



Ministry of Transportation

Highway 7&8 Transportation Corridor Planning and Class EA Study

Greater Stratford to New Hamburg Area
MTO Group Work Project # 13-00-00

Report I: Working Paper – Generation of Preliminary Design Alternatives for Provincial Roadways

DRAFT

July, 2012

www.7and8corridorstudy.ca

This report is presented in draft format in order to obtain information and comments from stakeholders. Your input is requested by September 28, 2012 so the report can be finalized.



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1.0 INTRODUCTION

1.1 Introduction to the Highway 7&8 Transportation Corridor Planning and Class EA Study

The Ministry of Transportation (MTO) is undertaking a Highway 7&8 Transportation Corridor Planning and Class Environmental Assessment (Class EA) Study, from Greater Stratford to New Hamburg area. The study includes:

- development of a plan that addresses:
 - capacity, operation and safety needs along the 2-lane and 4-lane sections of Highway 7&8 between Stratford and the New Hamburg area and through the urban centres (Stratford, Shakespeare and New Hamburg) along Highway 7&8 for the movement of people and goods; and
 - linkage needs between the analysis area and transportation corridors serving other regions in the province.
- preparation of a preliminary design for the provincial highway components of that plan; and
- documentation of the work in a Transportation Environmental Study Report for public review at study completion.

This study also:

- involved reviewing and building on the findings of the MTO Highway 7&8 Study Design – Greater Stratford to New Hamburg Area, December 2005;
- addresses the transportation policies and growth forecasts of the final Growth Plan for the Greater Golden Horseshoe (recognizing that the easterly portion of the analysis area for this project lies within the Greater Golden Horseshoe); and
- recognizes other relevant transportation corridor studies being undertaken by MTO.

Access to the above documents can be obtained through the project website at www.7and8.corridorstudy.ca.

The study is being carried out as a Group 'A' project, in accordance with the Class Environmental Assessment for Provincial Transportation Facilities.

A major component of the study is an outreach and consultation program structured around six key points of decision-making, each of which is supported by:

- the release of a newsletter;
- the release of draft reports for review and comment;
- a round of Public Information Centres (PICs);
- posting of information on the study web site; and
- newspaper notices announcing the above.

At the completion of the study, the filing of a Transportation Environmental Study Report (TESR) will be announced through newspaper notices. Decisions on funding and timing of detail design and construction are based upon environmental clearance of the TESR, since it determines the type of transportation facilities and their location, and triggers for their implementation.

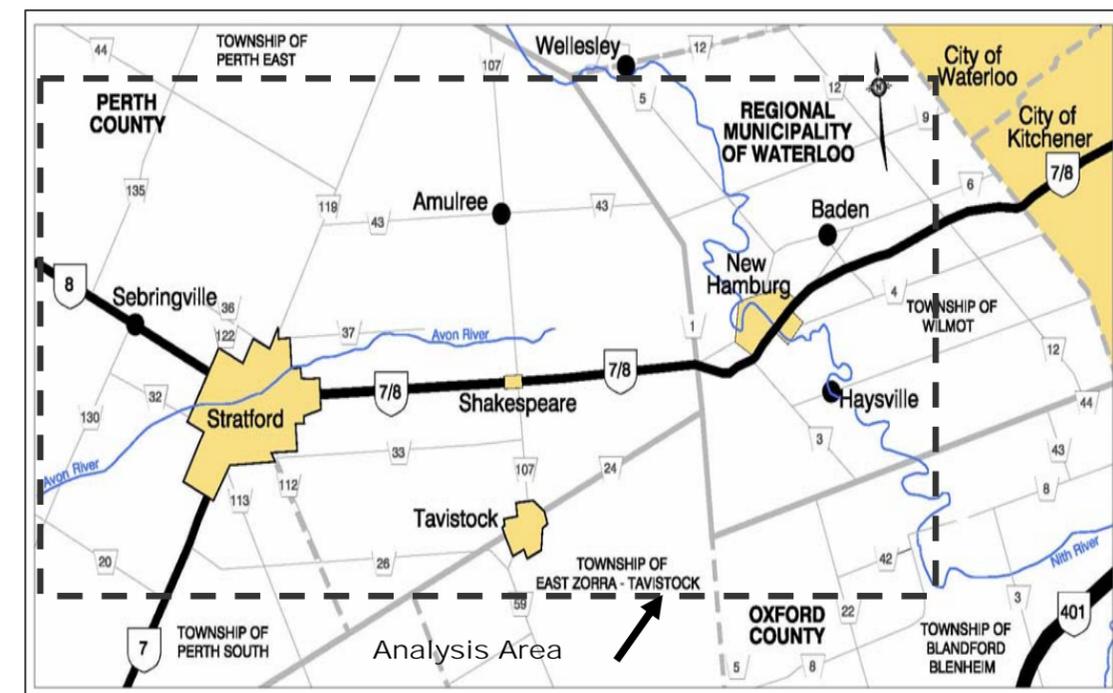
1.2 Study Background

1.2.1 Area Transportation System Strategy

The Analysis Area was established to identify transportation problems and opportunities associated with Highway 7&8 from the Greater Stratford to New Hamburg Area plus the broader 'Area Transportation System' (including Highway 8) between Highway 7&8 and Highway 401. The Analysis Area was not intended to represent a Study Area for the planning alternatives to be generated during the course of the study. The selection of a Study Area within the Analysis Area is documented in Report E.

For orientation and reference, a map of the Analysis Area is provided in **Exhibit 1.1** below.

Exhibit 1.1: Map of Analysis Area



The area transportation needs assessment (detailed in Report D) identified the preferred highway corridor improvements (i.e. widening of existing Highway 7&8 or a new highway corridor or combinations of the foregoing, plus inter-regional transit and transportation demand management (e.g. ridesharing and telecommuting)) to address the area transportation system problems and opportunities. A preferred highway corridor and an associated Study Area for the generation of detailed planning (route) alternatives, including an area for further review of Shakespeare route alternatives, was defined and is documented in Reports G and H.

Traffic projections for the planning horizon year of 2031 have shown that the current 2-lane highway from Highway 7/Erie Street in Stratford to east of New Hamburg is inadequate from the perspectives of both capacity and safety requirements. The 2031 forecasted traffic volumes have assumed that all reasonable modes of travel and demand management such as ridesharing, telecommuting, optimizing passenger/ freight rail capacity and increased inter-regional transit services are already implemented and operating to their fullest potential.

Even with the adjusted 2031 forecasted traffic volumes, the transportation assessment indicates there will be a road capacity deficiency of one lane in each direction from Stratford to New Hamburg by 2031 in the area road network which includes provincial and municipal roadways (i.e. 4 lanes on a single provincial highway are required). Accordingly, the study is investigating 4-lane alternatives on a single facility from New Hamburg to Stratford. West of Stratford there is not a capacity deficiency, but there is a need to link the provincial highway system. Accordingly, the study is investigating 2-lane alternatives west of Stratford.

In response to municipal stakeholder input, the study team is examining in greater detail the route alternative that uses existing Highway 7&8 west of Shakespeare via a north by-pass of Shakespeare, and a segment of Road 110 as the linkage from existing Highway 7&8 to Lorne Avenue. To accomplish this, preliminary design alternatives for the north bypass route have been generated and will be collectively evaluated with preliminary design alternatives for the previously selected south bypass route, at the same level of detail.

1.2.1 Generation and Evaluation of Detailed Planning (Route) Alternatives

The Study Area was then divided into six sections for the generation of provincial highway detailed planning (route) alternatives. These alternatives were reviewed with stakeholders, agencies and the public through the PIC #3B consultation process, with modifications / refinements made to the alternatives where appropriate to generate a final set of detailed planning alternatives to be evaluated.

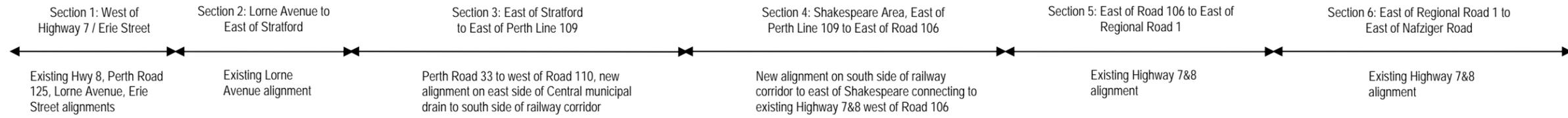
The environmental and transportation factors, sub-factors, criteria and indicators considered for the assessment and evaluation of route alternatives (presented in Report H) were refined / modified in part based on local information provided by stakeholders through the consultation process and then used to determine a preferred route alternative. Two evaluation approaches were used to assist in the selection of a preferred route alternative. The Reasoned Argument (or Trade-off) method was the primary tool used to identify a preferred alternative. The Arithmetic (weighting-scoring) method was the secondary tool, used to validate the results of the reasoned argument method. The preferred route alternative was presented for public review and comment at PIC #4 and was confirmed as the selected route in Spring 2011.

The assessment and evaluation results for the route alternatives resulted in the selection of:

- 4-lane alternatives on a single facility using sections of existing highway and new highway route from New Hamburg to Stratford; and
- 2-lane alternatives west of Stratford to link back to the provincial highway system.

This is documented in Report H and the preferred route for the entire study area is shown in **Exhibit 1.2** below.

Exhibit 1.2: Map of Preferred Route Alternative



1.3 Purpose, Relevance and Position of Report “I” Within the Study Process

The purpose of Report I is to document the process for generation of preliminary design alternatives involving highway cross-section and crossing road intersection treatments for the selected route.

As can be seen in **Exhibit 1.3** below, Report I is the tenth of 12 reports to be prepared for this study and the first report of Phase 5, Preliminary Design. Work completed as part of Study Phases 1 through 4 is available in Reports A through H as detailed below.

Exhibit 1.3: Summary of Reports Highway 7&8 Transportation Corridor Planning and Class EA Study
STUDY PHASE 1: STUDY PLAN
<ul style="list-style-type: none"> • Report “A” Study Plan For Technical Work, Outreach And Consultation
STUDY PHASE 2: AREA TRANSPORTATION SYSTEM PLANNING
<ul style="list-style-type: none"> • Report “B”: Working Paper – Overview of Transportation, Land Use and Economic Conditions Within the Analysis Area • Report “F” -1st Part: Working Paper - Environmental Conditions And Constraints • Report “C”: Working Paper – ‘Area Transportation System’ Problems and Opportunities • Report “D”: Working Paper – Area Transportation System Alternatives
STUDY PHASE 3: PRELIMINARY PLANNING
<ul style="list-style-type: none"> • Report “E”: Milestone Report – Highway 7&8 Transportation Corridor Needs Assessment
STUDY PHASE 4: DETAILED PLANNING FOR PROVINCIAL ROADWAYS
<ul style="list-style-type: none"> • Report “F” 2nd Part: Working Paper - Environmental Conditions And Constraints • Report “G”: Working Paper – Generation of Detailed Planning Alternatives for Provincial Roadways • Report “H”: Milestone Report - Selection of Detailed Planning Alternatives for Provincial Roadways
STUDY PHASE 5: PRELIMINARY DESIGN FOR PROVINCIAL ROADWAYS
<ul style="list-style-type: none"> • <i>Report “I”: Working Paper - Generation of Preliminary Design Alternatives for Provincial Roadways</i> • Report “J”: Milestone Report - Selection of Preliminary Design Alternatives for Provincial Roadways
STUDY PHASE 6: TRANSPORTATION ENVIRONMENTAL STUDY REPORT
<ul style="list-style-type: none"> • Report “K”: Transportation Environmental Study Report (documents overall study)

2.0 PRELIMINARY DESIGN ALTERNATIVES

Preliminary Design involves defining the selected route in greater detail, including:

- Horizontal and vertical alignments
- Highway cross section
- Right-of-way width / property requirements
- Crossing road intersection treatments (interchanges; grade separations; signalized and unsignalized intersections; 1-lane and 2-lane roundabouts)
- Drainage requirements (watercourse crossings, municipal drainage / tile drainage modifications, and a preliminary stormwater management strategy)
- Highway lighting requirements
- Access management (number and location of intersections and private entrances)
- Mitigation measures (e.g. environmental protection)

Preliminary Design Alternatives are generated when more than one method of implementing the proposed improvements is available with the objectives of capitalizing on transportation engineering opportunities, avoiding significant environmental features and / or minimizing design related environmental impacts.

This report presents preliminary design alternatives for highway cross-section and crossing road intersection treatments. The balance of preliminary design will be presented with the selected highway cross section and crossing road intersection treatments.

2.1 Generation of Preliminary Design Alternatives

In recognition of the varied environment and transportation requirements along the selected route, the study area was divided into eight segments for the development of Preliminary Design Alternatives, as shown in Exhibit 2.1.

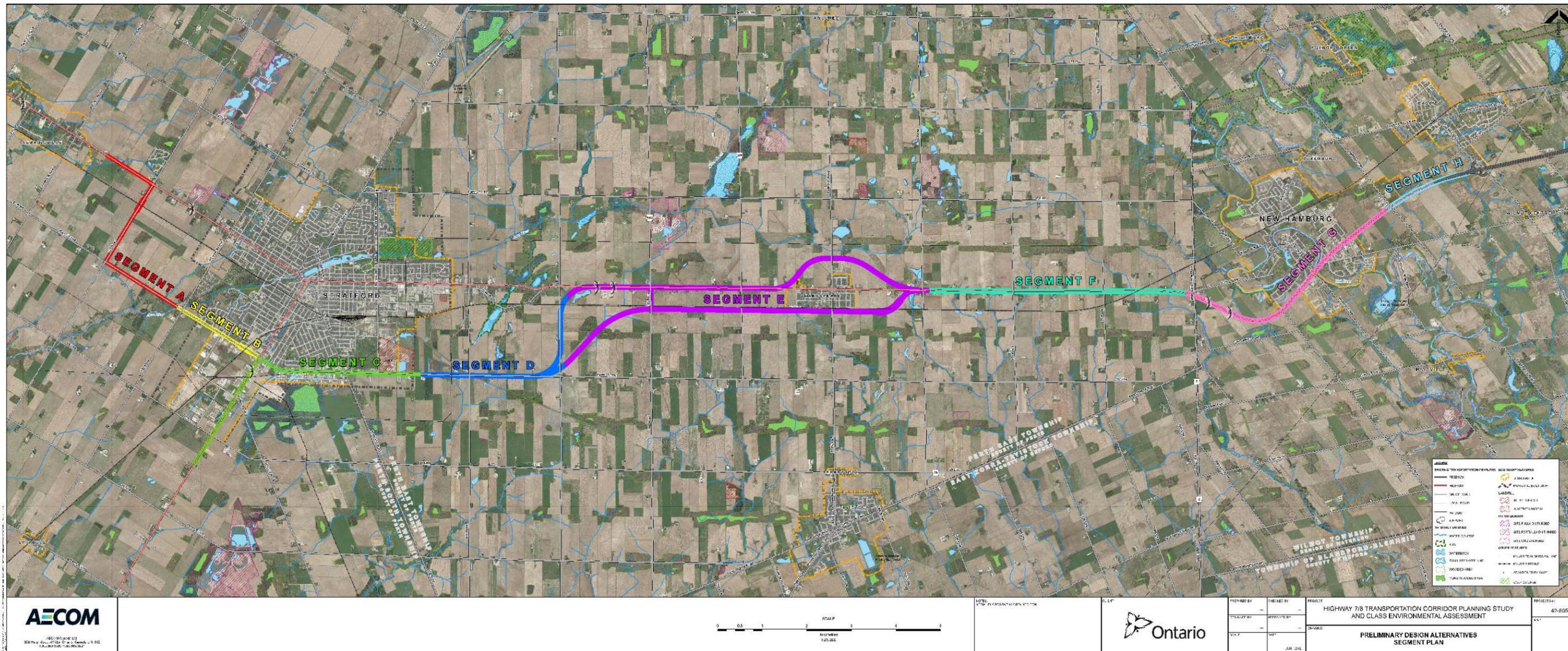
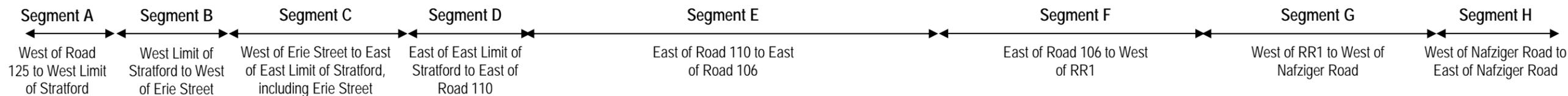
A range of Preliminary Design Alternatives for the highway cross section and crossing road intersection treatments have been generated and are being presented at Public Information Centre (PIC) #5 for public review and comment. The horizontal alignment of best overall fit (i.e. widening symmetrically, widening all to the north, widening all to the south, or combinations thereof) was determined on a segment by segment basis, taking into consideration the roadside environment.

Bridges are proposed at all locations where the selected route crosses the railway corridor.

Property requirements for each alternative have been defined on a preliminary basis and will be subject to refinement during preliminary design of the preferred alternative.

Following PIC #5, the preliminary design alternatives and the process for their evaluation will be refined taking into consideration the input received. The evaluation will be undertaken and the outcome will result in a preferred preliminary design alternative which will be carried forward as the "Final Plan". The evaluation results and the Final Plan will be presented at PIC #6 for public review and comment.

Exhibit 2.1: Preliminary Design Segments



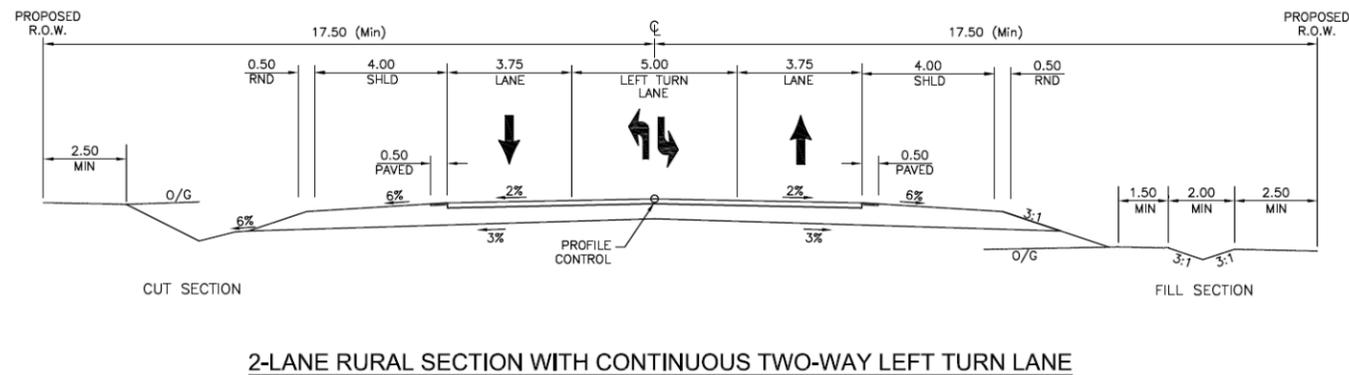
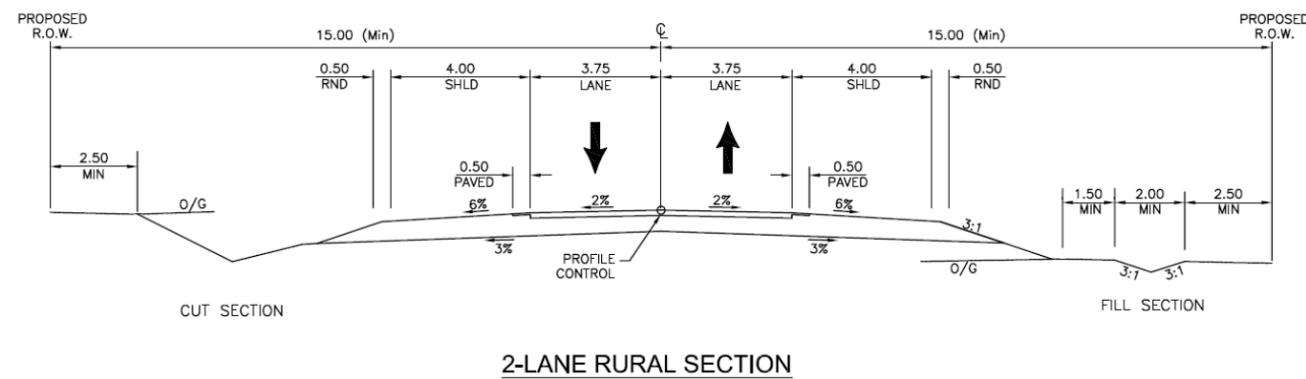
2.1.1 Segment A Preliminary Design Alternatives: West of Road 125 to West Limit of Stratford

Segment A extends from west of Road 125 to the west limit of Stratford. Within this segment there are three crossing roads, specifically:

- Road 125 at Highway 8
- Road 125 at Perth Line 32
- O’Loane Avenue

Preliminary Design alternatives through this segment have been generated for a rural highway cross section of two lanes, with or without a continuous two-way centre left-turn lane on Perth Line 32, as illustrated in **Exhibit 2.2**.

Exhibit 2.2: Segment A Highway Cross Section Alternatives



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, six Preliminary Design Alternatives have been generated for Segment A, as detailed in **Exhibit 2.3** and illustrated on the drawings in **Appendix A**.

Exhibit 2.3: Segment A Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternatives	Crossing Road Intersection Treatment Alternatives			
		Road 125 / Highway 8	Road 125 / Perth Line 32	O’Loane Avenue	
A1	2-lanes	Signalized intersection	Signalized intersection	Unsignalized intersection, with stop signs on the crossing road	
A2		Signalized intersection with channelization	Signalized intersection with channelization	Unsignalized intersection, with stop signs on the crossing road	
A3		1-lane roundabout	1-lane roundabout	1-lane roundabout	
A4		Signalized intersection	Signalized intersection	Unsignalized intersection, with stop signs on the crossing road	
A5		2-lanes on Road 125; 2-lanes with 5m continuous two-way centre left-lane on Line 32	Signalized intersection with channelization	Signalized intersection with channelization	Unsignalized intersection, with stop signs on the crossing road
A6		1-lane roundabout	1-lane roundabout	1-lane roundabout	

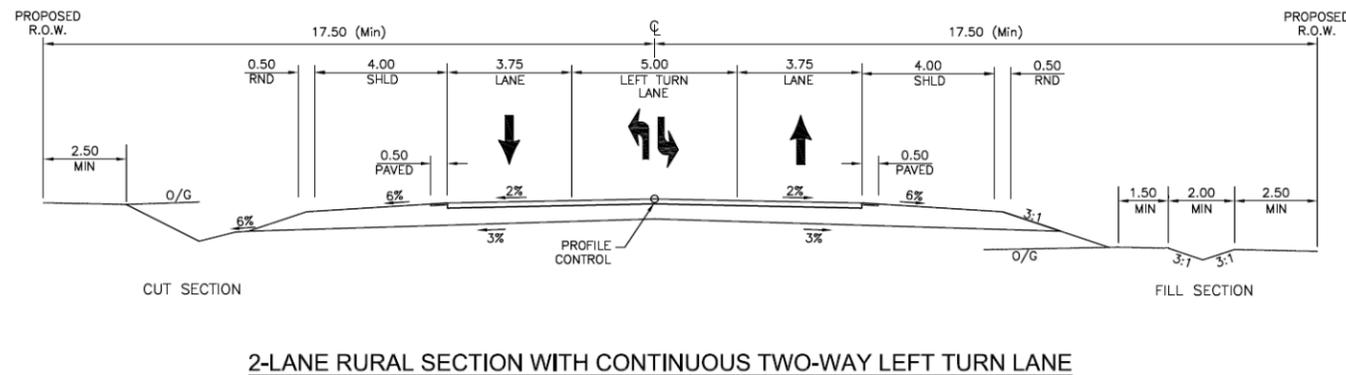
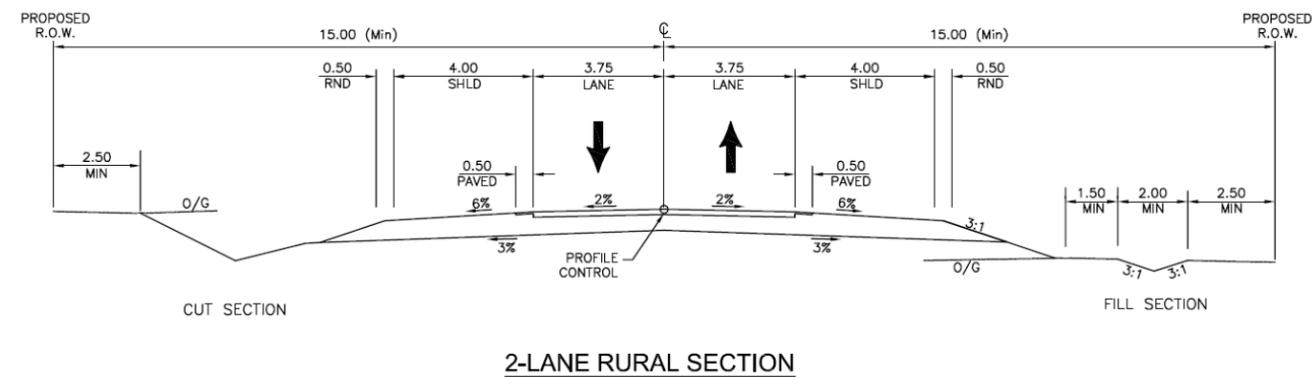
2.1.2 Segment B Preliminary Design Alternatives: West Limit of Stratford to West of Erie Street

Segment B extends from the west limit of Stratford to just west of Erie Street. Within this segment there are six crossing roads, specifically:

- Freeland Drive
- Queensland Road
- Wright Boulevard
- St. Vincent Street
- Monteith Avenue
- Linton Avenue

Preliminary Design Alternatives for this segment have been generated for a rural highway cross section of two lanes, with or without a continuous two-way centre left-turn lane, as illustrated in **Exhibit 2.4**.

Exhibit 2.4: Segment B Highway Cross Section Alternatives



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, two Preliminary Design Alternatives have been generated for Segment B, as detailed in **Exhibit 2.5** and illustrated on the drawings in **Appendix B**.

Exhibit 2.5: Segment B Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternatives	Crossing Road Intersection Treatment Alternatives					
		Freeland Dr	Queensland Rd	Wright Blvd	St. Vincent St	Monteith Ave	Linton Ave
B1	2-lanes	Unsignalized intersection, with stop signs on the crossing road	Unsignalized intersection, with stop signs on the crossing road	Unsignalized intersection, with stop signs on the crossing road	Unsignalized intersection, with stop signs on the crossing road	Cul-de-sac	Cul-de-sac
B2	2-lanes, 5m continuous two-way centre left-lane						

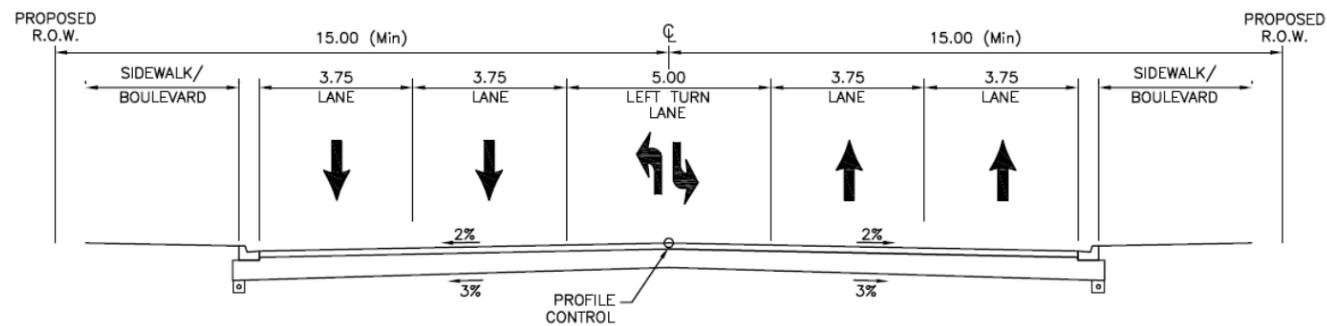
2.1.3 Segment C Preliminary Design Alternatives: West of Erie St. to East of East Limit of Stratford, including Erie Street

Segment C extends from west of Erie Street to east of the East Limit of Stratford and includes the portion of Erie Street from Lorne Avenue southerly to Line 29 / Gibb Road. Within this segment there are five main crossing roads, specifically:

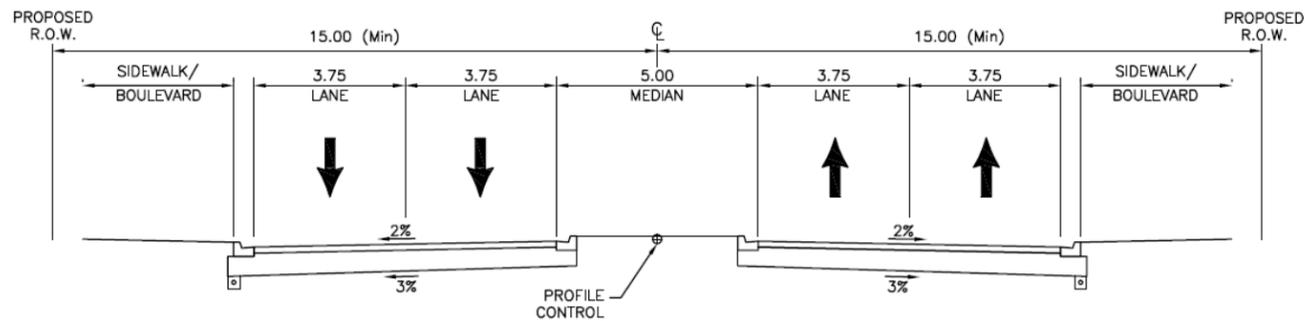
- Erie Street at Lorne Avenue
- Downie Street at Lorne Avenue
- Romeo Street at Lorne Avenue
- Embro Road at Erie Street
- Line 29 at Erie Street

Preliminary Design Alternatives for this segment have been generated for an urban highway cross section of four lanes, with a continuous two-way centre left-turn lane or a raised median, as illustrated in **Exhibit 2.6**.

Exhibit 2.6: Segment C Highway Cross Section Alternatives



4-LANE URBAN SECTION WITH CONTINUOUS TWO-WAY LEFT TURN LANE



4-LANE URBAN SECTION WITH RAISED 5m MEDIAN

Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, three Preliminary Design Alternatives have been generated for Segment C, as detailed in **Exhibit 2.7** and illustrated on the drawings in **Appendix C**. For all three alternatives, Dunlop Place and Scott Street are proposed to be cul-de-saced at Lorne Avenue.

Exhibit 2.7: Segment C Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternatives	Crossing Road Intersection Treatment Alternatives				
		Erie St. / Lorne Ave	Downie St. / Lorne Ave	Romeo St. / Lorne Ave	Embro Rd. / Erie St.	Line 29 / Erie St.
C1	4-lanes, 5m continuous two-way centre left-lane	Signalized intersection	Signalized intersection	Signalized intersection	Signalized intersection	Signalized intersection
C2	4-lanes, 5m raised median	2-lane roundabout	2-lane roundabout	2-lane roundabout	2-lane roundabout	2-lane roundabout
C3	4-lanes, 5m raised median	2-lane roundabout	2-lane roundabout	2-lane roundabout	2-lane roundabout	2-lane roundabout

2.1.4 Segment D Preliminary Design Alternatives: East of East Limit of Stratford to East of Road 110

Segment D extends from east of the east limit of Stratford to east of Road 110. Within this segment, two route alternatives are being considered, specifically the previously selected south bypass route and the north bypass route which utilizes a segment of Road 110 to connect from the Lorne Avenue corridor to existing Highway 7&8.

For the previously selected south bypass route, there are two crossing roads within this segment, specifically:

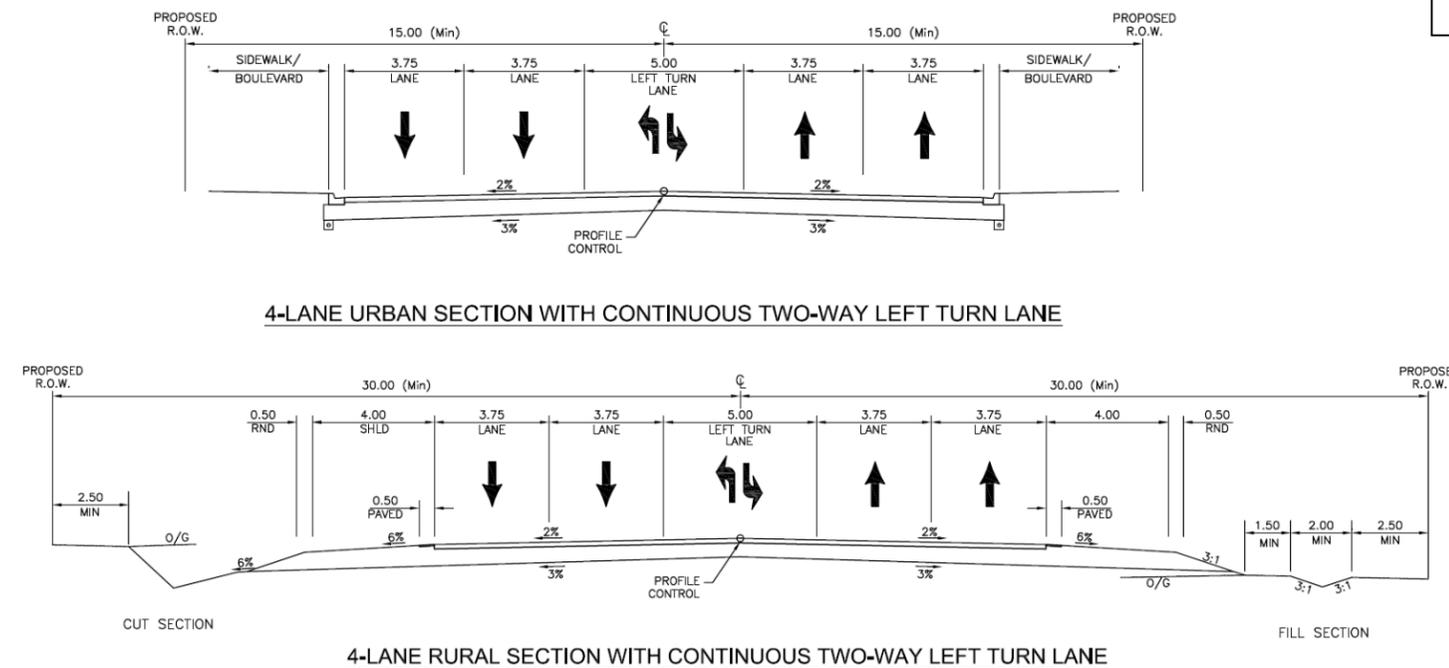
- Road 111
- Road 110 / Perth Line 33 Connection

For the north bypass route, there are three crossing roads within this segment, specifically:

- Road 111
- Road 110 / Perth Line 33 Connection
- Existing Highway 7&8 Connection

Preliminary Design Alternatives for this segment have been generated for a highway cross section of four lanes (urban section from east of Stratford to east of Road 111 and rural section from there easterly), with a continuous two-way centre left-turn lane, as illustrated in **Exhibit 2.8**.

Exhibit 2.8: Segment D Highway Cross Section Alternative



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, four Preliminary Design Alternatives have been generated for Segment D, as detailed in **Exhibit 2.9** and illustrated on the drawings in **Appendix D**.

Exhibit 2.9: Segment D Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternative	Crossing Road Intersection Treatment Alternative		
		Road 111	Road 110 / Connection to Perth Line 33	Existing Hwy 7&8 Connection
D1	4-lanes, 5m continuous two-way centre left-lane	Signalized intersection	Signalized intersection	Not applicable
D2		2-lane roundabout	2-lane roundabout	Not applicable
D3		Signalized intersection	Signalized intersection	Signalized intersection
D4		2-lane roundabout	2-lane roundabout	2-lane roundabout

2.1.5 Segment E Preliminary Design Alternatives: East of Road 110 to East of Road 106

Segment E extends from east of Road 110 to east of Road 106. Within this segment, two route alternatives are being considered, specifically the previously selected south bypass route and the north bypass route which utilizes a segment of Road 110 to connect from the Lorne Avenue corridor to existing Highway 7&8.

For the previously selected south bypass route, there are six crossing roads within this segment, specifically:

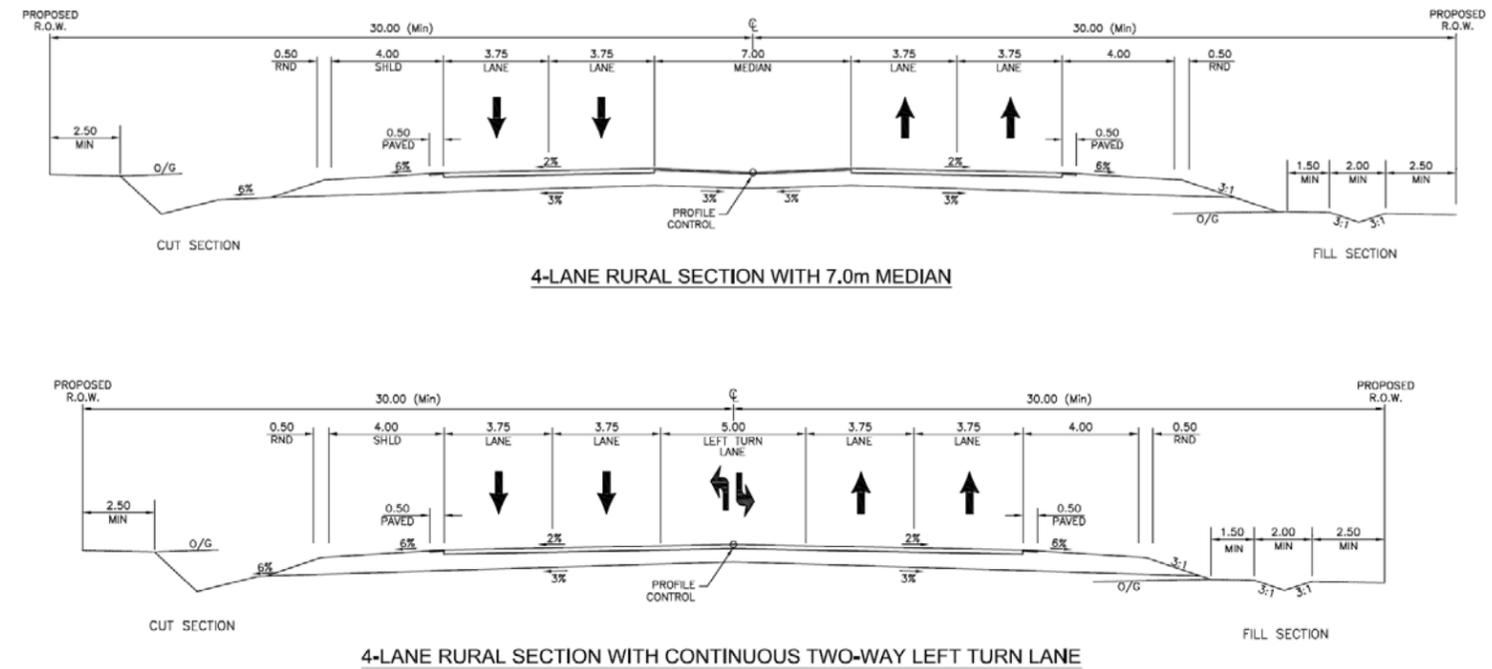
- Road 109 at New Highway 7&8
- Road 109 at Existing Highway 7&8
- Road 108
- Road 107
- Connection to Existing Highway 7&8 east of Shakespeare
- Road 106

For the north bypass route, there are seven crossing roads within this segment, specifically:

- Road 109 at New Highway 7&8
- Road 109 at Existing Highway 7&8
- Road 108
- Connection to Existing Highway 7&8 west of Shakespeare
- Road 107
- Connection to Existing Highway 7&8 east of Shakespeare
- Road 106

Preliminary Design Alternatives for this segment have been generated for a rural highway cross section of four lanes, with a 7 m median for new alignment sections and a continuous two-way centre left-turn lane for existing alignment sections, as illustrated in **Exhibit 2.10**.

Exhibit 2.10: Segment E Highway Cross Section Alternative



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, five Preliminary Design Alternatives have been generated for Segment E, as detailed in **Exhibit 2.11** and illustrated on the drawings in **Appendix E**.

Exhibit 2.11: Segment E Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternative	Crossing Road Intersection Treatment Alternatives					
		Road 109 & New Highway 7&8 / Existing Hwy 7&8	Road 108	Connection to Existing Hwy 7&8 west of Shakespeare	Road 107	Connection to Existing Hwy 7&8 east of Shakespeare	Road 106
E1	4-lanes, 7m median	Signalized intersection	Grade separation, carrying crossing road over highway (no highway access)	Not Applicable	Signalized intersection	Cul-de-sac / westbound slip lane	Unsignalized intersection, with stop signs on crossing roads
E2		Signalized intersection with channelization	Grade separation, carrying crossing road over highway (no highway access)	Not Applicable	Signalized intersection	Cul-de-sac / westbound slip lane	Grade separation, carrying crossing road over highway (no highway access)
E3		2-lane roundabout	Grade separation, carrying crossing road over highway (no highway access)	Not Applicable	2-lane roundabout	Cul-de-sac / westbound slip lane	Grade separation, carrying crossing road over highway (no highway access)
E4	4-lanes, 7 m median for new alignment section and continuous	Unsignalized intersection, with stop signs on crossing roads	Unsignalized intersection, with stop signs on crossing roads	Cul-de-sac / eastbound slip lane	Signalized intersection	Cul-de-sac / eastbound slip lane	Unsignalized intersection, with stop signs on crossing roads
E5	two-way centre left-turn lane for existing alignment section	Grade separation, carrying crossing road over highway (no highway access)	Grade separation, carrying crossing road over highway (no highway access)	Cul-de-sac / eastbound slip lane	2-lane roundabout	Cul-de-sac / eastbound slip lane	Grade separation, carrying crossing road over highway (no highway access)

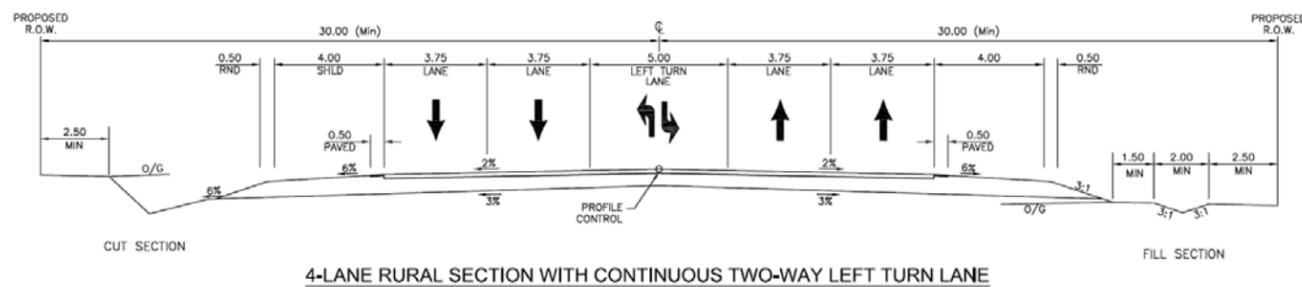
2.1.6 Segment F Preliminary Design Alternatives: East of Road 106 to West of Regional Road 1

Segment F extends from east of Road 106 to west of Regional Road 1. Within this segment there are two crossing roads, specifically:

- Road 104
- Road 102

Preliminary Design Alternatives for this segment have been generated for a rural highway cross section of four lanes, with a continuous two-way centre left-turn lane, as illustrated in **Exhibit 2.12**.

Exhibit 2.12: Segment F Highway Cross Section Alternative



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, two Preliminary Design Alternatives have been generated for Segment F, as detailed in **Exhibit 2.13** and illustrated on the drawings in **Appendix F**.

Exhibit 2.13: Segment F Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternative	Crossing Road Intersection Treatment Alternatives	
		Road 104	Road 102
F1	4-lanes, 5m continuous two-way centre left-lane	Unsignalized intersection, with stop signs on crossing roads	Grade separation, carrying crossing road over highway (no highway access)
F2		Grade separation, carrying crossing road over highway (no highway access)	Unsignalized intersection, with stop signs on crossing roads

2.1.7 Segment G Preliminary Design Alternatives: West of Regional Road 1 to West of Nafziger Road

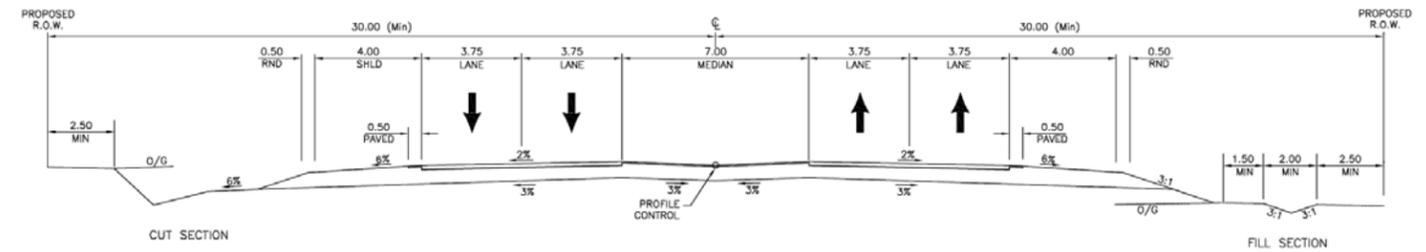
Segment G extends from west of Regional Road 1 to west of Nafziger Road. Within this segment there are five crossing roads, specifically:

- Regional Road 1
- Walker Road
- Peel Street / Haysville Road
- Victoria Street
- Hamilton Street / Bleams Road

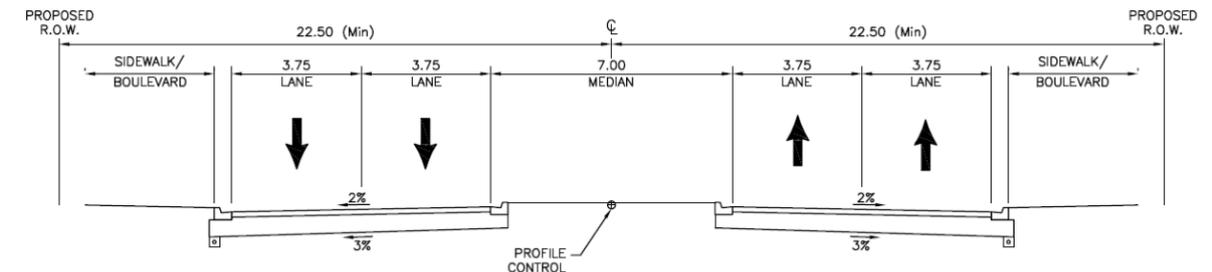
Preliminary Design Alternatives for this segment have been generated for two highway cross sections as described below and illustrated in **Exhibit 2.12**:

- Four lane rural cross section with a six lane urban section from west of Peel Street to east of Hamilton Street for the signalized intersection alternative, with a 7 m median throughout (median treatment to be determined through subsequent design phases)
- Four lane rural cross section with a four lane urban section from west of Peel Street to east of Hamilton Street, with a 7 m median (median treatment to be determined through subsequent design phases)

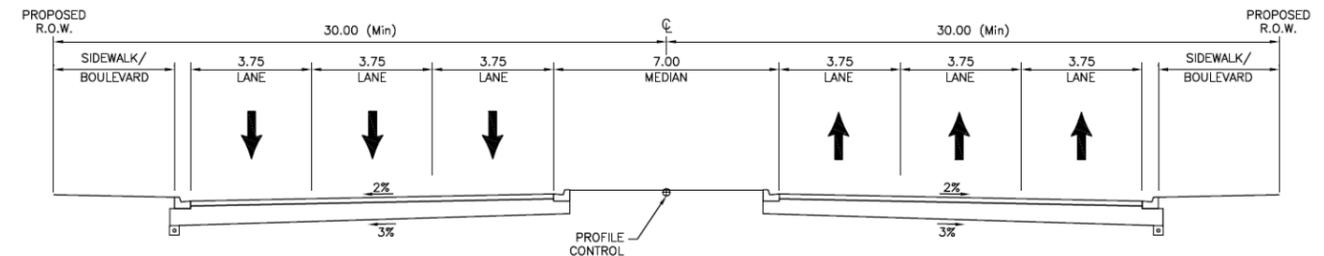
Exhibit 2.14: Segment G Highway Cross Section Alternative



4-LANE RURAL SECTION WITH 7.0m MEDIAN



4-LANE URBAN SECTION WITH RAISED 7m MEDIAN



6-LANE URBAN SECTION WITH RAISED 7m MEDIAN

Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, two Preliminary Design Alternatives have been generated for Segment G, as detailed in **Exhibit 2.13** and illustrated on the drawings in **Appendix G**.

Exhibit 2.15: Segment G Preliminary Design Alternatives

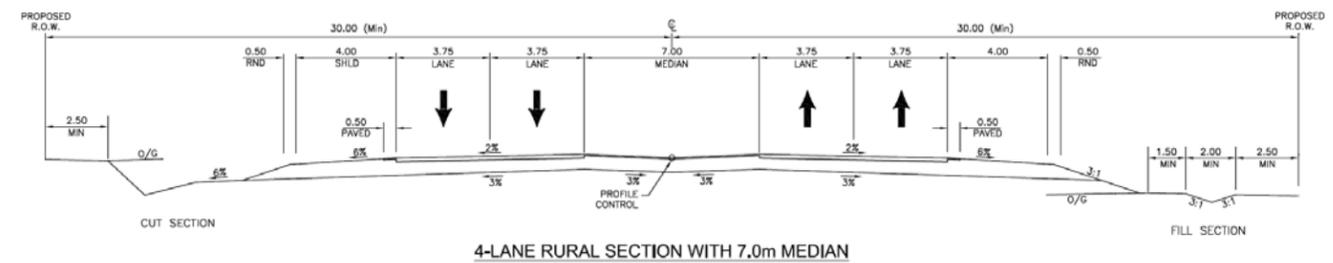
Alt No.	Highway Cross Section Alternatives	Crossing Road Intersection Treatment Alternatives				
		Regional Road 1	Walker Road	Peel Street	Victoria St.	Hamilton St.
G1	4-lanes with 6-lane segment from west of Peel Street to east of Hamilton Street, 7m median	Signalized intersection	Unsignalized, right in / right out intersection	Signalized intersection	Cul-de-sac	Signalized intersection
G2	4-lanes, 7m median	Signalized intersection	Unsignalized, right in / right out intersection	Diamond interchange (north side) / Buttonhook interchange (south side)	Cul-de-sac	Parclo B-2 interchange (north side) / Buttonhook interchange (south side) interchange

2.1.8 Segment H Preliminary Design Alternatives: West of Nafziger Road to East of Nafziger Road

Segment H extends from west of Nafziger Road to east of Nafziger Road. There is one crossing road within this segment, specifically Nafziger Road.

Preliminary Design Alternatives for this segment have been generated for a rural highway cross section of four lanes, with a 7 m median, as illustrated in **Exhibit 2.16**.

Exhibit 2.16: Segment H Highway Cross Section Alternative



Based on the transportation requirements from a capacity, operations and safety perspective and environmental constraints along this segment of the route, three Preliminary Design Alternatives have been generated for Segment H, as detailed in **Exhibit 2.17** and illustrated on the drawings in **Appendix H**.

Exhibit 2.17: Segment H Preliminary Design Alternatives

Alt No.	Highway Cross Section Alternative	Crossing Road Intersection Treatment Alternatives
H1	4-lanes, 7m median	Diamond Interchange
H2		Parclo A2 Interchange
H3		Parco B2 Interchange

2.2 Process for Assessment and Evaluation of Preliminary Design Alternatives and Selection of the Preferred Preliminary Design

The evaluation of highway cross section and intersection treatment alternatives will be conducted on a segment by segment basis using the “reasoned argument approach”. The reasoned argument approach presents the trade offs between various evaluation factors, sub-factors, criteria and indicators. For each segment, only those evaluation criteria that reflect the environmental conditions applicable to the segment will be utilized.

The preferred alternative east of Stratford is in part dependent upon the preferred alternative for the Stratford area.

The complete list of evaluation factors, sub-factors, criteria and indicators are detailed in **Exhibit 2.18** and a summary table, indicating the proposed evaluation criteria for each Preliminary Design segment is provided in **Exhibit 2.19**.

Subject to input and comments received through the PIC #5 consultation process, Preliminary Design Alternatives will be comparatively evaluated using the refined sub-factors, criteria and indicators to identify a preferred Preliminary Design Alternative for each segment and a recommended plan for the entire study area.

The results of the assessment and evaluation of the Preliminary Design highway cross section and crossing road intersection alternatives will be presented at PIC #6 for public review and comment.

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
1. Natural Environmental Factors		
1.1 Fisheries and Aquatic Ecosystems	1.1.1 Fish Habitat	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • critical fish habitat features • riparian areas • habitat rehabilitation goals
	1.1.2 Fish Community	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/ disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • fish species at risk (vulnerable, threatened or endangered fish species) • fish movement/migration • critical fish life stage processes (spawning, rearing, nursery, feeding) • long-term fish community management goals
1.2 Terrestrial Ecosystems	1.2.1 Wildlife	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • wildlife species at risk (vulnerable, threatened or endangered wildlife species) • wildlife of local and regional importance • migratory birds • critical wildlife habitat features • ecologically functional areas such as connective corridors or travel ways for movement/migration • important wildlife areas such as deeryards, heronries, waterfowl areas, important bird areas • wildlife management, rehabilitation/research program sites • interference with critical wildlife life stage processes (eg mating/rearing) etc
	1.2.2 Wetlands	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • provincially significant wetlands, their buffer areas, and their wetland function • evaluated and un-evaluated wetlands, their wetland buffer areas, and their wetland function • wetland management, research and/or wetland conservation programs/areas
	1.2.3 Forests (e.g. woodlands [forest stands, woodlots and interior forest habitat] and significant valley lands [valley and stream corridors])	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • significant woodlands/valley lands • forest management/research program areas

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
	1.2.4 Vegetation	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/disruption • short-term alteration/disruption (construction impacts). as applicable to the following: <ul style="list-style-type: none"> • populations of vegetation species at risk (vulnerable, threatened or endangered species), species of conservation concern and significant regional/local flora/communities • areas/corridors supporting known populations of vegetation species at risk (vulnerable, threatened or endangered species), species of conservation concern and significant flora/communities • vegetation management, rehabilitation/research program sites
	1.2.5 Designated/Special Areas (such as world biosphere reserves, heritage rivers, ESAs, ESPAs, ANSIs, environmental plan areas, conservation reserves; and the designated special areas of national parks, provincial parks, conservation areas, etc)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/ disruption; • short-term alteration/disruption (construction impacts) • change in area character/ aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services. to designated/special areas.
1.3 Groundwater	1.3.1 Areas of Ground water Recharge and Discharge	Potential and significance of alteration to areas of groundwater recharge and discharge due to physical intrusion or groundwater interception, draw-down, impoundment, obstruction, or soil compaction impacting groundwater base-flow and quality
	1.3.2 Groundwater Source Areas and Wellhead Protection Areas	Potential and significance of alteration to large volume wells due to physical intrusion or groundwater interception, draw-down, impoundment, obstruction and by soil compaction
	1.3.3 Large Volume Wells	Potential and significance of alteration to private well use due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction
	1.3.4 Private Wells	Potential and significance of alteration to private well use due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction
	1.3.5 Groundwater-Sensitive Ecosystems (e.g. groundwater fed wetlands, coldwater streams)	Potential and significance of alteration to groundwater-sensitive ecosystems due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction
1.4 Surface Water	1.4.1 Watershed / Sub-Watershed Drainage Features/Patterns	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/ disruption. as applicable to the following: <ul style="list-style-type: none"> • watercourse crossings (permanent, intermittent and ephemeral) • floodplain or meander belts • riparian areas • sensitive headwater areas • watershed and subwatershed management plans
	1.4.2 Surface Water Quality and Quantity	Potential and significance of impacts on quality through direct and indirect discharges of contaminated and sediment-laden run-off Potential and significance of impacts on hydrology due to changes in ground permeability, modifications to surface drainage patterns and alterations of water bodies
2. Land Use / Socio-Economic Environmental Factors		
2.1 Land Use Planning Policies, Goals, Objectives	2.1.1 First Nations Land Claims	Potential and significance of encroachment, severance, displacement to areas for which there are First Nations outstanding land claims
	2.1.2 Provincial/Federal land use planning policies/goals/objectives NOTES: PPS Policy 1.6.6.4 stipulates that when planning for corridors for significant transportation facilities,	Not considered in this phase.

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
	consideration will be given to significant natural heritage, water, agricultural, mineral, cultural heritage and archaeological resources. PPS Policy 2.3 requires prime agricultural areas be protected for long-term use. Prime agricultural areas include specialty crop areas and Classes 1, 2, and 3 soils in this order of priority.	
	2.1.3 Municipal (regional and local) land use planning policies/ goals/objectives (Official Plans)	Not considered in this phase.
	2.1.4 Development Objectives of Private Property Owners	Not considered in this phase.
2.2 Land Use / Community	2.2.1 First Nation Reserves	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time. to First Nation Reserves
	2.2.2 First Nations' Sacred Grounds	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time. to First Nations' sacred grounds
	2.2.3 Urban and Rural Residential	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption (e.g. loss of parking area); • short-term alteration/disruption (construction impacts); • change in area character / aesthetics (e.g. loss of trees / garden area); • nuisance impacts (e.g. intrusion of highway into current residential envelope); • change to access / travel time; • change to facilities / utilities / services; • interference with residential community cohesion; • change to highway operational impacts (e.g. snow storage and highway access visibility). to urban and rural residential areas (residents [owners/tenants] and community groups).

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
	2.2.4 Commercial/Industrial	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services; • interference with residential community cohesion; • change to highway operational impacts (e.g. customer parking, cargo loading/off-loading) to commercial and industrial areas (business owners/tenants and customers).
	2.2.5 Tourist Areas and Attractions (e.g. museums, theatres, etc.)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services; • loss of “critical mass” in number of signature business attractions (e.g. number of antique shops). to tourist areas and attractions.
2.2 Land Use / Community	2.2.6 Community Facilities / Institutions (e.g. hospitals, schools, places of worship, unique community features)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character/ aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services; • change to ease and safety of pedestrian movements across the highway and within the highway right-of-way; • change to highway operation impacts to current use (e.g. highway noise and vibration interfering with church services). to community facilities and institutions.
	2.2.7 Municipal Infrastructure and Public Service Facilities (e.g. sewage and water services, police/emergency services, local utilities)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change to access / travel time; • change to facilities / utilities / services. to municipal infrastructure and public service facilities.
	2.2.8 Downtown Historic Crossroads Function	Potential and significance of interference by long-distance through traffic on: <ul style="list-style-type: none"> • “main street” function and structure; • Character / aesthetics; • short-term alteration/disruption (construction impacts); • change to ease and safety of pedestrian movements across the highway and within the highway right-of-way; • change to on-street parking. in the historic downtown area.

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
2.3 Noise Sensitive Areas (NSAs) (residential areas and sensitive institutional uses)	2.3.1 Highway Noise	Potential for increase of traffic noise in NSAs by 5 dBA, or to above a 45 dBA ambient within 10 years of project construction.
	2.3.2 Construction Noise	Potential and significance of increase in construction noise to NSAs.
2.4 Agriculture	2.4.1 Agriculture - Canada Land Inventory Class 1,2,3 Land	Potential and significance of encroachment, severance of Canada Land Inventory Class 1, 2 and 3 soils
	2.4.2 Agricultural - Farm Infrastructure	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • nuisance impacts; to farm infrastructure (field tile drainage systems/outlets, irrigation systems, barns / silos/ structures, etc.
	2.4.3 Agriculture – Operations on Individual Farms	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/ disruption; • short-term alteration/disruption (construction impacts); • nuisance impacts; to in-farm field operations (planting, harvesting, grazing, nutrient management, etc.) as applicable to the following: <ul style="list-style-type: none"> • Specialty crops/cropland • Dairy/livestock operations • Field crop operations • High investment agricultural operations • Established agricultural farm communities
	2.4.4 Agriculture – Transportation Linkages between Integrated Agricultural Business Units	Potential to sever/disrupt transportation linkages between integrated agricultural business units (movement between integrated agricultural business units of equipment, materials, workers, etc.)
2.5 Land Use / Resources	2.5.1 First Nations People’s Treaty Rights or Use of Land and Resources for Traditional Purposes (e.g. hunting, fishing, harvesting of country foods, harvesting of medicinal plants)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • nuisance impacts; • change to access / travel time. to First Nations’ treaty rights or use of land and resources for traditional purposes
	2.5.2 Parks and Recreational Areas (e.g. national/provincial parks, conservation areas, municipal parks, public spaces, golf courses, trails, greenways and open space linkages)	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services. to parks and recreational areas.
	2.5.3 Aggregates, Mineral Resources	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change to access / travel time;

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
		<ul style="list-style-type: none"> • change to facilities / utilities / services. to current/future extraction of aggregate and mineral resources.
2.6 Major Utility Transmission Corridors (e.g. railroads, hydro, gas, oil)		Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • change to access / travel time; • change to facilities / utilities / services. to major utility transmission corridors.
2.7 Contaminated Property and Waste Management (e.g. Landfills, Hazardous Waste Sites, “Brownfield” Areas, other known contaminated sites, and high-risk contamination areas)		Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change to access / travel time; • change to facilities / utilities / services. to contaminated property and waste management.
2.8 Landscape Composition	2.8.1 Scenic Composition (total aesthetic value of landscape components)	Potential and significance of destruction / disturbance of specimen trees.
	2.8.2 Sensitive Viewer Groups	Potential and significance of change to scenic composition (total aesthetic value of landscape components).
	2.8.3 Scenic value of views/vistas from the transportation facility	Potential and significance of views/vistas from the transportation facility.
	2.8.4 Specimen Trees	Potential and significance of change vistas/outlooks for sensitive viewer groups.
2.9 Air Quality	2.9.1 Regional Air Quality and Total Contaminant and Greenhouse Gas Emissions	Not considered in this phase. See item below.
	2.9.2 Local Air Quality and Sensitive Receptors to Air Pollutants	Potential and significance of effects on sensitive receptors to air pollutants and greenhouse gas emissions
3. Cultural Environmental Factors		
3.1 Cultural Heritage – Built Heritage and Cultural Landscapes	3.1.1 Buildings or “Standing” Sites of Architectural or Heritage Significance or Ontario Heritage Foundation Easement Properties	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement, property acquisition; • long-term alteration / disruption; • change in area character/ aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services. to buildings or “standing” sites of extreme local, provincial or national interest or Ontario Heritage Foundation easements properties.
	3.1.2 Heritage Bridges	Potential for destruction or significant alteration of heritage bridges
	3.1.3 Areas of Historic 19 th Century Settlement	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • change in area character/ aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services. to areas of historic 19 th century settlement.

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
	3.1.4 Cultural Heritage Landscapes (collection of individual man-made features modifying pristine landscape)	Potential and significance of change to composition of cultural landscapes.
	3.1.5 First Nations' Burial Sites	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration/ disruption; • change in area character / aesthetics; • nuisance impacts; • change to access / travel time. to First Nations' burial sites.
	3.1.6 Cemeteries	Potential and significance of: <ul style="list-style-type: none"> • encroachment, severance, displacement; • long-term alteration / disruption; • short-term alteration/disruption (construction impacts); • change in area character / aesthetics; • nuisance impacts; • change to access / travel time; • change to facilities / utilities / services. to cemeteries.
3.2 Cultural Heritage – Archaeology	3.2.1 Pre-Historic and Historic First Nations Sites	Potential for destruction or disturbance of pre-historic and historic First Nations archaeological sites of extreme local, provincial or national interest
	3.2.2 Historic Euro-Canadian Archaeological Sites	Potential for destruction or disturbance of historic Euro-Canadian archaeological sites of extreme local, provincial or national interest
4. Area Economy – Previously addressed during Needs Assessment Phase		
5. Transportation Factors		
5.1 Area Transportation System Capacity and Efficiency	5.1 Federal/Provincial/Municipal transportation planning policies/goals/objectives	Previously considered during the Preliminary Planning phase
	5.2 Efficient movement of people	Potential to support the efficient movement of people between communities and regions based on Level of Service (LOS) and volume to capacity (v/c) on a network, screenline and critical link basis
	5.3 Efficient movement of goods	Potential to support efficient movement of goods between urban growth centres and regional intermodal facilities based on road network and Highway 7&8 corridor performance measures (LOS and travel speed)
5.2 System reliability / redundancy		Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions
5.3 Safety	5.3.1 Traffic Safety	Potential to improve traffic safety based on opportunity to reduce congestion on area road network (LOS and v/c) and reduce the frequency of intersections and entrances in the Highway 7&8 corridor. Potential for collisions recognizing side road intersections, presence of auxiliary lanes, number/spacing of entrances, available sight distance, storage for disabled vehicles, etc.
	5.3.2 Emergency Access	Potential to support emergency access to/from existing and/or new provincial facilities.
	5.3.3 Pedestrian, Cyclist and Snowmobile Safety within the highway right-of-way	Potential and significance of change to ease and safety of movement across the highway and within the right-of-way
5.4 Mobility and Access	5.4.1 Modal integration, balance and efficiency	Potential to improve modal choice and increase mode split between communities, regions and intermodal facilities based on travel performance indicators (LOS, v/c, travel speed) at critical screenlines and on potential to provide higher order transit service.
	5.4.2 Linkages to Population and Employment Centres	Potential to improve linkages to population and employment centres for people and goods movement
	5.4.3 Recreation and Tourism Travel	Potential to support recreation and tourism travel within and to/from the Analysis Area by provision of higher order network (roads and transit) continuity and connectivity and through network performance indicators (LOS, v/c, travel speed)

Exhibit 2.18: Preliminary Design Evaluation Factors, Sub-Factors, Criteria and Indicators

FACTOR / SUB-FACTOR	CRITERIA	INDICATORS
	5.4.4 Accommodate mobility of pedestrians, cyclists and snowmobiles	Potential to accommodate mobility of pedestrians, cyclists within critical travel corridors in urbanized areas and snowmobiles in recognized rural trails
5.5 Network Compatibility	5.5.1 Network Connectivity	Potential to improve transportation system connectivity within and to/from the analysis area
	5.5.2 Flexibility for Future Expansion	Potential to address future transportation needs beyond the forecasted planning horizon
5.6 Engineering	5.6.1 Constructability	Potential ease of implementation considering feasibility/difficulty of physical, property or environmental constraints
	5.6.2 Compliance with Design Criteria	Conformity to applicable provincial safety and design standards
5.7 Traffic Operations		Potential for negative impact on traffic operations due to factors such as design features, private access, and transportation network connections
5.8 Construction Cost (excludes property costs and engineering costs)		Relative road construction cost, excluding property and engineering costs

Exhibit 2.19: Proposed Evaluation Criteria by Preliminary Design Segment

Highway 7 & 8 Transportation Corridor Planning and Class EA Study Evaluation of Preliminary Design Alternatives									
Factor / Sub-factor	Criteria	Preliminary Design Segment							
		A	B	C	D	E	F	G	H
		√ = Applied				X = Not Applied			
1. NATURAL ENVIRONMENTAL FACTORS									
1.1 Fisheries and Aquatic Ecosystems									
	1.1.1 Fish Habitat	√	√	√	√	√	√	√	√
	1.1.2 Fish Community	√	√	√	√	√	√	√	√
1.2 Terrestrial Ecosystems									
	1.2.1 Wildlife	√	√	√	√	√	√	√	√
	1.2.2 Wetlands	X	X	X	√	√	X	√	√
	1.2.3 Forests	√	√	√	√	√	√	√	√
	1.2.4 Vegetation	√	X	X	√	√	√	√	X
	1.2.5 Designated/ Special Areas	X	X	√	√	√	X	X	X
1.3 Groundwater									
	1.3.1 Areas of Ground water Recharge and Discharge	√	√	√	√	√	√	√	√
	1.3.2 Groundwater Source Areas and Wellhead Protection Areas	√	√	√	√	√	√	√	√
	1.3.3 Large Volume Wells	√	√	√	√	√	√	√	√
	1.3.4 Private Wells	√	√	√	√	√	√	√	√
	1.3.5 Groundwater-Dependent Commercial Enterprises (e.g. water bottling operations)	X	X	X	√	√	X	X	X
	1.3.6 Groundwater-Sensitive Ecosystems (e.g. groundwater fed wetlands, coldwater streams)	√	√	√	√	√	√	√	√
1.4 Surface Water									
	1.4.1 Watershed / Sub-Watershed Drainage Features/Patterns	X	X	X	√	√	X	X	X
	1.4.2 Surface Water Quality and Quantity	X	X	X	√	√	X	X	X
2. LAND USE / SOCIO-ECONOMIC FACTORS									
2.1 Land Use Planning Policies, Goals, Objectives									
	2.1.1 First Nations Land Claims	X	X	X	√	√	X	X	X
	2.1.2 Provincial/ Federal land use planning policies/ goals/objectives	X	X	X	X	X	X	X	X
	2.1.3 Municipal (regional and local) land use planning policies/goals/objectives (Official Plans)	X	X	X	X	X	X	X	X
	2.1.4 Development Objectives of Private Property Owners	X	X	X	X	X	X	X	X
2.2 Land Use / Community									
	2.2.1 First Nation Reserves	X	X	X	√	√	X	X	X
	2.2.2 First Nations' Sacred Grounds	X	X	X	√	√	X	X	X
	2.2.3 Urban and Rural Residential	√	√	√	√	√			
	2.2.4 Commercial / Industrial	X	√	√	√	√	X	X	X
	2.2.5 Tourist Areas and Attractions (e.g. museums, theatres, etc.)	X	√	√	√	√	X	X	X
	2.2.6 Community Facilities / Institutions (e.g. hospitals, schools, places of worship, unique community features)	X	√	√	√	√	X	√	
	2.2.7 Municipal Infrastructure and Public Service Facilities (e.g. sewage and water services, police/emergency services, local utilities)	√	√	√	√	√	√	√	√
	2.2.8 Downtown Historic Crossroads Function	X	X	X	√	√	X	X	X
2.3 Noise Sensitive Areas (NSAs) (residential areas and sensitive institutional uses)									
	2.3.1 Highway Noise	√	√	√	√	√	√	√	√
	2.3.2 Construction Noise	X	X	X	√	√	X	X	X
2.4 Agriculture									
	2.4.1 Agriculture - Canada Land Inventory Class 1,2,3 Land	√	X	X	√	√	√	X	X
	2.4.2 Agriculture – Farm Infrastructure	√	X	X	√	√	√	X	X
	2.4.3 Agriculture – Operations on Individual Farms	√	X	X	√	√	√	X	X
	2.4.4 Agriculture – Transportation Linkages between Integrated Agricultural Business Units	√	√	√	√	√	√	√	√
2.5 Land Use / Resources									
	2.5.1 First Nations' Treaty Rights or Use of Land and Resources for Traditional Purposes (e.g. hunting, fishing, harvesting of country foods, harvesting of medicinal plants)	X	X	X	√	√	X	X	X
	2.5.2 Parks and Recreational Areas (e.g. national/ provincial parks, conservation areas, municipal parks, public spaces, golf courses, trails, greenways and open space linkages)	X	X	X	√	√	X	X	X
	2.5.3 Aggregates, Mineral-Resources	X	X	X	√	√	X	X	X
2.6 Major Utility Transmission Corridors (e.g. railroads, hydro, gas, oil)									
		√	√	√	√	√	X	X	X

Highway 7 & 8 Transportation Corridor Planning and Class EA Study Evaluation of Preliminary Design Alternatives									
Factor / Sub-factor	Criteria	Preliminary Design Segment							
		A	B	C	D	E	F	G	H
		√ = Applied				X = Not Applied			
2.7 Contaminated Property and Waste Management (e.g. Landfills, Hazardous Waste Sites, "Brownfield" Areas, other known contaminated sites, and high-risk contamination areas)									
		√	√	√	√	√	√	√	√
2.8 Landscape Composition									
	2.8.1 Scenic Composition (total aesthetic value of landscape components)	X	X	X	√	√	X	X	X
	2.8.2 Sensitive Viewer Groups	X	X	X	√	√	X	X	X
	2.8.3 Scenic value of views/vistas from the transportation facility	X	X	X	√	√	X	X	X
	2.8.4 Specimen Trees	X	X	X	√	√	X	X	X
2.9 Air Quality									
	2.9.1 Local and Regional Air Quality (Total contaminant and greenhouse gas emissions)	X	X	X	X	X	X	X	X
	2.9.2 Sensitive receptors to air pollutants and greenhouse gas emissions	X	X	X	√	√	X	X	X
3. CULTURAL ENVIRONMENTAL FACTORS									
3.1 Cultural Heritage – Built Heritage and Cultural Landscapes									
	3.1.1 Buildings or "Standing" Sites of Architectural or Heritage Significance or Ontario Heritage Foundation Easement Properties	√	X	X	√	√	X	√	X
	3.1.2 Heritage Bridges	X	X	X	√	√		X	X
	3.1.3 Areas of Historic 19 th Century Settlement	X	X	X	√	√	X	X	X
	3.1.4 Cultural Heritage Landscapes (collection of individual man-made features modifying pristine landscape)	√	√	√	√	√	√	√	√
	3.1.5 First Nations' Burial Sites	X	X	X	√	√	X	X	X
	3.1.6 Cemeteries	√	√	X	√	√	X	X	X
3.2 Cultural Heritage – Archaeology									
	3.2.1 Pre-Historic and Historic First Nations Sites	X	X	X	√	√	√	X	X
	3.2.2 Historic Euro-Canadian Archaeological Sites	X	X	X	√	√	√	X	X
4. AREA ECONOMY – Previously addressed during Needs Assessment Phase									
5. TRANSPORTATION FACTORS									
5.1 Area Transportation System Capacity and Efficiency									
	5.1.1 Federal/ Provincial/Municipal transportation planning policies/goals/ objectives	√	√	√	√	√	√	√	√
	5.1.2 Efficient movement of people	√	√	√	√	√	√	√	√
	5.1.3 Efficient movement of goods	√	√	√	√	√	√	√	√
5.2 Area Transportation System Reliability / Redundancy									
5.3 Safety									
	5.3.1 Traffic Safety	√	√	√	√	√	√	√	√
	5.3.2 Emergency Access	√	√	√	√	√	√	√	√
	5.3.3 Pedestrian, Cyclist and Snowmobile Safety within the highway right-of-way	√	√	√	√	√	√	√	√
5.4 Mobility and Accessibility									
	5.4.1 Modal integration, balance and efficiency	√	√	√	√	√	√	√	√
	5.4.2 Linkages to Population and Employment Centres	√	√	√	√	√	√	√	√
	5.4.3 Recreation and Tourism Travel	√	√	√	√	√	√	√	√
	5.4.4 Accommodate mobility of pedestrians, cyclists and snowmobiles	√	√	√	√	√	√	√	√
5.5 Network Compatibility									
	5.5.1 Network Connectivity	√	√	√	√	√	√	√	√
	5.5.2 Flexibility for Future Expansion	√	√	√	√	√	√	√	√
5.6 Engineering									
	5.6.1 Constructability	√	√	√	√	√	√	√	√
	5.6.2 Compliance with Design Criteria	√	√	√	√	√	√	√	√
5.7 Traffic Operations									
		√	√	√	√	√	√	√	√
5.8 Construction Cost (excludes property costs and engineering costs)									
		√	√	√	√	√	√	√	√

3.0 SUMMARY OF INPUT RECEIVED ON PRELIMINARY DESIGN ALTERNATIVES AND MTO RESPONSES AND CHANGES

In the final copy of this document, this section will provide a summary of comments and input received on draft *Report I: Generation of Preliminary Design Alternatives for Provincial Roadways* during the public review period, as well as an explanation of how this feedback was addressed in the updated version of the report.