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Appendix O

Structural Condition Memorandum



Technical Memorandum

Structure 03-12 B0060 Condition Memo

Date: January 12, 2022 **Project No.:** 300052314.0000
Project Name: Warden Avenue and Kennedy Road Environmental Assessment Studies
Client Name: Region of York
Submitted To: Region of York
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This memorandum provides a summary of the structural condition of structure 03-12 B0060 (Cashel Bridge), based on information provided by the Region on the 2020 OSIM forms and photo records, and provides comment and recommendations regarding needs for rehabilitation or replacement of the structure for consideration in the Environmental Assessment (EA) process.

1.0 Description

Structure 03-12 B0060 was built in 1986 and is located on Kennedy Road (York Regional Road 3), just north of the intersection with Elgin Mills Road East, conveying the Bruce Creek. The structure is a cast-in-place concrete, rigid frame, arched soffit bridge with a span of 15.2 m (+/-) and a width of 13.1 m (+/-). The structure is constructed on a skew of approximately 23 degrees and carries two through-lanes of traffic, with an overall platform width of 12.2 m between barriers. The roadway widens immediately east of the bridge to provide left and right turning lanes for southbound traffic.

2.0 Structural Condition

The recent 2020 OSIM inspection assigned a Bridge Condition Index (BCI) of 73.38 to this structure and identified the structure to be in good condition overall, with no significant structural defects identified. Structural components of the bridge were noted to have narrow to medium cracks, with some moisture staining and efflorescence, which is typical of structures of this vintage.

Localized cracking with efflorescence and/or moisture staining on the soffit indicates the potential of water penetration through the overlying asphalt and waterproofing system (if present) and into the structural deck slab. Migration of water through the deck slab can result in exposure of embedded reinforcing steel to salt-laden water, which can result in increased corrosion potential. Although there was no evidence of significant corrosion on the soffit (i.e., spalling, rust staining, medium-wide cracking) at the time of inspection, continued exposure could allow corrosion to excel and result in future defects and overall deterioration.

As such, the Region may wish to consider conducting a detailed deck condition survey. This study would provide additional information related to the current corrosion potential of the deck system and provide means for determining if additional repairs (partial depth concrete repairs to deck, or concrete overlay) would be warranted at this time. The survey would also confirm the presence and condition of the deck waterproofing system.

3.0 Recommended Work

3.1 Minor Rehabilitation

Based on the overall condition of the structure and deficiencies noted, only a minor rehabilitation would be recommended. Although this rehabilitation may not be warranted for 6 to 10 years, it may be most cost efficient to complete any repair works during the works associated with the Kennedy Road improvements. It is recommended that this rehabilitation consists of removing the existing asphalt, completing deck top repairs (if required), replacing the waterproofing system (if present), repaving the deck, and completing localized concrete removals and patching to noted areas.

Staging of traffic would be required to allow for the rehabilitation work on the deck top and barriers to be completed while maintaining traffic. If one lane of traffic in each direction is required at all times, the repairs would have to be completed in three stages, with a maximum driving width (lane + clearances) of 3.5 m per vehicle. The first stage would consist of two lanes shifted to the far-left end of the bridge, followed by stage two which would have one lane against the left barrier and one lane against the right barrier (for work along centre of bridge), and the final stage of both lanes shifted to the far right. Alternatively, if reduction of traffic to one-way, single lane traffic at a time is acceptable, the rehabilitation work could be completed in two stages along the centerline.

3.2 Structure Widening

If widening of the roadway is required for the proposed Kennedy Road improvements, consideration may be given to widening the existing structure to meet the required driving platform width under proposed conditions. The widening would consist of matching the overall geometry of the existing structure and would require extensions of the footings and construction of new wingwalls. The above recommended rehabilitation work to the existing structure should be incorporated with the works associated with the structure widening.

The proposed widening would be completed in two or three stages to allow traffic to be maintained at all times, following similar staging as outlined above in the rehabilitation option, but with increased temporary lane widths available. Depending on the width of the extension on each side of the structure, it may be possible to maintain one lane of traffic in each direction at all times while only using two stages.

If widening of the structure is required, hydraulic modelling should be undertaken to identify any associated impact of the increased structure width and/or new wingwall configuration.

3.3 Additional Studies

The following studies may be considered to provide additional information on the condition of the existing structure and to provide required geotechnical information for design if widening is considered.

- Detailed Deck Condition Survey;
- Geotechnical Subsurface investigation for foundation recommendations and soil sampling for management of excess fill requirements, if bridge widening is required; and
- Hydraulic modelling to identify impacts of structure modifications if widening is required.

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