McKay Road Interchange and Salem / Lockhart Crossing

- The McKay Road Interchange Class EA has two components:
  1. A new MacKay Road Interchange at Highway 400; and
  2. A new bridge crossing of Highway 400 at Salem / Lockhart Road.

- The need and justification for these projects (Phases 1 and 2 of the Municipal Class EA process) was completed as part of the City’s Multi-Modal Active Transportation Master Plan MMATMP (2014).

- The current EA will complete Phase 3 (Design Alternatives) and Phase 4 (Environmental Study Report) of the Class EA process.

- The design of these components will be integrated with the planned improvements to Salem / Lockhart Road and McKay Road, east and west of Highway 400.

- The design of the McKay Road Interchange will also be integrated with MTO’s Highway 400 improvements, which include the current replacement of the McKay Road bridge and future widening of Highway 400. The McKay Road Interchange and Salem / Lockhart Crossing is subject to MTO approval.
Existing Conditions

Natural Environment

- The predominant natural environmental feature in the general area is the Lovers Creek Provincially Significant Wetland and adjacent woodlands which are designated as Core Area within the Natural Heritage System (City of Barrie Official Plan).

- Lovers Creek supports Brook Trout; therefore, maintaining good water quality and groundwater discharge in the tributary will be important.

- Two tributaries of Lovers Creek are located within the area of the proposed McKay Road Interchange. These tributaries are considered medium and low constraints.

- Vegetation in close proximity to McKay Road / Highway 400 and to Salem / Lockhart Road tends to be more disturbed, culturally influenced, and of lower quality than areas closer to the Core Area.
Existing Conditions

Socio-Economic

Existing land use in the vicinity of Salem / Lockhart Road:

- Large-scale commercial development north of Salem Road and west of Highway 400;
- Commercial/Industrial development north of Lockhart Road, east of Highway 400;
- Natural areas to the south that are part of the Lovers Creek Provincially Significant Wetland (PSW) / City’s Natural Heritage System Core Area.

Existing land use in the vicinity of McKay Road / Highway 400:

- Commercial / Landscaping business in southeast quadrant;
- Agricultural lands and farmstead (Built Heritage Resource) in the northeast quadrant;
- Agricultural lands and wooded areas along the west side of Highway 400.

Official Plan land use designations within the study area:

- Highway 400 Industrial along west side of Highway 400 at McKay Road;
- General Industrial along north side of Salem / Lockhart Road;
- Environmental Protection Area associated with Lovers Creek PSW & City’s Natural Heritage System Core Area.
- Rural Area east of Highway 400 at McKay Road and along the south side of Salem / Lockhart Road; however within an area of long-term planning for Industrial land use.
Existing Conditions
Archaeology

- Extensive archaeological work has been undertaken previously in the general area.

- Most recently, a Stage 1 Archaeological Assessment and Aboriginal Engagement Program was undertaken for the Secondary Plan and Infrastructure Master Plans.

- The Stage 1 Assessment confirmed previously recorded sites in close proximity to the Salem / Lockhart Road and McKay / Highway 400 areas:

  - The Cleary site (BbGw-10): a 4.6 hectare ancestral Huron-Wendat village located in the northeast quadrant of McKay Road and Highway 400. The significance of the site is underscored by its large size.

  - The Paisley site (BbGw-14): located approximately 800 metres northeast of the Cleary site (BbGw-10); may be an extension of the Cleary site.

- A Stage 2 Assessment will be undertaken relative to the preferred design alternatives for this study. However, based on the previous Stage 1 work, a Stage 3 is already recommended for the Cleary site. It is likely that Stage 4 would ultimately be required.

- Given the nature and extent of the Cleary site, it is considered a significant constraint in the context of the McKay Road Interchange.
Existing Conditions
Noise-Sensitive Areas

- A noise assessment will be carried out in accordance with MOECC/MTO Noise Protocol.

- Existing residential dwellings have been identified as Noise-Sensitive Areas (NSA)* for the assessment.

- Existing noise levels will be compared against future (2031) traffic noise predictions based on computer modelling.

- The MOECC/MTO Noise Protocol states that noise mitigation is warranted if the increase above the future ‘do-nothing’ ambient noise level is greater than 5 dBA and the future noise level is in excess of 65 dBA at the nearest receiver.

- Results and recommended mitigation measures, if appropriate, will be documented in the Environmental Study Report.

* The NSAs will be subject to confirmation once the preferred design is confirmed for each of the areas. It is noted that the receptor at McKay Road may be impacted by the preferred interchange alternative. It is also noted that both NSAs are within lands subject to redevelopment and may not be present in the future.
Existing Conditions
Structures and Geotechnical

**Structures**
- The McKay Road Bridge is currently being replaced by MTO as part of their planned Highway 400 improvements.
- The new structure will be a 2-span, 84 m long bridge that will accommodate the future widened Highway 400
- The new bridge will be compatible with the proposed future McKay Road Interchange.

**Geotechnical**
- The general area is located at the western edge of the Peterborough Drumlin Field, a rolling till plain located north of the Oak Ridges Moraine.
- Surface materials include glaciofluvial (river) sand and gravel and glaciolacustrine (lake) sand, silt and clay deposits. Depth to bedrock is typically > 100 m.
- Previous geotechnical review had identified areas for additional study - primarily associated with pockets of sandy soils along Salem / Lockhart Road and the Lovers Creek wetland.
- Current geotechnical study in the vicinity of the proposed interchange and bridge will inform the design process.
Existing Conditions

Hydrogeology

• The area groundwater system consists of a number of water-producing aquifers. Groundwater recharge is relatively high where surface deposits consist of permeable materials.

• Groundwater discharge occurs in various reaches of Lovers Creek and associated wetlands.

• In referencing the South Georgian Bay Lake Simcoe Source Water Protection Plan the following is noted:
  • The Study Area is generally not within: Wellhead protection Areas; Intake Protection Zones; Issue Contributing Area; and Groundwater Under Direct Influence.
  • The Study Area includes portions of Significant Recharge Areas and Highly Vulnerable Aquifer Areas.

• A hydrogeological assessment, completed for MTO’s McKay Bridge replacement, concluded a Permit To Take Water (PTTW) was not required.

• A hydrogeological assessment will be undertaken for the new McKay Road interchange and the new Salem / Lockhart Road bridge, in detailed design, to ensure any permit requirements are met.

• In the context of the McKay Road Interchange and new Salem / Lockhart Road Bridge, groundwater will generally be protected through appropriate stormwater management design, discussed on the next display.
Existing Conditions
Drainage/Stormwater Management

• A Drainage / Stormwater Management (SWM) design will be developed to address the requirements for controlling and managing stormwater quality, quantity and erosion from the new McKay Road Interchange and Salem / Lockhart Road bridge.

• The drainage / stormwater management designs will be integrated with:
  • The broader road improvements being planned for Salem / Lockhart Road and McKay Road under separate study (also presented at the PIC);
  • MTO’s Highway 400 drainage plan under existing and future conditions; and
  • Surrounding land development.

• The design will be consistent with Ministry of Environmental and Climate Change (MOECC), MTO drainage standards and Lake Simcoe Source Water Protection Plan policies. SWM measures meet flow and erosion control criteria and targets set out by the Lake Simcoe Region Conservation Authority for the Lovers Creek Subwatershed.

• Low Impact Development (LID) measures will be employed to manage stormwater within the right-of-way and ensure that adjacent natural and agricultural areas are protected from direct stormwater runoff.

• Stormwater Management methods may include: ‘dry’ ponds for quantity control; ‘wet’ ponds for quality, quantity and erosion control; grassed swales and grassed embankments; interim linear facilities that will provide peak flow control and a measure of quality control until a permanent SWM system is developed as part of the surrounding land development; infiltration trenches, bio-swales may be considered in some cases (although may not be preferred for road runoff).
Traffic Assessment

Transportation Network Planning

- The Multi-Modal Active Transportation Master Plan (MMATMP) (2014) was a comprehensive transportation network planning process, coordinated with other land use and planning studies, including the secondary plans for the Annexed Lands.

- The MMATMP examined transportation network problems and opportunities (Phase 1 of the Class EA) and considered a range of solutions to create an efficient multi-modal network that addresses existing network deficiencies and meets future traffic demand associated with planned population and employment growth (Phase 2 of the Class EA).

- The MMATMP recommended solution included a new interchange at McKay Road and a new bridge crossing at Salem / Lockhart Road, both of which significantly improve the transportation network.

Traffic Assessment

The traffic assessment undertaken to support the current study will build on the MMATMP and consider:

- Future traffic volumes to 2031 for both weekday morning and afternoon rush hours;
- The operation of a continuous Salem / Lockhart Road including intersections, need for turning lanes etc.
- The various alternative interchange configurations for McKay Road including ramp terminal configurations (e.g. signalized intersection / roundabout, etc.) to assess operational and safety aspects.
- Potential issues created by the new McKay road Interchange on Highway 400 operations, considering the proximity to the Mapleview Drive and the Innisfil Beach Road Interchanges.
Design Alternatives

- The following displays illustrate the design alternatives that have been developed for Salem / Lockhart Road Bridge and the McKay Road Interchange. The main advantages and disadvantages of each are also noted.

- The design alternatives may be refined based on the comments received today, input from external agencies and through further technical assessment by the Study Team.

- The design alternatives will undergo a detailed assessment and evaluation to identify the preferred alternatives.

- Study area constraints that will factor into the decision-making process are illustrated in this display.

- The evaluation criteria that will be applied during the assessment and evaluation of design alternatives is presented elsewhere in this PIC.

- The results of the evaluation and the preferred alternatives will be presented in the Environmental Study Report with an opportunity for public review at that time.

Source: Public Information Centre 2 – City of Barrie Growth Management Strategy # 3, Infrastructure Master Plans Municipal Class EA
Salem / Lockhart Crossing - Alternatives

Two alternatives have been developed for the connection of Salem Road / Lockhart Road across Highway 400.

The key design objectives are to:
- Utilize the existing road right-of-way as much as possible
- Minimize intrusion into natural areas to the south
- Minimise property impacts to the north

Note: The Salem / Lockhart Crossing is subject to MTO approval.

Alternative 1 - Centreline

Advantages
- An alignment along the centreline of the existing right-of-way allows for a tangent (straight) alignment and results in a shorter structure than Alternative 2, decreasing structural cost.

Disadvantages
- Requires retaining wall adjacent cinema property to minimize property impacts.
- Construction of a retaining wall results in higher construction cost than Alternative 2.

Alternative 2 – Southern Shift

Advantages
- Reduces requirement for a retaining wall adjacent to the cinema property

Disadvantages
- Results in a longer bridge over Highway 400
- Greater vegetation impacts along the south of Salem Road, including impacts to edges of the Natural Heritage System Core Area

While varying in other impacts, both alternatives will have the same noise impact on the identified noise-sensitive receptor.

The City of Barrie
McKay Road Interchange Design Alternatives

**Alternative A – Parclo A4**

**Advantages**
- Typically, a Parclo A4 configuration has the greatest capacity and performance of all arterial road interchange types

**Disadvantages**
- Largest footprint of the alternatives
- Highest cost of all alternatives
- Direct impacts to the Built Heritage Resource in the northeast quadrant
- Extensive impacts to significant Archeological site in northeast quadrant
- Direct impacts to business in southeast quadrant
- Impacts woodlands in northwest and southwest quadrants (common to all)
- Overall costs could increase significantly with archaeological assessment requirements

Note: The McKay Road Interchange is subject to MTO approval.
McKay Road Interchange Design Alternatives

Alternative B – Parclo A3

Advantages
- Relatively high capacity and good safety performance
- Avoids impact to Built Heritage Resource property in northeast quadrant
- Avoids impacts to significant archaeological site in northeast quadrant
- Smallest footprint of all alternatives

Disadvantages
- Absence of northbound Highway 400 on-ramp slightly reduces interchange capacity and performance when compared to Alternative A
- Direct impacts to business in southeast quadrant
- Impacts woodlands in northwest and southwest quadrants (common to all)

Note: The McKay Road Interchange is subject to MTO approval.
McKay Road Interchange Design Alternatives

**Alternative C – Diamond**

**Advantages**
- Smaller footprint than Alternative A
- Slightly lower construction cost than other alternatives
- Avoids impact to Built Heritage Resource in northeast quadrant
- Could be re-designed in future to accommodate future loop ramps

**Disadvantages**
- Less operational capacity and performance compared with Alternatives A and B
- No free-flow movements from McKay Road to Highway 400 on-ramps
- Direct impacts to the business in the southeast quadrant
- Some impact to significant Archeological site in northeast quadrant
- Impacts woodlands in northwest and southwest quadrants (common to all)

Note: The McKay Road Interchange is subject to MTO approval.