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Louis Casolo City of Stamford Engineering Bureau 888 Washington Boulevard Stamford, CT 06901

P1 & P2: The Escape, 880 Pacific Street, Stamford, CT: Visual Survey

WJE No. 2022.0759

Dear Mr. Casolo:

Pursuant with our proposal dated April 6, 2022, and at the request of the Mayor of Stamford, Connecticut's Office, Wiss, Janney, Elstner Associates, Inc. (WJE) has completed our limited assessment of the above referenced property. The following is our report on the matter.

### **BACKGROUND**

Following the partial collapse of the 5<sup>th</sup> floor plaza slab at the Allure, the mayor of Stamford, Ms. Caroline Simmons, asked WJE to perform limited assessments of additional properties that have been developed by Building and Land Technology (BLT) in Stamford utilizing similar construction, similar designs and/or similar construction teams. The scope of these assessments was outlined in a March 25, 2022 letter issued to BLT by Mayor Simmons.

#### **DESCRIPTION OF STRUCTURE**

The Escape, located at 880 Pacific Avenue, also known as P1 & P2 is a 22-Story residential structure with a single basement level. It was built ca. 2020. Levels Basement through Level 4 primarily consists of parking with some apartments and amenity spaces along the perimeter of all four elevations. Level 5 primarily consists of an exterior amenities terrace with a pool and planters. Apartments are provided along the east elevation. The overall dimensions of Level B-5 are approximately 415 ft. north/south by 211 ft. east/west. Floor to floor heights are between 10 ft. and 11 ft. Above Level 5, two residential towers referred to as the north and south tower continue up to Level 22. The towers each have overall plan dimensions of approximately 169 ft. north/south by 79 ft. east/west. Typical floor-to-floor heights of both towers are between 10 and 11 feet.

The building structure is founded on pile caps that are supported by 14 in. diameter pressure injected piles. Levels 1-4 consist of either 7.5 in. or 8 in. thick post-tensioned, cast-in-place, concrete flat plates 1. The flat plates have uniformly spaced draped 2 post tensioning monostrand tendons that typically span in

<sup>&</sup>lt;sup>1</sup> A "flat plate" is a reinforced concrete slab of without beams or drop panels.

<sup>&</sup>lt;sup>2</sup> Draped tendons refers to the elevation profile of the strands which are typically located high in the slab at column lines and low in the slab at midspans.





the east/west direction at 4 ft. on center. Banded, draped monostrand tendons span in the north/south direction at the column lines. Conventional reinforcing is also provided with a continuous bottom mat in both directions and top bars in both directions at the columns. Additionally, stud rails<sup>3</sup> are provided at some, but not all, columns. Column spacings vary from approximately 3.5 ft. to 27.25 ft. in the north/south direction and approximately 11.75 ft. to 28 ft. in the east/west direction. The columns consist of cast-in-place concrete and are conventionally reinforced. A 3 in wide expansion joint separates the north side of the structure from the south side of the structure.

At the 5<sup>th</sup> floor level, the slab thickness increases to 12 in at the western portion where the pool and outdoor amenities terrace are located. At the eastern portion of the 5<sup>th</sup> floor where the residential apartments are located, the slab is 7.5 in thick. The flat plates at the 5<sup>th</sup> Level have uniformly spaced, draped, monostrand tendons that typically span in the east/west direction at 42-48 in. on center. Banded, draped, monostrand tendons span in the north/south direction at the column lines. Conventional reinforcing is also provided with a continuous bottom mat in both directions and top bars in both directions at the columns. Additionally, stud rails are provided at select columns. In order to allow for transitions between the occupied interior space and occupied amenities space, a step in the slab top surface is provided to allow for the installation of waterproofing and a pedestal paver system with the amenities space. A 3 in expansion joint is provided to separate the north side of the structure from the south side of the structure.

The north and south towers (floors 6 to 22) are supported by the same structural system which has a slab thickness of 7.5 in. The flat plates have uniformly spaced draped tendons that typically span in the east/west direction at 3-4 ft. on center. The live end anchors are provided on both elevations based on the tendon layout. Draped banded tendons span in the north/south direction at the column lines. Conventional reinforcing is also provided with a continuous bottom mat in both directions and top bars in both directions at the columns. Additionally, stud rails are provided at select columns. Post-tensioned cantilever balconies are provided on the east and west elevations.

The building is clad with an exterior insulation and finishing system (EIFS) and has a flat roof (Figures 1-5). The building was designed by EDI International (EDI), and the structural engineer of record is Henderson Rogers Structural Engineers (HRSE).

### **DOCUMENTS REVIEWED**

The following documents were reviewed by WJE to gather a basic understanding of the building design and construction:

- Architectural Drawings issued by EDI issued for construction including bulletin 11 dated April 15, 2020.
- Structural Drawings issued by HRSE for construction including revision number 7 dated March 18, 2020
- Post Tensioning Shop Drawings issued by Suncoast Post-Tension with various dates.

<sup>&</sup>lt;sup>3</sup> Stud rails are welded assemblies of steel strips and headed studs that are positioned around columns to enhance the punching shear strength of the slabs



Rebar Shop Drawings issued by CMC Rebar dated October 2, 2019.

Following the partial collapse at the Allure, a resident of The Escape asked the Stamford building department about the installed steel plates at the underside of the expansion joint at the building (Figure 6). WJE reviewed a March 15, 2022 letter issued by HRSE titled: "Harbor Points- The Escape: Steel Plates on Underside of Level 1" which includes the following:

- After the level 1 shores were removed following the concrete placement, a ¾ in. vertical deflection was noted at the expansion joint.
- Upon review it was determined that the profiles of the uniform tendons at the cantilevered end adjacent to the expansion joint were reversed.
- Structural analysis indicated that the reversed tendon condition is structurally ok, however, steel plates will be required to control deflection.
- The layout was corrected at the upper-level floors, therefore the plates were not required.

Review of the original structural drawings issued by HRSE compared to the post tensioning shop drawings issued by Suncoast, indicates that the approved shop drawings for level 1 show the post tensioning near the expansion joints to be lower in the slab than shown in the structural design drawings at level 1. This appears to be corrected in the upper-level shop drawings which were issued at a later date.

Finally, WJE reviewed a report issued by Desimone Consulting Engineers entitled: "Harbor Point- The Escape P1/P2) On-Site Structural Assessment" dated March 29, 2022. The following is described in the report:

- Desimone conducted a visual assessment.
- The exposed garage structure was found to generally be in good condition.
- Shrinkage cracks were observed but are not of structural concern.
- There was some limited water infiltration as well.
- The visual walkthrough of the interior of the building was very limited, just to the accessible common areas on the first floor as well as the amenity space and amenity roof deck at the 5<sup>th</sup> floor.
- The interiors of the apartment units were not accessible for review.
- Based on the on-site visual observations, Desimone did not observe any items of structural concern.
- In general, the existing garage structure in its current condition appears structurally sound.
- Desimone recommended that shrinkage cracks should be sealed and maintenance of expansion joints to prevent water infiltration should be monitored over the next 2-3 years and addressed as maintenance.
- Desimone apparently performed no calculations or non-destructive testing in support of their opinions.

# **OBSERVATIONS**

On May 12, 2022, John Cocca, P.E., Hannah Rakowski, P.E., David Fagan and Chase Gallik all from WJE, performed a limited visual review of the building. Prior to our site visit, we reviewed the drawings to look





for areas of structural anomalies such as steps in the slabs, large openings or other features that could create design or construction issues. During our visit, WJE visually reviewed the exposed structure within the parking garage, the 5<sup>th</sup> floor terrace and amenity spaces and 18 apartments spread between the two towers which were all that were made available to WJE by the owner. Additionally, WJE reviewed various halls and stairwells in both towers. Field sheets indicating the areas surveyed are provided in Appendix A. The following conditions were noted:

## Garage

- The lower level of the parking garage was observed to be in good condition at isolated locations, shrinkage cracks were noted in the slab-on-grade as well as at the underside of the 1st floor slab level. In some instances, efflorescence was observed emanating from the shrinkage cracks (Figures 7 & 8).
- Levels 1 through 3 of garage appear in good condition a few shrinkage cracks noted at isolated locations (Figures 9-11).
- The 4<sup>th</sup> floor of the garage beneath the amenities terrace appears in good condition. A few hairline shrinkage cracks were noted at the underside of the 5th floor terrace slab (Figure 12).
- WJE reviewed areas beneath the 5<sup>h</sup> floor terrace where the slab steps up or down and found no cracks or offsets in the spray foam insulation (Figures 13). Any significant disruption of the underlying concrete would be expected to manifest as cracks and offsets in the spray foam insulation bonded to it
- On Levels 1 to 4, there are three locations on each floor where the 3 in. wide building expansion joint crosses the drive lanes in the garage (Figure 14). At the north and south end of the garage, the slab cantilevers to create the expansion joint which is due to the column layout at the location of the expansion joint (Figure 15). At these expansion joints, rather large deflections were noted, in some instances greater than 1 inch. This results in an vertical offset between the two edges of the joint which then creates lip in the slab that is impacted as car tires roll over the joint (Figure 16- 18).
  - The expansion joint at the first-floor joint has been repaired with steel plates and a concrete patch has been installed at the deflected joint as well (Figure 19)
  - Additionally, cracking following the banded tendon layout was noted in the cantilevered slab (Figure 20).

Following our observations, WJE suggested that the expansion joints be scanned with ground penetrating radar (GPR)<sup>4</sup> to determine if the as-built construction matches the approved design drawings and shop drawings. WJE reviewed the June 7, 2022, Baker Concrete Construction (BCC) report entitled: "Harbor Point Allure Block P1-P2". This report presents the findings of GPR scanning that was completed at the underside of two expansion joints at the 2<sup>nd</sup> floor and at the 3<sup>rd</sup> floor levels. The following was noted in the report:

<sup>&</sup>lt;sup>4</sup> GPR is a non-destructive testing device that is rolled along the concrete surface and probes interior conditions using high frequency radar waves. Voids in the concrete, the bottom surface, or the presence of metal embedments such as reinforcing or post-tensioning tendons, are reflected in the GPR display.



- BCC subcontracted the scanning to Ground Penetrating Radar Systems, LLC (GPRS)
- Uniformly spaced tendons were documented with spacings and drapes that appear to match the approved shop drawings at both scanning locations
- Banded tendons at the column line were documented with spacings and drapes that appear to match the approved shop drawings at both scanning locations.

#### **Terrace**

■ WJE visually reviewed the amenity terrace at the 5<sup>th</sup> Floor. WJE did not observe any cracking in finishes or excessive deflections that could be an indication of an underlying structural issue (Figures 21-22).

## **Tower/Interior Spaces**

- At the time of our visit, WJE was provided access to 18 units within the two towers. WJE visually reviewed the 18 apartments and all accessible public and amenities spaces. As part of our review, WJE looked for cracks in the drywall finishes especially at doorways and floor to ceiling transitions that may be an indication of differential movement. Additionally, WJE also looked for separations in the trim or gaps in the trim that may indicate the presence of slab deflections. No distressed conditions were noted at the reviewed areas (Figures 23-26).
- Elevator lobbies and corridors at various levels were visually inspected for similar cracks and separations. No distressed conditions were noted at the reviewed areas (Figures 27).
- The north and south stair towers in each building were also partially examined. At these locations, painted concrete shear walls are exposed. No cracking or other signs of distress or significant deformation conditions were noted at the reviewed areas.

#### **Exterior**

- WJE visually reviewed the exterior elevations of the building from grade, select terraces of accessible apartments and from the 4<sup>th</sup> floor terrace. In general, WJE did not observe any cracking in the EIFS or exposed concrete that would be indicative of an underlying structural issue.
- At one location at the north end of the south tower, at the northwest balcony line, (i.e. 17<sup>th</sup> floor) there appears to be grout missing at the end anchorages at the face of the cantilevered balconies (Figure 28).

## **CONCLUSIONS**

Based on our limited review of the provided documents and our visual assessment of the building, WJE did not identify any additional conditions at the Escape that would be indicative of an underlying structural issue at the time of our inspections.

### RECOMMENDATIONS

Based on our review, WJE would offer the following recommendations to the owner to prolong the life of the structure and help to limit future maintenance.



- WJE would recommend routing and sealing the shrinkage cracks to prevent the ingress of air and water which could result in corrosion of the underlying steel and/or post tensioning.
- The owner should consider applying a penetrating sealer to the parking levels top surfaces or installing a traffic coating on the parking levels top surfaces to protect the mild reinforcement from chloride laden water that is tracked into the garage from vehicles in the winter.
- The owner should consider having an engineer review the condition of the expansion joints and propose a repair solution to improve the serviceability of the joints. Overtime, the joints will continue to displace downward because of concrete creep. The impacts of the tires on the edges of the joints will likely result in premature deterioration of the concrete, the expansion joint material and potentially damage embedded anchorages. In their current installation, the expansion joints are forced to accommodate movement in 6 directions (two each vertically, longitudinally, and transversely) which the rubber seals cannot accommodate.
- Please note that expansion joints and surface treatments in parking garages are high maintenance items, requiring repair of replacement typically every 5 years.
- Missing grout at the live end anchorages should be installed to prevent corrosion.
- Repairs to the exposed grout pockets at the end anchorages should be made at the cantilever balconies.

Sincerely,

WISS, JANNEY, ELSTNER ASSOCIATES, INC.

John Cocca, P.E.

Associate Principal & Project Manager









Figure 2- Escape: Northeast Elevation





Figure 3- Escape: South Elevation



Figure 4: Escape: Southwest Elevation





Figure 5- Escape: Northwest Elevation

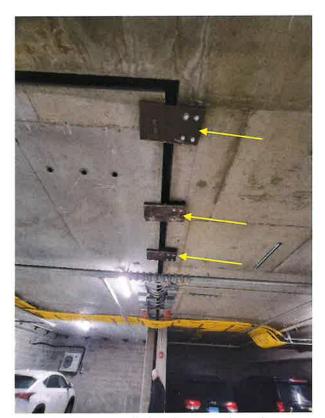


Figure 6- Plates Installed under Expansion Joint





Figure 7- Lower Level of Garage, Note Shrinkage Cracks at Slab-on-Grade



Figure 8- Shrinkage Cracks at Underside of Level 1 with Efflorescence





Figure 9- Garage Level 1 Overall



Figure 10- Shrinkage Cracks at Garage Level 1





Figure 11- Shrinkage Cracks at Level 2



Figure 12-Garage 4<sup>th</sup> Floor Level Overall





Figure 13- Steps in Slab Beneath Terrace

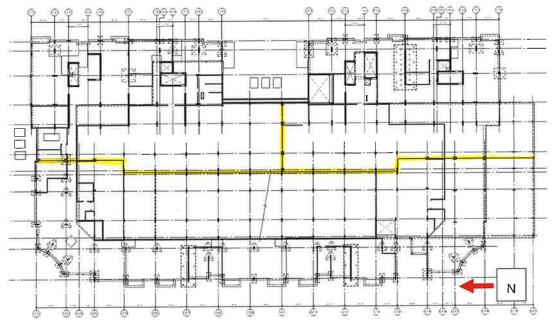


Figure 14- Expansion Joint Locations (Yellow Lines)





Figure 15- Typical Cantilevered Expansion Joint at North and South of Garage



Figure 16- Deflection at Cantilevered End of Joint





Figure 17- Deflection at Cantilevered End of Joint



Figure 18- Deflection at Cantilevered End of Joint





Figure 19- Repaired Expansion Joint with Plates at Underside. Note Concrete Patch.

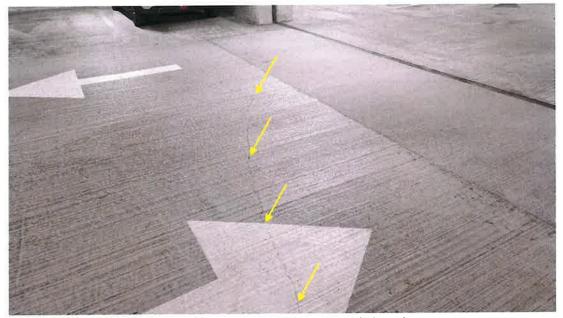


Figure 20- Cracking at Repaired Expansion Joint Following Banded Tendons





Figure 21- Terrace South Side



Figure 22- Terrace Looking North





Figure 23- Amenity Space



Figure 24- Typical Apartment





Figure 25- Typical Apartment



Figure 26- Typical Apartment





Figure 27- Typical Hallway



Figure 28- Missing Grout at End Anchorages

