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February 4, 2022

Mr. Greg Johnson
Property Manager
Harborview HOA
greg@soniatrealty.com

Re: Harborview Structural Inspection
500 Lake Marina Drive
New Orleans, Louisiana

Dear Mr. Johnson:

At your request, our office performed a limited visual and non-destructive inspection of the above referenced property on January 20, 2022. We were accompanied by you during our visit. The purpose of our inspection was to provide you with an independent inspection report in response to the Storm Damage Assessment that was completed by Sdii Global Corporation. As you are aware, Sdii was the firm hired to assess the insurance claim on the property as a result of Hurricane Ida. Our office was provided with a copy of this report for our review.

The referenced property is multi-family 3-story wood framed structure supported by a precast concrete podium that, from what we understand, was built around the early 1970's. The 1st floor serves as at grade parking. The 2nd floor is mostly residential combined with a pool terrace. The upper floors are all residential. The original architectural and structural drawings were not made available to us for review.

Our inspection focused on uncovering signs of structural damages or distress either as a result of the recent hurricane or other sources such as foundation settlement, termites, exposure to water, etc. It consisted of viewing the exterior of the property from grade and performing a full walkthrough of the garage area including the area below the pool structure. We were also able to walk the 2nd floor, portions of the upper floors, and the roof. We did not access any of the residential units.

Observations

The following observations were made by our office during the site inspection. Photos are included in the Appendix.

Exterior of building

- At several balconies on the northwest side of the building, significant deterioration of the wood beam at the edge of the balcony was noted with signs of past and ongoing water damaged visible. The deterioration is so severe that a noticeable deflection or sag at the edge of the some of the balconies was apparent from ground level. It appears that a partial failure of the support framing has occurred. It is also very likely that other exterior

balconies along this side of the building, which are not currently exhibiting a noticeable deflection, are also compromised. It is our opinion; this is a non-hurricane related issue that has been developing over a long period of time. During our site visit, residents were observed on some of the balconies. It was stressed to you at the time of our inspection the critical nature of this issue and that the balconies should not be occupied until such time that the damages are corrected or adequate shoring has been installed. **Photos 1 and 2.**

- A majority of the precast columns at the perimeter of the building show signs of concrete cracking, spalling, and steel corrosion at the interface of the precast beams and columns due to long term exposure to water and the elements. **Photo 3 and 4.** *Note columns on the interior of the garage also exhibited this damage and will be discussed below.* This type of damage is not uncommon for precast structures due to the embedded steel plate that serves as the main connection between the precast beam and the column. Minimal concrete cover over the plate is usually the weak link in this type of connection especially when exposed to the elements. Precast structures that are exposed to the elements require regular maintenance to avoid deterioration issues such as this. At several locations, we observed what appeared to be a retrofit in the form of a steel collar around the top of the columns to address this deficiency. **Photo 5.**
- Damages to balcony and roof soffits and exterior wall siding were observed at a few locations. **Photos 6, 7, and 8.** The damages observed appear, in our opinion, to be hurricane or wind related given the nature of the failures. However, we should note that other issues such as steel corrosion were observed in areas where the structure was exposed for viewing. **Photo 9.**
- Evidence of foundation issues at the concrete masonry or CMU wall enclosures on the east side of the building were observed in the form of large cracks in the wall and settlement of the surrounding paving. Previous crack repairs at the walls were visible indicating that this issue is an ongoing one. The enclosures are most likely not supported by piling and are subject to ground settlement which is causing the damage. Differential settlement is also visible relative to the portion of the CMU wall over the pile supported column foundation and the opposite end of the wall which is not pile supported. **Photo 10.**

Garage

- As noted above, a majority of the precast columns both at the interior and exterior show signs of concrete cracking, spalling, and steel corrosion. At two locations specifically, we made note of especially concerning conditions due to a possible lack of full support for the beams framing onto the columns and excessive cracking. These two locations were identified to you during our visit. **Photos 11, 12, and 13.** Additionally, corrosion was observed at precast double tee ends and their support beam ledges and at exposed slab and beam reinforcing. Where the double tees bear on the precast beams, a considerable amount of corrosion was observed at numerous locations. The steel plates embedded into the beams showed multiple layers of delamination and the joints are no longer

functioning as intended which is to allow for thermal expansion and contraction. **Photos 14 and 15.**

- It should be emphasized that the concrete spalling that is occurring here is a safety concern. Falling concrete can cause serious bodily injury as well as damage vehicles.
- Due to concerns you mentioned about the pool support, we accessed the storage room below the pool. In this room, we were able to see the current state of the pool support framing. From what we could see, the support framing appears to be a two-way spanning concrete slab supported by individual timber piles. A thin metal form deck was used to provide temporary support of the concrete slab until it achieved design strength. We observed a significant amount of corrosion of the metal deck and slab reinforcing in several areas. **Photos 16, 17, and 18.** Corrosion of the metal deck assuming it was used as a form is not necessarily a major concern from a stability standpoint since it doesn't provide the support for the concrete slab; however, it is likely trapping water and exacerbating the corrosion of the slab reinforcing. The slab corrosion on the other hand is very concerning given that we noticed almost complete loss of reinforcing cross section in a few areas. Loss of reinforcing will reduce the capacity of the slab and could jeopardize its ability to properly support the pool. Additionally, it is unknown what the full extents are of the slab damage due to corrosion, because the majority of the bottom surface of the slab is concealed by the metal decking.

Roof

- The existing roof is a flat roof with minimal slope. A considerable amount of ponding water was observed throughout. **Photos 19 and 20.** Excessive ponding can lead to large deflections and even structural failures. Where ponding is occurring, there is no means to drain the water such as a positive slope to the exterior of the building. The water is ultimately left to either evaporate or accumulate to the point where it can partially drain off the roof edges. The accumulation of water without an avenue for draining is what can lead to ponding related failures in a structure.
- We also walked the roof to look for hurricane related damages. We noticed a tarp covering what we assume is roof damage related to the hurricane towards the N-E building corner and a missing section of roofing membrane at the N-W building corner that also appears hurricane related. **Photos 21 and 22.** Roofing debris was also noted in the general vicinity of these areas. **Photo 23.** Various roof patches were noted throughout.
- At the west side of the roof where the aforementioned balcony issues were noted, a perceptible deflection was apparent at the edge of the roof. **Photo 24.** Ponding was also occurring in the immediate area. A concern here is that the damages noted at the balconies below, specifically unknown rotten or deteriorated framing could be translating through to the structure supporting the roof.

Recommendations

Based on our observations, we recommend the following to address the above referenced issues. We have listed them in order of importance with those related to safety listed at the top. Addressing the deficiencies in a timely manner whether through permanent repairs or temporary shoring is of the utmost priority to ensure the safety of the residents and to avoid larger and more costly repairs down the road.

Balconies

- The current state of the balconies at the west side of the building represents an unsafe condition and, as stated previously, they should not be occupied. We recommend installing temporary shoring as soon as possible down to the podium level. This will allow for removal of finishes in order to determine the extents and type of repairs that will be needed. Shoring should be installed by a company that specializes in this type of work such as Abry Brothers.

Precast columns

- Drawings will need to be developed to address the damages observed at the precast columns. All columns will need to be inspected, identified as requiring repairs or not, and assigned a repair detail. A typical minor repair would include cleaning any steel and reinforcing and restoring the column cross section with grout. Steel collars will likely be required for the worst conditions. For the two locations that we are especially concerned about, we recommend installing temporary shoring under the precast beams as soon as possible followed by a permanent fix such as steel collars.

Pool support structure

- The damages noted at the slab supporting the pool should also be considered a high priority to address in the near future. In the short-term to mitigate the risk of a potential failure, temporary shoring should be installed below the slab and draining of the pool should be done to reduce the loading on the framing. Further investigation, such as removal of the metal decking to expose the slab, will be necessary to determine the extents of the corrosion.
- Possible repair solutions might involve a new layer of steel or concrete framing below the slab to provide additional support to a worst-case scenario of a full replacement of the existing slab.

Roof

- The amount of ponding on the roof is concerning and given the amount of various roof patches, it is apparent that the roof is no longer functioning as originally intended and has exceeded its lifespan. Other factors that may be contributing to the ponding could be the result of substandard construction, deterioration of the roof framing which is causing excessive deflections, or material creep (time dependent deformation) that has occurred at the concrete podium, wood structure, or roofing insulation. We also suspect that the ponding and various roof patches are likely causing water leaks.
- Regarding the sag in the roof on the west side, we think additional investigation needs to be done to expose the roof and exterior wall framing in this area to determine the cause of the deflection. Exposing the structure from below through removal of the ceiling and interior wall finishes is one possible way for this to be done.
- Given the age of the roof and the multiple areas of concern related to the structural integrity of the framing, we recommend installing a new sloped roof. This will provide positive drainage and eliminate the ponding concern. It will also allow for inspection of the existing framing which, we suspect, is likely deteriorated in areas.
- We observed two locations that, in our opinion, appear to be wind related damages. We were not able to look under the location that was tarped; however, the other location appeared to be a clear indication of wind damage. **Photo 22**. We also noticed loose roofing material which is another sign of a wind related roofing failure. We should note that the N-W location where the missing roofing membrane was observed was not specifically identified in the Sdii report since they found no wind causing damages. We suggest having the insurer reevaluate the roof and specifically these two areas for damages due to wind.

Precast beams and double Tees

- Similar to the precast columns, drawings will need to be developed to address the damages observed. All locations will need to be inspected and identified. At the double Tee bearing locations, the corroded embed plates will need to be cleaned or possibly removed with new bearing plates installed. Jacking of the Tees will be required to allow for these repairs. Typically, a neoprene pad separates the Tee from the embed plate so jacking is necessary to allow for removal and replacement of these elements.
- Slabs, Tees, and girders that show evidence of spalled concrete and corrosion of reinforcing or steel plates should be cleaned and patched and any cracks should be injected. These types of repairs, in our opinion, are long overdue and are essential to maintaining the integrity and longevity of the structure.

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Soffits and Wall siding

- Wind damage was noted in a few areas at balcony and roof soffits and wall siding. These damages were not specifically identified in the Sdii report. These damages should be brought to the attention of the insurer. We also noted instances of corrosion at the corridor slabs that were exposed for viewing at the missing soffits. Further exploratory work will need to be done to inspect these slabs to determine what types of repairs if any are needed.

CMU enclosures

- The settlement related issues will continue to be an ongoing problem and further cracking and settlement is to be expected. Rebuilding the enclosures using pile foundations that are tied to or completely independent of the building foundations is the most effective way to resolve this issue.

Going forward, our office is available to help facilitate the repair process from an engineering standpoint. We can provide you with a fee to conduct further investigations, develop repair documents, and help oversee the repair work. We can also get you in touch with shoring companies, concrete repair specialists, and contractors that are familiar with this type of work. Initially, a contractor will be needed to expose areas that will allow us to look for hidden damages, and ultimately a contractor such as a general contractor will be needed to manage the various trades and subcontractors involved during the repair work.

We also request that any architectural or structural drawings pertaining to the building be shared with us.

Please feel free to call us should you have any questions or concerns and let us know how we can assist you moving forward.

Sincerely,

MORPHY, MAKOFSKY, INC.



Jonathan A. Sofranko, P.E.

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