

October 6, 2008

VIA EMAIL

Ms. Nickie Greco
Parkway Towers Condominium Association
c/o WestStar Management
6795 East Tennessee Avenue, Suite 601
Denver, Colorado 80224
Email: ngreco@weststarmanagement.com

Re: Parking Structure Evaluation for Parkway Towers Condominium Association
Project No.: 08103

Dear Ms. Greco and Members of the Board of Directors:

We have completed our site observations of the parking structure at Parkway Towers, located in Denver, Colorado. The following is a summary of our observations, comments and recommendations.

The recommendations provided within this report are not intended to be a complete set of construction documents but will give the Parkway Towers Condominium Association a general idea of the repair recommendations.

General Information

Parkway Towers is a 17-story condominium building consisting of approximately 100 residential units, a roof top pool, upper surface parking area with approximately 25 parking stalls and a below grade parking structure with approximately 50 parking stalls. We were informed that the Parkway Towers was constructed in 1962.

Blueprint drawings of the parking structure were provided by the Parkway Towers Condominium Association however, the blueprint drawings did not include waterproofing details for the parking structure.

We performed our observation of the parking structure on Thursday, August 14, 2008.

Observations, Conclusions and Recommendations

Upper Surface Parking Deck

A1. Upper Surface Wear Slab

Description: Concrete topping slab over structural twin tees coated with an elastomeric waterproof membrane.

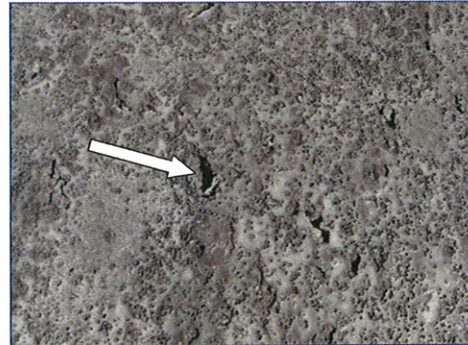
Comments: We observed a significant amount of deterioration of the elastomeric waterproof membrane that has been applied to the concrete wear slab.

We observed a significant amount of concrete deterioration of the upper surface wear slab below the elastomeric waterproof coating. The elastomeric waterproof coating at many locations is easily removed by hand.

We performed a chain drag test which involves dragging a heavy link chain across the upper surface wear slab while listening to the acoustic response. Areas where significant delaminations have occurred often have an audible acoustic response that contains different frequencies than areas where sound concrete/coatings are located.

We observed approximately 85% of the upper surface of the concrete topping slab to be affected by severe surface deterioration of the elastomeric waterproof coating. As a result of the severe waterproof coating deterioration observed and subsequent concrete topping slab deterioration, we estimate approximately 15% of the concrete topping slab to be sound.

Recommendations: We recommend that the existing waterproof membrane and topping slab be removed. A new topping slab should be poured and a traffic grade overlay system should be installed. These systems provide protection from water intrusion as well as impeding the absorption of deicing salts and deicing compounds. These products are very hard wearing in vehicular traffic conditions. They also provide excellent slip resistance under wet and icy conditions.



A2. Concrete Aprons and Concrete Drain Pans

Description: Presumed to be on-grade, non-reinforced concrete slabs located on the north and south entrances to the building.

Comments: The concrete drain pans are severely deteriorated. We observed the concrete aprons to be approximately 1/2" to 2" below the upper surface parking wear slab on the north entrance and 1" to 3" below the upper surface parking wear slab on the south entrance.

Recommendations: We recommend that the concrete aprons and concrete drain pans be removed and replaced. The movement, and subsequent damages observed, indicates that the soils beneath the concrete aprons and concrete drain pans have settled. We recommend removing a minimum 12" of existing soils and importing compacted structural fill prior to the placement of the new concrete aprons and drain pans.

Due to the significant amount of movement between the concrete topping slab and the east foundation wall, and the fact that commercial grade urethane sealants do not have the movement capability to handle the shear movement observed, the following are two repair options to affectively remediate this damage.

Option 1 – Preformed Sanoprene Expansion Joint

Saw cut the concrete topping slab to accommodate a preformed, sanoprene expansion joint, designed to perform under compression, tension and shear movements. A concrete block-out shall be formed and poured to receive the expansion joint materials. Repair option #1 will provide a long term solution to the movement issue observed at this location.



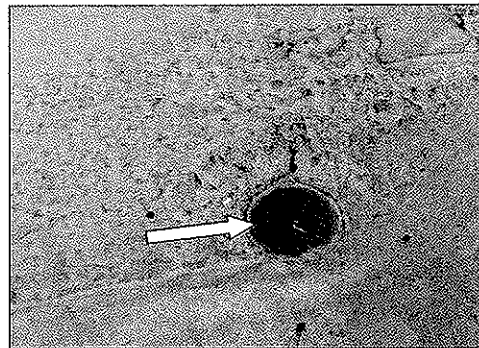
Option 2 – Silicone Joint Sealant

The joint control joint at the east entrances to the parking decks shall be formed such that the joint opening is a minimum 1/2". The control joint shall be cleaned, primed and backed with a closed cell backer rod. The sealant joint shall be tooled below the concrete deck surface, concaved to form an hourglass configuration to provide for maximum movement capability. While this repair option requires continued maintenance it is the most cost effective of the two repair options.

A3. Upper Surface Drains

Description: 6" diameter round deck drains with slotted metal screen covers.

Comments: There were seven deck drains visible during our observations of the upper surface of the parking structure.



The deck drains are located at various locations on the west and south side of the building. The deck drains appear to be functioning properly however; due to the large amounts of runoff from areas to the south and west of the property, the drains appear to be undersized and/or more drains are needed.

The deck drains drain to an existing storm sewer system which routes the runoff through the building out to public storm sewer located in Ash Street. The condition of this system is currently unknown.

Recommendations: The deck drains appear to be undersized or more drains are needed to adequately capture the runoff directed toward the structure. While we did not observe any areas of standing water, the metal screen covers appear to limit the potential flow capability from surface drainage. By increasing the number and size of the drains and modifying the screen covers it will increase the flow potential and reduce the maintenance required to keep the drains functioning at a maximum efficiency.

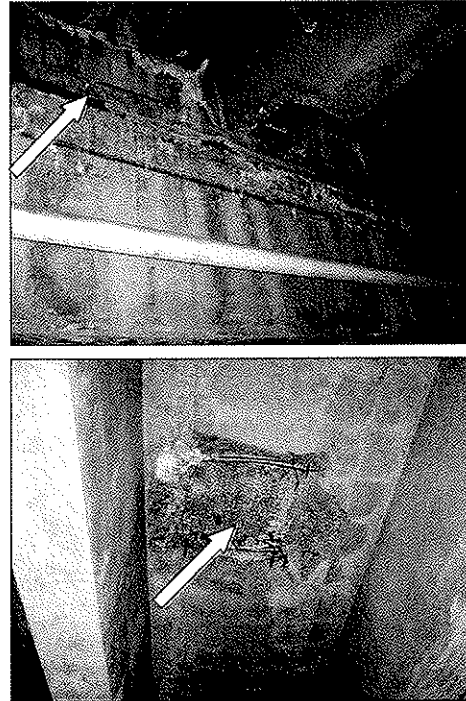
A video scope inspection shall be performed on the existing storm sewer system, at which time Bornengineering can recommend any modification required for the storm sewer system.

A4. Structural Twin Tees

Description: Horizontal structural support members that span between the inverted tee beams and the exterior foundation walls.

Comments: For orientation purposes the inverted tee beams are located on gridlines A through G as noted in the original drawings dated July 14, 1960. The ramp into the parking garage is located roughly between gridlines C and D. The double tees are located between gridlines 1 and 5. A copy of this sheet is appended to this report.

We observed active water leaks between gridlines E and F and the west foundation wall and gridline 5. Water leaks were also observed along gridline 3 between gridlines A and the south foundation wall.



We observed damage to double tee flanges and/or webs in the following locations.

- The first double tee located east of gridlines 5 and 6 on gridline G.
- The third leg to the east from gridlines 4 and G.
- There are several delaminated areas including exposed reinforcing steel in the flanges of the double tees at gridlines E, C and 4.
- We observed a repair that appears to be failing between gridlines D and E above parking stall #27.
- There is a spall in the flange of the double tee at gridlines B and C west of the concrete beam directly below the building footprint.
- We observed a crack in the flange of the third double tee to the east of gridline 5 between gridline A and the south foundation wall that extends the length of the double tee.
- The third and fifth legs of the double tees between the west foundation wall gridline 5 are spalled where the double tees intersect the inverted tee beam.

Recommendations: Upon completion of the upper surface wear slab and traffic grade overlay system and sealant installation, clean surface rust from the exposed portions of the steel bearing plates and apply a penetrating, migrating corrosion inhibitor.

Remove deteriorated concrete, clean the existing reinforcing steel and apply a penetrating, migrating corrosion inhibitor and repair the deteriorated areas with a polymer modified, shrinkage compensated, vertical and overhead repair mortar with integral corrosion inhibitor.

A5. Inverted Tee Beam and Concrete Columns

Description: Precast structural concrete beam supported on concrete columns and supporting precast twin tees.

Comments: For orientation purposes the inverted tee beams are located on gridlines A through G as noted in the original drawings dated July 14, 1960. The ramp into the parking garage is located roughly between gridlines C and D. The double tees are located between gridlines 1 and 5. A copy of this sheet is appended to this report.



We observed delaminations in the inverted tee beams at the following locations.

- Along gridlines G and 5 between the west foundation wall and gridline 5.
- Above the column at gridlines G and 5.
- We observed a large spall along the bottom of the inverted tee beam at gridline 4.
- Corroded steel embed plates along the inverted tee beam at gridline C between gridlines 4 and 5.
- There is delamination in the inverted tee beam C between gridlines 4 and 5.
- Corroded steel embed plates along the inverted tee beam at gridline A between the west foundation wall and gridline 5. We also observed a significant amount of dirt and debris on the top of the inverted tee beam.
- There is delamination in the face of the inverted tee beam below the second and third double tee legs west of the concrete beam directly below the building footprint.
- We observed a significant delamination in the inverted tee beam between gridlines 2 and 3 and A. The steel embed plates are corroded and in one 10'-0" section along gridline 3, the steel embed plate is completely corroded.

Recommendations: Upon completion of the upper surface wear slab and traffic grade overlay system and sealant installation, clean surface rusting from the exposed portions of the steel bearing plates and apply a penetrating, migrating corrosion inhibitor.

Remove deteriorated concrete, clean the existing reinforcing steel and apply a penetrating, migrating corrosion inhibitor and repair the deteriorated areas with a polymer modified, shrinkage compensated, vertical and overhead repair mortar with integral corrosion inhibitor.

A6. Site Drainage

Description: The property receives offsite runoff from the west and north and well as its own runoff.

Comments: The property receives offsite runoff from the west and north of the property which is currently redirect to the north via an asphalt berm that collects in an area drain located in front of the parking garage entrance. Runoff from the site is collected via existing drains located in the parking deck. The current slopes on parking deck are less than the industry standard minimum of 2.0%.

Recommendations: After the removal of the existing upper surface parking deck ware slab, the new concrete wear slab should be sloped to maintain a minimum slope. Additional and larger drains should be installed to adequately handle the onsite and offsite runoff. The existing asphalt berm should as be removed to allow the offsite runoff to sheet flow away from the property instead of constraining the flow at one inlet.

Summation

In summation, the waterproof coating on the upper surface parking structure wear slab has significantly deteriorated. The concrete wear slab beneath the waterproof coating has severely deteriorated. We estimate that approximately 75% to 80% of the existing concrete wear slab will need to be removed and replaced.

We recommend installing additional drains in the upper surface parking deck to accommodate the on and offsite runoff.

Upon installation of a new concrete ware slab, a traffic grade overlay system should be installed. These systems provide protection from water intrusion as well as impeding the absorption of deicing salts and deicing compounds. These products are very hard wearing in vehicular traffic conditions. They also provide excellent slip resistance under wet and icy conditions.

We recommend that the concrete aprons and concrete drain pans be removed and replaced.

Installing a preformed, sanoprene expansion joint between the concrete aprons and the upper surface parking deck, designed to perform under compression, tension and sheer movements, between the upper surface concrete topping slabs and the east foundation walls, will significantly reduce or mitigate water intrusion as a result of the complex movement at this location.

Please contact our office if you have any questions.

Sincerely,

Bornengineering

A handwritten signature in black ink, appearing to read 'N. Mekelburg', with a large, stylized loop at the end.

Neil L. Mekelburg, P.E.
Director
Structural Engineering Group

A handwritten signature in blue ink, appearing to read 'T. Foulke', with a large, stylized loop at the end.

Terry Foulke
Project Manager
Site and Building Evaluation Group

A handwritten signature in blue ink, appearing to read 'Jason Buechler', with a large, stylized loop at the end.

Jason Buechler
Project Manager
Civil Engineering

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