APPENDIX O

Structural Memorandum
INTRODUCTION

The City of Mississauga has retained Stantec Consulting Ltd. (Stantec) to undertake a Class EA and preliminary design for the improvements to Courtneypark Drive East, between Kennedy Road and Dixie Road. These limits include the Courtneypark Drive East interchange with Highway 410, as well as the associated bridge.

This memo presents a brief summary of the widening of the Courtneypark Drive East Underpass necessary to accommodate the proposed roadway improvements.

PROJECT LOCATION

The structure, which carries Courtneypark Drive East traffic over Highway 410, is located approximately 3.5 km west of Hurontario Street and 2.0 km north of Highway 401. Courtneypark Drive East will be referenced as being orientated west to east for the purposes of this memo.

AVAILABLE INFORMATION

Original construction drawings, from Ministry of Transportation Contracts 79-27 and 89-69, have been made available to Stantec. The General Arrangement drawings from these contracts are included with this memo.

EXISTING STRUCTURE

The Courtneypark Drive East Underpass consists of a two-span (35 m – 35 m) slab-on-girder (steel I-girder) bridge.

The original bridge was built circa 1979 and is approximately 15 m wide. In 1989, the bridge was widened to the south by about 12 m. There is a longitudinal joint in the raised concrete median between the two superstructures. There is a sidewalk on each side of the bridge and there are utility ducts within the south sidewalk. A barrier wall is situated on each of the sidewalks and there are electrical conduits within the barrier walls.

The pier consists of two separate units, each of which consist of a concrete pier cap supported on three square concrete pier columns founded on a spread footing. The abutments also consist of separate units, which are conventional concrete abutments supported on spread footings. The wingwalls for the original bridge are conventional concrete walls supported on spread footings;
however, the wingwalls for the widened portion of the bridge consist of Retained Soil System (RSS) walls.

**DESIGN CRITERIA**

**GENERAL**

Courtneypark Drive East is classified as an Urban Arterial Undivided roadway with a design speed of 80 km/h (UAU 80).

This project does not include any work on Highway 410 at the structure location.

The existing vertical clearance (approximately 5.0 m) under the bridge will be maintained.

**GEOMETRICS**

The horizontal alignment of Courtneypark Drive East is to be shifted approximately 3.7 m to the south.

There are no significant changes proposed to the vertical alignment.

**PROPOSED CROSS-SECTION**

The bridge will be widened to accommodate the proposed Courtneypark Drive East improvements. The proposed cross-section of the structure consists of the following (from north to south):

- 0.35 m parapet wall
- 1.5 m sidewalk
- 0.45 m barrier wall
- 1.5 m shoulder
- 3.3 m westbound auxiliary lane
- 3 x 3.5 m westbound through lanes
- 2.0 m median
- 3 x 3.5 m eastbound through lanes
- 3.3 m eastbound auxiliary lane
- 1.5 m shoulder
- 0.45 m barrier wall
- 3.5 m multi-use trail
- 0.35 m parapet wall

**PROPOSED STRUCTURE WIDENING**

The proposed cross-section requires the bridge to be widened approximately 13 m to the south. The superstructure widening is expected to consist of a slab-on-girder and the substructure widening will be similar to that carried out circa 1989. Modifications to the existing RSS walls along the south side of the structure will be required. The elimination of expansion joints (i.e., the use of semi-integral abutments) for the widening and the existing structure should be investigated in Detail Design.
In order to maintain the required vertical clearance, the depth and spacing of the steel I-girders for the widening may need to be shallower and smaller, respectively, than typically used for this bridge span configuration. The steel I-girder depth will need to be confirmed in Detail Design; however, it is expected that the depth will need to be approximately 900-950 mm in order to satisfy vertical clearance requirements.

The existing north barrier wall and sidewalk, including street lighting, will be replaced in order to accommodate the roadway improvements. The existing median will require modifications in order to accommodate the shift in the Courtneypark Drive East horizontal alignment. A portion of the existing deck will also need to be overlaid to accommodate the alignment shift. These modifications will need to be investigated in Detail Design in order to determine if any structural strengthening of the existing structure is necessary.

Street lighting (light poles, ducts and bases) will be added to the structure in accordance with preliminary street lighting design recommendations.

A Preliminary General Arrangement drawing is provided to illustrate the proposed bridge widening.

The estimated construction cost for the proposed widening is approximately $4,900,000.

**DETAIL DESIGN RECOMMENDATIONS**

The rehabilitation needs of the existing structure should be determined in Detail Design and any required rehabilitation work should be coordinated with the work necessary for the proposed widening. The determination of rehabilitation scope of work should include field investigations, consisting of at least a bridge deck condition survey, and life cycle cost analysis. A structural analysis of the bridge is also recommended to be completed in Detail Design to investigate impacts from the proposed horizontal alignment shift.

**STANTEC CONSULTING LTD.**

**M. D’Andrea**

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Attachment: General Arrangement drawings from Contracts 79-27 and 89-69
Preliminary cost estimate of proposed widening
Preliminary General Arrangement drawing of proposed widening

Design with community in mind
## COURTNEY PARK DRIVE EAST UNDERPASS - WIDENING

### PRELIMINARY COST ESTIMATE

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<th>Unit</th>
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Sub-total                                 | $4,080,300 |

20% Contingency                           | $816,100  |

TOTAL                                     | $4,896,400 |