



County of Renfrew and Town of Petawawa

PETAWAWA TRANSPORTATION PLANNING STUDY

Phase 1 and 2 Study Report

February 2008



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Executive Summary

The purpose of this study was to identify short term and longer term improvements required to the Petawawa transportation system to support growth at CFB Petawawa (Base) and in the community and to fulfill Phases 1 and 2 of the Class Environmental Assessment (EA) process. The study area is illustrated in **Exhibit E-1**. A Study Liaison team with representatives from the County, Town and Base was formed to direct the study.

Exhibit E-1: Study Area



The Problem

There are safety, operational and capacity problems in the Town of Petawawa, concentrated in the section of Petawawa Boulevard from the intersection of Menin and Paquette-Festubert southerly to south of the intersection of Doran-Mohns. These problems will become more severe as traffic volumes increase. Development within the Town of Petawawa and increased employment at CFB Petawawa will result in more traffic on Petawawa Boulevard.

Identified problems include:

- Collision rates on Petawawa Boulevard that are higher in the section where there are numerous entrances, driveways and side streets and visual distractions, i.e. through the downtown area from the river to south of the Doran-Mohns intersection;
- Public crossings of the Petawawa River are limited to two bridges, Petawawa Boulevard and Highway 17, which limits network flexibility and encourages out-of-way travel during congested periods;
- Rail line adjacent to Petawawa Boulevard disrupts traffic movements and limits the space available for intersection improvements;

- Short distance between the intersections of Victoria-Portage and Doran-Mohns reduces the efficiency of the signal operations;
- The intersection of Petawawa Boulevard and Victoria-Portage is operating at capacity during peak periods at the present time;
- In the future, the intersections of Petawawa Boulevard and Victoria-Portage and Menin Road and Paquette-Festubert will operate over capacity in the southbound and westbound directions during the p.m. peak period; and
- Winter maintenance operations become increasingly difficult as traffic volumes increase.

Preferred Solution

Based on the trade-off evaluation, which was finalized with input from the public and agencies, and with consideration for the sensitivity testing undertaken, the preferred solution is to construct a new crossing of the Petawawa River. The route in the vicinity of Laurentian Drive addresses the needs of existing traffic patterns and land use as well as the development anticipated in the 2004 Petawawa Official Plan. This route should be examined in more detail in Phase 3 of the Class Ea process.

During future planning for the area south of the Petawawa River and west of the existing development, the Town and County should protect for a new arterial and river crossing connecting to the Montgomery Gate area of CFB Petawawa. This may become the preferred solution should additional environmental concerns that cannot be reasonably mitigated be identified during Phase 3 of the Class EA process.

Principal Environmental Issues

Issues reviewed during Phase 2 of the process are generally mitigatable and include:

- Potential for natural environmental impacts along the Petawawa River including Species at Risk;
- Increased vehicle volumes along Ypres Boulevard;
- Impacts to access and parking for businesses along Petawawa Boulevard;
- Need for additional stormwater management with increased pavement area;
- Potential noise and visual intrusion impacts;
- Potential impacts on recreational land uses;
- Potential requirement for additional right-of-way from commercial and residential properties.

With provision of a new route, there are opportunities to improve safety and traffic operations and to provide an alternative route during emergencies. Removal of existing houses immediately adjacent to Ypres Boulevard would reduce the social impacts of having increased traffic volumes along that street. When schools along Ypres are replaced in the future, alternative locations should be investigated in order to reduce vehicle-pedestrian conflicts.

During Phase 3 of the Class EA process, a detailed investigation of the environment will be required.

Consultation Program

The public consultation program for this study consisted of newspaper and web site notices, discussions with agencies and stakeholders, a Public Information Centre (PIC), presentation to Renfrew County Committee and presentation to Town Council and representatives of CFB Petawawa.

This report was made available for public review for a period of 30 days.

1.0 INTRODUCTION

The County of Renfrew, in association with the Town of Petawawa and the Canadian Forces Base (CFB) Petawawa, initiated a Transportation Planning Study in January 2007 to assess and analyze existing and future traffic conditions and to make recommendations for improvements within a designated study area. This study area is bounded by the Ottawa River to the east and by Highway 17 to the west. It extends from Airport Road in the south to CFB Petawawa in the north as illustrated in **Exhibit 1**. The Petawawa River flows across the study area from west to east and divides the Town from CFB Petawawa on the north side of the river. CFB Petawawa includes residential, commercial, and institutional (schools) land uses as well as Ministry of Defence operations. The study area also includes federal land south of the river that contains various types of housing and related land uses for CFB Petawawa military personnel.

Exhibit 1: Study Area



1.1 Purpose of the Study

The purpose of the study was to identify short term and longer term improvements to the Petawawa transportation system required to support growth at CFB Petawawa and in the community and to fulfill Phases 1 and 2 of the Class environmental assessment (EA) process.

1.2 Class Environmental Assessment Process

Class EA studies for municipal infrastructure projects are undertaken in accordance with the *Municipal Class Environmental Assessment*, June 2000, which is an approved process under the Ontario *Environmental Assessment Act*. This document was amended in late 2007. The amendments do not affect the process and work undertaken for this study.

Class EA studies are undertaken for projects with similar types of problems and a common set of alternatives to the undertaking and alternatives designs. In addition, the range of environmental impacts and approaches to mitigation are similar in nature for Class EA projects. The Class EA process is illustrated in **Exhibit 2**, reproduced from Exhibit A.2 of the Municipal Class EA Document, 2000.

This study followed Phases 1 and 2 of the Municipal Class EA process. The work undertaken is outlined below:

Phase 1: Problem or Opportunity

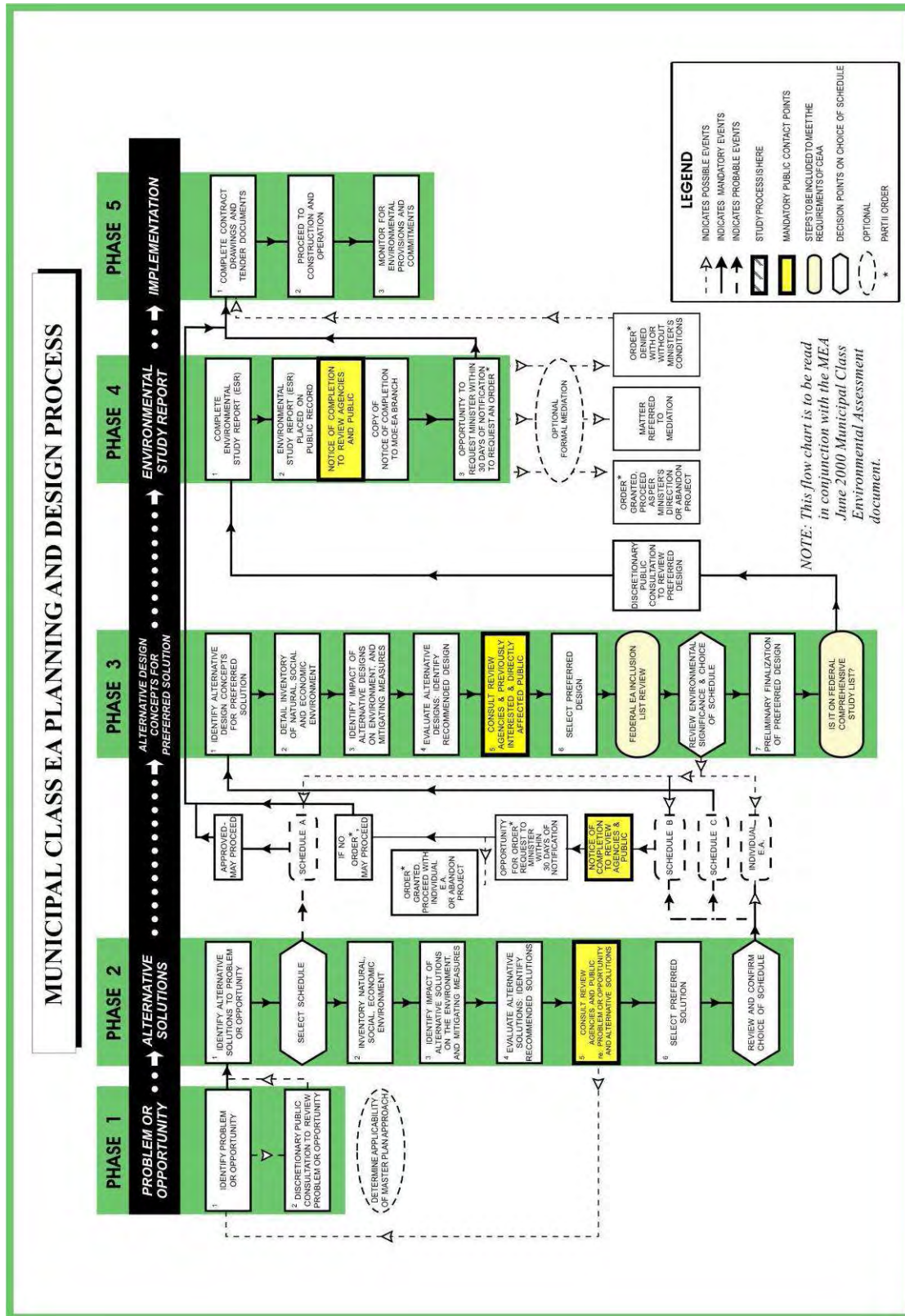
- Notify public of study commencement;
- Undertake traffic data collection and analysis;
- Identify transportation problems and opportunities.

Phase 2: Alternative Solutions (Alternatives to the Undertaking)

- Identify alternative solutions to transportation problems and opportunities;
- Develop and refine evaluation criteria;
- Undertake environmental inventory (secondary source information used for this study);
- Generate, assess and evaluate Alternative Solutions;
- Present Alternative Solutions and the Preferred at the Open House;
- Refine the Alternative Solutions, present results to County and Town Councils and Base representatives;
- Confirm Preferred Solution;
- Document study.

Phases 3 and 4 of the Class EA process (Alternative Design Concepts for Preferred Solution and Environmental Study Report) will follow completion of Phase 1 and 2 as determined by the County and Town. Phases 3 and 4 are required for alternative solutions involving construction of a new route or widening of Petawawa Boulevard.

Exhibit 2: Municipal Class EA Flow Chart



1.3 Background

Improvements to Petawawa Boulevard were studied in the mid 1990's to address growing traffic. The recommended plan to widen Petawawa Boulevard to five lanes was not implemented. Because of a lapse in time of over 10 years since the previous work, the Class EA process (as amended 2007) requires that "the proponent shall review the planning and design process and the current environmental setting" (page A-73 Class EA). The County and Town recognized the need to re-assess the problems and the alternatives using current information and traffic data and to consider the changes in the environment since the last study was completed.

The Official Plan for the amalgamated Town of Petawawa was approved in 2004. The population at that time was 15,000, including 6,000 within federal lands. Planned growth at the Base is detailed in **Exhibit 3**. Note that the Town population cannot be directly compared to the population figures for the Base because of the different methods of including people in the total population count. The Base population includes all people associated with the Base, whether they are living or working on the Base. The Town population figures only include residents.

Exhibit 3: Expected Growth at CFB Petawawa

Base Population	2006	15 year growth	2021	% Growth
Military	5100	2000	7100	39.2%
Civilian Employees	950	250	1200	26.3%
Family Members	7000	500	7500	7.1%
TOTAL	13050	2750	15800	21.1%

Exhibit 3 shows that growth in the number of military personnel and their families is expected. Traffic patterns in the Town of Petawawa, as in all communities, are influenced by where people live and work. Currently CFB Petawawa provides rental accommodation for personnel on federally-owned lands both north and south of the river; however, these rental units are becoming less attractive as military families choose to purchase their own homes in Petawawa. As a result of this growing trend to home ownership, any increase in accommodation on federal lands is expected to be minor.

The growing popularity of off-Base accommodation is one factor in the increase of traffic on Petawawa Boulevard as all off-Base accommodation is south of the river, on the opposite side from the Base. This means that a greater proportion of people working at the Base will live south of the river and travel across the bridge to work, increasing the existing congestion on Petawawa Boulevard where queuing frequently occurs during peak periods.

AECL, located to the north of Petawawa is another large employer for Petawawa residents. In the last two years, the workforce at AECL has increased by about 600 employees to a total of 2450 employees and this number is expected to reach 3000 by the year 2010. Expansion activity (construction) at AECL is expected to be considerable starting in 2008. As noted some AECL employees live in Petawawa and therefore commute across the Petawawa River daily.

There are several residential and commercial developments currently in the planning stages or under construction in Petawawa. At some future time, new areas for development will need to be identified. The ability to service lands with water and sanitary sewers is a controlling factor in the development of Petawawa.

There are two public road bridges over the Petawawa River, on Petawawa Boulevard and on Highway 17. When a road closure affects one of these bridges, the impact on traffic and the road network is significant.

2.0 CONSULTATION

The public consultation program for this study consisted of newspaper and web site notices, discussions with stakeholders, a Public Information Centre (PIC) and presentations to Council and the Base Commander. A Study Liaison team with representatives from the County, Town and Base was formed to direct the study.

2.1 Meetings

Meetings were held with the Study Liaison team at project milestones including at study commencement, for presentation of the traffic study data, to finalize the evaluation of alternatives in advance of the Public Information Centre and to confirm the study findings for the Council presentations. Participants included Steven Boland and Charles Cheeseman from the County of Renfrew, Mitch Stillman from the Town of Petawawa and Peter Fernandez and Wayne Quade from CFB Petawawa.

2.2 Notices

One of the key objectives of the EA process is to provide the public with opportunities for meaningful input. To ensure this objective was met, public notification of the PIC was undertaken. Notices were placed in the following local newspapers at study commencement and in advance of the PIC:

- Petawawa Post (study commencement February 2007, PIC June 19, 2007);
- Daily News (study commencement February 2007, PIC June 15, 2007).

Notices were also placed on the County of Renfrew web site. A copy of the notices is provided in **Appendix A**.

2.3 Public Information Centre

The PIC was held from 4:00 p.m. to 8:00 p.m. on Tuesday, June 26, 2007 at the Petawawa Civic Centre, Main Hall. The purpose of the PIC was to present and obtain input on the study. The following displays were presented:

- Welcome/Introduction
- Purpose of PIC
- Class EA Process
- Municipal Class EA Process Flow Chart
- Study Area Maps
- Background
- Schedule "A" Land Use – Official Plan
- Project Need
- Collision Map
- List of Alternatives to the Undertaking
- Screening of Alternatives to the Undertaking
- Evaluation Criteria
- Traffic Study
- Balanced Counts
- Maps of Alternatives to the Undertaking
- Assessment and Evaluation of Alternatives
- Technically Preferred Alternative
- Next Steps
- Thank you for Attending

The PIC displays are provided in **Appendix A**. The displays were made available to the public on the County of Renfrew website following the PIC.

County of Renfrew and consultant representatives were available at the PIC to respond to inquiries. The members of the project team in attendance included:

- Steve Boland: Manager of Maintenance, County of Renfrew
- Valerie McGirr: Consultant Project Manager, Totten Sims Hubicki Associates
- Vanessa Skelton: Consultant Project Engineer, Totten Sims Hubicki Associates

A total of seven people signed the registration sheet and one comment sheet was received at the PIC. One additional comment was received by e-mail. Copies of the comment sheet and the e-mail comment, excluding personal information, are provided in **Appendix A**. Comments are summarized in **Exhibit 4**.

Exhibit 4: Summary of Written Comments

Description of Comments	Number of Respondents	Comment Sheet
Supports road corridor west of Town	1	1
Concerns with regard to increase in use of Murphy Rd. and Paquette Rd.	1	1
Supports Laurentian Drive road corridor	1	2

Four of the people who attended the PIC were employees or elected officials of the Town who were interested in the progress of the study including the costs for the alternatives. A number of attendees expressed support for a bridge connecting Laurentian Drive and Ypres Boulevard.

2.4 Changes Made as a Result of Consultation

Following the PIC, the study team reviewed the comments made, confirming information with responsible authorities where possible. The evaluation was revised and provided to the Study Liaison Team for review. Their suggestions for weighting of the various sub-factors were also solicited and incorporated into the analysis. The original and revised evaluations are provided later in this report.

2.5 County Web Site

Information concerning the Petawawa Transportation Planning Study was placed on the main County of Renfrew web site at the following address:

<http://www.countyofrenfrew.on.ca/publicworks/administration.htm>

2.6 Committees/Councils

A presentation was made to the County of Renfrew Works Committee on October 5, 2007 to describe the study, the findings, the results of the consultation and the Preferred Solution and to obtain feedback. A similar presentation was made on December 10, 2007 to the Town of Petawawa Council at a special meeting, which included representatives from CFB Petawawa. Members of the media were also in attendance. Both presentations included a question and answer session. The Councils and the Base representatives expressed their support for the study and the importance of continuing with this work.

3.0 PROJECT NEED

The need for improvements to the transportation system was determined by reviewing existing data and relevant reports, collecting additional traffic data, assessing future growth and analyzing existing and future traffic conditions.

The transportation analysis focused on key intersections as observed during daily operations. Data was collected for the p.m. peak period through the downtown area and hence the analysis reports results for this period. Requirements may be similar for the a.m. peak period. The noon period is also a peak travel period in Petawawa as many employees at CFB Petawawa travel to and from home for lunch.

3.1 Explanation of Level of Service

The operation of signalized intersections is assessed using level of service (LOS), which is based on the average delay experienced by a vehicle travelling through the signalized intersection. Each movement is assessed individually (i.e. through movements in each direction and turning movements in each direction) and then the intersection as a whole is categorized. The levels of service are applied as follows:

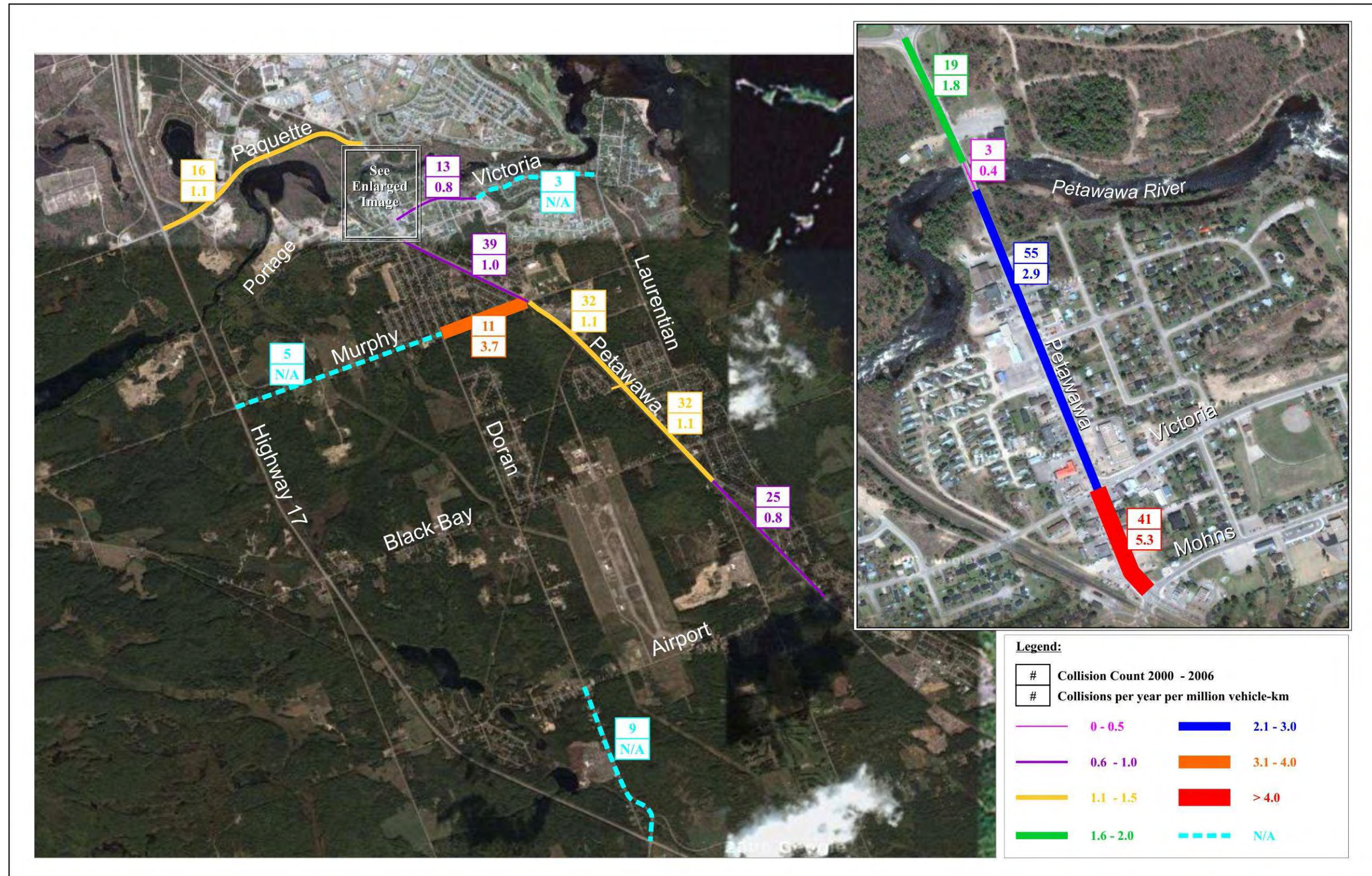
- LOS A: delay less than 10 seconds for the average vehicle travelling through the signalized intersection
- LOS B: delay from 10 seconds to 20 seconds
- LOS C: delay from 20 seconds to 35 seconds
- LOS D: delay from 35 seconds to 55 seconds
- LOS E: delay from 55 seconds to 80 seconds
- LOS F: delay over 80 seconds

3.2 Safety

The County of Renfrew provided collision data from 2000 to 2006 for the County roads in the study area. These were assessed with regard to their geographical distribution, type and severity. Where traffic volume data was available, a collision rate was calculated.

The calculated collision rates and the number of collisions for the major roads within the study area are illustrated in **Exhibit 5**. The section of Petawawa Boulevard from the river southerly to the vicinity of the Portage-Victoria and Doran-Mohns intersections had higher collision rates than other sections of Petawawa Boulevard or other roads. The possible reasons for the higher collision rates include the multiple entrances, driveways and side streets along Petawawa Boulevard. Each access point has a number of potential vehicle-vehicle conflict points as well as vehicle-pedestrian/cyclist conflict points associated with it. The proximity and frequency of these accesses result in numerous conflict points along Petawawa Boulevard. The volume of traffic, the concentration of traffic during peak travel periods and the complexity of the roadside environment with multiple distractions such as signs, likely also contributes to the higher collision rate.

Exhibit 5: Collision Map



The Ontario Provincial Police and the CFB Petawawa Military Police were contacted with regard to their experience with collisions in the area. The OPP concerns were focused on Highway 17. The Military Police noted that when they have concerns Base staff has acted to resolve any issues. They had no current concerns.

During the on-site survey of the area, cars were observed stopping on Petawawa Boulevard to join the drive-through queue for Tim Horton's. Stopped cars on a roadway, especially at a remote distance from an intersection, are unexpected and may result in an increase in rear-end collisions.

As traffic increases in the future, the number of conflicts will increase as will the potential for increased collisions. Driver frustration as the level of service deteriorates along the roadway and at intersections may result in more risk-taking in vehicle manoeuvres.

3.3 Operations

Operations were assessed through observation of traffic in the study area as well as through consultation. Petawawa Boulevard is the only alternative crossing of the Petawawa River to the bridge on Highway 17. It is used as a detour route during highway closures that result in gridlock and extensive delays for both local and through traffic. While an infrequent event, when highway closures occur the impacts are widespread and extensive. Highway 17 at Murphy Road was closed in the spring of 2007 for several hours during the peak period due to a fatal collision.

Petawawa Boulevard is adjacent to the rail line through Petawawa from the Doran-Mohns intersection southerly. Since crossings of the railway are all at-grade, train movements disrupt the traffic flow at these locations. Train movements frequently occur during peak periods, causing delays and queuing at a number of signalized intersections, such as Doran-Mohns and Petawawa Boulevard. The location of the track adjacent to Petawawa Boulevard controls the configuration of intersections and limits the County and Town's ability to make intersection improvements.

Additional operational problems are created by the short distance between the intersections of Portage-Victoria and Doran-Mohns and by the closely-spaced commercial entrances located along this section of Petawawa Boulevard. Conflicts arise between turning vehicles and those continuing straight along Petawawa Boulevard. The complexity of the roadside environment also makes turning movements difficult. Turning vehicles experience delays and disrupt the flow of traffic.

Winter maintenance operations are more difficult during peak traffic periods when snow removal must compete with commuters for road space. In Petawawa there are four "peak" periods, in the morning, at lunch and in the afternoon as people travel to and from the Base. The challenge with snow removal and winter maintenance will increase as traffic grows.

3.4 Capacity

3.4.1 Existing Traffic

In order to assess the roadway capacity and the level of service provided during peak periods, turning movement data was collected during the p.m. peak period on February 7, 2007 at the following intersections:

- Menin and Montgomery (4-way stop control intersection on the Base);
- Menin and Paquette-Festubert (signal control at entrance to the Base);

- Petawawa Boulevard & Bert (1-way stop control, T-intersection);
- Petawawa Boulevard and Portage-Victoria (signal control);
- Petawawa Boulevard and Doran-Mohns (signal control);
- Petawawa Boulevard and Maple Street (1-way stop control, T-intersection).

In addition, turning movements were counted at the intersection of Petawawa Boulevard and Portage-Victoria during the a.m. and noon peak periods. Traffic count data is provided in **Appendix B**.

Traffic volumes in Petawawa were reported to be relatively consistent through the year, with the exception of the July vacation period; therefore, the February counts were used for the analysis without a seasonal adjustment.

Following the field data collection, traffic volumes were balanced to account for any discrepancies in the counts between intersections. These balanced traffic counts were used to assess the level of service at the intersections along Petawawa Boulevard under existing traffic conditions and are provided in **Exhibit 6**.

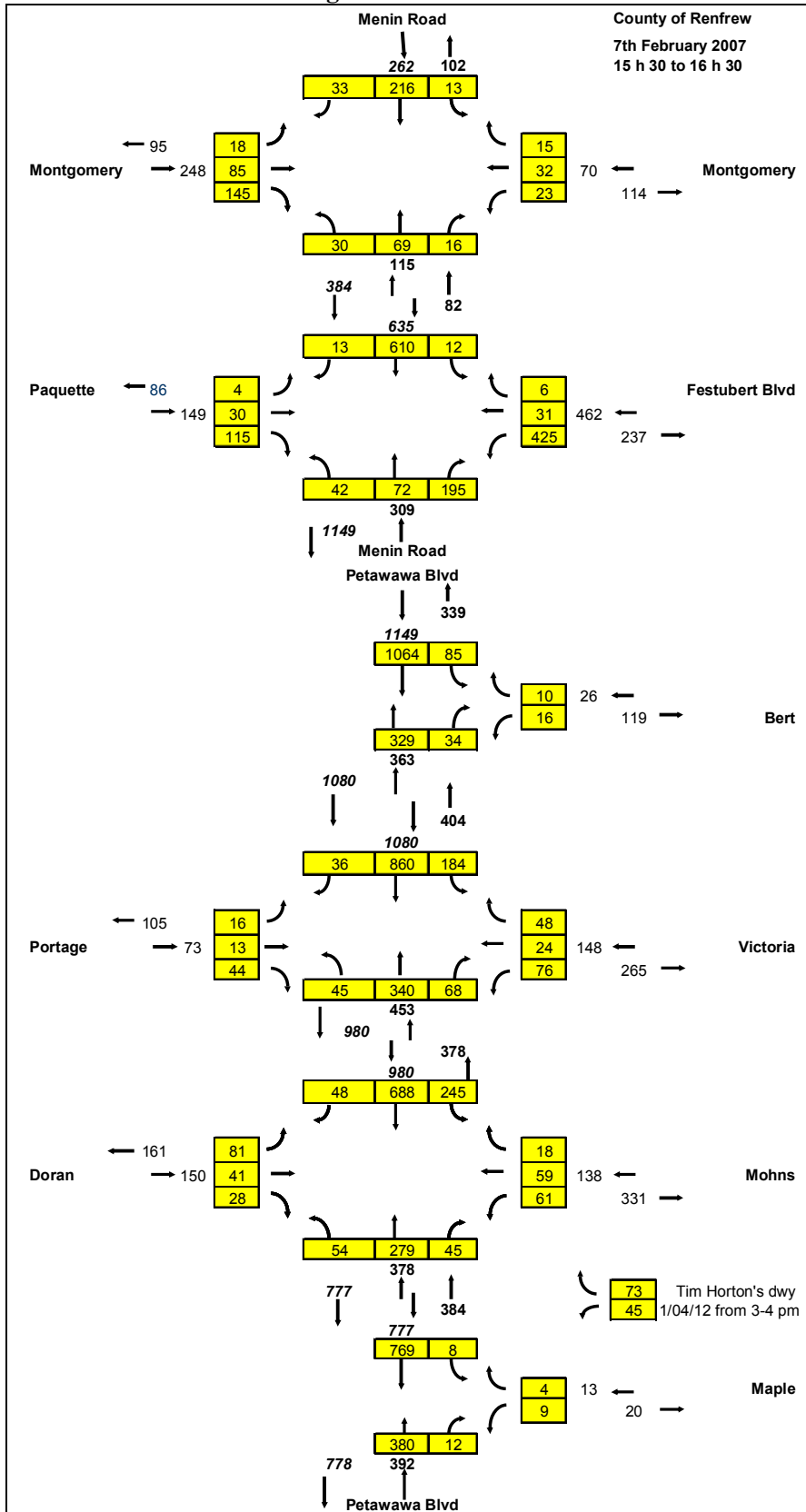
Existing traffic volumes along Petawawa Boulevard during peak periods cause congestion and queuing, especially at the intersection of Portage-Victoria and at the intersection of Menin and Festubert-Paquette. These two intersections served as indicators for the level of congestion at the critical section of Petawawa Boulevard between Paquette-Festubert and Portage-Victoria.

Traffic counts available from the County and from independent traffic impact studies were also considered in the analysis.

The road network analysed contains three actuated traffic signals, which give priority for green time to vehicles travelling in the north-south direction. The east-west movements and left turning movements are actuated, which means that the green time for these directions is only provided when a vehicle is present. In addition, the green phases of the signals at Portage/Victoria and at Mohns/Doran are coordinated to facilitate the movement of vehicles through these two intersections. The coordination changes during the day to facilitate the peak direction of flow.

Level of service, based on the delay experienced by vehicles at an intersection, is indicated in **Exhibit 7** under Section 3.4.2.

Exhibit 6: Balanced Existing Traffic Volumes on Petawawa Boulevard



3.4.2 Future Traffic

Traffic growth in the Town of Petawawa is estimated at 15% over the next 15 years due to growth at CFB Petawawa and AECL as well as related service industries. Significant growth may happen more quickly if the Base achieves its target for the recruitment of personnel over the next two years.

In the Town of Petawawa there is ongoing residential development between Petawawa Boulevard and Laurentian Drive (Limestone Trail) and along Murphy Road (The Forest) and commercial development (Moncion) along Petawawa Boulevard. Other residential and commercial developments are Highland Park, Renfrew Street and downtown redevelopment. The traffic generated by the new residential and commercial developments is generally focused toward Petawawa Boulevard. Some new traffic may use Laurentian Drive and Doran Road to access downtown.

The traffic operations along Petawawa Boulevard were analysed using the traffic simulation software Synchro6 with SimTraffic. The analysis included the three signalised intersections and one unsignalised intersection between Paquette-Festubert and Doran-Mohns. Two scenarios were analyzed: an existing traffic scenario and a future scenario with a 15% growth in traffic volumes. The levels of service (LOS) for existing and future traffic at the two critical intersections are provided in **Exhibit 7**. The number of seconds of delay is indicated in brackets for movements operating at LOS F (i.e. with delay of over 80 seconds per vehicle).

Exhibit 7: Intersection Level of Service

	Paquette/ Menin				Petawawa/ Portage			
	NB	SB	EB	WB	NB	SB	EB	WB
Existing traffic	B	D	C	F (140s)	B	E	D	D
Growth Scenario	B	F (81s)	D	F (600s)	B	F (120s)	D	E

The analysis indicates that the delay experienced by drivers at the main intersection to CFB Petawawa will continue to increase.

3.5 Summary of Project Need

There are transportation safety, operational and capacity problems in the Town of Petawawa, concentrated in the section of Petawawa Boulevard from the intersection of Menin and Paquette-Festubert southerly to south of the intersection of Petawawa Boulevard and Doran-Mohns. Along Petawawa Boulevard, many of the problems result from the historic development pattern and the concentration of traffic between the Town and the Base. Development within the Town of Petawawa and increased employment at CFB Petawawa will be the catalyst for traffic increases through the downtown on Petawawa Boulevard. As traffic volumes increase, the associated problems will become more severe.

Problems include:

- Collision rates on Petawawa Boulevard are higher in the section where there are numerous entrances, driveways and side streets and visual distractions, i.e. through the downtown area from the river to south of the Doran-Mohns intersection;
- Crossings of the Petawawa River are limited to two public bridges, Petawawa Boulevard and Highway 17, which limits network flexibility and encourages out-of-way travel during congested periods;
- Rail line adjacent to Petawawa Boulevard disrupts traffic movements and limits the space available for intersection improvements;

- Short distance between the intersections of Victoria-Portage and Doran-Mohns reduces the efficiency of the signal operations;
- The intersection of Petawawa Boulevard and Victoria-Portage is operating at capacity during peak periods at the present time;
- In the future, the intersections of Petawawa Boulevard and Victoria-Portage and Menin Road and Paquette-Festubert will operate over capacity in the southbound and westbound directions during the p.m. peak period;
- Winter maintenance operations become increasingly difficult as traffic volumes increase.

4.0 EXISTING CONDITIONS

Existing environmental conditions in the study area were reviewed using secondary source data to provide a basis for the generation, assessment and evaluation of alternatives. The County interactive mapping tool was a valuable source of environmental information (<http://www.renfrewcountygeosmart.ca>).

4.1 Natural Environment

The regional presence of flora and fauna Species at Risk were investigated using the Species at Risk tool on the Environment Canada web site. **Appendix C** contains the results of a web site search. Species at Risk listed as potentially in the area include the Eastern Grey Wolf, Least Bittern, Peregrine Falcon, Blanding's Turtle, Milksnake, Northern Map Turtle and Monarch Butterfly. **The Environment Canada search tool is not intended to identify the local presence of any Species at Risk or their habitat. This must be assessed through detailed field work.**

The Petawawa River is the most prominent natural environment feature within the study limits. The river is 187 km in length and drains an area of 4,200 km² (Atlas of Canada). There are some wetland areas along tributaries entering the river but no wetlands have been identified along the river itself as illustrated in **Exhibit 8**. A weir has been constructed near the Petawawa municipal building to provide an area for swimming. The three maps in Exhibit 8, taken from the County web site, illustrate the watercourses and wetlands in the area of the Petawawa River where new routes are being considered.

Exhibit 8: Watercourses and Wetlands

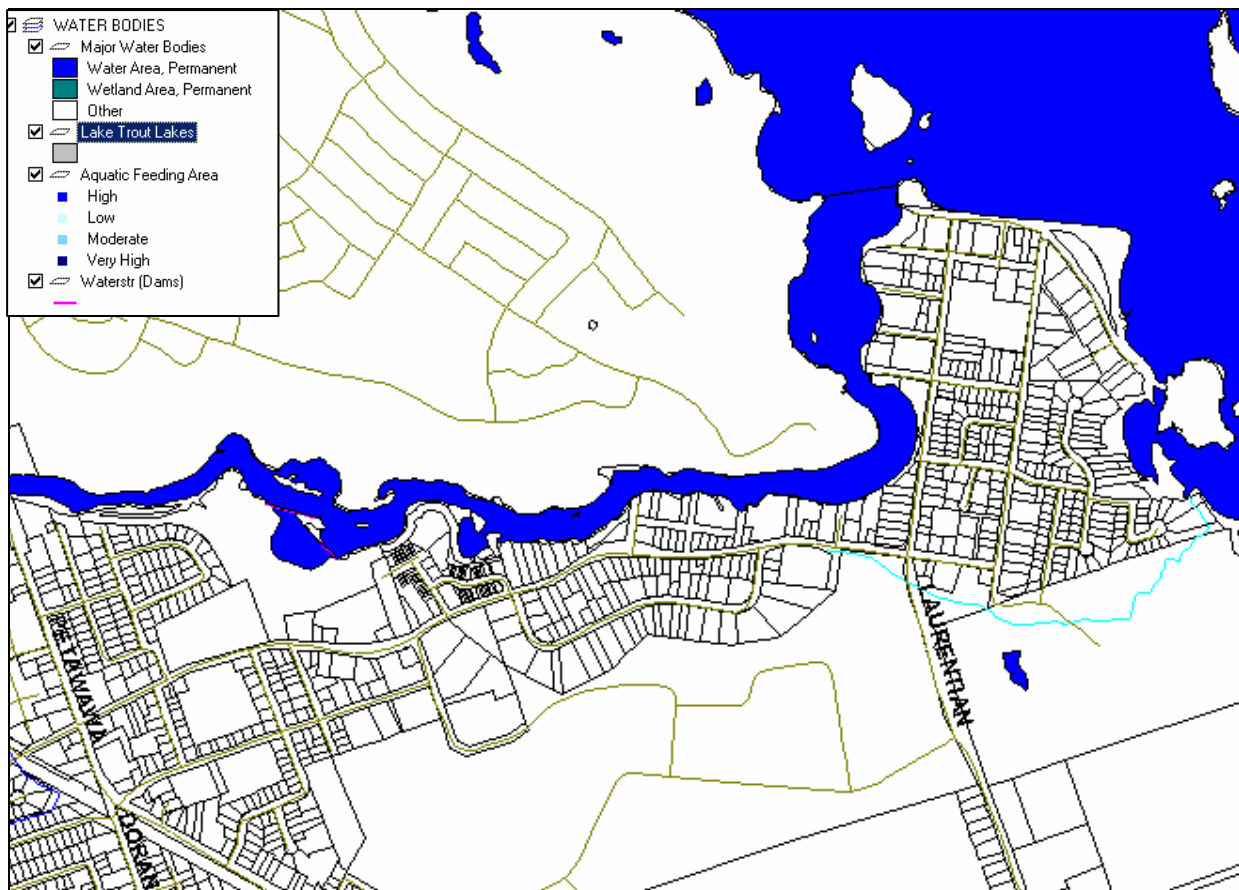
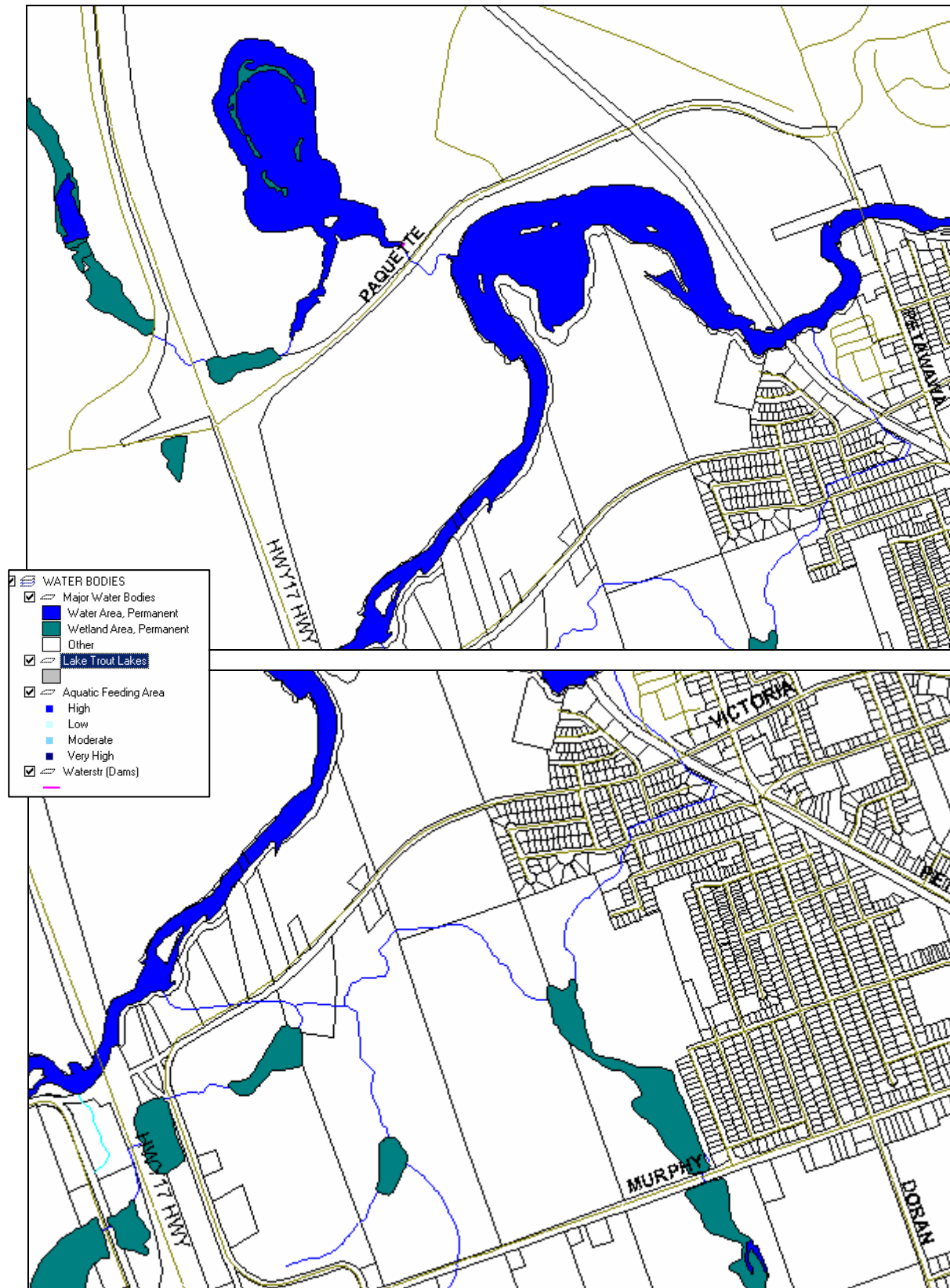


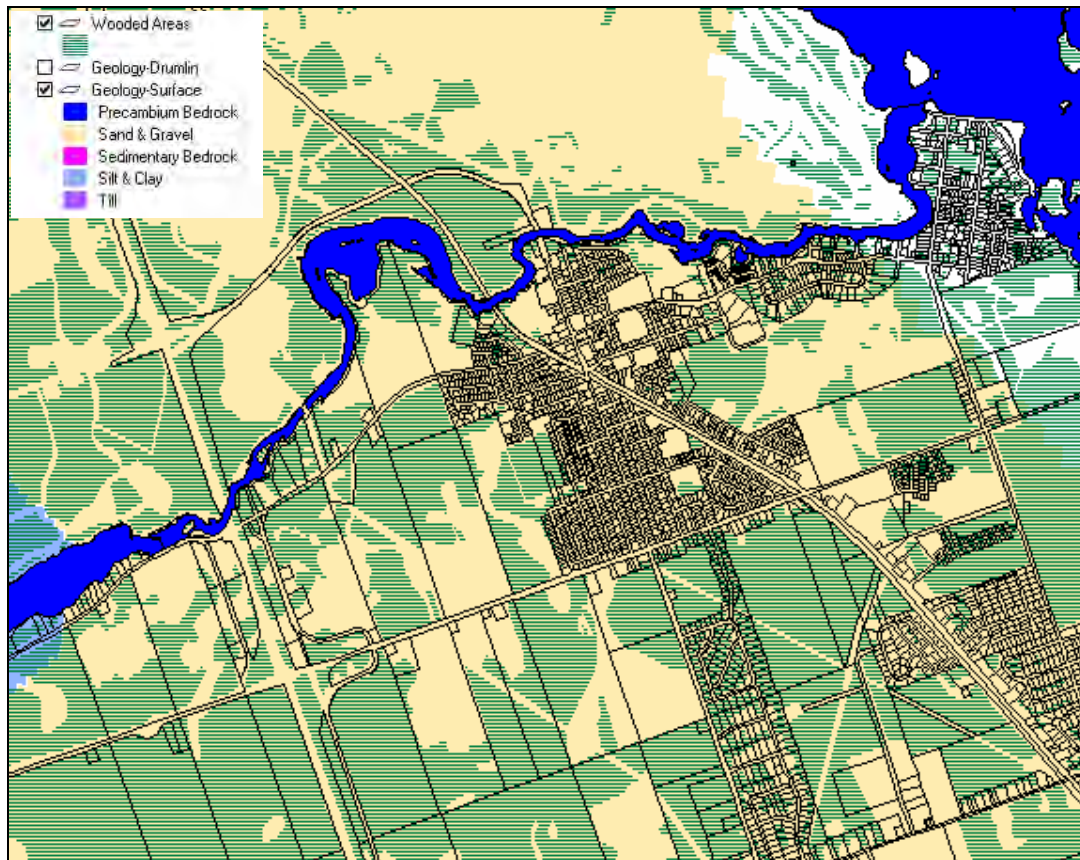
Exhibit 8: Watercourses and Wetlands (cont'd)



A large portion of undeveloped land is located between Portage Road and Murphy Road and includes some forest, wetlands and land in agricultural use. These natural areas offer habitat for wildlife. Wooded areas are indicated on **Exhibit 9** below.

The landscape within the developed area of the Town and Base has been largely transformed from a natural state. Current land use is mainly residential and commercial.

Exhibit 9: Surficial Geology and Wooded Areas



The *Soils Survey of Renfrew County, 1964*, indicates that the surficial material in the study area map is fine sandy loam, except for the area from the Petawawa River south to about Portage-Victoria Street, which is gravelly sandy loam. Both of these soils provide good drainage. Along the shores of the Ottawa River, there are areas of clay and muck that are poorly draining.

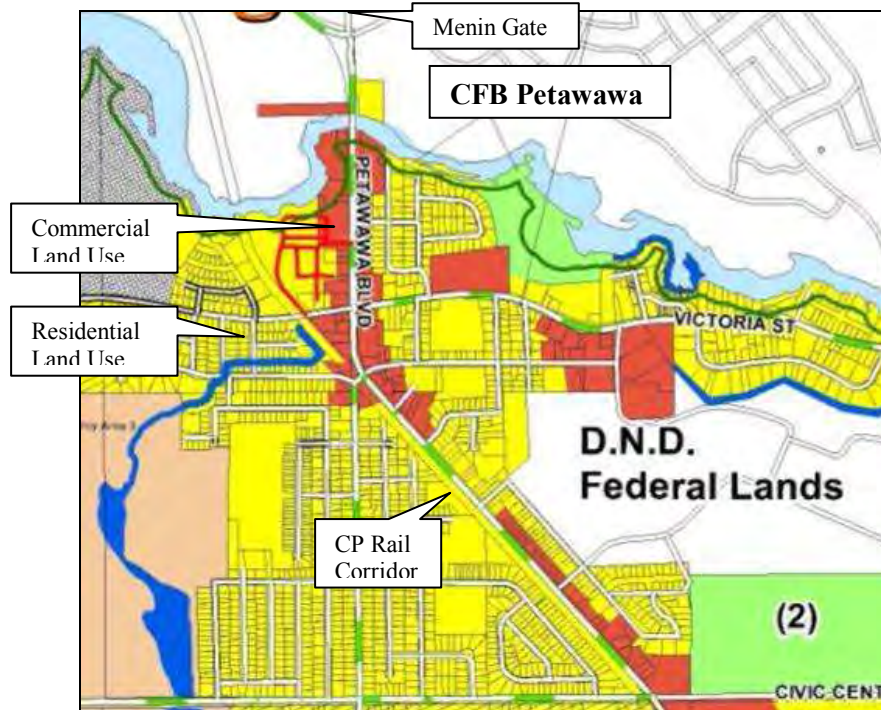
4.2 Socio-Economic Environment

4.2.1 Community

The study area includes CFB Petawawa, which is located on the north side of the Petawawa River. On the south side of the river, sits additional federal lands with accommodation and services for Base personnel as well as the Town of Petawawa, which was formed by the amalgamation of the Village of Petawawa and the Township of Petawawa in 1997.

The main entrance to the Base is from the Menin gate, which is an extension of Petawawa Boulevard, the main arterial road within the Town. Between the Petawawa River and the intersection of Mohns Avenue/Doran Street is “Downtown Petawawa”, a mainly commercial area with a few residential properties. South of Mohns/Doran there is a mix of residences and commercial properties. The CP Rail Line parallels the south side of Petawawa Boulevard from Doran Street southerly. **Exhibit 10** illustrates the relationship of some of these land uses (map from Schedule A of the Petawawa Official Plan, 2004).

Exhibit 10: Community Features of Downtown Petawawa and Vicinity



Along Petawawa Boulevard through downtown Petawawa there are a number of stand-alone buildings and small strip malls offering a wide variety of businesses including fast food establishments, grocery stores, retail stores, financial and insurance institutions, health and personal care businesses, car sales and service, gas stations, and motels. These businesses serve people from Petawawa and the surrounding area.



The majority of businesses along Petawawa Boulevard have entrances defined by depressed curbs. Some businesses have parking spaces that are accessed directly from the roadway while other businesses have controlled parking access. For pedestrians, a concrete sidewalk is provided along the east side of Petawawa Boulevard from CFB Petawawa to Murphy Road. Along the west side, there is no sidewalk on the Petawawa River bridge and northerly to the Base. Pavement behind the curb provides a defacto sidewalk on the west side from downtown to Doran Road.

4.2.2 Noise

The County of Renfrew follows the Ministry of the Environment (MOE) protocol for investigating and mitigating noise impacts along County roadways. Noise sensitive areas include residential outdoor living spaces, communal living areas of apartment buildings, hospitals and nursing homes. A background urban sound level is generally in the 50 to 55 dBA range while a background rural sound level is in the 40 to 45 dBA range. People perceive a difference of 10 dBA as a doubling (or conversely a halving) of the noise level that they hear.

4.2.3 Air Quality

The MOE and Environment Canada have developed guidelines for air quality for contaminants that are typically associated with vehicular traffic. Ambient air quality conditions are generally established using data from MOE monitoring stations. A monitoring station is operating in Petawawa, recording data once every hour, except during the winter. Records for 2007 indicate that air quality is frequently good to very good; however on some days air quality is reduced to moderate to poor due to the concentration of ozone or fine particulate matter (data found at http://www.airqualityontario.com/reports/aqi_site_map.cfm - click on Petawawa).

Ozone is generally a regional air quality issue with contaminants originating from long distances away. Fine particulate matter may be more associated with roadway traffic. The air quality web site notes that impacts from vehicle contaminants decrease significantly with distance from the roadway. Impacts also depend on traffic volume; traffic congestion (i.e. free flowing or congested); presence of trees to filter the air and predominant wind directions.

4.2.4 Recreation

There are a wide range of recreational activities for residents and visitors to Petawawa including:

- Arenas and community centres
- Beaches
- Camping
- CFB Petawawa Military Museum
- Cross-Country and Downhill Skiing
- Golfing
- Snowmobiling
- Kayaking
- Marinas
- Millennium Trail and Centennial Park
- Petawawa National Forestry Institute
- Petawawa Public Library
- Petawawa Terrace Provincial Parks
- Ottawa River Waterway

In the study area, immediately east of Petawawa Boulevard, the Millenium Trail is a multi-use pathway that runs along the south side of the Petawawa River. It offers recreational uses for walkers, joggers, in-line skaters, cyclists, cross-country skiers, and snowshoe enthusiasts. A parking lot is located along Petawawa Boulevard south of the bridge for trail users.

An OFSC (Ontario Federation of Snowmobile Clubs) snowmobile trail is maintained adjacent to the railway tracks in Petawawa. This trail is designated as a trunk trail since it is the main north-south snowmobile trail in the region. There is a bridge over the Petawawa River adjacent to the rail bridge that serves as a continuation of the snowmobile trail in the winter and is also used by pedestrians and cyclists.

A swimming area, Centennial Park waterfront, is located along the Petawawa River behind the municipal building. Other swimming areas are located on the Ottawa River at Petawawa Point. A golf course is located on the north side of the Petawawa River at the Ottawa River on the Base. The Petawawa River is also a route for canoes and kayaks. There is a ski hill down the escarpment overlooking the Ottawa River.

4.2.5 Landscaping

Residential and commercial properties contain vegetation and planted areas where space permits. Hedges, trees, fences and gardens are used to improve the aesthetics of a property and to reduce visual intrusion from the adjacent land uses, especially at residential properties.

4.2.6 Future Development

The Official Plan of the Town of Petawawa was approved by the Ontario Municipal Board in July 2004. Schedule 'A' illustrated on **Exhibit 11** identifies the various land uses within the study limits. Future residential development is intended to be on full municipal services (water and sewer).

4.3 Cultural Environment

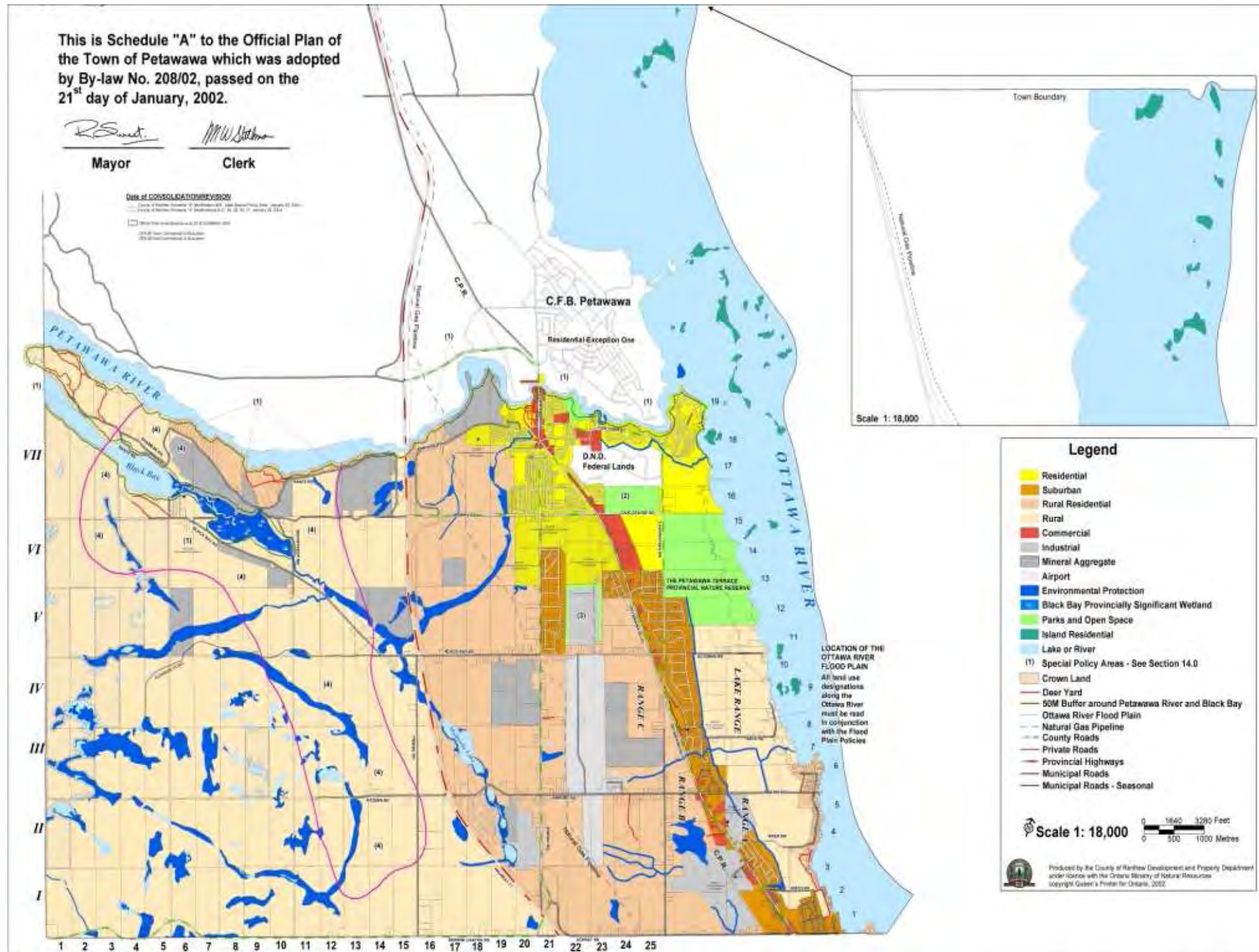
There is generally a potential for the discovery of archaeological resources within 300 m of a permanent watercourse as these were locations popular with early inhabitants. During Phase 3 of the Class EA process, it will be necessary to conduct a Stage 1 and 2 Archaeological Assessment to obtain clearance from the Ministry of Culture.

There are presently no known built heritage resources (houses, bridges, industrial buildings, barns) within the study area.

4.4 Land Use and Property

Residential (yellow) and commercial (red) land uses including development areas are depicted in **Exhibit 11**.

Exhibit 11: Town of Petawawa Official Plan - Schedule 'A'



5.0 ALTERNATIVE SOLUTIONS

Alternatives to the Undertaking are functionally different ways to address a problem or opportunity. Based on the safety, operational and capacity problems identified for the study area, the alternatives to the undertaking listed in **Exhibit 12** were examined.

Exhibit 12: Alternatives to the Undertaking

Alternative	Description
Do Nothing	No physical and/or operational modifications to Petawawa Boulevard or related intersections. The safety, operational and level of service concerns would worsen over time.
Transportation Demand Management (TDM)	TDM includes measures to reduce the number of vehicles on the roadway such as: <ol style="list-style-type: none"> 1. <i>Flexible hours</i>: Introduce flexible hours at main employers. 2. <i>New services</i>: Build new services on the Base. 3. <i>Other modes</i>: Introduce a transit program between the south side of the river and the Base. Encourage walking and cycling.
Transportation System Management (TSM)	TSM includes measures such as minor physical and/or operational modifications to improve road capacity on the existing network such as additional auxiliary lanes, adjustment of signal timing or signal timing coordination.
New Route	New routes include new crossings of the Petawawa River with or without new arterial roads. Two alternative new routes were identified: <ol style="list-style-type: none"> 1. <i>West bridge</i>: Construct a new bridge to the west for the downtown. 2. <i>Laurentian bridge</i>: Construct a new bridge connecting to Laurentian Drive (either a crossing at Tall Pines Road or at Alfred Street to Ypres Boulevard).
Widening of an existing route	Widen Petawawa Boulevard to a maximum of 5 lanes with two through lanes in each direction and a centre left turning lane where appropriate.

5.1 Generation of Alternative Solutions

An initial screening was completed to assess the long list of alternatives to the undertaking with regard to their ability to address the identified problems. This screening is detailed as follows:

- **Do Nothing**: The do nothing alternative does not address the identified problems. It is carried forward for comparison purposes in accordance with the Environmental Assessment process.
- **Transportation Demand Management (TDM)**: The measures included in the TDM alternative would not divert enough traffic to make TDM an effective stand-alone alternative to address identified problems. For example:
 - The introduction of flexible hours at the Base could help to spread traffic flow over a longer period thereby reducing delay. This program is already in place for civilian personnel at the base but cannot reasonably be adopted for military personnel given the need for activities to start at the same time for everyone involved.
 - The construction of restaurants within the Base would reduce travel across the bridge at lunch. This would not benefit the am and pm peak periods.

- The introduction of a transit service between the south side of the river and the Base would reduce the number of vehicles on the road. This has been tried in the past and was unsuccessful due to the short distance involved and the wait times (particularly in winter).
- The Base and the Town have encouraged walking and cycling through the construction of a new bridge over the Petawawa River for the use of pedestrians, cyclists and snowmobiles. There are a few people who do walk or cycle to the Base in all weather.

As a result, TDM is not carried forward as a stand-alone alternative but is included as a part of all other alternatives.

- **Transportation System Management (TSM):** The County has implemented a number of minor projects to improve traffic operations and safety at intersections, which are the bottlenecks in the road network. The signals have been coordinated and optimized to respond to changes in traffic demand. Since all of the measures that would fall under the category of TSM have been done, further measures will not address the identified problems. Therefore, TSM is not carried forward as a stand-alone alternative.
- **New Route:** A new route will add capacity across the Petawawa River and potentially through the downtown segment of Petawawa Boulevard. The attractiveness of a new route will determine whether or not it will address the safety, capacity and operational concerns identified. A new route is carried forward for more detailed evaluation, including two route alternatives – a bridge to the west of downtown (between Highway 17 and the railway) and a bridge downstream of Petawawa Boulevard connecting Ypres Boulevard to Laurentian Drive.
- **Widening of an existing route:** Widening of Petawawa Boulevard would add capacity across the Petawawa River and through downtown. This alternative has the potential to address some of the identified problems and is carried forward for more detailed evaluation.

5.2 Alternative Solutions

Conceptual drawings of the new route alternatives and the widening of Petawawa Boulevard are illustrated on **Exhibits 13 to 15**.

- Alternative 1 : Do Nothing (not illustrated)
- Alternative 2 : West Bridge and Arterial (**Exhibit 13**)
- Alternative 3 : Laurentian Bridge Connection (**Exhibit 14**)
- Alternative 4 : Widening of Petawawa Boulevard (**Exhibit 15**)

Exhibit 13: Alternative 2, West Bridge and Arterial

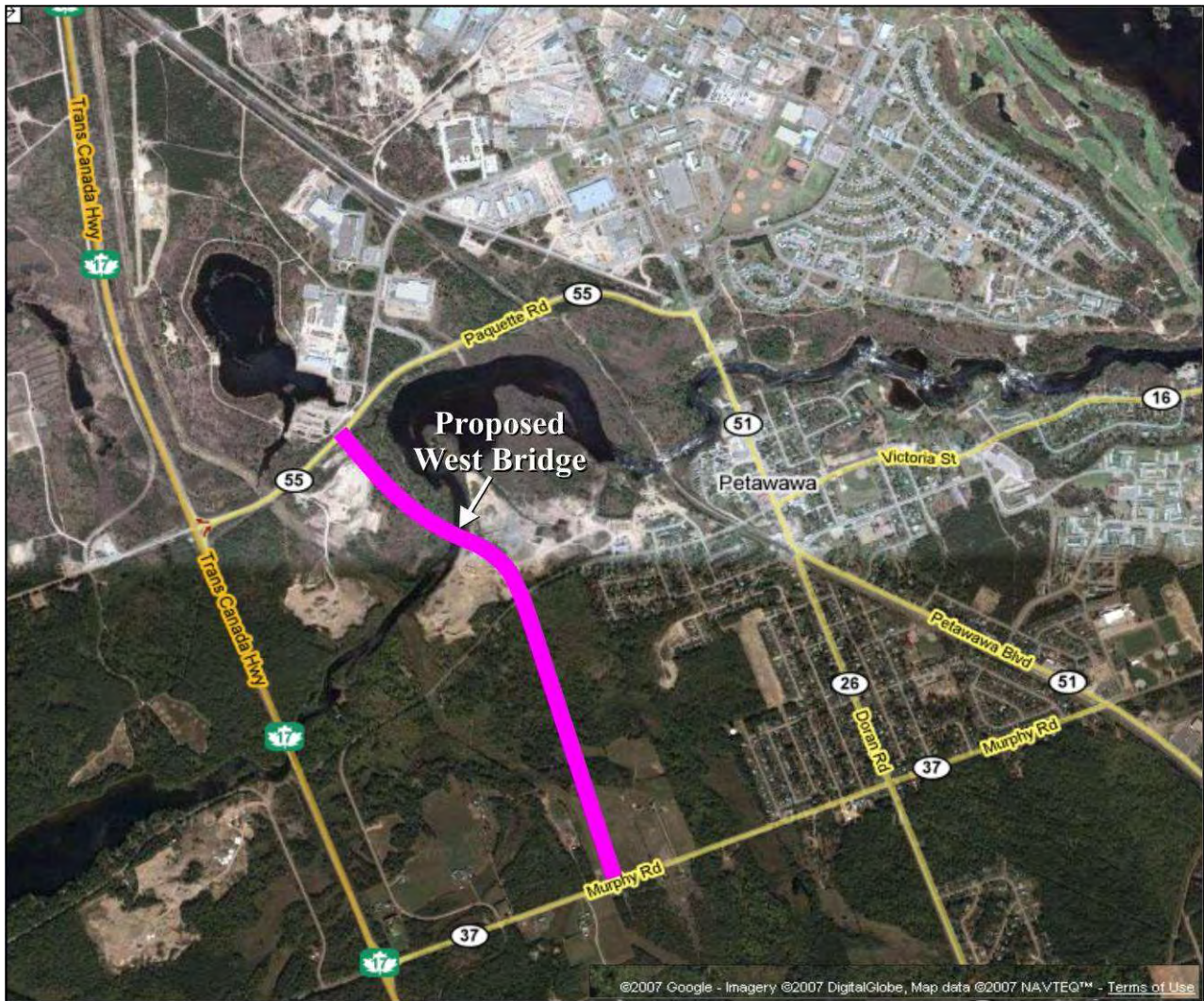


Exhibit 14: Alternative 3, Laurentian Bridge Connection

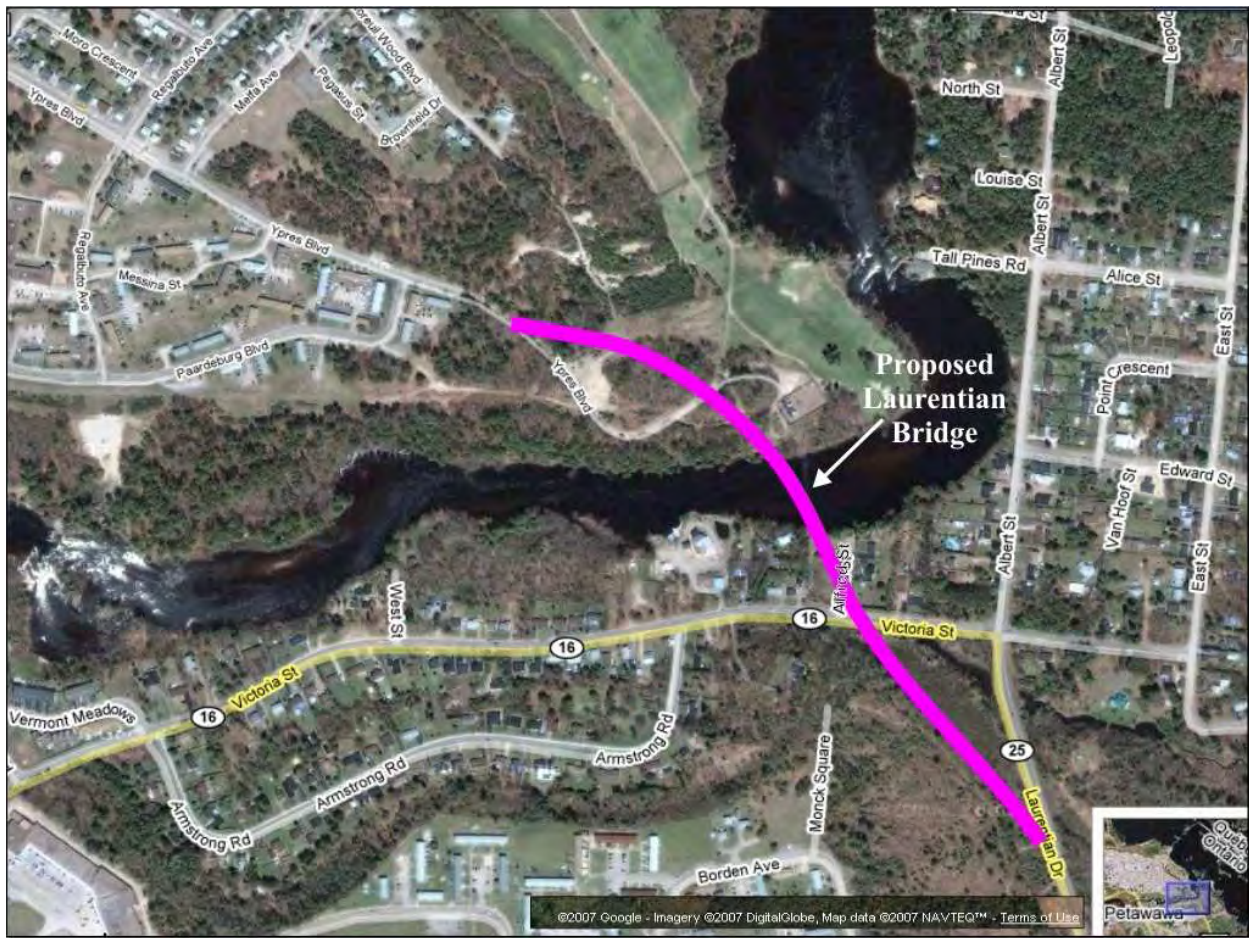


Exhibit 15: Alternative 4, Widening of Petawawa Boulevard



5.3 Evaluation Criteria

The assessment and evaluation of Alternative solutions was conducted, based on available information. The alternatives were assessed in term of their ability to address existing and future problems and needs as well as their potential environmental impacts. Alternatives were evaluated based on five categories:

- Traffic and Transportation;
- Natural Environment;
- Socio-economic and Cultural Environment;
- Land Use and Property; and
- Cost.

Within each Factor category, sub-factors were chosen that reflected the issues and impacts to provide meaningful comparisons of the alternative solutions. The factors used are listed in **Exhibit 16** along with their definitions and measurements.

Exhibit 16: Evaluation Criteria

Factors / Sub-Factor	Definition	Measurement
1.0 TRAFFIC and TRANSPORTATION		
Safety (vehicle, pedestrians, cyclist)	Potential for collisions considering number of side road intersections, presence of auxiliary lanes, cyclist lane, pedestrian walkway, number/ spacing of entrances, available sight distance.	Relative collision potential
Traffic Operations and Level of Service	Impact on traffic operations due to number and configuration of lanes and intersections, horizontal and vertical alignments, auxiliary lanes and driveways. Quantified by estimating the level of service at critical intersections on Petawawa Blvd for existing and future conditions considering the average vehicle delay in a.m. and p.m. peak periods.	Ave. vehicle delay, qualitative operational issues
Emergency Response Services and Alternatives Routes	Potential impact on the response times of emergency vehicles due to the number of traffic lanes and/or the number of routes or lanes provided.	Availability of alternative route, significance
Accommodation of Pedestrian / Cyclist	Satisfies demand and encourages pedestrian / cyclist modes of travel based on the availability of dedicated pedestrian and/or cyclist facilities.	Facilities provided
2.0 NATURAL ENVIRONMENT		
Impacts to terrestrial habitat (wildlife/vegetation)	Natural area lost to road construction.	Area and significance
Impact to areas potentially supporting Species at Risk	Presence of significant habitats within or adjacent to future right-of-way.	Yes/No/ SAR
Impacts to Fisheries and Aquatic Habitat	Number of new watercourse crossings and their significance (coldwater, warmwater, sensitive habitats). Potential for HADD.	#/ significance
Impacts to Surface Water	Increase in stormwater runoff due to area of new pavement and potential for mitigation.	ha/ SWM potential
Impacts to Groundwater	Potential impact on existing wells, groundwater recharge and/or discharge areas due to roadway grading.	# of wells/ other sensitive areas
3.0 SOCIO-ECONOMIC and CULTURAL ENVIRONMENT		
Impacts to parking for businesses	Loss of parking spaces for businesses.	Number
Impacts to commercial entrances	Loss of or changes to existing commercial driveways.	Number, impact
Visual Intrusion	Homes with new road/bridge in viewscape.	Qualitative, None/Some/ Many
Noise	# of existing homes along routes with increased traffic (actual noise levels to be determined during future phase, if needed) and distance from road to outdoor living area.	Number / distance to outdoor living area
Air Quality	Change in fuel used and vehicle emissions due to idling/delays calculated using traffic simulation software.	Comparative emissions
Archaeological Resources	Impact on undisturbed areas with high archaeological potential (e.g. within 300 m of watercourse).	ha
Heritage Resources	Known heritage structures physically impacted or removed.	#
Recreational Uses	Impact to recreational uses i.e. rapids, trails (walking, hiking, snowmobile) cycling paths, golf course, etc.	Impact, nature
Landscaping	Impact to residential/commercial landscaping.	# of properties affected/ extent
Future Development	Transportation support for future development (planned/potential) based on Official Plan.	Yes/No
4.0 LAND USE and PROPERTY		
Residential property required/ impacted	# of existing residential properties required/ impacted by improvements.	# / nature of impacts
Commercial property required/ impacted	# of commercial properties required/ impacted by improvements.	# / nature of impacts
Development land required/ impacted	Area of developable property required to construct improvements and potential impact.	ha/ impact
5.0 COST		
Construction Cost	Road construction cost based on lane-km of new construction, bridge work and other major items (but excluding property and utility relocation costs).	\$
Operations/Maintenance Costs	Maintenance and operations costs based on the lane-km added to the road network and maintenance issues particular to an alternative.	Lane-km added/ Issues
Potential utility conflicts	Presence of overhead pole lines, underground services and utilities that would require relocation.	Type, # of conflicts, costs
Property costs	Comparative, qualitative assessment of the property costs for an alternative.	Comparative \$

5.4 Assessment and Evaluation of Alternatives to the Undertaking

5.4.1 Comparison/Trade-off Evaluations

Based on the Factors and Sub-factors described in Exhibit 16, the alternatives were analysed and then ranked according to whether their impacts or benefits (when compared to other alternatives) were better, worse or the same. A relative comparison, trade-off approach was used. **Exhibit 17** documents the initial Study Liaison Team evaluation. This table was presented to the public at the Public Information Centre held in June 2007. At the PIC, the West Bridge and Arterial was presented as the Technically Preferred Solution. It was recommended to be carried forward to Phases 3 and 4 of the Class EA process.

Following the PIC, the evaluation was revised in consultation with the Study Liaison Team to reflect input from the public and agencies. **Exhibit 18** provides the revised evaluation. The highlighted words and comparisons indicate where changes have been made between Exhibits 17 and 18.

Exhibit 17: Assessment and Evaluation of Alternatives to the Undertaking

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
✓ Good in Comparison to other Alternatives — Neutral in Comparison to Other Alternatives ✗ Poor in Comparison to Other Alternatives				
1.0 TRAFFIC and TRANSPORTATION				
Safety (vehicle, pedestrians, cyclist)	Many access points along Petawawa Blvd result in many conflict points. Cyclists share the through lanes. Sidewalks are generally available on both sides of Petawawa Blvd. Traffic volumes result in driver frustration. Significant number of collisions likely to continue from Doran to Paquette. ✗	The County/Town can control access during the development process to maximize safety. A cycle lane and sidewalks can be included along the new route. Diversion of traffic will reduce conflicts on Petawawa Blvd. ✓	There are existing driveways along Laurentian Drive, Tall Pines and Alfred creating potential conflicts. There are no existing cycle lanes and few sidewalks. Diversion of traffic will reduce conflicts on Petawawa Blvd. —	Many access points along Petawawa Blvd will continue to result in many conflict points. Cyclists will share the through lanes. Pedestrians and turning vehicles will have more lanes to cross. ✗
Traffic Operations and Level of Service	Frequent back-ups and queuing will increase along Petawawa Blvd. during a.m., lunch and p.m. peak periods. Turning movements at driveways and stop-controlled intersections will become more difficult as traffic volumes increase. Delays and congestion will increase critical intersections ✗	If the new route can attract 25% of the future traffic on Petawawa Blvd the level of service will be good on both roadways. Operations will improve at intersections and driveways along Petawawa Blvd. New intersections will be created on Portage and Murphy. These are expected to operate well. ✓	If the new bridge can attract 25% of future traffic on Petawawa Blvd the level of service and operations will improve at intersections and driveways along Petawawa Blvd. Traffic will increase along the new route including Ypres Blvd., Laurentian Drive and connecting links. —	Level of service at intersections will improve, satisfying the traffic demand anticipated. At driveways and stop-controlled intersections, it will be somewhat more difficult to make left turns due to the additional road width. ✓
Emergency Response Services and Alternatives Routes	Emergency vehicles will be caught in congestion. Only one crossing of Petawawa River will be available east of Hwy 17. ✗	Provides new arterial route and new crossing of Petawawa River in the event of emergencies. ✓	Provides new arterial route and new crossing of Petawawa River in the event of emergencies. ✓	Only one crossing of Petawawa River will be available east of Hwy 17. More lanes on Petawawa Blvd available. —
Accommodation of Pedestrian / Cyclist	Sidewalks available; cyclists in shared lanes downtown or on recreational trails. —	Sidewalks and cycle lanes can be provided as part of the design of the new road and bridge. ✓	Sidewalks and cycle lanes can be provided on the new bridge/road segment. Few existing sidewalks or cycle lanes in area. —	Sidewalks can be provided on both sides of Petawawa Blvd. Cyclists in shared lanes. —
Results	✗	✓	—	—
2.0 NATURAL ENVIRONMENT				
Impacts to terrestrial habitat (wildlife/vegetation)	No impact on wildlife habitat/forested area. ✓	Impact to 3.74 ha of undeveloped land (potential habitat) from Murphy Road to Portage Road. Area on either side of the river provides less desirable due to industrial use (aggregate pits). ✗	Impact to some parcels of undeveloped land (depending on where crossing will occur). Generally only limited wildlife habitat/ forest. —	No impact on wildlife habitat/forested area. ✓
Impacts to areas potentially supporting Species at Risk	No impact on Species at Risk habitat. ✓	There are Species at Risk present regionally; however, the local presence of Species at Risk or their habitat is unknown and will require detailed field work. ✗	There are Species at Risk present regionally; however, the local presence of Species at Risk or their habitat is unknown and will require detailed field work. ✗	No impact on Species at Risk habitat. ✓
Impacts to Fisheries and Aquatic Habitat (note HADD = Harmful Alteration, Disruption or Destruction)	No impact on watercourses. ✓	Potential impact from a new bridge crossing during construction and operation (will be designed to avoid HADD of fish habitat). ✗	Potential impact from a new bridge crossing during construction and operation (will be designed to avoid HADD of fish habitat). ✗	Potential impact from widened bridge crossing during construction and operation. Pier extension will require in-water work (HADD). ✗

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
✓ Good in Comparison to other Alternatives — Neutral in Comparison to Other Alternatives ✗ Poor in Comparison to Other Alternatives				
Impacts to Surface Water	No additional stormwater runoff generated. No opportunity to enhance stormwater management. —	3.68 ha of new impervious surface will generate additional stormwater runoff. Location provides the opportunity to implement SWM measures. —	1.33 ha of new pavement will generate additional stormwater runoff. Some space likely available to implement SWM measures. ✗	1.95 ha of new pavement will generate additional stormwater runoff. No space at Petawawa River to implement new SWM measures. ✗
Impacts to Groundwater	No impact on groundwater wells or recharge and/or discharge areas. ✓	Development will include municipal services. No known impact on groundwater wells or recharge and/or discharge areas. ✓	Area of existing municipal services. No known impact on groundwater wells or recharge and/or discharge areas. ✓	Area of existing municipal services. No known impact on groundwater wells or recharge / discharge areas. ✓
Results	✓	✗	✗	—
3.0 SOCIO-ECONOMIC and CULTURAL ENV.				
Impacts on parking for businesses	No impact on commercial parking spaces. ✓	No impact on commercial parking spaces. ✓	No impact on commercial parking spaces. ✓	Property required for widening of road along Petawawa Blvd. Loss of approx 120 parking spaces. ✗
Impacts to commercial entrances	No impact to commercial entrances. ✓	No impact to commercial entrances. ✓	No impact to commercial entrances. ✓	Impact to approx. 45 entrances fronting onto Petawawa Blvd. ✗
Visual intrusion	No impact on visual intrusion. ✓	No impact on visual intrusion. Unless bridge location is currently visible to isolated residences. ✓	Many homes impacted by visual intrusion of the bridge. ✗	Some homes impacted by visual intrusion of the bridge. —
Noise	Impact from noise on adjacent residents will increase with increased traffic. ✓	Minimal impact as noise mitigation can be incorporated into future land use planning. —	Increased noise impact to approx. 70 houses along Ypres (between new river crossing and Festubert) and on the south side of the river. ✗	Increased noise to approx. 31 houses along Petawawa Blvd. ✗
Air Quality	Future traffic levels result in greatest fuel used and hydrocarbon emissions. Therefore poorer air quality along Petawawa Boulevard. ✗	Similar fuel used and hydrocarbon emissions along Petawawa Boulevard as 2007 traffic levels. Low emissions along new arterial due to less delay. —	Similar fuel used and hydrocarbon emissions along Petawawa Boulevard as 2007 traffic levels if diversion achieved. —	Similar fuel used & hydrocarbon emissions along Petawawa Blvd. as 2007 traffic levels. Higher pollutants such as carbon monoxide due to delays at signals. —
Archaeological Resources	No impact on undisturbed land. ✓	Some undisturbed area (within 11 ha). Potential for impact on undisturbed land within 300m of watercourse). Mitigatable. —	Mostly disturbed area (within 6 ha). Some potential for impact on undisturbed land within 300m of watercourse. Mitigatable. —	No impact on undisturbed land within 300m of watercourse. ✓
Built Heritage Resources	None known	None known	None known	None known
Recreational Uses	No impact on existing recreational uses. ✓	No impact to existing recreational uses. Provides opportunity for a multi-use path. ✓	Roadway will impact golf course. Bridge will be located in vicinity of rapids. Additional traffic adjacent to ski hill. ✗	Facilities associated with the Millenium Trail will require relocation. Distance reduced between snowmobile trail along rail and a widened Petawawa Blvd. —

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
✓ Good in Comparison to other Alternatives — Neutral in Comparison to Other Alternatives ✗ Poor in Comparison to Other Alternatives				
Landscaping	No impact on commercial/ residential landscaping. ✓	No impact on landscaping as the area is currently undeveloped. ✓	Significant impact to residents along Tall Pines or Alfred Street due to expansion of the road right-of-way. ✗	Impact to landscaping and streetscaping at Mohans/Doran and at residences between Maple and Fred. Commercial district landscaping along Petawawa Blvd. also affected due to increased right-of-way. ✗
Future Development	Will not support future development in the Official Plan. ✗	Will support future development in the Official Plan., including potential additional expansion of commercial and residential land use as needed. ✓	Will support future development in the Official Plan. Limited development land is left in the Petawawa Point area that would be served by this route. ✓	Will support future development in the Official Plan. ✓
Results	—	✓	✗	✗
4.0 LAND USE and PROPERTY				
Residential property required/impacted	No impact on residential property. ✓	No anticipated impact on residential property in the area. ✓	Potential impact on residential properties, depending on alignment and right-of-way width. ✗	Property impacts on one residence. ✗
Commercial/Industrial property required/impacted	No impact on commercial property. ✓	No impact on commercial property. Quarry will be impacted (nearing the end of its life and planned for re-development). ✓	Significant impact to golf course. ✗	Major impact to 45 commercial buildings located along Petawawa Blvd. ✗
Development land required/impacted	No impact on development property. ✓	New road will occupy about 6.9 ha of developable land between Murphy and Paquette but is necessary to serve future development in this same area. ✓	No impact on development property. ✓	No impact on development property. ✓
Results	✓	✓	✗	✗
5.0 COST				
Construction Cost	No construction cost. ✓	Construction cost for 2.3 km of 2 lane arterial roadway and new bridge. —	Construction cost for 0.83 km of 2 lane arterial roadway and new bridge. —	Construction cost of adding 2.6 km of 2 lane arterial roadway under traffic. ✗
Operations / Maintenance Costs	No change in operational/maintenance costs. ✓	Additional 2 lanes of 2.3 km of road and a new bridge. —	Additional 2 lanes of 0.83 km of road and a new bridge. —	Additional 2 lanes of 2.6 km of road. —
Potential utility conflicts	No utility impacts. ✓	No anticipated impact on existing utilities including the pipeline to the west of the proposed alignment. ✓	Extensive relocation of existing utilities (power lines) depending on route selected. Sanitary siphon and water line across river in vicinity. —	Extensive relocation of utilities including power, telephone and underground municipal services will be required. ✗
Property costs	No property required. ✓	Some property costs for new right-of-way. Right-of-way may be dedicated where property served is intended for development. ✓	High property costs due to value of existing residential land and the golf course along the river. ✗	Highest property costs due to the number of commercial and other properties impacted. ✗
Results	✓	—	✗	✗

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
✓ Good in Comparison to other Alternatives — Neutral in Comparison to Other Alternatives ✗ Poor in Comparison to Other Alternatives				
SUMMARY:				
TRAFFIC and TRANSPORTATION	✗	✓	—	—
NATURAL ENVIRONMENT	✓	✗	✗	—
SOCIO-ECONOMIC and CULTURAL ENV.	—	✓	✗	✗
LAND USE and PROPERTY	✓	✓	✗	✗
COST	✓	—	✗	✗
RECOMMENDATION	Does not address the problem. Carry forward for comparison purposes only.	Addresses the problem and provides opportunities for planning. Carry forward to Phase 3 of the EA process to develop and evaluate alternative designs and their anticipated impacts.	Do not carry forward.	Do not carry forward.

Exhibit 18: Revised Assessment and Evaluation of Alternatives to the Undertaking following Consultation

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
1.0 TRAFFIC and TRANSPORTATION				
Safety (vehicle, pedestrians, cyclist)	Many access points along Petawawa Blvd result in many conflict points. Cyclists share the through lanes. Sidewalks are generally available on both sides of Petawawa Blvd. Traffic volumes result in driver frustration. Significant number of collisions likely to continue from Doran to Paquette. x	The County/Town can control access during the development process to maximize safety. A cycle lane and sidewalks can be included along the new route. Diversion of traffic will reduce conflicts on Petawawa Blvd. ✓	There are existing driveways along Laurentian Drive and Alfred creating potential conflicts. There are some existing facilities for pedestrians and cyclists and others can be built. Diversion of traffic will reduce conflicts on Petawawa Blvd. ✓	Many access points along Petawawa Blvd will continue to result in many conflict points. Cyclists will share the through lanes. Pedestrians and turning vehicles will have more lanes to cross. x
Traffic Operations and Level of Service	Frequent back-ups and queuing will increase along Petawawa Blvd. during a.m., lunch and p.m. peak periods. Turning movements at driveways and stop-controlled intersections will become more difficult as traffic volumes increase. Delays and congestion will increase critical intersections x	If the new route can attract 25% of the future traffic on Petawawa Blvd the level of service will be good on both roadways. Operations will improve at intersections and driveways along Petawawa Blvd. New intersections will be created on Portage and Murphy. These are expected to operate well. ✓	If the new bridge can attract 25% of future traffic on Petawawa Blvd the level of service and operations will improve at intersections and driveways along Petawawa Blvd. Traffic will increase along the new route including Ypres Blvd., Laurentian Drive and connecting links. These roads can handle more traffic. ✓	Level of service at intersections will improve, satisfying the traffic demand anticipated. At driveways and stop-controlled intersections, it will be somewhat more difficult to make left turns due to the additional road width. ✓
Emergency Response Services and Alternatives Routes	Emergency vehicles will be caught in congestion. Only one crossing of Petawawa River will be available east of Hwy 17. x	Provides new arterial route and new crossing of Petawawa River in the event of emergencies. ✓	Provides new arterial route and new crossing of Petawawa River in the event of emergencies. ✓	Only one crossing of Petawawa River will be available east of Hwy 17. More lanes on Petawawa Blvd available. —
Accommodation of Pedestrian / Cyclist	Sidewalks available; cyclists in shared lanes downtown or on recreational trails. —	Sidewalks and cycle lanes can be provided as part of the design of the new road and bridge. ✓	Sidewalks and cycle lanes can be provided on the new bridge/road segment. (Few existing sidewalks or cycle lanes in area.) ✓	Sidewalks can be provided on both sides of Petawawa Blvd. Cyclists in shared lanes. —
Results	x	✓	✓	—
2.0 NATURAL ENVIRONMENT				
Impacts to terrestrial habitat (wildlife/vegetation)	No impact on wildlife habitat/forested area. ✓	Impact to 3.74 ha of undeveloped land (potential habitat) from Murphy Road to Portage Road. Area on either side of the river provides less desirable due to industrial use (aggregate pits). x	Impact to some parcels of undeveloped land (depending on where crossing will occur). Generally only limited wildlife habitat/ forest. —	No impact on wildlife habitat/forested area. ✓
Impacts to areas potentially supporting Species at Risk	No impact on Species at Risk habitat. ✓	There are Species at Risk present in the river valley. The local presence of Species at Risk or their habitat will require detailed field work. x	There are Species at Risk present in the river valley. The local presence of SAR or their habitat will require detailed field work. x	No impact on Species at Risk habitat. ✓
Impacts to Fisheries and Aquatic Habitat (note HADD = Harmful Alteration, Disruption or Destruction)	No impact on watercourses. ✓	Potential impact from a new bridge crossing during construction and operation (will be designed to avoid HADD of fish habitat). —	Potential impact from a new bridge crossing during construction and operation (will be designed to avoid HADD of fish habitat). —	Potential HADD due to pier extension and potential impact during construction and operation of widened bridge. x

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
Impacts to Surface Water	No additional stormwater runoff generated. No opportunity to enhance stormwater management. —	3.68 ha of new impervious surface will generate additional stormwater runoff. Location provides the opportunity to implement SWM measures. —	1.33 ha of new pavement will generate additional stormwater runoff. Some space available to implement SWM measures on either side of river. —	1.95 ha of new pavement will generate additional stormwater runoff. No space at Petawawa River to implement new SWM measures. ✗
Impacts to Groundwater	No impact on groundwater wells or recharge and/or discharge areas. ✓	Development will include municipal services. No known impact on groundwater wells or recharge and/or discharge areas. ✓	Area of existing municipal services. No known impact on groundwater wells or recharge and/or discharge areas. ✓	Area of existing municipal services. No known impact on groundwater wells or recharge and/or discharge areas. ✓
Results	✓	✗	✗	—
3.0 SOCIO-ECONOMIC and CULTURAL ENVIRONMENT				
Impacts on parking for businesses	No impact on commercial parking spaces. ✓	No impact on commercial parking spaces. ✓	No impact on commercial parking spaces. ✓	Property required for widening of road along Petawawa Blvd. Loss of approx 120 parking spaces. ✗
Impacts to commercial entrances	No impact to commercial entrances. ✓	No impact to commercial entrances. ✓	No impact to commercial entrances. ✓	Impact to approx. 45 entrances fronting onto Petawawa Blvd. ✗
Visual intrusion	No impact on visual intrusion. ✓	No impact on visual intrusion. Unless bridge location is currently visible to isolated residences. ✓	Many homes impacted by visual intrusion of the bridge. ✗	Some homes impacted by visual intrusion of the bridge. —
Noise	Impact from noise on adjacent residents will increase with increased traffic. —	Minimal impact as noise mitigation can be incorporated into future land use planning. ✓	Increased noise impact to approx. 70 houses along Ypres (between new river crossing and Festubert) and on the south side of the river. It may be possible to remove federally-owned houses. —	Increased noise to approx. 31 houses along Petawawa Blvd. ✗
Air Quality	Future traffic levels result in greatest fuel used and hydrocarbon emissions. Therefore poorer air quality along Petawawa Boulevard. ✗	Similar fuel used and hydrocarbon emissions along Petawawa Boulevard as 2007 traffic levels. Low emissions along new arterial due to less delay. —	Similar fuel used and hydrocarbon emissions along Petawawa Boulevard as 2007 traffic levels if diversion achieved. —	Similar fuel used & hydrocarbon emissions along Petawawa Boulevard as 2007 traffic levels. Higher pollutants such as CO due to delays at signals. —
Archaeological Resources	No impact on undisturbed land. ✓	Some undisturbed area (within 11 ha). Potential for impact on undisturbed land within 300m of watercourse). Mitigatable. —	Mostly disturbed area (within 6 ha). Some potential for impact on undisturbed land within 300m of watercourse. Mitigatable. —	No impact on undisturbed land within 300m of watercourse. ✓
Built Heritage Resources	None known	None known	None known	None known
Recreational Uses	No impact on existing recreational uses. ✓	No impact to existing recreational uses. Provides opportunity for a multi-use path. ✓	Roadway will have some impact on golf course. Bridge will clear span river in vicinity of rapids. Additional traffic adjacent to ski hill. —	Facilities associated with the Millenium Trail will require relocation. Distance reduced between snow-mobile trail along rail and a widened Petawawa Blvd. —

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
Landscaping	No impact on commercial/ residential landscaping. ✓	No impact on landscaping as the area is currently undeveloped. ✓	Potential impact to residences along Alfred Street due to expansion of the road right-of-way. —	Impact to landscaping and streetscaping at Mohns/ Doran and at residences between Maple and Fred. Commercial district landscaping along Petawawa Blvd. also affected due to increased right-of-way. ✗
Future Development	Will not support future development in the Official Plan. ✗	Route is away from current and planned development and would require an update of the Official Plan. Potential to help support OP development. —	Will best support future development in the Official Plan. ✓	Will support future development in the Official Plan. ✓
Results	—	✓	—	✗
4.0 LAND USE and PROPERTY				
Residential property required/impacted	No impact on residential property. ✓	Potential impact on rural residential properties in the area. —	Potential impact on residential properties, depending on alignment & right-of-way width. —	Property impacts on one residence. ✗
Commercial/Industrial property required/impacted	No impact on commercial property. ✓	No impact on commercial property. Quarry will be impacted (nearing the end of its life and planned for re-development). ✓	Some impact to golf course. —	Major impact to 45 commercial buildings located along Petawawa Blvd. ✗
Development land required/impacted	No impact on development property. ✓	New road will occupy about 6.9 ha of developable land between Murphy and Paquette but is necessary to serve future development in this same area. —	No impact on development property. Road will serve currently planned development. ✓	No impact on development property ✓
Results	✓	—	—	✗
5.0 COST				
Construction Cost	No construction cost. ✓	Construction cost for 2.3 km of 2 lane arterial roadway and new bridge. —	Construction cost for 0.83 km of 2 lane arterial roadway and new bridge. —	Construction cost of adding 2.6 km of 2 lane arterial roadway. ✗
Operations / Maintenance Costs	No change in operational/maintenance costs. ✓	Additional 2 lanes of 2.3 km of road and a new bridge. —	Additional 2 lanes of 0.83 km of road and a new bridge. —	Additional 2 lanes of 2.6 km of road. —
Potential utility conflicts	No utility impacts. ✓	No anticipated impact on existing utilities including the pipeline to the west of the proposed alignment. ✓	Extensive relocation of existing utilities (power lines) depending on route selected. Sanitary siphon and water line across river in vicinity. —	Extensive relocation of utilities including power, telephone and underground municipal services will be required. ✗
Property costs	No property required. ✓	Some property costs for new right-of-way. Right-of-way may be dedicated where property served is intended for development. ✓	Significant property costs due to value of existing federal land and the utility corridor. —	Highest property costs due to the number of commercial and other properties impacted. ✗
Results	✓	—	—	✗

ASSESSMENT FACTORS/SUB-FACTOR	Alternative 1 Do Nothing	New Route		Alternative 4 Widening of Petawawa Blvd.
		Alternative 2 West Bridge and Arterial	Alternative 3 Laurentian Bridge Connection	
SUMMARY:				
TRAFFIC and TRANSPORTATION	x	✓	✓	—
NATURAL ENVIRONMENT	✓	x	x	—
SOCIO-ECONOMIC and CULTURAL ENV.	—	✓	—	x
LAND USE and PROPERTY	✓	—	—	x
COST	✓	—	—	x
RECOMMENDATION	Does not address the problem. Carry forward for comparison purposes only.	Has potential to address the problem and provides opportunities for planning. Consider during update of Official Plan for future growth. Carry forward to Phase 3 of the EA process to develop and evaluate alternative designs in order to protect corridor during planning	Better serves existing and currently planned development. Most likely able to achieve traffic diversion from Petawawa Boulevard. Carry forward to Phase 3 of the EA process to develop and evaluate alternative designs, their engineering feasibility and anticipated impacts.	Do not carry forward.

5.4.2 Sensitivity Testing

To assess the robustness of the evaluation result, sensitivity testing was conducted using a quantitative approach. Each member of the Study Liaison Team provided independent weightings for the factors and sub-factors. The weightings indicated the relative importance of each of the factors and sub-factors, which is a matter of personal values and judgment. By completing the evaluation using a range of weights, it is possible to judge how sensitive the result is to changes in these weights.

The weightings for the five factors added to 100. The weightings for each group of sub-factors under each factor also added to 100. The range of weightings tested is provided in **Exhibit 19**.

Exhibit 19: Factor and Sub-Factor Weightings

Factors / Sub-Factors	Range of Weights	
	From	To
1.0 TRAFFIC and TRANSPORTATION	20	50
Safety (vehicle, pedestrians, cyclist)	15	40
Traffic Operations and Level of Service	30	65
Emergency Response Services and Alt. Routes	10	25
Accommodation of Pedestrian / Cyclist	10	20
2.0 NATURAL ENVIRONMENT	10	30
Impacts to terrestrial habitat (wildlife/vegetation)	5	30
Impact to areas potentially supporting Species at Risk	5	40
Impacts to Fisheries and Aquatic Habitat	10	30
Impacts to Surface Water	10	40
Impacts to Groundwater	10	40
3.0 SOCIO-ECONOMIC and CULTURAL ENV.	10	30
Impacts on parking for businesses	0	22
Impacts to commercial entrances	0	20
Visual intrusion	5	25
Noise	5	20
Air Quality	0	10
Archaeological Resources	0	5
Built Heritage Resources (no difference between alts.)	0	0
Recreational Uses	5	11
Landscaping	5	15
Future Development	11	22
4.0 LAND USE and PROPERTY	10	20
Residential property required/ impacted	33.3	50
Commercial property required/ impacted	25	60
Development land required/ impacted	0	33.3

Exhibit 19: Factor and Sub-Factor Weightings

Factors / Sub-Factors	Range of Weights	
	From	To
5.0 COST	10	25
Construction Cost	30	50
Operations/Maintenance Costs	10	30
Potential utility conflicts	10	25
Property Costs	15	30

The set of weightings provided by each person was used to calculate an overall score for each alternative. First, unweighted scores were assigned to each sub-factor and alternative based on the comparative ratings from Table 18. The unweighted scores are detailed in **Exhibit 20**. In some cases, alternatives with the same qualitative rating (cross, dash or check mark) were judged to be somewhat different from each other. As a result, different unweighted scores were assigned.

To calculate a weighted score for each alternative:

- The score for each sub-factor was multiplied by the weight for that sub-factor;
- Sub-factor scores were totalled to obtain a score for each factor area;
- The scores for each factor area was multiplied by the weight for that factor area;
- All factor area scores were totalled to obtain an overall score for each alternative.

The process was repeated for each set of weights. The overall scores for each alternative are listed in **Exhibit 21**. A higher score was preferred.

Exhibit 20: Quantitative Comparison Scoring

Scores: 1=poorer; 9=best

ASSESSMENT FACTORS/SUB-FACTOR	Alt 1 Do Nothing	New Route		Alt 4 Widening of Petawawa Blvd.
		Alt 2 West Bridge and Arterial	Alt 3 Laurentian Br. Connection	
1.0 TRAFFIC and TRANSPORTATION				
Safety (vehicle, pedestrians, cyclist)	1	9	7	3
	x	✓	✓	x
Traffic Operations and Level of Service	1	9	9	9
	x	✓	✓	✓
Emergency Response Services and Alternatives Routes	1	9	9	3
	x	✓	✓	-
Accommodation of Pedestrian / Cyclist	3	7	7	5
	-	✓	✓	-

Exhibit 20: Quantitative Comparison Scoring

Scores: 1=poorer; 9=best

ASSESSMENT FACTORS/SUB-FACTOR	Alt 1 Do Nothing	New Route		Alt 4 Widening of Petawawa Blvd.
		Alt 2 West Bridge and Arterial	Alt 3 Laurentian Br. Connection	
2.0 NATURAL ENVIRONMENT				
Impacts to terrestrial habitat (wildlife/vegetation)	9	3	5	9
	✓	✗	–	✓
Impacts to areas potentially supporting Species at Risk	9	1	3	9
	✓	✗	✗	✓
Impacts to Fisheries and Aquatic Habitat	9	3	3	1
	✓	–	–	✗
Impacts to Surface Water	5	5	5	1
	–	–	–	✗
Impacts to Groundwater	9	7	7	9
	✓	✓	✓	✓
3.0 SOCIO-ECONOMIC and CULTURAL ENVIRONMENT				
Impacts on parking for businesses	9	9	9	1
	✓	✓	✓	✗
Impacts to commercial entrances	9	9	9	1
	✓	✓	✓	✗
Visual intrusion	7	7	1	3
	✓	✓	✗	–
Noise	7	7	5	3
	✓	–	–	✗
Air Quality	3	5	5	5
	✗	–	–	–
Archaeological Resources	9	7	7	9
	✓	–	–	✓
Built Heritage Resources	None known	None known	None known	None known
Recreational Uses	9	7	5	5
	✓	✓	–	–
Landscaping	9	0	5	1
	✓	✓	–	✗
Future Development	1	5	7	7
	✗	–	✓	✓
4.0 LAND USE and PROPERTY				
Residential property required/impacted	9	7	7	3
	✓	–	–	✗
Commercial/Industrial property required/impacted	9	9	7	1
	✓	✓	–	✗
Development land required/impacted	9	7	9	9
	✓	–	✓	✓

Exhibit 20: Quantitative Comparison Scoring

Scores: 1=poorer; 9=best

ASSESSMENT FACTORS/SUB-FACTOR	Alt 1 Do Nothing	New Route		Alt 4 Widening of Petawawa Blvd.
		Alt 2 West Bridge and Arterial	Alt 3 Laurentian Br. Connection	
5.0 COST				
Construction Cost	9	5	5	1
	✓	–	–	✗
Operations / Maintenance Costs	7	5	5	5
	✓	–	–	–
Potential utility conflicts	9	9	5	1
	✓	✓	–	✗
Property costs	9	9	5	1
	✓	✓	–	✗

Exhibit 21: Weighted Scores for Alternatives 1 to 4

Weighted Scores	Alternative 1 Do Nothing	Alternative 2 West Bridge & Arterial	Alternative 3 Laurentian Br. Connection	Alternative 4 Widening of Petawawa Blvd
Individual 1	463	747	688	502
Individual 2	604	712	644	389
Individual 3	658	618	586	465
Individual 4	551	710	681	461
Individual 5	580	730	672	437
Average	570	700	650	450

Alternative 1, Do Nothing, scored best when the cost and potential impacts to the natural environment and property were considered more important than the benefits to traffic, transportation and Town development. In most cases, the Do Nothing alternative scored lower than the new route alternatives.

Alternative 4, Widening of Petawawa Boulevard, scored poorly in most cases due to the impacts on property and business, the natural and social environment and the cost.

The “New Route” alternatives scored best in most cases in the quantitative evaluation. While the west bridge and arterial scored better than the Laurentian Bridge connection during the quantitative analysis, there remain uncertainties with regard to a number of issues. These include impacts on Species at Risk, rate of growth and future land use along Ypres Boulevard.

5.5 Selection of the Preferred Solution

Based on the results of the evaluation, the preferred solution is a new route. The two alternatives for a new route are a bridge connection at Laurentian Drive and a new arterial road and bridge to the west of downtown. Each alternative has advantages.

The Laurentian Drive connection addresses the needs of existing traffic patterns and land use as well as the development anticipated in the 2004 Petawawa Official Plan. It also provides an alternative route in the event of a road closure. To support this alternative, CFB Petawawa could consider the eventual removal of existing houses along Ypres Boulevard to reduce social impacts of increased traffic on adjacent residents. When schools along Ypres are replaced, alternative locations for new schools should be investigated to reduce vehicle-pedestrian conflicts. There are no planned school closures as the funding is not available for new buildings.

The west bridge and road has potential to address future issues of growth in Petawawa. If this alternative is not selected as the preferred solution at this point in time, it would be advantageous to complete Phases 3 and 4 of the Class EA process in order to identify an alignment that could be protected during development. This would ensure that Official Plan updates and plans for development are consistent and will provide for the future needs of the community. The new arterial would connect to the Montgomery Gate area of CFB Petawawa.

Once more information is available, the County and Town will be able to compare the two new route alternatives more rigorously in order to confirm the preferred alternative. At this point in the study, as noted at the end of Exhibit 18, the Laurentian Drive connection is preferred as it better serves existing and currently planned development and is in the best position to attract (divert) traffic from Petawawa Boulevard.

6.0 NEXT STEPS

6.1 Municipal Class EA

Phases 3 and 4 of the Class EA process must be completed and environmental clearance obtained before the County and the Town can construct a new crossing of the Petawawa River. These phases are outlined in Exhibit 2 of this report and include the following tasks:

Phase 3: Alternative Design Concepts for Preferred Solution

- Identify alternative design concepts;
- Undertake detailed inventory of the environment;
- Identify potential impacts of alternative design concepts and mitigation measures;
- Evaluate alternative designs;
- Identify the recommended design;
- Consult with agencies and the public;
- Select and finalize preferred design.

Phase 4: Environmental Study Report

- Prepare the Environmental Study Report (ESR);
- Prepare the Study Completion Notice and distribute to agencies and the public;
- Provide ESR for 30-day public review.

Upon completion of Phases 3 and 4 and if no irreconcilable concerns are raised during the review period, the project will have environmental clearance under the Ontario Environmental Assessment Act.

6.2 Federal EA

The project must comply with the requirements of the Canadian Environmental Assessment Act (CEAA) as there are several potential triggers. These include:

- Federal land will be affected;
- Approvals and permits under the Fisheries Act will likely be required; and
- Federal funding may be obtained.

At this stage (completion of Phase 1 and 2 of the Class EA process), a Project Description under CEAA will be written and provided to the Canadian Environmental Assessment Agency who will circulate it to Federal Authorities. These Authorities will identify their potential interests and prepare a “Scope of Project, Scope of Assessment”, which will detail their requirements.

The County and Town can undertake a coordinated federal-provincial process by including federal EA requirements in their Terms of Reference for the assignment to undertake Phases 3 and 4 of the Class EA. This coordination of future activities may increase efficiency and shorten timelines to complete both provincial and federal EA processes.

6.3 Further Considerations for Phases 3 and 4

To address uncertainties raised during Phases 1 and 2 of the Class EA process, the Terms of Reference for Phases 3 and 4 of this study should include:

- A broad range of environmental field work, including assessment of the local presence of regional Species at Risk;
- Mapping/survey work including collection of detailed utilities information to provide adequate data for the development of reasonable preliminary designs and cost estimates for the bridges and associated roadworks;
- Assessment of the old dump site on the CFB Petawawa side of the River;
- Meetings with municipal, provincial and federal agencies;
- Discussions with CFB Petawawa regarding future land use along Ypres Boulevard and future plans for the Base complement.

The alignment of the new route may need to be re-assessed should more detailed work reveal impacts that significantly change the tradeoffs between the new route alternatives.

Appendix A
PIC Summary Report

Appendix B
Traffic Count Data

Appendix C
Species At Risk