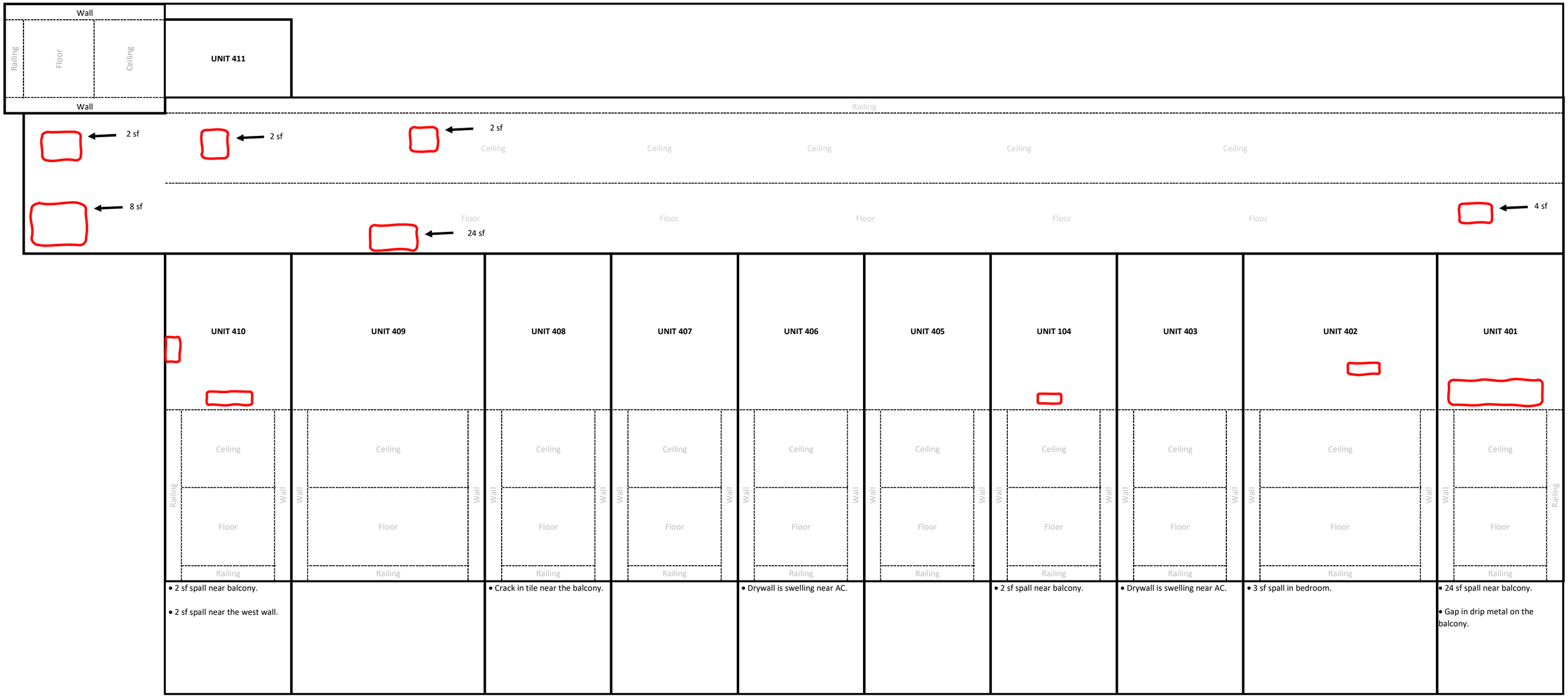
UNIT 210	UNIT 209	UNIT 208	UNIT 207	UNIT 206	UNIT 205	UNIT 204	UNIT 203	UNIT 202	UNIT 201
• Balcony is sloping on west corner near the column. • 2 sf spall in southwest corner of the unit.	• Tile in the bedroom is lifting up. • 1 sf spall in the southeast corner of the living room.	• Water moisture on the south wall near the sliding glass door. • 2 sf spall in bedroom.	• 13 sf spall in bedroom. • Water stains overhead inside on southeast corner.		• AC on the balcony is leaking and has rust stains. • Approximately 63 sf of spalls near balcony.	• Standing water on balcony. • 50 sf of spalls overhead near balcony.	• Ceiling in bedroom is cracked from water intrusion. • 72 sf spall approximately 5 ft from balcony.	• AC is leaking on the balcony. • 72 sf spall in living room that migrates to bedroom.	• Paint is blistering from AC near sliding glass door. • 60 sf spall in the bedroom. • Ceiling has moisture from unit above.

Panama City Resort Club
Damaged Areas Survey



UNIT 310	UNIT 309	UNIT 308	UNIT 307	UNIT 306	UNIT 305	UNIT 304	UNIT 303	UNIT 302	UNIT 301
• Balcony has a steep slope to the SW. • 2 sf spall overhead in kitchen. • 12 sf spall near south wall.	• 12 sf spall in living room. • 16 sf spall in bedroom.	• 4 sf spall along east wall on the south end. • 5 sf spall along south wall. • 3 sf spall in middle of living room.	• 6 sf spall along west wall towards the middle of the unit. • 6 sf spall near south wall.	• 2 sf spall in southwest corner. • Ceiling is blistering.	• 2 sf spall approx.. 5 ft from south wall. • 16 sf spall on southeast corner. • 2 sf spall along near the east wall towards the middle of the unit.	• Moisture damage on west wall. • 1 sf spall near east wall.	• 6 sf spall near the west wall. • 16 sf spall near the southeast corner. • Moisture damage at drywall near AC.	• Tile has popped out with a small spall on floor in bedroom on the east side. • 2 sf spall in living room. • 12 sf spall in the bedroom overhead.	• Tile is popping out near sliding glass door from spall.

Panama City Resort Club
Damaged Areas Survey



UNIT 410	UNIT 409	UNIT 408	UNIT 407	UNIT 406	UNIT 405	UNIT 104	UNIT 403	UNIT 402	UNIT 401
• 2 sf spall near balcony. • 2 sf spall near the west wall.		• Crack in tile near the balcony.		• Drywall is swelling near AC.		• 2 sf spall near balcony.	• Drywall is swelling near AC.	• 3 sf spall in bedroom.	• 24 sf spall near balcony. • Gap in drip metal on the balcony.

Panama City Resort Club
Damaged Areas Survey

Panama City Resort					
Unit Number	Balcony Spalls (sqft)		Description	Walkway Spalls (sqft)	
	Floor	Overhead		Floor	Overhead
101		24	24 sf spall near the balcony.		
102					
103		26	2 sf spall in the living room. 24 sf spall in the bedroom.		
104		0			
105		70	Concrete is chipped OVH near the north wall. 10 sf spall in each corner of the living room. 60 sf spall in the bedroom.		
106		0			
107		15	15 sf spall in the living room near balcony.		
108		99	38 sf spall in living room. 60 sf spall in bedroom. 1 sf spall near the front door.		
109		99	60 sf spall in the living room. 8 sf spall near the north wall in living room. 30 sf spall near the balcony in bedroom. 1 sf spall OVH in bedroom bathroom.		
110		40	30 sf spall near balcony. 10 sf spall near the north wall.		
111					
201		60	60 sf spall in the bedroom.		
202		72	72 sf spall in the living room that migrates to bedroom.		
203		72	72 sf spall in the balcony.		
204		50	50 sf spall OVH near balcony.		
205		63	63 sf spall near balcony.		
206		24	24 sf spall in bedroom	11	6
207		13	13 sf spall in bedroom.		
208		2	2 sf spall in bedroom.		
209		1	1 sf spall in the southeast corner of the living room.		
210		2	2 sf spall in the southwest corner of the unit.		
211		4	4 sf spall in the northwest corner.		
301			Tile is popping out near the sliding glass door.		
302		14	2 sf spall in the living room. 12 sf spall in the bedroom OVH.		
303		22	6 sf spall near the west wall. 16 sf spall near the southeast corner. Moister damage at drywall near AC.		
304		1	Moisture damage on the west wall. 1 sf spall near east wall.		
305		20	2 sf spall approx.. 5 ft from south wall. 16 sf spall on southeast corner. 2 sf spall along near the east wall towards the middle of the unit.		
306		2	2 sf spall in the southwest corner. Ceiling is blistering.	30	
307		12	6 sf spall along the west wall towards the middle of the unit. 6 sf spall near the south wall.		
308		12	4 sf spall along the east wall on the south end of the unit, 5sf spall along the south wall, and 3 sf spall in middle of the living room.		
309		28	12 sf spall in the living room, 16 sf spall in the bedroom.		
310		14	2 sf spall OVH in kitchen, 12 sf spall near south wall.		
311					
401		24	24 sf spall near the balcony. Gap in drip metal on the balcony.		
402		3	3 sf spall in the bedroom.		
403			Drywall is swelling near AC.		
404		2	2 sf spall near balcony.		
405					
406			Drywall is swelling near AC.	36	6
407					
408			Crack in the tile near the balcony.		
409					
410		4	2 sf spall near balcony. 2 sf spall near the west wall.		
411					

Total	0	894
	894 sqft	

77	12
89 sqft	

Panama City Resort Club
Damaged Areas Survey

East Stairwell							
	Level	Spall (sqft)	Doors	Stair	Landing	Newel	Notes
Landing	2						
Flight	2.25						
Intermediate Landing	2.5						
Flight	2.75	8					The second step is cracked and spalled.
Landing	3	2.5					2.5 sf spall OVH at beam.
Flight	3.25	18					18 sf spall at edge underneath.
Intermediate Landing	3.5	5					5 sf spall underneath.
Flight	3.75						
Landing	4	29					9 sf spall underneath. 4 sf spall OVH at beam. 16 sf spall on north wall.
East Total		71 (sqft)					

West Stairwell							
	Level	Spall (sqft)	Doors	Stair	Landing	Newel	Notes
Landing	2						
Flight	2.25						
Intermediate Landing	2.5	8					8 sf spall on the wall that is adjacent to 311 & 211.
Flight	2.75						
Landing	3						
Flight	3.25	4					4 sf spall at beam OVH.
Intermediate Landing	3.5						
Flight	3.75	9					9 sf spall underneath.
Landing	4						
East Total		21 (sqft)					