

Public Safety & Health Committee Board of Representatives

Tuesday, February 22, 2022 Time: 6:30 p.m.

**Item 2– “REVIEW; Collapse of Outdoor Patio at
Allure Apartment Building Located in Harbor Point”**



Presented by
Department of Operations
and Public Safety



**Allure
Block P4-P5
850 Pacific Street
Building B –**
Final CO
Issued August 28,
2020

Partial slab failure
incident happened
around 2:30 PM on
Feb 1, 2022



Level 5 Amenity Deck



Level 4 Parking Level
below Amenity Deck



Who's Who

HPP-Four LLC (BLT) is the building owner

Henderson Rogers is the structural design engineer of record, and coordinator of special inspections for the building owner.

Coastal Materials Testing Lab is the inspector for the owner.

Baker is concrete contractor for the owner.

WJE was retained by the City as an independent engineer performing peer review of post failure documentation.



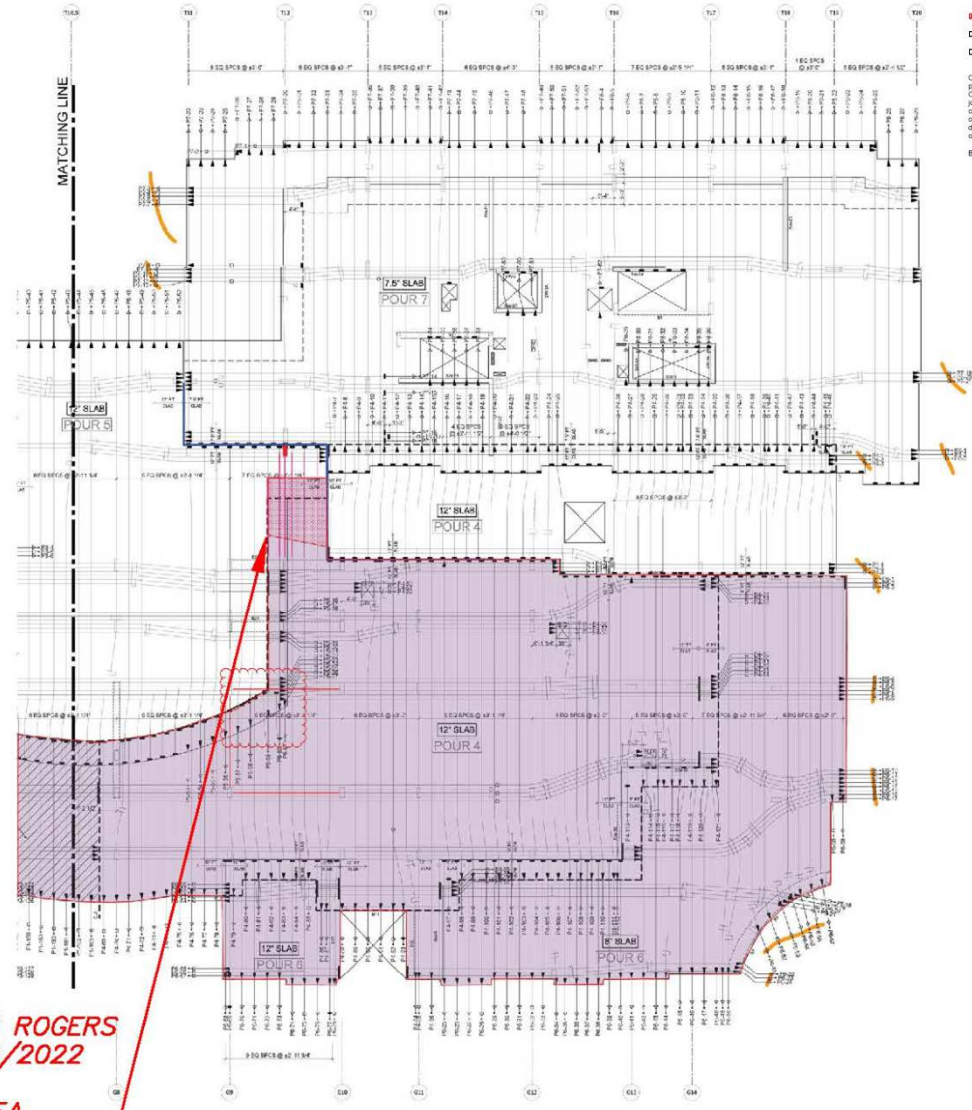


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DESCRIPTION	STRESSING	LENGTH	TYPE	COLUMN CODE	Δ
PT-10-01-01	10	47'-0"	1	PT-10-01-01	0.00
PT-10-01-02	10	47'-0"	1	PT-10-01-02	0.00
PT-10-01-03	10	47'-0"	1	PT-10-01-03	0.00
PT-10-01-04	10	47'-0"	1	PT-10-01-04	0.00
PT-10-01-05	10	47'-0"	1	PT-10-01-05	0.00
PT-10-01-06	10	47'-0"	1	PT-10-01-06	0.00
PT-10-01-07	10	47'-0"	1	PT-10-01-07	0.00
PT-10-01-08	10	47'-0"	1	PT-10-01-08	0.00
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PT-10-01-10	10	47'-0"	1	PT-10-01-10	0.00
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**HENDERSON ROGERS
LETTER 2/9/2022
IDENTIFIED
FAILURE AREA
SK-3**



SLAB TENDON LAYOUT - 5TH FLOOR (SLAB THICKNESS 7 1/2" U.N.O.)
SCALE: 3/32"=1'-0"

- NOTES:
1. REFER TO DETAIL 13PT-1.01 FOR ALL TENDONS SKIRTING AROUND OPENINGS.
 2. STRESSING TAIL TO BE A MINIMUM OF 16" REFER TO DETAIL 3PT-1.01.
 3. E.O.R TO VERIFY CONSTRUCTION JOINT LOCATIONS.
 4. E.O.R TO VERIFY SLAB TENDON LAYOUT.

NO EXCEPTIONS TAKEN
EXCEPTIONS NOTED
ACCEPTED FOR RECORD PURPOSES ONLY

REVISE AND RESUBMIT
SUBMIT SPECIFIED ITEM
REVIEWED FOR IMPACT TO STRUCTURE ONLY

Checking is only for general conformance with the design concept of the project and for general compliance with the Contract Documents. The Contractor is responsible for confirming and correcting dimensions at the job site for information which pertains to fabrication processes or construction techniques and for coordination of work of all trades. Checking of shop drawings shall not relieve the Contractor of the responsibility for dimensions from the requirements of the Contract Documents and for errors or omissions in the shop drawings.

By **VIVEK GURJAR** DATE **07/08/2018**
HENDERSON ROGERS STRUCTURAL ENGINEERS, LLC.

**Approval Stamp
from PT-2-09
Drawing**

VIVEK GURJAR
Professional Engineer
State of New York
No. 13456
Exp. 12/31/2023

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**HENDERSON ROGERS
LETTER 2/9/2022
IDENTIFIED
FAILURE AREA
SK-1**

SEE S105A, FOR POUR 5 CONTINUATION

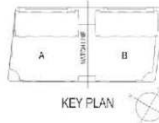
POUR 5
8/24/2018

POUR 4A
8/17/2018

POUR 4B
8/20/2018

NOTE: THE POUR LOCATIONS ARE AS SHOWN
ON THE PT SHOP DRAWINGS. THE DATES ARE
FROM BAKER'S CONCRETE LOG.

1 5TH FLOOR PLAN - SOUTH
1/8" = 1'-0"



BAKER & LUND
TECHNOLOGY

Civil

Structural

Foundation

MECHANICAL

ELECTRICAL

PLUMBING

HAZARDOUS WASTE

ENVIRONMENTAL

ARCHITECTURAL

INTERIOR DESIGN

LANDSCAPE ARCHITECTURE

PLANNING

TRANSPORTATION

WATER RESOURCES

WASTE MANAGEMENT

CONSTRUCTION

OPERATIONS & MAINTENANCE

RESEARCH & ANALYSIS

TRAINING & EDUCATION

CONSULTING

GENERAL CONTRACTING

MANUFACTURING

POWER GENERATION

TELECOMMUNICATIONS

DEFENSE

OTHER

1/8" = 1'-0"



Figure 1- Partially Collapsed 5th Level Slab. Looking East to West

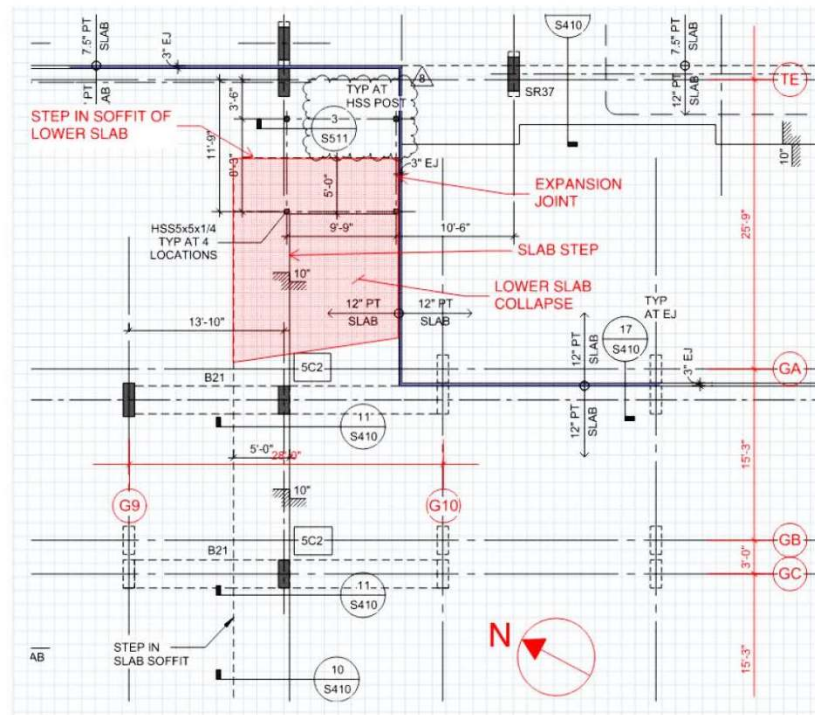


Figure 2- Partial Floor Plan from HR Report

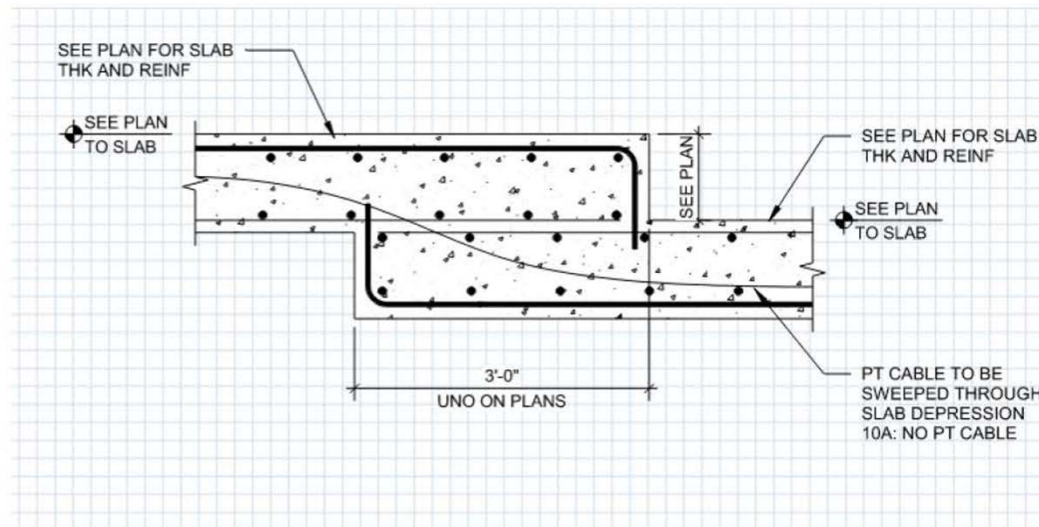


Figure 3- PT Step Detail from Original Drawings and HR Report

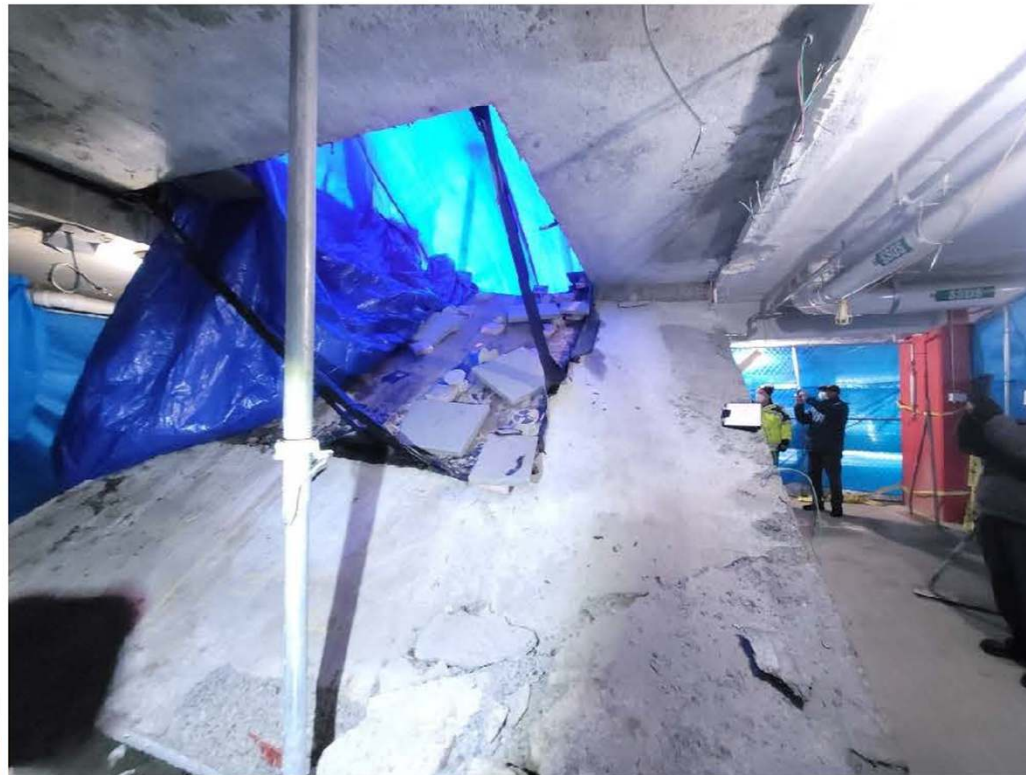


Figure 4- Partially Collapsed Slab looking West

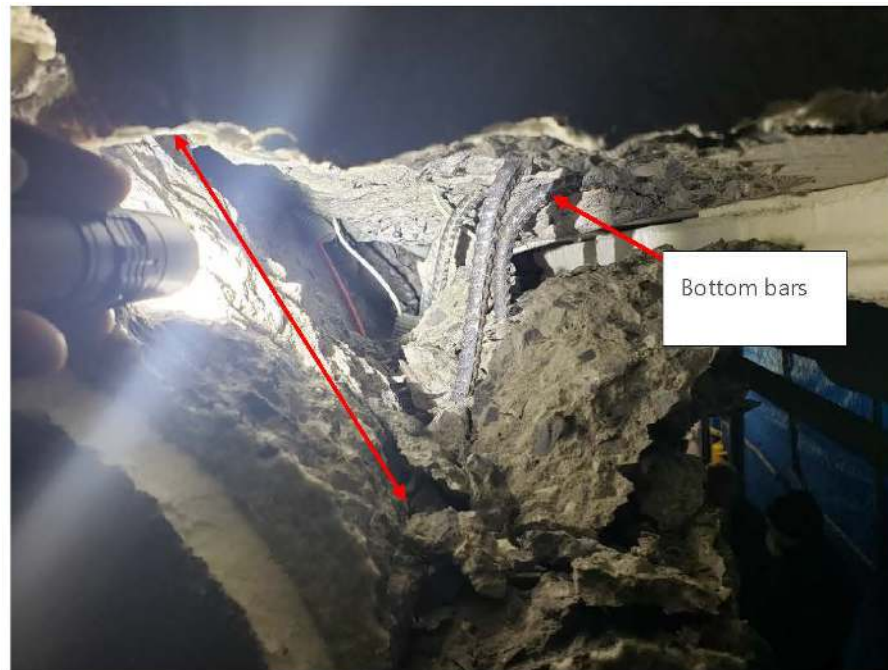


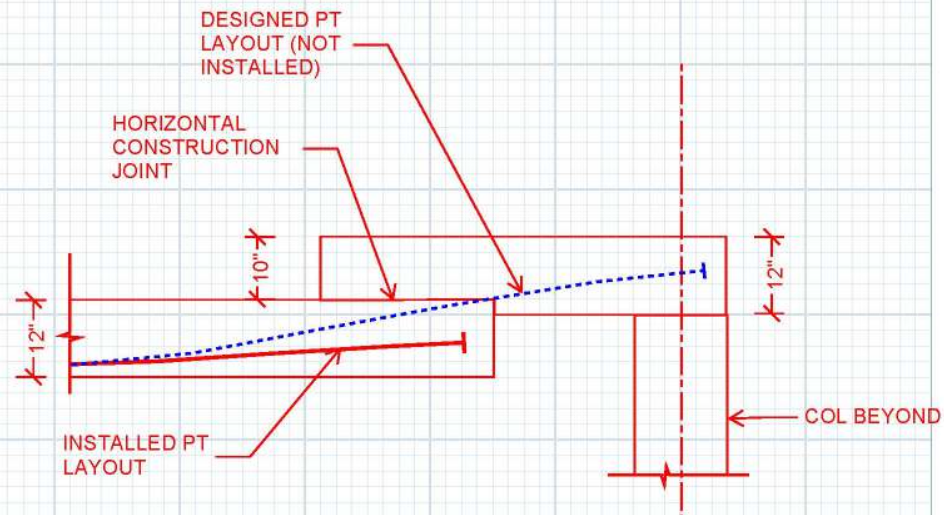
Figure 9- No Top Steel Crossing Failure Plane Looking North to South at West Failure Plane



Figure 10- PT Layout at Slab Looking East to West



SK-4





February 9, 2022

Mr. Tim Yahn
Managing Director of Construction
Building and Land Technology
1 Elmcroft Road – Suite 500
Stamford, CT 06902

**RE: Harbor Points-The Allure: Opinion of Causation-Local Slab Failure
850 Pacific Street, Stamford CT**

Dear Tim:

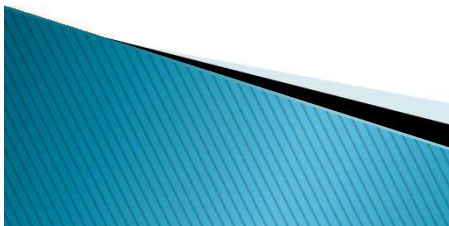
It is our understanding that the City of Stamford, CT is requesting our professional opinion regarding the reason or cause for the recent partial collapse of the 5th level amenity deck of the Allure.

The following descriptions and conclusions are based on our review of the existing structural drawings, the post tension shop drawing submittals, photographs of the collapsed slab section, discussions with our in-house Engineers (including one who visited the site), discussions with the concrete sub-contractor, and discussions with the building developer/ owner.

The slab structure at the 5th level amenity deck and the lower garage levels consists of cast-in-place, two-way, flat plate construction reinforced with post tensioning and conventional mild steel. The tendons are banded in the north-south direction, with uniformly spaced bundles of three (3) or four (4) in the east-west. The collapsed area of slab is approximately 16'-0" x 20'-0" and bound within structural grids G9/ G10 and TE/ GE (See attached SK-1 partial plan). The failed section bears on the 4th level garage at the east side and is still connected near the 5th level beam on the west side. There is a ten (10) inch step in the slab around the failure boundaries of the north and east sides and a transition zone or widened/ deepened slab soffit to allow passage and transition of the tendons from the "high" to "low" slab (See attached SK-2, Section 10/ S4.10). The transition step is shown in section 10/S4.10 as monolithic and without a construction joint(s). A review of the structural PT layout plan S105PT-B and the post tension shop drawings indicates the uniform tendons to be continuous through the slab step transition and extending west to the opposite end of the garage, approximately 80 feet (See attached SK-2 and 3).

In our recent discussions and a review of the photographs we found that the tendons across the transition zone are missing, resulting in discontinuity of the post tension reinforcing across the slab step and the ability of the slab to span to beyond the transition slab step. Additionally, it appears from the photographs that a horizontal construction joint was placed at the step transition, with no shear transfer mechanism. A 2-inch recess was observed from the underside of the remaining 5th level slab. (See attached SK-4 and Photo).

We anticipate that the uniform tendons, which extend west from the existing beam line along grid GA have also been compromised or relaxed, and that is why we requested reshoring to extend west to the edge of the next slab drop from the collapsed area.



HENDERSON AND ROGERS STRUCTURAL ENGINEERS, LLC
DATE - 02/14/2022

- The design drawings and PT shop drawings provided to WJE to date, do not show the as-built condition at the step in the slab. Was this condition identified by the special inspector as not conforming to the design? Was the EOR or PT Specialty Engineer aware of this condition? At any point was a sketch provided or reviewed by the EOR or PT Engineer for this change? Can you provide the specific special inspection reports for this location?
- The construction documents show both a top mat and bottom mat of conventional reinforcement within the PT slab with bars in both directions. In the area of the collapse there is no top steel. Is there supposed to be a top mat of reinforcement? Was this missing steel identified by the special inspector prior to concrete placement? Can you provide the specific special inspection reports for this location? In the event the top steel is missing, how do you plan to identify and assess the extent of the non-confirming steel?
- Is the identified PT layout correct in the area of the collapsed slab? Are there only supposed to be 3 groups of tendons? The drawings seem to indicate that the tendons should be equally spaced at approximately 3 ft. on center which would indicate that 1 additional band of tendons should have been provided in this area. For the remaining portion of the lower slab that spans west to the exterior wall, is the correct post tensioning layout provided or is a band of tendons missing? If missing, how do you plan to further assess this condition? Can you provide the specific special inspection reports for this location?
- Did the design team specify the beam between column line T12/T13 along GD that is not shown in the provided drawings? There are not details for it in the provided shop drawings. Provide documentation showing the design revisions adding the beam and reason that this change was made.
- What is the geometry (layout, drape, anchorage conditions) of the PT at the upper slab at the east end of the collapse? Is there a sketch or modified drawings for this area since the PT is not continuous? Have calculations been done to show this is sufficient in the new cantilevered arrangement?
- Could the contractor provide a description of the construction sequence of the 5th floor amenity slab?
- Please provide any other relevant information to the design, construction and inspection in this area

THE AS-BUILT CONDITION OF THE STEP APPEARS TO BE IN NON-CONFORMANCE WITH THE STRUCTURAL DRAWINGS AND PT SHOP DRAWINGS. ENGINEER-OF-RECORD WAS NOT NOTIFIED BY THE SPECIAL INSPECTOR ABOUT THE NON-CONFORMANCE. NO SKETCHES/DRAWINGS/CALCULATIONS WERE PROVIDED TO THE EOR FOR REVIEW. NO, WE DO NOT HAVE SPECIAL INSPECTION REPORTS FOR THIS AREA, AS THEY WERE NOT PROVIDED TO THE EOR.

FOR CLARIFICATION, THERE IS ONLY SUPPOSE TO BE #4 MAT AT THE BOTTOM OF THE SLAB IN EACH DIRECTION. ADDITIONAL TOP BARS ARE PROVIDED IN EACH DIRECTION AT COLUMN LOCATIONS. NO, ENGINEER-OF-RECORD WAS NOT NOTIFIED OF ANY MISSING STEEL REINFORCEMENT PRIOR TO CONCRETE PLACEMENT. NO, WE DO NOT HAVE SPECIAL INSPECTION REPORTS FOR THIS LOCATION. SLAB ASSESSMENT FOR MISSING STEEL WILL BE CONDUCTED IN PHASE 2.

NO, THE AS-BUILT CONDITION OF THE PT LAYOUT APPEARS TO BE IN NON-CONFORMANCE WITH THE STRUCTURAL DRAWINGS AND PT SHOP DRAWINGS. NO, THERE SHOULD BE SIX (6) BUNDLES OF PT CABLES EXTENDING FROM LOW SLAB INTO THE HIGH SLAB AT THE STEP AND ANCHORING AT THE EXPANSION JOINT. SLAB ASSESSMENT FOR MISSING PT CABLES WILL BE CONDUCTED IN PHASE 2. ENGINEER-OF-RECORD WAS NOT NOTIFIED BY THE SPECIAL INSPECTOR ABOUT THE NON-CONFORMANCE. NO, WE DO NOT HAVE SPECIAL INSPECTION REPORTS FOR THIS AREA.

THERE WAS A BEAM MARK "B21" AT THIS LOCATION SHOWN ON DRAWINGS DATED "02.23.2018", THIS BEAM WAS SUPPORTING A COLUMN THAT WAS SUPPORTING THE FITNESS CLUB ROOF. THE COLUMN AND BEAM WERE BOTH REMOVED FROM THE IFC DRAWINGS DATED "04.20.2018", SHEET "S105.B", BECAUSE OF ARCHITECTURAL CHANGES. HOWEVER, IT APPEARS THAT THE CONCRETE BEAM (B21) WAS CONSTRUCTED PER DRAWINGS DATED "02.23.2018". DRAWINGS DATED 02.23.2018 WILL BE PROVIDED.

THE GEOMETRY (CABLE LAYOUT, DRAPE AND ANCHORAGE) FOR THE UPPER SLAB SHOULD HAVE BEEN CONSTRUCTED PER THE STRUCTURAL DRAWINGS AND APPROVED SUBMITTALS. NO, THERE IS NOT A SKETCH ADDRESSING THIS CHANGE THAT WAS SUBMITTED TO THE ENGINEER-OF-RECORD. NO CALCULATIONS HAVE BEEN PROVIDED TO THE EOR.

ENGINEER-OF-RECORD DOES NOT HAVE A COPY OF POUR SEQUENCE FOR THE LEVEL 5 SLAB.

WE HAVE ATTACHED MILD STEEL REINFORCEMENT PLANS FROM THE STRUCTURAL DRAWINGS AND THE REBAR SUBMITTALS.

February 15, 2022

Mr. Tim Yahn
Managing Director of Construction
Building and Land Technology
1 Elmcroft Road – Suite 500
Stamford, CT 06902

**RE: Harbor Points-The Allure: Response to WJE Letter
850 Pacific Street, Stamford CT**

Dear Tim:

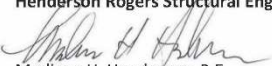
Please see below responses to the comments/questions noted in the "Discussions & Recommendations" section of the letter issued by WJE, dated 2/15/2022.

- The as-built condition of the step does not appear to conform with the structural drawings and PT shop drawings, and the Engineer-of-Record (EOR) was not notified by the special inspector about this non-conformance. The EOR was not aware of this condition, and no sketches/drawings/calculations were provided to the EOR for review. No, we do not have special inspection reports for this area, as they were not provided to the EOR for review.
- For clarification, there is only supposed to be a #4 size rebar mat at the bottom of the slab in each direction. Additional top bars are provided at column locations in each direction. No, the EOR was not notified of any missing steel reinforcement prior to concrete placement, and we do not have special inspection reports for this location. Slab assessment for missing steel will be conducted in Phase 2 of the Work Plan.
- No, the as-built condition of the PT layout does not appear to conform with the structural drawings and PT shop drawings. No, there should be six (6) bundles of PT cables extending from low slab into the high slab at the step and anchoring at the expansion joint. Slab assessment for missing PT cables will be conducted in Phase 2 of the Work Plan. EOR was not notified by the special inspector about the non-conformance, and we do not have special inspection reports for this area.
- There was a beam mark "B21" at the questioned location shown on drawings dated "02.23.2018", and this beam was designed to support a column for the fitness club roof. The column and beam were both removed from the "IFC" drawings dated "04.20.2018", Sheet "S105.B", because of architectural changes. However, it appears that the concrete beam (B21) was constructed per drawings dated "02.23.2018".
- Presently, we do not know the geometry (cable layout, drape and anchorage) for the upper slab condition. No, we are not aware of any sketch addressing this change that was submitted to the EOR for review and no calculations have been provided to the EOR.
- Engineer-of-record does not have a copy of pour sequence for the level 5 slab.

Mr. Tim Yahn
Building and Land Technology
February 15, 2022
Page 2 of 2

- We have attached mild steel reinforcement plans from the structural drawings and the rebar submittals.

We hope you find this information useful. Please contact our office should you have any questions or need additional information regarding this matter.

Respectfully,
Henderson Rogers Structural Engineers, LLC

Madison H. Henderson, P.E.
Principal

Cc: Ralph Martin (BLT); Vivek Gurjar, PE (HRSE); Ben Downing, PE (DCE)

Encl: Mild steel reinforcement plans; Rebar Submittal



02.15.2022



***Post Failure Letter
provided by Design
Engineer of Record to BLT***

February 2, 2022

Mr. Tim Yahn
Managing Director of Construction
Building and Land Technology
1 Elmcroft Road – Suite 500
Stamford, CT 06902

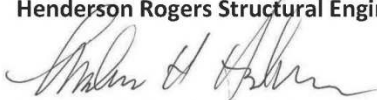
**RE: Harbor Points The Allure-Local Slab Failure at Amenities Deck
850 Pacific Street, Stamford CT**

Dear Tim:

Yesterday afternoon, we were advised of a partial floor failure at the amenities deck (Level 5) above the existing parking garage. Subsequent our discussion and review of the photos, we visited the site this morning to assess the condition in person and found the floor failure to be local and isolated within a segment of the stepped slab region of the amenities deck. Based on our findings at the time of our visit, the condition should not impact the global stability of the overall building structure and the areas outside of the impacted region can be considered safe to occupy. Shoring will be needed; however, in the shaded regions of the attached plan to prevent future serviceability issues until the area can be properly repaired. We should note that the failed stepped slab condition within the interior bay is unique to this building and does not occur at any of the other Harbor Points P-Block buildings.

We hope you find this information useful. Please contact our office should you have any questions or need additional information regarding this matter.

Respectfully,
Henderson Rogers Structural Engineers, LLC


Madison H. Henderson, P.E.
Principal



02/02/2022

Cc: Ralph Martin (BLT); Vivek Gurjar, PE (HRSE); Ben Downing, PE (DCE)

Encl: Partial Plan

EXHIBIT A



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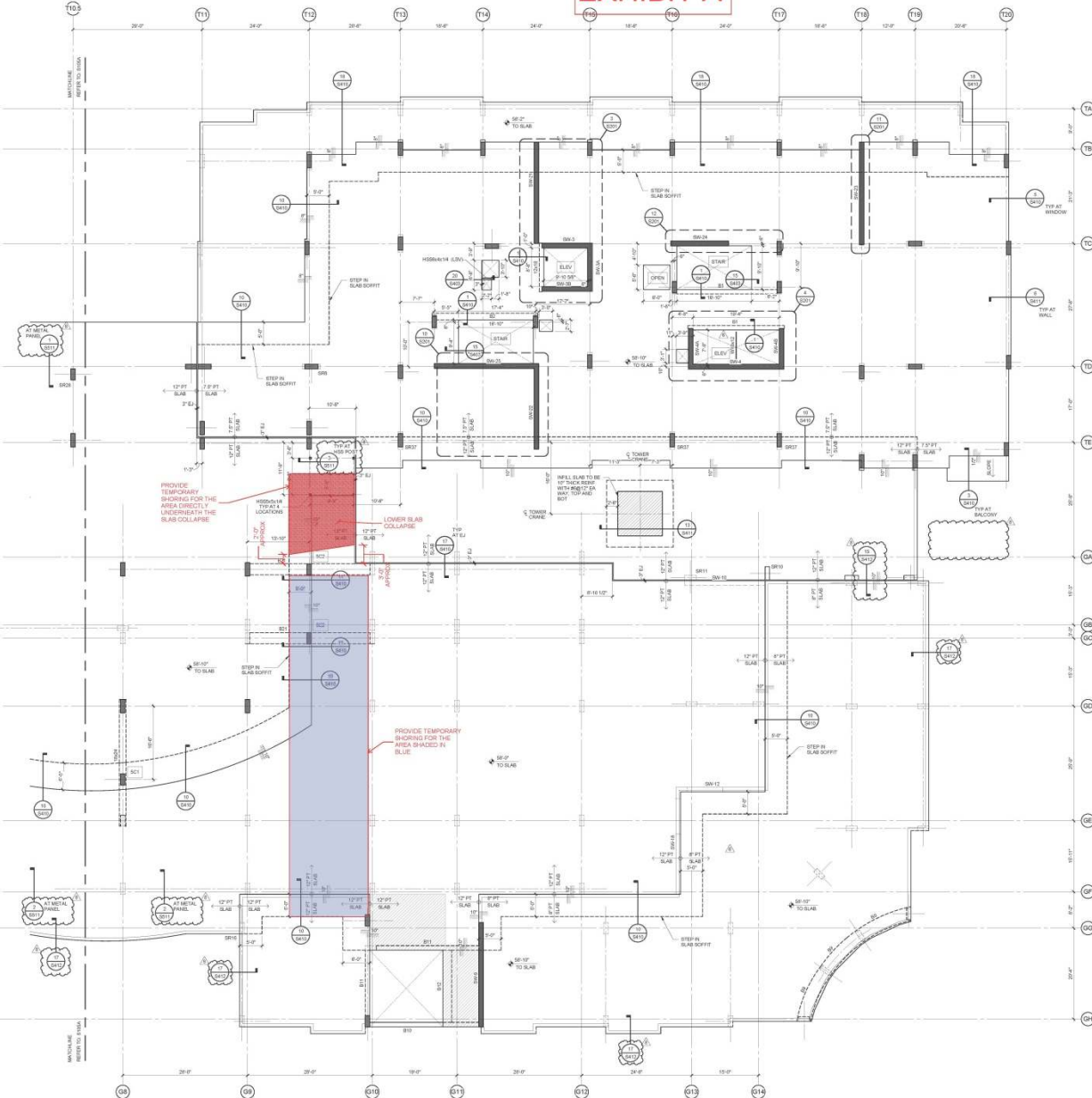
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- FLOOR FINISHING PLAN NOTES:**
1. REFER TO GENERAL NOTES SHEET FOR CONCRETE COMPRESSIVE STRENGTH AND ADDITIONAL REINFORCING INFORMATION.
 2. NOT ALL REINFORCING THROUGH THE FLOOR STRUCTURE ARE SHOWN ON THIS PLAN. CONSULT THE REINFORCING DETAIL SHEETS FOR THE NUMBER, SIZE AND LOCATION OF ALL REINFORCING WITH THE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS. REFER TO TYPICAL DETAILS FOR FINISHING AROUND PENETRATIONS.
 3. CONTRACTOR TO VERIFY ALL SLAB EDGES, STAIR AND ELEVATOR OPENINGS DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.
 4. PROVIDE 1/2" MIN. OF ADDITIONAL SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 5. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 6. TOP OF SLAB REINFORCING ARE NOTED ON PLANS.
 7. SEE ARCHITECTURAL DRAWINGS FOR EXTENT AND DIMENSIONS OF RAISED OR DEPRESSIONED SLAB AREAS, SLIPS AND CHANNELS.
 8. NOTATION "C" FOR CONCRETE ON PLAN DENOTES CONCRETE COLUMNS. SEE COLUMN SCHEDULE ON SHEET 100-110 FOR ADDITIONAL INFORMATION.
 9. NOTATION "W" FOR CONCRETE ON PLAN DENOTES CONCRETE WALLS. SEE BEAM SCHEDULE ON SHEET 100-110 FOR ADDITIONAL INFORMATION.
 10. NOTATION "S" FOR CONCRETE ON PLAN DENOTES STUD RAILS. SEE STUD RAIL SCHEDULE ON SHEET 100-110 FOR ADDITIONAL INFORMATION.
 11. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 12. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 13. ALL REINFORCING SLABS TO BE 7" THICK TWO WAY PER PLAN UNLESS NOTED OTHERWISE ON PLAN.
 14. NOTATION "TYP." FOR CONCRETE ON PLAN DENOTES CONCRETE BEAMS. SEE BEAM SCHEDULE ON SHEET 100-110 FOR ADDITIONAL INFORMATION.
 15. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 16. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
 17. REINFORCE ALL CORNERS OF SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.

- LEGEND:**
- 100-110 1/2" MIN. OF ADDITIONAL SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.
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 - 100-110 1/2" MIN. OF ADDITIONAL SLAB REINFORCEMENT AT ALL RE-ENTRANT CORNERS.

NO.	DATE	ISSUE
1	10/20/2010	ISSUED FOR PERMIT
2	10/20/2010	ISSUED FOR PERMIT
3	10/20/2010	ISSUED FOR PERMIT
4	10/20/2010	ISSUED FOR PERMIT
5	10/20/2010	ISSUED FOR PERMIT

PROJECT NO. 17130-000
ISSUED FOR PERMIT
ISSUED DATE: 10/20/2010
DRAWING TITLE
5TH FLOOR PLAN
DRAWING NUMBER
S105B



KEY PLAN

1 5TH FLOOR PLAN - SOUTH
100-110