



**December 22<sup>nd</sup>, 2021**

**Phoenix V Condominiums  
24400 Perdido Beach Blvd,  
Orange Beach, AL 36561**

**Attention: Mr. James Redwine  
225-281-4089**

**Subject: Handrail Securement Component Observations**

Pursuant to your request, Thompson Engineering has performed general representative observations of the existing handrail hardware and securement components in three (3) units located at 24400 Perdido Beach Blvd, Orange Beach, AL 36561. General observations included handrail stanchions, railings, attachment/securement pockets, and adjacent cementitious materials. The assessment was performed on December 9<sup>th</sup> of 2021 by Bryce Moore (Staff Consultant) Connor Harkey (Level IV Technician, RRO), and Heath Horton (Level III Technician) all representing Thompson Engineering.

### **FIELD OBSERVATIONS**

General observations were made on the North and South elevation balconies on three (3) condominium units. The units observed included; unit 1401, unit 701 and unit 503. The handrail components and securement components were observed and notated. The stanchion pockets (where the handrail is secured into the concrete deck/slab) appeared to be concrete knock outs within the original concrete pour that were then filled with a pourable filler after the hand rail had been inserted into the pocket. These areas were the focal point of the observations, as moisture had been hypothesized to be intruding into the handrail stanchions and stanchion pockets inundating the concrete balcony deck, and causing subsequent corrosion in the nearby reinforcing components, such as rebar. The expansion of the steel reinforcing components during the corrosion process (known as rust jacking) had then caused the concrete around the steel components to spall, cracking and displacing the concrete.

Unit 1401 – The North elevation balcony was noted to have natural weathering and conditions typical with its age. Some hairline cracking was observed to the balcony's concrete decking on the Northwest corner of the balcony. This cracking did not appear to be atypical nor be a significant concern at the time of observation.

The South elevation balcony was noted to have cracked/split metal stanchions (likely from freeze/thaw cycles) on the West side of the balcony area. The Easternmost stanchion pocket was deconstructed in a small area and samples were gathered in an attempt to determine material make-up of the pockets' fill. When chiseling out the material, it was noted that there appeared to be a topically applied non-shrink



type grout applied over the original pocket fill material. The pocket was also noted to have some irregularity to its perimeter shape. This appeared to be a past repair to the original pocket. This topical repair effort was concluded to hinder any fast paced topical observations of the pockets for damage, as the visible material may not represent the material that is in the depth of the pocket(s). It was also noted that the rear perimeter of the pocket (most difficult area to reach while on the balcony with the handrails in place) where it abutted the south perimeter of the concrete balcony deck was soft and granulated. This resembled gypsum based grout that has gone through wet and dry cycles, which was unlike what was primarily observed atop and within the remainder of the pocket. This also eludes to the possibility of multiple past repairs/mitigation efforts at the handrail securement pockets.

The Southwest corner of the balcony handrail area was noted to have severe corrosion staining and cracking in the adjacent concrete decking. The handrail stanchion was also readily able to be lifted up from the securement pocket as the fill had pulled away from the perimeter of the stanchion, allowing upward movement.

The results at units Unit 701 and 503 were typical of unit 1401.

The most notable differential was that unit 503 is located on a vertical stack where the shear wall and stucco abut without a proper joint and can be typically observed as cracking. The pocket observed as being most affected on unit 503 was the pocket located closest to the wall. This pocket could be receiving moisture at a combined wall deficiency, stanchion leak and at deck absorption.

### CONCLUSIONS / RECOMMENDATION

The handrail stanchions that are split should receive a recommendation from a certified handrail manufacturer/applicator or Structural engineer who knows and understands both handrail codes and resistance algorithms.

Due to the evidence that appears to point to past repairs that may hide underlying deficient materials or application practices we can recommend only two realistic options on moving forward from this point.

1. Continue the physical grasping, shaking and identification of the handrails as described and shown to us by Mr. Lipinsky. Note all damaged components and all loose handrail stanchions. Have a professional scope of work designed and written to remedy the damaged/split stanchions.  
Remove all material from a pocket of an unstable stanchion, clean the pocket and install a non-shrink grout that is not susceptible to strength loss if introduced to moisture. *Note: This will more than likely involve concrete spall deck and rebar repair near these pockets.*  
Coat the area at the stanchion perimeter to deck abutment with a waterproof coating.



2. Prevent the stanchions from having the ability to introduce future moisture into the concrete. Many stanchions were noted to have been drilled in the past. This was more than likely an effort to weep the stanchions and prevent the stanchions from filling with water and splitting the metal.

This effort did not and will not prevent the stanchions from providing the concrete and stanchion pocket with exterior salt laden rain water.

To achieve this, there should be two drilled holes. One at the or just above the horizontal deck level and a second hole parallel to the first but just a bit higher than the first.

The first hole should be filled with an epoxy and will take up the voided stanchion area that is within and below grade of the balcony slab. The second hole would be a weep that would release rain water and condensation without allowing the moisture into the concrete pocket while preventing any head pressure or accumulation of water before it's weeped out.

This is a process we've recommended and observed have success in the past. We recommend this be performed on all handrails.



Cracked/split metal stanchions (likely from freeze/thaw cycles) on the West side of the balcony area.



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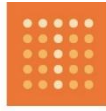


Stanchion with stanchion pocket “cap” repair rather than a full in-depth repair.



Example of difference in material between original pocket-fill and “cap” repair material.





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Example of original pocket-fill material.



Example of material utilized during “cap” repairs.



This contract document recommendation is to aid in removal, replacement and repair of the previously installed hand railing components recently labeled as deficient on the Phoenix V building(s) located at 24400 Perdido Beach Blvd, Orange Beach, Alabama 36561.

### **EXISTING CONDITIONS SUMMARY**

General observations were made on the North and South elevation balconies (both public and private balcony areas). The handrail components and securement components were observed and notated. The stanchion pockets (where the handrail is secured into the concrete deck/slab) appeared to be concrete knock outs within the original concrete pour that were then filled with a pourable filler after the stanchion had been inserted into the pocket.

The pocket areas relationship to random concrete discoloration and spalling indicates moisture has more than likely intruded into multiple handrail stanchions. Leaking stanchions deliver moisture down their length and into the stanchion pockets inundating the pocket filler and adjacent concrete balcony deck. This causes electrolysis followed by corrosion in the nearby reinforcing components, such as rebar. The expansion of the steel reinforcing components during the corrosion process (known as rust jacking) then causes the concrete around the steel components to spall, cracking and displacing the concrete.

The current count of deficiencies accumulated by Coastline Management are as follows;

- One hundred sixty-six (166) out of two hundred forty-seven (247) units have been reported to have some type of handrail deficiency.
- One hundred thirty-six (136) stanchion pockets were found to have loose/cracking filler material and/or space between the stanchions perimeter and the filler material that allowed the stanchion to have free movement. These were located on private unit balconies.
- One hundred forty (140) stanchions were observed to have a split at their factory seam. This is hypothesized to have been caused by water holding within the stanchion, freezing and then expanding to split the factory seam. These were located on private unit balconies.
- Sixty-nine (69) loose bottom rail to stanchion connections were observed. These were located on private unit balconies.
- Four (4) stanchion pockets were found to have loose/cracking filler material and/or space between the stanchions perimeter and the filler material that allowed the stanchion to have free movement. These were located on the public balcony/walkway.
- Two hundred twenty-seven (227) stanchions were observed to have a split at their factory seam. This is hypothesized to have been caused by water holding within the stanchion, freezing and then expanding to split the factory seam. These were located on the public balcony/walkway.
- One (1) loose bottom rail to stanchion connections were observed. These were located on the public balcony/walkway.

- Two (2) bent balusters were observed. These were located on the public balcony/walkway.

### **RECOMMENDED SCOPE of WORK**

The Owner would like to entertain cost estimates for the following work:

- **Stanchion Replacement / Mounting Pockets**

Remove the stanchion and all existing pocket filler material from the concrete deck pocket of an unstable or split stanchion. Clean the pocket to assure existing pocket filler material is completely removed and install a non-shrink epoxy grout that is not susceptible to strength loss if introduced to moisture. *Note: This step could likely involve concrete spall deck and rebar repair near these pockets.*

It's recommended to coat the area at the stanchion perimeter to deck abutment with a waterproof deck coating to protect the pocket grout to concrete slab abutment.

Bid to detach split and loose stanchions from their top and bottom rail connections, clean existing slab pockets and properly reinstall stanchions. *Note; stanchions without structural damage will be requested by the owner to be salvaged and reinserted into their cleaned pockets.*

Provide unit pricing per stanchion to include;

- Access via swing stage
- labor for detachment/removal of existing railing and pocket components
- material/labor for replacement of railing and pocket components

Provide unit pricing per square foot of waterproof deck coating to include;

- substrate preparation
- new coating application

Provide price for four hundred (400) new handrail stanchions to match existing material, fastening points, size, appearance, strength and attachment method(s) of those removed.

- **Loose Bottom Rails**

Diagnose the (70) bottom rails movement to stanchion as being fastener related, broken component related or both. Fastener sizes may be upsized in shank/flight diameter if the present connection location has been wallowed and is the cause of the excessive movement.

In the case of broken tabs at the bottom rail connection to the stanchions it may be found that a new stanchion replacement will be needed.

Provide unit pricing per stanchion to include;

- material/labor for removal and replacement of stanchion to bottom railing fasteners

*Note; Unit price per stanchion and new handrail stanchions to match existing material, fastening points, size, appearance, strength and attachment method(s) of those removed have been estimated in the 400 new stanchions priced in the prior section.*

- **Bent Balusters**

Bent balusters should be removed and replaced by detaching the top rail from the stanchions, lifting the top rail, removing the damaged baluster and replacing with a new one.

Provide pricing to include;

- material/labor for removal and replacement of bent balusters between top and bottom rails.  
Provide price for two (2) new handrail stanchions to match existing material, fastening points, size, appearance, strength and attachment method(s) of those removed.

- **Waterproofing/Stanchion and Concrete Failure Preventative**

In an effort to prevent the stanchions from having the ability to hold water or introduce future moisture into the concrete pocket it is recommended that all stanchions have drilled weeps installed.

At completion of all other handrail component repairs we recommend two 1/8" holes be drilled into each stanchion. The holes should be nearly parallel with one being slightly higher than the other. Both holes should be less than one inch (1") above the horizontal concrete deck level. The highest hole should be utilized as a fill hole to insert an epoxy into the stanchion. The epoxy will take up the voided interior stanchion area that is within and below grade of the balcony slab. The epoxy is completed when it shows at the second lower elevation hole. The first higher hole will become a future weep that will release rain water and condensation without allowing the moisture into the concrete pocket while preventing any head pressure or accumulation of water within the stanchion.

Provide unit pricing per stanchion to include;

- material/labor to install epoxy into each stanchion providing a drilled weep upon completion of the process



## **GENERAL**

It is the responsibility of the Contractor to investigate to the fullest extent the existing conditions and scope recommendations associated with this project prior to submitting a bid. All construction and construction actions shall comply with any and all local and state safety codes/requirements.

Contractor shall supply, receive, off-load and maintain all materials and equipment needed to support and achieve the work described above.

All equipment necessary to perform the work shall be provided by the Contractor.

The Contractor shall protect the building components and surrounding property from any damage directly or indirectly related to the construction activities and provide all require construction barriers required by this work to protect Phoenix V property and personnel. The Contractors bid should include all mobilization, safety, overhead equipment, materials installation equipment, personnel and profit fees to perform the work described.

A construction schedule shall be submitted with the bid. The schedule should include all anticipated mobilization, equipment delays, weather delays, holidays and conflicts. The construction period shall not exceed \_\_\_\_\_ days from award of contract unless accepted by Phoenix V.

All new handrail components shall be produced by a professional manufacturer with a tested hand railing design.

A minimum one (1) year contractor labor warranty shall be provided.

The contractor is required to verify all existing conditions referred to in the document and take steps necessary for compliance with the recommendations and drawing details.

## **QUALITY ASSURANCE**

The Owner has the right to provide Quality Assurance Inspections. The Owner shall be fully responsible for the cost of Quality Assurance.

## **CLOSING**

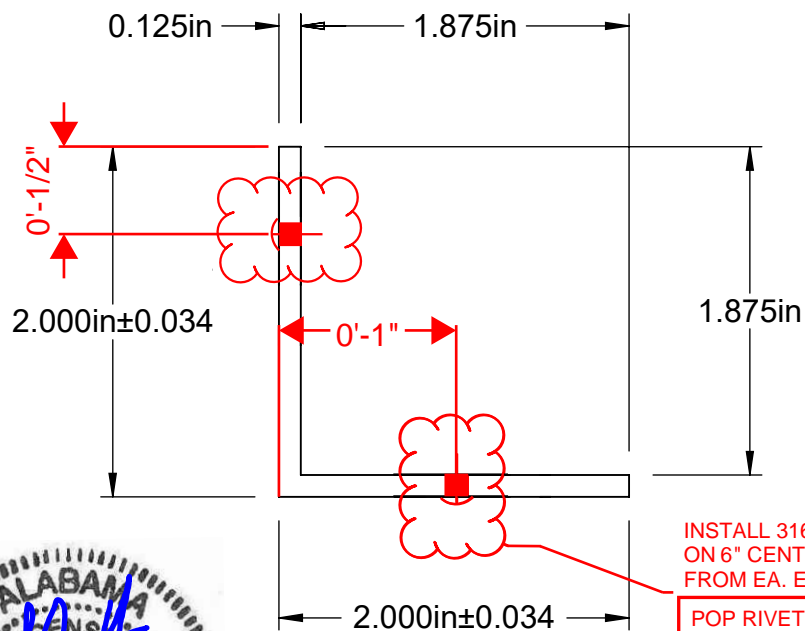
**Thompson Engineering** appreciates the opportunity to provide this recommended scope of work to the Phoenix V Condominium. If there are any questions regarding this recommended scope or if additional information is required, please feel free to contact me at your convenience.

Respectfully,

**Thompson Engineering, Inc.**

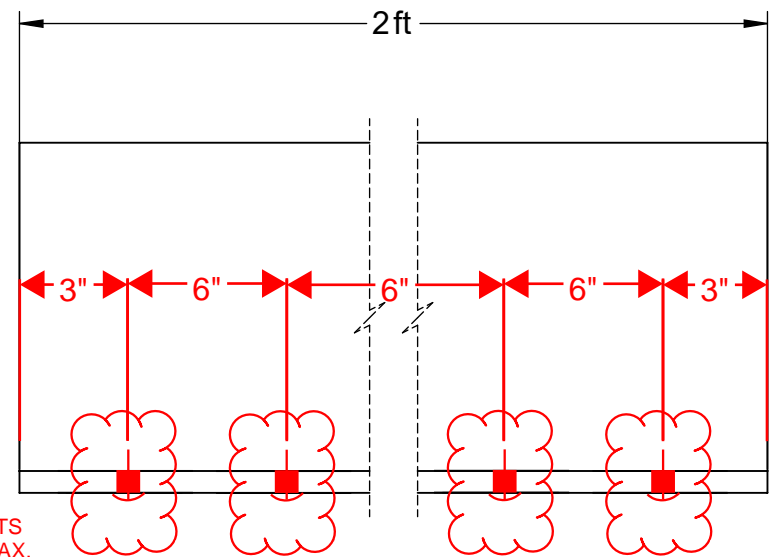


Bryce Moore  
Staff Consultant, Thompson Engineering Building Envelope Services



INSTALL 316SS POP RIVETS  
ON 6" CENTERS AND 3" MAX.  
FROM EA. END (EACH SIDE).

POP RIVETS TO BE 1/4"  
MIN. SIZE.



\*STAMP FOR  
FASTENING ONLY

Straightness Tolerance: 0.013in per ft

TE Project No. 19-1101-0202

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Information in this drawing is provided for reference only.

PART NUMBER **88805K333**

Architectural 6063  
Aluminum 90 Degree Angle