The City of
Barrie

HURONIA ROAD
City of Barrie

Class EA - Phases 3 & 4 Report
Draft Report

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Executive Summary

In order to identify the most appropriate road improvement strategy for Huronia Road from Yonge Street to Lockhart Road, a Municipal Class Environmental Assessment was initiated by the City of Barrie. Phases 1 & 2 of the ‘Schedule C’ Municipal Class EA process involved defining the problem, developing alternative solutions, and formulating measures to mitigate identified impacts. The preferred solution was identified, with Huronia Road divided into 3 sections as follows:

- widen to 3 lanes from Yonge Street north of Herrell Avenue;
- widen to 5 lanes from north of Herrell Avenue to just south of Mapleview Drive; and
- widen to 3 lanes from just south of Mapleview Drive to Lockhart Road with provisions for an ultimate widening to 5 lanes through this section as the surrounding area develops.

Following the identification of the preferred solutions, a number of alternative design concepts were developed to implement the solution. The City of Barrie standard cross-sections formed the basis of the design alternatives considered to reflect the above. To reduce the road allowance required to implement the design alternatives, modifications to the standards were considered, including reducing the lane widths, providing a sidewalk on one side only, reducing the boulevard widths and in some cases shifting the centreline of the road. Consideration was also given to extending the TransCanada trail system by providing a multi-use path on the east side of Huronia Road, from Loon Avenue to Lockhart Road. In essence, the design alternatives reflect varying cross-sections to implement the preferred solution.

The design alternatives were assessed in terms of the impacts to the various environments as well as the potential to mitigate such impacts. The primary impacts identified relate to property requirements and impacts to the adjacent commercial, industrial and residential land uses. Impacts to the natural environment associated with the widening of Huronia Road can be mitigated through the design and implementation process.

For the section of Huronia Road from Yonge Street to north of Herrell Avenue, property acquisition will be required to implement Design Alternative 3-1, the standard 3-lane cross-section. Design Alternatives 3-2 and 3-3 would reduce property impacts by reducing lane widths, at the expense of driver safety and comfort. Design Alternative 3-4 would remove the sidewalk from one side of the road, but this is not desired considering the high priority of active transportation in the City of Barrie. Reducing the boulevard width, as suggested by Design Alternative 3-5, could potentially force overhead utilities underground, at an increased cost. Property acquisition could be minimized by shifting the centreline, as proposed by Design Alternative 3-6.

For the section of Huronia Road from north of Herrell Avenue to south of Mapleview Drive, property acquisition will be required to implement Design Alternative 5-1, the standard 5-lane cross-section.
Design Alternatives 5-2 and 5-3 would reduce property impacts by reducing lane widths, at the expense of driver safety and comfort. Design Alternative 5-4 would remove the sidewalk from one side of the road, but this is not desirable considering the high priority of active transportation in the City of Barrie. Reducing the boulevard width, as suggested by Design Alternative 5-5, could potentially force overhead utilities underground, at an increased cost. Although it is desirable to reduce the right-of-way and therefore the property requirements, the implementation of Design Alternative 5-6 would contribute to the completion of the Trans-Canada Trail through the south end of Barrie, expanding the active transportation network for the City. Furthermore, Design Alternative 5-6 is proposed only for the section of Huronia Road from Saunders Road to Loon Avenue, where the Trans-Canada Trail continues east.

For the section of Huronia Road from south of Mapleview Drive to Lockhart Road, property acquisition would be required to implement Design Alternative 3-1, the standard 3-lane cross-section. Design Alternatives 3R-2 and 3R-3 would reduce property impacts by reducing lane widths, at the expense of driver safety. Design Alternative 3R-4 would limit impacts to abutting property by shifting the proposed centreline of the road. A section of the Trans-Canada Trail has been considered for Huronia Road from Loon Avenue to Lockhart Road and east on Lockhart. The implementation of the preferred design alternative will contribute to the completion of the Trans-Canada Trail through the south end of Barrie. Consideration should be given to the continuation of the trail on Huronia Avenue through the annexation area south of Lockhart to 10th Line, which will be assessed in a study by others.

As part of the Class EA process, the railway crossings and watercourse crossings on Huronia Road were also addressed in Phase 3.

Detailed safety assessments of the railway crossings of Huronia Road immediately south of Ellis Drive, immediately south of Herrell Avenue and on Little Avenue immediately west of Huronia Road were undertaken. In consideration of the cross-product of rail and road traffic and the deficient sight lines, a warning system (to include both lights and bells) is currently warranted at all three grade crossings. As both train and traffic volumes increase, the warrant for gate control will also be met at all crossings.

There are 10 water crossings on Huronia Road, from Yonge Street to south of Lockhart Road, that have been considered for culvert extension or replacement. There are also two proposed culverts, one on Huronia Road and the other on Saunders Road. Culvert crossings on arterial roads are typically designed to accommodate 100 year storm events. Hydraulic analysis was performed on the 10 existing culverts on Huronia Road to determine available capacity to convey the 100 year flow conditions. Water Crossings 7 to 10 meet the hydraulic requirements and therefore only require culvert extensions to provide a suitable water crossing in consideration of the road widening. Culverts 1 to 6 do not meet the hydraulic requirements of the 100 year flow, thus, these undersized culverts are to be replaced. The existing culvert on Saunders Road is within the proposed road improvements for Huronia Road and will need to be relocated further to the west.
The remaining tasks of Phase 3 include public and stakeholder consultation, the identification of the preferred design alternative, and the preliminary finalization of the preferred design alternative. Public Information Centre (PIC) 2 will allow the concerned public and agencies to provide comments and input related to the alternative design concepts, the assessment of such, and the preliminary recommendations. Notification of PIC 2 will be provided in local newspapers, the City’s website and through direct mailings to stakeholders and the affected public along Huronia Road.

All comments and concerns will be reviewed and an evaluation of all design concepts will be completed in light of such. Following consideration of comments and concerns received at PIC 2, a preferred design alternative concept will be recommended to Barrie City Council. Upon endorsement of such, Phase 3 of the Class EA process will be completed. The Phases 3 & 4 Report will be completed and placed on public record for a period of 30 days to allow for further public and stakeholder review and comment. A Notice of Completion will be published to inform the public and stakeholders of the study completion.
1 Introduction

1.1 Phases 1 & 2 Summary

The City of Barrie initiated a Municipal Class Environmental Assessment to identify the most appropriate road improvement strategy for Huronia Road from Yonge Street to Lockhart Road, a distance of approximately 4.7 kilometres. Various improvements are being considered to address existing and future deficiencies with respect to pavement condition, infrastructure and road capacity.

This study is being completed in accordance with the planning and design process for a ‘Schedule C’ Class Environmental Assessment as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, amended September 2007). Applying to all municipal road improvement projects, a number of study categories or schedules have been established recognizing the range of environmental impacts. The process corresponding to each is illustrated in Figure 1. Phases 1 and 2 of the Class EA process include defining the problem, development of alternative solutions, and formulation of measures to mitigate identified impacts.

In consideration of the existing conditions, the Problem Statement, which sets the framework for the study, is as follows:

That existing traffic and infrastructure deficiencies be corrected in an environmentally friendly manner which also meets future transportation needs.

Alternative solutions to address the Problem Statement included the following:

- do nothing (maintain existing conditions);
- reduce travel demands on Huronia Road;
- construct/designate alternative routes to Huronia Road;
- reconstruct Huronia Road (existing 2 lanes maintained) with intersection improvements; and
- reconstruct and widen Huronia Road (to 3, 4 or 5 lanes) with intersection improvements.

Following the completion of Phases 1 and 2 of the Class EA, the following preferred solution was selected:

- widen to 3 lanes from Yonge Street to north of Herrell Avenue;
- widen to 5 lanes from north of Herrell Avenue to just south of Mapleview Drive; and
- widen to 3 lanes from just south of Mapleview Drive to Lockhart Road with provisions for an ultimate widening to 5 lanes through this section as the surrounding area develops.
The provision of a continuous centre turn lane from Yonge Street to Lockhart Road is recommended given the need for left turn lanes at intersections to minimize impacts to through traffic. A centre turn lane will also serve all of the residential and commercial access points along Huronia Road thereby improving operations for vehicles entering/exiting these areas. While there is limited development currently south of Ellis Drive, the abutting lands have the potential for future development and thus the provision of a centre turn lane is considered appropriate (as opposed to widening the road at a later date to accommodate such).

Given the existing residential development along Huronia Road in the vicinity of Little Avenue, a 3-lane section is considered the most appropriate. Through the implementation of additional improvements at the Huronia Road/Little Avenue intersection (i.e. left and right turn lanes), adequate intersection operations (reasonable delays and queue lengths and acceptable levels of service) will be provided.

At Herrell Avenue, 2 lanes per direction are required to ensure appropriate intersection operations and queue lengths at the intersection given the through volumes on Huronia Road. With 1 lane per direction, an average queue of 250 metres and a 95th percentile queue of 400 metres would occur in the northbound direction during the PM peak hour (the critical time period), which is not considered acceptable. The transition from 3 lanes to 5 lanes should occur north of Herrell Avenue and south of Webb Street.

As indicated, a 3-lane section south of Mapleview Drive is recommended. However, in recognition of Simcoe County’s Transportation Master Plan which recommends widening County Road 54 (the extension of Huronia Road) to 4 lanes in the future, provisions for an ultimate 5-lane section should be considered. A portion of County Road 54 is now part of Barrie and will be renamed Huronia Road as part of the annexation lands, from Lockhart Road to 10th Line. Property should be acquired to accommodate 5 lanes ultimately with a staged implementation (a rural, 3-lane cross section can be constructed initially, to be updated to an urban, 5-lane section as warranted).

In conjunction with the above, the road is to be upgraded from its current rural cross-section to an urban cross-section, which includes the provision of curb and gutter, sidewalks, improved street lighting, and extended infrastructure services (water, sanitary sewers and stormwater sewers).

1.2 Phases 3 & 4 Steps to Complete

The steps to complete Phases 3 & 4 are identified in Figure 1. Following endorsement of the Preferred Solution by Council and at the direction of Council, the Study has proceeded to Phase 3 of the Class EA process, which has developed alternative design concepts for the preferred solution. The alternative design concepts have been assessed in consideration of their potential impacts to the various environments, and a recommended design concept will be identified. Similar to Phases 1 & 2, the development and assessment of the alternative design concepts will be presented for review by the public and agencies at a Public Information Centre (PIC 2). Appropriate notification will precede PIC 2. Following consideration of comments and concerns received, a preferred design alternative
concept will be recommended to Council. Upon endorsement of such, Phase 3 of the Class EA process will be completed. Phase 4 is the documentation of the process and methodology employed throughout the Study through the preparation of a final Phase 3 & 4 report, which includes a summary of the Phase 1 & 2 report. The Phase 3 & 4 report will be completed and placed on the public record for a period of 30 days to allow for further public and stakeholder review and comment. A Notice of Completion will be published to inform the public and stakeholders of the study completion.
Chapter 2 Alternative Design Concepts for the Preferred Solution

The study area has been defined to include Huronia Road from Yonge Street to Lockhart Road, as illustrated in Figure 2, and the immediately abutting lands recognizing that such could be impacted through the improvement strategy. Photographs of the existing conditions along Huronia Road are illustrated in Figure 3 and Figure 4.

To reflect the preferred solution and the limits of such, alternative design concepts were prepared based on the following road sections:

- Yonge Street to north of Herrell Avenue;
- north of Herrell Avenue to south of Mapleview Drive; and
- south of Mapleview Drive to Lockhart Road.

For each road section, a centre turn lane will be included to accommodate left turns. The provision of landscape median islands (in lieu of the centre turn lane) in areas where there are no driveways or entrances, such as between Loon Avenue and Mapleview Drive, will also be considered. As per City urban arterial road standards, street plantings can be provided in the new boulevards.

Where feasible, the provision of a trail within the Huronia Road right-of-way will be considered to complement the existing trail systems within the area (as per Figure 5) and in accordance with the objectives of the City’s Active Transportation Plan.

Section 2.1 Huronia Road - Yonge Street to north of Herrell Avenue

The design alternatives considered for the proposed 3-lane section of Huronia Road from Yonge Street to north of Herrell Avenue are illustrated in Figure 6 and are referenced 3-1 through 3-5 to reflect 5 options of a 3-lane road section. It should be noted that the preferred design alternative may be a combination of alternatives.

Section 2.1.1 Design Alternative 3-1: City of Barrie Standard (23 m Right-of-Way)

Design Alternative 3-1 involves the reconstruction of Huronia Road and widening to provide a continuous 3-lane urban section, complete with appropriate infrastructure services (i.e. curb and gutter, storm sewer, sidewalks, street lighting, etc.). This alternative reflects the City of Barrie standard cross-section BSD-03, which has a 23 metre right-of-way. The cross-section provides for an 11.0 metre road width (one 3.5 metre travel lane per direction and a 4.0 m centre turn lane), 5.5 metre boulevards (measured from property line to curb) and 1.5 metre sidewalks on both sides of the road.
2.1.2 Design Alternative 3-2: Reduced Centre Lane Width (22.5 m ROW)

Design Alternative 3-2 deviates from the City of Barrie standard cross-section by reducing the centre lane width from 4.0 metres to 3.5 metres and hence reducing the road width from 11.0 to 10.5 metres. The BSD-03 standard cross-section would be modified from the 23 metre right-of-way to a 22.5 metre right-of-way accordingly. All other elements remain unchanged from the standard cross-section.

2.1.3 Design Alternative 3-3: Reduced Lane Width (22.5 m ROW)

Design Alternative 3-3 deviates from the City of Barrie standard cross-section by reducing the lane width from 3.5 metres to 3.3 metres, and hence reducing the road width from 11.0 to 10.6 metres. The BSD-03 standard cross-section would be modified from the 23 metre right-of-way to a 22.5 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.1.4 Design Alternative 3-4: Sidewalk on One Side Only (20.5 m ROW)

Design Alternative 3-4 deviates from the City of Barrie standard cross-section by removing the 1.5 metre sidewalk from one side of Huronia Road and eliminating the 1.0 metre offset from the property line to the sidewalk. The BSD-03 standard cross-section would be modified from the 23 metre right-of-way to a 20.5 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.1.5 Design Alternative 3-5: Reduced Boulevard Width (20 m ROW)

Design Alternative 3-5 deviates from the City of Barrie standard cross-section with a reduction in boulevard width from 5.5 metres (measured from property line to curb) to 4.0 metres on both sides. The BSD-03 standard cross-section would be modified from the 23 metre right-of-way to a 20 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.1.6 Design Alternative 3-6: Proposed Centreline Shift on Huronia Road (23 m ROW)

Design Alternative 3-6 employees the City of Barrie standard cross-section BSD-03 (as with Alternative 3-1), however it shifts the road centreline in consideration of the existing and widened right-of-ways and the desire to minimize potential impacts to abutting residential properties.

2.2 Huronia Road - north of Herrell Avenue to south of Mapleview Drive

The design alternatives considered for the proposed 5-lane section of Huronia Road from north of Herrell Avenue to south of Mapleview Drive are illustrated in Figure 9 and are referenced 5-1 through 5-6 to reflect 6 options of a 5-lane road section. It should be noted that the preferred design alternative may be a combination of alternatives.
2.2.1 **Design Alternative 5-1: City of Barrie Standard (30 m Right-of-Way)**

Design Alternative 5-1 involves the reconstruction of Huronia Road and widening to provide a continuous 5-lane urban section, complete with appropriate infrastructure services (i.e. curb and gutter, storm sewer, sidewalks, street lighting, etc.). This alternative reflects the City of Barrie standard cross-section BSD-07A, which has a 30 metre right-of-way. The cross-section provides an 18.0 metre road width (two 3.5 metre wide travel lanes in each direction and a 4.0 m centre turn lane), 5.5 metre boulevards (measured from property line to curb) and 1.5 metre sidewalks on both sides of the road.

2.2.2 **Design Alternative 5-2: Reduced Centre Lane Width (29.5 m ROW)**

Design Alternative 5-2 deviates from the City of Barrie standard cross-section by reducing the centre lane width from 4.0 metres to 3.5 metres, thus reducing the road width from 18 to 17.5 metres. The BSD-07A standard cross-section would be modified from the 30 metre right-of-way to a 29.5 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.2.3 **Design Alternative 5-3: Reduced Lane Width (29.0 m ROW)**

Similar to Design Alternative 5-2, Design Alternative 5-3 deviates from the City of Barrie standard cross-section by reducing the lane width from 3.5 metres to 3.3 metres, thus reducing the road width from 18.0 to 17.2 metres. The BSD-07A standard cross-section would be modified from the 30 metre right-of-way to a 29 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.2.4 **Design Alternative 5-4: Sidewalk on One Side Only (27.5 m ROW)**

Design Alternative 5-4 deviates from the City of Barrie standard cross-section by removing the 1.5 metre sidewalk and 1.0 metre setback from one side of Huronia Road. The BSD-07A standard cross-section would be modified from the 30 metre right-of-way to a 27.5 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.2.5 **Design Alternative 5-5: Reduced Boulevard Width (27 m ROW)**

Design Alternative 5-5 deviates from the City of Barrie standard cross-section with a reduction in boulevard width from 5.5 metres (measured from property line to curb) to 4.0 metres on both sides. The BSD-07A standard cross-section would be modified from the 30 metre right-of-way to a 27 metre right-of-way. All other elements remain unchanged from the standard cross-section.

2.2.6 **Design Alternative 5-6: Proposed Multi-Use Trail (31.5 m ROW)**

Design Alternative 5-6 will only be considered for the section of Huronia Road from Saunders Road to Loon Avenue. The BSD-07A standard cross-section would be modified from the 30 metre right-of-way to a 31.5 metre right-of-way, to provide a 3.0 metre wide multi-use trail instead of a 1.5 metre wide
sidewalk on the east side of Huronia Road. The multi-use trail will terminate at Loon Avenue. Directly north of Loon Avenue, the proposed 1.5 m sidewalk will be aligned with the multi-use trail.

2.3 Huronia Road - south of Mapleview Drive to Lockhart Road

The design alternatives considered for the proposed interim 3-lane rural section of Huronia Road from south of Mapleview Drive to Lockhart Road are illustrated in Figure 8 and are referenced 3R-1 through 3R-4 to reflect 4 options of a 3-lane rural (R) road section. It should be noted that the preferred design alternative may be a combination of alternatives.

2.3.1 Design Alternative 3R-1: City of Barrie Standard (36 m Right-of-Way)

Design Alternative 3R-1 involves the reconstruction of Huronia Road and widening to provide an interim 3-lane rural cross-section with open drainage ditches. The City of Barrie standard cross-section BSD-05 was modified from 2 lanes to 3 lanes of travel, while maintaining the proposed 36.0 metre right-of-way. The cross-section will provide an 11.0 metre road width (one 3.5 metre wide travel lane per direction and a 4.0 m centre turn lane) with 2.0 metre shoulders (1.0 metre paved and 1.0 metre gravel). A 3.0 metre multi-use trail will also be provided on the east side of the road.

When the road is upgraded to 5-lanes, the shoulders will be converted to travel lanes with curb and gutter and storm sewer replacing the open ditches, and a sidewalk will be provided on the west side (to complement the multi-use trail on the east side).

2.3.2 Design Alternative 3R-2: Reduced Centre Lane Width (35.5 m ROW)

Design Alternative 3R-2 deviates from Design Alternative 3R-1 by reducing the centre lane width from 4.0 metres to 3.5 metres thereby reducing the road width to 10.5 metres and the required right-of-way to 35.5 metres. The proposed 3.0 metre wide trail would also be provided with this design alternative.

2.3.3 Design Alternative 3R-3: Reduced Lane Width (35.5 m ROW)

Similar to Design Alternative 3R-2, Design Alternative 3R-3 deviates from Design Alternative 3R-1 by reducing the lane width from 3.5 metres to 3.3 metres, thereby reducing the road width to 10.6 metres and the required right-of-way to 35.5 metres. The proposed 3.0 metre wide trail would also be provided with this design alternative.

2.3.4 Design Alternative 3R-4: Proposed Centreline Shift on Huronia Road (36 m ROW)

Design Alternative 3R-4, is similar to Design Alternative 3R-1 however, the centreline of the road would be shifted in consideration of the existing right-of-ways and the desire to minimize potential impacts to abutting properties. The proposed 3.0 metre wide trail would also be provided with this design alternative.
3 Environment Inventories

A description of the study area has been developed considering the alternative design concepts and the following environments:

- physical environment;
- natural environment
- social environment;
- cultural/heritage environment; and
- economic environment.

3.1 Physical Environment

3.1.1 Storm System

The entire area along Huronia Road within the study area uses ditches and surface flows as a storm drainage system, with the exception of a 260 metre section south of Little Avenue. As part of the Huronia Road upgrade, including the ultimate 5-lane section just south of Mapleview Drive to Lockhart Road, the open ditch drainage system will be replaced with a closed system consisting of curb and gutter, storm manholes and structures.

3.1.2 Sanitary System

A 600 mm diameter sanitary sewer is in place along Huronia Road between Yonge Street and Big Bay Point Road. An 825 mm sanitary sewer is in place along Huronia Road from Big Bay Point Road to Ellis Drive. There is no sanitary sewer system in place along Huronia Road from Ellis Drive to Pump Station 3 (150 metres north of Saunders Road). Rather, the sanitary sewer detours along Ellis Drive to Welham Road during this stretch, and connects back to Huronia Road along Saunders Road. There is a 975 mm sanitary sewer in place along Huronia from Pump Station 3 to Lockhart Road. A future trunk sewer extension is planned from Pump Station 3 to Mapleview Drive and is expected to be constructed in conjunction with the Mapleview Drive East road upgrade (currently being designed by others).

3.1.3 Utilities

The 3.5 metre boulevard provided in the City of Barrie cross-sections for an urban road allow for the provision of overhead and underground utilities. As the boulevard width is reduced, the width to accommodate overhead utilities is reduced, potentially forcing overhead utilities underground, at an increased cost.
3.1.4 Lane Width

The through lane width of Huronia Road must accommodate vehicles of different types and sizes, travelling in the same direction, whereas the centre lane width must accommodate vehicles turning in opposite directions (and therefore should be wider to allow opposing vehicles to see beyond the other).

The alternative design solutions (i.e. methods to implement the preferred solution) as previously presented, include consideration for 3.3 and 3.5 metre lanes. In considering traffic operations, the capacity of a through lane increases with its width - a wider lane can accommodate more traffic\(^1\). As such, a 3.5 metre lane will have a higher capacity than a 3.3 metre lane, all else being equal. Safety also increases with lane width, up to a width of 3.7 metres (beyond which no further improvements are realized)\(^2\).

To investigate the implications of a reduced lane width (recognizing that 3.5 metres is a standard lane width in the City of Barrie), the intersection operational analyses were revised to reflect 3.3 metre lanes. While the overall intersection operations and levels of service remain acceptable, the average intersection delays increased in the order of 4 to 7 seconds during the critical PM peak hour at the key intersections (i.e. Little Avenue, Big Bay Point Road, Mapleview Drive and Lockhart Road).

It is further noted that as per the *Transportation Association of Canada* (TAC) guidelines, the lane widths for urban collector and arterial roads should be in the order of 3.5 to 3.7 metres. Only local roads are to have a lane width of less than 3.5 metres. The guidelines do however indicate that reduced lane widths of 0.2 metres less (i.e. 3.3 to 3.5 metres) can be considered where constraints are severe and the design speed is 60 km/h or less. However, in keeping with the City’s practice of adopting design speeds of 20 km/h over the posted speed limit, the applicable design speed for Huronia Road is 70 km/h from Yonge Street to Herrell Avenue and 80 km/h from Herrell Avenue to Lockhart Road, and thus the reduction should not be applied. For reduced lane widths to be considered, the posted speed limit would need to reflect a design speed of 60 km/h or less.

The centre turn lane should have a minimum width of 4.0 metres to provide sufficient opportunity for motorists to see beyond an opposing turning vehicle, thus ensuring the way is clear prior to completing a turn.

3.1.5 Traffic Operations

**Phases 1 & 2 Analyses**

An analysis of traffic operations along Huronia Road was undertaken as part of the initial stages of the Class EA process and otherwise documented in the Phases 1 & 2 report. The analysis consisted of the following:

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\(^2\) Ibid
- review of existing (2006) and 2016 traffic volumes and operations as per the Huronia Road Traffic Impact Study\(^3\); 

- development and assessment of 2026 traffic projections in consideration of low and high growth scenarios; 

- review of link operations along Huronia Road and identification of the corresponding lane requirements (i.e. number of lanes per direction with consideration for a centre turn lane); and 

- review of intersection operations along Huronia Road and identification of the corresponding lane requirements and intersection control at the intersections.

As part of the preliminary assessment of the alternative solutions developed in Phase 2 of the Class EA process, the ability of each solution to accommodate the above noted traffic volumes was investigated and a recommended solution identified (the assessment also considered factors other than traffic operations).

As part of the final assessment of the alternative solutions, the City of Barrie provided traffic projections for the 2031 horizon year, as per their City-wide transportation model (which was otherwise under development during the course of the study). The traffic projections were therefore revisited and revised to better reflect the anticipated growth as per the City’s transportation model. Based on the revised 2026 volumes, and in consideration of the lane and intersection capacities, the following lane requirements were identified:

- 1 lane per direction from Yonge Street to north of Herrell Avenue; 

- 2 lanes per direction from Herrell Avenue to just south of Mapleview Drive; 

- 1 lane per direction from just south of Mapleview Drive to Lockhart Road, with provision for a second lane as the area develops; 

- left turn lanes at all intersections; 

- an eastbound right turn lane at Yonge Street; and 

- a continuous centre turn lane from Yonge Street to Ellis Drive (in consideration of the density of residential and commercial driveways).

It is noted that the intersections will effectively dictate the lane requirements necessary, which in turn have been determined based on the provision of acceptable intersection delays, levels of service and queues on the major approaches.

The above were incorporated into the development of the alternative solutions and reflected in the preferred solution as previously noted.

**Phases 3 & 4 Analyses**

During the completion of Phases 3 and 4 of the Class EA process, the City continued to develop and refine its transportation model including consideration for various road improvements within the immediate area that could otherwise affect traffic operations on Huronia Road. In this respect, the previous traffic analyses were revisited to confirm the lane requirements as they relate to the preferred solution.

Revised model projections for the year 2031 were provided by the City which considered the alternative solutions as previously defined, in addition to the preferred solution, namely:

- Alternative 1: Do Nothing (2 lane Huronia Road from Yonge Street to Lockhart);
- Alternative 5: Widen to 3 lanes;
- Alternative 6: Widen to 4 lanes;
- Alternative 7: Widen to 5 lanes; and
- Preferred Solution: 3 lanes from Yonge Street to north of Herrell Avenue, 5 lanes to south of Mapleview Drive and 3 lanes to Lockhart Road.

The corresponding link volumes are provided in Table 1. As is evident, the volumes will increase as road capacity is increased (through the provision of additional lanes). As the transportation model is capacity constrained, if the number of lanes is restricted (and hence capacity is restricted), the model will only assign a certain volume and then traffic will have to use alternative routes (as per the model, the capacity of Huronia Road is 700 vehicles per hour per lane). For options with a centre lane, the centre lane is assumed to add an additional 350 vphpl to the capacity.

The traffic projections prepared for the Phases 1 & 2 report for the year 2026 (last column of Table 1) were compared with the 2031 model results. While the projections are somewhat greater than the model, they are considered reasonable and thus the operational and link analyses undertaken were not otherwise updated (as per the model developers, the model numbers are not to be taken as exact figures, but rather an indicator as to future growth).

In considering the preferred solution lane configuration and the link volumes corresponding to it (i.e. Preferred Solution) the following lane requirements were confirmed:

- 1 lane per direction from Yonge Street to Herrell Avenue;
- 2 lanes per direction from Herrell Avenue to Mapleview Drive;
• 1 lane per direction from Mapleview Drive to Lockhart Road; and

• construction of a centre turn lane, which will accommodate left turn movements, thereby improvement capacity and hence operations of the through movement.

**Table 1: 2031 PM Peak Hour Volumes**

<table>
<thead>
<tr>
<th>Road Section</th>
<th>Alt 1 Do Nothing</th>
<th>Alt 5 Widen to 3 lanes</th>
<th>Alt 6 Widen to 4 lanes</th>
<th>Alt 7 Widen to 5 lanes</th>
<th>Preferred Solution</th>
<th>2026 EA Volumes</th>
</tr>
</thead>
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<tr>
<td></td>
<td>NB</td>
<td>SB</td>
<td>NB</td>
<td>SB</td>
<td>NB</td>
<td>SB</td>
</tr>
<tr>
<td>Yonge St to Little Ave</td>
<td>231</td>
<td>438</td>
<td>256</td>
<td>620</td>
<td>275</td>
<td>735</td>
</tr>
<tr>
<td>Little Ave to Herrell Ave</td>
<td>188</td>
<td>491</td>
<td>222</td>
<td>698</td>
<td>243</td>
<td>831</td>
</tr>
<tr>
<td>Herrell Ave to Truman Rd</td>
<td>136</td>
<td>643</td>
<td>180</td>
<td>882</td>
<td>208</td>
<td>1040</td>
</tr>
<tr>
<td>Truman Rd to Big Bay Point</td>
<td>412</td>
<td>465</td>
<td>451</td>
<td>694</td>
<td>459</td>
<td>838</td>
</tr>
<tr>
<td>Big Bay Point to Ellis Dr</td>
<td>399</td>
<td>513</td>
<td>490</td>
<td>731</td>
<td>535</td>
<td>894</td>
</tr>
<tr>
<td>Ellis Dr to Loon Ave</td>
<td>429</td>
<td>360</td>
<td>517</td>
<td>564</td>
<td>566</td>
<td>718</td>
</tr>
<tr>
<td>Loon Ave to Mapleview Dr</td>
<td>417</td>
<td>691</td>
<td>519</td>
<td>901</td>
<td>563</td>
<td>1047</td>
</tr>
<tr>
<td>Mapleview Dr to Saunders Rd</td>
<td>654</td>
<td>678</td>
<td>817</td>
<td>804</td>
<td>862</td>
<td>861</td>
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<tr>
<td>Saunders Rd to Lockhart Rd</td>
<td>812</td>
<td>488</td>
<td>962</td>
<td>583</td>
<td>1001</td>
<td>626</td>
</tr>
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</table>

To accommodate the northbound travel queues at Herrell Avenue, it is recommended that the transition from 3 to 5 lanes occur north of Herrell Avenue (as previously recommended). This will ensure the maximum capacity and hence best level of service through the intersection.

### 3.2 Natural Environment

An Environmental Impact Study of the preferred solution was completed by Azimuth Environmental Consulting for the Huronia Road widening entitled *Natural Environment Impact Assessment Report – Huronia Road Improvements*. A summary of their findings is provided below, whereas the corresponding report is provided in Appendix A.

---

3.2.1 Aquatic Resources

Due to the proposed culvert extensions and ditch enclosures, the Huronia Road widening has the potential to harmfully alter, disrupt or destroy (HADD) direct or indirect fish habitat. As such, acceptable measures must be presented and implemented to compensate for the loss in fish habitat. Watercourse culvert crossings and roadside ditches classified as either indirect or direct fish habitat will require provincial and federal review to protect the habitat.

Prior to undertaking work near the Huronia Road watercourses, permits are required from the Lake Simcoe Regional Conservation Authority (LSRCA). Such work must not adversely impact the existing flow regimes of these water systems.

The Department of Fisheries and Oceans (DFO) guidelines state that any replacement or proposed changes to culverts or ditches must improve upon the existing conditions of the culverts, ditches or fish habitat. The DFO does not have a favourable position towards new enclosures of potential fish habitat.

An application for a Federal Authorization for Works or Undertakings Affecting Fish Habitat may be required through the LSRCA due to culvert lengthening. The application may require development of a fish habitat compensation plan for the habitat lost by the enclosures of the watercourses/ditches to ensure “no net loss” overall. The DFO is not required to accept any such compensation plan. Such an application will generate a Canadian Environmental Assessment Act (CEAA) review process.

3.2.2 Terrestrial Resources

Due to the proposed widening of Huronia Road, approximately 1.3 ha of woody vegetation will be lost, including sections adjacent to the Lover’s Creek corridor. This loss of edge vegetation exposes internal plant material to the effects and impacts from wind, exposure, road salt spray, etc. The loss of vegetation may also have an impact on the ambient temperatures for the adjacent Lover’s Creek, a well documented and significant cold water fish habitat. Vegetation restoration must offset the impacts from the culvert extensions and the open channel relocation proposed in the design concept. Once trees within the limit of clearing are removed, newly exposed trees should be examined in terms of safety hazards (potential to cause damage to life or property).

None of the vegetation communities or vegetation within the study area are of federal or provincial conservation concern. There is a record on file with the Ontario Ministry of Natural Resources (OMNR) Natural Heritage Information Centre (NHIC) indicating the area may contain the habitat of a threatened or endangered species (Fogg’s Goosefoot), however, there is no presence of a suitable habitat within the area and the species was not identified during field investigations.
3.2.3  Wetland

The implementation of the preferred solution will result in the loss of 0.21 ha of wetland habitat. This does not represent a significant loss to the system.

3.2.4  Wildlife

The implementation of the preferred solution will result in the loss of 1.29 ha of tree cover. This does not represent a significant loss to the system.

There will be potential minimal loss of amphibian breeding habitat in the study area. The potential loss is minimal as the majority of the features will remain after the preferred design alternative is implemented. The loss of amphibian breeding habitat does not represent a significant loss to the system, with continued breeding within the area expected.

The proposed widening of Huronia Road is not expected to alter the movement of wildlife.

3.2.5  Conclusion

The proposed road improvements potentially pose a localized impact to the existing form and function of aquatic habitat found within Whiskey Creek, its tributaries, and the tributaries of Lover’s Creek. Impacts associated with construction activity are temporary and can be adequately addressed through appropriate mitigation. There is the potential for a HADD considering the enclosure/culvert lengthening of existing fish habitat. To offset this risk, an appropriate compensation plan may be required that can result in a greater overall gain (i.e. providing an overall improvement to the watershed).

3.2.6  Construction Mitigation

Work involving the watercourses or ditches should be completed ‘in the dry’, during low water levels. It is anticipated that in-water works will not be permitted between September 30 and June 30 near the Whiskey Creek and Lover’s Creek (and associated tributaries), to be confirmed by the LSRCA/MNR. Removal of vegetation should not occur between April to the end of July to avoid impacting nesting birds.

Erosion and sediment control measures will be paramount considering the fish habitat of the Whiskey Creek and Lover’s Creek. Best management practices must be in effect to minimize impacts. All sediment controls are to be maintained until vegetation has been re-established to sufficiently stabilize any disturbed soils.

Any new culverts or culvert replacements should be installed with a minimum 20% embedment below the existing channel invert or design bottom of the watercourse and appropriate substrate material placed to improve the bottom conditions (as opposed to an exposed culvert). If possible, a similar
bottom width as the existing structure should be provided. All culverts must provide for fish passage. The LSRCA has favoured the use of “open bottom” culverts where cold water fish habitat and ground water inputs are present.

Ground water contributions potentially occur in ditch locations through the subject area. The LSRCA requires such contributions be maintained, therefore any proposed ditch enclosures should be perforated to maintain and capture ground water seepage.

All areas disturbed during construction should be restored immediately following completion of the works. All required maintenance activities must be conducted away from flowing roadside ditch and watercourses to avoid harm to the aquatic environment.

3.3 Social Environment

Property impacts have been considered from the acquisition of land at the following locations:

- land adjacent to the proposed Huronia Road right-of-way;
- land adjacent to the proposed right-of-way on roads intersecting Huronia Road;
- daylighting triangles (10 m x 10 m) have been pursued, as requested by the City of Barrie, to improve sight lines at the intersections; and
- property blocks (5 m x 10 m) will be acquired at each end of every culvert on Huronia Road and Saunders Road for maintenance and repairs to the water crossing.

If a building is impacted by the proposed changes to the right-of-way, the structure and property may be acquired in order to provide the most appropriate cross-section.

The need for the 5 x 10 metre property blocks at the culvert ends will be further reviewed (as will all property impacts) during the detailed design stage, to confirm whether or not there is an existing easement owned by the City of Barrie or whether additional property will need to be acquired.

3.4 Cultural/Heritage Environment

An archaeological assessment of Huronia Road\(^5\) was undertaken by AMICK Consulting Limited in 2005 as referenced in the Huronia Road Phases 1 & 2 EA Report. While background research indicated the high potential for archaeological resources of Native and Euro-Canadian origins in select locations, no archaeological deposits were encountered during the physical assessment of the area. The study concluded that no further archaeological investigations are considered necessary for the undertaking. Furthermore, the City of Barrie Heritage Sites Inventory does not identify any heritage buildings along Huronia Road.

Based on a review of applicable mapping, there are no known First Nations lands or interests along Huronia Road that would otherwise be impacted. During the course of the study, additional correspondence with First Nations will be undertaken to confirm such.

### 3.4.1 Conclusion

In consideration of the above, the impacts to the cultural and heritage environment will be similar for all design alternatives.

### 3.4.2 Construction Mitigation

Should archaeological/heritage remains be found during site preparation or construction, the Ministry of Culture and AMICK Consultants Limited should be notified immediately.

### 3.5 Economic Environment

The construction and maintenance costs for the various design alternatives are expected to be the same. Thus, only the cost to acquire property will impact the various design alternatives.

The following land values have been referenced from the 2008 City of Barrie Development Charges document, based on the current zoning:

- low density residential $25/ft² ($269/m²)
- commercial - arterial $35/ft² ($376/m²)
- industrial - medium density $20/ft² ($215/m²)
- institutional - medium density $25/ft² ($269/m²)

No value is assumed for environmentally protected or open space land in that it cannot otherwise be developed.
4 Evaluation of Alternative Design Concepts

4.1 Impacts of Design Alternatives

The potential impacts associated with each alternative are noted in Table 2 through Table 4 and discussed further below. Although there will be impacts to other environments, it is expected that property acquisition and the associated impacts will govern the evaluation and the selection of a preferred design alternative.

Wherever possible, the alternatives to the City of Barrie standard for a 3-lane urban (BSD-03, 23 m right-of-way), 5-lane urban (BSD-07A, 30 m right-of-way), or 3-lane rural (BSD-05, 36 m right-of-way) cross-section will be applied within the corresponding road sections (i.e. Yonge Street to Herrell Avenue, Herrell Avenue to Mapleview Drive and Mapleview Drive to Lockhart Road). Where property constraints exist, other design alternatives may be pursued to reduce the impacts associated with land acquisition. Prior to receiving input and comments regarding the preferred design alternative from stakeholders through the public consultation process, certain assumptions have been made with respect to property acquisitions which are subject to change following PIC 2. Any revisions to the plans will be amended and included in an updated version of this report.

4.1.1 Huronia Road - Yonge Street to North of Herrell Avenue (3-lanes)

Design Alternative 3-1 would provide a 3-lane cross-section with a 23 metre right-of-way and sidewalks on both sides. Huronia Road from Yonge Street to north of Herrell Avenue has an existing road allowance which would require land acquisition in certain sections to accommodate the standard BSD-03 cross-section. There are several residential properties along the east and west side of Huronia Road that may be impacted through the implementation of the BSD-03 standard cross-section.

Design Alternative 3-2 would reduce the road allowance from 23 metres to 22.5 metres, by reducing the centre lane width. This reduction would reduce property impacts by 0.25 metres on either side of the road. However, in reducing the centre lane, the likelihood of a collision with vehicles occupying the centre turn lane would be increased (due to reduced site visibility past the opposing vehicle) and the level of safety would be reduced on Huronia Road.

Design Alternative 3-3 would reduce the road allowance from 23 metres to 22.5 metres, by reducing the through lane width. This reduction would reduce property impacts by 0.25 metres on either side of the road. Similar to Design Alternative 3-2, in reducing the travel lanes, the likelihood of a collision with vehicles occupying these lanes would be increased on Huronia Road. Furthermore, the Geometric Design Guide for Canadian Roads stipulates that for two-lane or multilane roadways designated as an arterial with a rural or urban cross-section, the through lane width should not be less than 3.5 metres.
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<tr>
<th>Evaluation Criteria</th>
<th>Design Alternative 3-1</th>
<th>Design Alternative 3-2</th>
<th>Design Alternative 3-3</th>
<th>Design Alternative 3-4</th>
<th>Design Alternative 3-5</th>
<th>Design Alternative 3-6</th>
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**Legend**

- **Represents Negative Impact**
- **Represents Impact which is Mitigative or Neutral**
- **Represents Positive Impact**

---

**Table 2: Assessment of Design Alternatives - Yonge Street to north of Herrell Avenue**

*Huronia Road Class EA - Phases 3 & 4 Report*

*November 12, 2010*
### Table 3: Assessment of Design Alternatives – north of Herrell Avenue to south of Mapleview Drive

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<tr>
<th>Evaluation Criteria</th>
<th>Design Alternative 5-1 3.5 m Centre Lane</th>
<th>Design Alternative 5-2 3.5 m Centre Lane</th>
<th>Design Alternative 5-3 3.3 m Lanes</th>
<th>Design Alternative 5-4 Sidewalk on One Side Only 27.5 m Road Allowance</th>
<th>Design Alternative 5-5 Reduced Boulevard Width 20 m Road Allowance</th>
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**Legend**
- **•** Represents Negative Impact
- **□** Represents Mitigative or Neutral Impact
- **△** Represents Positive Impact

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Huronia Road
Class EA - Phases 3 & 4 Report  
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November 12, 2010
Table 4: Assessment of Design Alternatives – south of Mapleview Drive to Lockhart Road

<table>
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<tr>
<th>Evaluation Criteria</th>
<th>Design Alternative 3R-1 Modified City of Barrie Standard 25 m Road Allowance</th>
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<th>Design Alternative 3R-3 3.3 m Lanes 35.5 m Road Allowance</th>
<th>Design Alternative 3R-4 Proposed Centreline Shift 36 m Road Allowance</th>
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<tr>
<td>Physical Environment</td>
<td>• comparable impacts to intersection operations as other design alternatives • comparable impacts to transit as other design alternatives • sidewalk provided on both sides of road • no impact to road safety as 3.5 m lanes provided • full urban cross-section to accommodate utilities</td>
<td>• comparable impacts to intersection operations as other design alternatives • comparable impacts to transit as other design alternatives • sidewalk provided on both sides of road • comparable impacts to pavement condition as other design alternatives • reduced safety due to narrower centre lane • full urban cross-section to accommodate utilities</td>
<td>• comparable impacts to intersection operations as other design alternatives • comparable impacts to transit as other design alternatives • sidewalk provided on both sides of road • comparable impacts to pavement condition as other design alternatives • reduced safety due to narrower through lanes • full urban cross-section to accommodate utilities</td>
<td>• comparable impacts to intersection operations as other design alternatives • comparable impacts to transit as other design alternatives • sidewalk provided on both sides of road • comparable impacts to pavement condition as other design alternatives • no impact to road safety as 3.5 m lanes provided • full urban cross-section to accommodate utilities</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>• potential localized impacts to aquatic and terrestrial habitats, vegetation and wetland • impacts associated with construction are fully mitigable • can offset risk to fish habitat with appropriate compensation plan resulting in overall gain</td>
<td>• potential localized impacts to aquatic and terrestrial habitats, vegetation and wetland • impacts associated with construction are fully mitigable • can offset risk to fish habitat with appropriate compensation plan resulting in overall gain</td>
<td>• potential localized impacts to aquatic and terrestrial habitats, vegetation and wetland • impacts associated with construction are fully mitigable • can offset risk to fish habitat with appropriate compensation plan resulting in overall gain</td>
<td>• potential localized impacts to aquatic and terrestrial habitats, vegetation and wetland • impacts associated with construction are fully mitigable • can offset risk to fish habitat with appropriate compensation plan resulting in overall gain</td>
</tr>
<tr>
<td>Social Environment</td>
<td>• greatest property impacts • does not diminish aesthetics considering road needs • comparable noise impacts as other design alternatives • no impact to driver comfort • comparable construction impacts</td>
<td>• 2nd greatest property impacts • does not diminish aesthetics considering road needs • comparable noise impacts as other design alternatives • reduced driver comfort due to reduced centre lane width • comparable construction impacts</td>
<td>• 2nd greatest property impacts • does not diminish aesthetics considering road needs • comparable noise impacts as other design alternatives • reduced driver comfort due to reduced through lane width • comparable construction impacts</td>
<td>• least property impacts • does not diminish aesthetics considering road needs • comparable noise impacts as other design alternatives • no impact to driver comfort • comparable construction impacts</td>
</tr>
<tr>
<td>Cultural/Heritage Environment</td>
<td>• no known archaeological, heritage or First Nations impacts</td>
<td>• no known archaeological, heritage or First Nations impacts</td>
<td>• no known archaeological, heritage or First Nations impacts</td>
<td>• no known archaeological, heritage or First Nations impacts</td>
</tr>
<tr>
<td>Economic Environment</td>
<td>• comparable maintenance and construction costs • most costly based on land acquisition</td>
<td>• comparable maintenance and construction costs • 2nd most costly based on land acquisition</td>
<td>• comparable maintenance and construction costs • 2nd most costly based on land acquisition</td>
<td>• comparable maintenance and construction costs • least costly based on land acquisition</td>
</tr>
</tbody>
</table>

Legend

• Represents Negative Impact
• Represents Impact which is Mitigative or Neutral
• Represents Positive Impact
Sidewalk would only be provided on one side of the road under Design Alternative 3-4, reducing the road allowance from 23 metres to 20.5 metres. Property impacts would be reduced by 1.25 metres on either side of the road. Providing only one sidewalk on this section of Huronia Road is not considered practical in consideration of the adjacent land uses and pedestrian traffic safety concerns. By providing sidewalk on both sides of the road for a 3-lane road, the City of Barrie would expand their active transportation network and reduce the potential for pedestrian crossings, thereby reducing the potential for vehicle-pedestrian conflicts.

The 3.5 metre wide boulevards of the BSD-03 cross-section which would accommodate utilities, is to be reduced under Design Alternative 3-5, reducing the road allowance from 23 to 20 metres. Property impacts under this design alternative would be reduced by the greatest margin: 1.5 metres on either side of the road. Although land acquisition costs may be reduced due to the reduced width of the right-of-way, there may be increased costs associated with potentially forcing overhead utilities underground.

As discussed previously, it is preferable to acquire the necessary property to provide the standard BSD-03 cross-section. In some cases, buildings or structures are located within the proposed right-of-way and may need to be purchased by the City. However, property acquisition may not be a feasible alternative for the land owner. Such cases will be considered following PIC 2, where land owners will be asked to comment on the various design alternatives.

Land owned by the City which is adjacent to Huronia Road will be acquired with minimal impacts in the case of the water booster pump station (now abandoned), and the AC/DC rail line property. The existing hydro substation west of Huronia Road will likely have its access relocated to align with the existing intersection at Huronia Road and Herrell Avenue.

Some property acquisition along Huronia Road from Yonge Street to north of Herrell Avenue is required due to the alignment of the existing and proposed centreline, not necessarily due to the existing width of the right-of-way. As such, consideration should be given to providing the BSD-03 standard cross-section while minimizing impacts through shifting the proposed centreline.

Design Alternative 3-6 would provide the standard BSD-03 cross-section and permit the centreline to shift according to the property constraints. This would see the centreline shifted west near Herrell Avenue, crossing from west to east towards Yonge Street to minimize impacts to adjacent residential properties.

4.1.2 Huronia Road - North of Herrell Avenue to South of Mapleview Drive (5-lanes)

Design Alternative 5-1 would provide a 5-lane cross-section with a 30 metre right-of-way and sidewalks on both sides. Huronia Road from north of Herrell Avenue to south of Mapleview Drive has an existing road allowance which would require land acquisition in certain sections to accommodate the standard BSD-07A cross-section.
Design Alternative 5-2 would reduce the road allowance from 30 metres to 29.5 metres, by reducing the centre lane width. This reduction would reduce property impacts by 0.25 metres on either side of the road. However, in reducing the centre lane, the likelihood of a collision with vehicles occupying the centre turn lane would be increased (due to reduced site visibility past the opposing vehicle) and the level of safety would be reduced on Huronia Road.

Design Alternative 5-3 would reduce the road allowance from 30 metres to 29 metres, by reducing the through lane width. This reduction would reduce property impacts by 0.5 metres on either side of the road. Similar to Design Alternative 5-2, in reducing the travel lanes, the likelihood of a collision with vehicles occupying these lanes would be increased on Huronia Road. Furthermore, the Geometric Design Guide for Canadian Roads stipulates that for two-lane or multilane roadways designated as an arterial with a rural or urban cross-section, the through lane width should not be less than 3.5 metres. Consideration should also be given to the fact that a section of the subject length of Huronia Road is designated as a haul route (until Big Bay Point Road), which would potentially increase the severity of potential collisions due to the size and weight of the vehicles.

Sidewalk would only be provided on one side of the road under Design Alternative 5-4, reducing the road allowance from 30 metres to 27.5 metres. Property impacts would be reduced by 1.25 metres on either side of the road. Providing only one sidewalk on this section of Huronia Road is not considered practical in consideration of the adjacent land uses and pedestrian traffic safety concerns. By providing sidewalk on both sides of the road for a 5-lane road, the City of Barrie would expand their active transportation network and reduce the number of pedestrian crossings, thereby reducing the potential for vehicle-pedestrian conflicts.

The 3.5 metre wide boulevards of the BSD-07A cross-section which would accommodate utilities, is to be reduced under Design Alternative 5-5, reducing the road allowance from 30 metres to 27 metres. Property impacts under this design alternative would be reduced by the greatest margin: 1.5 metres on either side of the road. Although land acquisition costs may be reduced due to the reduced width of the right-of-way, there may be increased costs associated with potentially forcing overhead utilities underground.

Design Alternative 5-6 would provide a 3.0 metre multi-use trail on the east side of Huronia Road, with a 1.5 metre sidewalk on the west side, increasing the road allowance from the 30 metre standard to 31.5 metres. A section of the Trans-Canada Trail has been considered for Huronia Road from Loon Avenue to south of Lockhart Road. Although it is desirable to reduce the right-of-way and therefore the property requirements, the implementation of Design Alternative 5-6 would contribute to the completion of the Trans-Canada Trail through the south end of Barrie, expanding the active transportation network for the City. Furthermore, Design Alternative 5-6 is proposed only for the section of Huronia Road from Saunders Road to Loon Avenue, where the Trans-Canada Trail continues east. North of Loon Avenue, the standard cross-section could be applied.
As discussed previously, it is preferable to acquire the necessary property to provide the standard BSD-07A cross-section. In some cases, buildings or structures are located within the proposed right-of-way and may need to be purchased by the City (such as the restaurant at 352 Huronia Road). However, property acquisition may not be a feasible alternative for the land owner. Such cases will be considered following PIC 2, where land owners will be asked to comment on the various design alternatives.

4.1.3 Huronia Road - South of Mapleview Drive to Lockhart Road (3-lanes, ultimate 5-lanes)

Design Alternative 3R-1 would provide an interim 3-lane cross-section with rural open drainage ditches with a road platform constructed to accommodate the ultimate 5-lane cross-section and future urbanization.

Design Alternative 3R-1 through 3R-4 would provide a 3.0 metre multi-use trail on the east side of Huronia Road from Lockhart Road to Saunders Road. An extension of the Trans-Canada Trail has been considered for Huronia Road from Loon Avenue to south of Lockhart Road and the implementation of preferred design alternative would contribute to the completion of the Trans-Canada Trail through Barrie. Additionally, upon up-grading from a 3-lane rural to a 5-lane urban cross-section, a sidewalk would be provided on the west side of Huronia Road.

Some land acquisition is required to provide the proposed 36 metre right-of-way. Design Alternatives 3R-2 and 3R-3 would reduce the property impacts associated with land acquisition by reducing the lane width. As discussed previously, the Geometric Design Guide for Canadian Roads stipulates that for two-lane or multilane roadways designated as an arterial with a rural or urban cross-section, the through lane width should not be less than 3.5 metres. The reduction in lane width would result in small reductions in property impacts between 0.5 metres and 1.0 metre. However, there would be an increase risk of a collision as the travel width for vehicles travelling on Huronia Road would be reduced.

Design Alternative 3R-4 would provide the same cross-section as Design Alternative 3R-1 but would be shifted to limit potential impacts to abutting properties.

4.2 Assessment of Design Alternatives

4.2.1 Score

Scores will be established for each criterion under each design alternative to reflect the relative degree of impact, upon approval of the weighting system. A score of -2 denotes a negative impact, 0 denotes no impact and +2 denotes a positive impact. In determining the scores, appropriate quantifiable measures will be employed where possible (i.e. number of residents affected, length of road to be constructed, total area of impact, etc.). Where this is not possible, the score will be based on a qualitative assessment of the various alternatives.
4.2.2 Weight

It is recognized that some of the noted criteria within each environment are more important than others in the overall assessment. Likewise, some of the environments are of greater importance than others. In this regard, further to the scores which reflect the effects and impacts, a weighted scoring system has been employed. Weights have been assigned to the evaluation criteria to reflect their relative importance within their associated environment, and also in consideration of the individual environments considered. The assigned weighting is to be reviewed by City staff prior to assigning scores to each design alternative.

The associated criteria and environment weights are indicated in Error! Not a valid bookmark self-reference..

4.2.3 Weighted Score

Based on the total weighted score (weighted score = score x weight) for each alternative, an overall ranking will be determined. The resulting weighted scoring system and ranking will be discussed with the City following receipt of comments from PIC 2.
Table 5: Weighted Scoring Assessment

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Weight</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environment &amp; Criteria</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>road operations</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>intersection operations</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>transit operations</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>pedestrian operations</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>pavement condition</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>road safety</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>utilities &amp; services</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total (max score of 52)</strong></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td><strong>Natural Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fisheries/aquatic impacts</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>wildlife/terrestrial impacts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>vegetation impacts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Wet land impacts</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total (max score of 32)</strong></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td><strong>Social Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>property/development impacts</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>aesthetics</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>noise impacts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>driver comfort</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>construction impacts</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total (max score of 28)</strong></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td><strong>Cultural Heritage Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>archaeological &amp; heritage impacts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>First Nations impacts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total (max score of 12)</strong></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Economic Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maintenance costs</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>construction costs</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>land acquisition costs</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total (max score of 16)</strong></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td><strong>TOTAL SCORE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SCORE (max score of 140)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Impact Mitigation

The Class EA guidelines indicate that significant features and impacts should be avoided where possible. However, where they cannot be avoided, every effort should be made to mitigate the adverse impacts. Manners in which impacts are to be mitigated, either in the development of the alternatives, or as part of the detail design and implementation are noted below.

4.3.1 Stormwater Management

With respect to stormwater quality control, such will be provided through the use of structure sumps and oil/grit separators. Enhanced protection to achieve 80% removal of suspended solids will be provided through the use of an oil/grit separator, or approved equal, at the downstream reach of the drainage system prior to discharging runoff to the existing outlets.

This study did not involve a storm management study, which will be dealt with at the detail design phase. As a result, stormwater quantity control may be warranted. Should an opportunity to acquire property within the study limits become available, consideration should be given to constructing a stormwater detention pond to provide additional quality control. Consideration should be given to utilizing existing lands owned by the City adjacent to Huronia Road for the purpose of constructing quantity control facilities.

4.3.2 Impacts to Private Wells

No private wells have been identified in close proximity to the project limits that would be impacted by the proposed works. To extend or replace culverts as part of the Huronia Road widening, a permit to take water may be required at the design phase. In this case, all necessary mitigating measures would be applied to any private wells within the appropriate proximity.

4.3.3 Parking Improvements at Huronia Park North (Soccer Fields)

The proposed widening of Huronia Road will no longer permit on-street parking. As such, the Huronia Park North parking area may need to be expanded to provide an overflow parking area. Given the available City owned lands which the sports facility is located in, opportunities to increase parking are available, and details of which will be address during detail design.

4.3.4 Summary of Identified Concerns & Mitigation Measures

The identified environmental concerns associated with the construction of the project are summarized in
Table 6 as are mitigation measures where they have been recommended to minimize or eliminate changes to the environmental conditions described in this report.
### Table 6: Summary of Environmental Concerns and Commitments

<table>
<thead>
<tr>
<th>Concern</th>
<th>Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion &amp; Sedimentation Control</td>
<td>- include operational constraints for erosion and sedimentation control (including grassed swales and rock check dams)</td>
</tr>
<tr>
<td></td>
<td>- maintenance of erosion &amp; sedimentation control measures</td>
</tr>
<tr>
<td></td>
<td>- stabilization of all disturbed soil</td>
</tr>
<tr>
<td></td>
<td>- preparation of sediment control plan</td>
</tr>
<tr>
<td>Water Quality</td>
<td>- include operational constraints for water quality protection</td>
</tr>
<tr>
<td></td>
<td>- implement stormwater management techniques (grassed swales)</td>
</tr>
<tr>
<td>Vegetation</td>
<td>- trees not designated for removal shall be protected by a barrier and trees repaired if damaged</td>
</tr>
<tr>
<td></td>
<td>- soils along right-of-way and in areas disturbed by construction will be restored immediately following final grading</td>
</tr>
<tr>
<td>Wildlife</td>
<td>- removal of trees and other vegetation will be done primarily outside of local nesting periods, as much as possible</td>
</tr>
<tr>
<td>Land Use</td>
<td>- contractor will comply with local noise control bylaws and maintain equipment in proper working order</td>
</tr>
<tr>
<td></td>
<td>- traffic disruptions will be minimized</td>
</tr>
<tr>
<td></td>
<td>- municipal restrictions and regulations regarding local roads will be observed by contractor</td>
</tr>
<tr>
<td></td>
<td>- open burning will not be permitted</td>
</tr>
<tr>
<td></td>
<td>- water and other non-chloride based compounds will be used for dust control</td>
</tr>
<tr>
<td>Archaeological &amp; Heritage Resources</td>
<td>- construction will cease and archaeologist contacted if any artifacts uncovered in construction zone</td>
</tr>
<tr>
<td>Air Quality</td>
<td>- open burning will not be permitted</td>
</tr>
<tr>
<td></td>
<td>- water and calcium chloride will be used for dust control</td>
</tr>
<tr>
<td>Excess Materials Management</td>
<td>- as per Special Provision OPSS 180, and MOE protocol</td>
</tr>
<tr>
<td>Fisheries</td>
<td>- sediment and erosion control as indicated in this table</td>
</tr>
</tbody>
</table>
Monitoring objectives include:

- monitoring of individual measures and issues (e.g. erosion and sedimentation control, waste handling and storage);

- monitoring of overall effectiveness of control measures; and

- ongoing identification of areas of potential concern.

Environmental inspectors will make regular visits to the work site to ensure that mitigation measures described in this report and in the subsequent contract document provisions are carried out effectively. The timing and frequency of these visits will coincide with the schedule of the construction operations, and will be adjusted to reflect the sensitivity of site concerns and the development of unforeseen environmental problems during and after construction. The inspectors will use a standardized inspection report form, which will detail any concerns, and further actions required. A copy of the form is provided to the site inspector, construction manager and the environmental inspection supervisor with noted action items to be signed off as completed.

During short and long term intervals of construction activity, the project site will be regularly monitored to ensure all environmental protection measures are operating effectively.

In addition to the site specific monitoring requirements, an audit of environmental performance for the project may be undertaken. Such an audit may include:

- the review of long-term effectiveness of mitigation measures;

- the review of inspection reports, notes and the resolution of noted concerns;

- the review of comments and concerns received from regulatory agencies and public interest groups and how these issues were addressed; and

- recommended modifications to mitigation measures or procedures as required.
5 Huronia Road Railway Crossings

Detailed safety assessments of the railway crossings of Huronia Road immediately south of Ellis Drive and Huronia Road immediately south of Herrell Avenue were undertaken. In addition, the crossing on Little Avenue immediately west of Huronia Road was completed. The assessment was completed by C.C. Tatham & Associates in August 2010. Copies of the detailed safety assessments are included in Appendix B.

5.1 Objectives

The fundamental objectives of the safety assessment are to:

- reduce crash risk within the grade crossing environment;
- minimize the frequency and severity of preventable crashes;
- consider the safety of all grade crossing users;
- verify compliance of the technical standards referred to in the Railway Safety Act/Grade Crossing Regulations and contained in the RTD 10 Road/Railway Grade Crossing Technical Standards and Inspection, Testing and Maintenance Requirements document\(^6\); and
- ensure that all the crash mitigation measures/factors aimed to eliminate or reduce the identified safety problems are fully considered, evaluated and documented for review/action by the appropriate authorities.

5.2 Existing Conditions

Existing conditions at the crossings were determined in accordance with the Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide. For the purpose of these reports, Huronia Road is considered in a north-south orientation, while the rail line is described in an east-west orientation. At the Little Avenue crossing, Little Avenue is considered in an east-west orientation, while the rail line is described in a north-south orientation.

Huronia Road is a major arterial road within the City of Barrie, with a posted speed limit of 60 km/h in the area of the crossings. Based on an 8-hour traffic count completed at the intersection of Huronia Road and Ellis Drive (March 2010), the daily volume on Huronia Road at the crossing is estimated at 7000 vehicles. Based on an 8-hour traffic count completed at the intersection of Huronia Road and Herrell Avenue (March 2010), the daily volume on Huronia Road at the crossing is estimated at 6000 vehicles.

Little Avenue is a major arterial road within the City of Barrie, with a posted speed limit of 50 km/h in the area of the crossing. Based on an 8-hour traffic count completed at the intersection of Huronia Road and Little Avenue (March 2010), the daily volume on Little Avenue at the crossing is estimated at 7000 vehicles.

With respect to rail traffic, the Allandale Community Development Corporation (ACDC) currently operates on average 1 train a day (2 crossings) on the Beeton Subdivision, at a speed of 17 km/h (10 mph).

Additional details with respect to the road and railway approaches are provided in the field data forms, attached as Appendix B. As the grade crossing does not currently have a warning system in place (i.e. it is currently a passive crossing consisting of warning signs only), the forms corresponding to such were employed. Photographs of the railway crossing are provided as part of the assessments in Appendix B.

### 5.3 Assessment of Existing Conditions

For purposes of the assessment, and in consideration of the arterial road classification for Huronia Road, a B-Train Double (BTD) combination vehicle, which is 25 metres in length, was selected as the appropriate design vehicle (as per the Canadian Road/Railway Grade Crossing Detailed Safety Assessment Field Guide). Given the truck restrictions on Little Avenue in the immediate area, a bus (intercity bus) was considered the most appropriate design vehicle (length of 14 metres) and hence has been considered in the assessment. In comparison, a standard single unit bus is approximately 12 metres in length.

The key findings of the detailed safety assessment, including suggested remediation measures, are identified in the detailed safety assessments as they relate to the following:

- location of grade crossing;
- grade crossing surface;
- road geometry;
- sight lines;
- signs & pavement markings; and
- illumination

The key deficiencies relate to sight lines. As detailed in the railway safety assessments, the sightlines at the rail crossing are deficient. Improved sight lines are expected from the clearance of vegetation from the road and rail right-of-way, as well as within the sight distances noted in the assessments.
5.4 Grade Crossing Warrants

As per the RTD guidelines, unrestricted grade crossings for vehicular use shall have a grade crossing warning system (i.e. lights and bells) if:

- the cross-product of the daily road and train volumes is 1,000 or more (cross-product = daily road volumes x daily train volumes); or

- the grade crossing does not include a sidewalk and the maximum railway operating speed exceeds 80 mph; or

- the grade crossing includes a sidewalk and the maximum railway operating speed exceeds 60 mph; or

- there are two or more tracks and trains may be passing one another; or

- the sightlines or alternative measures are not provided, including where trains, engines, railway cars, or other railway equipment, standing or stored, may obscure driver or pedestrian sightlines of a train approaching; or

- the maximum railway operating speed exceeds 15 mph, there is a stop sign or traffic signals controlling vehicular traffic on that part of the road leading away from the grade crossing, and the distance between the front of a vehicle in the first stopped position at the stop sign or traffic signals and a rail in the grade crossing surface is:
  - less than 30 m for a stop sign; or
  - 30 m or more for a stop sign, unless a traffic study indicates that queued traffic will not encroach within 2.4 m of the rail nearest the road intersection; or
  - less than 60 m for traffic signals; or
  - 60 m or more for traffic signals, unless a traffic study indicates that queued traffic will not encroach within 2.4 m of the rail nearest the road intersection.

Where grade crossing warning systems are installed, they shall include gates if:

- the cross-product is 50,000 or more; or

- the maximum railway operating speed is 50 mph or more; or

- there are two or more tracks where trains may be passing one another; or

- the sightlines along the railway right-of-way for a driver or pedestrian stopped at the grade crossing are not sufficient, including where trains, engines, railway cars or other railway equipment, standing or stored, may obscure the driver’s or pedestrian’s sightlines of a train approaching the grade crossing.
Under existing conditions, the cross-product of daily road and train volumes exceeds 1000 (6000 to 7000 vehicles per day x 2 train crossings per day) and the available sight lines are restricted. Therefore, a grade warning system is recommended (i.e. lights and bells).

Projected rail traffic through to the year 2017 was provided by ACDC for the Beeton Subdivision, as follows (freight traffic):

- operating speeds in some areas may reach 50 km/h while the maximum operating speed at the crossing is 16 km/h (10 mph);
- 6 return trains daily (12 train crossings in total);
- 4 return trips during the day (07:00 to 23:00) and 2 during the night (23:00 to 07:00);
- normal operations will include weekday and weekend movements; and
- train configuration normally 1 locomotive and up to 15 cars.

At the rail crossings, future volumes upwards of 15,000 to 20,000 are expected over the next 10 to 20 years. As such, the cross-product of vehicle and train volumes will exceed 50,000 and thus gates will be warranted in future, in addition to lights and bells.

5.5 Grade Crossing Warning System

In consideration of the cross-product of rail and road traffic and the deficient sight lines, a warning system (to include both lights and bells) is currently warranted at the grade crossing on Huronia Road south of Ellis Drive, at the crossing on Huronia Road south of Herrell Avenue and at the Little Avenue crossing west of Huronia Road. The distance between the rail crossing and the signalized intersection at Huronia Road and Little Avenue further warrants an active warning system at the crossing. As both train and traffic volumes increase, the warrant for gate control will also be met.

It is noted that the safety assessment of the grade crossings on Huronia Road and on Little Avenue cover physical features which may affect road and rail user safety and it has sought to identify potential safety hazards. However, no guarantee is made that every deficiency has been identified. Further, if all the recommendations in this assessment were to be addressed, this would not confirm that the crossing is ‘safe’; rather, adoption of the recommendations should improve the level of safety at the facility. Train whistling was not otherwise addressed at this crossing.
6 Huronia Road Water Crossings

6.1 Existing Conditions

The water crossings under Huronia Road were examined with respect to hydraulic capacity. There are 10 existing water crossings along the subject length of Huronia Road, from Yonge Street to south of Lockhart Road, that have been considered for culvert extension or replacement. There are also two proposed culverts, one on Huronia Road and the other on Saunders Road. Details pertaining to the water crossings are summarized in Table 7.

Table 7: Huronia Road Water Crossings

<table>
<thead>
<tr>
<th>Water Crossing (Number and Chainage)</th>
<th>Creek</th>
<th>Existing or Proposed</th>
<th>Sufficient Capacity</th>
<th>Sufficient Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 5+115</td>
<td>main branch of Whiskey Creek</td>
<td>Twin 1800 mm dia.</td>
<td>no, replace with 6000 mm dia. x 1500 mm dia. Hyspan concrete culvert</td>
<td>-</td>
</tr>
<tr>
<td>2 4+235</td>
<td>tributary to Whiskey Creek</td>
<td>size unknown</td>
<td>no, to be replaced</td>
<td>-</td>
</tr>
<tr>
<td>3 2+921</td>
<td>tributary to Whiskey Creek</td>
<td>1500 mm dia. x 16.3 m</td>
<td>no, replace with 2-1500 mm dia.</td>
<td>-</td>
</tr>
<tr>
<td>4 2+750</td>
<td>tributary to Lover’s Creek</td>
<td>400 mm dia. x 14.8 m</td>
<td>no, replace with 700 mm dia.</td>
<td>-</td>
</tr>
<tr>
<td>5 2+640</td>
<td>tributary to Lover’s Creek</td>
<td>400 mm dia.</td>
<td>no, replace with 800 mm dia.</td>
<td>-</td>
</tr>
<tr>
<td>6 2+044</td>
<td>cold water tributary to Lover’s Creek</td>
<td>1400 mm dia. x 16.5 m</td>
<td>no, replace with 5.5 m x 900 mm dia.</td>
<td>-</td>
</tr>
<tr>
<td>7 1+858</td>
<td>tributary to Lover’s Creek</td>
<td>1000 mm dia. x 20.1 m</td>
<td>yes extension required</td>
<td></td>
</tr>
<tr>
<td>P1 Saunders Rd</td>
<td>-</td>
<td>Proposed 750mm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P2 1+667</td>
<td>-</td>
<td>Proposed 2700mm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 1+515</td>
<td>tributary to Lover’s Creek</td>
<td>2700 mm dia. x 25.0 m</td>
<td>yes extension required</td>
<td></td>
</tr>
<tr>
<td>9 1+230</td>
<td>tributary to Lover’s Creek</td>
<td>2000 mm dia. x 23.0 m</td>
<td>yes extension required</td>
<td></td>
</tr>
<tr>
<td>10 0+958</td>
<td>tributary to Lover’s Creek</td>
<td>1800 mm dia.</td>
<td>yes extension required</td>
<td></td>
</tr>
</tbody>
</table>

Hydraulic analysis was performed on the 10 existing culverts and the two new proposed culverts on Huronia Road based on the 100 year flow conditions. Water Crossings 7 to 10 met the hydraulic requirements and therefore only require an extension of the culvert in order to provide a suitable water...
crossing in consideration of the road widening. Culverts 1 to 6 did not meet the hydraulic requirements of the 100 year flow, thus, these undersized culverts are to be replaced.

6.2 Channel Relocation/Realignment

Water Crossing 8 (1+515) conveys a cold water stream from west to east of Huronia Road. West of Huronia Road, the stream runs north along the road through 4 culverts under commercial access driveways before connecting to a tributary of Lover’s Creek to head further west. The proposed widening of Huronia Road will impact this channel on the west side of the road as the existing stream is within the proposed right-of-way.

In consideration of the road widening and subsequent impacts to the stream, three options have been investigated: conveying the stream via closed pipe; shifting the stream to the west; and relocating the stream.

The provision of a closed pipe to convey the stream north alongside Huronia Road is not desirable, mainly as the waterway has been identified as a cold water stream. Shifting the stream further west would bring the stream closer to the development properties. At such a location, the channel would likely be impacted by the road operations and in future, other mitigating measures may be required, possibly requiring a closed system. The recommended solution is to relocate the stream to the east side of Huronia Road and connect to the existing tributary by creating a natural channel. Further north, the stream would travel via Water Crossing P2 to the existing Lover’s Creek tributary flowing to the west. The relocation of the stream and provision of the natural channel on the east side of Huronia Road would represent such a significant improvement to the existing conditions from a natural environment perspective that it would compensate for other impacts associated with the road widening.

The existing culvert on Saunders Road is within the proposed improvements for Huronia Road and will need to be replaced further to the west. Water Crossing 7 will be extended and the existing ditch will be realigned to allow the flow to connect between the proposed culvert on Saunders Road and Water Crossing 7 north of Saunders Road.
7 Completion of Class EA Process

As previously discussed, the process to complete the Huronia Road Class Environmental Assessment is detailed in Figure 1.

7.1 Phases 1 & 2

The previous report, summarized in Section 1.1, addressed Phases 1 & 2 as follows:

Phase 1: Problem or Opportunity
- Task 1: Identify Problem or Opportunity
- Task 2: Discretionary public consultation to review problem or opportunity

Phase 2: Alternative Solutions
- Task 1: Identify Alternative Solutions to the Problem
- Task 2: Inventory Natural, Social, Economic Environment
- Task 3: Identify Impact of Alternative Solutions on the Environment
- Task 4: Evaluate Alternative Solutions and Identify Recommended Solution
- Task 5: Consult review agencies & public re: problem or opportunity & alternative solutions
- Task 6: Select preferred solution

7.2 Phase 3

Phase 3 of the EA process has developed alternative design concepts for the preferred solution (i.e. it addressed various road designs to implement the preferred solution). This report addressed Phases 3 & 4 and has documented the completion of the following:

Phase 3: Alternative Design Concepts for Preferred Solutions
- Task 1: Identify alternative design concepts for preferred solution
- Task 2: Detail inventory of natural, social & economic environment
- Task 3: Identify impact of alternative designs on environment & mitigating measures
- Task 4: Evaluate alternative designs: Identify recommended design
The remaining tasks of Phase 3 include public and stakeholder consultation, the identification of the preferred design alternative, and the preliminary finalization of the preferred design alternative. Public Information Centre (PIC) 2 will occur on Thursday, November 25th 2010, in Huronia Room A on the 2nd floor of City Hall. The intent of PIC 2 is to allow the concerned public and agencies to provide comments and concerns related to the preferred alternative design concepts, the assessment of such, and the preliminary recommendations. Notification of PIC 2 will be provided in local newspapers, the City’s website and through direct mailings to stakeholders and the affected public along Huronia Road.

All comments and concerns will be reviewed and the assessment revisited in light of such. Following consideration of comments and concerns received at PIC 2, a preferred design concept will be recommended to Barrie City Council. Any stakeholder who has expressed an interest in continuing to be informed of the study will be advised when the recommendations from this study proceed to council. Upon endorsement of such, Phase 3 of the Class EA process will be completed.

7.3 Phase 4

Phase 4 will document the process and methodology employed throughout the study through the preparation of the Phases 3 & 4 Report. Upon completion, the report will be completed and placed on the public record for a period of 30-days to allow for further public and stakeholder review and comment. A Notice of Completion will be published to inform the public and stakeholders of the study completion. Any member of the public or stakeholder who had expressed an interest in continuing to be informed will be advised when the recommendations from this study are to council.

If concerns are raised which cannot be resolved in discussion with the Corporation of the City of Barrie the Minister of Environment may be requested to make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order), which addresses individual environmental assessments. Requests must be received by the Minister at the address below within 30 days of the publication of the Notice of Completion. A copy of the request must also be sent to C.C. Tatham and Associates Ltd. and the City of Barrie.

Minister of the Environment
135 St. Clair Avenue West, 10th Floor
Toronto, ON  M4V 1P5
STUDY LIMITS

source: maps.esri.ca
EXISTING CONDITIONS - YONGE STREET TO ELLIS DRIVE
source: City of Barrie Recreation Map

source: Trans Canada Trail (www.tctrail.ca)
OPTION 3-3
22.5m ROAD ALLOWANCE
URBAN - RESIDENTIAL
BSD-03 MODIFIED
(3.3m LANES)

OPTION 3-4
20.5m ROAD ALLOWANCE
URBAN - RESIDENTIAL
BSD-03 MODIFIED
(SIDEWALK ON ONE SIDE ONLY)
OPTION 3-5
20m ROAD ALLOWANCE
URBAN-RESIDENTIAL
BSD-03 MODIFIED
(REDUCTED BOULEVARD WIDTH)

OPTION 3-6
23m ROAD ALLOWANCE
URBAN-RESIDENTIAL
BSD-03 MODIFIED
(PROPOSED CENTRELINE SHIFT)
HERRELL AVE TO YONGE ST.
OPTION 5-3
29m ROAD ALLOWANCE
URBAN - RESIDENTIAL
BSD-07A MODIFIED
(3.3m LANES)

OPTION 5-4
27.5m ROAD ALLOWANCE
URBAN - RESIDENTIAL
BSD-07A MODIFIED
(SIDWALK ON ONE SIDE ONLY)
OPTION 5-5
27m ROAD ALLOWANCE
URBAN-RESIDENTIAL
BSO-07A MODIFIED
(REDUCED BOULEVARD WIDTH)

OPTION 5-6
31.5m ROAD ALLOWANCE
URBAN-RESIDENTIAL
BSO-07A MODIFIED
(PROPOSED 3.0m MULTI USE TRAIL)
SAUNDERS RD. TO LOON AVE.
OPTION 3R-1
36.0m ROAD ALLOWANCE
SEMI-URBAN
BSD-05 MODIFIED
(3 Lanes)

OPTION 3R-2
35.5m ROAD ALLOWANCE
SEMI-URBAN
BSD-05 MODIFIED
(3 Lanes, 3.5m CENTRE LANE)
CITY OF BARRIE
HURONIA ROAD CLASS EA

OPTION 3R-3
35.5m ROAD ALLOWANCE
SEMI-Urban
BSO-09 Modified
(3 Lanes, 3.3m Lanes)

OPTION 3R-4
36m ROAD ALLOWANCE
SEMI-Urban
BSO-09 Modified
(3 Lanes, Proposed Centreline Shift)
APPENDIX A:
NATURAL ENVIRONMENT IMPACT ASSESSMENT REPORT
Natural Environmental Impact Assessment Report

Huronia Road Improvements

Prepared for:
C.C Tatham and Associates Ltd.

Prepared by:
Azimuth Environmental Consulting, Inc.

November 2010

AEC 08-007
November 12, 2010

C.C. Tatham & Associates Ltd.
41 King Street, Unit 4
Barrie, ON
L4N 6B5

Attention: Brad Kalus, C.E.T., Branch Manager

Re: Environmental Impact Study Component for a Municipal Class EA for the proposed Huronia Road Improvements (Lockhart Road to Yonge Street), City of Barrie

Dear Mr. Kalus:

Azimuth Environmental Consulting (Azimuth) is pleased to submit our Environmental Impact Study for the abovementioned road reconstruction in the City of Barrie. The purpose of this report is to assess the potential impacts to environmental features associated with the expansion of the roadway and the preferred alternative. The findings of the final Environmental Study Report (ESR) will be incorporated into the Municipal Class EA being prepared by C.C. Tatham & Associates Ltd.

Please do not hesitate to call if you have any questions regarding this report.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING INC.

Lisa Moran, B.Sc.Env.
Biologist

Matt Stuart, B.Sc.Env.
Aquatic Biologist
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1.0 INTRODUCTION
Azimuth Environmental Consulting (Azimuth) was retained to undertake an Environmental Impact Study of the preferred alternative for the expansion of Huronia Road, between Lockhart Road to Yonge Street, within the City of Barrie (Figure 1). Improvements along Huronia Road will involve modifications to the roadway including widening of the roadway, the degree of which is to be determined through the examination of several design alternatives as part of a Class Environmental Assessment (EA). An Environmental Study Report (ESR) was completed by Azimuth in August 2009 which documented the existing environmental features present within and adjacent to the study area. The purpose of this document is to assess the environmental impacts to the environmental features associated with the preferred alternative for the expansion of the roadway. These findings will be integrated into the final ESR being prepared by C.C. Tatham & Associates Ltd.

2.0 STUDY APPROACH
A letter (April 5, 2008) was submitted to the Lake Simcoe Region Conservation Authority (LSRCA) to determine the required scope of work for this project (Appendix A). The LSRCA agreed to the proposed scope of work (via an email from Jackie Burkart (Senior Planner) (Appendix A) and indicated that the proposed scope of work was sufficient with the exception of a few additional details that should be incorporated into the fieldwork and/or report including:

- “An amphibian breeding/ habitat study within 120m of the expected limit of disturbance”;
- “Ensure that wildlife passage is afforded and ecological connectivity is maintained/ enhanced”; and
- “If large swaths of the natural heritage features are to be removed for the upgrades, breeding bird surveys should be conducted”.

This report presents a description of the environmental features and functions within the limits of the Huronia Road expansion study area as well as an impact assessment of the preferred design upon natural environmental resources. Figures 1-3 define the nature of the affected natural environment within and adjacent to the study area and is intended to supplement the full scale Design Drawings prepared by C.C. Tatham & Associates Ltd. This impact assessment will assist the LSRCA in the evaluation of this project in order to acquire environmental approvals in accordance with Ontario Regulation 179/06, and the Federal Fisheries Act.
A combination of field investigation and searches of background information were used to fulfill the objectives of this report. Azimuth undertook the following activities for this study:

- Conducted a background information search and review of existing documents;
- Consulted with the LSRCA and OMNR to collect background information and determine their concerns and permitting requirements for the project (Appendix A);
- Completed field reconnaissance investigations of the study area to identify existing natural environmental features in the study area (2008, 2009 and 2010);
- Classified vegetation communities within the road right-of-way based on air photo interpretation combined with field study, using the general methods of the Ecological Land Classification System (ELC) for southern Ontario (Lee et al. 1998);
- Completed three evening anuran amphibian surveys (2008);
- Completed two dawn breeding bird surveys (2008 and 2010);
- Documented incidental observations of wildlife in the study area (2008, 2009 and 2010);
- Characterized aquatic habitat conditions at watercourse crossing locations, including 2010 fish sampling with the use of a backpack electrofisher (2008, 2009, 2010);
- Overlaid information collected on recent aerial photography of the study area so that the relationship between the proposed road widening and the natural environmental features can be more easily visualized and assessed;
- Assessed the potential impacts of the proposed road widening on sensitive or significant environmental features as described above; and
- Recommended mitigation measures to minimize or avoid potential impacts to natural environmental features, particularly fish habitat.

3.0 PLANNING CONTEXT

3.1 Provincial Planning Policy

3.1.1 Provincial Policy Statement
The Provincial Policy Statement (PPS) (MMAH 2005) outlines policies related to natural heritage features (Section 2.1) and water resources (Section 2.2). The Planning Act requires that planning decisions shall be consistent with the PPS.
According to the PPS development and site alteration shall not be permitted in:

- Significant habitat of endangered or threatened species,
- Significant wetlands (in coastal areas or in Ecoregions 5E, 6E and 7E), and
- Significant coastal wetlands.

Similarly, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted within:

- Significant woodlands (south and east of the Canadian Shield),
- Significant valley lands (south and east of the Canadian Shield),
- Significant wildlife habitat, and
- Significant Areas of Natural and Scientific Interest (ANSI).

Furthermore, no development and site alteration will be permitted on lands adjacent to the areas defined above unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated there will be no negative impacts on the natural features and ecological functions.

The term development (as defined in the PPS, 2005) is defined as the creation of a new lot, a change in land use or the construction of buildings and structures, requiring approval under the Planning Act, but does not include activities that create or maintain infrastructure authorized under an environmental assessment process, as is the case with the proposed Huronia Road expansion.

Development and site alteration is not permitted in fish habitat except in accordance with federal and provincial requirements.

Portions of the Lover’s Creek Provincially Significant Wetland (PSW) are within the proposed roadway expansion (Figure 1 and Figures 2, 2a, 2b, Appendix B).

There are no ANSI’s on or within 120m of the property. Current provincial databases do not identify Significant Woodlands or Valley Lands on or adjacent to the study area.

There is one recent (i.e. within 20 years) element of occurrence record within OMNR’s Natural Heritage Information (NHIC) database to indicate that there are any species of conservation concern have been documented within the study area (NHIC, 2010). This record is for Fogg’s Goosefoot (*Chenopodium foggii*) (Appendix B). This species prefers sandy areas on limestone under oak or pine-oak forests (MNR, 2000). There is no suitable habitat for the Fogg’s Goosefoot nor was it observed within the study area.
To our knowledge the province has not identified significant “Wildlife Habitat” within or adjacent to the study area. A Stratum 2 deeryard has been identified at the northeast corner of Mapleview Drive and Huronia Road (Allen et al., 2005). Stratum 2 deeryards may be utilized by deer when the winters are mild and there is minimal snow cover or for feeding.

3.1.2 Endangered Species Act
The Endangered Species Act (ESA) for Ontario was enacted on June 30, 2008. The Act protects species and the habitats on which the species depends, directly or indirectly, to carry on its life processes such as reproduction, rearing, hibernation, migration or feeding. Section 10 of the ESA prohibits the damaging or destroying of habitat of endangered or threatened species.

Background data indicate that there are three endangered and one special concern species that are known to exist within the City of Barrie and/or the County of Simcoe; Butternut (Juglans cinera) [Endangered], American Ginseng (Panax quinquefolius) [Endangered], Spotted Turtle (Clemmys guttata) [Endangered] and Milksnake (Lampropeltis triangulum) [Special Concern].

According to the Ontario Breeding Bird Atlas Database (OBBAD) 2001-2005 survey (square # 17PK01), the Red-headed Woodpecker (Melanerpes erythrocephalus) [Special Concern] has been confirmed as breeding within the area.

No Butternut observed within the limits of disturbance from the roadside along Huronia Road.

American Ginseng prefers deep leaf litter in rich, moist deciduous woods, especially on rocky, shaded cool slopes in sweet soil (MNR, 2000). There is no suitable habitat within the study area.

Spotted Turtle inhabits unpolluted, shallow bodies of water such as streams, ponds, wet meadows, marshes or swamps with aquatic vegetation, logs or clumps of vegetation for basking; nest is dug near water in fine-textured soil (e.g. sand) or moss (MNR, 2000). There are no known populations of Spotted Turtle within the City of Barrie and there is no optimal habitat within the study area.

Milksnake is designated provincially as Special Concern and inhabits farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones, or boards or in outbuildings (MNR, 2000). The ESA currently does not protect species or the habitat of species designated as Special Concern. Milksnake was not observed within the study area however, potential habitat for this snake does exist owing to its diverse array of suitable habitat. This habitat
is well represented within the area and the Huronia Road improvements do not represent a significant loss of potential habitat.

The Red-headed Woodpecker is designated provincially as Special Concern and inhabits a variety of treed and non-treed habitats and is commonly found in open deciduous forests with little understorey (often composed of Beech or Oak), wooded swamps, forest edges, groves of dead and dying trees and fields or pasturelands with scattered large-diameter trees (OMNR, 2000, Smith et al., 2000). It prefers xeric woodlands with trees of large circumference of at least 40cm diameter breast height (dbh) and requires 4 hectares for territory (Smith et al., 2000, OMNR 2000). This species can also be found in urban environments such as parks, golf courses, cemeteries and private woodlands (Cadman et al., 2007). It is most often found nesting in dead trees and branches (Smith et al., 2000 and Cadman et al., 2007). The ESA currently does not protect species or the habitat of species designated as Special Concern. Red-headed Woodpecker was not observed within the area, however, potential habitat exists owing to its diverse array of suitable habitat and ability to live within urban environments. This habitat is well represented within the area and the Huronia Road improvements do not represent a significant loss of potential habitat.

3.1.3 Lake Simcoe Protection Plan (2009)

The Lake Simcoe Protection Act (2008) was developed to protect and restore the ecological health of the Lake Simcoe watershed. The roadway improvements are not considered to be “development” and/or “site alteration” as these terms do not include infrastructure, facilities for transportation or utilities. Therefore, any policy pertaining to development and/or site alteration does not apply. The study area is within the City of Barrie.

3.2 County of Simcoe

The study area is located within the City of Barrie and is not subject to this plan (2008).

3.3 City of Barrie Official Plan

The City of Barrie Official Plan (2009) identifies the lands adjacent to the proposed works along Huronia Road on Schedule A. Residential, General Commercial, General Industrial, Open Space and an Environmental Protection Area constitute the designations within the area. The Environmental Protection Areas appear to be associated with watercourses that cross Huronia Road and the Lover’s Creek Provincially Significant Wetland (PSW). Environmental Protection Areas are intended primarily for preservation and conservation in their natural state. Development is not permitted within a PSW under the Provincial Planning Policy (2005) with the exception of infrastructure.
3.4 Lake Simcoe Region Conservation Authority

3.4.1 Ontario Regulation 179/06
The study area is located within the jurisdiction of the LSRCA. The study area includes lands subject to Ontario Regulation 179/06 – “Regulation of Development Interference with Wetlands and Alterations to Shorelines and Watercourses” by the LSRCA, which is associated with the presence of Lover’s Creek PSW, several watercourses and their associated floodplain (Appendix C). Under Regulation 179/06, the LSRCA requires that approvals be obtained for any proposed development within areas regulated under their jurisdiction.

3.4.2 Natural Heritage System
The Natural Heritage System (NHS) for the Lake Simcoe Watershed, prepared by the LSRCA and Beacon Environmental, was adopted by the LSRCA in July 2007. Within this document a number of features have been identified within LSRCA’s Natural Heritage System (Appendix C) and are described in Table 1.

At this time, LSRCA is encouraging planning authorities to adopt the NHS and incorporate appropriate suggested policies in their Official Plans to protect and enhance the system (LSRCA et al., 2007), however, this has not yet been integrated into the City of Barrie’s planning policies.
Table 1: Natural Heritage Features Identified within LSRCA's Natural Heritage System

<table>
<thead>
<tr>
<th>Level of Feature</th>
<th>Feature Identified</th>
<th>LSRCA Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Lover’s Creek PSW</td>
<td>These features are deemed to be provincially significant by LSRCA and, for a PSW, the province. It is the intent of the authority to retain all such features and no development or site alteration should occur within these areas.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Forested lands surrounding portion of PSW situated to the north of Maplevie Dr. and West of Huronia Rd.</td>
<td>Level 2 features should be retained and there should be no negative impact to overall function. If it is determined that there will be no negative impacts, the loss of all or part of a feature can be contemplated subject to the identification of measures to replace the lost areas or functions.</td>
</tr>
<tr>
<td>Level 3</td>
<td>All watercourses</td>
<td>Development within Level 3 features is generally avoided but there is some flexibility when development is proposed. Although retention is preferred, replacement is acceptable.</td>
</tr>
<tr>
<td>Level 4</td>
<td>Early successional lands situated north of Lockhart Rd. and West of Huronia Rd.</td>
<td>A Level 4 feature is considered to be supporting Level 1, 2 and 3 features. Level 4 features do not represent a constraint to development, although replacement is encouraged.</td>
</tr>
</tbody>
</table>

4.0 EXISTING CONDITIONS

4.1 On Site Land Use

For the purposes of this report the limits of the study area include the footprint of the existing Huronia Road alignment, and adjacent lands within the preferred road widening alternative on both sides of Huronia Road. Vegetation communities will be identified within 120m of the proposed disturbance through air photo interpretation, as we do not have access or landowner permission to these private lands. The proposed road improvement study area includes existing City roadway (i.e. existing Huronia Road), forest and early successional vegetation communities, industrial and commercial lands, portions of the Lover’s Creek PSW, residential homes with maintained lawns and
maintained residential properties. A number of watercourses exist within the study area (Figure 1).

### 4.2 Adjacent Lands

Adjacent lands, for the purposes of this report, are those lands residing outside of the 120m setback from the preferred design alternative.

The land use on adjacent lands is similar to the on-site land uses. Lands adjacent to the proposed road improvements are composed of forest and early successional vegetation communities, agricultural, industrial and commercial lands, portions of the Lover’s Creek PSW, residential homes and maintained residential properties. A number of watercourses also traverse the adjacent lands.

### 4.3 Natural Resources

#### 4.3.1 Aquatic Resources

Between Yonge Street and Lockhart Road, Huronia Road is traversed by the main branch of Whiskey Creek, two tributaries of Whiskey Creek, and seven tributaries of Lover’s Creek, as shown on Figure 1, 2, 2a and 2b. These watercourse crossings were field investigated on April 28, 2008 to document existing aquatic habitat conditions under spring conditions and potential for providing fish habitat. A detailed investigation that included fish sampling with the use of a backpack electrofisher was completed on June 17, 2010.

The following paragraphs describe these surface water features from north to south along Huronia Road within the study limits, with reference to crossing numbers 1-10 as identified in Figure 1, 2, 2a and 2b.

#### 4.3.1.1 Crossing 1

This crossing is the main branch of Whiskey Creek. Whiskey Creek is located entirely within the limits of the City of Barrie. The watercourse originates in the Veteran’s Drive area, west of Highway 400, draining a catchment area of approximately 6.35km². The creek flows in a general easterly direction through natural and urbanized reaches ultimately discharging to Kempenfelt Bay, Lake Simcoe, adjacent to Minet’s Point Park. Whiskey Creek flows beneath Huronia Road Avenue via twin corrugated steel pipe (CSP) culvert.

Whiskey Creek is a permanently flowing, cold water watercourse that sustains populations of Brook Trout (*Salvelinus fontinalis*) and Mottled Sculpin (*Cottus bairdi*). As described in the August 2001 Whiskey Creek Master Drainage Plan (MDP), fish sampling efforts have captured a variety of warm, cool, and cold water species throughout the system. Electrofishing efforts completed by Azimuth in August 2001 captured the following fish species; Brook Trout, Mottled Sculpin, Blacknose Dace
(Rhinichthys atratulus), Creek Chub (Semotilus atromaculatus), Longnose Dace (Rhinichthys cataractae), Golden Shiner (Notemigonus crysoleucas), and Black Crappie (Pomoxis nigromaculatus). Site specifically, an electrofishing station located just upstream of Little Avenue captured both Brook Trout and Mottled Sculpin, both of which require good water quality conditions and are indicative of cold water habitat.

Background information from the LSRCA and the MNR concur with the results presented in the MDP and above. LSRCA and MNR agree that the watercourse maintains a cold water thermal regime, and that any in-water works must be completed within the July 1 – September 30 (three month) cold water fisheries timing window.

4.3.1.2 Crossing 2
This watercourse crossing is an unnamed tributary of Whiskey Creek that conveys seasonal drainage in a westerly direction beneath Huronia Road. The intermittent drainage originates in a Cattail stand on the west side of Huronia Road. The existing culvert inlet is buried, and there is no suitable standing/flowing water that would provide fish habitat. On the downstream (east) side of the culvert there is a small area of standing water, however fish sampling revealed no fish captured, and it is expected that this watercourse crossing strictly provides seasonal drainage, and does not provide direct fish habitat.

4.3.1.3 Crossing 3
This unnamed tributary to Whiskey Creek conveys intermittent drainage and appears to originate within the west ditch of Huronia Road, adjacent to the C.N.R. tracks. Field investigations could not locate where/how the drainage crosses Huronia Road, as no culvert was observed. On the east side of Huronia Road, water appears to seep from the east ditch where it eventually flows into a defined channel easterly within a vegetated corridor through the City’s Huronia Soccer Fields. There is no direct fish habitat present within the right-of-way (ROW) of Huronia Road, as no fish were captured in isolated pools adjacent to the crossing. This watercourse crossing strictly provides seasonal drainage, and does not provide direct fish habitat.

4.3.1.4 Crossing 4
This watercourse crossing conveys an unnamed tributary of Lover’s Creek. A single CSP culvert carries permanent flow from the west side of Huronia Road to the east. The 1m wetted channel displays excellent aquatic habitat characteristic, hosts Brook Trout, and should be considered direct cold water fish habitat. At low water levels the degraded condition of the existing culvert may create a barrier to fish movement. LSRCA and MNR agree that the watercourse maintains a cold water thermal regime, and any in-water works must be completed within the July 1 – September 30 (three month) cold water fisheries timing window.
4.3.1.5 Crossing 5
This unnamed tributary to Lover’s Creek originates in the west ditch of Huronia Road and crosses via a small CSP culvert to the east. On the downstream (east) side, the culvert is buried and water seeps through the bank and flows diffusely approximately 5m to a small defined channel. Flow appears limited but permanent, and there is no direct fish habitat present within the right-of-way (ROW) of Huronia Road. Due to its proximity to the receiving watercourse (Crossing 3), cold water thermal regime, and potential downstream direct fish habitat this drainage area should be considered indirect cold water fish habitat, to which the cold water fisheries timing restriction would potentially apply.

4.3.1.6 Crossing 6
This crossing represents an unnamed cold water tributary to Lover’s Creek. This watercourse sustains permanent flow, and is historically known to provide direct habitat for cold water fish species, including Brook Trout. Azimuth’s June 2010 fish sampling confirmed the presence of Brook Trout in proximity of the Huronia Road crossing. The watercourse traverses Huronia Road via a single CSP from the west side of the road to the east towards the main branch of Lover’s Creek. Fish passage does not appear to be negatively affected by the present condition of the existing culvert. Background information from the LSRCA and the MNR concur with the results presented above and agree that the watercourse maintains a cold water thermal regime.

4.3.1.7 Crossing 7
This unnamed tributary of Lover’s Creek crosses Huronia Road via a single CSP culvert. Water originates in the west ditch of Huronia road, which receives drainage from the north and south ditch of Saunders Road. At the intersection of Saunder’s Road and Huronia Road, water flows in the ditch to a gabion basket headwall located within the west ditch and then crosses Huronia Road east towards Lover’s Creek. The watercourse is classified as permanent cold water, however due to the gabion structure and ditch conveyance upstream, only the downstream (east) side of Huronia Road should be considered direct cold water fish habitat. This drainage area flows year round and is a permanent tributary to Lover’s Creek. Fish sampling revealed no fish captured.

4.3.1.8 Crossing 8
This unnamed watercourse crosses Huronia Road via a concrete box culvert. Water flows through a small vegetated channel corridor on the west side of Huronia Road, enters the ditch, and crosses beneath the road, where it is conveyed within a small wetted channel easterly towards Lover’s Creek. There is no fish passage at this crossing due to a large rock check dam located on the upstream side of the culvert, and a large stone/sediment deposit located at the downstream side. Despite the absence of direct fish habitat at Huronia Road, this watercourse conveys permanent flow, Azimuth’s 2010 fish
sampling captured Brook Trout downstream of the culvert outlet, and therefore it should be considered as cold water direct fish habitat.

4.3.1.9 Crossing 9
This unnamed tributary of Lover’s Creek traverses Huronia Road via a concrete box culvert. Intermittent surface drainage flows down a vegetative channel corridor on the west side of Huronia Road, flows beneath Huronia Road, then enters a small vegetated wetted channel that heads east towards Lover’s Creek. Azimuth’s 2010 fish sampling did not capture any fish both upstream and downstream of the culvert crossing. Therefore, the watercourse should be classified as warm water indirect fish habitat, however due to its connectivity to Lover’s Creek (cold water direct fish habitat) the crossing may require cold water timing restrictions.

4.3.1.10 Crossing 10
Just south of the Lockhart Road – Huronia Road intersection, this unnamed tributary of Lover’s Creek crosses beneath Huronia Road via an existing box culvert. The watercourse provides permanent flowing cold water, and hosts Brook Trout both upstream and downstream of the crossing. Based on the present existing conditions and fish habitat observed, this crossing should be considered direct cold water fish habitat, and therefore subjected to the cold water in-water work timing restrictions.

4.3.1.11 Permanent Ditch Flow
During Azimuth’s site investigations, it was observed that there was permanent cold water base flow flowing within the west ditch of Huronia Road. Ditch flow appears to be originating from a vegetated corridor located to the west of Huronia road, flowing down gradient west to east towards the west ditch of Huronia Road. The flow reaches Huronia Road in between crossing 7 and 8. From 680 Huronia Road, the ditch flows south towards crossing 8, where in discharges into the unnamed tributary of Lover’s Creek. From 357 Saunders Road, the flow heads north, eventually discharging into the unnamed tributary of Lover’s Creek at crossing number 7. Fish sampling within the ditch did not capture any fish, however the permanent flowing cold water base flow contribution to the tributaries of Lover’s Creek may require the protection/maintenance of such contributions in the future.

4.3.2 Terrestrial Resources

4.3.2.1 Vegetation
Vegetation within the area is composed of a variety of forms including open early successional lands, forest and wetland habitat. The majority of the vegetative natural heritage features are situated to the south of Loon Avenue and north of Lockhart Road (Figure 2, 2a and 2b) North of Loon Avenue to Yonge Street is primarily residential.
development with lawns and boulevard tree plantings. A vegetation survey was conducted on May 20, May 28 and October 7, 2008 to document the vegetation communities that reside within the proposed limit of disturbance. The Ecological Land Classification for Southern Ontario (ELC) (Lee et al., 1998) was used as a general guide to the classification of the vegetation community types within the study area in addition to lands within 120m of the proposed limit of disturbance (Figure 2, 2a and 2b). Where communities were not accessible, air photo interpretation was utilized to best describe the areas.

Figures 2, 2a, 2b and Table 2 outlines the locations and types of vegetation communities found within the study area.

**Table 2: ELC Characterization of Vegetation Communities Located within the Huronia Road Study Area**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOREST (FO)</td>
<td>Tree cover &gt;60%</td>
</tr>
<tr>
<td>CONIFEROUS FOREST (FOC)</td>
<td>Tree cover &gt; 75% coniferous tree species</td>
</tr>
<tr>
<td>FOC2-2: Dry-Fresh White Cedar</td>
<td>Forest community composed primarily of Eastern White Cedar with Eastern White Pine and Poplar associates. Groundcover include species such as Brown-seed Dandelion, Sow Thistle, Bracken Fern, Coltsfoot, Sensitive Fern and Wild Grape.</td>
</tr>
<tr>
<td>MIXED FOREST (FOM)</td>
<td>Tree cover &gt; 25% coniferous and deciduous tree species</td>
</tr>
<tr>
<td>FOM4-2: Dry-Fresh White Cedar-Poplar Mixed Forest Type</td>
<td>Mixed forest community composed of Eastern White Cedar with associates including Trembling Aspen, Paper Birch, Ash, White Pine, Sugar Maple and Red Oak.</td>
</tr>
<tr>
<td>FOM5-2: Dry-Fresh Poplar Mixed Forest Type</td>
<td>Mixed forest community composed of Trembling Aspen, White Pine, Sugar Maple, Eastern White Cedar, White Spruce and Choke Cherry. Bracken Fern is one component of the groundcover.</td>
</tr>
<tr>
<td>FOM7-2: Fresh-Moist White Cedar – Hardwood Mixed Forest Type</td>
<td>Eastern White Cedar, Ash and Yellow Birch are found within this community. Red Raspberry, Climbing Nightshade, and Poison Ivy contribute to the understorey and groundcover layers.</td>
</tr>
<tr>
<td>DECIDUOUS FOREST (FOD)</td>
<td>Tree cover &gt; 75% deciduous tree species</td>
</tr>
<tr>
<td>FOD3-1a Dry-Fresh Poplar Deciduous Forest Type</td>
<td>A small portion of Whiskey Creek runs through this community. Community largely composed of Balsam Poplar with Trembling Aspen, Manitoba Maple, Eastern White Cedar, White Pine and Paper Birch. Red Raspberry, Alternate-leaf Dogwood and Staghorn Sumac can be found within the understorey layer.</td>
</tr>
</tbody>
</table>
with Red-osier Dogwood and Highbush Cranberry in the riparian areas. Bracken Fern, Virginia Creeper, Riverbank Grape, Brown-seed Dandelion are all common herbaceous species within this area.

<table>
<thead>
<tr>
<th>FOD3-1b: Dry-Fresh Poplar-Deciduous Forest Type</th>
<th>Community dominated by Trembling Aspen with Black Cherry, American Elm, Staghorn Sumac and Eastern White Cedar. Groundcover includes species such as Woodland Strawberry and Brown-seed Dandelion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOD6-1: Fresh-Moist Sugar Maple – Lowland Ash Deciduous Forest Type</td>
<td>Community largely dominated by Ash with Trembling Aspen, Sugar Maple, Basswood, American Elm, Balsam Poplar, White Spruce and Eastern White Cedar. Bracken Fern is abundant within the groundcover however, from the roadside, it appears that there are pockets of Red-osier Dogwood and Sensitive Fern.</td>
</tr>
<tr>
<td>FOD7-2: Fresh-Moist Ash Lowland Deciduous Forest Type</td>
<td>Community largely composed of Green Ash and Trembling Aspen with a variety of other tree species such as Balsam Poplar, Red Oak, American Elm, Manitoba Maple and Sugar Maple. Alternate-leaf Dogwood, Staghorn Sumac and Highbush Cranberry, Poison Ivy, Virginia Creeper and Riverbank Grape are components throughout community. Wetland adept species are found in proximity to watercourses that traverse through this community.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CULTURAL (CU)</th>
<th>Community resulting from, or maintained by, cultural or anthropogenic-based disturbances.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUP3-1: Red Pine Coniferous Plantation Type</td>
<td>Red Pine plantation.</td>
</tr>
<tr>
<td>CULTURAL WOODLAND (CUW)</td>
<td>35% &lt; Tree cover &lt; 60%</td>
</tr>
<tr>
<td>CUW1: Mineral Cultural Woodland Ecosite</td>
<td>Community composed of a scattering of young Trembling Aspen, Black Cherry and Willow with a variety of field species found within CUM1-1.</td>
</tr>
<tr>
<td>CULTURAL THICKET (CUT)</td>
<td>Tree cover &lt;25%, shrub cover &gt;25%</td>
</tr>
<tr>
<td>CUT1: Mineral Cultural Thicket Ecosite</td>
<td>Old field successional community composed of species similar to those found within the Cultural Meadow Community with a higher component of shrubs and young saplings.</td>
</tr>
<tr>
<td>CULTURAL MEADOW (CUM)</td>
<td>Vegetation community characterized by having &lt;25% tree cover and &lt;25% shrub cover.</td>
</tr>
<tr>
<td>CUM1-1: Dry-Moist Old Field Meadow Type</td>
<td>Old field successional composed of a variety of grasses, Wild Carrot, Evening Primrose, Mullein, Milkweed, Brown-seed Dandelion, Red Raspberry, Staghorn Sumac and a variety of Goldenrods and Asters. Along the intermittent channel is a larger concentration of tree and shrub species including Maple, American Elm, Trembling Aspen, Eastern White Cedar, White Pine, Ash, Common Apple and Buckthorn.</td>
</tr>
<tr>
<td>SWAMP (SW)</td>
<td>Tree or shrub cover &gt;25% dominated by hydrophytic shrub and tree</td>
</tr>
<tr>
<td>Vegetation Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>THICKET SWAMP (SWT)</strong></td>
<td>Tree cover &lt;25%, hydrophytic shrubs &gt;25%</td>
</tr>
<tr>
<td>SWT2-2: Willow</td>
<td>Community largely dominated by willow (shrub form) with other wetland species.</td>
</tr>
<tr>
<td>Mineral Thicket Swamp Type</td>
<td></td>
</tr>
<tr>
<td><strong>CONIFEROUS SWAMP (SWC)</strong></td>
<td>Conifer tree species &gt; 75% of canopy</td>
</tr>
<tr>
<td>SWC1-1: White Cedar –</td>
<td>Community largely dominated by Eastern White Cedar.</td>
</tr>
<tr>
<td>Coniferous Swamp Type</td>
<td></td>
</tr>
<tr>
<td><strong>MIXED SWAMP (SWM)</strong></td>
<td>Tree species &gt; 25% coniferous and deciduous</td>
</tr>
<tr>
<td>SWM1-1 White Cedar –</td>
<td>Community composed of tree species including Balsam Poplar, Eastern White</td>
</tr>
<tr>
<td>Hardwood Mixed Swamp Type</td>
<td>Cedar and American Elm. Groundcover composed of species such as Sensitive</td>
</tr>
<tr>
<td></td>
<td>Fern, Spotted Joe-pye Weed and Swamp Aster.</td>
</tr>
<tr>
<td><strong>DECIDUOUS SWAMP (SWD)</strong></td>
<td>Tree cover &gt;25%, deciduous tree species &gt;75% of canopy cover.</td>
</tr>
<tr>
<td>SWD2-2: Green Ash</td>
<td>Community dominated by Green Ash with Balsam Poplar, Trembling Aspen</td>
</tr>
<tr>
<td>Mineral Deciduous Swamp</td>
<td>and Eastern White Cedar. Tree and shrub form will are found within the sub-</td>
</tr>
<tr>
<td>Type</td>
<td>canopy and within the understory. Red-osier Dogwood and Cattails are also</td>
</tr>
<tr>
<td></td>
<td>components of this community.</td>
</tr>
<tr>
<td>SWD4: Mineral Deciduous</td>
<td>Community dominated by Trembling Aspen with American Elm, Eastern White</td>
</tr>
<tr>
<td>Swamp Ecosite</td>
<td>Cedar and Willow. Reed Canary Grass, Common Reed and Cattail are found in</td>
</tr>
<tr>
<td></td>
<td>the herbaceous layer.</td>
</tr>
<tr>
<td><strong>MARSH (MA)</strong></td>
<td>Tree and shrub cover &lt;25% and hydrophytic emergent macrophyte cover &gt; 25%</td>
</tr>
<tr>
<td><strong>SHALLOW MARSH (MAS)</strong></td>
<td>Standing or flowing water for much or all of the growing season with water</td>
</tr>
<tr>
<td></td>
<td>up to 2m deep.</td>
</tr>
<tr>
<td>MAS2-1: Cattail</td>
<td>Community dominated by cattails.</td>
</tr>
<tr>
<td>Mineral Shallow Marsh Type</td>
<td></td>
</tr>
</tbody>
</table>

None of the vegetation communities are considered to be provincially rare (NHIC, 2010). None of the species observed are considered to be provincially endangered, threatened or of special concern. Table 3 lists the vegetation species documented within the study area. None of the vegetative species observed are of conservation concern.

There is one recent (i.e. within 20 years) element of occurrence records on file with the Ontario Ministry of Natural Resources’ (OMNR) Natural Heritage Information Centre (NHIC) to indicate that the property potentially contains habitat of threatened, or endangered species, Fogg’s Goosefoot (*Chenopodium foggii*) (NHIC, 2010). Fogg’s
Goosefoot can be found in sandy areas on limestone under oak or pine-oak forests, rocky woods, cliff bases, rocky slopes and outcrops, sparsely wooded areas (OMNR 2000, Flora of North America 2007, USDA Forest Service 2005). This species was not documented within the study area nor is suitable habitat present.

Silv-Econ prepared a Tree Inventory and Preservation Plan in 2005 for the Municipal Class Environmental Assessment for the widening of Huronia Road. This report documents the trees potentially impacted from the proposed road works and recommends trees that should be removed, preserved and strategies to avoid damage to trees that may be retained. None of the trees documented within this report are of provincial conservation concern. One watershed rare tree, Black Walnut (LSEMS, 2003) was documented on a residential property north of Little Avenue (Figure 2b).

4.3.2.2 Wetland
Portions of the Lover’s Creek PSW are situated within the study limits and are located to the east of Huronia Road between Lockhart Road and Mapleview Drive and along each side of Huronia Road between Mapleview Drive and Loon Crescent (Figure 1 and Figure 2, 2a and 2b). This PSW is composed of four individual wetlands and is composed primarily of swamp habitat with 75% of the wetland composed of organic soils (Black et al., 1985). Within the 1985 wetland evaluation, the PSW was documented to provide a number of functions and provide habitat for wildlife including:

- Herpetiles including Bullfrog, Snapping Turtle;
- Furbearers including the Muskrat, Raccoon, Beaver, Mink and Coyote;
- Waterfowl including the regionally significant Black Duck, feeding area for the Great Blue Heron and waterfowl staging areas;
- Deer as a core winter area; and
- Vegetation including the locally significant Slender Wedge Grass (*Sphenopholis intermedia*).

4.3.2.3 Wildlife
Species of birds and small mammals that utilize forested habitat within the study area would be restricted to those edge species that are more tolerant of an urban or disturbed environment. Small mammals such as Gray and Red Squirrel, Raccoon, Striped Skunk, European Hare, and Eastern Cottontail would use habitat in proximity to the existing roadbed for food resources.

More urban species of birds including Robin, American Crow, Mourning Dove, Blue Jay, European Starling, sparrows, House Finch and other disturbance-tolerant species would be expected to utilize the forest fringe in proximity to the existing road allowance and treed vegetation associated with landscaped properties.
Dawn breeding bird surveys were conducted on June 3 and 21, 2008 and June 17, 2010 at eight point count stations within the study limits (Figure 2, 2a, 2b). A total of 25 bird species were recorded (Table 4). None of the birds observed are of conservation concern.

A Stratum 2 deeryard has been identified at the northeast corner of Mapleview Drive and Huronia Road (Allen et al., 2005).

According to the Ontario Breeding Bird Atlas Database (OBBAD) 2001-2005 survey (square # 17PK01), there is one provincially rare bird identified within the area, Red-headed Woodpecker. The Red-headed Woodpecker has been confirmed as breeding within the area (OBBA, 2010). This bird is ranked as an S4 species (former S3 ranking) according to OMNR’s NHIC database (NHIC 2010). The term S4 indicates that this woodpecker is apparently secure, uncommon but not rare; some cause for long-term concern due to declines or other factors. The Red-headed Woodpecker is designated provincially as Special Concern and is discussed in Section 3.1.2 above. The Red-headed Woodpecker was not observed during field investigations.

There are no regionally rare birds confirmed as breeding within the area according to the Ontario Breeding Bird Atlas.

Three colonial species, Bank Swallow (*Riparia riparia*), Great Blue Heron and Green Heron have been confirmed to be breeding within the area according to the Ontario Breeding Bird Atlas.

Bank Swallow prefers riverbanks, cliffs and open fields close to water (OMNR, 2000). It can also be found in artificial sites such as sand and gravel pits, along roadsides and in stockpiles of soil or other material where it will excavate its own nest burrows in exposed soils (Cadman et al., 2007). Furthermore, telephone and hydro lines are often used for diurnal roosting. These roosts may be a considerable distance from nesting area therefore; it may be possible that breeding was confirmed in some areas where no breeding was actually occurring (Cadman et al., 2007). Potential habitat for Bank Swallow exists within stockpiled soil that is associated with the garden supply company located just east of Saunders Road. Disturbance of these stock piles would be associated with routine operations of this business and would therefore likely not represent suitable habitat. Bank Swallow was not documented within the study area.

The Great Blue Heron has been confirmed as breeding within the area (OBBA, 2008). This species is a colonial bird that primarily nests in large colonies (99% of nests in Ontario occur in colonies) (Cadman et al., 2007) with up to several hundred pairs (Butler, 1992). Great Blue Herons build large conspicuous bulky stick nest in trees, close to or over water (Cadman et al., 2007). These birds inhabit wetlands, shores of ponds or lakes, marshes, standing trees in open water, swamps including woodlots that are isolated
in order to discourage predation by snakes and mammals (OMNR, 2000 and Butler, 1992). It is intolerant of human disturbance and has been known to choose colony sites that are situated away from roads and human structures. Furthermore, colonies have been known to abandon an area in response to housing, industrial development, highway construction, logging, vehicle traffic and repeated human intrusions (Quinn et al., 1999). There were no Great Blue Heron, nests or colonies observed within the study area along Huronia Road.

The Green Heron has been confirmed as breeding within the area (OBBA, 2010). This species most often nests solitary but sometimes will nest in colonies. The Green Heron inhabits wetlands with heavy cover, woodland pools, streams or rivers, brushy drainage ditches, streamside thickets and conifer plantations (OMNR, 2000) and prefers thick vegetation throughout its range (Davis et al., 1994). The nests are bulky and are built of sticks. There were no Green Herons or stick nests observed within the study area along Huronia Road.

Evening anuran amphibian surveys were conducted on April 19, May 24, and June 27, 2008 at 5 different locations within the study area (Figure 2, 2a, 2b). Spring Peeper, American Toad, Gray Treefrog and Green Frog were observed within the study area (Table 5). Survey stations 2, 3, 4 and 5 represent areas that are being utilized for amphibian breeding. There were no calls heard at Station 1. None of the amphibian species observed are of conservation concern.

4.4 Lover’s Creek Hydrological Environmentally Sensitive Area (ESA)

The southern portion of the study area (i.e. south of Big Bay Point Road) falls within the Lover’s Creek Environmentally Significant Area (ESA) designation. This ESA contributes to baseflow and cold water habitat of Lover’s Creek and the portion within the study limits has been identified as a discharge area.

5.0 PREFERRED ROAD DESIGN ALTERNATIVE

The preferred road design alternative is listed below.

- Widen to three (3) lanes - South from Yonge Street to south of Webb Street/north of Herrell Ave.
- Widen to five (5) lanes - South of Webb Street/north of Herrell Ave south to Mapleview Drive.
- Widen to three (3) lanes (with the provision for an ultimate of five (5) lanes as area development occurs) - Mapleview Drive south to Lockhart Road.

Any widening will be mitigated with the use of standard mitigation practices outlined in advance of any works taking place.
6.0 IMPACT ASSESSMENT

6.1 Planning Policy
Portions of the Lover’s Creek Provincially Significant Wetland exist within the study area. Current provincial databases do not identify Significant Woodlands or Valleylands on or adjacent to the study area. The proposed road improvements along Huronia Road will not adversely impact the form or function of the Lover’s Creek PSW as vegetation removal is limited to the edge habitat adjacent to Huronia Road and is only removing very little vegetation within the PSW.

The study area includes lands that are regulated by LSRCA according to Regulation 179/06. A permit from LSRCA will be required prior to any road works.

6.2 Aquatic Resources
The implementation of the proposed Huronia Road improvements (widening) will result in sections of fish habitat within the existing ROW being ultimately enclosed/ altered due to the lengthening of existing culverts and increased footprint of the new road design. Proposed construction activities involving the ten (10) watercourse culvert crossings and roadside ditches currently hosting both direct and indirect fish habitat (as previously described) proposed for enclosure due to the lengthening/replacement will require both provincial and federal review in order to protect the existing form and function of fish habitat found within the site limits.

The Federal Fisheries Act applies to all projects that occur in or near water that could harmfully alter, disrupt or destroy direct or indirect fish habitat (HADD). The proposed improvements have the potential to harmfully alter fish habitat as a result of the requirement for culvert extensions and ditch enclosures due to the road widening.

The following is a list of criteria/recommendations to be considered in the final design of the Huronia Road improvements as it relates to the areas of fish habitat found within the study area:

- The previously described ten (10) watercourse crossings and sections of the roadside ditches in the study area are located within areas that are regulated under the jurisdiction of the LSRCA (Section 179/06 of the Conservation Authorities Act). In general, any proposed works on these watercourses/ditches must not adversely impact the existing flow regimes of these systems. Prior to undertaking works on these watercourses/ditches, permits are required from LSRCA;
- LSRCA has an agreement with DFO that allows the LSRCA to review proposed works potentially affecting fish habitat in accordance with the Federal Fisheries Act, therefore LSRCA will be the primary contact for any final proposals to alter the watercourse crossings/ditches;
• DFO’s general guidelines for the replacement of culverts/ditches is that they be "like or better" than the existing, and that culverts that have the potential to negatively affect fish habitat upstream or downstream, be redesigned to improve such conditions where possible;

• Based on the continuing advancements in science related to watercourse/ditch enclosures and implications to aquatic habitat, DFO’s position is generally not favorable towards new enclosures of potential fish habitat. Please note that Section 35(1) of the *Fisheries Act* stipulates that "No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction (HADD) of fish habitat. Furthermore, a HADD of fish habitat is prohibited unless authorized by the DFO pursuant to subsection 35(2) of the *Fisheries Act.*” In such cases, no such authorizations are issued unless acceptable measures to compensate for the habitat loss are developed and implemented by the proponent. In the event that the watercourses/ditches are not maintained in their current state within the road improvement area, then an authorization will be required for such works. LSRCA is the primary agency contact for works within areas of fish habitat and LSRCA regulated lands; and,

• Because new enclosures are proposed due to culvert lengthening, the proponent will potentially be required to apply for a Federal Authorization for Works or Undertakings Affecting Fish Habitat, through the LSRCA. As part of the application, the proponent will potentially be required to develop a fish habitat compensation plan that replaces ("no net loss") the habitat lost by the enclosure of the watercourses/ditches. This plan must be prepared by a qualified fisheries biologist. There is no requirement for DFO to accept a compensation plan to address a proposed HADD of fish habitat. In addition, please be advised that the application for a Federal Authorization will trigger a Canadian Environmental Assessment Act (CEAA) review process. The CEAA process has legislated timelines that must be followed prior to the approval of the authorization (NVCA, 2009).

6.3 Terrestrial Resources

6.3.1 Vegetation

The widening of Huronia Road will result in the permanent removal of all tree, shrub and herbaceous vegetation within the areas identified on the Plan and Profile drawings where the limit of grading occurs beyond the existing tree line, as shown on Figure 3, 3a and 3b.

The approximate amount of vegetation that will be lost due to the road expansion is summarized in Table 6 below.
### Table 6: Areas of Woody Vegetation Lost within Huronia Road Study Area

<table>
<thead>
<tr>
<th>ELC Community (Figure 2 and 3)</th>
<th>Approximate Area of Woody Vegetation Lost (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUM1-1: Dry-Moist Old Field Meadow Type</td>
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<td>CUP3-1: Red Pine Coniferous Plantation Type</td>
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<td>CUT1: Mineral Cultural Thicket Ecosite</td>
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As shown in Table 6, the proposed roadway expansion will result in the loss of approximately 12,930 m² (1.29ha) of woody vegetation. The tree clearing is limited to the edges of the treed and cultural communities. This does not represent a significant loss to the system.

As indicated in Section 4.3.2, one watershed rare species, Black Walnut, was observed on the east side of Huronia Road North of Little Avenue (Figure 2, 2b). Based on the proposed road expansion, the Black Walnut will not have to be removed or pruned as a result of the proposed road works (Silv-Econ Ltd., 2005) (Figure 3b).

Once trees within the limit of clearing are removed, the new edge of vegetation should be examined for any trees that may potentially pose a safety hazard pre or post construction. A hazard tree would be any tree that is structurally unsound or susceptible to windthrow with the potential to cause damage to life or property. Partially fallen, damaged, unstable and old/decrepit trees would all be considered hazard trees and should be removed. If a hazard tree is found but does not pose any risk of damage or injury, it should be retained.

None of the vegetation communities or vegetation documented within the study area is of federal or provincial conservation concern. No Butternut individuals were observed within the study limits. There is one recent (i.e. within 20 years) element of occurrence records on file with the Ontario Ministry of Natural Resources’ (OMNR) Natural Heritage Information Centre (NHIC) to indicate that the property potentially contains habitat of threatened, or endangered species, Fogg’s Goosefoot (*Chenopodium foggii*) (NHIC, 2010). This species was not identified during field investigations nor is suitable habitat present within the study area.
6.3.2  Wetland
The footprint of the preferred option will result in the loss of 2,135m² (0.21ha) of wetland habitat. This includes wetland identified outside of the Lover’s Creek PSW within the study area. Wetland loss is limited to the edges of these communities in proximity to Huronia Road. This does not represent a significant loss to the system.

6.3.3  Wildlife
The project will result in the loss of approximately 12,930m² (1.29ha) of tree cover (Figure 3, Table 6). There should be negligible impacts to any urban tolerant avian species that may be utilizing the area as their primary habitat. Birds currently utilizing the natural heritage features within the area should continue to make use of the area post-development as there will be minimal loss of habitat.

There will be no significant impacts to wildlife habitat as a result of the proposed road reconstruction. Existing wildlife use of the habitat to be removed is confined to edge species of birds and small mammals and species adapted to a high degree of anthropogenic disturbance.

Anuran amphibian breeding habitat was documented at 4 of the 5 anuran survey stations (Figure 2, 2a, 2b and Table 5). There will be potential minimal loss of amphibian breeding habitat at Station 2, 3, 4, 5 (Figure 2, 2a, 2b). The potential loss of this habitat is minimal as the majority of the features (i.e. wetland, watercourse or wetted areas) will remain post-development. Furthermore, the majority of the calls heard from the 5 survey stations were not heard immediately adjacent to Huronia Road further reducing potential impacts. This loss of amphibian breeding habitat does not represent a significant loss to the system and amphibians should continue to breed within the area post-development. In addition there will be some loss of forest habitat which could provide summering habitat for the abovementioned species. This loss is negligible relative to the forest cover remaining in the immediate area.

Deer yards have been identified at the northeast corner of Mapleview Drive and Huronia Road. The road urbanization is not expected to directly impact the deer yard wintering area.

6.3.4  Wildlife Movement
Given the high traffic volumes along Huronia Road, it is expected that wildlife movement is currently significantly restricted. Road improvements will not alter the current wildlife movement function. However, at the water crossings where “open bottom” culverts are utilized, potential wildlife movement (i.e. amphibians) will be enhanced.
7.0 CONSTRUCTION MITIGATION

7.1 Timing Restrictions
Work involving the watercourses and ditches should not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods. Any works involving the watercourses/ditches should be completed ‘in the dry’, during low water levels, or by means of temporary diversions. Based on the thermal classification of both Whiskey Creek and Lover’s Creek and their associated tributaries, it is anticipated that in-water works will not be permitted between September 30th and June 30th of any given year for the culvert works. Ultimately, the LSRCA/MNR will confirm appropriate timing windows for this project during agency review.

Construction activities involving the removal of vegetation should be restricted from occurring between April to the end of July to avoid impacting nesting birds.

7.2 Sediment and Erosion Controls
Diligent application of erosion and sediment control measures will be of the utmost importance for this project recognizing the existing fish habitat located in the “receiving” watercourses (Whiskey Creek and Lover’s Creek). All construction activities occurring in or around the watercourses/ditches must be completed using best management practices to minimize the extent of accidental or unavoidable impacts to fish habitat, and alleviate the risk of sediment entering the Whiskey Creek and Lover’s Creek. All sediment controls are to be maintained until vegetation has been re-established to sufficiently stabilize any disturbed soils.

7.3 Culvert/Sewer Design
It is recommended that any proposed new culverts and/or replacement culverts for the watercourse crossings are to be installed with a minimum 20% embedment below the existing channel invert or design bottom of the watercourse, and if possible, should provide a similar bottom width as the existing structure. New culverts and replacement culverts must provide for fish passage. Historically, LSRCA has recommended that “open bottom” culverts be utilized, where applicable, where cold water fish habitat thermal regimes and ground water inputs are present.

Cold water base flow is present within the previously described ditch locations hosting indirect fish habitat along a section of Huronia Road, indicating that ground water contributions potentially occur to some degree at this location. The LSRCA requires that this contribution be maintained in order to protect the existing water quality, therefore any proposed ditch enclosure (if approved) should be perforated to maintain and capture ground water seepage at these locations.
7.4 Site Restoration
All areas disturbed during construction should be restored immediately following the completion of the works. Site restoration should include immediate site stability methods (erosion control blankets, silt fencing), of all excavated and erodible soils to minimize the potential for erosion, combined with a planting plan that utilizes native material deemed acceptable to LSRCA.

7.5 Operations
All maintenance activities required during construction must be conducted away from the flowing roadside ditch and watercourse features to protect them from any accidental spillage of deleterious substances that may harm the aquatic environment, both locally and downstream.

8.0 CONCLUSIONS
Given the current conditions of both the indirect and direct cold water fish habitat found within the site limits, overall the proposed road improvements potentially pose a localized threat to the existing form and function of aquatic habitat found within Whiskey Creek, its tributaries, and the tributaries of Lover’s Creek. Temporary impacts associated with construction practices are fully mitigable through the effective use of sediment and erosion controls that will maintain the quantity and quality of flows within the watercourses at all times. The enclosure/culvert lengthening of the existing fish habitat will potentially result in a HADD, however an appropriate compensation plan may be developed in consultation with LSRCA and DFO. Design alternatives submitted include the creation of approximately 149m open channel (Figure 3a) that would maintain the cold water base flow of the contributing ditches between crossing 7 and 8. The relocation of this ditch flow into a natural channel on the east side of Huronia Road will have a positive impact in ensuring that the open channel flow is maintained, with the potential to create approximately 149m of direct fish habitat. Implementing design alternatives such as this can result in a greater overall “gain”, providing increased habitat/water quality than the existing aquatic habitat, thus providing an overall improvement to the watershed. During the detail design/approval stages, it is strongly recommended that this, and other design alternatives that have the potential to increase habitat form and function, are implemented and put forth to agencies such as the LSRCA and DFO in order to achieve successful approvals and ensure that negative impacts on existing habitat are fully compensated for.

The limited width of the road allowance and the size of the urban roadway required to convey existing and future traffic volumes does not provide the opportunity to reduce vegetation loss. Ultimately, this roadway will be transformed to a multi-lane urban road to provide improved access to Barrie’s developing south end.
This project will result in the loss of approximately 12,930m$^2$ (1.29ha) of woody vegetation in addition to the loss of early cultural meadow/thicket/woodland, manicured lawn and associated boulevard tree plantings adjacent to Huronia Road. Vegetation communities within the study limits are common within the area.

None of the wildlife (mammals, birds, amphibians) observed are of federal, provincial or local conservation concern. The edge habitat adjacent to Huronia Road does not provide any unique function to the natural environs and will continue to function as it did prior to the proposed road improvements.

9.0 REFERENCES


Natural Heritage Information Centre (NHIC), 2010. http://nhic.mnr.gov.on.ca/nhic_cfm


Quinn, Timothy and Ruth Milner. 1999. Great Blue Heron (Ardea herodias)


Silv-Econ Ltd. 2005. Huronia Road – Tree Inventory and Preservation Plan for the Municipal Class EA (from Young Street to Lockhart Road)


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1 Nomenclature based on Ontario Ministry of Natural Resources (OMNR), Natural Heritage Information Centre (NHIC) database - http://nhic.mnr.gov.on.ca/MNR/nhic/species.cfm
2 Conservation Rankings: From Ontario Ministry of Natural Resources, Natural Heritage Information Centre (http://nhic.mnr.gov.on.ca/nhic_ccf)
3 Watershed Rare - Identifies species that are considered to be rare in the Lake Simcoe Watershed according to Lake Simcoe Environment Management Strategy 2003, State of the Lake Simcoe Watershed
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1 Nomenclature based on Ontario Ministry of Natural Resources (OMNR), Natural Heritage Information Centre (NHIC) database - http://nhic.mnr.gov.on.ca/MNR/nhic/species.cfm
2 Conservation Rankings: From Ontario Ministry of Natural Resources, Natural Heritage Information Centre (http://nhic.mnr.gov.on.ca/nhic_cfm)
3 June 3, 2008 Observer: L. Mone, Temperature 15°C; Cloud cover 60%, Wind: B0, Precipitation: Nil, Search Time 7:15 to 7:30.
5 June 17, 2010 Observer: L. Mone, Temperature 13°C; Cloud cover 75%, Wind: B3, Precipitation: Nil, Search Time 6:27 to 7:45.
6 Breeding Bird Evidence Codes: X - Species observed; H - Species observed in its breeding season in suitable nesting habitat (Possible Breeding); S - Singing male (Possible Breeding); A - Agitated behaviour or anxiety calls of adu
Table 5: Amphibians Documented During Evening Anuran Surveys at 5 Stations Along Huronia Road

AEC 08-007 Huronia
Observers: B. Clayton, L. Moran

Frog Call Survey Results

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*see Figure 2

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*Call Code Levels
0 = none heard
1 = males could be individually counted
2 = calls overlap but numbers could be estimated
3 = overlapping calls, not possible to estimate numbers involved in chorus.