Table of Contents

List of Exhibits

5. Alternatives and Evaluation

5.1 Alternatives to the Undertaking

Alternatives to the undertaking are generated to identify possible solutions that will improve the deficiencies and protect for the long term transportation needs identified in Section 3. Five alternatives were considered and a description of each is provided in the following subsections.

5.1.1 The Do Nothing Alternative

The "do nothing" alternative is considered the status quo, where the area transportation system would be limited to maintenance of current transportation infrastructure and the implementation of approved provincial, regional municipality and local municipality initiatives.

The do nothing alternative does not address the study problem and need for Highway 17 improvements, and would have the following negative impacts:

- Increased costs for the delivery of goods and services;
- Negative economic impact on tourism, industry and community quality of life;
- Negative environmental impacts through increased fuel consumption and emissions;
- Increased driver delay and stress;
- Constrained employment and economic growth in the study area; and
- Loss of opportunity to improve highway safety and ensure adequate future highway capacity and operational needs.

In spite of the above, the do nothing alternative was utilized as the baseline for comparative evaluation of alternatives.

5.1.2 Optimize Existing Area Transportation System

Considerations for the optimization of the existing area transportation system include the following:

- Travel Demand Management (TDM) – The objective of TDM strategies is to improve the operation of the current area transportation system by managing travel demand independent of actually expanding or constructing new infrastructure; and
- Transportation Systems Management (TSM) – The objective of TSM is to improve the efficiency and safety of the current area transportation system and to optimize the use of existing and planned infrastructure through a wide range of strategies and technology policies and initiatives on existing municipal roads and existing provincial highways.

TDM and TSM are more applicable to commuter traffic with more defined origin/ destination patterns than the local, recreational and commercial traffic that predominates on Highway 17. Optimization of the existing area transportation system is therefore not consistent with the role of Highway 17. The optimized existing area transportation system alternative does not address the study problem and need for Highway 17 improvements, and it was therefore eliminated from further consideration in this study.

5.1.3 Expanded/ New Non-Road Infrastructure

Expanded/ new non-road initiatives include the following:

- Local Transit – The provision of new or improved local transit service could divert people movement from private cars and relieve congestion on existing municipal roadways, or it could function as a component of inter-regional transit;
- Freight Rail – Increased freight rail services for goods movement within existing rail corridors and/ or along new rail corridors could encourage the diversion of freight from trucks. The ability to expand rail service and divert longer haul goods to rail may provide some relief to network congestion both on regional arterials and on the provincial highway network; and
- Inter-regional Transit/ Passenger Rail, and/ or Provincial Transitways – Providing inter-regional transit and passenger rail and/ or provincial transitways through new/ increased services within the existing area transportation system and/ or through new services in new corridors, could relieve congestion and increase the performance of the area transportation system.

The vast majority of trips in the study area are made using automobiles and trucks. The scattered origin/ destination patterns of travel within and beyond the study area are not conducive to supporting the use of non-road alternatives. The expanded/ new non-road infrastructure alternative does not address the study problem and need for Highway 17 improvements, and it was therefore eliminated from further consideration in this study.

5.1.4 Widen/ Improve Existing Municipal Arterial Roads or New Municipal Roads

Alternatives within this category include the following:

- Widened/ improved or new municipal arterial roads – The provision of improved capacity and operations/ congestion relief on existing facilities through additional lanes to increase the performance of the transportation network.

Municipal roads are not generally designed and maintained to the standards required for higher speed, long distance inter-regional travel that is required through this study area. They are intended to serve as area access roads, and are characterized by slower-moving and turning traffic. Mixing long-distance and local traffic creates other transportation network concerns. In addition there are no current continuous east-west municipal roads within the study area that could be improved for this purpose. Widened/ improved or new municipal roads were therefore eliminated from further consideration in this study.

5.1.5 Widen/ Improve Existing Provincial Highways and or Realign Provincial Highways

Alternatives within this category include the following:

- Widened/ improved or realigned provincial highways – The provision of improved capacity and operations on existing provincial highways, and/ or accommodating required capacity on realigned provincial highways, could provide lanes for HOV and lanes/shoulders for inter-regional bus transit, and could provide general purpose lanes to increase the performance of the area transportation system.

Widened/ improved provincial highway would provide the following:

- opportunity to improve highway safety and accommodate future highway capacity and operational needs;
- maximize the use of the existing Highway 17 corridor;
- opportunity to improve the existing highway to meet current MTO design standards;
- opportunity to stage the improvements in such a way that they can be incrementally applied on a priority basis.

Realigned provincial highway would provide the following:

- opportunity to accommodate future capacity and operational needs;
- opportunity to bypass areas of the existing highway constrained by adjacent development/ facilities;
- a realigned highway that meets current MTO design standards;
- opportunity to implement the improvements with lower impact to travel on the existing facility during construction.

Based on the above, a combination alternative composed of widened/ improved provincial highway and realigned provincial highway does address the study problem and need for Highway 17 improvements, and it is therefore carried forward for further study.

5.1.6 Preferred Alternative to the Undertaking

The detailed assessment of alternatives to the undertaking is presented in **Exhibit 5.1**. On the basis of the assessment presented in **Exhibit 5.1**, the alternatives to the undertaking carried forward for further study were a combination that included:

- segments of widened/ improved provincial highway; and
- segments of realigned provincial highway.

Exhibit 5.1: Assessment and Selection of Alternative to the Undertaking

Alternatives to the Undertaking						
Screening Criteria	***Do Nothing***	***Optimize the Existing Transportation System (TDM and TSM)***	***Expanded/New Non Road Infrastructure (Transit, Freight Rail, Passenger Rail)***	***Widen/Improve Existing Municipal Arterial Roads or New Municipal Roads***	***Widen/Improve Sections of Existing Highway (Carry forward for further analysis)***	***Realign Sections of Highway 17 (Carry forward for further analysis)***
Long Term Needs (recognizing that in this area, highways will continue to be the major means of transportation)						
Highway 17 Traffic Congestion Reduced	Congestion would increase as traffic volumes increase over long term.			Minor traffic congestion reduction on Highway 17 due to diversion of some traffic to municipal roads.	Traffic congestion would be reduced on Highway 17 due to significant capacity improvements.	
Highway 17 Road Safety Improved	Road safety on Highway 17 would decrease over long term due to increased potential for collisions as traffic volumes increase.			Minor road safety improvement on Highway 17 due to diversion of some traffic to municipal roads.	Road safety would improve on Highway 17 due to design and capacity improvements.	
Serve Local Needs	Alternatives would not service local needs over the long term due to increased congestion on Highway 17.				Would service local needs over the long term due to decreased traffic congestion and increased road safety over the long term. Since private entrances to highway would be eliminated, changed access via municipal roads and service roads would be required.	
Construction Staging	Not applicable.		Construction can be staged in appropriate stand-alone segments.		Construction can be staged in appropriate stand-alone segments.	
Minimize Impact						
Minimize Economic Impact	Alternatives do not enhance economic growth in the study area and northern Ontario, and do not support area tourism focus. No changes in local highway access to impact current highway businesses.				Alternatives enhance economic growth both in the study area and northern Ontario, and do support area tourism focus. Since private entrances to highway would be eliminated, changed access via municipal roads and service roads would impact current highway businesses. Since major widening could not be accommodated through Rutherglen, highway realignment would impact current highway businesses.	
Minimize Natural Environmental Impact *Minimize Socio/Cultural Effects*	No impact.	Minimal impact.	Minimal impact since existing corridors for other modes considered adequate.	Degree of Impact would relate to scope of the improvement, which municipal studies would work towards mitigating.	Degree of Impact would relate to scope of the improvement, which this study would work towards mitigating.	

Exhibit 5.1: Assessment and Selection of Alternative to the Undertaking

Alternatives to the Undertaking						
Screening Criteria	***Do Nothing***	***Optimize the Existing Transportation System (TDM and TSM)***	***Expanded/New Non Road Infrastructure (Transit, Freight Rail, Passenger Rail)***	***Widen/Improve Existing Municipal Arterial Roads or New Municipal Roads***	***Widen/Improve Sections of Existing Highway (Carry forward for further analysis)***	***Realign Sections of Highway 17 (Carry forward for further analysis)***
Consistent With Existing Systems						
Existing Corridor Available	No change to use of existing Highway 17 corridor.	Minimal change in use of Highway 17 corridor.	Since highways will continue to be the major means of transportation, existing corridors for other modes considered adequate. Some additional infrastructure required at local access points	Since existing municipal roads are not continuous in an east-west direction through the study area, this would require construction of new segments of municipal roads to "fill in the gaps".	Existing highway right-of-way could not accommodate major widening through Rutherglen In some areas, widening of existing right-of-way is constrained by proximity of adjacent railway and rivers	Highway realignments could be accomplished where widening of existing highway is not possible.
Requires Different Modes	Travel modes would continue to be cars, trucks and buses		Although highways will continue to be the major means of transportation, would result in minor shift to transit, freight rail, passenger rail.	Travel modes continue to be cars, trucks and buses.	Travel modes would continue to be cars, trucks and buses.	
Cost Effective	Not cost effective. Although there is no capital cost, area transportation needs are not addressed.	Not cost effective. Although capital cost is low, area transportation needs are not addressed.		Not cost effective. Although capital cost is moderate, area transportation needs are not addressed.	More costly solution. Economic benefits to the area and improved highway capacity, operation and safety offset capital costs.	
Comments	Alternatives would not adequately address area's long term needs as highways will continue to be the major means of transportation. Alternatives are not consistent with the long-term strategy to provide a 4-lane freeway extending from Highway 416 in Ottawa to Sault Ste Marie.				Alternatives would address area's long term needs as highways will continue to be the major means of transportation. Alternatives are consistent with the long-term strategy to provide a 4-lane freeway extending from Highway 416 in Ottawa to Sault Ste Marie.	
Recommendation	**Eliminate from further consideration**				**Carry forward for further analysis**	**Carry forward for further analysis**
					Combinations of the above	

5.2 Alternative Methods for Carrying Out the Undertaking

The EA process is based on a sequence of decision-making in which alternatives are assessed at an increasing level of detail as they become more focused, starting with a broad perspective, and narrowing to a more focused perspective as the study progresses. Accordingly, alternative methods for carrying out the selected alternative to the undertaking were generated, comparatively evaluated and selected in the following sequence:

- Corridor alternatives that include segments of widened/ improved highway and segments of new highway.
- Route alternatives within the preferred corridor alternative, including interchanges and potential service roads.
- Preliminary design alternatives for the selected route alternative.
- A preferred preliminary design (the recommended plan).

5.2.1 Selected Highway Corridor

Having determined the recommended alternative to the undertaking included segments of widening the provincial highway and segments of realigning the highway, and having identified the major environmental constraints, a corridor was identified within which alternative methods (widening/ realignment locations) were generated. Based on the physical constraints and environmental conditions discussed in the previous subsections, only a single highway corridor was carried forward for further study, as shown in **Exhibit 5.2**.

5.2.2 Highway Planning Alternatives

Highway planning alternatives were generated, assessed and evaluated within the selected highway corridor for the recommended alternative to the undertaking. The highway planning alternatives included segments of widening/ improving the existing highway and segments of realigned highway, with interchanges at key connection points and new service roads for some areas. In the Rutherglen and Amable du Fond areas, widening of the existing highway was not possible due to physical constraints and environmental conditions. Therefore, realignment alternatives were generated for these two areas while widening alternatives were generated for the Pimisi Bay and Pautois Creek areas as shown schematically in **Exhibit 5.3** and presented in greater detail in the following subsections.

5.2.2.1 Principles for Generation of Highway Planning Alternatives

The generation of highway planning alternatives considered the environmental constraints and opportunities within the study area detailed in Section 4 and were generated according to the following principles:

Principle 1: Minimize impacts to significant natural features, functions, systems and communities:

- Avoid where possible, or minimize encroachment on or loss of:
  - water bodies and associated riparian zones;
  - fish habitat features;
  - species of conservation concern (vegetation, fish and wildlife);
  - Species at Risk habitat;
  - ecologically functional areas;
  - significant wildlife habitat and travel corridors. Other areas to be considered are any identified wildlife management, rehabilitation and research program sites;
  - Provincially Significant Wetlands (PSWs) and avoid impairment to wetland functions, including ecological function;
  - other evaluated and unevaluated wetlands;
  - designated significant vegetation;
  - other important vegetation;
  - individual farm fields/ operations (i.e. follow headlands/ property lines where possible);
  - known groundwater recharge and discharge areas;
  - impairment of ecological function to environmentally significant features, and where appropriate associated functions, including Significant Valleylands, ESAs, ANSIs, or other areas of provincial, regional or local significance; and
  - impairment of ecological function to special spaces (including recreational activity zones).

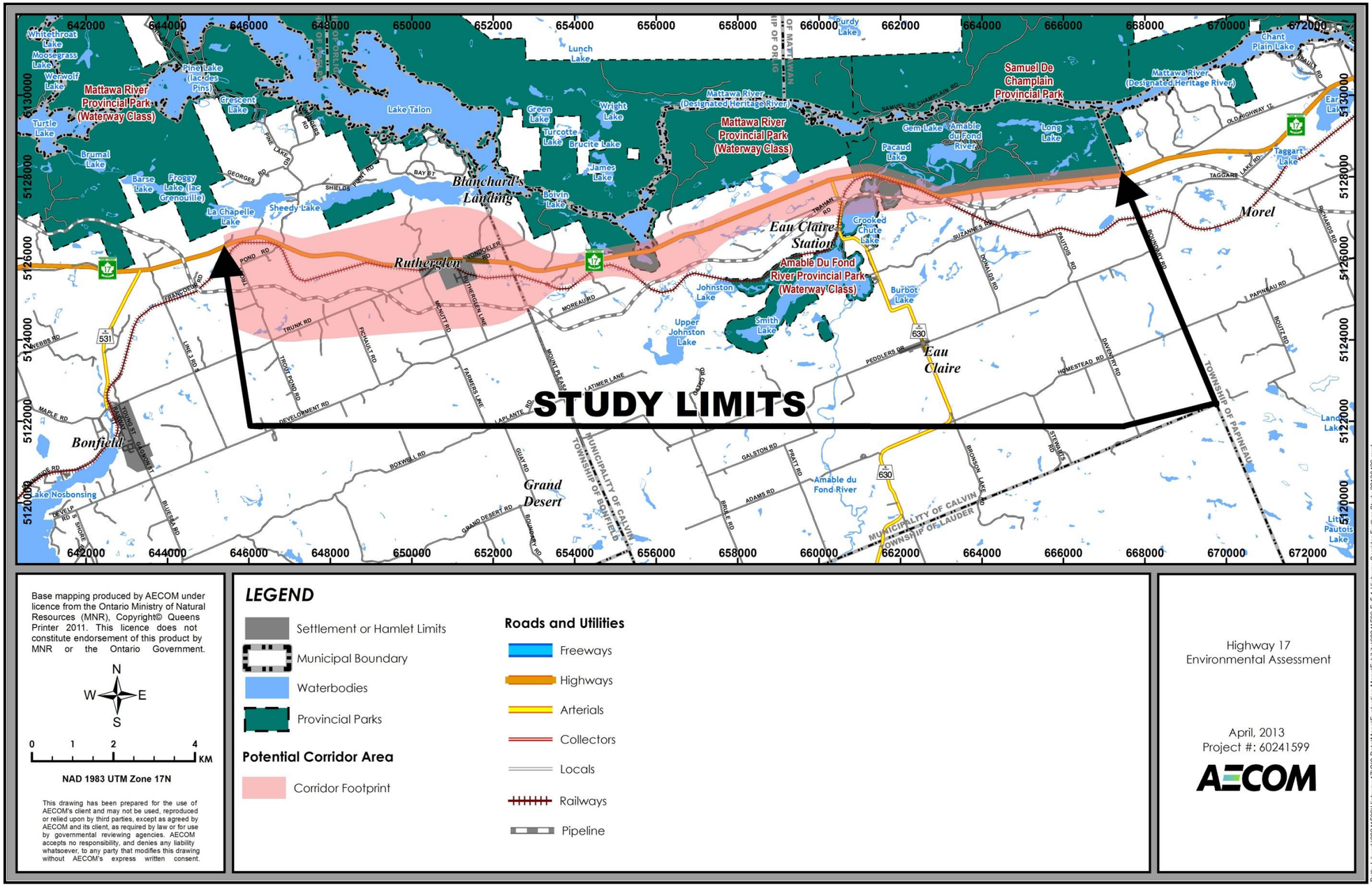
Principle 2: Minimize impacts to existing and planned (approved under Official Plans) population and employment areas:

- Maximize where possible separation distance from sensitive receptor locations;
- Avoid where possible or minimize encroachment on, or loss of developed properties;
- Minimize access impacts;
- Maximize the access provided to major generators of economic activity;
- Avoid where possible, or minimize encroachment on, or loss of mineral and mineral aggregate resources;
- Avoid where possible operating and "non-operating" waste disposal sites; and
- Avoid where possible, minimize encroachment on, or loss of known archaeological sites/built heritage features/cultural heritage landscape areas of extreme significance.

Principle 3: Transportation service criteria:

- Generate alternatives that are efficient and direct, while meeting standards for design; and
- Select alternatives that address the transportation problems and transportation opportunities

Exhibit 5.2: Selected Highway Corridor



Base mapping produced by AECOM under licence from the Ontario Ministry of Natural Resources (MNR), Copyright© Queens Printer 2011. This licence does not constitute endorsement of this product by MNR or the Ontario Government.

N W E S

0 1 2 4 KM

NAD 1983 UTM Zone 17N

LEGEND

- Settlement or Hamlet Limits
- Municipal Boundary
- Waterbodies
- Provincial Parks

Potential Corridor Area

- Corridor Footprint

Roads and Utilities

- Freeways
- Highways
- Arterials
- Collectors
- Locals
- Railways
- Pipeline

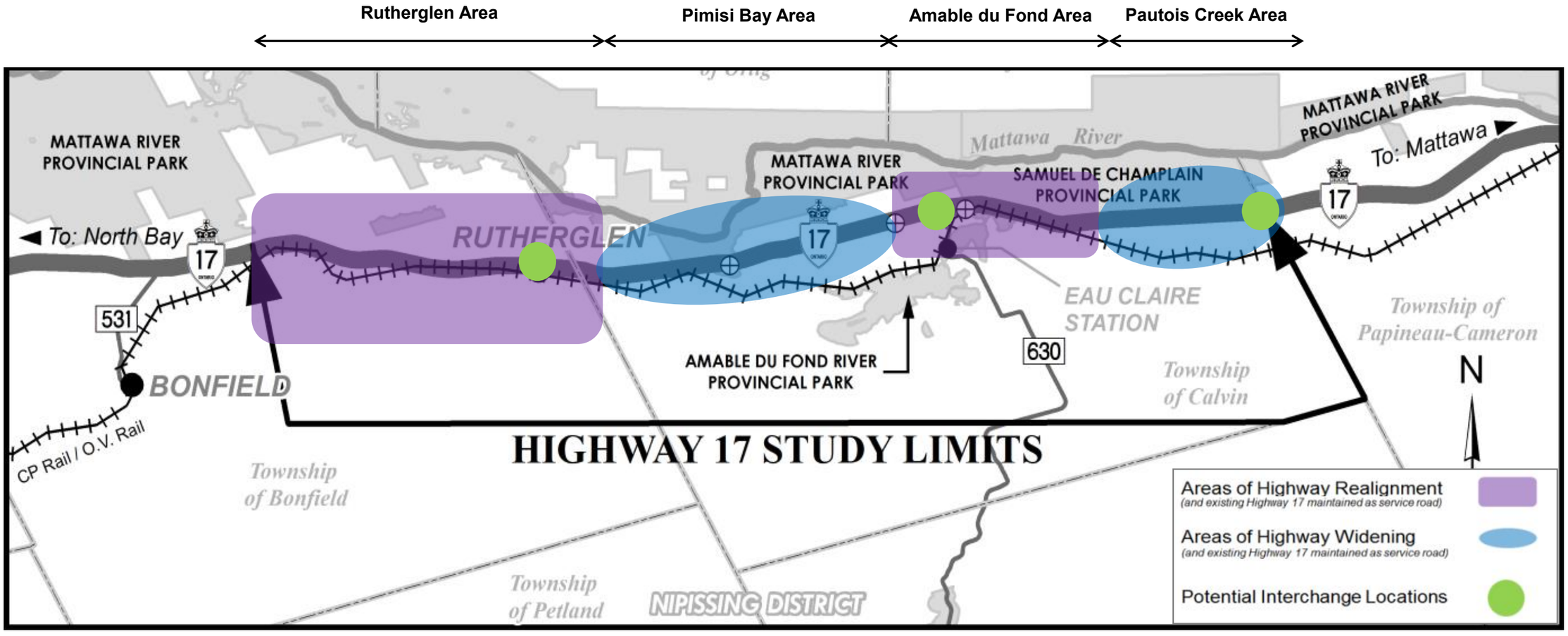
Highway 17
Environmental Assessment

April, 2013
Project #: 60241599

AECOM

Path: L:\work\60241599\Highway 17\GIS Data\Maps\Evaluation Maps\Exhibits\60241599-Ex5-1 Highway Corridor Further Study-20130429.mxd

Exhibit 5.3: Highway Planning Alternatives, Study Area Subsections



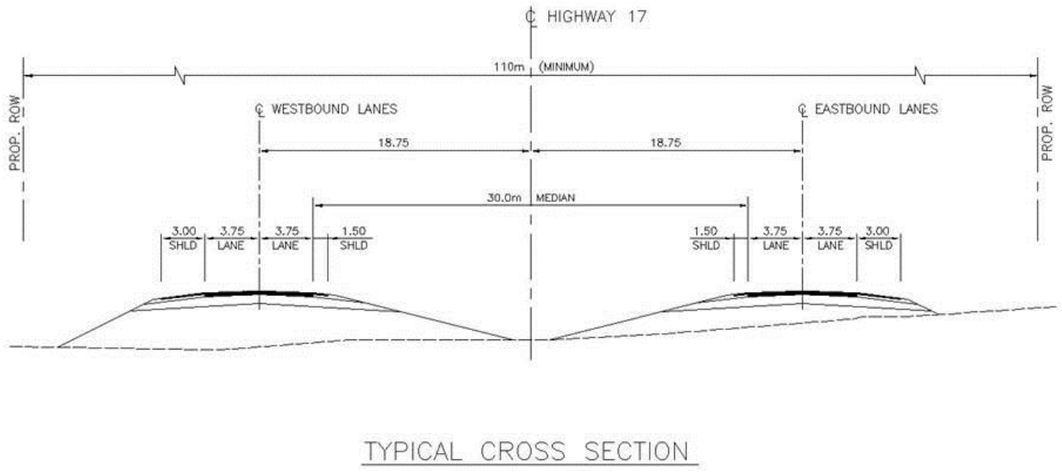
5.2.2.2 Selected Highway Cross Section

The typical highway cross section for both widened and realigned sections of Highway 17 is presented in **Exhibit 5.4** and consists of:

- a freeway with two lanes in each direction
- a 30m median within a 110m right-of-way
- access restricted to interchanges at Rutherglen Line, Highway 630 and Boundary Road

The selected cross-section results in the loss of direct access from the highway to abutting lands. In some areas of highway widening, restoration of this local access is not practical. In some areas, local access will be maintained via retention of the existing highway within its own 30 m right-of-way.

Exhibit 5.4: Typical Cross-Section of Widened/ Improved/ Realigned Highway 17



TYPICAL CROSS SECTION

5.2.2.3 Process for Evaluation of Highway Planning Alternatives

The evaluation of highway planning alternatives was completed on a comparative basis for each of the four highway realignment or widening alternative areas (with associated interchanges and service roads).

Exhibit 5.5 provides the criteria for the evaluation of highway planning alternative by factor area.

The process for the evaluation of highway planning alternatives is presented in **Exhibit 5.6**.

Exhibit 5.5: Highway Planning Alternatives Evaluation Criteria

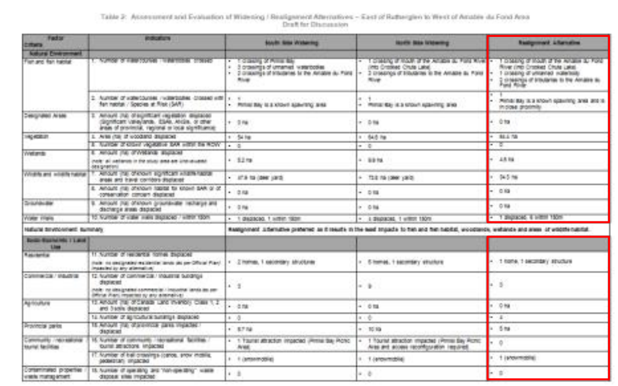
Natural Environmental Factors
Fish and fish habitat, including Species at Risk
Vegetation, including Species at Risk
Wetlands
Wildlife and wildlife habitat, including Species at Risk
Surface water
Groundwater
Socio-Economic/ Land Use Factors
Residential
Commercial/ business
Provincial parks
Community/ recreational/ tourist facilities
Contaminated properties/ waste management
Highway noise
Air quality
Aggregates and mineral resources
Water wells
Cultural Environment Factors
Built heritage and cultural landscapes
Archaeology
Transportation Factors
Accommodation of long term planning objectives
Accommodation of projected traffic demand
Enhancement of safety
Traffic operations on municipal roads and intersections
Design consistency with geometric standards for Ontario
Travel time/ out of way travel
Cost Factor
Cost, including construction, utility relocation and property requirements
Constructability Factor
Existing traffic flow and operations accommodated during construction
Availability of staged construction

The comparative evaluation identified a recommended highway planning alternative for each highway realignment and widening area according to the potential impacts to:

- Natural Environment Factors
- Socio-Economic/ Land Use Factors
- Cultural Factors
- Transportation Factors
- Cost and Constructability Considerations

Exhibit 5.6: Process for Evaluation of Highway Planning Alternatives

1. Confirm existing conditions and constraints within realignment and widening areas
2. Refine highway realignment and widening alternatives in consideration of additional information and stakeholder input from PIC #1
3. Comparatively evaluate highway planning alternatives according to refined criteria
4. Identify a recommended highway planning alternative



5.2.2.4 Rutherglen Area Realignment Alternatives

From Highway 531 to east of Rutherglen, seven realignment alternatives were generated and each included an interchange at Rutherglen Line as shown on **Exhibit 5.7** below.

On the basis of the assessment and evaluation results presented in **Exhibit 5.8**, **Alternative 2** is the recommended alternative in the Rutherglen area as it:

- Results in least overall impacts to Natural Environment (fish and fish habitat);
- Results in least overall impacts to Socio-Economic Environment (residential and agricultural buildings); and
- Is equally preferred relative to other alternatives from a Cultural Environment, Transportation, Cost and Constructability perspective.

Exhibit 5.7: Rutherglen Area Realignment Alternatives

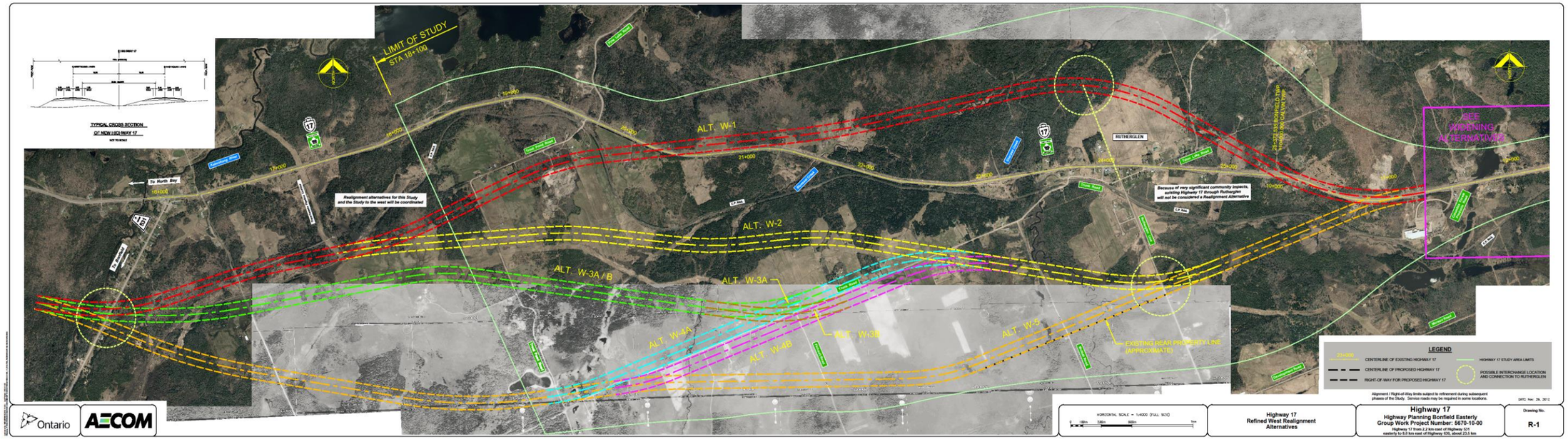


Exhibit 5.8: Evaluation of Rutherglen Area Realignment Alternatives

Factor / Criteria	Indicators	Alternative 1	Alternative 2 (Preferred)	Alternative 3A	Alternative 3B	Alternative 4A	Alternative 4B	Alternative 5
Natural Environment								
Fish and fish habitat	1. Number of watercourses / waterbodies crossed	▪ 1 crossing of Kaibuskong River ▪ 1 crossing (confluence) of Blueseal Creek and Sparks / Sharpes Creek	▪ 1 crossing of Kaibuskong River ▪ 1 crossing of Blueseal Creek	▪ 1 crossing of Kaibuskong River ▪ 2 crossings of tributary to Kabuskong River ▪ 1 crossing of Sparks/Sharpes Creek	▪ 1 crossing of Kaibuskong River ▪ 2 crossings of tributary to Kabuskong River ▪ 1 crossing of Sparks/Sharpes Creek	▪ 1 crossing of Kaibuskong River ▪ 2 crossings of tributary to Kabuskong River ▪ 1 crossing of Sparks/Sharpes Creek	▪ 1 crossing of Kaibuskong River ▪ 2 crossings of a tributary to the Kabuskong River ▪ 1 crossing of Blueseal Creek ▪ 1 crossing of Sparks/Sharpes Creek	▪ 1 crossing of Kaibuskong River ▪ 2 crossings of a tributary to the Kabuskong River ▪ 1 crossing of Blueseal Creek ▪ 2 crossings of Blueseal Creek tributaries ▪ 1 crossing of Sparks/Sharpes Creek
	2. Number of watercourses / waterbodies crossed with fish habitat / Species at Risk (SAR)	▪ 2, though no known spawning areas	▪ 2, though no known spawning areas	▪ 4, though no known spawning areas	▪ 4, though no known spawning areas	▪ 4, though no known spawning areas	▪ 5, though no known spawning areas	▪ 7, though no known spawning areas
Designated Areas	3. Amount (ha) of significant vegetation displaced (Significant Valleylands, ESAs, ANSIs, or other areas of provincial, regional or local significance)	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha
Vegetation	4. Area (ha) of woodland displaced	▪ 72 ha	▪ 71 ha	▪ 64 ha	▪ 62 ha	▪ 59 ha	▪ 58 ha	▪ 63 ha
	5. Number of known vegetative SAR within the ROW	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0
Wetlands	6. Amount (ha) of wetlands displaced *(note: all wetlands in the study area are Unevaluated designation)*	▪ 7 ha	▪ 15 ha	▪ 13 ha	▪ 13 ha	▪ 17 ha	▪ 17 ha	▪ 15 ha
Wildlife and wildlife habitat	7. Amount (ha) of known significant wildlife habitat areas and travel corridors displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha
	8. Amount (ha) of known habitat for known SAR or of conservation concern displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha
Groundwater	9. Amount (ha) of known groundwater recharge and discharge areas displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha
Water Wells	10. Number of water wells displaced / within 150m	▪ 7 displaced, 17 within 150m	▪ 1 displaced, 7 within 150m	▪ 4 displaced, 5 within 150m	▪ 7 displaced, 5 within 150m	▪ 5 displaced, 6 within 150m	▪ 3 displaced, 6 within 150m	▪ 2 displaced, 7 within 150m
Natural Environment Summary		**Alternative 2 is preferred as it results in the least impacts to fish and fish habitat (the size of the watercourse crossings for Alt 1 at Blue Seal Creek is significantly larger) and comparable impacts for the remaining criteria relative to the other alternatives.**						
Socio-Economic/ Land Use								
Residential	11. Number of residential homes displaced *(note: no designated residential lands (as per Official Plan) impacted by any alternative)*	▪ 17 homes, 3 secondary structures	▪ 13 homes	▪ 17 homes, 2 secondary structures	▪ 17 homes, 7 secondary structures	▪ 17 homes, 3 secondary structures	▪ 17 homes, 6 secondary structures	▪ 13 homes, 3 secondary structures
Commercial/ industrial	12. Number of commercial / industrial buildings displaced *(note: no designated commercial / industrial lands (as per Official Plan) impacted by any alternative)*	▪ 0	▪ 1 communications tower potentially displaced	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0

Exhibit 5.8: Evaluation of Ruthergle Area Realignment Alternatives

Factor / Criteria	Indicators	Alternative 1	Alternative 2 (Preferred)	Alternative 3A	Alternative 3B	Alternative 4A	Alternative 4B	Alternative 5
Agriculture	13. Amount (ha) of Canada Land Inventory Class 1, 2 and 3 soils displaced	▪ 32 ha	▪ 41 ha	▪ 40 ha	▪ 40 ha	▪ 38 ha	▪ 39 ha	▪ 39 ha
	14. Number of agricultural buildings displaced	▪ 4	▪ 0	▪ 3	▪ 5	▪ 3	▪ 4	▪ 1
Provincial parks	15. Amount (ha) of provincial parks impacted / displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha	▪ 0 ha
Community/ recreational/ tourist facilities	16. Number of community / recreational facilities / tourist attractions impacted	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0
	17. Number of trail crossings (canoe, snow mobile, pedestrian) impacted	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0
Contaminated properties/ waste management	18. Number of operating and "non-operating" waste disposal sites impacted	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0
Highway noise	19. Number of noise sensitive areas within 600 m of the ROW	▪ 67	▪ 48	▪ 37	▪ 37	▪ 42	▪ 42	▪ 36
Air quality	20. Number of sensitive receptors within 600 m of the ROW	▪ 67	▪ 48	▪ 37	▪ 37	▪ 42	▪ 42	▪ 36
Aggregates and mineral resources	21. Amount (ha) of mineral and mineral aggregate resources impacted / displaced	▪ 2.2 ha	▪ 4.3 ha	▪ 2.9 ha	▪ 3.1 ha	▪ 5.8 ha	▪ 5.8 ha	▪ 5.8 ha
Socio-Economic/ Land Use Summary		**Alternative 2 is preferred as it results in the least residential displacements, no displacement of agricultural buildings and comparable impacts for the remaining criteria relative to the other alternatives.**						
Cultural Environment								
Built heritage and cultural landscapes	22. Number of designated / locally significant built heritage features / cultural heritage landscapes impacted	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0	▪ 0
Archaeology	23. Amount (ha) of land with archaeological potential affected	▪ 130 ha	▪ 125 ha	▪ 125 ha	▪ 128 ha	▪ 130 ha	▪ 130 ha	▪ 129 ha
Cultural Environment Summary		**Alternatives are equally preferred.**						
Transportation								
Accommodation of long term planning objectives	24. Potential to accommodate long term planning objectives and support the efficient movement of people and goods between communities and regions	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High
Accommodation of projected traffic demand	25. Potential to address the transportation problems and opportunities	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High
Enhancement of safety	26. Potential to improve safety	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High
Traffic operations on municipal roads and intersections	27. Number of crossings of local / municipal roads	▪ 4	▪ 5	▪ 5	▪ 6	▪ 7	▪ 7	▪ 7
	28. Number of private accesses impacted	▪ 9	▪ 3	▪ 7	▪ 8	▪ 7	▪ 7	▪ 3
Design consistency with geometric standards for Ontario	29. Consistency with geometric design standards	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High	▪ High
Travel time/ out of way travel	30. Potential for increased travel time / out of way travel	▪ Low	▪ Low	▪ Low	▪ Low	▪ Low	▪ Low	▪ Low

Exhibit 5.8: Evaluation of Rutherglen Area Realignment Alternatives

Factor Criteria	Indicators	Alternative 1	Alternative 2 (Preferred)	Alternative 3A	Alternative 3B	Alternative 4A	Alternative 4B	Alternative 5
Transportation Summary		**Alternatives are equally preferred.**						
Cost								
Construction cost (considering utility relocation, amount of property required, rail crossings, etc)	31. Dollars	▪ $135 million	▪ $120 million	▪ $124 million	▪ $124 million	▪ $124 million	▪ $124 million	▪ $118 million
Cost Summary		**Excepting Alternative 1, there are no significant differences between alternatives.**						
Constructability								
Existing traffic flow and operations accommodated during construction Availability of staged construction	32. Complexity of staging and traffic flow maintenance during construction	▪ Moderate complexity with some staging issues at the east tie in point and new lanes in conflict with existing Highway 17 means some traffic maintenance provisions will be required to maintain flow	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment
Constructability Summary		**Excepting Alternative 1, there are no significant differences between alternatives.**						
Overall Summary and Recommendation		**Alternative 2 was recommended as it:** • **Results in least overall impacts to Natural Environment (fish and fish habitat).** • **Results in least overall impacts to Socio-Economic Environment (residential and agricultural buildings).** • **Is equally or more preferred relative to other alternatives from a Cultural Environment, Transportation, Cost and Constructability perspective.**						

5.2.2.5 Pimisi Bay Area Widening Alternatives

Widening alternatives for the Pimisi Bay area, from east of Rutherglen to west of Highway 630, are shown on **Exhibits 5.9**, **5.10** and **5.11**. Two widening alternatives and one widening/ realignment alternative were generated and each included retention of existing Highway 17 as a local service road.

On the basis of the assessment and evaluation results presented in **Exhibit 5.12**, **Alternative 3**, which includes segments of realigned and widened highway to the south with existing Highway 17 maintained as a service road on the north side of the highway, is the recommended alternative in the Pimisi Bay area as it:

- Results in least impacts to Natural Environment (fish/fish habitat, woodlands, wetlands and wildlife habitat);
- Results in least impacts to Socio-Economic Environment (residential and commercial structures, provincial parks, aggregate areas and tourist areas (Pimisi Bay picnic area));
- Results in least impacts to Transportation Environment (access to Pimisi Bay and associated picnic area is maintained); and
- Results in fewer constructability issues and has the lowest construction cost.

Exhibit 5.9: Alternative 1 Pimisi Bay Area - North Side Widening

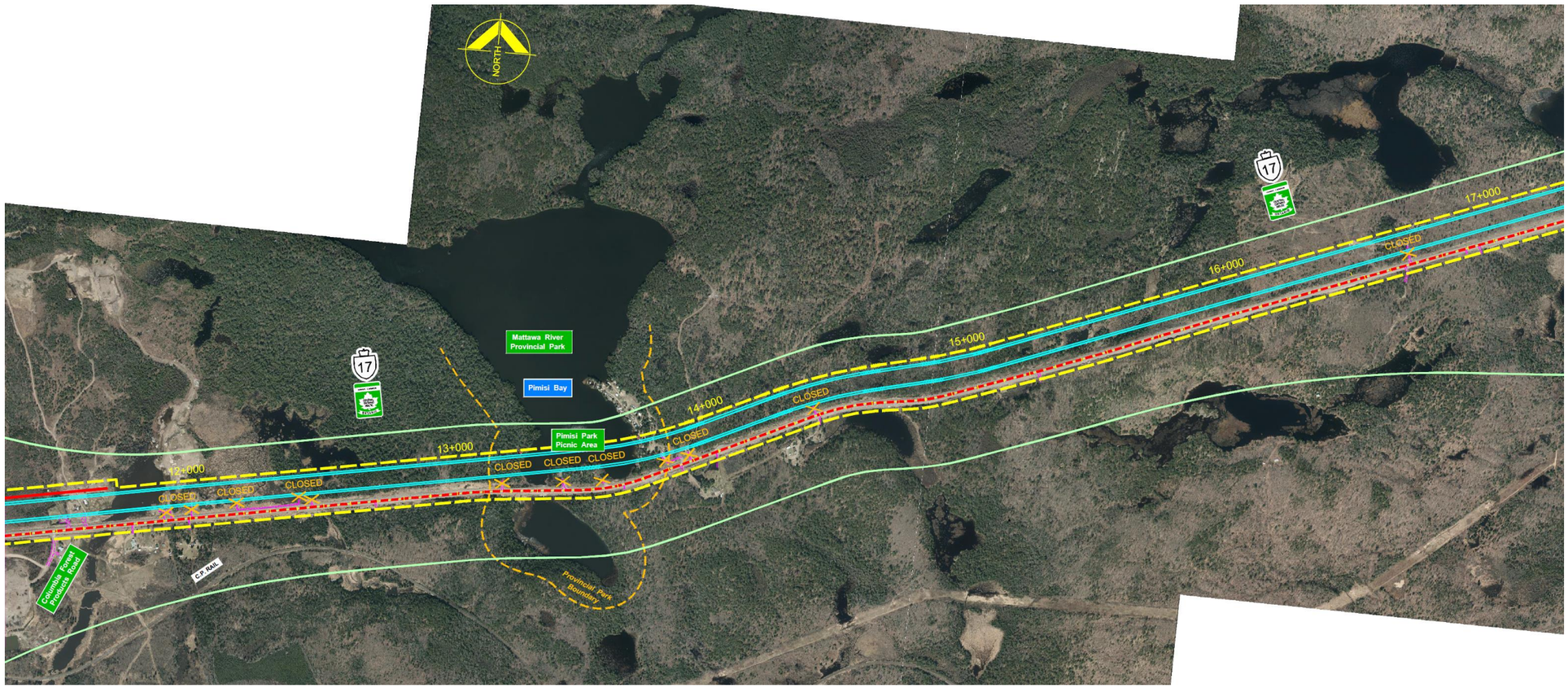


Exhibit 5.10: Alternative 2 Pimisi Bay Area - South Side Widening

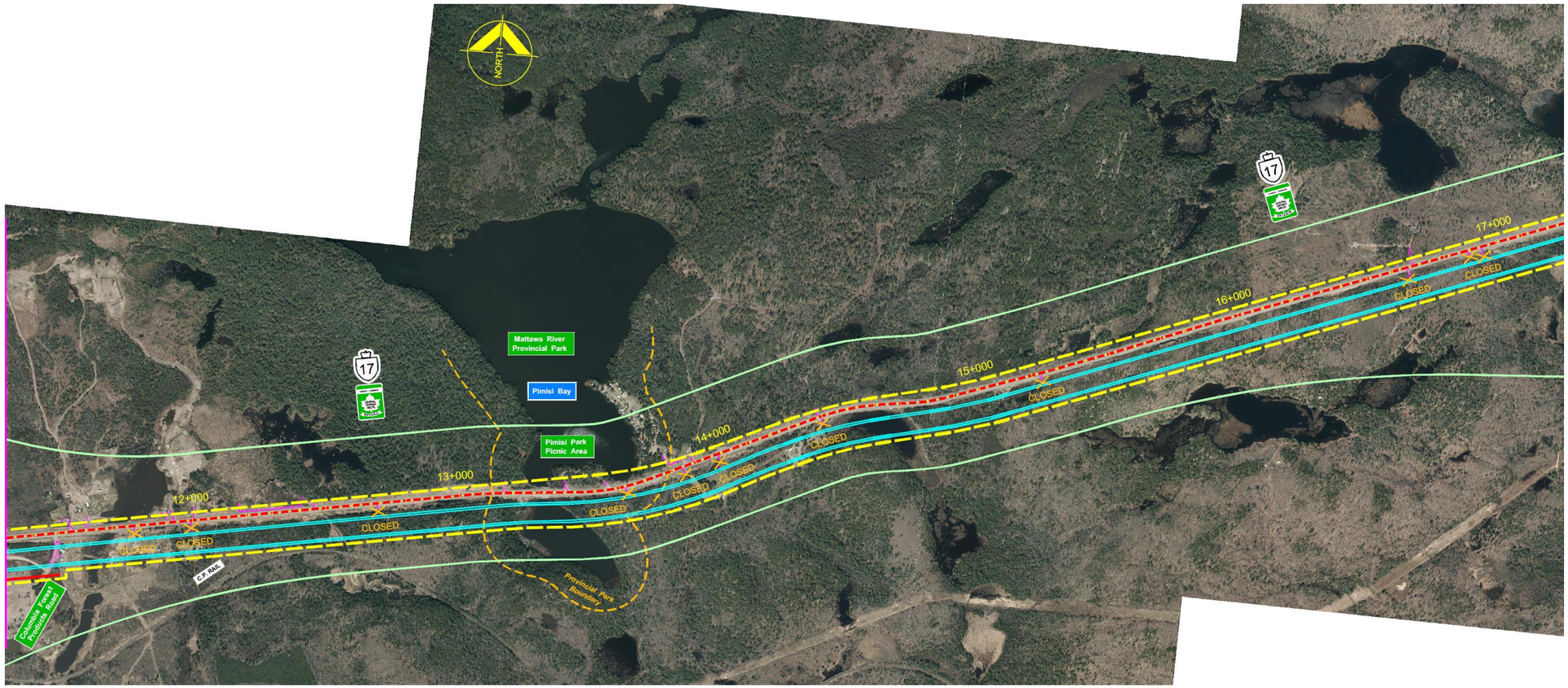


Exhibit 5.11: Alternative 3 Pimisi Bay Area - South Side Widening/ Realignment

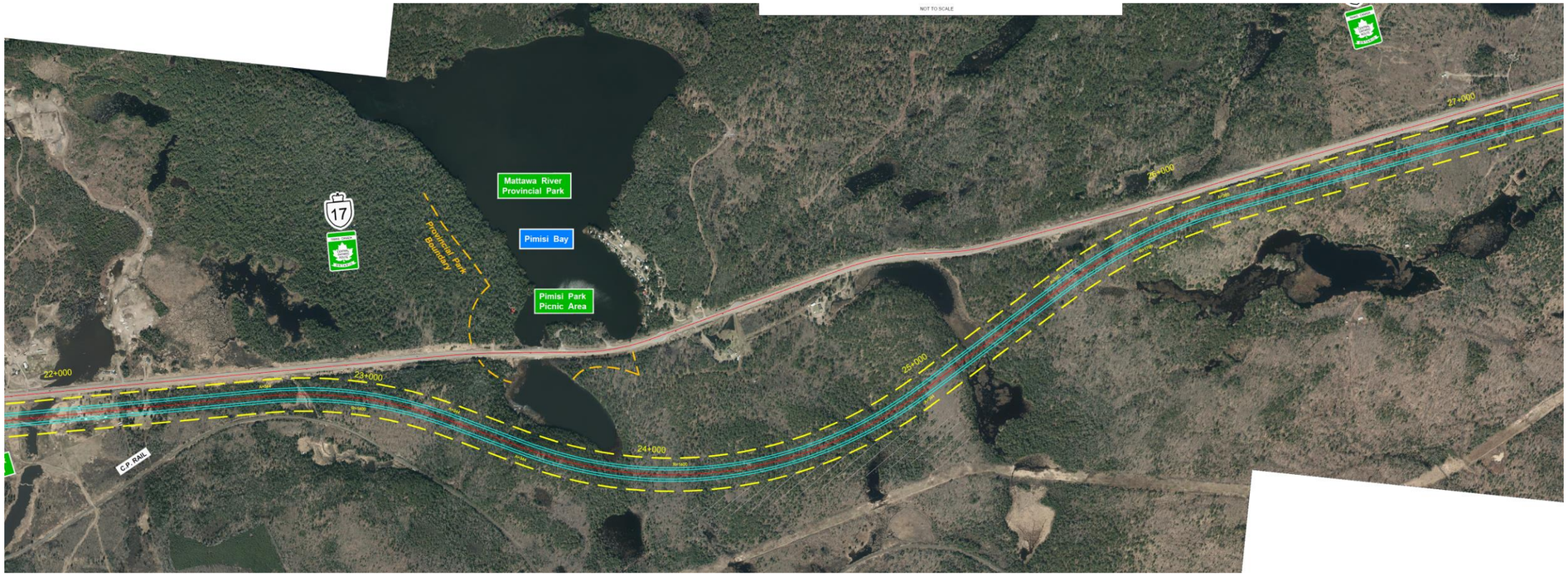


Exhibit 5.12: Evaluation of Pimisi Bay Area Widening Alternatives

Factor Criteria	Indicators	Alternative 1 South Side Widening	Alternative 2 North Side Widening	Alternative 3 South Side Widening and Realignment Alternative (Preferred)
Natural Environment				
Fish and fish habitat	1. Number of watercourses / waterbodies crossed	▪ 1 crossing of Pimisi Bay ▪ 3 crossings of unnamed waterbodies ▪ 2 crossings of tributaries to the Amable du Fond River	▪ 1 crossing of mouth of the Amable du Fond River (into Crooked Chute Lake) ▪ 2 crossings of tributaries to the Amable du Fond River	▪ 1 crossing of mouth of the Amable du Fond River (into Crooked Chute Lake) ▪ 1 crossing of unnamed waterbody ▪ 2 crossings of tributaries to the Amable du Fond River
	2. Number of watercourses / waterbodies crossed with fish habitat / Species at Risk (SAR)	▪ 1 ▪ Pimisi Bay is a known spawning area	▪ 1 ▪ Pimisi Bay is a known spawning area	▪ 1 ▪ Pimisi Bay is a known spawning area and is in close proximity
Designated Areas	3. Amount (ha) of significant vegetation displaced (Significant Valleylands, ESAs, ANSIs, or other areas of provincial, regional or local significance)	▪ 0 ha	▪ 0 ha	▪ 0 ha
Vegetation	4. Area (ha) of woodland displaced	▪ 54 ha	▪ 64.6 ha	▪ 60 ha
	5. Number of known vegetative SAR within the ROW	▪ 0	▪ 0	▪ 0
Wetlands	6. Amount (ha) of wetlands displaced *(note: all wetlands in the study area are Unevaluated designation)*	▪ 5.2 ha	▪ 9.9 ha	▪ 3.8 ha
Wildlife and wildlife habitat	7. Amount (ha) of known significant wildlife habitat areas and travel corridors displaced	▪ 47.9 ha (deer yard)	▪ 73.8 ha (deer yard)	▪ 21 ha (deer yard)
	8. Amount (ha) of known habitat for known SAR or of conservation concern displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
Groundwater	9. Amount (ha) of known groundwater recharge and discharge areas displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
Water Wells	10. Number of water wells displaced / within 150m	▪ 1 displaced, 1 within 150m	▪ 4 displaced, 1 within 150m	▪ 1 displaced, 3 within 150m
Natural Environment Summary		**Alternative 3 is preferred as it results in the least impacts to fish and fish habitat, woodlands, wetlands and areas of wildlife habitat.**		
Socio-Economic / Land Use				
Residential	11. Number of residential homes displaced *(note: no designated residential lands (as per Official Plan) impacted by any alternative)*	▪ 2 homes, 1 secondary structures	▪ 5 homes, 1 secondary structure	▪ 1 home
Commercial / industrial	12. Number of commercial / industrial buildings displaced *(note: no designated commercial / industrial lands (as per Official Plan) impacted by any alternative)*	▪ 3	▪ 9	▪ 3
Agriculture	13. Amount (ha) of Canada Land Inventory Class 1, 2 and 3 soils displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
	14. Number of agricultural buildings displaced	▪ 0	▪ 0	▪ 4
Provincial parks	15. Amount (ha) of provincial parks impacted / displaced	▪ 5.7 ha	▪ 10 ha	▪ 4.6 ha
Community / recreational / tourist facilities	16. Number of community / recreational facilities / tourist attractions impacted	▪ 1 Tourist attraction impacted (Pimisi Bay Picnic Area)	▪ 1 Tourist attraction impacted (Pimisi Bay Picnic Area and access reconfiguration required)	▪ 0
	17. Number of trail crossings (canoe, snow mobile, pedestrian) impacted	▪ 1 (snowmobile)	▪ 1 (snowmobile)	▪ 1 (snowmobile)
Contaminated properties / waste management	18. Number of operating and "non-operating" waste disposal sites impacted	▪ 0	▪ 0	▪ 0
Highway noise	19. Number of noise sensitive areas within 600 m of the ROW	▪ 7	▪ 11	▪ 13

Exhibit 5.12: Evaluation of Pimisi Bay Area Widening Alternatives

Factor / Criteria	Indicators	Alternative 1 South Side Widening	Alternative 2 North Side Widening	Alternative 3 South Side Widening and Realignment Alternative (Preferred)
Air quality	20. Number of sensitive receptors within 600 m of the ROW	▪ 7	▪ 11	▪ 13
Aggregates and mineral resources	21. Amount (ha) of mineral and mineral aggregate resources impacted / displaced	▪ 0 ha	▪ 6.2 ha	▪ 0 ha
Socio-Economic / Land Use Summary		**Alternative 3 is preferred as it has the least impacts on residential and commercial structures, provincial park lands, tourist areas (Pimisi Bay Picnic Area) and aggregate resources.**		
Cultural Environment				
Built heritage and cultural landscapes	22. Number of designated / locally significant built heritage features / cultural heritage landscapes impacted	▪ 0	▪ 0	▪ 0
Archaeology	23. Amount (ha) of land with archaeological potential affected	▪ 106.2 ha	▪ 125.4 ha	▪ 67.8 ha
Cultural Environment Summary		**Alternative 3 is preferred as it impacts the least lands with archaeological potential.**		
Transportation				
Accommodation of long term planning objectives	24. Potential to accommodate long term planning objectives and support the efficient movement of people and goods between communities and regions	▪ High	▪ High	▪ High
Accommodation of projected traffic demand	25. Potential to address the transportation problems and opportunities	▪ High	▪ High	▪ High
Enhancement of safety	26. Potential to improve safety	▪ High	▪ High	▪ High
Traffic operations on municipal roads and intersections	27. Number of crossings of local / municipal roads	▪ 1	▪ 1	▪ 1
	28. Number of private accesses impacted	▪ 11	▪ 11 and Pimisi Bay entrance	▪ 9
Design consistency with geometric standards for Ontario	29. Consistency with geometric design standards	▪ High	▪ High	▪ High
Travel time / out of way travel	30. Potential for increased travel time / out of way travel	▪ Moderate	▪ Moderate	▪ Moderate
Transportation Summary		**Alternative 3 preferred as it does not impact the existing access to Pimisi Bay.**		
Cost				
Construction cost (considering utility relocation, amount of property required, rail crossings, etc)	31. Dollars	▪ $53 million	▪ $60 million	▪ $34 million
Cost Summary		**Alternative 3 is preferred as it has the lowest cost.**		

Exhibit 5.12: Evaluation of Pimisi Bay Area Widening Alternatives

Factor Criteria	Indicators	Alternative 1 South Side Widening	Alternative 2 North Side Widening	Alternative 3 South Side Widening and Realignment Alternative (Preferred)
Constructability				
Existing traffic flow and operations accommodated during construction Availability of staged construction	32. Complexity of staging and traffic flow maintenance during construction	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the widened highway segment (except in combination with Alternative W-1 which would cross existing Highway 17)	▪ High complexity of staging and traffic flow maintenance during construction given the transition to west realignment alternatives and the need for construction to be done through the existing Highway 17 corridor; will require a deep rock cut east of Rutherglen ▪ Some complexities at the transition point to east realignment alternatives also given that the transition point will cross existing Highway 17	▪ Low complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment (except in combination with Alternative W-1 which would cross existing Highway 17)
Constructability Summary		**Alternatives 1 and 3 are preferred as traffic can primarily be maintained on the existing highway during construction.**		
Overall Summary and Recommendation		**Alternative 3 was recommended as it:** • **Results in least impacts to Natural Environment (fish/fish habitat, woodlands, wetlands and wildlife habitat)** • **Results in least impacts to Socio-Economic Environment (residential and commercial structures, provincial parks, aggregate areas and tourist areas (Pimisi Bay picnic area)).** • **Results in least impacts to Transportation Environment (access to Pimisi Bay and associated picnic area is maintained).** • **Results in fewer constructability issues and least cost.**		

5.2.2.6 Amable du Fond Area Realignment Alternatives

From west of Highway 630 to west of Pautois Creek, three realignment alternatives were generated, each with an interchange at Highway 630, as shown on **Exhibit 5.13** below.

On the basis of the assessment and evaluation results presented in **Exhibit 5.14**, **Alternative 3** is the recommended alternative in the Amable du Fond area as it:

- Results in least impacts to Socio-Economic Environment (commercial / industrial and residential properties);
- Results in less complex construction staging and traffic maintenance during construction relative to other alternatives; and
- Is equally preferred relative to other alternatives from a Cultural Environment, Transportation, and Cost perspective.

Exhibit 5.13: Amable du Fond Area Realignment Alternatives

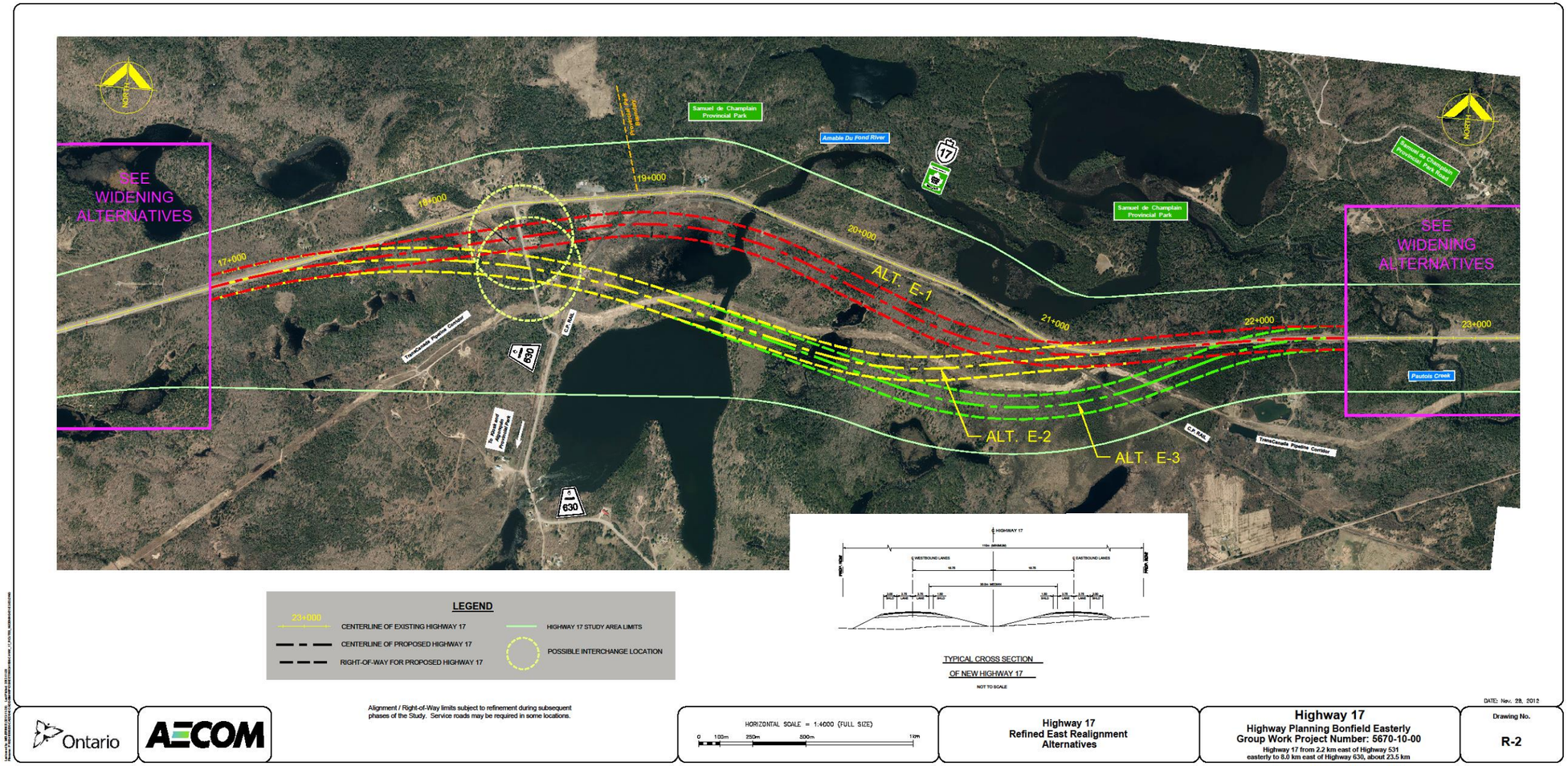


Exhibit 5.14: Evaluation of Amable du Fond Area Realignment Alternatives

Factor Criteria	Indicators	Alternative 1	Alternative 2	Alternative 3 (Preferred)
Natural Environment				
Fish and fish habitat	1. Number of watercourses / waterbodies crossed	▪ 1 crossing of Amable du Fond River ▪ 2 crossings of tributaries to the Amable du Fond River	▪ 1 crossing of mouth of the Amable du Fond River (into Crooked Chute Lake) ▪ 2 crossings of tributaries to the Amable du Fond River	▪ 1 crossing of mouth of the Amable du Fond River (into Crooked Chute Lake) ▪ 2 crossings of tributaries to the Amable du Fond River
	2. Number of watercourses / waterbodies crossed with fish habitat / Species at Risk (SAR)	▪ 3 ▪ No known spawning areas in close proximity	▪ 3 ▪ Spawning areas identified in Crooked Chute Lake	▪ 3 ▪ Spawning areas identified in Crooked Chute Lake
Designated Areas	3. Amount (ha) of significant vegetation displaced (Significant Valleylands, ESAs, ANSIs, or other areas of provincial, regional or local significance)	▪ 0 ha	▪ 0 ha	▪ 9 ha
Vegetation	4. Area (ha) of woodland displaced	▪ 38.3 ha	▪ 36.17 ha	▪ 43.2 ha
	5. Number of known vegetative SAR within the ROW	▪ 0	▪ 0	▪ 0
Wetlands	6. Amount (ha) of wetlands displaced *(note: all wetlands in the study area are Unevaluated designation)*	▪ 5.19 ha	▪ 3.6 ha	▪ 7.96 ha
Wildlife and wildlife habitat	7. Amount (ha) of known significant wildlife habitat areas and travel corridors displaced	▪ 59.72 ha (deer yard)	▪ 59.72 ha (deer yard)	▪ 59.72 ha (deer yard)
	8. Amount (ha) of known habitat for known SAR or of conservation concern displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
Groundwater	9. Amount (ha) of known groundwater recharge and discharge areas displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
Water Wells	10. Number of water wells displaced / within 150m	▪ 2 displaced, 1 within 150m	▪ 1 displaced, 0 within 150m	▪ 1 displaced, 0 within 150m
Natural Environment Summary		**Alternative 1 is preferred as it results in the least impacts to fish and fish habitat (the size of the watercourse crossings for Alternatives 2 and 3 are substantially larger), though Alternative 1 does result in slightly more impact to vegetation and wetlands than Alternative 2.**		
Socio-Economic/ Land Use				
Residential	11. Number of residential homes displaced *(note: no designated residential lands (as per Official Plan) impacted by any alternative)*	▪ 6 homes displaced, 2 secondary structures	▪ 4 homes, 1 secondary structure	▪ 4 homes, 1 secondary structure
Commercial/ industrial	12. Number of commercial / industrial buildings displaced *(note: no designated commercial / industrial lands (as per Official Plan) impacted by any alternative)*	▪ 1 displaced (Algonquin North Outfitters Service)	▪ 1 potentially displaced (Algonquin North Outfitters Service)	▪ 1 potentially displaced (Algonquin North Outfitters Service)
Agriculture	13. Amount (ha) of Canada Land Inventory Class 1, 2 and 3 soils displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
	14. Number of agricultural buildings displaced	▪ 0	▪ 0	▪ 0
Provincial parks	15. Amount (ha) of provincial parks impacted / displaced	▪ 6.4 ha	▪ 3.73 ha	▪ 3.49 ha
Community/ recreational/ tourist facilities	16. Number of community / recreational facilities / tourist attractions impacted	▪ 1 displaced (Algonquin North Outfitters Service)	▪ 1 potentially displaced (Algonquin North Outfitters Service)	▪ 1 potentially displaced (Algonquin North Outfitters Service)
	17. Number of trail crossings (canoe, snow mobile, pedestrian) impacted	▪ 2 (1 snowmobile, 1 walking)	▪ 2 (1 snowmobile, 1 walking)	▪ 2 (1 snowmobile, 1 walking)
Contaminated properties/ waste management	18. Number of operating and "non-operating" waste disposal sites impacted	▪ 0	▪ 0	▪ 0
Highway noise	19. Number of noise sensitive areas within 600 m of the ROW	▪ 13	▪ 13	▪ 13
Air quality	20. Number of sensitive receptors within 600 m of the ROW	▪ 13	▪ 13	▪ 13

Exhibit 5.14: Evaluation of Amable du Fond Area Realignment Alternatives

Factor Criteria	Indicators	Alternative 1	Alternative 2	Alternative 3 (Preferred)
Aggregates and mineral resources	21. Amount (ha) of mineral and mineral aggregate resources impacted / displaced	▪ 0 ha	▪ 0 ha	▪ 0 ha
Socio-Economic/ Land Use Summary		**Alternatives 2 and 3 are equally preferred as they result in least impacts to the commercial / industrial features of the study area and displace fewer homes.**		
Cultural Environment				
Built heritage and cultural landscapes	22. Number of designated / locally significant built heritage features / cultural heritage landscapes impacted	▪ 0	▪ 0	▪ 0
Archaeology	23. Amount (ha) of land with archaeological potential affected	▪ 59 ha	▪ 59 ha	▪ 60 ha
Cultural Environment Summary		**Alternatives are equally preferred.**		
Transportation				
Accommodation of long term planning objectives	24. Potential to accommodate long term planning objectives and support the efficient movement of people and goods between communities and regions	▪ High	▪ High	▪ High
Accommodation of projected traffic demand	25. Potential to address the transportation problems and opportunities	▪ High	▪ High	▪ High
Enhancement of safety	26. Potential to improve safety	▪ High	▪ High	▪ High
Traffic operations on municipal roads and intersections	27. Number of crossings of local / municipal roads	▪ 0	▪ 0	▪ 0
	28. Number of private accesses impacted	▪ 8	▪ 4	▪ 4
Design consistency with geometric standards for Ontario	29. Consistency with geometric design standards	▪ High	▪ High	▪ High
Travel time / out of way travel	30. Potential for increased travel time / out of way travel	▪ Low	▪ Low	▪ Low
Transportation Summary		**Alternatives are equally preferred.**		
Cost				
Construction cost (considering utility relocation, amount of property required, rail crossings, etc)	31. Dollars	▪ $60 million	▪ $60 million	▪ $59 million
Cost Summary		**Alternatives are equally preferred.**		
Constructability				
Existing traffic flow and operations accommodated during construction Availability of staged construction	32. Complexity of staging and traffic flow maintenance during construction	▪ High complexity of staging and traffic flow maintenance during construction due to the connection to existing Highway 17 in the east given the grade differential associated with the CP Rail Line (10+ m) and the close proximity of the tie in point to the rail crossing ▪ Some complexity at west tie-in to existing Highway 17 (particularly with north side widening alternative)	▪ High complexity of staging and traffic flow maintenance during construction due to the connection to existing Highway 17 in the east given the grade differential associated with the CP Rail Line (10+ m) and the close proximity of the tie in point to the rail crossing ▪ Some complexity at west tie-in to existing Highway 17 (particularly with north side widening alternative)	▪ Moderate complexity of staging and traffic flow maintenance during construction as traffic can be maintained on the existing highway during construction of the realigned highway segment; increased separation between the east tie-in point and the rail crossing ▪ Some complexity at west tie-in to existing Highway 17 (particularly with north side widening alternative)
Constructability Summary		**Alternative 3 is preferred as the associated construction staging and traffic maintenance is less complex relative to other alternatives.**		

Exhibit 5.14: Evaluation of Amable du Fond Area Realignment Alternatives

Factor Criteria	Indicators	Alternative 1	Alternative 2	Alternative 3 (Preferred)
Overall Summary and Recommendation		**Alternative 3 was recommended as it:** • **Results in least impacts to Socio-Economic Environment (commercial / industrial and residential properties).** • **Results in less complex construction staging and traffic maintenance during construction relative to other alternatives.** • **Is equally preferred relative to other alternatives from a Cultural Environment, Transportation, and Cost perspective.**		