

Appendix E

Structural Assessment

Project Memo

H353997

May 26, 2017

To: To Whom It May Concern From: Robert Short

cc: Melissa Alexander, David Jackson, Robert
Shamess

City of Barrie Hewitt's Secondary Plan Area

Structural Inspection of Watercourse Crossings

1. Introduction

On April 14, 2016, Hatch Infrastructure (Hatch) inspected a series of watercourse crossings along Mapleview Drive East and Lockhart Road in Barrie, ON, as part of the Hewitt's Class Environmental Assessment Study for the City of Barrie. The Schedule C Class EA is building on the Secondary Plan to evaluate alternative design concepts to accommodate future growth in the City of Barrie to the year 2031. As part of this undertaking, Hatch assessed the existing crossing structures.

This memo summarizes Hatch's structural observations and preliminary recommendations for the seven (7) crossings within the scope of work. Hatch's inspections were predominantly visual, and generally limited to the exterior portions of each structure. Hatch cannot state conclusively whether or not further defects are present within inaccessible areas, and our anticipated recommendations are solely based upon what we observed. This document should be read in conjunction with Hatch's hydraulic inspection memo for the same watercourse crossings.

2. Observations

Structural observations for each watercourse crossing are noted in the following sub-sections.

If you disagree with any information contained herein, please advise immediately.

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2.1 Mapleview Drive East Over Lovers Creek

- Designation: MAP 1
- Location: 0.1 km west of Country Lane / Stunden Lane
- Type: Concrete, rigid frame
- Span: 6.3 m (+/-)
- Condition: Fair
- Anticipated actions: Rehabilitate and extend.
- Defects and other remarks:
 - Some cracks present, mainly near construction joints.
 - Isolated reinforcement exposure at two locations; some corrosion present.
 - Minor spalls / scaling present at curbs and top slab.
 - Sparse rust stains and efflorescence present.
 - Less than 0.6 m of cover present above top slab.
 - A small portion of the slope south east of the structure is retained by plywood.
 - Full or partial demolition of existing curbs and walls maybe required to prevent formation of hard points beneath new roadway.

2.2 Mapleview Drive East over Hewitt's Creek

- Designation: MAP 2
- Location: 0.1 km west of Royal Jubilee Drive
- Type: Concrete, rigid frame + 2 x concrete storm pipe outlets (north side only)
- Span / Diameter: 4.3 m (+/-) span main channel + 1.2 m (+/-) outer diameter storm pipes (outlets only)
- Condition: Good
- Anticipated actions: Perform minor repairs and extend.
- Defects and other remarks:
 - Isolated minor spalling present at outlet for main channel.

- Unconsolidated concrete corroded rebar and exposed reinforcement present at west storm outlet, likely due to poor workmanship.
- Headwalls to be relocated to suit final road configuration.

2.3 Mapleview Drive East over Hewitt's Creek Tributary

- Designation: MAP 3
- Location: < 0.1 km west of Royal Jubilee Drive
- Type: Corrugated steel pipe (CSP), round
- Diameter: 0.9 m
- Condition: Good
- Anticipated action: Replace
- Defects and other remarks:
 - While Hatch did not observe any significant structural defects or damage, the current CSP is too small for the hydraulic conditions present and should be replaced with a larger pipe.
 - Some water may be seeping through the retaining wall along the north side of the road.
 - Headwalls to be relocated to suit final road configuration.

2.4 Lockhart Road over Hewitt's Creek

- Designation: LOC 1
- Location: 1.3 km east of Yonge Street
- Type: Structural plate corrugated round pipe
- Diameter: 2.4 m (+/-)
- Condition: Fair
- Anticipated action: Replace
- Defects and other remarks:
 - Bolts appear to be non-galvanized and have corroded. Bolt corrosion inside the culvert is most apparent.

- While the steel plates are galvanized and appear to be in good condition from the outside, the non-galvanized bolts appear to be accelerating corrosion of the plates from the inside of the culvert.
- Repair of the culvert may be possible, but replacement would likely be more economical. This culvert currently appears to be fair condition, but the accelerated corrosion could degrade the structure quickly and significantly reduce its service life.
- Gabion headwalls have deformed and should be rebuilt or demolished to suit final road configuration.

2.5 Lockhart Road over Hewitt's Creek Tributary

- Designation: LOC 2
- Location: 0.7 km east of Yonge Street
- Type: Corrugated high-density polyethylene (HDPE), round
- Diameter: 0.9 m
- Condition: Good
- Anticipated action: Extend
- Defects and other remarks:
 - Hatch did not observe any structural defects or damage.
 - No headwalls are present; demolition will not be required.

2.6 Lockhart Road over Lovers Creek Tributary

- Designation: LOC 3
- Location: 1.3 km west of Yonge Street
- Type: CSP, round
- Diameter: 0.9 m
- Condition: Fair
- Anticipated actions: Replace
- Defects and other remarks:
 - The lower portion of the CSP is moderately corroded.

- Some damage / deformation of steel at inlet.
- The fore slope near the outlet has eroded significantly.
- Although the culvert appears to be in fair condition, replacement may be more economical than repair, due to its relatively small size.

2.7 Lockhart Road over Lovers Creek

- Designation: LOC 4
- Location: 0.2 km east of Huronia Road / 10 Sideroad
- Type: Concrete, rigid frame
- Span: 6.1 m (+/-)
- Condition: Fair
- Actions: Rehabilitate and extend.
- Defects and other remarks:
 - Some cracks present, mainly near construction joints, at wing walls and at curbs.
 - Isolated reinforcement exposure at one location (top slab); some corrosion present.
 - Minor spalls present at wing walls and curbs.
 - Sparse rust stains and efflorescence present.
 - Less than 0.6 m of cover present above top slab.
 - Guide rails are likely anchored to top slab.

Full or partial demolition of existing curbs and wing walls maybe required to prevent formation of hard points beneath new roadway.

3. Conclusions

Recommended actions for the watercourse crossings are summarized in Table 3.1.

Table 3.1: Summary of Anticipated Actions for Watercourse Crossings

Crossing	Type	Approximate Span or Diameter	Structural Condition	Anticipated Action(s)	Remarks
MAP 1	Concrete, rigid frame	6.3 m	Fair	Rehabilitate and extend.	Partial demolition required.
MAP 2	Concrete, rigid frame	4.3 m	Good	Repair and extend.	Minor repairs required at storm outlets.
MAP 3	CSP, round	0.9 m	Good	Replace.	Current pipe is too small for hydraulic conditions; headwalls to be relocated.
LOC 1	Steel plate corrugated round pipe	2.4 m	Fair	Replace.	Bolts are corroded; replacement likely more economical than repair.
LOC 2	HDPE, round	0.9 m	Good	Extend.	No structural defects observed.
LOC 3	CSP, round	0.9 m	Fair	Replace.	Replacement likely more economical than repair.
LOC 4	Concrete, rigid frame	6.1 m	Fair	Rehabilitate and extend.	Partial demolition required.

Robert Short

RDS:rds
Attachment(s)/Enclosure