2.0 NEED AND JUSTIFICATION

2.1 Background

Highway 17 comprises part of the Trans-Canada Highway and provides a major transportation link between Eastern Ontario and Northern Ontario. The original need for the highway was established through a continuous planning program set up by the Ontario Department of Highways in 1955. Two reports "A Plan for Ontario Highways" in 1956 and "Ontario Roads and Streets" in 1958, summarized the future needs for Ontario roads. Subsequently, Ontario was divided into highway planning areas to facilitate the detailed study of the specific traffic needs of each area.

In 1969, the "Highway 17 Planning Study, Ottawa to North Bay" was completed by the Traffic and Planning Studies Office of the Ontario Department of Highways. The objectives of this study were:

- To examine present and future traffic requirements of Highway 17 between Ottawa and North Bay;
- To develop a plan for Highway 17 which will provide an adequate level of service throughout the planning period (1964-1985);
- To ensure that the plan for Highway 17 will be sufficiently flexible to accommodate possible changes during the planning period and expansion beyond the year 1985. Also, to complement highway and street plans in areas and urban municipalities in and adjacent to the study area; and
- To establish priorities and cost estimates of new construction and improvements which will be required to bring Highway 17 to the standards recommended by the plan.

A large scale roadside origin-destination survey was conducted for the corridor to establish 1964 travel patterns for July and August, which represented the peak travel months in rural Ontario. The traffic volumes were expanded to 1985 levels on the basis of population and growth data. Four cordons around the Towns of Arnprior, Renfrew, Pembroke and Mattawa provided traffic information relating to the corresponding urban areas. Eight north-south screenlines were established between Ottawa and North Bay to count traffic volumes used to validate the origin-destination interview data.

The study concluded that the Highway 17 corridor should be served by a freeway in the long term plan and in the interim by a highway of an arterial classification. The future Highway 17 would require controlled access with bypasses of the urban centres. The highway was to be located near the urban centres, however, to provide maximum service to local traffic. In general, 4 lanes will be required by the end of the planning period for the eastern and western sections of the highway.

Based on the conclusions of the 1969 Planning Study, controlled access highway designations and formal Road Closing Plans were prepared and registered in 1971 for the Township of McNab-Braeside (formerly the geographic Township of McNab) and the Town of Arnprior, and in 1972 for the Townships of Horton and Ross and the Town of Renfrew. The right-of-way was nominally 100 m in width (324-336) feet with additional property identified at side roads, potential interchanges, and embankment locations. Property for this corridor was subsequently purchased by the Department of Highways.

Two-lane highway sections between Arnprior and Renfrew based on the 1971-72 plans were constructed in a series of contracts between 1969 and 1980, as listed in **Table 2-1**. The existing lanes will become the future eastbound lanes for the ultimate freeway except at the west limits of the project where the existing lanes will become the future westbound lanes. The design was based on offsets from the property line to the centre of the eastbound or westbound lanes of 30 m (100 feet).

Table 2-1
Highway 17 Construction History

Contract	Location	Work Type
69-132	County Road 508 westerly to Anderson Road	Grading, Drainage, Granular Base and Base Course Paving
70-234	White Lake Road westerly to County Road 508	Grading, Drainage, Granular Base and Base Course Paving
73-186	Anderson Road westerly to 2 km west of Bruce Street	Grading, Drainage and 3 structures (Bonnechere, CPR and CNR)
74-83	2 km west of Bruce Street westerly to Haley Road	Grading and Drainage
75-83	Anderson Road westerly to Haley Road	Grading, Drainage, Granular Base and Paving
78-42	County Road 29 to White Lake Road	Grading and Drainage
80-27	County Road 29 to White Lake Road, including intersections at White Lake	Grading, Drainage, Granular Base and Paving

Table 2-1 Highway 17 Construction History		
Contract	**Location**	**Work Type**
	Road, Baskin Drive and County Road 29	
(1990)	Bruce Street westerly to Storyland Road	Resurfacing
93-29	Baskin Drive to Bruce Street	Resurfacing

In the early 1990's the Ministry of Transportation (MTO) completed the planning and preliminary design for the adjacent 16 km of freeway from Breezy Heights Road to County Road 29 in Arnprior. The recommended cross section was a 100 m right-of-way with 30 m offsets from the centre of the eastbound and westbound lanes to the property limit and a 32.5 m median. This cross section is consistent with that shown in the Road Closing Plans from Arnprior to Renfrew. The 16 km section of 4-laning, to the east of this study, is scheduled to be completed to Arnprior with a planned completion in 2004 and this study allows continuation of twinning projects westerly to Renfrew.

2.2 Transportation Environment

This section provides an assessment of current and projected traffic conditions in the Highway 17 study area. Vehicular demands and identified safety concerns will determine the need for specific operational or capacity improvements such as highway widening. This overview of the traffic and transportation of the existing and project conditions for the study area is detailed in **Appendix D, Traffic Operations Report** appended to this document.

2.2.1 Existing Transportation Network

The study area consists of approximately 30 kilometres of highway extending from County Road 9 to west of the Town of Renfrew. The existing cross section comprises a basic 2-lane undivided roadway with a posted speed of 90 km/h. Passing lanes are provided in several locations for both eastbound and westbound travel. There are thirteen cross roads with at-grade intersections with four signalized intersections. There are no private driveways or entrance locations in the study area having direct access to Highway 17.

2.2.1.1 Existing and Future Traffic Volumes

The historical and projected Average Annual Daily Traffic (AADT) volumes on Highway 17 are illustrated in **Table 2-2**, Historical, Current and Projected Average Annual Daily Traffic Volumes. The current traffic levels are constant throughout the study area with a slight decrease at County Road 508. The historical growth in traffic was derived through the application of growth rates specific to the count locations. There has been a significant increase in traffic volumes in the Arnprior area.

Table 2-2 Historical, Current and Projected Average Annual Daily Traffic Volumes (AADT)				
Location	**1991**	**2000**	**2010**	**% Growth 2000 to 2010**
County Road 29	7950	11300	16750	48%
White Lake Road	8200	11200	15850	42%
County Road 508	9050	10200	11650	14%
Miller / Anderson	9200	11000	13450	22%
O'Brien Road	6900	11000	13450	22%
Source: MTO, 2002				

2.2.1.2 Design Hour Volume

The Design Hour Volume (DHV) is a one-hour period used to assess the various operating characteristics of a highway. It is expressed as a percentage of the Average Annual Daily Traffic (AADT) volumes and typically reflects the 30 busiest hour of travel. In the Highway 17 study area, the DHV has historically ranged from 10% to 13% of the AADT. More specifically, in 1996, the DHV in the Eastern, Central and Western Sections was 10.2%, 12.6% and 10.2%, respectively. The DHV values in the Eastern and Western Sections have decreased (from 1991 to 1996) while the Central Section has remained relatively constant. The decrease is attributed to a greater level of commuter use and increased highway congestion in the urbanized parts of the study area, which results in highway users spreading

their travel periods over greater period. It is expected that the continued increase in traffic within this corridor will result in DHV's that are consistent in all three study sections. In this regard, it is projected that the DHV in the Central Section of the study area will generally match the DHV values of the two adjoining sections.

2.2.1.3 Commercial Vehicles

Commercial vehicles reflect the percentage of light, medium and heavy vehicles on the highway. The number of commercial vehicles travelling on Highway 17 generally equals 12.8% of the total traffic volume in the eastern and central sections and 14.5% in the western section. In total, approximately 1000 trucks operate on this section of Highway 17 daily carrying freight worth about several billion dollars annually.

2.2.1.4 Cross Roads

The traffic volumes at the unsignalized intersections have increased near the urban areas of Arnprior and Renfrew. O'Brien Road, County Road 6 and County Road 508 have considerable turning activity evident. White Lake Road is a signalized intersection that exhibits the highest volume of weekday traffic levels of 9,800 vpd (vehicles per day) and higher volumes on both Friday and the weekend. The lowest traffic volumes are at Scheel Drive, Goshen Road and Campbell Drive.

2.2.1.5 Highway 17 Operational Analysis

Highway operating conditions are typically expressed in terms of Level of Service (LOS). Level of Service is a measure of the quality of traffic service provided by a roadway, and ranges from LOS "A", freeflow to LOS "F", failure. Highway 17 is defined as a Class 1 highway and is a primary link in the provincial highway system. Drivers on a Class 1 highway anticipate higher travel speeds and fewer delays. The LOS "E" is not considered an acceptable operating condition because of the accompanying significant effects on highway safety. The typical threshold for improvements is LOS "C". At this level roadway widening and/or other operational improvements should be considered and implemented before any further degradation in service occurs.

Based on 2000 traffic volumes the White Lake Section of Highway 17 operates at a LOS "E", the County Road 508 section operates at a LOS "D" and the O'Brien Road section operates at a LOS "D". With respect to the future LOS the White Lake Road section is projected to remain at LOS "E" for both the high growth scenario and the low growth scenario. The County Road 508 section is projected to experience a LOS "D" until 2010 and then decline to a LOS "E" with a low growth scenario. Under the high growth scenario this section will experience a LOS"D" until 2005 and a LOS "E" after 2005. The O'Brien Road section will remain at LOS "D" until the year 2020 under both the low and high growth scenarios.

There is a need for additional capacity in this segment of Highway 17 both under current and projected conditions.

2.2.1.6 Intersection Operation

There are nine key intersections in the study area; three of which are signalized and six are unsignalized. There are two signalized intersections in the Town of Arnprior and one signalized intersection at the Town of Renfrew. All three intersections will operate at an acceptable level of service until the year 2010, following which Baskin Drive and White Lake Road will experience a reduced level of service. The need for improvements such as dedicated left turn lanes at Baskin Drive and White Lake Road will depend to a great extent on the timing of any widening. The highway operations are impacted by the signalized intersections and the development of alternatives that eliminate the at-grade signalized crossings are warranted in the 20 year planning horizon to ensure highway operations are commensurate with this class of roadway and with driver expectations.

2.2.1.7 Unsignalized Intersections

There are six unsignalized intersections within the study area. Traffic signal warrant analyses determined that signals would be warranted at O'Brien Road within the 2005 to 2010 planning horizon, and County Road 6 after 2010. The development of alternatives that eliminate all at-grade

unsignalized crossings will ensure highway operations are commensurate with this class of roadway and driver expectations.

2.2.1.8 Collision Analysis

The collision analysis was separated into the mainline highway and signalized intersections. The resultant number of collisions occurring on the mainline section of Highway 17 is less than the number expected on a typical highway section with similar geometrics and traffic volumes. The number of fatal collisions is considerably higher within the eastern section of the highway, between Scheel Road and County Road 29. About 6 percent of all collisions occurred at the bridges within the existing corridor. Two-thirds of collisions occurred during daylight hours. Single vehicle collisions accounted for almost half of all recorded crashes during the period reviewed.

2.2.2 Future Requirements

There is a need for additional capacity on Highway 17; the existing level of service is incompatible with the nature and function of the highway and the expectations of the users of the facility. Based on the projected traffic volumes presented in this report, the twinning of the highway would provide a LOS "A" in all sections. Based on the capacity and collision analyses, the improvements to the study area are illustrated in **Table 2-3, Summary of Improvements.**

Table 2-3
Summary of Improvements

First Priority Improvements (0-5 yr.)	• Twin Highway 17 from County Road 29 westerly to Scheel Drive easterly to County Road 29 (limit of future Phase 1 4-lane section).. • Grade separations of Baskin Drive and Division Street. • Interchanges at White lake Road and Campbell Drive.
Second Priority Improvements (3-7yrs)	• Twin Highway 17 from Scheel Drive to Goshen Road. • Grade separations at major cross roads. • Provide interchange at County Road 508. • Close McCallum Road. • Traffic Control signals required at O'Brien Road intersection.
Third Priority Improvements (beyond 7 years)	• Widen Highway 17 from Goshen Road to west of Bruce Street. • Provide grade separations at major cross roads. • Interchanges at County Road 6, O'Brien Road and County Road 20

In addition to the operational review recommendations of the planned roadway network, the following suggestions are provided:

- Provide high level lighting at all transition zones and avoid areas of vertical or horizontal alignment changes; and
- The Whitton Road intersection should be outside the limits of the interchange design.

2.3 Project Justification

This project was initiated by the MTO to address the following operational problems on Highway 17 in the study area:

- Unacceptable Level of Service conditions i.e. reduced travel speeds, manoeuvrability and excessive lane densities (i.e. how closely vehicles are spaced);
- Driver frustration because of the high volume of traffic coupled with the lack of available passing opportunities;
- The specific operating needs of commercial and heavy vehicles;
- The severity of accidents (personal injury and fatalities) evident on Highway 17;
- Conflicting movements at the numerous at-grade intersections; and
- Anticipated growth in travel demand on the Highway 17 corridor.

The twinning of Highway 17 between Arnprior and Renfrew is required to address these deficiencies and provide for the safe and efficient movement of goods along this section of the Trans-Canada Highway. The improvements will also help to address community growth and land use development needs within the study area.

Previous planning studies over a 30 year period have established the need for a freeway facility in this travel corridor. This study served to re-examine and build on these previous recommendations, as well as addressing the requirements of the Environmental Assessment Act in developing a Recommended Plan for the highway twinning.

2.4 Summary

Highway 17 provides a major transportation link between Northern and Eastern Ontario. The "Highway 17 Planning Study, Ottawa to North Bay", 1969, concluded that the Highway 17 corridor should be served by a controlled access freeway in the long-term plan. A freeway corridor was then designated, and property for the ultimate plan was acquired by the Department of Highways in the 1970's.

Highway 17 was constructed between 1969 and 1980 as a 2-lane arterial cross section with the intention of ultimately twinning to a 4-lane freeway when warranted by traffic growth. Traffic volumes have now grown to the extent that concerns for level of service and operational safety need to be addressed for existing and future conditions.

The twinning of Highway 17 is required to provide safe and efficient traffic operation and capacity on Highway 17 to meet forecasted future traffic volumes. In addition, improvements to the highway will also help to meet community growth and land use development needs in the study area. By re-examining and building on the recommendations of the 1969 Planning Study, a recommended plan has been developed to address these needs and fulfill the requirements of the Environmental Assessment process.