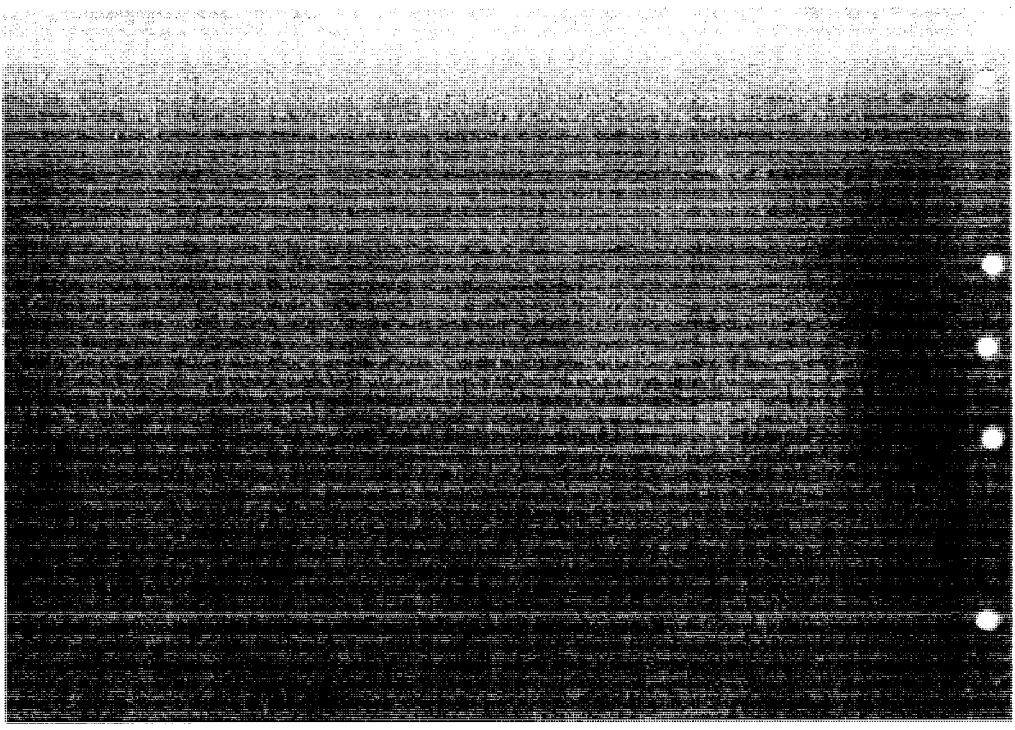
PART I

ENVIRONMENTAL ASSESSMENT REPORT



1. Summary

1.1 Purpose of the Undertaking

The proponent is the Ministry of Transportation and Communications. The purpose of the undertaking is to ultimately provide a new fully grade separated freeway facility to:

1. Improve access to the recently expanded Hamilton Civic Airport.

2. Encourage industrial and residential growth in Townsend/Nanticoke and Hamilton-Wentworth Region.

3. Alleviate operational deficiencies on existing Highway 6.

To fulfill the purpose of the undertaking, Highway 6 (New) has the following objectives:

1. **Provide access from the airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself.**

2. **Increase use of the Caledonia Bypass.**

3. **Improve access to and provide flexibility for development in Townsend/Nanticoke.**

4. **Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system.**

5. **Select a route which can be stage constructed in a realistic and economical manner.**

1.2 Description of the Undertaking

The undertaking is a new, ultimate six-lane, fully grade separated, divided, rural freeway with a 120 km/h design speed (RFD 120). A description of the recommended plan for Highway 6 (New) is included in Chapter 6; detailed plans and profiles of the recommended design along with the Preliminary Design component of the study are found in Part II.

The following briefly describes the recommended alignment and profile for Highway 6 (New) from Highway 403 in Ancaster to the north end of the Caledonia Bypass at Greens Road (refer to Exhibit 1.1).

Starting at Greens Road (the north end of the existing Caledonia Bypass), a full interchange would be provided for access to Caledonia.

The alignment proceeds northerly towards Unity Road, a designated rural hamlet and an area determined to be environmentally significant for the purposes of this study. The crossing at Unity Road is in an area of deep cut, approximately 7 to 9 m, and thus mitigates visual and noise effects.

From Unity Road the alignment follows existing lot lines wherever possible. Overpasses are provided at Townline, Leeming and Chippewa Roads.

Between Chippewa and White Church Roads there is an overpass at White Church Road and an interchange with a connection to existing Highway 6. In addition to local access, the interchange serves a major traffic movement from Highway 6 (New) onto Highway 6 Existing and into Hamilton. The location and function of this interchange was judged to be environmentally significant for the purpose of this Study.

An interchange is provided opposite the existing access to the parking area of the Hamilton Civic Airport. This interchange is intended, in the short term, to serve all of the facilities associated with the Hamilton Civic Airport; and in the long term, will serve traffic to the Airport's air cargo and general aviation facilities.

The alignment proceeds to the west where it crosses Glancaster and Butter Roads. Overpasses will be provided at both these roadways.

The alignment proceeds northerly toward Book Road. At Book Road, an interchange is provided for local access and to serve airport-related industries and the long-term requirements of Transport Canada for a terminal on the north side of the Airport. The Book Road area was judged to be environmentally significant for the purposes of this Study.

The alignment proceeds northerly from Book Road to join the existing designated lands. This designation was laid down by the MTC in 1975 to protect land for a future interchange between Highway 403 and Highway 6 (New).

The interchange provided at Highway 403 serves all movements between Highway 403 and Highway 6 (New). In addition, ramps are provided to and from Highway 53 serving movements to and from the east on Highway 403.

It is proposed that Highway 6 (New) be staged constructed as follows:

Stage 1 - two-lane undivided arterial highway;
Stage 2 - four-lane divided rural freeway;
Stage 3 - six-lane divided rural freeway.

Proposed staging is discussed in detail in Chapter 6.

1.3 Justification for the Undertaking

The identified need for a new transportation corridor between Hamilton and Nanticoke relates to municipal, provincial and federal desires to create an environment which will encourage planned development in the area. The new route is also needed to alleviate deficiencies in the access between the provincial freeway network and the existing and planned developments in the Hamilton/Nanticoke corridor.

Specifically, the need for Highway 6 (New) is based upon:

1. Improving access to the recently expanded Hamilton Civic Airport.

2. Encouraging industrial and residential growth in Nanticoke/Townsend and Hamilton-Wentworth.

3. Alleviating operational deficiencies on existing Highway 6.

The need and justification for the undertaking is detailed in Chapter 2.

1.4 Advantages and Disadvantages of the Undertaking

The advantages are:

- direct access from the airport to the Provincial freeway system;
- increased use of the Caledonia Bypass;
- improved access to Townsend/Nanticoke;

Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

0 500 1000m

Study Area Boundary

Highway 6 New Designated Section

Exhibit 13

Recommended Route

- improved access to the industrial area of lower Hamilton;
- flexibility for staged construction to provide traffic service in accordance with available funding;
- the reduction of through and truck traffic from congested urban areas;
- encourages Provincial and Municipal objectives for economic growth;
- addresses needs and concerns of the trucking industry
- improved operational safety on the Provincial highway system.

The disadvantages are:

- removal of 166 ha of agricultural land including 34 ha of woodlot and 11 ha of waterfowl nesting area;
- removal of four residences;
- the creation of proximity impacts (noise, visual intrusion) in a largely rural area;
- reduction in traffic on existing Highway 6 may affect existing businesses.

These advantages and disadvantages are elaborated throughout the document.

1.5 Alternatives to the Undertaking

Alternatives to the undertaking consist of:

- modal (transit, rail, air);
- upgrading of existing facilities;
- "do nothing".

These alternatives to the undertaking were compared to the transportation objectives outlined above.

The transit, rail and air alternatives do not provide for improved auto and truck access to the airport, Townsend/Nanticoke or the industrial area of lower Hamilton, and they do not increase use of the Caledonia Bypass.

Either upgrading of existing facilities or "do nothing" will not improve access to the airport, Haldimand-Norfolk or the industrial area of lower Hamilton. They do not increase use of the Caledonia Bypass. These alternatives do not provide for a new connection to Highway 403 and thus do not improve accessibility beyond that currently provided by the existing road system.

A more detailed comparison of the alternatives to the undertaking is presented in Chapter 5.

1.6 Corridor Alternatives
(Alternative Methods of Carrying Out the Undertaking)

During earlier studies for Highway 6 (New) between Caledonia and Hamilton (including the 1976 Highway 6 Nanticoke to Hamilton Joint Use Corridor Study), three basic corridors were identified for potential alignments between Caledonia and Hamilton. These corridors were:

1. The "West Corridor", located west of existing Highway 6 connecting to existing Highway 403 in Ancaster.
2. The "Central Corridor" generally located immediately east of existing Highway 6 and connecting to the proposed East-West Arterial in Hamilton-Wentworth.
3. The "East Corridor" generally east of the CNR tracks connecting to the proposed North-South Parkway in Hamilton-Wentworth.

In order to identify the Study Area for the Caledonia to Hamilton Study, it was decided to analyze the above three corridors in terms of their ability to meet the transportation objectives.

It was decided that if any of the three basic corridors did not meet the required objectives of the new facility, then they would be considered to be unacceptable alternatives and would be abandoned without any further study.

Based on this analysis (presented in Chapter 5), it was concluded that the East and Central Corridors do not adequately meet the required transportation objectives and, consequently, the Central and East

Corridors were not studied further. The Study Area is thus defined around the West Corridor.

1.7 Alternative Alignments

(Alternative Methods of Carrying Out the Undertaking
- Route Location and Alignment Alternatives)

Between Highway 53 and Glancaster Road there are three basic alternative alignments. Between Glancaster Road and the Caledonia Bypass at Greens Road there are four basic alternative alignments. In addition, there are also two abandoned alternatives at the west end of the Study boundary.

These alignments were generated on the basis of technical feasibility and the avoidance of known major impacts and constraints.

Chapter 5 of this report deals with the detailed comparative evaluation of the corridor alternatives and the alignment alternatives.

1.8 Study Area

Exhibit 1.1 illustrates the study area. The alternative alignments subject to detailed analysis and comparison are contained within this area, and are shown on Exhibit 5.2. The determination of the study area is presented in Chapter 5.

1.9 Potential Effects and Mitigating Measures

Detailed information on potential effects and related mitigating measures for the recommended design are included in Chapter 6 of this Environmental Assessment. The more important potential effects identified during the course of this study are discussed in Section 6.3, "Environmentally Significant Areas and Issues". Table 1.1 summarizes information related to these issues.

Section 6.4 of this Report describes commitments made to future work as a result of this Environmental Assessment.

Part II of this report presents tables outlining typical mitigation measures considered for construction effects.

1.10 Public Participation

Details of the project's public participation program are included in Chapter 3 and the relevant appendices. In summary, the formal public participation program proceeded as follows:

Start of Project

April 1985 - Newspaper announcement and brochure mailing informing the public of the start of the project

Preliminary Assessment of Feasible Alternatives

May 1985 - Newspaper announcement and Public Information Centre brochure distribution

June 1985 - First Series of Public Information Centres held in Ancaster and Mount Hope

Detailed Evaluation of Feasible Alternatives and Presentation of a Technically Recommended Alignment

October 1985 - Newspaper announcement and Public Information Centre brochure distribution

October 1985 - Second Series of Public Information Centres held in the Unity Road Hamlet and Ancaster

Special Property Owners Meeting - White Church Road Area

February 1986 - Direct mailing to affected Property Owners informing them of the special meeting

February 1986 - Property Owners Meeting, White Church Road Area

Presentation of Recommended Alignment in Preliminary Design Level of Detail

March 1986 - Newspaper announcement and Public Information Centre brochure distribution

April 1986 - Third Series of Public Information Centres held in Ancaster and the Unity Road Hamlet.

TABLE 1.1

GENERAL SUMMARY OF ENVIRONMENTALLY SIGNIFICANT AREAS/ISSUES

Issue/Concern	Report Section	Future Work Proposed	Agencies/Groups Involved In Future Work	Comments
Noise	6.3.1	Detailed barrier calculations during final design.	Property Owners/ MOE	Mitigation to be investigated and provided based upon MTC/MOE noise protocol.
Agriculture	6.3.2	Access to be provided to new farm units created Landlocked parcels to be offered for sale to adjacent owners	Property Owners	Standard MTC practice.
Unity Road	6.3.3	Investigate advanced tree planting	Haldimand/ Norfolk Board of Education	To reduce visual impacts associated with the crossing, advanced tree planting will be investigated at the time of detail design.
White Church Road	6.3.4	None required.	N/A	Mitigation incorporated in design.
Book Road	6.3.5	Provide access to historic abandoned human cemetery (Parkin)	Town of Ancaster	Town requires access to the cemetery in order to undertake maintenance.
Property	6.3.6	Obtain residences prior to construction	Property Owners	Residences preferably obtained on a willing seller, willing buyer basis at fair market value.
Vegetation	6.3.7	Walk R-O-W to identify significant species	MNR	To be undertaken during detail design.

1.11 External Contacts

Formal Municipal Council presentations were made during May 1985, October 1985, February 1986 (Glanbrook Council only), and April 1986. Numerous working meetings and correspondence were conducted with municipal staff members from all affected municipalities.

An External Team was formed of all government agencies and ministries which have formal review of the Environmental Assessment Report. Formal External Agency presentations were made in June 1985, October 1985 and April 1986. In addition, several working meetings were made with individual ministries and agencies for a specific project-related concern. These were:

- Ministry of Agriculture and Food;
- Ministry of the Environment;
- Ministry of Citizenship and Culture;
- Ministry of Natural Resources;
- Grand River Conservation Authority;
- Niagara Peninsula Conservation Authority;
- Transport Canada;
- Ontario Hydro.

Contact was made with the following utility companies to determine location of existing plants, planned improvements or expansion, and relocation or plant modification requirements:

- Ontario Hydro;
- Union Gas;
- Bell Canada;
- TransCanada PipeLines;
- Interprovincial Pipelines;
- Trans Northern Pipelines.

Additional information on external contacts is presented in Chapters 3 and 4.

1.12 Sub-studies Carried Out in Relation to this Project

As part of this route location and preliminary design study, the following interim reports were prepared:

- Interim Report: Study Area Determination and Traffic Analysis, M.M. Dillon Limited;
- Results of the First Series of Public Information Centres, M.M. Dillon Limited, June 1985;
- Results of the Second Series of Public Information Centres, M.M. Dillon Limited, October 1985;
- Results of the Property Owners' Meeting (White Church Road area), M.M. Dillon Limited, February 1986;
- Results of the Third Series of Public Information Centres, M.M. Dillon Limited, April 1986;
- Report W86-204, No. 1, Noise Environment Study, Highway 6 (New), Hamilton to Caledonia, March 10, 1986, S.S. Wilson and Associates Ltd.;
- Revision 1, Report W86-204, No. 2, Noise Environment Study, Highway 6 (New), Hamilton to Caledonia, September 15, 1986, S.S. Wilson and Associates Ltd.;
- Heritage Report, Ministry of Transportation and Communications, January 1987;
- Effects to Farm Operations, M.M. Dillon Limited, September 1986.

2. Introduction

2.1 The Environmental Assessment Report - One-Stage Submission

This report is a One-Stage Environmental Assessment Submission. The one-stage process allows for a one-time only Environmental Assessment to be carried out for a Group "A" project.

Part I of this report will document the following:

- the study purpose;
- the environmental assessment process followed;
- environmental conditions;
- alternative alignments evaluated, their environmental effects and potential mitigating measures;
- description of the recommended plan and its effects and mitigating measures;
- commitments to be undertaken for identified "environmentally significant areas/issues".

Part II of this report will document the following:

- traffic forecasts;
- design alternatives;
- general mitigation measures for construction;
- detail design requirements.

This Environmental Assessment Report is for submission to the Minister of the Environment for approval. Its approval will allow the Ministry of Transportation and Communications to:

- designate the recommended route;
- purchase property necessary for project implementation;
- complete the design and construct and operate the facility.

2.2 Justification for the Undertaking

The undertaking is an ultimate six-lane, fully grade separated, divided rural freeway with a design speed of 120 kph (RFD 120). Although this report deals specifically with the section of proposed Highway 6 (New) between the Hamilton Area and Caledonia, the entire corridor from Hamilton to Nanticoke is considered when addressing the issue of the need for a new facility.

Exhibit 2.1 shows Highway 6 (New) in relation to the freeway system in Southwestern Ontario. Without Highway 6 (New) there is no freeway access from the Hamilton area to the Nanticoke area on Lake Erie.

The identified need for a new transportation corridor between Hamilton and Nanticoke reflects municipal, provincial and federal aspirations to create an environment which will encourage planned development in the area. The new route is also needed to alleviate deficiencies in the access between the provincial freeway network and existing and planned developments in the Hamilton-Nanticoke corridor in order to establish a climate which is conducive to economic development.

Specifically, the need for Highway 6 (New) is based upon:

1. Improving access to the recently expanded Hamilton Civic Airport.

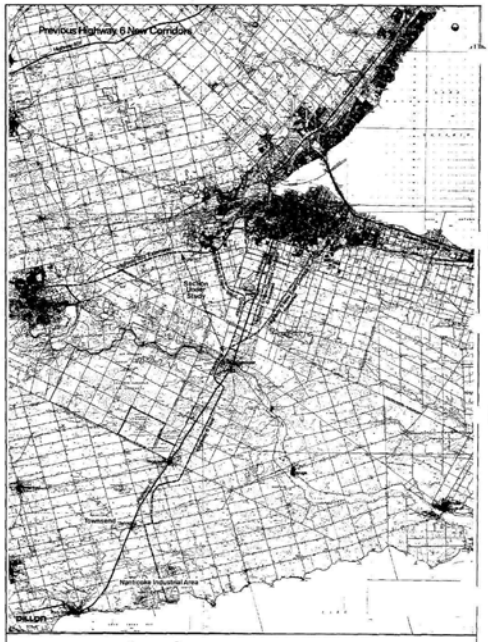
2. Encouraging industrial and residential growth in Nanticoke/ Townsend and Hamilton-Wentworth.

3. Alleviating operational deficiencies on existing Highway 6.

The following sections expand on these issues.

2.2.1 The Hamilton Civic Airport and Airport Industrial Business Park

A major justification for Highway 6 (New) is to provide improved access between the Provincial freeway system and the Hamilton Civic Airport, including related commercial and industrial developments associated with its expansion. The Airport has recently undergone a major expansion to promote an improvement in air carrier service. Also, the Airport's draft Master Plan indicates that additional expansion can occur within the present boundaries.



Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report

Proposed Routes

Exhibit 2.1

Highway 6 Corridors

According to Transport Canada, the level of service offered by the upgraded Hamilton Civic Airport will make it a viable alternative to Lester B. Pearson International Airport for passengers and freight from the Hamilton-Niagara-Brantford area.

The following statements were made in a letter dated August 17, 1982 to the Ontario Minister of Transportation and Communications from the Minister of Transport Canada:

> Transport Canada's forecasts for the utilization of Hamilton anticipate a significant improvement of carrier service following the upgrading of the airport. It is my department's view that the more extensive the services, the greater the traffic and the greater the incentive to carriers to offer yet better service. With more services being offered at Hamilton, more travellers in the area should regard it as a viable alternative to Toronto International Airport (TIA), especially given the forecast increase in airside delays at TIA, and the increased traffic on the access highway.

In order to adequately serve this regional market and to realize the full potential of the airport, Transport Canada concluded that improved road access was required. The Minister's letter of August 17, 1982 continued as follows:

> So as to exploit the full potential of the Hamilton Airport, it is essential that the road access be improved, not only for passengers from the City of Hamilton itself, but also from other cities and municipalities in the Hamilton-Niagara-Brantford area. Clearly, one of the most effective improvements would be to provide direct access to the Hamilton Airport from Highway 403.

This position was reiterated in a January, 1983 letter from the Federal Minister of Transport to the Ontario Minister of Transportation and Communications as follows:

> With respect to long-term development of the Hamilton airport, I would like to reiterate the views of my Department that, should air traffic activity at Hamilton increase as forecast, it will be necessary to further improve road access to the airport by construction of the proposed new Highway 6 corridor to ensure that direct highway access is available to the airport.

Accordingly, Transport Canada has urged MTC to ensure direct highway access to the Hamilton Civic Airport from Highway 403. In his letter to the Chairman of the Regional Municipality of Hamilton-Wentworth dated 27 July 1982, the Federal Minister of Transport mentioned their discussions concerning the "need for direct highway access to the Hamilton Airport, ideally from Highway 403."

Recent communication from the Minister of Transport Canada to the Ontario Minister of Transportation and Communications dated 9 April 1986 confirms the Ministry's position that "provision of regional access to Hamilton Airport would be a beneficial instrument for increasing the utilization of the airport." To that end, it is suggested that possible improvements to highway access to the airport would be desirable.

Copies of the Minister of Transport Canada's letters on this matter are included in Appendix A.

A Highway 403 to Highway 6 (New) connection would provide direct highway access to the airport and significantly increase its accessibility for the entire Hamilton/Haldimand-Norfolk/Niagara Peninsula/Brantford area. The Draft Hamilton Airport Master Plan confirms this need for regional accessibility. Transport Canada's regional planning staff are also concerned about under-utilization of the airport if highway access is not improved.

The Regional Municipality of Hamilton-Wentworth recognized the need for improving accessibility to the airport in their Official Plan policies. Section 9.5.5 of the Official Plan states that it is the policy of Regional Council:

> To encourage the appropriate Federal and Provincial authorities to provide a controlled access road facility connecting the airport terminal to the freeway system in the Hamilton-Wentworth area in order to ensure a high degree of accessibility to the airport from all areas in the Region.

The Council of the Regional Municipality of Hamilton-Wentworth passed the following resolution on 15 October 1985:

> That the Province of Ontario be urged to complete the first stage of No. 6 Highway to Hamilton Airport.

The City of Hamilton Council passed the following resolution on 31 January 1984:

> That Council take prompt steps to approach the Provincial Minister of Transport, The Honourable James Snow, with a view to obtaining a commencement upon the implementation of a full interchange on Highway 403 and the Nanticoke Highway Corridor

as far as the Airport Road extension, at as early a date as possible.

The Hamilton and District Chamber of Commerce, in a letter dated 3 January 1984, encouraged the study of Highway 6 (New) to provide direct access between the Airport and Highway 403:

> "We believe it is now the time to resolve the location of the north terminus of the Nanticoke-Hamilton Corridor (Highway 6). We believe it is important to provide a more direct access to the expanded Airport than is now being provided via Fiddler's Green Road at Highway 403, and that this should be one of the criteria for the study of this corridor terminus."

A report prepared by Regional staff, investigating existing and proposed access to the airport, concluded that:

> The proposed full interchange at Highway No. 403 and the Nanticoke Highway Corridor to the Airport Road Extension is required as soon as possible to ensure an efficient and direct route from and to the Airport.

2.2.2 Haldimand-Norfolk Region

In 1968, The Steel Company of Canada (Stelco) acquired several thousand acres of land on the north shore of Lake Erie to develop a new steel making plant and the Lake Erie Industrial Park. There are now 9,000 acres of land commonly known as Nanticoke. It also contains an Ontario Hydro thermal generating station, a major Texaco Canada oil refinery, and a few small-scale steel related industries. Since the early 1970s, there has been little additional industrial development. There now remains approximately 4,000 acres of readily available, zoned, industrial land.

This land has good rail and ship access and most of it is fully serviced. Hydro power is readily available from the nearby thermal generating station. The lands are zoned for virtually all types of industrial uses, including the large-scale steel and refining activities currently underway. There is little other development nearby, and a buffer zone, a 3 km Industrial Influence Area, has been designated around the exterior properties of the Stelco mill, Hydro and Texaco sites in the City of Nanticoke District Plan so that new land uses which are incompatible with heavy industrial operations are restricted. In summary, the Nanticoke area is an ideal location for large-scale, heavy industrial uses. The services are provided and there are no other nearby conflicting land uses. However, the one missing piece of infrastructure for these industrial operations is the lack of good highway access.

At the time of the development of the Lake Erie Industrial Park, the Ontario Government proceeded with the planning of Townsend as a major new community to accommodate the forecasted residential growth. In the Official Plan for the Haldimand-Norfolk Planning Area, Townsend was planned to accommodate a population of approximately 40,000 persons. Today, it contains a population of less than 2,700 persons.

Townsend/Nanticoke is thus an area of considerable unrealized potential in both industrial and residential growth.

It is widely held among municipal politicians, municipal staff, provincial civil servants, and industry representatives that a major reason for this growth not occurring is the poor access and that improving the accessibility of Nanticoke by the construction of Highway 6 (New) will encourage an acceleration in industrial development in Nanticoke and the corresponding residential development in Townsend.

In addition, many reports have concluded that the existing Highway 6, which is the main access route from Nanticoke to Hamilton, Toronto and points beyond, is inadequate.

In order to investigate these concerns, interviews were held (as part of this Study) with representative industries and trucking firms in the Highway 6 Corridor. Information was solicited from 14 representative firms in the areas of steel production, transportation, mining and refining. Those surveyed ranged in size from 20 to 1,400 employees and were generally located in Nanticoke, Caledonia, Hagersville, Simcoe, Cayuga, Port Dover, and Delhi.

Problem areas cited by many, if not all, of those interviewed were:

i) Many truckers avoid Highway 6 where possible due to congestion in Hamilton and other communities. Truckers will travel considerable distance on other routes to avoid Highway 6 through urban areas.

ii) There is very poor access from Nanticoke to the Provincial freeway system. Most notably Highway 6 does not connect to Highway 403. Such a connection would provide direct access to the Provincial freeway system.

iii) There are significant operational problems relating to additional travel distance and turning movements, and speed change

requirements on the Caledonia Bypass. Many truckers remain on Highway 6 through Caledonia to avoid the Bypass.

Due to the nature of the industries in the Nanticoke area, mainly steel, mining and refining, trucks used for moving these goods are generally the largest and heaviest allowed by law. These types of trucks have considerable impact on urban areas by adding to congestion, noise, dust, vibration, and visual intrusion. These types of trucks are best carried by a freeway facility that avoids urban areas.

Many of the trucking firms have shown growth in recent years, adding considerably to their fleet of trucks and trailers. Representative industries attributed this growth to increased use of trucks for transporting finished goods. Recently manufacturers have modified inventory procedures and demand that material be supplied within very short time frames. This procedure, referred to as "just in time" or JIT inventory, has placed increasing demand on truck hauling as it is the only mode of transport that can meet these new stringent delivery requirements.

Thus, trucking firms and industries forecast increased reliance on truck movements even at existing production levels. In addition, many firms were "cautiously optimistic" about their growth, believing that they would grow along with the rest of the economy in general.

Most of those interviewed believed that a new Highway 6 facility would significantly improve their current and future operations. They believed improved access to Nanticoke is vital to increased economic development of the area and that historically, poor growth in the Nanticoke area can at least partially be attributed to the poor highway access.

The Director of Industrial Development for the Regional Municipality of Haldimand-Norfolk was also interviewed. He stated that many of the firms considering Nanticoke for new industrial sites have expressed concern about the area's lack of good highway access. There is a strong perception in the area that, as a result of this poor access, industries have selected sites other than Nanticoke.

The Director of Industrial Development feels strongly that improving the accessibility of Nanticoke by developing Highway 6 (New) would attract more industries and generate additional development, and help realize the growth potential of the area.

2.2.3 Hamilton-Wentworth

Highway 6 (New) is also seen as providing access to and stimulating development in the Hamilton-Wentworth Region.

Within the Town of Ancaster a major industrial business park has been designated at Duff's Corners (Highway 2 at Highway 53). It will be approximately 1,200 acres in size comprised of mainly lighter type industrial uses with some commercial/business use. Accessibility was a major factor in the planning of this business park and Highway 6 (New) was identified as a contributor to its success. The direct link via Highway 6 (New) to the Hamilton Civic Airport and Nanticoke enhances the business park's accessibility.

Also within Ancaster, a major residential development is planned just east of Highway 6 (New). This development, known as Scenic Woods, will ultimately support some 17,000 persons. Investigations have indicated that traffic generated by this additional development will overload the Mohawk Road/Highway 403 interchange, severely limiting access to Highway 403. Highway 403 serves areas to the west in Ancaster and Brantford and also lower Hamilton and points beyond in Burlington and Toronto. Additional access provided at the Highway 403/Highway 6 (New) interchange will offload the Mohawk Road/Higway 403 interchange, thus increasing regional accessibility to the future residents of Scenic Woods and improving the viability of the development.

To support Highway 6 (New), the Town of Ancaster Council passed a resolution on 13 May 1985, citing the strong need for a new highway to alleviate the increasing amount of traffic requiring access to and from Lake Erie destinations, and to serve the expanded Hamilton Civic Airport.

In the Township of Glanbrook, an industrial business park has been approved to encourage complementary airport-related industries. The business park is 300 acres and is located west of existing Highway 6, north of the Airport. This is adjacent to the area set aside under the Draft Hamilton Airport Master Plan for future long-term expansion and a new air terminal buildings. Highway 6 (New) will provide access to and from Highway 403 for both the Airport expansion area and the industrial business park, thus avoiding travel through the urban areas of Hamilton and Ancaster.

In addition, the Regional Muncipality of Hamilton-Wentworth's Official Plan supports Highway 6 (New) by stating that it will improve

accessibility from Caledonia into Hamilton by accommodating traffic from Nanticoke to Hamilton-Wentworth, Toronto, and points east.

2.2.4 Purpose of the Undertaking

In summary, the purpose of the undertaking is to provide a fully grade separated freeway facility to:

1. Improve access to the recently expanded Hamilton Civic Airport.
2. Encourage industrial and residential growth in Townsend/Nanticoke and the Hamilton-Wentworth Region.
3. Alleviate operational deficiencies on existing Highway 6.

2.3 Transportation Issues

2.3.1 Transportation Objectives

To fulfill the purpose of the undertaking, Highway 6 (New) has the following objectives:

1. **Provide access from the airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself.**
2. **Increase use of the Caledonia Bypass.**
3. **Improve access to and provide flexibility for development in Townsend/Nanticoke.**
4. **Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system.**
5. **Select a route which can be stage constructed in a realistic and economical manner.**

The following sections will elaborate upon the objectives by outlining their rationale.

Objective 1 - Provide access from the airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself.

The first objective is in response to the strong requests from Transport Canada, The City of Hamilton, The Regional Municipality of Hamilton-Wentworth and local businesses for improved Airport access. Access today is only available via municipal roads, and local residents object to the use of such roadways as major transportation routes.

Objective 2 - Increase use of the Caledonia Bypass.

In response to municipal and local residents concerns over the use of the existing Highway 6 through the Town of Caledonia by heavy truck traffic, the Ministry of Transportation and Communications opened the Highway 6/Caledonia Bypass in 1983. Today, due to the extra turns and the additional distance required to use the Bypass, some truck traffic has elected to remain on old Highway 6 through the Town. The completion of Highway 6 (New) north of the Bypass will encourage truck traffic to completely avoid existing Highway 6 through Caledonia and thus will increase use of the Bypass.

The south end of the Bypass is the subject of another study, and improvements are planned in the near future that will encourage use of the Bypass.

Objective 3 - Improve access to and provide flexibility for development in Townsend/Nanticoke.

Municipal politicians, municipal staff, provincial civil servants, and industry representatives have been strong in stating that a new Highway 6 Corridor connection to the provincial freeway system will encourage an acceleration in industrial development in Nanticoke and the corresponding residential development in Townsend.

Objective 4 - Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system.

Interviews with trucking firms and industries indicate that a major problem with existing Highway 6 is its poor connection to the provincial freeway system. These connections now require considerable travel through the urban areas of Hamilton. With Highway 6 (New) connected to Highway 403, most of the urban area of Hamilton is bypassed and truck traffic is carried by a route designed to carry heavy trucks.

Objective 5 - Select a route which can be stage constructed in a realistic and economical manner.

Construction of Highway 6 (New) is considered to be in the long term. However, pressure from area municipalities, Transport Canada, and

local businesses may require that Highway 6 (New) be built in stages. It is therefore desirable to select an alignment which will facilitate the incremental meeting of transportation objectives, while at the same time demanding only a reasonable level of capital investment.

2.3.2 Traffic Forecasts

In order to assess the travel demand between Caledonia and Hamilton, a corridor traffic forecasting and transportation analysis was undertaken. Population and employment forecasts were prepared for two growth scenarios: "anticipated" and "high" growth. From these, traffic projections were made for the three corridors discussed in Chapter 5.

2.3.2.1 Population and Employment Forecasts

The population and employment forecasts were prepared for the Highway 6 Corridor from Hamilton to Lake Erie, including the communities of:

- Hamilton Mountain
- Dundas
- Ancaster
- portions of Stony Creek
- Caledonia
- Jarvis
- Hagersville
- Townsend
- Nanticoke
- Simcoe
- Port Dover.

These forecasts were based upon information provided by the following agencies:

- Regional Municipality of Hamilton-Wentworth
- Regional Municipality of Haldimand-Norfolk
- The Ontario Ministry of Transportation and Communications
- The Ontario Ministry of Treasury and Economics
- Statistics Canada

The anticipated population and employment projections assume that growth will proceed in accordance with past trends.

However, the Highway 6 Corridor also has the potential to go beyond past trend growth. The factors contributing to the potential for high growth include:

- complete expansion of Hamilton Civic Airport and total development of the Airport Industrial Business Park;
- completion of the development of plans for the new town of Townsend;
- predicted potential development of the Nanticoke (Stelco) works in the Lake Erie Industrial Park.

2.3.2.2 Airport Generated Traffic

Future traffic for the Hamilton Civic Airport was estimated based upon Transport Canada's projected four times increase in passenger travel above the 1980 levels. The forecast is for flight-related traffic only, it does not reflect traffic generated by the Airport Industrial Business Park. The total Airport vehicle trip generation in the year 2001 is estimated to be 4,300 vehicles per day.

2.3.2.3 Truck Traffic

Truck volume forecasts for the year 2001 were based on existing truck volumes factored by the change in employment levels. These volumes were assigned to the different corridors based on a truck origin-destination survey conducted in June 1984. Most truck traffic is comparatively long-distance trips from south of Caledonia to the industrial regions of Hamilton and to points beyond. Highway 6 (New) was assigned the majority of truck traffic in the area as it will provide good access to the freeway system to facilitate long-distance trips. In addition, the trips bound for Hamilton's industrial area will be able to avoid the congestion experienced through central Hamilton.

2.3.2.4 Automobile Traffic

To forecast automobile traffic, trip tables were developed for both the anticipated and high growth scenarios. For the new trip tables, trip production and attraction data, and gateway volumes were produced for both scenarios. The productions and attractions represent the number

of trips exiting (produced, entering, attractive) a zone. The gateways allow for trips to and from the areas external to the Study Area.

In addition to the existing provincial highways and regional roads, the network included the following major future roads:

- the North-South Parkway/East-West Arterial;
- the Highway 403 extension to Brantford and Woodstock;
- the Hamilton Industrial Perimeter Road.

2.3.2.5 Future Traffic Volumes

The forecasted volumes for Highway 6 (New) are shown in Table 2.1 along with the resulting level of service for a two, four and six-lane facility. Although approval is being sought for a six-lane freeway, it is likely that Highway 6 (New) will be built in stages. The table shows the resulting level of service for each of these stages based on year 2001 traffic projections. Traffic congestion will occur with a two-lane facility. Good levels of service, however, would be provided with a four or six-lane facility.

TABLE 2.1
YEAR 2001 TRAFFIC PROJECTIONS

Scenario	AADT*	Percent Commercial	Level of Service+ Two Lane	Four Lane	Six Lane
Anticipated:					
North of Airport	7,000	20	C	A	A
South of Airport	9,900	12	D	A	A
High:					
North of Airport	9,000	24	D	A	A
South of Airport	13,000	13	E	B	A

* Annual Average Daily Traffic

+ Level of Service is a rating of the amount of congestion and ease of traffic movement; Level A is the highest and best traffic service, Level F represents the worst traffic condition and is beyond the capacity of the facility.

Table 2.1 also shows the percentage of commercial vehicles (trucks). Generally highways carry approximately 10% commercial vehicles. However, due to the large industrial areas served by Highway 6 (New), the commercial vehicles represent 12% to 24% of the total traffic. This indicates the importance of Highway 6 (New) for providing access for industries in the Highway 6 Corridor to the Provincial freeway system.

Future daily traffic volumes (AADT) and design hourly volumes (DHV) are shown on Table 2.2 for the "do nothing" alternative. Congestion will be experienced under both growth scenarios.

2.4 Background

In 1974, the Ministry of Transportation and Communications undertook the "Highway 6 - Nanticoke to Hamilton Joint Use Corridor Study". The prime objective of that study was to identify an acceptable route for a new joint use transportation corridor (including a highway and major utilities such as hydro and pipelines) between the Nanticoke area and Hamilton. The report on this study was issued in 1976.

TABLE 2.2
EXISTING HIGHWAY 6 LEVEL OF SERVICE
YEAR 2001, DO NOTHING TRAFFIC FORECASTS

Scenario	AADT* (vph)	Level of Service+ Existing 4 Lanes
Anticipated:		
North of Airport	22,440	D
South of Airport	15,080	D
High:		
North of Airport	29,400	F
South of Airport	20,120	D

* Average Annual Daily Traffic

+ Level of Service is a rating of the amount of congestion and ease of traffic movement; Level A is the highest and best traffic service, Level F represents the worst traffic condition and is beyond the capacity of the facility.

At approximately the same time the MTC designated lands along Highway 403, between Fiddler's Green Road and Mohawk Road to protect land for an interchange with Highway 6 (New), should the west corridor be selected.

The Joint Use Corridor Study recommended an alignment for a new route between Nanticoke and Caledonia, including the now completed Caledonia Bypass.

However, the study concluded that the alignment for Highway 6 (New) between Caledonia and the Hamilton area should not be determined until:

- the Hamilton-Wentworth Official Plan was completed; and
- plans for the expansion of the Mount Hope Airport were confirmed.

With these issues resolved, the Ministry of Transportation and Communications in 1984 commissioned M.M. Dillon Limited to undertake "The Highway 6 (New) Hamilton to Caledonia Route Location and Preliminary Design Study".

3. Study Organization and the Environmental Assessment Process

3.1 Study Organization

3.1.1 Study Team

The project was headed by the Ministry of Transportation and Communications Central Region Planning and Design Section through a Project Manager and an Environmental Planner as indicated in Exhibit 3.1. This exhibit also illustrates the senior Dillon staff assigned to the Study.

S.S. Wilson and Associates, acoustical engineers, were used as noise subconsultants on this project.

3.1.2 Pre-Study

This section outlines work undertaken to allow for the preparation of the detailed study design. The following documents were reviewed in order to determine the background of the study:

- Justification Report;
- Consultant Terms of Reference;
- Highway 6, Nanticoke to Hamilton Joint Use Corridor Feasibility Study, March 1976;
- Municipal Official Plans.

In order to identify major factors affecting the project, discussions were held with senior MTC and Regional staff. These discussions identified the following factors as having particular significance:

- the Caledonia Bypass;
- the Hamilton Civic Airport;
- the Hamilton Mountain North-South Parkway and East-West Arterial;
- the existing MTC designation on Highway 403;
- the strong agricultural community;
- the need for a comprehensive public involvement process.

In addition, field visits were made to assess the general nature and character of the area.

Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report

Exhibit 3.1

Study Team

Information collected in the pre-study allowed for the determination of the preliminary study area, the identification of significant constraints and controls for alignments, and the general direction and scope of the study.

3.1.3 Development and Review of Study Design

Based on the information collected above and the Consultant's experience with other similar projects, a detailed study design was prepared.

The study design provided a full list of tasks, activities and sub-activities for the entire route location, environmental assessment, and preliminary design phases. The study design included information on:

- Consultant's staff and organization;
- study schedule;
- list of external agencies;
- internal MTC involvement;
- person-days for each activity and task;
- methods for project control;
- a list of major assumptions;
- the study team;
- division of responsibility for tasks and activities between the Ministry and Consultant;
- the extent of public involvement and presubmission consultation.

There were a total of 19 activities and 53 tasks within the study design along with numerous sub-tasks.

One important step was Activity 3, "Confirm Intensive Study Area". The purpose of this activity was to screen out unacceptable corridors. This led to the definition of the Study Area.

A Draft Study Design was prepared and reviewed in detail by the Ministry of Transportation and Communications. It was subsequently modified by the Consultant. The final document was completed and approved in September 1984.

A Summary Study Design was prepared and forwarded to all external agencies, internal team members, and municipal staff. Comments were requested from all reviewing agencies. The Study Design was also discussed at the first External Team meeting held prior to the first series of Public Information Centres in June 1985. The summary Study Design was accepted by most reviewing agencies and no comments were received that required any modifications.

3.1.4 Determination of the Study Area

The pre-study identified three basic corridors for potential alignments between Caledonia and Hamilton. In order to keep the study to a realistic scope, it was decided that if any of the three basic corridors did not meet the required objectives of the new facility, then they would be abandoned without any further study. Section 5.4 of this report, "Corridor Alternatives", documents the comparison of the corridors with the objectives. This analysis led to the rejection of the East and Central Corridors. The Study Area was thus defined around the West Corridor. The Study Area is shown in Exhibit 3.2.

The exact extent of the Study Area was established to ensure that all reasonable effects of the various alternatives identified during the Study would be appropriately dealt with.

The current conditions for the natural environment, the social environment, and the engineering environment as described in Chapter 4, were gathered for this area.

3.1.5 Study Stages and Timing

Exhibit 3.3 shows the major study stages and timing of key events.

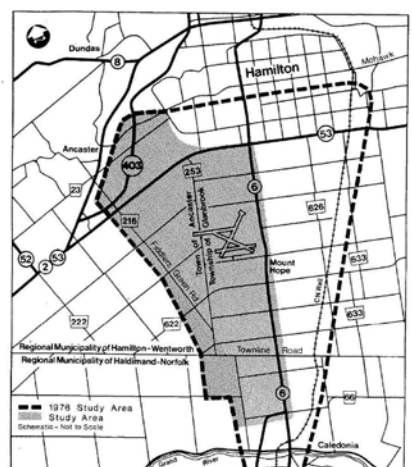
3.2 Pre-Submission Consultation

3.2.1 General

The pre-submission consultation process is a key component of the Environmental Assessment process. Pre-submission allows for the identification of issues early in the Study, providing the time and a process for dealing with these issues. The purpose of the pre-submission consultation is to provide an opportunity for the review ministries/agencies and the public to:

- review and comment on the study design;
- identify "environmentally significant areas/issues";
- be aware of the progress of the Study;
- be involved early and be able to review and comment on the findings at various stages of the Study.

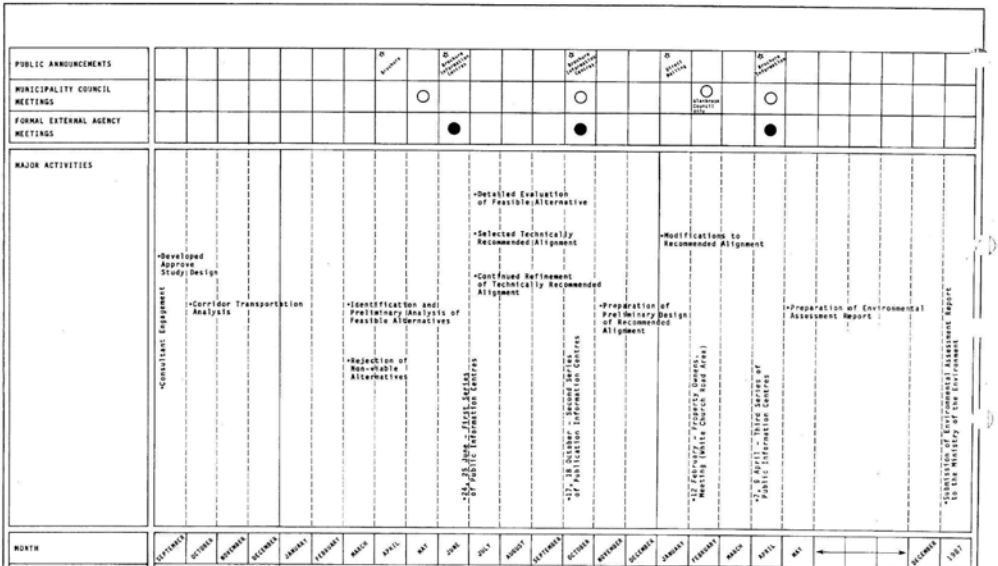
The following sections describe the involvement of all contact external to the consultant and MTC team members. These agencies and their



Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report

Exhibit 3.2

Study Area



Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 3.3

Major Study Stages and Schedule

interrelationship to the study are shown in Exhibit 3.4. These external contacts can be broadly defined by the following categories:

- affected municipalities (staff and elected representatives);
- government ministries and agencies;
- the general public;
- organized interest groups;
- the private sector;
- utility companies.

The major purpose of the in-depth and organized program of consultation with these groups can be summarized as follows:

1. To ensure that all relevant concerns of the various parties are given appropriate consideration.

2. To assist in the identification of environmentally significant areas/issues.

3. To ensure that all realistic alignment alternatives have been addressed.

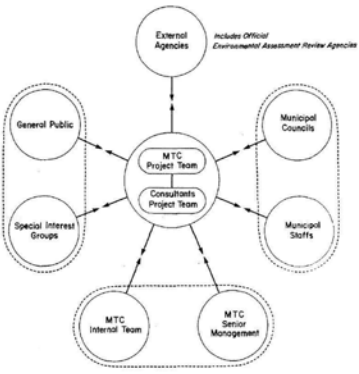
4. To ensure that where any adverse effects of the recommended plan are unavoidable, these effects are minimized and the appropriate mitigating measures introduced.

5. To ensure that the project can be implemented and the appropriate approvals received by attempting to deal with all the issues and concerns prior to the formal environmental assessment review process.

6. To ensure that all appropriate work required beyond the planning stage (i.e. commitments to future work) is clearly outlined and documented.

The type of involvement of the various external contacts, their major comments and concerns, and the way in which these concerns have been dealt with are discussed in the following sections.

As part of the pre-submission consultation process, comments from reviewing agencies on the draft report are summarized in Appendix J.



Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report

Exhibit 3.4
Various Teams Involved in the Study

3.2.2 Municipal Involvement

At the start of the project, each municipality designated a contact individual. Meetings were held with the contact individual and appropriate staff members throughout the study to review concerns and identify appropriate solutions. The schedule for these meetings are shown on Exhibit 3.3. The municipalities supplying assistance were:

- The Regional Municipality of Hamilton-Wentworth
- The City of Hamilton
- The Town of Ancaster
- The Township of Glanbrook
- The Regional Municipality of Haldimand-Norfolk
- The Town of Haldimand.

Elected representatives were kept fully informed of the status of the project through formal council presentations. The timing of these presentations is shown in Exhibit 3.3.

Appendix B to this report summarizes all the major comments made by the various municipal staffs and elected representatives, together with the methods in which these concerns were handled.

3.2.3 Government Agencies

Representatives of all government ministries and agencies who have the responsibility for review of and comment on environmental assessments were constituted into an external agency team. The external agency contacts are shown on Exhibit 3.3.

In addition to this format, several working meetings and contacts were held with individual ministries and agencies who had specific project-related concerns. Ministries and agencies with whom such meetings were held included:

- Ministry of Agriculture and Food;
- Ministry of the Environment;
- Ministry of Citizenship and Culture;
- Ministry of Natural Resources;
- Grand River Conservation Authority;
- Niagara Peninsula Conservation Authority;
- Transport Canada;
- Ontario Hydro.

Major comments and concerns raised by these agencies are noted in Appendix B which also explains how these concerns were dealt with.

3.2.4 The General Public, Organized Interest Groups and the Private Sector

These three categories of external contact were dealt with through the project's organized public participation program.

In summary, public contacts were made at the following study phases:

Start of Project

April 1985 - Newspaper announcement and brochure mailing informing the public of the start of the project

Preliminary Assessment of Feasible Alternatives

May 1985 - Newspaper announcement and Public Information Centre brochure distribution

June 1985 - First Series of Public Information Centres held in Ancaster and Mount Hope

Detailed Evaluation of Feasible Alternatives and Presentation of a Technically Recommended Alignment

October 1985 - Newspaper announcement and Public Information Centre brochure distribution

October 1985 - Second Series of Public Information Centres held in the Unity Road Hamlet and Ancaster

Special Property Owners Meeting - White Church Road Area

February 1986 - Direct mailing to affected Property Owners informing them of the special meeting

February 1986 - Property Owners Meeting, White Church Road Area

Presentation of Recommended Alignment in Preliminary Design
Level of Detail

March 1986 - Newspaper announcement and Public Information Centre brochure distribution

April 1986 - Third Series of Public Information Centres held in Ancaster and the Unity Road Hamlet.

During the June and October 1985 and April 1986 series of information centres, the centres were open to the general public from 2:00 p.m. to 5:00 p.m and 7:00 p.m. to 9:00 p.m. Prior to one of the afternoon and evening sessions, special morning meetings were held with external team members during each series.

Detailed reports of the results of the Public Information Centres and the Property Owners Meeting are shown in Appendices C, D, E, and F of this report. These reports are entitled:

1. Summary of the Results of the First Series of Public Information Centres, Highway 6 (New) Hamilton to Caledonia, June 1985.

2. Summary of the Results of the Second Series of Public Information Centres, Highway 6 (New) Hamilton to Caledonia, October 1985.

3. Result of the Property Owners Meeting (White Church Road Area), Highway 6 (New), February 1986.

4. Summary of the Results of the Third Series of Public Information Centres, Highway 6 (New), Hamilton to Caledonia, April 1986.

In addition, interviews were held with 14 representative trucking firms and industries in the Highway 6 Corridor to solicit information on existing truck movements and problems, forecasted growth, type and extent of operation, and need for a new highway facility.

In addition, the Six Nations Indian Band was contacted throughout the Study so that any comments and concerns they might have could be identified. At the request of the Ontario Native Affairs Directorate, the New Credit Band was advised of the Study during the finalization of the Environmental Assessment Report.

3.2.5 Utility Companies

The following utility companies:

- Ontario Hydro;
- Union Gas;
- Bell Canada;
- TransCanada PipeLines;
- Interprovincial Pipelines;
- Trans Northern Pipelines;

were contacted or met with during the course of the Study to determine:

- the location of existing plants;
- any planned expansion or improvements of existing facilities;
- relocation or plant modification requirements and costs.

Information on municipally owned and operated services was obtained through the appropriate municipal officials.

Chapter 4 of this Report details the information received concerning major utilities within the general study area.

3.3 Process for Determining Environmentally Significant Areas/Issues

The MTC has, in conjunction with the Ministry of the Environment (MOE), developed guidelines for the preparation of Environment Assessment Report One-Stage Submissions. With the one-stage submission process, it is important to deal with environmental issues at an appropriate level of detail to meet the concerns of the reviewing agencies and allow them to accept the document, leading to the eventual approval of the project. The study process and timing will obviously not permit that every single issue be dealt with at a final design level of detail. Consequently, to ensure that the more significant areas are appropriately dealt with, the one-stage submission guidelines have defined a procedure for identifying "environmentally significant areas and issues". These areas and issues must be dealt with satisfactorily in the Environmental Assessment Report.

The guidelines define environmentally significant areas/issues as follows:

"Areas/Issues of the natural, cultural, economic and social environment for which the reviewing ministries/agencies/the public require detail relative to specific environmental impacts and commitment to mitigation. This information is necessary to facilitate decision-making relative to the acceptance to the environmental assessment and approval of the undertaking."

In the pre-submission process for the preparation of this Environmental Assessment, issues or areas of the natural and socio-economic environment were considered to be environmentally significant (in terms of the requirements of a One Stage Environmental Assessment) if one or more of the following applied:

1. The area or issue was identified as environmentally significant in provincial, regional or local plans, policies or studies and was likely to be affected by reasonable alternative methods of carrying out the undertaking.

2. The area or issue was demonstrated as environmentally significant during the consultation process by any of the following:

   - external ministries or agencies;
   - municipalities;
   - interest groups;
   - the general public.

3. The area or issue was identified as environmentally significant during field surveys and investigations and analysis undertaken by the project team for the project.

Based on this approach, Environmentally Significant Areas and Issues (ESA/ESI's) have been identified for which additional analyses or investigation were required to achieve the selection of a recommended alternative and its preliminary design. ESA/ESI's are identified in Chapter 4. Chapter 5 outlines the evaluation of the alternatives, including the component elements of the ESA/ESI's used in the assessment. Chapter 6 provides a summary statement of the resolution of concerns for individual ESA/ESI's.

3.4 Commitment to Further Work

Throughout the study process of external team contacts, internal team meetings, and the organized public participation program, concerns raised by any of these groups that required further work were documented. No concerns were identified that were unique and could not be accommodated through standard highway design techniques. These techniques will be documented in the Ministry of Transportation and Communications Design and Construction reports. These reports should be suitable for dealing with all concerns raised. The Design and Construction Reports will be submitted to the Ministry of the Environment a minimum of 30 days prior to construction. In addition, relevant agencies will be involved during the final design process.

To ensure that the commitments are carried out during construction, the Ministry of Transportation and Communications will undertake a program of construction monitoring.

4. Existing and Future Conditions

4.1 Introduction

The purposes of this Chapter are as follows:

1. To provide a description of the natural environment, socio-economic and cultural environment, transportation facilities, and major utilities within the identified Study Area.

2. To identify potential "environmentally significant areas/issues" (terms defined in Section 3.3).

NOTE: An actual listing of environmentally significant areas/issues affected by the eventually recommended plan is included in Chapter 6 of this report.

4.1.1 Definition of Study Area

The Study Area is shown on Exhibit 3.2.

The Study Area runs from Ancaster in the north to the north end of the Caledonia Bypass in the south. On the east the Study Area is defined by existing Highway 6, and on the west the Study Area is roughly bounded by Fiddler's Green Road and Glancaster Road.

During the early 1970s the MTC became aware of the increasing pressure to permit land development adjacent to Highway 403 in Ancaster. The 1976 Joint Corridor Feasibility Study identified only one feasible location for an interchange on Highway 403 between Fiddler's Green Road and Mohawk Road. Hence, in order to protect the location and also to allow appropriate adjacent development to proceed the MTC designated the interchange area from Highway 403 to Book Road. The results of this study are still valid and there are no other feasible locations for a new freeway-to-freeway interchange on this section of Highway 403.

In 1984, the Caledonia Bypass was opened as a two-lane facility, by-passing Caledonia on the west side. Ultimate plans are to twin the facility to provide a divided four-lane freeway. The Bypass currently terminates at Greens Road with an at-grade intersection.

The Study Area includes a portion of the City of Hamilton, the recently expanded Hamilton Civic Airport, the Village of Mount Hope, and the Unity Side Road Hamlet. The remaining portions of the Study Area are largely rural in nature with a strong agricultural base and some scattered residential development.

4.1.2 Organization of Sections

The documentation of existing and future conditions is divided into five sections:

- 4.2 - Natural Environment
- 4.3 - Socio-economic and Cultural Environment
- 4.4 - Summary of Environmentally Significant Areas/Issues
- 4.5 - Transportation facilities

4.2 Natural Environment
(See Exhibit 4.1 and Appendix I)

4.2.1 Climate

i) Data Sources, Reliability and Data Gaps

The source of climatic data for the Study Area is The Climate of Southern Ontario (Brown, D.M., G.A. McKay and L.J. Chapman, Environment Canada, 1980). The authors have used an internationally accepted interval, 1931 to 1960, for the computation of averages, thereby obtaining values which are comparable to those prepared for other areas. Large deviations from the mean may occur both daily and seasonally. This is a recognized reliable source and provides sufficient detail for this study.

ii) General Description

The Study Area is within the Lake Erie Counties Climatic Region, and the climate is moderated by proximity to the Lower Great Lakes. The northern part of the Study Area is within 10 km of Lake Ontario, although it is considerably higher than the lake because of the Niagara Escarpment. Higher elevations west of the area create a slight rain shadow effect. The topography in the northern part of the Study Area increases microclimatic variation because of differences in slope position, aspect and natural air drainage.

iii) Significance and Sensitivity

In the past, the climate has proved amenable to the establishment of a variety of natural species, general and specialized farming, and human settlement. It is anticipated that Highway 6 (New) will not affect the general climate. There are no significant or sensitive climatic conditions in the Study Area which would affect the design and functioning of Highway 6 (New).

iv) Identified Environmentally Significant Areas/Issues

Climate is not considered to be an Environmentally Significant Issue for the purposes of this study.

4.2.2 Physiography

i) Data Sources, Reliability and Data Gaps

The Physiography of Southern Ontario (Chapman, L.J. and D.F. Putnam, Ontario Research Foundation, University of Toronto Press, 1966) and Map 2226 (scale 1:253,440) published to accompany that book are the main authorities on the generalized physiography of Southern Ontario. Elevations were established from maps of the National Topographic System at a scale of 1:25,000. The available level of detail is sufficient for interpretation of general sensitivity of physiographic conditions in the Study Area.

ii) General Description

The Study Area is located primarily on clay plains of the Haldimand Clay Plain Physiographic Region. Inclusions of till moraines, kame moraines, and sand plains occur in the northern part of the Study Area. Several drumlins occur near the southern edge of the Study Area.

Topographic relief is generally low. It is greatest in the northern part where elevations range from 190 m above mean sea level near Tiffany Falls to 256 m in the Hamilton Golf and Country Club (both areas being recognized Environmentally Sensitive Areas in the Study Area).

The physiographic types have provided a land base with the capability for the development of a considerable range of land uses, including soils for agriculture and materials for building.

iii) Significance and Sensitivity

In much of the Study Area, the low topographic relief indicates a fairly low sensitivity of landforms to disturbance from highway construction. Local areas of topographic variability, such as stream valleys and the ridge north of Book Road, provide a greater degree of landform diversity and sensitivity. This contributes to the environmental significance of these areas.

iv) Identified Environmentally Significant Areas/Issues

The physiography is not considered to be an Environmentally Significant Issue for the purposes of this Study.

4.2.3 Soils

i) Data Sources, Reliability and Data Gaps

The basic source of soil information for the area is Report No. 32 of the Ontario Soil Survey (Presant, E.W., R.E. Wicklund and B.C. Mathews, 1965, The Soils of Wentworth County). The soils mapping is at a scale of 1:63,360.

Canada Land Inventory (CLI) interpretations of capability for agriculture are based on this mapping. The CLI mapping for the Study Area was supplied by the Ontario Ministry of Agriculture and Food. The inherent limitations of the soil survey, particularly the scale and emphasis of classification toward agricultural utilization, should be recognized. If necessary, site-specific data gaps can be filled in at the detailed design stage.

ii) General Description

Sixteen soil types have been identified within the Study Area. Most soils are silt loams developed on tills on lacustrine deposits. Coarse textured soils on sand and gravel are found only in the northern part of the Study Area. Soils in the Study Area are suitable for both agricultural production and urban development.

The Canada Land Inventory ratings of soil capability to produce common field crops are based on a scale from the best, Class 1, to the worst, Class 7.

iii) Significance and Sensitivity

The Study Area soils are rated almost entirely as Class 1 (70%) and Class 2 (20%) for agricultural productivity and are therefore considered to be a significant feature of the Study Area. Permanent removal of agricultural lands is difficult to mitigate and thus they are sensitive to highway construction.

Silty soils are sensitive to erosion. Erosion control can be performed during construction.

iv) Identified Environmentally Significant Areas/Issues

Agriculture, including loss of farmland, is an Environmentally Significant Issue for the purposes of this study.

4.2.4 Vegetation

i) Data Sources, Reliability and Data Gaps

Forest Regions of Canada (Rowe, J.S. 1972, Canadian Forestry Publication No. 1300) provides a general description of the plant geography of the country. The Forest Resources Inventory of the Ontario Ministry of Natural Resources has produced forest stand maps at a scale of 1:10,000 based on air photo interpretation (1979). Separate District Programs of the Ministry of Natural Resources ranked woodlots into five classes (mapped at 1:50,000 in Cambridge District and 1:10,000 in Niagara District). However, additional documentation was required for environmental assessment purposes and a reconnaissance ffeld survey was undertaken by M.M. Dillon Limited to determine the significance of plant associations, to improve reliability, and to fill in data gaps at a site-specific level of detail.

ii) General Description

The Study Area is located within the Deciduous Forest Region. Here, very favourable climatic and soil conditions have allowed extension into Canada of many trees, shrubs and herbs from the deciduous forest of the east-central United States.

As most of the land has been cleared for agriculture and settlement, the natural forest vegetation has been reduced to remnant stands. These stands are mainly dominated by broadleaved trees such as beech, sugar maple, red oak, red maple, black cherry, bitternut hickory, shagbark hickory, white ash and basswood. Less common species include white oak, bur oak, butternut and black walnut.

Hop-hornbeam occurs in the understory and reaches dominance in heavily pastured locations. Disturbed areas also contain poplars, willows, hawthorns, elms and red ash.

White pine is one of the few conifer species that achieves representation in the natural woodlots. Some hemlock and white cedar occur near the Niagara Escarpment. Planted species also include scots pine, red pine, white spruce and norway spruce.

The remaining plantations and woodlands are being affected by agricultural practices and airport and urban expansions. The Ministry of Natural Resources (Niagara District) has established two new plantations of white pine and improved a degraded woodlot under Woodlands Improvement Act agreements in the southern part of the Study Area (see Exhibit 4.1).

iii) Significance and Sensitivity

The vegetation within the four identified "Environmentally Sensitive Areas" in the northern part of the Study Area near the Niagara Escarpment is considered highly significant (see Exhibit 4.1 and Appendix I).

The significance of vegetation units in the remainder of the Study Area required interpretation. Because of the large number of scattered units, a detailed comparison of species richness, rarity, productivity and sensitivity was not feasible. However, because environmental priority and replacement values generally increase with advancement in age and succession, the quality of vegetation units was assessed primarily on the basis of: 1) maturity, indicating lack of disturbance; and 2) health, indicating potential longevity and productivity. This primary assessment was supplemented by an evaluation by M.M. Dillon Limited of vegetation diversity and rarity in the regional context.

After the field investigation by M.M. Dillon Limited, five general types or quality levels of existing advanced terrestrial communities characterized by woody vegetation were identified in the area as follows: 1) highest quality, well-stocked vegetation units; 2) maturing, representative woodlots; 3) immature or degraded woodlots; 4) advanced, old fields, shrublands, pioneer woods, and sparsely treed areas (not mapped); and 5) hedgerows and isolated specimen trees (not mapped).

The significance of individual units is a function of the size of the existing or potentially affected area as well as its quality. Official Plans for the Regional Municipalities of Hamilton-Wentworth and Haldimand-Norfolk indicate that areas of forest cover should be retained and managed or expanded. The Ministry of Natural Resources has expressed concern for the retention of woodlots with recognition to be given to quality classes and priorities arranged accordingly. Therefore, vegetation types 1, 2 and 3 described above were identified as being important for the purposes of this study.

The areas under Woodlands Improvement Act agreements are also significant in recognition of existing land use commitments and the management efforts expended.

The Grand River Conservation Authority has suggested a special survey of rare or signficant plants along the right-of-way during detailed design for potential mitigation efforts.

iv) Identified Environmentally Significant Areas/Issues

Four municipally designated "Environmentally Sensitive Areas" have been identified in the northern portion of the Study Area. As such, they would merit consideration as Environmentally Significant Areas for the purposes of this assessment. However, no reasonable alternatives were considered which would affect these areas directly, and their regional significance was not a factor in the evaluation of the various alternatives. As such, they are not documented as Environmentally Significant Areas in this assessment.

Vegetation (woodlots and forest areas) is identified as an Environmentally Significant Issue, based on a request by the Ministry of Natural Resources.

4.2.5 Wildlife

i) Data Sources, Reliability and Data Gaps

The Ontario Land Inventory and the Canada Land Inventory have published maps, at scales of 1:50,000 and 1:250,000 respectively, indicating the capability of the land to produce habitat suitable for several species of wildlife. The Ministry of Natural Resources provided maps at 1:50,000 showing wildlife resources. Site visits were undertaken by M.M. Dillon Limited to supplement this information and fill in any data gaps. The Hamilton-Wentworth Region Environmentally Sensitive Areas Study (Ecologistics 1976) provides reliable lists of species and their status.

Additionally, several organizations with interest in the natural environment were contacted. These are identified in Appendix C.

ii) General Description

The wildlife of the Study Area is characteristic of agricultural areas in this Forest Region. The climate and soils have provided the capability to produce habitat with a high carrying capacity. The most sensitive period for wildlife population generally extends from April to August.

A considerable variety of bird species occurs. In the Hamilton-Wentworth Region, 76 bird species have been identified as common, compared to 27 mammal species and 15 herptile species. White-tailed deer are the largest animals and are generally confined to the vicinity of hedgerows and woodlots.

The fragmentation of habitat units has favoured species of wildlife adaptable to such conditions. Maintenance of the wide range of wildlife species is dependent on the existence of the remaining woodlots. Thus wildlife habitat quality in the Study Area is closely related to the area of forest cover.

The Ministry of Natural Resources and the Ontario Land Inventory have identified a location along the Welland River 2 km south of the Hamilton Civic Airport as a Waterfowl Area. The field survey undertaken by M.M. Dillon Limited noted this area to be essentially a widening in the flood plain with numerous ox-bows and old channels. Willows line the river in many places. The area is used by waterfowl for nesting, brooding and staging. Although the Waterfowl Area offers some potential as a wildlife habitat, the diversity and quality of the habitat for wildlife is greatly enhanced by the forest communities to the west of the area. Appendix I contains species list for the waterfowl area and adjacent woodlots between White Church and Chippewa Roads.

A number of ponds throughout the Study Area also serve as nesting and staging areas for Canada Geese and some ducks. The vegetation around the ponds is either maintained grass or willow/hawthorn associations.

iii) Significance and Sensitivity

Four "Environmentally Sensitive Areas" have been documented for the Study Area. All are located in the northern portion of the Study Area (refer to Exhibit 4.1(c) and Appendix I). They are regarded as being highly sensitive and significant wildlife habitat areas, due to a combination of terrain features and locally and regionally rare species (vegetation and wildlife).

The waterfowl area identified between White Church and Chippewa Roads is a locally significant nesting area. It is not regarded as particularly sensitive however, as the woodlot area immediately to the west of it provides greater potential for more diverse habitats.

Other remaining natural vegetation units provide habitats for local wildlife and migrating bird populations. Additionally, several local ponds and streams provide waterfowl nesting and staging areas. These units and areas are not considered to be significant beyond the immediately local area of the site, and are not regarded as having any great degree of sensitivity.

iv) Identified Environmentally Significant Areas/Issues

The four "Environmentally Sensitive Areas" in the northern portion of the Study Area have been designated as regionally significant areas for protection in the Regional Municipality of Hamilton-Wentworth's Official Plan. As such, they would merit consideration as Environmentally Significant Areas for the purposes of this Study. However,

no reasonable alternatives were considered which would affect these areas directly and their regional signiifcance was not a factor in the evaluation of the various alternatives. As such, they are not documented as Environmentally Significant Areas in this assessment.

The waterfowl area has not be regarded as an Environmentally Significant Area due to its comparatively low sensitivity in conjunction with adjacent woodlots.

Wildlife is not considered to be an Environmentally Signiffcant Issue for the purposes of this Study.

4.2.6 Water Resources and Fisheries

4.2.6.1 Hydrology

i) Data Sources, Reliability and Data Gaps

Reliable data were obtained from published material from the Ministry of the Environment (Maps S100 and 3002-2) and topographic maps of the area (NTS, 1:50,000). The first map (S100) describes hydrogeologic environments and the susceptibility of groundwater to contamination. The second map (300-2) outlines watersheds within major drainage basins in southern Ontario. Details of their boundaries can be delineated on topographic maps (scale 1:50,000). This level of detail was sufficient to assess general sensitivity of the watercourses to effects associated with design and construction of new roads.

Field surveys by M.M. Dillon Limited at an overview level of detail, and subsequently at specific sites (potential alignment crossings) supplemented gaps in the regional mapping information. Well records were examined at Book Road and Unity Road to assess the potential for impacts associated with the deep cuts.

Discussions were also held with representatives of the Niagara Peninsula Conservation Authority, the Grand River Conservation Authority, the Hamilton Regional Conservation Authority, and the Ministry of Natural Resources throughout the study.

At the time of this Study, a proposed policy statement had been released for public comment under the Planning Act regarding Flood Plain Planning. This statement will be given consideration upon its finalization for any detail design requirements outstanding at that time.

ii) General Description

The Study Area includes the boundary between the Lake Ontario and Lake Erie drainage basins. Watershed units whose head waters touch on the Study Area include the Welland River, Twenty Mile Creek, Redhill Creek, Ancaster (Sulphur) Creek and the Grand River. Several small tributaries drain into the watercourses, including a number of channelized agricultural drainage ditches.

The Welland River and Twenty Mile Creek flow easterly through the Niagara Peninsula. Redhill Creek and Ancaster (Sulphur) Creek flow north to Hamilton Harbour. Downstream sections of Ancaster Creek have been identified as being prone to flooding and erosion by the Hamilton Regional Conservation Authority. Tributaries of the Grand River (flowing into Lake Erie) such as Seneca Creek cross the southern portion of the Study Area. Many of the small tributaries as well as the main channel of the Welland River stop flowing in summer (N. Tilt, MNR, personal communication).

The Study Area lies in an area of generally low susceptibility to groundwater contamination. Surface materials are finely textured, consisting predominantly of fine sands, silts, clays and glacial deposits. These materials have a low permeability and thus have a high capacity for the retention of contaminants. There are no significant shallow aquifers in the area. Because of the generally low relief of the land, contaminant movement in the groundwater is likely to be minimal. In this area, groundwater is usually obtained from overburden and bedrock wells and is used mainly for farm and domestic supplies.

iii) Significance and Sensitivity

The watercourses in this area are significant on a small local scale in providing drainage. It is also important to maintain flows in natural and man-made watercourses to prevent flooding in or above the floodplain limits and to not unduly affect the rights of upstream and downstream users. Proper hydraulic design should not increase downstream drainage and will maintain riparian rights. This is in keeping with the erosion and flooding concerns expressed by the Hamilton Region Conservation Authority for Ancaster Creek.

Sensitivity to erosion and sedimentation of streambanks by construction activities can be reduced by employing proper design and construction techniques to reduce impacts on stream hydrology. Chapter 6 documents the commitments to future work with respect to drainage concerns.

Groundwater resources in the rural portions of the Study Area are significant at a local level, as they provide the major source of water for domestic and agricultural uses. There are no significant shallow aquifers in the Study Area. Groundwater resources are sensitive to disruption only at the local level, normally as a result of major cuts.

iv) Identified Environmentally Significant Areas/Issues

Hydrology is not an Environmentally Significant Issue for the purposes of this study. The identification of possible groundwater effects at Book and Unity Roads as a result of cuts, contributed to the identification of these areas as Environmentally Significant Areas.

4.2.6.2 Surface Water Quality

i) Data Sources, Reliability and Data Gaps

Water quality data were available for the Welland River in the Ontario Ministry of the Environment's Water Quality Data for Ontario Lakes and Streams Series. The sample station near Binbrook (immediately east of the Study Area) is located 112.5 km upstream from the river mouth. No data were available for Twenty Mile Creek or the other smaller watercourses in the Study Area. A visual inspection and assessment made on all watercourses during site visits by M.M. Dillon Limited in May 1985 filled in data gaps on these small streams. Information noted for each watercourse included: width, depth, water quality, flow, and bank characteristics. These data provided reliable descriptions of typical early summer conditions for the watercourses in the Study Area.

Provincial water quality objectives are outlined in the Ministry of the Environment's publication on Water Management - Goals, Policies and Implementation Procedures (1978).

ii) General Description

The most recent water quality data (1984 and 1985) for the Welland River near the Study Area show the river to be generally typical of watercourses in agricultural areas. Parts of it have been channelized, and much of the overhanging bank vegetation which helps to maintain cool water temperatures has been removed.

Complete water quality records for 1984-85 were provided by MOE. An analysis of these data with respect to MOE's provincial water quality objectives indicated that total and fecal coliform counts exceeded provincial standards in most months. This is likely caused by agricultural drainage and animal watering upstream. Temperatures were generally in a range suitable for supporting warm water biota. Nitrogen and phosphorus concentrations also exceeded provincial guidelines in most months, indicating inputs from agricultural practices such as fertilization of fields in the surrounding area and at upstream locations.

The similar settings of the other watercourses in the Study Area would result in their having comparable water quality to that of the Welland River.

iii) Significance and Sensitivity

Good water quality is essential to ensure human health as well as to sustain and promote fish and wildlife populations and to support vegetation. In addition, clean water supplies are needed for agricultural and recreational uses. Watercourses in the Study Area provide adequate water quality for these uses but do not provide significant quality for rare or unusual species (e.g. brook trout).

Although it is recognized that construction activities may affect on-site and downstream water quality in a number of ways including erosion and sedimentation, appropriate design and construction techniques will mitigate these effects. Because of the generally low sensitivity of these already degraded streams, there should be no appreciable decrease in water quality which could affect downstream water use and aquatic habitat and fisheries potential in the Study Area as a result of the development of Highway 6 (New).

iv) Identified Environmentally Significant Areas/Issues

Surface water quality is not an Environmentally Significant Issue for the purposes of this Study.

4.2.6.3 Fisheries and Aquatic Habitat

i) Data Sources, Reliability and Data Gaps

There have been no stream inventories or creek censuses (i.e. fishing surveys) done on the watercourses in the Study Area. Data on species

occurrence were obtained from the Ministry of Natural Resources (Cambridge District; Niagara District). Stream fisheries potential in areas in and downstream from the Study Area are given in the Niagara District and Cambridge District Land Use Guidelines, Ministry of Natural Resources, 1983. Aquatic habitat surveys were undertaken by M.M. Dillon Limited to assess local watercourse conditions in the Study Area and to provide a site-specific level of detail at potential watercourse crossings. These surveys provide reliable descriptions of typical habitat for fish species found in the area.

ii) General Description

Field surveys undertaken by M.M. Dillon Limited revealed that the watercourses in the Study Area would provide, at best, only limited habitat for fish. Deforestation, agricultural practices, urbanization, water diversions and channelization have all contributed to degradation of both water quality and aquatic habitat. As a result, the capability of these streams to support fish populations within the Study Area is low.

The headwaters of the Welland River meander through the Study Area. The width of the main channel varied from 2 to 4 m, and the water quality could be considered to be typical of agricultural areas with high levels of suspended solids observed in areas of low flow. In addition there were several small stagnant pools. A few warm-water fish species may inhabit reaches where there is sufficient depth (R. Lewles, MNR, Niagara District, personal communication). These include rockbass, pumpkinseed sunfish, yellow perch, largemouth bass and various minnow species.

The stretches of Twenty Mile Creek, Three Mile Creek and the numerous small unnamed tributaries and channelized agricultural drainage ditches which lie within the Study Area boundaries do not contain suitable habitat for fish.

iii) Significance and Sensitivity

Disturbances have occurred within the Study Area through urban development and agricultural activities that have reduced stream quality to the point where the watercourses in the Study Area support few and mainly insignificant fish species. Due to their already degraded state, aquatic habitat in the watercourses would not be particularly sensitive to development, provided that environmental protection measures are used during construction. Thus, there is little potential to further affect aquatic species within the Study Area.

However, water quality should be maintained at the work site through the use of acceptable environmental protection measures because of the presence of healthy fish populations downstream.

iv) Identified Environmentally Significant Areas/Issues

Fisheries and aquatic habitat are not Environmentally Significant Issues for the purposes of this Study.

4.3 Socio-Economic and Cultural Environment
(See Exhibits 4.1, 4.2 and 4.3)

4.3.1 Existing Land Use

i) Data Sources, Reliability and Data Gaps

Data on the existing land use within the Study Area were obtained from the following reliable sources:

- the Regional Municipality of Hamilton-Wentworth Planning staff;
- the Regional Municipality of Haldimand-Norfolk Planning staff;
- the Municipal staff and consultants of the Town of Ancaster, the City of Hamilton, the Township of Glanbrook, and the Town of Haldimand;
- the Ontario Ministry of Transportation and Communications;
- Transport Canada, Airports and Properties, Ontario Region;
- extensive land use field surveys conducted by M.M. Dillon Limited staff between April 1985 and June 1985.

After consultation with all of the agencies listed above, a thorough review of the information collected was conducted. Subsequently, M.M. Dillon Limited staff carried out extensive land use field surveys to verify and update the existing land use.

Existing land use air photo mosaics identifying all land uses in the entire Study Area, including the names of commercial, industrial and

institutional establishments (except Mount Hope) were prepared. These are available upon request for viewing from the MTC Central Region Office.

ii) General Description of the Study Area

The existing land use in the Study Area is described in relation to the local municipality and to local, regional and provincial roads. The Study Area contains four local municipalities as follows:

- the City of Hamilton;
- the Town of Ancaster;
- the Township of Glanbrook;
- the Town of Haldimand.

The following text should be read in conjunction with Exhibit 4.1 which illustrates the existing land use.

City of Hamilton

A small part of the Study Area is located in the City of Hamilton. Generally it is bounded by the following physical features:

- the Hydro Corridor on the south (north of Twenty Road);
- Glancaster Road on the west;
- Highway 6 on the east;
- Highway 53 on the north.

This area forms part of Hamilton's southern boundary and reflects the pressures of urban development. An existing single-family residential subdivision is located at Highway 6 and Highway 53. The St. Elizabeth Village (a 300 unit retirement centre) is located just south of Highway 53, west of the existing subdivision. This is a self-contained development centre which also provides intensive care beds.

A number of commercial establishments are located along Highway 6 in this area including restaurants, gas stations, and car dealers. There are also several institutional uses including Corpus Christi Church and School and Mount Calvary Baptist Church.

Single-family residential development on large lots exists all along Highway 53 from Highway 6 to Glancaster Road. Some of these residences are associated with farm operations, but most are not because intensive farming is not prevalent in this part of the Study Area.

Town of Ancaster

The western portion of the Study Area is located in the Town of Ancaster in the Regional Municipality of Hamilton- Wentworth and is generally bounded by the following municipal roads:

- Townline Road on the south;
- Glancaster Road on the east;
- Mohawk Road on the north;
- Fiddler's Green Road on the west.

Golf Links Road, Highway 403, Highway 53, Book Road, Butter Road and Carluke Road are the other main east-west transportation routes; and Southcote Road and Fiddler's Green Road are the other main north-south routes.

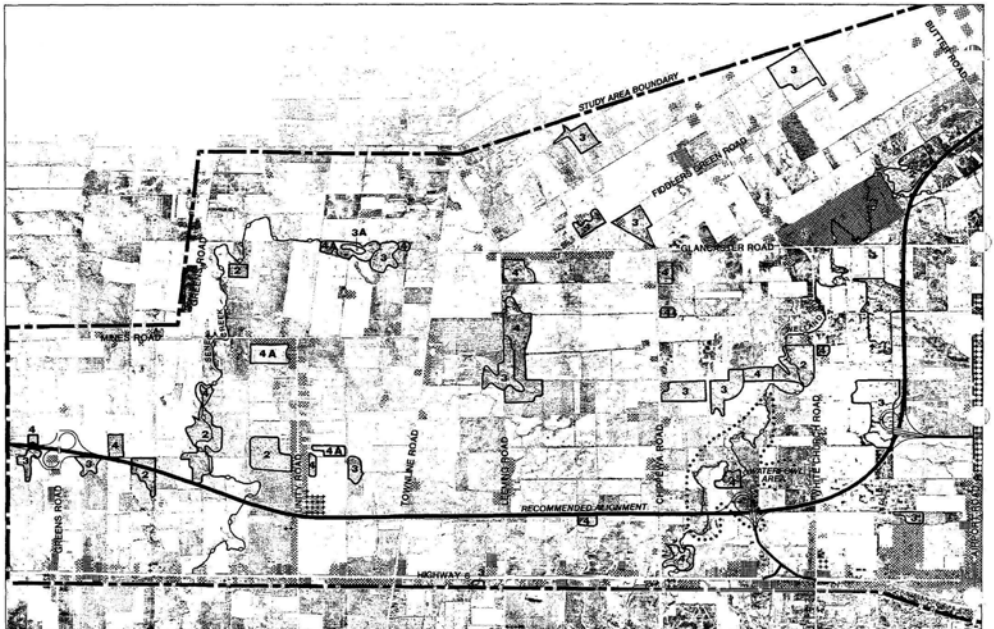
The area south of Highway 53 is generally characterized by rural land uses, predominantly agriculture. Significant land use features in Ancaster include:

- the Ancaster Animal Cemetery;
- [redacted] an extensive tree farm operation located at Carluke Road and Glancaster Road;
- the Oak Run Farms (a large bakery operation undergoing expansion) located at the southeast corner of Fiddler's Green Road and Carluke Road.

A number of local commercial/retail operations are located along Highway 53 including gas stations, restaurants and convenience stores. A major landmark in this area is the Ancaster Fair Grounds located at Kitty Murray Lane and Highway 53.

The area to the north of Highway 53 consists mainly of urban uses, predominantly single-family residences along with local commercial/retail and institutional uses. The largest concentration of homes is northwest of Highway 403. Areas southeast of Highway 403 are largely rural with some residential development along the major roads. In addition there are several significant land uses in this area including:

- the Hamilton Golf and Country Club located south of Golf Links Road between Southcote Road and Fiddler's Green Road;



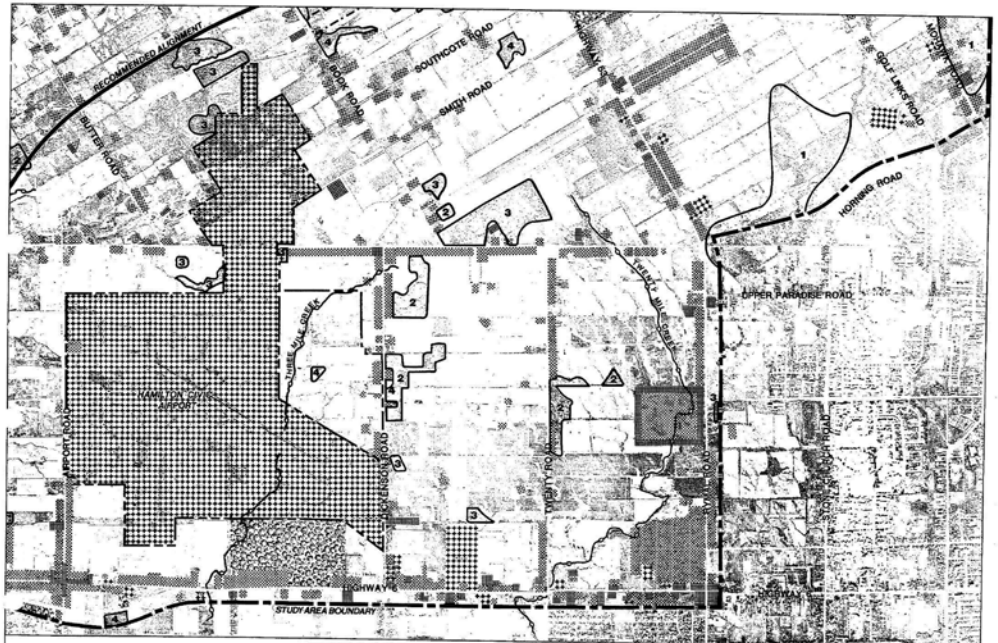
Highway 6 (New)

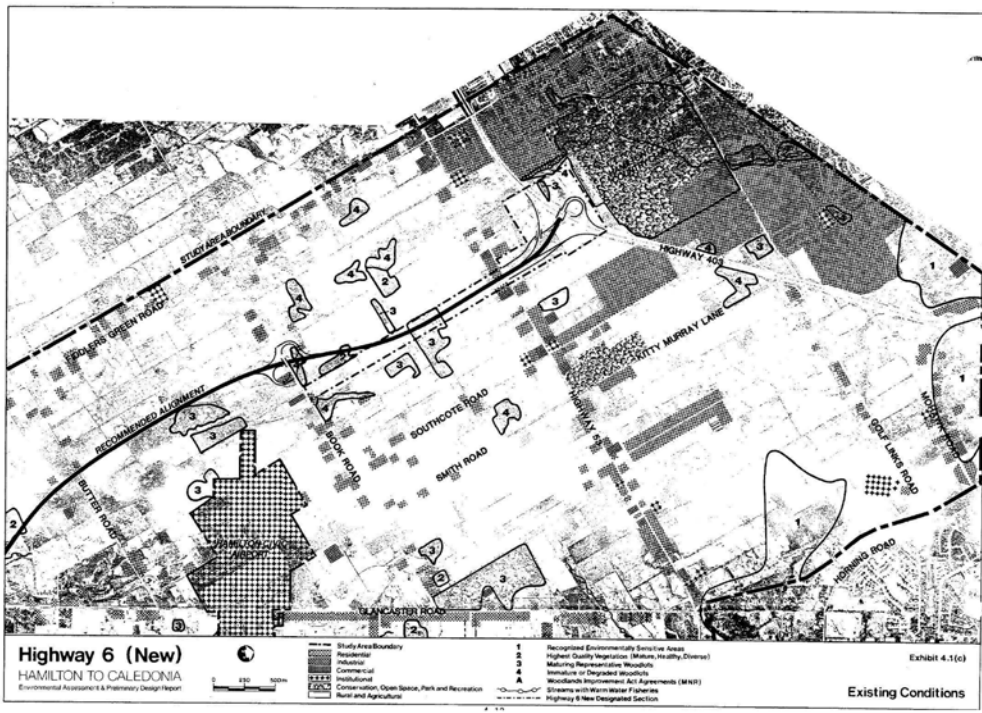
HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 4.1(a)

Existing Conditions


RECOMMENDED ALIGNMENT
BUTLER ROAD
BOOK ROAD
SOUTHCOTE ROAD
SMITH ROAD
HIGHWAY 403
GOLF LINKS ROAD
MORNEY ROAD
HORNING ROAD
UPPER PARADISE ROAD
THREE MILE CREEK
AIRPORT ROAD
HAMILTON INTERNATIONAL AIRPORT
UPPER JAMES
TWENTY ROAD
STONEHENGE ROAD
HIGHWAY
STUDY AREA BOUNDARY
Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report
0 250 500m
Study Area Boundary
Residential
Industrial
Commercial
Institutional
Conservation, Open Space, Park and Recreation
Rural and Agricultural
1 Recognized Environmentally Sensitive Areas
2 Highest Quality Vegetation (Mature, Healthy, Diverse)
3 Maturing Representative Woodlots
4 Immature or Degraded Woodlots
A Woodlands Improvement Act Agreements (MNR)
Streams with Warm Water Fisheries
Highway 6 New Designated Section
Exhibit 4.1(b)
Existing Conditions


STUDY AREA BOUNDARY
HOLLERS GREEN ROAD
RECOMMENDED ALIGNMENT
BUTTER ROAD
HAMILTON AIRPORT
SOUTHCOTE ROAD
BOOK ROAD
SMITH ROAD
HIGHWAY 403
HIGHWAY 403
TRINITY MURRAY LANE
GOLF LINKS ROAD
MORNING STAR
HORNING ROAD
LANCASTER ROAD
Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report
0 250 500m
Study Area Boundary
Residential
Industrial
Commercial
Institutional
Conservation, Open Space, Park and Recreation
Rural and Agricultural
1 Recognized Environmentally Sensitive Areas
2 Highest Quality Vegetation (Mature, Healthy, Diverse)
3 Maturing Representative Woodlots
4 Immature or Degraded Woodlots
A Woodlands Improvement Act Agreements (MNR)
Streams with Warm Water Fisheries
Highway 6 New Designated Section
Exhibit 4.1(c)
Existing Conditions

- the Ontario Hydro transformer station - one of the primary transformers in the area located just south of Golf Links Road and west of Upper Horning Mountain Road;

- a pumping station and water reservoir which is located at Glancaster Road and Highway 53.

A designation was laid down in 1975 to protect for an interchange between future Highway 6 (New) and Highway 403. The portion of the designation north of Highway 53 is owned by MTC.

A licensed gravel and sand pit has been identified within the designation by the Ministry of Natural Resources on part of Lot 45, Concession 3, Ancaster. MNR also identified that the potential for the loss of this mineral aggregate resource of secondary significance would not be expected to affect the long-term availability of sand and gravel in the area. As such, the effect of Highway 6 (New) on this potential aggregate resource has not been considered to be environmentally significant for this assessment. (It should be noted that the presence of such a potential resource within the proposed right-of-way of the undertaking will require consideration of its use for construction purposes during detail design). The identification of this mineral aggregate resource has been included in this Study, in consideration of the Mineral Aggregate Resources policy statement made under the Planning Act.

Township of Glanbrook

The eastern portion of the Study Area is located in the Township of Glanbrook in the Regional Municipality of Hamilton-Wentworth and is generally bounded by the following features:

- Townline Road on the south;
- Highway 6 on the east;
- Hydro Corridor (south of Highway 53) on the north;
- Glancaster Road on the west.

Other major east-west transportation routes include Twenty Road, Dickenson Road, Airport Road, White Church Road, Chippewa Road and Leeming Road. There are no other major north-south roads between Highway 6 and Glancaster Road in this area.

The Glanbrook part of the Study Area is diverse in terms of its land use. Although Glanbrook is mainly an agricultural area, there has been a significant amount of urbanization.

Mount Hope is located at Highway 6 and Airport Road. Comprised of mainly older single-family homes, the village is also the centre of public and commercial facilities serving local needs and those of the surrounding agricultural area.

To the north of Mount Hope is the Hamilton Civic Airport which occupies most of the land between Airport Road and Dickenson Road from Highway 6 to Glancaster Road. The airport is owned by Transport Canada and leased to the City of Hamilton for operation. With its recent expansion and expected traffic increase, the Hamilton Civic Airport has the potential to become an important regional airport.

A significant amount of residential and commercial development has occurred along Highway 6 in Glanbrook. The commercial activity along Highway 6 includes restaurants, gas stations and other similar establishments. A number of single-family houses front onto Highway 6 in the area from the Hydro Corridor to Townline Road. Many of the houses are located on lots which have been created adjacent to older farm residences.

Single-family residential development on large lots has occurred along all of the main roads in the Glanbrook area. In some instances these are the original farm houses; but, for the most part, new residential development has occurred more recently on lots which have been severed from the original holding. This development is especially prevalent along Glancaster Road, Dickenson Road and Twenty Road.

In addition to the uses already described, other important land uses in the Township of Glanbrook include:

- the residential development along White Church Road, immediately west of existing Highway 6;

- the Mount Hope Golf and Country Club located south of Dickenson Road along Highway 6;

- the Hamilton-Wentworth Transit Centre which is a primary regional bus terminal and garage and is located on Highway 6 midway between Twenty Road and Dickenson Road;

- the Oriental Nurseries and Garden Centres Ltd. on the west side of existing Highway 6 south of White Church Road.

Town of Haldimand

The southern part of the Study Area is located in the Town of Haldimand in the Regional Municipality of Haldimand-Norfolk. It has the following boundaries:

- Greens Road in the south;
- Highway 6 in the east;
- *Townline Road in the north;
- Lot 17, west of Mines Road, on the west.

The area is generally rural, and agriculture is the predominant land use. However, some residential and commercial development has occurred along existing Highway 6. In addition, the Unity Side Road Hamlet exists along Unity Road from Highway 6 to Mines Road. The hamlet contains mainly single-family homes on large lots as well as two institutional uses - i.e., the Seneca Unity School and the Wesleyan Methodist Unity Church. There are also a number of residences along Mines Road, west of the Unity Side Road Hamlet.

Some industrial development has occurred on the south side of Greens Road just east of the Caledonia Bypass. Three industrial type buildings are presently located in this area.

iii) Significance and Sensitivity

The significance and sensitivity of the existing land uses were determined by examining the magnitude and significance of the potential effects, if any, of the alternative alignments on these land uses based on information collected throughout the study from the external agencies and the public. Additional studies were also conducted of particular areas and issues to better understand the significance of these uses to the local area and its residents.

The sensitivity of particular land uses to the specific effects of the alternative alignments of Highway 6 (New) are indicated in Table 4.1, Sensitivity of Existing Land Uses. This table does not refer to effects which may occur during construction, these potential effects are discussed with respect to the recommended alignment in Chapter 6.

---

* Townline Road is the boundary between the Regional Municipalities of Hamilton-Wentworth and Haldimand-Norfolk.

The significant areas and issues which emerged from the public and local government consultation process, the external team members, and the Study Team's studies and analyses are documented below.

Property Effects

Based upon comments received from local residents, the municipalities, and external team members and the Study Team's analysis, effects to property - both direct takings and proximity effects - is a significant issue.

Agriculture

Agriculture and the preservation of good quality agricultural land and viable farming operations is considered a significant issue based on the character of the Study Area, the Ontario Food Land Guidelines, the Ontario Ministry of Agriculture and Food's mandate and concerns expressed by municipal representatives and residents of the area.

Detailed investigations were undertaken by M.M. Dillon Limited of the potential effects of the development of Highway 6 (New) on agricultural operations in the Study Area and on their significance to the local area. These investigations included field surveys, questionnaire surveys of local farmers, and meetings with OMAF staff, including the district representatives, and local farmers. The results are documented in the report "Effects to Farm Operations". This report is included as Appendix G.

At the time of this Study, a proposed policy statement had been released for public comment under the Planning Act regarding Foodland Preservation. This statement will be given consideration upon its formalization for any detail design requirements outstanding at that time.

Ancaster Animal Cemetery

Based upon the level of concern expressed by plot owners in the Ancaster Animal Cemetery, the pet cemetery contributed to the recognition of Book Road as an Environmentally Significant Area.

Following the first series of Public Information Centres, the size and viability of this commercial operation was determined. A meeting was

TABLE 4.1
SENSITIVITY OF EXISTING LAND USES

Types of Uses(s)	Sensitivity
Residential	* Property Effects . loss of buildings, property
	* Proximity Effects[1] . changes in ambient environment: noise, visual, amenity (quality of life)
	* Accessibility Effects . changes in residential access and access to other facilities and services
Community/Hamlet	* Property Effects . loss of buildings, property
	* Division of Existing Community/Hamlet
	* Disruption to Existing Community/Hamlet (Proximity Effects) . changes in community character, ambient environment: noise, visual, amenity (quality of life)
	* Accessibility Effects . changes in access to community services and facilities
Agriculture[2]	* Property Effects . loss of land, including specialty crop lands, farmsteads, buildings . creation of farm severances: new units and landlocked parcels
	* Accessibility Effects . changes in access and farm machinery movements
Commercial/Industrial	* Property Effects . loss of buildings, property, parking area
	* Proximity Effects . changes in ambient environment: in particular changes in exposure/visibility to transportation corridors
	* Accessibility Effects . changes in pedestrian or vehicular access to particular uses
Institutional	* Property Effects . loss of buildings, property, play area
	* Proximity Effects . changes in ambient environment: noise, visual, atmosphere or character
	* Accessibility Effects . changes in pedestrian or vehicular access

1. Additional discussion of visual and noise effects is provided in Sections 4.3.3 and 4.3.5

2. Further discussion of the potential effects to agricultural land use in the Study Area is documented in the report "Effects to Farm Operations".

held with its owner who indicated that the pet cemetery was a very successful commercial operation comprising 2,000 plots. The plots are also of considerable intrinsic and sentimental value to the individual plot owners. On receipt of this information, the individual plot owners were contacted through advertisements placed in the local newspapers by MTC. They were also contacted by the owner. Their numerous responses by telephone and by mail and at the subsequent Public Information Centre indicated their concerns with respect to any removal or dislocation of the existing cemetery.

White Church Road

As a result of the local municipality's and the residents' concerns, the White Church Road area is considered to be an Environmentally Significant Area.

During and after the second series of Public Information Centres, concerns were expressed by residents living nearby and alongside White Church Road and by the municipal council with respect to property takings, proximity effects such as noise and visual impacts, and the realignment of White Church Road with its resultant changes in traffic patterns and residential access. As a result, additional studies including further detailed field investigations were undertaken in this area by M.M. Dillon Limited. Changes were then recommended to the interchange in this location with a new link proposed between Highway 6 (New) and existing Highway 6.

When these changes were presented to the affected residents and the municipal council, further concerns were raised by some of the owners of local businesses along existing Highway 6 about the effects of future traffic reduction on their operations with the development of Highway 6 (New). Some concern was also expressed with respect to their visibility. However, the traffic analysis undertaken by M.M. Dillon Limited indicated that most of these commercial uses in the vicinity of White Church Road would be exposed to virtually the same amount of traffic that exists today and any of the other alignment alternatives would result in lower traffic volumes in the vicinity of the commerical uses along Highway 6. In addition, most of these commercial enterprises do not rely primarily upon 'passer-by' traffic for their livelihood. Many of them would have an established clientele of area residents and thus would be largely unaffected by changes in traffic patterns. Finally, most of the existing commercial uses will be visible from the new roadway link between Highway 6 (New) and existing Highway 6.

Unity Side Road Hamlet

Based on its designation as a hamlet in the Official Plan for the Haldimand-Norfolk Planning Area and in the Town of Haldimand District Plan, the views of local residents and offfcials, and the Study Team's investigations, the Unity Side Road Hamlet is considered to be an Environmentally Significant Area.

An in-depth study was conducted by M.M. Dillon Limited to determine the sensitivity of the hamlet to the development of Highway 6 (New). This study comprised additional field investigations, interviews, and archival research. Particularly important issues which were addressed were the church, which has only one service per year, the effects the to school, community cohesion, noise, and visual impacts.

4.3.2 Future Land Use

i) Data Sources, Reliability, and Data Gaps

The future land use of the Study Area is determined by the following Regional Municipal and Area Municipal Official Plans:

- Regional Municipal Official Plans
  - The Regional Municipality of Hamilton-Norfolk Official Plan which received approval from the Minister of Municipal Affairs and Housing in March 1982;
  - The Official Plan for Haldimand-Norfolk Planning Area which was approved for most of the Planning Area in August 1983. (A small portion, outside of the Study Area, has not been approved by the Ministry of Municipal Affairs.)
- Area Municipal Official Plans (or District Plans)
  - City of Hamilton Official Plan which was approved in September 1982;
  - Town of Ancaster Official Plan which was approved in July 1984;
  - Amendment No. 11 to the Official Plan of the Hamilton Wentworth Planning Area (Glanford section) which is now in the Township of Glanbrook. It received approval from the Minister of

Housing in 1964. Amendments to it were examined up to 1985. Use was also made of the Regional Municipality of Hamilton-Wentworth Official Plan update material for Glanbrook;

- Town of Haldimand District Plan which was approved in December 1983.

In order to update the Official Plans and to ensure accuracy in their interpretation, regional and local planning staffs (consultants in some instances) were contacted. This information was plotted on air photo mosaics and appears as Exhibit 4.2.

ii) General Description of the Study Area

The future land use within the Study Area is described with respect to the local municipality and to local, regional and provincial roads.

City of Hamilton

The Official Plan of the Regional Municipality of Hamilton-Wentworth designates the Hamilton part of the Study Area as "Residential" and "Related Uses".

The Official Plan for the City of Hamilton designates most of this land as "Residential" in conformity with the Regional Official Plan. The Hamilton Official Plan also designates three areas as "Major Institutional" as follows:

i) a 400 m strip of land located east of Upper James Street that stretches from Rymal Road south to the city limits;

ii) a small area containing the St. Elizabeth Village which is currently being expanded; and

iii) another small parcel located just north of the city limits along Highway 6.

"Commercial" use has been designated for the four quadrants at the intersection of Rymal Road and Upper James Street, which is in keeping with existing commercial activity in the area.

In summary, this part of the Study Area will continue to develop as it has in the recent past with mainly single family detached homes and compatible institutional and commercial uses such as the St. Elizabeth Village and the existing commercial retail outlets, along Rymal Road and Upper James Street.

Town of Ancaster

A significant amount of growth is designated for the area north of Highway 53 in Ancaster. The Regional Official Plan for Hamilton-Wentworth designates most of this area as "Residential and Related Uses" and to a lesser extent as "Industrial - Business Parks".

The Ancaster Official Plan designates this area as mostly "Residential". In addition, a significant amount of land is designated "Industrial" between Mohawk Road and Golf Links Road. There are also some lands within the residential area designated for "Commercial", "Institutional", "Open Space", and "Conservation" uses. The Ancaster Official Plan refers to this area as the "Mohawk and Golf Links Communities" (now called Scenic Woods). It is anticipated that at completion this area will contain an additional 25,000 people.

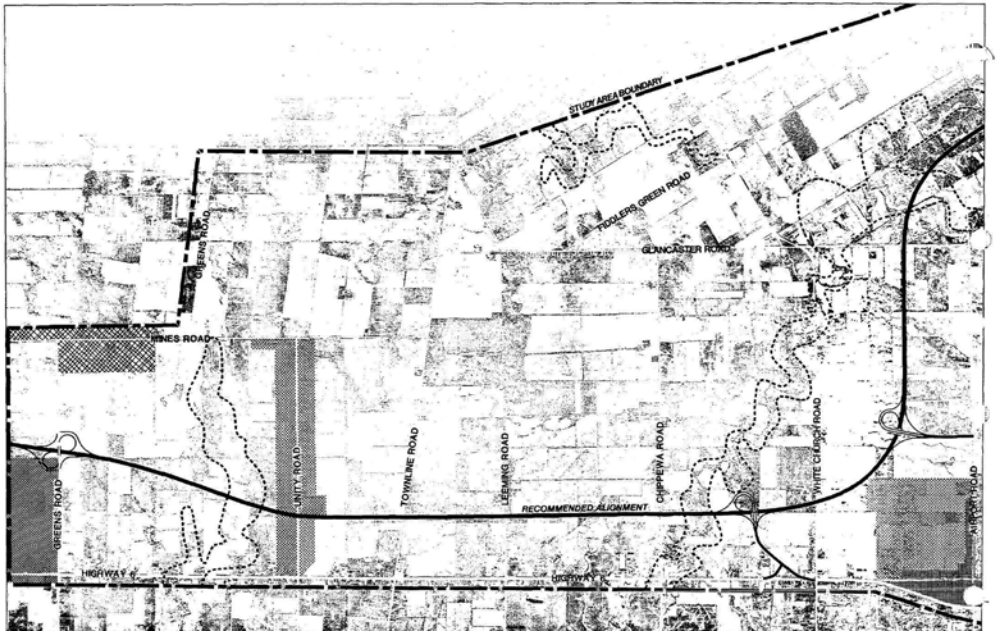
The Regional Municipality of Hamilton-Wentworth's Official Plan designates the remainder of the Ancaster part of the Study Area, mostly south of Highway 53, as "Rural" and is intended for mainly agricultural purposes.

The Ancaster Official Plan reflects the Regional Official Plan in designating the remaining area as "Agricultural". Therefore the area south of Highway 53 in Ancaster is not expected to change significantly from its current state of existing development.

Township of Glanbrook

Within the Official Plan of the Regional Municipality of Hamilton-Wentworth most of the Township is "Rural" with the exception of Mount Hope which is "Rural Settlement", and the lands surrounding the Hamilton Civic Airport have been designated "Business-Industrial Park" by the following amendments to the Regional Official Plan:

- Official Plan Amendment No. 12 designates the lands north of Twenty Road at Highway 6 as "Business-Industrial Park" and is intended to facilitate the establishment of airport-related commercial uses.



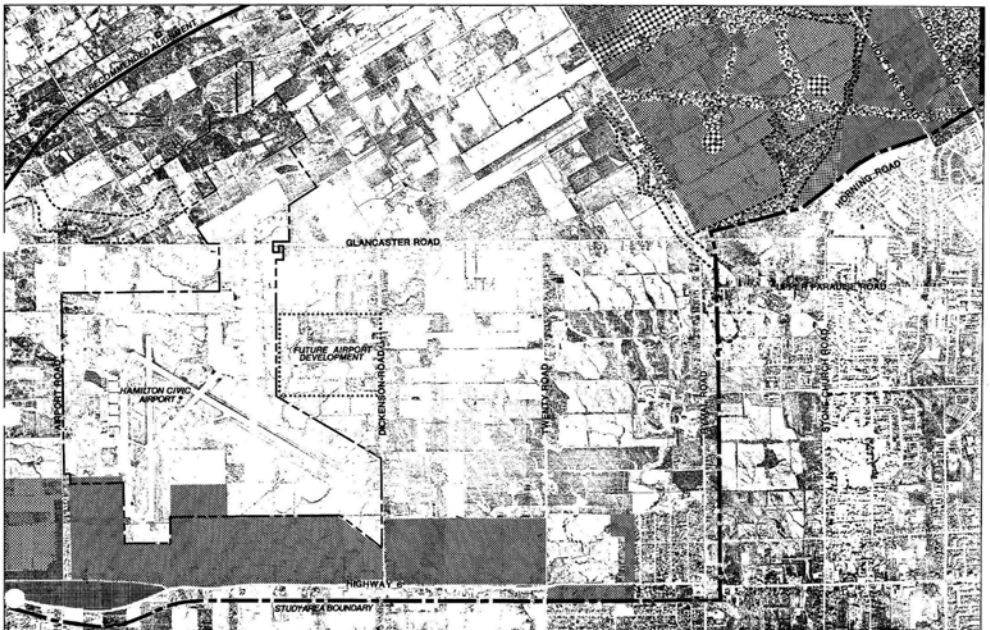
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 4.2 (a)

Official Plan Designations



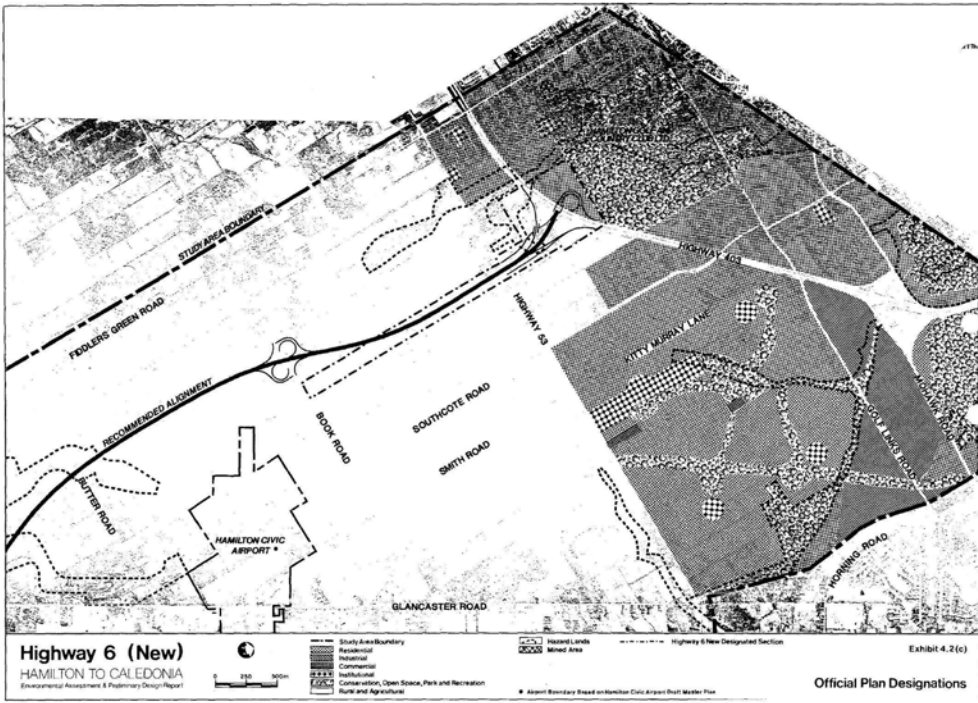
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 4.2(b)

Official Plan Designations


STUDY AREA BOUNDARY
FIDDLERS GREEN ROAD
RECOMMENDED ALIGNMENT
HIGHWAY 403
HIGHWAY 53
KIRBY MURRAY LANE
BOOK ROAD
SOUTHCOTE ROAD
SMITH ROAD
BUTTER ROAD
HAMILTON CIVIC AIRPORT *
GLANCASTER ROAD
HORNING ROAD
Highway 6 (New)
HAMILTON TO CALEDONIA
Environmental Assessment & Preliminary Design Report
0 250 500m
Study Area Boundary
Residential
Industrial
Commercial
Institutional
Conservation, Open Space, Park and Recreation
Rural and Agricultural
Hazard Lands
Mined Area
Highway 6 New Designated Section
* Airport Boundary Based on Hamilton Civic Airport Draft Master Plan
Exhibit 4.2(c)
Official Plan Designations

- Amendment No. 15 redesignates much of the land surrounding the Airport. A strip of land along Highway 6 from Twenty Road to Airport Road is designated as "Industrial-Business Park". In addition, the amendment redesignates most of the land to the northwest of the Airport (see Exhibit 4.2) as "Special Policy Area 1".

- "Special Policy Area 1" is intended to be developed for industrial and commercial purposes as demand for airport related facilities warrants it.

- The Glanbrook Official Plan is now in the process of being updated and will, accordingly, reflect the designations in the Regional Official Plan. The local Official Plan currently designates most of this area as agricultural. It also designates lands in the Mount Hope area as "Village Residential" and "General Commercial".

Therefore, the general rural character of Glanbrook is not expected to change except in the vicinity of the Hamilton Civic Airport and Mount Hope as described.

Town of Haldimand

The Official Plan for the Haldimand-Norfolk Planning Area contains broad policies with which the Haldimand District Plan conforms. The specific land use designations for the Haldimand part of Study Area are contained in the District Plan.

The primary future land use of this area will continue to be agriculture. There are also other types of future land use including:

- Unity Road from Highway 6 to Mines Road is designated as "Hamlet", and the predominant use will continue to be single-family residential with ancillary commercial and institutional uses.

- The area extending north along Mines Road from Greens Road to the continuation west of Greens Road is designated as "Mined Area" which generally restricts surface use to agriculture.

- The area east of the Caledonia Bypass to Highway 6 on the south side of Greens Road is designated "Industrial". At present three industrial type buildings exist in this location.

Therefore, as is the case with a majority of the Study Area, most of the future land use in the Haldimand section is expected to remain rural and agricultural.

Section ii) has presented a generalized summary of the future land use in the Study Area. Greater detail air photo mosaics that illustrate all future land uses are available for viewing upon request from the MTC Central Region Offices.

iii) Significance and Sensitivity

The sensitivity of future land uses to the development of Highway 6 (New) was determined by examining the potential effects - both positive and negative - to future land uses of the alternative alignments. These uses and their effects are documented in Table 4.2. The significance of these uses and their relationship to Highway 6 (New) was determined by the local municipalities, the external team, the area residents, and the Study Team.

TABLE 4.2

SENSITIVITY OF FUTURE LAND USES

Future Land Use(s)	Sensitivity
Residential	• Prevention of infilling in the Unity Side Road Hamlet, in the White Church Road area (south of Mount Hope), and a limited amount throughout the Study Area
	• Creation of new development parcels
	• Pressure for redesignation due to improved access
Commercial/Industrial	• Facilitation of airport expansion and related commercial and industrial development
	• Creation of new development parcels

The significant areas and issues are as follows:

Airport Expansion and Increased Usage

Improved access to the newly expanded airport is expected by Transport Canada to lead to increased use of the airport. In addition, the long-range plans of Transport Canada call for the further expansion of the Hamilton Civic Airport to the north of the current facility (see Exhibit 4.2). Accordingly, the design of Highway 6 (New) should facilitate these plans through its route and interchange locations.

White Church Road Area

The Township of Glanbrook requested that future urban development south of Mount Hope down to White Church Road should not be precluded by the development of Highway 6 (New) and the link roadway originally proposed between it and existing Highway 6. (The recommended plan accommodates this requirement.)

Unity Side Road Hamlet

The future development of the Unity Side Road Hamlet was considered a significant issue in this study. Detailed investigations were undertaken by M.M. Dillon Limited as discussed in Section 4.3.1 iii) to determine the effects of Highway 6 (New) on the hamlet. The main impacts to the hamlet would be the loss of community through the "barrier" effects created by the highway and the loss of residential units.

4.3.3 Visual Resources

i) Data Sources, Reliability and Data Gaps

No data was available on visual resources thus, to supplement this gap, visual resources of the Study Area were investigated by Dillon staff in conjunction with the MTC Central Region Historical Planner. Investigations were undertaken through field inspection and analysis of topographic maps and air photos.

These investigations are suitable for route planning and preliminary design purposes.

ii) General Description

The Study Area was divided into units that exhibited homogeneous trends, characters and features of the natural, heritage and social environment. Thus the general description of the Study Area from a visual perspective overlapped considerably with that presented in Section 4.3.4.1, Historical.

The Study Area was divided into:

a) cultural landscape zones;
b) cultural landscape units;
c) visual landscape units.

Cultural landscape zones are in areas that have homogeneous attributes defined on a regional scale. Cultural landscape units are areas that exhibit homogeneous attributes defined relative to the specific characteristics of the Study Area. Visual landscape units are areas defined within the cultural landscape unit that are spatially defined by topography, vegetation, or land use.

Six cultural landscape zones were identified primarily based on a pattern of lot division, road layout, character of the natural environment, building character, and land use pattern.

Twenty-two cultural landscape units were defined in the Study Area based upon the Ministry of Culture and Recreation "Guidelines on the Man-made Heritage Component of Environmental Assessments".

Visual landscape units were identified where areas were distinctly defined by topography, vegetation, or land use. Units were delineated where these elements gave them discreet spatial definition.

iii) Significance and Sensitivity

The purpose in describing landscape character is to judge the significance and evaluate the impact of various route alternatives in disrupting the key elements giving form, structure and identity to the Study Area. Information gathered during the inventory phase was used to help guide the location of route alternatives to minimize impact on landscape character.

The pattern of lot division, road layout, and character of the natural environment guided the location of the possible alignments. The form

and structure of the area is sensitive to highway construction, however, disruption was minimized by the alignment following the orientation of the lots and existing roads.

iv) Identified Environmentally Significant Areas/Issues

The visual impacts of Highway 6 (New) were important considerations in identifying Unity Road, White Church Road and Book Road as Environmentally Significant Areas.

4.3.4 Heritage Resources

4.3.4.1 Historical

i) Data Sources, Reliability, and Data Gaps

An investigation of heritage resources (historic, architectural and aesthetic) has been undertaken by the MTC Central Region Historical Planner. Its findings are presented in a separate technical report: "Investigation of Heritage Resources - Highway 6 (New), Hamilton to Caledonia, W.P. 36-84-00". Because of the large size of this report, it is not included in an appendix to this Environmental Assessment Report. Copies will be provided to the Ministry of Citizenship and Culture, and to other review agencies upon request. Copies will also be available at the locations identified for review by members of the public.

The investigation of heritage resources was undertaken between 1984 and 1986. It included field inspections and windshield surveys, historical research using the resources of the Archives of Ontario and the Toronto Public Library, and contact with numerous local and provincial heritage groups or organizations.

The level of investigation is more than adequate for route planning and preliminary design highway study. Heritage resources were identified and evaluated on the basis of observable charateristics and documentary or other evidence. The data and evaluations may be regarded as being reliable, given that investigations of this sort can never be definitive.

ii) General Description of the Study Area

The investigation of heritage resources has been undertaken with reference to cultural landscape characteristics and built environment features identified within the Study Area (see Exhibit 4.3).

The area has experienced nearly two hundred years of development and continues to reflect a largely agricultural pattern of land occupation and ownership. Other cultural landscape areas include those reflecting characteristics of clustered communities, residential groupings of modern origin, highway and airport transportation systems, and resource extraction activities. The characteristics which lend each area its own "personality" include the nature of physical features, original survey patterns, local road network, historical and contemporary land uses, and social and functional communities.

Well over two hundred built environment features (individual buildings, groupings, or areal sites) have been identified within the study area by the investigation as having some degree of heritage interest (historic, architectural, or aesthetic). Only one site has been designated under the Ontario Heritage Act, although many others exist with notable characteristics. Built environment features have been grouped into those with exceptional, moderate, ordinary and minimal qualities. Additionally, the community of Mount Hope has been identified as a cohesive grouping. The study area is rich in features related to the agricultural development of the area. In large measure, these are located within the pattern of farm lots laid out by the original surveys.

iii) Significance and Sensitivity

Of the cultural landscape areas, two have been identified as being especially susceptible to disruption. These constitute the historic community of Mount Hope, and the triangle comprising Concession VIII, Ancaster. Additionally, the boundary between two areas, created by the ridge/escarpment along the north side of Book Road, is also very sensitive to disruption. Mount Hope represents a cohesive historical community. The latter two areas are most notable because of their aesthetic qualities (though historic built environment features add to the ridge/escarpment's sensitivity). The significance of these cultural landscape areas has been determined by the Study to be only local in extent, based on their identification in comparison with other landscape areas in the Study Area.

By their nature, many individual built environment features have tangible qualities which may be susceptible to disruption. Generally, features of exceptional and moderate qualities are the most sensitive to impacts. The exact nature of the effect of any proposed alternative must be considered on a feature by feature basis.

iv) Identified Environmentally Significant Areas

The heritage resources at Book Road were an important component in identifying this area as Environmentally Significant for the purpose of this Study. Individual features or other cultural landscape areas were not regarded as being Environmentally Significant Areas, and historical resources were not considered to be an Environmentally Significant Issue for the purposes of this Study.

4.3.4.2 Archaeological

i) Data Sources, Reliability and Gaps

A review of the Ministry of Citizenship and Culture's archaeological data bank was undertaken for the Study Area and immediately surrounding areas. This revealed that no complete archaeological surveys have been undertaken in the Study Area. Forty-seven known pre-historic sites were identified, located generally in the northern and southern extremities of the study area or immediately adjacent to it.

Two reports of archaeological investigations carried out in conjunction with the Hamilton Civic Airport expansion were reviewed. These were: "An Archaeological Survey and an Assessment of the Hamilton Civic Airport, Mount Hope, Ontario" (Wm. C. Noble, McMaster University, 1983), and "Archaeological Survey - Hamilton Civic Airport Access Roads Study" (G. Foster, Archaeological Investigations, 1983). Neither the data bank nor these reports identified archaeological resources along the recommended alignment, although a Neutral Indian village site was identified on Alternative C (west of the Airport). As well, a site of unknown nature was identified by MCC staff as being in the vicinity of Unity Road on the recommended alignment.

To supplement this, field investigations were conducted by MTC's licensed archaeologist along the recommended alignment. This was done in order to locate sites and conduct surface collection of any material of archaeological interest.

These field investigations were conducted on approximately half the recommended alignment. The remainder was not investigated due to poor ground visibility or failure to obtain access from owners or occupants.

The investigations undertaken to date allow for identification of sites but not their significance.

ii) General Description of Archaeological Resources

A review of available literature reveals that both archaic and Neutral Indian sites were present within the Study Area. Several archaic cultures are represented along the Welland River in the region.

High concentrations of aboriginal peoples were present in the area during the 17th Century. The Neutral component has been identified by the presence of village and scattered cabin sites.

During historic times extensive European based agricultural development occurred. Evidence of this occupation has been identified in several sites.

Field investigations undertaken for this study have identified an additional 50 sites.

iii) Significance and Sensitivity

Normal MTC practice for archaeological investigations for new routes involves the survey of only the selected alternative. This is done on the basis that the complete survey of all alternatives is not practically warranted and that, where resources of significance are located along the selected alternative, appropriate mitigation will be applied as determined in consultation with the Ministry's archaeologist(s). As such, the significance of archaeological resources cannot be applied to the route selection process, except in a general fashion based on accumulated literature and other documentary information.

This process has been followed in this Study and most of the selected alternative has been investigated. To date the significance of these resources has not yet been determined. The identification of significant resources as the project progresses will be incorporated into the design process for the Study and appropriate mitigation will be applied.

Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

0 500 1000 m

- Study Area Boundary
- Gas
- Hydro
- Inter Provincial Pipe Line-60' Easement
- Proposed and Existing Trans Canada Pipe Line
- Built-Environmental Features of Exceptional and Moderate Importance
- Built-Environmental Features (Designated Under the Ontario Heritage Act)
- Highway 6 New Designated Section (In Place 1975)
- Areas of Heritage Sensitivity (historic, aesthetic)
- On-Site Noise Measurement Locations (1983) (See Appendix H)
- Draft Approved Subdivisions (Within 600m of Any Alternative Alignment)
  - A Approval 1976-1986
  - B Approval 1987

Exhibit 4.3

Utilities, Noise and Heritage Resources

The Route Planning and Preliminary Design Study has proceeded on the basis that any resources identified will be sensitive to disturbance or disruption. However, this sensitivity is regarded as being applicable to all sites equally until otherwise determined by completion of the initial surveys and further investigations as required.

Chapter 6 outlines commitments for future work for this factor.

iv) Identified Environmentally Significant Areas/Issues

Archaeology is not considered to be an Environmentally Significant Issue for the purposes of this Study. This consideration is based on the general practice of not introducing detailed archaeological information into the decision-making process until later in the preliminary design, and on the basis that acceptable mitigation is normally applied to minimize the degree of impacts to any significant resources.

4.3.5 Noise

i) Data Sources, Reliability and Data Gaps

Investigations

The evaluation of noise for this Study has been undertaken on the basis of significant impacts as a result of condition changes to (future) ambient conditions expected to occur because of the operation of the ultimate Highway 6 (New) facility.

The investigations undertaken for this Study included:

i) on-site noise measurements conducted in 1985 for eight representative (rural) locations within the project's Study Area (see discussion below, Exhibit 4.3 and Appendix H);

ii) route planning level of detail predictions of future noise conditions based on anticipated traffic volumes;

iii) preliminary design level of detail predictions for future noise conditions with the recommended alignment, including consideration and evaluation of mitigation measures, based on anticipated traffic volumes.

The investigation of noise impacts was carried out by S.S. Wilson and Associates during 1985-86. Part I, Appendix H contains two reports produced by this firm:

"Report W86-204, No. 1" (March 1986)

- contains information concerning route planning level of detail conditions: traffic volumes, numbers of lanes, truck percentages, posted speeds, and distances from both centrelines and edges of pavement for 5 dBA contour intervals.

"Report W86-204, No. 2, incorporating Revisions 1 (September 1986) and 2 (October 1986)

- contains on-site noise level measurements (April 30 to May 16, 1985);

- preliminary design level of information for the evaluation of recommended alignment impacts;

- preliminary design level of information for the investigation of mitigating measures.

As well, supplementary interpretation and analysis by the MTC Central Region Environmental Unit was done. This is included in the report "Route Planning Noise Evaluation" in Appendix H.

Procedures Followed

During the course of the Study, a number of changes occurred as a result of policy commitments agreed to between the Ministry of the Environment and MTC. These commitments took the form of a protocol signed in February 1986.

Although the route location and early preliminary design phase decisions had been completed by the time of the adoption of this protocol, noise impacts were re-evaluated in a format compatible with the agreement. The results were compared with earlier findings to determine whether the new analysis produced significantly different results. The results were not determined to be substantially different by the Study Team, but were used as a basis for additional preliminary design level of detail considerations. As a result, the body of this report (Sections 4, 5 and 6, and Appendix H) has been finalized to show the consideration of noise in terms of protocol commitments.

When the noise investigations were begun for this study, no accepted criteria existed which covered rural freeway situations in the province. Based on criteria for urban freeways, and on previous investigations undertaken by MTC, the investigation of noise impacts was done by comparing the changes in numbers of residential noise receivers receiving:

i) between 50 and 55 dBA (Leq 24), and
ii) over 55 dBA,

with a given Highway 6 (New) alternative alignment in place. (A discussion of dates and traffic volumes used for both pre-protocol and post-protocol investigations is provided below.)

For route planning purposes, the numbers of residences located within the areas experiencing 50 to 55 dBA, and over 55 dBA were used in presentations to External Team and municipal representatives, and to the Public, as referenced in Part I, Appendices D, E and F. The effects of terrain and screening by intervening obstructions were not taken into account for route planning level of detail investigations, except where the existence of a major cut at Unity Road was found to be important in the evaluation of the alternatives at that location.

"A Protocol for Dealing with Noise Concerns during the Preparation, Review and Evaluation of Provincial Highways Environmental Assessments" was signed in February 1986, but was not received by the Study Team until May 1986, after the last series of Public Information Centres had been held. As a result, information presented at that time, and the decisions leading to it, were based on the pre-protocol investigations.

The re-assessment of noise impacts in a manner compatible with the protocol included the following considerations:

- impacts were based on noise predictions based on expected traffic volumes, ten years after completion of the facility (see discussion below);

- area investigated for noise impacts, for each alternative, was determined on the basis of the smaller of: the distance from the noise source (i.e. highway) to where no increase above the ambient noise level occurred, or 600 m from the source.

The same traffic volumes were used for both the pre-protocol and the post-protocol investigations. Post-protocol procedures are outlined in Appendix H.

Data Used

The protocol indicates that noise impacts for all MTC provincial roads are to be predicted, based on traffic projections ten years after completion (of the undertaking), or on the best available data where ten-years-after predictions are not available. The commencement of construction (and thus the estimation of a completion date) cannot be determined until after approval for Highway 6 (New) has been received under the Environmental Assessment Act. The actual construction schedule for a highway of this type is not normally determined in the preliminary design phase of investigations.

As a result, this Study has based noise level calculations on future anticipated traffic volumes, which have been determined by the use of a comprehensive model as outlined in Part II, Section 2. Included in the assumptions of this model is the growth of existing and proposed developments in the Study Area to a mature state, under a "high growth" scenario. As they are growth dependent, these predictions are independent of an actual date of construction, and are representative of a period at least ten years after construction of the ultimate undertaking. Appendix H, Part I, provides additional information on the future traffic volume predictions used.

Traffic predictions used for this Study are based on average annual daily traffic (AADT) rather than on summer annual daily traffic (SADT) values, as Highway 6 (New) is not expected to experience major seasonal fluctuations in traffic volumes.

The evaluation of noise level increases reflects the difference between predicted road-generated noise levels for future conditions with and without Highway 6 (New) in place. In some cases, however, low traffic volumes along local roads result in unrealistically low noise level predictions at receiver locations. In cases where the predicted noise levels were less than 45 dBA, this study has used an assumed minimum ambient value of 45 dBA to account for non-roadway noise contributors to rural ambient levels (such as wind, leaf rustle, agricultural activities, etc.). In these cases, the amounts of increase in noise levels are based on 45 dBA rather than on the lower traffic-generated noise predictions.

The assumption of 45 dBA has been used in several previous MTC Environmental Assessments for similar situations. In this case, the on-site noise measurements for (existing) conditions confirm the validity of this assumption.

On-site measurements at eight locations throughout the Study Area were made at 15 m from the edge of pavement. This was considered representative of conditions expected throughout the rural portions of the Study Area. In the case of higher traffic volume roads (e.g. White Church and Carluke Roads, with 1986 AADT of 1060) traffic-generated noise can be seen to contribute substantially to measured levels at this distance, and would be reduced at greater distances from the edge of pavement, to where rural background ambient (i.e. non-traffic noise) levels were experienced. Along less travelled roads (e.g. Book Road AADT of 450 and Townline Road AADT of 275 to 350), traffic contributions to the ambient noise levels can be seen, in average daytime (07:00 to 23:00) measurements of over 50 dBA. At night (23:00 to 07:00) very low traffic volumes are experienced and the measurements would consist largely of nighttime background ambient. This is reflected in the fact that, although some hourly measurements are below 45 dBA, the nighttime average is 45 dBA or more. As road-generated noise is not a substantial component in such cases, the "drop-off" in road-generated noise levels over distance does not come into play on an Leq_{24} basis and the background rural ambient is closely reflected in the measurements.

The assumed background rural ambient of 45 dBA has been used in the evaluation of noise impacts in future conditions. Increases in the rural ambient over time, due to such changes as increased residential development or more highly mechanized agricultural practices, has not been included. As such, the use of 45 dBA is considered to be an appropriate assumption for future conditions.

The Ministry of Transportation and Communications holds the position that noise from aircraft near airports should be included in the assessment of ambient conditions, as this noise is a component of ambient (per definition of ambient, draft National Environmental Noise Code). The assessment of noise resulting from the operation of the Hamilton Civic Airport within the Study Area (as reflected by NEF contour mapping) has been removed from the analysis of noise conditions at the request of the Ministry of the Environment. The noise reports referenced above have been revised appropriately to reflect this removal.

ii) General Description

The Study Area is largely rural and agricultural in nature. In the communities of Ancaster, Hamilton and Mount Hope, residential clustering occurs in subdivisions. Elsewhere, individual residences are scattered on farm lots or along local roads and highways, singly or in "strips". No hospitals or other municipally-recognized quiet areas were identified within 600 m of any alternative. None of the industrial or commercial developments located within this distance are identified as major noise contributors. The operation of the Hamilton Civic Airport has been identified as a potential contributor but the airport is not used to capacity at the present time.

At the time of the noise investigations, the only draft approved subdivisions close to any alternative alignments were located adjacent to Highway 403 near Southcote Road, over 350 m east of the designation laid down to protect for a connection between Highway 403 and Highway 6 (New) in 1975. These draft approved subdivisions received approval after this designation was laid down and are currently on the MTC noise barrier retrofit programme for Highway 403. As the ramps connecting Highway 6 (New) to and from the east merge with Highway 403 in this area, Highway 403 will remain the major noise generator, and mitigation will be provided under the provisions of the retrofit programme.

Following the noise investigations, draft approval was obtained in 1987 for a subdivision immediately west of the designation. The noise analysis undertaken by Valcoutics Canada Ltd. for the proposed subdivision indicated that the alignment of Highway 6 (New) will be acoustically insignificant. A condition of approval included that noise attentuation along Highway 403 should be provided at the developer's cost. This would include any attentuation associated with the Highway 403/Highway 6 (New) ramps in this location. As such, no re-evaluation of noise impacts was made to take the draft approved subdivision into account for this Study.

Low traffic volumes on most local roads contribute to low ambient noise levels. The Study Area is generally perceived as being very quiet. On-site measurements made in 1985 for eight representative rural sites at 15 m from adjacent roadways to represent the typical setback of residences within the Study Area and noise level predictions based on traffic volumes support this perception (see Appendix H).

Sources of highway noise in the Study Area include existing Highway 6, Highway 53, and Highway 403, with the latter, as a divided freeway, being the largest noise generator of the three.

Future ambient conditions, as reflected by the ten years after construction scenario predictions in most areas are not expected to change significantly from existing noise levels. Local roads will experience only small increases in traffic and the area will continue to remain largely rural and agricultural in nature. Local ambient noise levels will remain low, with the exception of areas immediately adjacent to the highways. These areas will continue to experience localized increases in traffic-generated noise.

Future usage of the Hamilton Civic Airport is uncertain at the present time, although Transport Canada has produced NEF contour mapping outlining anticipated future noise levels for areas adjacent to the airport. Consideration of noise resulting from the operation of the airport has been removed from this assessment at the request of the Ministry of the Environment.

iii) Significance and Sensitivity

In compliance with the protocol between MOE and MTC, noise impacts have been regarded as significant for this Study where an increase of more than 5 dBA has been predicted for noise sensitive receivers over the (future) ambient condition without Highway 6 (New), as a result of the operation of the facility ten years after construction. Where such a significant impact occurs, investigation of mitigation within the right-of-way is required by the protocol. The protocol recognizes an objective for outdoor sound levels to be the higher of 55 dBA or the existing ambient.

For information purposes, it is noted that the Ministry of the Environment assesses noise impacts that have an increase of greater than 5 dBA as "definite" and those with an increase of greater than 10 dBA as "significant". These terms are not so defined in the MOE/MTC protocol and have not been used in this assessment.

Noise sensitive locations include residential receivers (calculated for a known or assumed outdoor amenity area, usually behind a residence), within the distances from the noise source outlined in the protocol. For the purposes of this Study, schools located within 600 m of an alternative alignment where their outdoor area would receive an increase as a result of an alternative were included. Only Seneca Unity School on Unity Road was applicable. No hospitals or other municipally-recognized noise sensitive areas were identified within 600 m of any alternative.

In general, noise sensitive locations (receivers) occur on local roads adjacent to alternative alignments where residences would be in close proximity to the alternative.

iv) Identified Environmentally Significant Areas/Issues

Highway noise associated with the proposed undertaking is identified as an Environmentally Significant Issue for the purposes of this Study.

4.3.6 Major Utilities

Major utilities within the Study Area are shown on Exhibit 4.3. Table 4.3 summarizes the status and ownership of these utilities. This information was obtained from correspondence with the relevant utility companies and municipal officials and indicate existing plant and any planned expansion. Relocations or modifications to utilities will be dealt with in detailed design.

As part of the information-gathering process, a detailed inventory of existing utility plants was completed. The purpose of this information was twofold:

1. To identify those major utilities for which relocation costs were prohibitive to the point where they affect evaluation of alternative alignments.

2. To provide base data and a list of contacts for all utilities within the project area for reference during subsequent project phases.

Because of the rural nature of the Study Area, there is not an extensive network of utility plants. No future expansion of utility plants was identified, except as noted below.

Ontario Hydro

There are three major Hydro lines within the Study Area. A 230 kV line runs east-west between White Church and Chippewa Roads. A 230 kV line runs approximately north-south from Book Road to south of Butter Road. There are three 230 kV lines running east-west between Highway 53 and Book Road.

TABLE 4.3
SUMMARY OF EXISTING AND FUTURE UTILITY PLANT

UTILITY	AFFECTED PLANT WITHIN STUDY AREA	FUTURE EXPANSION/ACTION
Bell Canada 66 Bay Street South Hamilton, Ontario	No major Bell Canada facilities affected.	No major expansion planned.
	Minor adjustments to buried distribution cables may be required.	Relocation requirements can be dealt with in detail design.
Ontario Hydro 700 University Avenue Toronto, Ontario	230 KV line running East-West between White Church and Chippewa Roads.	Relocation requirements can be dealt with in detail design.
	230 KV line running approximately North-South from Book Road to south of Butter Road.	Crossing Hydro line by Alternatives A2 and A3 immediately south of Book Road may not be feasible. Crossing at Butter Road can be dealt with in detail design.
	Three 230 KV lines running East-West between Highway 53 and Book Road.	Relocation requirements can be dealt with in detail design.
	115 KV line runs through Northeast corner of Study Area.	No effect on alternative alignment.
Inter-Provincial Pipeline 10201 Jasper Avenue Edmonton, Alberta	Pipeline right-of-way runs East-West between Airport Road and White Church Road.	National Energy Board approval required for crossing.
TransCanada PipeLines 50 Commerce Court West Toronto, Ontario	Pipeline runs through Northeast corner of Study Area.	No effect on alternative alignments. Proposed pipeline for construction in 1987 will run East-West between Book Road and Highway 53 on south limit of Hydro right-of-way.
Union Gas 50 Keil Drive North Chatham, Ontario	Pipeline runs Northwesterly from the intersection of Unity Road at Highway 6 to Butter Road, where it leaves the Study Area. An intermediate pressure line runs along Unity Road from Highway 6 to Mines Road.	No plans for any future expansion.
Regional Municipality of Hamilton-Wentworth 71 Main Street West Hamilton, Ontario	Limited local service of water and sewer mains.	Relocation requirements can be dealt with in final design.

The crossing of the Ontario Hydro line immediately south of Book Road is not feasible. This facility was recently lowered to accommodate the zoning requirements for the recently expanded Hamilton Civic Airport. All other crossings were judged to be feasible and relocation requirements can be dealt with in the final design.

A 115 kV line runs through the northeast corner of the Study Area and does not effect any of the alternative alignments.

Bell Canada

Bell Canada has no major facilities that would be affected by any of the alternative alignments for Highway 6 (New). Bell plans no major expansions within the Study Area. Some minor adjustments may be required for buried distribution cables. These adjustments can be dealt with during final design.

Interprovincial Pipelines

An Interprovincial Pipeline right-of-way runs approximately east-west between Airport Road and White Church Road. National Energy Board approval will be required for any crossings.

TransCanada PipeLines

An existing pipeline runs through the north-east corner of the Study Area and does not affect any of the alternative alignments. TransCanada PipeLines is proposing a new line which will run east-west between Highway 53 and Book Road along the south limit of the Hydro right-of-way.

Union Gas

There is a high pressure gas pipeline running northwesterly from the intersection of Unity Road and Highway 6 to Butter Road where it leaves the Study Area.

There is also an intermediate pressure line which runs along Unity Road from Highway 6 to Greens Road.

Municipal Services

Due to the rural nature of the Study Area, municipal services exist in only a few locations. These consist of:

1. developed areas of the Town of Ancaster, north of Highway 53;

2. the portion of the City of Hamilton within the Study Area; and

3. the Highway 6 Corridor to Mount Hope.

The majority of this service is local in nature, and any relocations can be dealt with during final design.

4.4 Summary of Environmentally Significant Areas/Issues

For the purposes of this Study, the following have been identified as Environmentally Significant Areas or Issues (ESA/ESIs). The components contributing to their status as ESA/ESIs are also outlined, as are some of the contacts for technical and other information.

ESA/ESI	Major Components	Contacts
Noise	- predicted (future) highway noise impacts	Ministry of the Environment
Agriculture	- area required for right-of-way - farms affected	Ministry of Agriculture and Food
"Unity Road"	- proximity impacts (noise, visual) - travel patterns - right-of-way requirements - groundwater	Various
"White Church Road"	- proximity impacts (noise, visual) - municipal planning requirements - travel patterns, access - right-of-way requirements - waterfowl, woodlot areas	Various

ESA/ESI	Major Components	Contacts
"Book Road"	- proximity impacts (noise, visual) - airport navigation requirements - hydro-electric corridors - human and animal cemeteries - heritage resources - right-of-way requirements - specialty crop and other agriculture - groundwater	Various
Property	- acquisition - proximity effects	Various
Vegetation	- woodlot/forested area	Ministry of Natural Resources

The components of these ESA/ESIs are used in Chapter 5 in the evaluation of the various alternative alignments. Chapter 6 provides a description of the relationship of the recommended alignment to the ESA/ESIs and mitigating measures or commitments to future work proposed.

4.5 Transportation Facilities

4.5.1 Provincial Highways and Municipal Roadways

Existing Highway 6 has a basic four-lane cross section north of Caledonia and a basic two-lane cross section south of Caledonia. The Caledonia Bypass is two lanes wide. The posted speed limit is 80 km/h.

The existing land use adjacent to existing Highway 6 is primarily agricultural and light industrial with some residential and commercial uses. Along the section of Highway 6 approaching Hamilton and on Upper James in Hamilton, strip commercial development predominates. All access to Highway 6 is at-grade.

General characteristics of existing Highway 6 between Hamilton and Caledonia are summarized in Table 4.4. This information was obtained from the Ministry of Transportation and Communications Provincial Road Appraisal Sheets. Existing Highway 6 carries approximately 13,500 vehicles per day (vpd) north of the airport 11,400 vpd south of the airport. The respective design hourly volumes (DHV) are 1,457 and 1,231 vehicles per hour (vph). Both sections operate at level of service "C". North of the airport there are 8.0% trucks or 1,080 trucks per day and south of the airport this increases to 9.5% but remains at 1,080 trucks per day.

TABLE 4.4
SUMMARY OF PROVINCIAL ROAD APPRAISAL SHEETS
FOR EXISTING HIGHWAY 6

Section	Distance (km)	No. of Lanes	1983 Traffic AADT	DHV%	DHV	% Comm.	Hourly Service Volumes B	C	D	E	Existing Level of Service
Caledonia Bypass	6.5	2	3,000*	10.8	323	5.0	-	633	1,233	1,666	A
South of Airport	6.4	4	11,400	10.8	1,231	9.5	497	1,623	2,545	2,926	C
North of Airport	6.2	4	13,500	10.8	1,457	8.0	515	1,892	2,638	3,032	C

* Not based on a full year of counts

Traffic accident records were obtained for existing Highway 6 from the Ministry of Transportation and Communications for the years 1981 to 1983 inclusive. Accident statistics were compiled for two sections of Highway 6, south of the Airport and north of the Airport. These are shown in Table 4.5.

From the table, it is noted that the intersection or private drive related accidents form a high percentage of the total accidents, generally 30-50%. This is a reflection of the combination of relative

high speed highway, at-grade intersections, and driveways fronting on the highway. The sectional rates are consistent through the three year period and are somewhat above the provincial average. Truck involvements vary considerably and range from 3% to 18% of all accidents.

TABLE 4.5
EXISTING HIGHWAY 6 ACCIDENT SUMMARY[1]

	SECTION[3]					
	South of Airport			North of Airport		
	1983	1982	1981	1983	1982	1981
Number of Accidents	35	26	36	31	30	22
Accident Rate[2]	1.7	1.3	1.8	1.3	1.3	0.9
% Trucks Involved	11	8	5	3	17	18
% Intersection or private drive related	40	31	28	45	30	50
% Intersection or private drive related (trucks involved)	6	8	3	0	10	14

NOTES:

1. Source: Ministry of Transportation and Communications
2. Accident rate expressed in number of accidents per million vehicle kilometres. Provincial Average for the year 1981 to 1983 is 1.1 accidents per million vehicle kilometres for King's Highways.
3. Data is not yet available for the Caledonia Bypass.

Highway 6 (New) will ultimately be constructed as a divided, fully controlled access freeway. Freeways are statistically the safest type of highway, with accident rates averaging approximately 0.8 accidents/million vehicle kilometres (Mvkm). During the preliminary design of Highway 6 (New), standards reflecting a 120 km/h design speed were used for all geometric criteria (see Part II). Therefore, relative to existing Highway 6 (accident rate: 1.6/Mvkm), it can be anticipated that significant improvements in the accident rate will accompany construction of the ultimate freeway.

A major consideration in the determination of the initial stage cross section was the accident experience of at-grade intersections (see Section 3.6, Part II). Sight distances and grades were carefully examined in the design of the at-grade intersections (see Section 5, Part II).

Table 4.6 summarizes the existing conditions of the Provincial highways and municipal roadways in the Study Area. There are no planned expansions for these roadways.

The information was obtained from:

- meetings with representatives of MTC;
- meetings with appropriate municipal officials;
- review of relevant plans and reports.

The major problems identified are the lack of direct access to the Provincial freeway system and operational problems on the Caledonia Bypass.

Existing Highway 6 does not connect to Highway 403 and thus long distance traffic, particularly truck traffic, must use local roads to access Highway 403. Local residents have expressed concern over the use of these local municipal roads for long distance travel and truck traffic. These concerns were also expressed by municipal staff and politicians.

The lack of direct access to the Provincial freeway system was also cited by many of the representative truckers and industries interviewed in the Highway 6 Corridor. In addition, the trucking firms and industries also identified operational problems related to congestion through both Jarvis and Hagersville.

Operational problems on the Caledonia Bypass have been cited by trucking companies, local industries and municipal staff. In order to use the Bypass additional turns and increased travel distance are required. This has led to some users, primarily truckers, to stay on existing Highway 6 through Caledonia.

In addition to the roads within the Study Area, the following are proposed:

TABLE 4.6
SUMMARY OF EXISTING ROADS WITHIN STUDY AREA

Roadway	Jurisdiction	Existing Conditions
Highway 403	Province	Four basic lane freeway with one extra lane on escarpment. Right-of-way width 91 m.
Highway 53	Province*	Two-lane paved highway. R-O-W 26 m.
Highway 6	Province*	Four-lane paved highway. R-O-W 37 m.
Glancaster Road R.R. 253	Regional Municipality of Hamilton-Wentworth	Two-lane paved roadway. Boundary road between Town of Ancaster and Township of Glanbrook. Section of road closed due to Airport Expansion.
Airport Road R.R. 637	Regional Municipality of Hamilton-Wentworth	Two-lane paved roadway. Provides access to Hamilton Civic Airport.
White Church Road R.R. 622	Regional Municipality of Hamilton-Wentworth	Two-lane paved roadway.
Fiddler's Green Road R.R. 216	Regional Municipality of Hamilton-Wentworth	Two-lane paved roadway.
Southcote Road R.R. 248	Regional Municipality of Hamilton-Wentworth north of Highway 53 Town of Ancaster south of Highway 53	Two-lane paved roadway. (Section closed due to Airport expansion.)
Smith Road	Town of Ancaster	Two-lane gravel roadway. (Section closed due to Airport expansion.)
Book Road	Town of Ancaster	Two-lane gravel roadway.
Butter Road	Town of Ancaster	Two-lane roadway realigned to connect with Airport Road.
Chippewa Road	Township of Glanbrook	Two-lane gravel roadway.
Leeming Road	Township of Glanbrook	Two-lane gravel roadway.
Dickenson Road	Township of Glanbrook sest of Highway 6	Two-lane paved roadway.
Twenty Road	Township of Glanbrook	Two-lane paved roadway.
Townline Road	Boundary Road Town of Haldimand/Township of Glanbrook	Two-lane gravel roadway.
Unity Road	Town of Haldimand	Two-lane paved roadway.
Greens Road	Town of Haldimand	Two-lane paved roadway.
Mines Road	Town Haldimand	Two-lane paved roadway.

* Negotiations are underway to transfer portions of these highways to the appropriate Regional Municipality.

- the North/South Parkway and East/West Arterial, approved recently for design and construction;

- Highway 403, Ancaster to Brantford, presently programmed for construction;

- the Hamilton Perimeter Industrial Road, feasibility study ongoing.

4.5.2 Transit System

There is little existing transit service within the Study Area. The Hamilton Street Railway runs some routes in the portion of the City of Hamilton within the Study Area. No service exists beyond the Mountain Terminal on Upper James, between Dickenson and Twenty Roads.

Canada Coachlines operates a bus service along existing Highway 6 between Hamilton and Port Dover with stops in Mount Hope and Caledonia. Between Hamilton and Caledonia there are four runs daily, Monday to Thursday, and on Saturday. On Friday there are five runs daily, and on Sunday there are two runs daily.

United Trails Buslines also operates a bus service along Highway 6 between Caledonia and Hamilton. There is no stop in Mount Hope. This service runs twice daily.

No changes were identified to the existing transit system.

5. Identification and Evaluation of Alternatives

5.1 Introduction

This Chapter describes the identification and evaluation of alternatives for Highway 6 (New).

Chapter 2 of this report developed the transportation objectives for Highway 6 (New). Throughout the evaluation of alternatives, these objectives were used as a basis for assessing the alternatives to the undertaking, determining the Study corridor, and determining viable alternative alignments.

Section 5.3 discusses alternatives to the undertaking.

In Section 5.4 corridor alternatives are discussed.

Section 5.5 describes the alternative alignments.

Section 5.6 discusses alternative alignments rejected after a preliminary analysis.

Section 5.7 describes the viable alternative alignments.

In Section 5.8 the factors and criteria used in the comparative analysis are developed.

The comparative evaluation is presented in Section 5.9.

Section 5.10 outlines modifications to the Recommended Alignment, the result of which is the ultimate undertaking.

5.2 Design Criteria

Alignments for Highway 6 (New) were designed in accordance with Ministry of Transportation and Communications Standards for Rural Divided Freeways to a design speed of 120 km/h (RFD 120).

5.3 Alternatives to the Undertaking

In this section reasonable alternatives to the undertaking are compared to the transportation objectives of Highway 6 (New) as outlined in Section 2.3.

The objectives used in assessing the alternatives to the undertaking are:

1. Provide access from the airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself.

2. Increase use of the Caledonia Bypass.

3. Improve access to provide flexibility for development in Townsend/ Nanticoke.

4. Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system.

5.3.1 Modal Alternatives

Transit

Access to the newly expanded Hamilton Civic Airport could not be provided adequately by transit as users of the airport have many dispersed origins and can travel considerable distances. Therefore, automobile access to the airport is of particular importance. Currently there is no existing public transit service to the airport due to low demand. Taxi and limousine service is available for those unable to arrive by personal automobile.

Transit would not increase use of the Caledonia Bypass. In addition, transit would not improve access to either the Townsend/Nanticoke area or the industrial area of east Hamilton, as both these areas require improved automobile and predominantly truck access.

Rail

Improved access to Townsend/Nanticoke and the industrial area of east Hamilton requires a roadway link rather than a rail link. Both industrial areas are currently well served by rail transportation.

Additional rail service would not improve access to the Hamilton Airport or increase use of the Caledonia Bypass. In addition, as noted in Section 2.2.2, current industry inventory procedures place more emphasis on truck rather than rail service.

Air

Very good air access is currently provided by the recently expanded Hamilton Civic Airport. Improvements to air service in the area would not increase access to the Townsend/ Nanticoke area, increase use of the Caledonia Bypass, or improve access to the industrial area of east Hamilton.

5.3.2 Operational Improvements/Upgrading of Existing Facilities

The only major north/south transportation facility within the Study Area is existing Highway 6. Upgrading of existing Highway 6 would not improve access to the Hamilton Civic Airport as direct access is required to the Provincial Freeway System. Access today is only available via municipal roads, and local residents object to the use of such roadways as major transportation corridors.

To improve access to both the Townsend/Nanticoke area and the industrial area of east Hamilton, a major highway facility with direct connections to the existing Provincial freeway system is required. Interviews held with representative industries and trucking firms in the Highway 6 Corridor, as detailed in Section 2.2.2, indicate that there is very poor access from Nanticoke to the Provincial freeway system.

The interviews also revealed that the industries in the Nanticoke area require use of the largest and heaviest trucks allowed by law. These trucks have considerable impact on urban areas and are best carried by a freeway facility.

Thus, upgrading of existing Highway 6 would not provide for a direct connection to the Provincial freeway system and would rely on the use of municipal roadways to accommodate large volumes of heavy trucks in congested urban areas.

An upgrading of existing Highway 6 would do little to increase the use of the Caledonia Bypass. Currently, operational problems exist at the north end of the Caledonia Bypass that can only be relieved by eliminating the existing connection to existing Highway 6.

5.3.3 "Do Nothing"

The "Do Nothing" option would place total reliance upon existing Highway 6 as the major transportation facility within the Study Area. Although it generally offers a good level of service today, congestion will occur as growth continues, particularly within the urban area of Hamilton (see Section 2.3).

As noted in the preceding section, existing Highway 6 does not have a direct connection to the existing Provincial freeway system and requires that truck traffic be accommodated on municipal roadways. Thus, as with "Upgrading of Existing Facilities" a "Do Nothing" option would not improve access to the Hamilton Civic Airport, improve access to the Townsend/ Nanticoke area, increase use of the Caledonia Bypass or improve access to the industrial area of east Hamilton.

5.3.4 Summary

Table 5.1 summarizes the comparison of the Alternatives to the Undertaking. This shows that none of the Modal Alternatives, Upgrading of Existing Facilities or the Do Nothing option meets the objectives of Highway 6 (New) and therefore they are not considered further.

5.4 Corridor Alternatives
(Alternative Methods of Carrying Out the Undertaking)

5.4.1 Background

During earlier studies for Highway 6 (New) between Caledonia and Hamilton (including the 1976 Highway 6 Nanticoke to Hamilton Joint Use Corridor Study), three basic corridors were identified as areas for potential alignments between Caledonia and Hamilton (see Exhibit 2.1). These corridors were:

- the "West Corridor" connecting to existing Highway 403 in Ancaster;
- the "Central Corridor" generally located immediately east of existing Highway 6 and connecting to the proposed mountain expressway in Hamilton-Wentworth; and
- the "East Corridor" generally east of the CNR tracks and connecting to the proposed North-South Parkway.

Various alternative alignments are available within each of these corridors.

As part of this study corridor traffic forecasts were developed for the East, Central and West Corridors (see Section 2.3, Part I and Section 2, Part II). Table 5.2 shows the future forecasts for each corridor.

The highest volumes are forecasted for the Central Corridor, followed by the West with the East Corridor having the lowest volumes, reaching a high of 23,500 vpd, north of the Airport, under the "high" growth scenario.

Both the Central and East Corridors have higher volumes north of the Airport than to the south. The West Corridor, however, has the lower volume north of the Airport. Immediately south of the Airport, traffic destined to the Hamilton Mountain area and most of lower Hamilton switches to Old Highway 6. Traffic remaining on Highway 6 (New) north of the Airport is travelling to Brantford and areas west of Hamilton, Ancaster, Dundas and long distance trips to Burlington and beyond.

5.4.2 Process for Determining the Study Area

In order to identify the Study Area for the Caledonia to Hamilton study, it was decided to analyze the above three corridors in terms of their ability to meet the transportation objectives of the Highway, outlined in Section 2.3 and reiterated in Section 5.3 of this report.

If any of the three basic corridors did not meet the required objectives of the new facility, then they would be considered to be unacceptable alternatives and would be abandoned without any further study.

5.4.3 Comparison of Corridors with Objectives

Exhibit 5.1 provides a comparison of the three basic corridors with the stated transportation objectives.

Based on this analysis, it was concluded that the East and Central corridors do not meet the required transportation objectives; and consequently, the Central and East corridors were not studied further. The Study Area is thus defined around the West corridor.

TABLE 5.1

COMPARISON OF TRANSPORTATION OBJECTIVES TO ALTERNATIVES TO THE UNDERTAKING

ALTERNATIVES TO THE UNDERTAKING	1 Provide access from the airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself.	2 Increase use of the Caledonia Bypass.	3 Improve access to and provide flexibility for development in Townsend/Mantcoke.	4 Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system.	COMMENTS
TRANSIT	Cannot serve dispersed trip origins of air travellers.	Does not increase use of the Bypass.	Would not improve auto and truck access.	Would not improve auto and truck access.	Improved auto and truck access not provided for by transit.
RAIL	Cannot serve dispersed trip origins of air travellers.	Does not increase use of the Bypass.	Good rail service already exists.	Good rail service already exists.	Improved auto and truck access not provided for by rail.
AIR	Good air facilities already exists.	Does not increase use of the Bypass.	Would not improve auto and truck access.	Would not improve auto and truck access.	Improved auto and truck access not provided for by air.
UPGRADING OF EXISTING FACILITIES	Does not improve access.	Does not increase use of the Bypass.	Does not improve access.	Does not improve access.	Upgrading would not provide for a connection to Highway 403.
"DO NOTHING"	Does not improve access.	Does not increase use of the Bypass.	Does not improve access.	Does not improve access.	No connection to Highway 403 would be provided.

Study Objective	Provide access from the airport to the existing provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself		Increase use of the Caledonia By-Pass	Improve access and provide flexibility for development in Townsend/Nanticoke	Improve access to the industrial area of lower Hamilton, such access currently provided by the local road system	Select a route which can be stage-constructed in a realistic and economical manner		
West Corridor	Provides a direct connection from the airport to the provincial freeway system	Provides the best access from the airport to areas west of Hamilton	All corridors the same in the long run	Provides good access to Townsend/Nanticoke to the provincial freeway system	Good access to the industrial area of lower Hamilton (assuming the Hamilton Perimeter Industrial Road is in)	Can be staged independently of the N-S/E-W	Can be staged to provide a direct connection to Highway 403 from the airport	Can be staged to improve use of the Caledonia By-Pass
Central Corridor	Does not provide a direct connection from the airport to the provincial freeway system (assuming the N-S/E-W is in)	Duplicates service provided by existing Highway 6 for access to/from Hamilton	All corridors the same in the long run	Duplicates service provided by existing Highway 6 No connection to the provincial freeway system	Duplicates service provided by existing Highway 6	Staging depends on the N-S/E-W	Stage to serve the airport will duplicate service provided by existing Highway 6	Can be staged to improve use of the Caledonia By-Pass
East Corridor	Does not provide a direct connection from the airport to the provincial freeway system (assuming the N-S/E-W is in)	Duplicates service provided by existing Highway 6 for access to/from Hamilton	All corridors the same in the long run	Duplicates service provided by existing Highway 6 (assuming the N-S/E-W is in) No connection to the provincial freeway system	Very good access to the industrial area of lower Hamilton (assuming the N-S is in)	Staging depends on the N-S/E-W	Cannot be staged to service the airport	Can be staged to improve use of the Caledonia By-Pass

Legend:

Denotes key factors in selecting the west corridor

N-S/E-W Stands for the Region's proposed North-South Parkway and East-West Arterial

TABLE 5.2
CORRIDOR TRAFFIC PROJECTIONS

Scenarios	Forecasted Year 2001 AADT		
	West	Central	East
Anticipated:			
North of Airport	7,000	17,700	8,700
South of Airport	9,900	12,200	5,700
High:			
North of Airport	9,000	23,500	10,700
South of Airport	13,900	16,400	7,700

The major reasons for this decision are discussed below with respect to the various objectives.

Objective 1: Provide access from the Airport to the existing Provincial freeway system to improve accessibility to the west and east of Hamilton and to Hamilton itself

The West Corridor provides a direct and an immediate connection to existing Highway 403. In addition (and this is related to objective 5 below), this connection to Highway 403 could be constructed at any time. Therefore, benefits in terms of Airport access would be quickly realized. The other two alternative corridors (East and Central) cannot connect to the Provincial freeway system and depend upon the proposed North-South Parkway/East-West Arterial.

The Central Corridor duplicates service provided by existing Highway 6 and thus does not improve access to the Airport.

The direct connection to the Provincial freeway system was a major factor in selecting the West Corridor for detailed study.

Objective 2: Increase use of the Caledonia Bypass

The three corridors would all increase use of the Caledonia Bypass.

Objective 3: Improve access and provide flexibility for development in Townsend/Nanticoke

Because the West Corridor connects directly to existing Highway 403, the Nanticoke/Townsend areas would benefit immediately from the improved access. The Central and East Corridors do not connect to the Provincial freeway system and also depend upon the proposed the North South Parkway/East-West Arterial routes.

Industries and truckers interviewed (see Section 2.2.2) indicated that they require a direct connection to the Provincial freeway system to avoid travel in the urban areas of Hamilton and other communities. In addition, the large, heavy trucks used by these firms are not compatible with travel on municipal roadways within an urban environment. Only the West Corridor would connect directly to Highway 403 and avoid travel on municipal roadways through urban areas.

If the Region of Hamilton-Wentworth North-South/East-West routes are constructed, a connection will be made with existing Highway 6. Existing Highway 6 south of the East-West Arterial is a four lane undivided arterial roadway with geometrics providing a comparatively high level of service. Consequently any traveller from the Nanticoke/Townsend areas with a desire to access the easterly portion of Hamilton or travel to points east of Hamilton will still be able to use existing Highway 6 and the North-South/East-West routes.

Thus, the East and Central Corridors would serve essentially the same traffic movements as Existing Highway 6 and the North-South/East-West routes and would therefore provide a duplication of service.

Objective 4: Improve access to the industrial areas of lower Hamilton

When the Region of Hamilton-Wentworth's proposed Industrial Perimeter Road is constructed (from Highway 403 easterly along the Harbour connecting to Burlington Street), the West Corridor will provide improved access from Nanticoke to the easterly industrial areas of Lower Hamilton via Highway 403 and the Industrial Perimeter Road.

In addition (reaffirming the point made in Objective 3 above), with the North-South/East-West facilities in place the Central Corridor or East Corridor would only duplicate the service that will be provided by existing Highway 6 and would require that truck traffic be carried through urban areas or municipal roadways.

Objective 5: Select a route which can be stage constructed in a realistic and economical manner

Because the West Corridor connects to an existing provincial freeway (Highway 403), Highway 6 (New) could be constructed on the West Corridor at any time with the realization of maximum transportation benefits. This is particularly relevant to servicing the Airport and is a major factor in selecting the West corridor for detailed study.

The East and Central Corridors depend entirely on the Regional North-South/East-West facilities to provide service and meet the objectives. Consequently with the East and Central Corridors the Province would not have full control over the construction staging of Highway 6 (New).

Another consideration is that Provincial freeways are primarily intended to connect larger cities, industrial concentrations and recreational areas. They serve as the major highway routes through intensely developed areas and serve interregional travel movements. The West Corridor would provide such a connection between Highway 403 and the Townsend/Nanticoke area. However, the Central, and to a lesser extent the East, Corridors would not carry primarily interregional travel movements. Both the East and Central Corridors would simply duplicate the service and function of existing Highway 6.

In the longer term it can be anticipated that Highway 6 (New) will be a freeway facility. General MTC practice is to terminate a freeway at another freeway. The West Corridor is the only corridor of the three which would terminate at a Provincial freeway facility. The Region of Hamilton-Wentworth's North-South route, while being fully grade separated, does not meet provincial freeway standards. The East-West portion is to be built as an arterial. In addition these two routes address primarily municipal traffic needs and will not be assumed as Provincial Highways.

5.4.4 Summary

A comparison of the corridors with the stated objectives was undertaken to define an area in which alternative alignments for Highway 6 (New) would be investigated. The two main reasons for selecting the West Corridor over the East and Central Corridors are that only the West Corridor connects directly to the Provincial freeway system and only the West Corridor can be staged independently of the proposed North-South Parkway and East-West Arterial. These factors are highlighted in Exhibit 5.1. Also, the Central and East Corridors duplicate service provided by existing Highway 6 and thus do not improve access to the Airport or to Townsend/ Nanticoke. Based on this analysis, the East or Central Corridors were not studied in any further detail.

5.5 Initial Alternative Alignments

The alternative alignments for Highway 6 (New) are shown on Exhibit 5.2. These alignments were generated on the basis of technical feasibility and the avoidance of known major impacts and constraints. Principles used in their generation were as follows:

1. Lot lines were followed wherever possible to minimize farm severances.

2. Avoidance of the recently expanded Hamilton Civic Airport and related future navigational controls as required by Transport Canada.

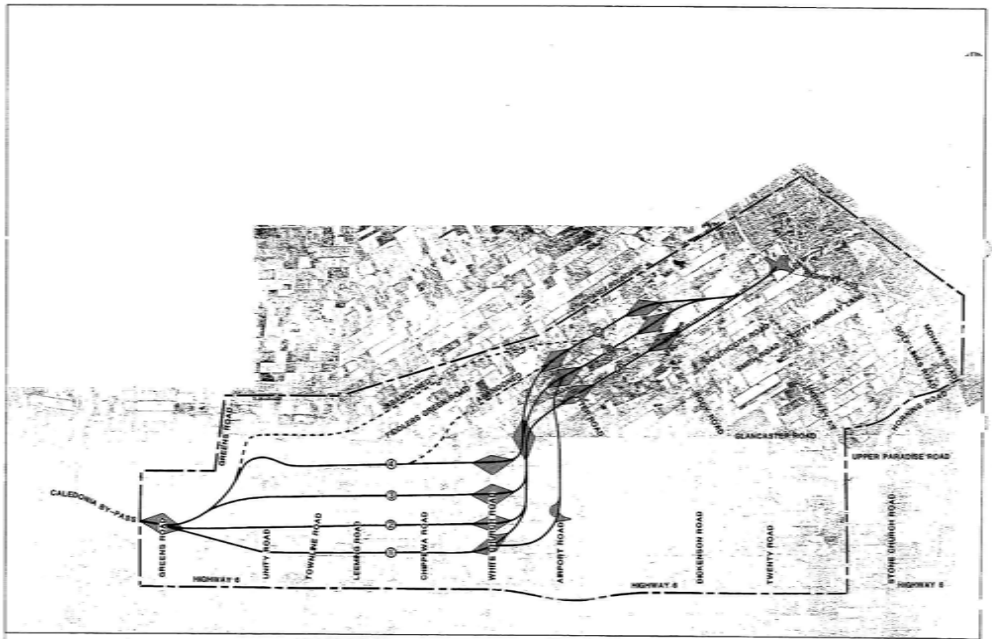
3. Flexibility to avoid the waterfowl nesting area, the Unity Road Hamlet and the Town of Mount Hope.

4. The necessity to link the alignments at the north end to Highway 403 and at the south end to the Caledonia Bypass. It was considered desirable although not mandatory to match the previously designated Highway 6 (New) corridor between Highway 403 and Book Road.

5. Minimize direct impacts to residences.

Between Highway 53 and Glancaster Road there are three basic alternative alignments. These are labelled A, B, and C. Between Glancaster Road and the Caledonia Bypass at Greens Road, there are four basic alternative alignments, 1, 2, 3, and 4. Other sub-alternatives to the basic alternatives were also examined, these are discussed in Section 5.9.

Also shown are two abandoned alternatives. Both of these abandoned alternatives connect between Alignment C and Alignment 4. (The reasons for abandoning these two alternatives are discussed in the following section).


GREENS ROAD
CALEDONIA BY-PASS
HIGHWAY 6
UNITY ROAD
TOWNLINE ROAD
LEMARD ROAD
CHIPPEWA ROAD
WEIR ROAD
AIRPORT ROAD
HIGHWAY 6
DICKENSON ROAD
TWENTY ROAD
STONE CHURCH ROAD
HIGHWAY 6
LANCASTER ROAD
UPPER PARADISE ROAD
Highway 6 (New)
HAMILTON TO CALEDONIA
Study Area Boundary
Alternative Alignments Studied
Abandoned Alignments
Potential Interchange Locations
Highway 6 New Designated Section
Exhibit 5.2
Alternative Alignments

5.6 Alternative Alignments Rejected After A Preliminary Analysis

All of the alternative alignments were compared to the study objectives, discussed in Section 2.3. On the basis of this comparison the alignments, Abandoned 1 and Abandoned 2, were dismissed from further study as they did not adequately meet all the objectives of the study.

Both of these alignments are to the west side of the Study Area and are the greatest distance from existing Highway 6. A traffic analysis conducted as part of this study identified a major traffic movement between Highway 6 (New) and existing Highway 6, south of Mount Hope. This movement consists of traffic coming from Caledonia and areas to the south in Townsend/Manticoke wishing to travel to the Hamilton Mountain area and the central and easterly portions of lower Hamilton. This movement accounts for approximately 50% of the traffic forecasted for Highway 6 (New) south of Mount Hope.

Both of the alternative alignments abandoned were judged to be too far from existing Higway 6 to adequately serve this traffic movement. Traffic would continue to use existing Highway 6 and the objective of increasing use of the Caledonia Bypass would not be met.

In addition, both of the abandoned alternatives are the greatest distance from the Hamilton Civic Airport. Both these alternatives would provide the poorest service to the airport.

The abandoned alternatives 1 and 2 were not studied in any further detail.

5.7 Alternative Alignments

The alternatives remaining for detailed analysis consisted of Alignments 1, 2, 3, and 4 and Alignments A, B, and C as shown on Exhibit 5.2. With these alignments, interchanges were considered at:

- Highway 403;
- Book Road;
- Butter Road;
- Glancaster Road;
- White Church Road;
- Greens Road.

Not all of these interchanges are proposed for all alignments. Depending upon the alignment selected the interchange configurations vary. For example, with Alignment 4 an interchange would not be possible at both White Church and Glancaster Roads as there is insufficient distance to provide for ramps between the two roadways. However, with Alignment 1 interchanges at both White Church and Glancaster Roads would be feasible as sufficient distance exists to provide ramps between the two roadways.

The interchange at Highway 403 is proposed to provide all movements between Highway 6 (New) and Highway 403. In addition, ramps are proposed between Highway 53 and Highway 403 to serve movements to and from the east on Highway 403.

An interchange is proposed at Book Road to provide access for a future passenger terminal and asociated airport related developments on the north side of the Airport. Also, from an interchange spacing point of view, a connection at Book Road is desirable to provide access and service to adjacent lands. (A separate study was undertaken of the Book Road crossing, as outlined in Section 5.9.1.)

Interchanges at Butter and Glancaster Roads are proposed to provide access to the south side of the Airport. Transport Canada's ultimate plans for the airport call for freight facilities and general aviation services along Airport Road.

The White Church interchange serves not only local traffic but also provides for a connection between Highway 6 (New) and existing Highway 6. The need for this connection was identified during the traffic analysis and is discussed in Section 5.6.

At the south end of the Study Area an interchange is proposed at Greens Road to connect to the north end of the Caledonia Bypass. This interchange would also provide access to Caledonia.

5.8 Detailed Assessment of Alternative Alignments

In this stage of the study, the various alternative alignments were analyzed and assessment tables were developed. Based on studies conducted during the last 20 years, certain principles have been employed to make the recurring trade-offs required for decision-making purposes on capital projects. These principles of level of service,

TABLE 5.3

FACTORS USED FOR THE DETAILED ASSESSMENT OF ALTERNATIVE ALIGNMENTS

Factor	Criteria	Rationale	Significance
Property	. Number of residential properties taken . Number of commercial properties taken . Number of industrial properties taken . Number of institutional properties taken . Number of properties from which land is required but which are not eliminated (by type) — Residential, Commercial, Industrial, Institutional	. Minimization of disruption to local residents and local business, industries and institutions	. Effects to property, both direct takings and proximity effects is an Environmentally Significant Issue for the purposes of this Study
Agriculture	. Area of Class 1, 2 and 3 lands removed (by class) — 1, 2, 3, Total . Area of speciality crop lands affected . Number of farmsteads removed . Number of farms affected . Number of farm severances - landlocked parcels - new units . Area of landlocked parcels	. Preservation of productive agricultural land . Minimization of disruption to agricultural operations	. Agriculture and the preservation of good quality agricultural land and viable farming operations is an Environmentally Significant Issue for the purposes of this Study
Community	. Effects (division, disruption) to Unity Side Road Hamlet	. Preservation of existing community and minimization of disruption to local residents	. Effects in terms of proximity impacts, noise and visual, the loss of community through "barrier" effects, and impacts to future development combined to make the Unity Road area an Environmentally Significant Area for the purposes of this Study.
Heritage	. Number of heritage features affected (by type) — Direct, Indirect	. Preservation of heritage resources	. Heritage resources contributed to Rook Road being an Environmentally Significant Area for the purposes of this Study
Noise	. Number of residential receivers experiencing an increase of over 5 dBA over (future) ambient, as a result of an alternative, ten years after construction	. Minimization of disturbance to local residents	. Noise is an Environmentally Significant Issue for the purpose of this Study

TABLE 5.3

FACTORS USED FOR THE DETAILED ASSESSMENT OF ALTERNATIVE ALIGNMENTS

(continued)

Factor	Criteria	Rationale	Significance
Natural Environmental Features	. Area of all forests, plantations and other woodlots affected . Area of highest quality and maturing representative woodlots affected . Area of Woodland Improvement Act agreement areas affected . Area of identified Waterfowl area affected . Number of stream crossings — Primary, Secondary	. Regional Official Plans indicated that such areas of forest cover should be retained and managed or expanded . Recognition that not all wooded areas are of equal value (MNR and field survey) . Recognition of an existing land use commitment and management effort expended (MNR) . Area of wildlife concern (outside existing woodlands) used by waterfowl for nesting, brooding and staging (MNR) . Regional Official Plans identify stream banks and valleys as areas for maintenance and expansion of forest cover	. Vegetation (woodlots and forested areas) is an Environmentally Significant Issue for the purposes of this Study
Planning Policies	. Effects on future land use . Effects on development proposals	. Protection of future development options	. Planning Policies at White Church and Unity Roads contributed to these being Environmentally Significant Areas for the purposes of this Study
Visual	. Compatibility with landscape character . Effects on views	. Identification of this issue by MCC . Identification of this issue by MCC	. Visual concerns at Book Road, Unity Road and White Church Road contributed to these being Environmentally Significant Areas for the purposes of this Study
Cost	. Construction (cost assumed to be proportional to length) . Property . Total	. Minimization of cost	. Cost of all alternatives was considered to be relatively the same and thus was not considered significant
Traffic Service	. Access to the airport	. Objective of Highway 6 (New) to improve access for the airport . Objective of Highway 6 (New) to allow staging to best match travel demand with financial expenditures . Objective of Highway 6 (New) to increase use of the Caledonia Bypass. This is best met by alignments close to existing Highway 6 as they best serve the major traffic demand from Caledonia and areas to the south into Hamilton	. Traffic service, in particular the movement between Highway 6 (New) south of the airport back to existing Highway 6 into Hamilton, and access to the airport were significant factors in the evaluation of alternatives

direct costs, and indirect costs (impacts) provide a useful framework for analysis. Each alternative is assessed with respect to the level of service it provides for both its direct and indirect costs.

The major factors and criteria developed from these principles, and used in describing the performance and impacts of each alternative alignment in addition to the rationale for their use and their significance, are documented in Table 5.3.

Comparisons were undertaken assuming that standard mitigating measures would be applied to all alternatives. Over time the Ministry of Transportation and Communications has recognized certain typical environmental effects of highway projects and has developed standard mitigating measures. These standard mitigating measures are shown in Table 5.4. This results in a comparison of alternatives based on the "net effects" of these measures. The detailed assessment of alternative alignments generally considered additional mitigation measures where specific impacts were identified. Consideration of additional mitigation is intrinsic in the detailed assessment of the alternative alignments.

Where environmental impacts could not be mitigated through design, these impacts are indicated in the assessment tables and form one of the bases for the comparative evaluation of the alternatives.

5.9 Comparative Evaluation of Alternative Alignments

The process of evaluating alternatives and recommending a preferred alternative should have theoretical validity. In order to have theoretical validity, the process by which a preferred alternative is identified must be logical and must include a variety of alternatives and a set of relevant criteria for the evaluation of each alternative. Accordingly, a strategy of elimination of alternatives based on their comparative evaluation was employed to make a final recommendation. One alternative was successively compared to all of the other alternatives for its relative ability to meet the design objectives and criteria of providing the best recommendation. One alternative was successively compared to all of the other alternatives for its relative ability to meet the design objectives and criteria of providing the best traffic service for the lowest possible cost and with the fewest environmental impacts. In turn, the alternative least able to meet the criteria was rejected, and the remaining alternatives were successively compared. In other words, if an alternative offered no advantages over the other alternatives but had more disadvantages, it was rejected in favour of the remaining alternatives and the process repeated until the preferred alternative emerges.

This process was used in the comparative evaluation of alternatives as outlined in the following sections.

5.9.1 Book Road Crossing

Before the alternative alignments A, B and C could be comparatively evaluated, an alignment for Alternative A at Book Road required additional study. Through discussions with External Team members and the public at the first series of Public Information Centres, many constraints and controls were identified at the Book Road crossing for Alternative A. Consequently, a detailed analysis of alternative interchanges at Book Road and Alignment A was carried out. This led to the preferred plan for Alignment A which was then compared with Alignments B and C.

The controls and constraints at the Book Road crossing contributed to it being an Environmentally Significant Area for the purposes of this Study. These consist of:

1. The navigation, lighting, and zoning requirements of the recently expanded Hamilton Civic Airport.

2. A 230 KV hydro line which has recently been lowered at the end of Runway 12L to accommodate the Airport's zoning requirements. This 230 KV line is immediately south of the crossing of Book Road.

3. The Ancaster Animal Cemetery which lies directly opposite the existing MTC designation at Book Road.

4. An abandoned historic human cemetery (the Parkin Cemetery) on the north side of Book Road immediately west of the MTC designation.

5. Two historically significant houses immediately west of the MTC designation, just north of Book Road.

6. Several residences in the immediate vicinity.

7. Several large viable farms in the area, some with specialty crops.

TABLE 5.4

GENERAL ENVIRONMENTAL EFFECTS AND STANDARD MITIGATING MEASURES

Environmental Effect	Standard Mitigating Measures
Sedimentation and turbidity of adjacent water-bodies	° Appropriate construction techniques ° Erosion control by interception ditches, terracing, slopes, etc. ° Contain sediments by check dams, sediment traps, etc.
Volume and frequency of stormwater flow	° Normally investigated as part of detail design drainage investigations to determine measures to minimize amount of increase to adjacent watercourses; flow retention measures considered when applicable
Stream bank erosion	° Bank stabilization measures
Interception of aquifers and springs	° Raise vertical alignment above the water table, where possible
Contamination of groundwater by highway runoff	° Use of contained storage and ensure positive drainage where possible
Disruption of aquatic habitat	° Restore stream banks ° Maintain streamflow ° Minimize stream diversion, channelization ° Apply seasonal construction constraints ° Ensure proper culvert design and placement
Loss or disturbance of significant trees and/or ground flora	° Utilize close-cut clearing rather than grubbing to retain maximum regenerative potential ° Protect retained vegetation during construction ° Landscape planting
New or increased exposure of forest edge with resultant effects of wind throw, loss of wildlife habitat	° Utilize close-cut clearing
Road salt damage	° Utilize resistant species in landscape planting ° No sensitive specialty crops, therefore additional measures are not applicable
Removal of productive farmland	° Design facility to minimize land requirement ° Rehabilitate areas disturbed by construction
Disruption of field access	° Provide alternative access
Disruption of tile and surface drainage systems	° Minimize duration of disruption ° Restore tile and surface drainage system
Dust during construction	° Use dust control/suppression methods ° Utilize temporary erosion control methods on staged construction
Groundwater contamination	° Minimize disturbance to septic systems ° Rebuild disturbed systems
Construction Noise	° Operational constraints to be imposed during construction (to be negotiated with appropriate municipalities); procedures required by MOE/MTC noise protocol for construction noise to be applied
Removal of residences on wells and septic systems	° Pump out and fill septic tanks ° Fill wells per MOE guidelines
Damage or relocation of septic systems or wells	° Repair or relocate per MOE regulations

NOTE: Additional standard mitigating measures relating to construction activities are provided in Part II, Table 4.1.

Three alternatives to the Book Road interchange with Alignment A were developed, these are referred to as A1, A2, and A3 and are shown in Exhibit 5.3.

Table 5.5 shows a comparison between Alternatives A1, A2, and A3 at Book Road. The comparative evaluation focusses primarily on design criteria, impacts and cost because the service provided by the three alignments is essentially the same.

In evaluating A1, A2 and A3, Alternative A3 was successively compared to Alternatives A1 and A2. Compared to Alternative A1, Alternative A3 had greater impacts, particularly with respect to residences and the cemeteries, greater costs, and offered much less flexibility and poorer highway geometrics. In comparison to Alternative A2, Alternative A3 had greater impacts with respect to the cemeteries, greater costs, and offered no advantages over Alternative A2 in terms of its geometrics and flexibility. Accordingly, Alternative Alignment A3 was rejected.

Alternative A2 was evaluated in comparison to Alternative A1, A2 had greater impacts, particularly with respect to residences, somewhat greater costs, and offered poorer geometrics and far less flexibility. Thus, Alternative A2 was rejected in favour of Alternative A1.

Alternative A1 was selected largely on the basis that it provided the best highway geometrics and the greatest flexibility in meeting Transport Canada's long-term requirements and avoiding conflicts with Ontario Hydro. It requires the removal of only one residence and leaves the Pet Cemetery unaffected. The Parkin Cemetery is unaffected and remains within the interchange lands. A heritage feature, the Book House is indirectly affected by the removal of the barn, but the barn removed is not, in itself, of any great historical significance as it was constructed in the 1950s. Alternative A1, however, has marginally greater agricultural impacts and marginally greater impacts to the natural environment.

Alternative A1 at Book Road was used in all further evaluations of the Highway 6 (New) alignment alternatives.

5.9.2 Alternative Alignments A, B, and C

Alternative A was recommended over Alternatives B and C. Table 5.6 shows all of the factors and criteria used in the evaluation. Appendix G documents the effects to farm operations.

In evaluating Alternative Alignments A, B, and C, Alternative C was successively compared to Alternatives A and B. In comparison to both Alternatives A and B, Alternative C provided the poorest traffic service at the highest cost with the greatest impacts, especially with respect to agriculture. It provided no advantages and had major disadvantages in comparison to both Alternatives A and B and was, therefore, rejected.

When Alternative B was evaluated in comparison to Alternative A, it provided poorer traffic service at a greater cost with greater impacts, especially property, agricultural, and heritage impacts. Thus, Alternative B was rejected in favour of Alternative A. It should be noted that Alternatives B and C also had greater noise, planning policy, and visual impacts than Alternative A.

5.9.3 Alternative Alignments 1, 2, 3, and 4

Alternative 1 was recommended over Alternatives 2, 3 and 4. Table 5.7 shows all of the factors and criteria used in the evaluation. Appendix G documents the effects to farm operations.

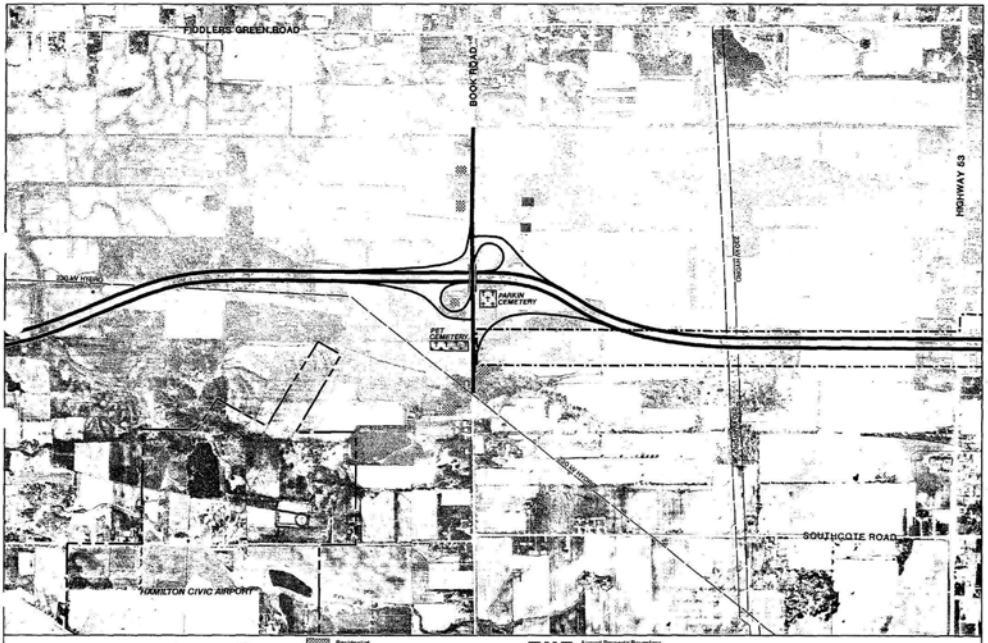
The corridor traffic forecasting (see Section 2.3) identified a major demand for traffic travelling on Highway 6 (New), south of the Airport to switch back to existing Highway 6 to travel on into Hamilton. Approximately one-half of the forecasted corridor volume on Highway 6 (New) south of the Airport is expected to make this movement.

A sensitivity analysis was undertaken to estimate the potential for each of the Alternatives 1, 2, 3, and 4 to carry this traffic movement.

Comparisons were made with other bypasses in the area to determine the amount of traffic which would continue to use existing Highway 6 and the amount that would divert to Highway 6 (New).

This analysis indicated that Alignment 1, closest to existing Highway 6, would attract 100% of the demand. Alignment 4, furthest from existing Highway 6, would attract only 25% of the demand. Alternatives 2 and 3 would attract 75% and 50%, respectively. Therefore, it was determined that alignments in close proximity to existing Highway 6 would offer far superior traffic service and carry substantially higher traffic volumes.

In evaluating Alternative Alignments 1, 2, 3, and 4, Alternative 4 was successively compared to Alternatives 1, 2, and 3. In comparing



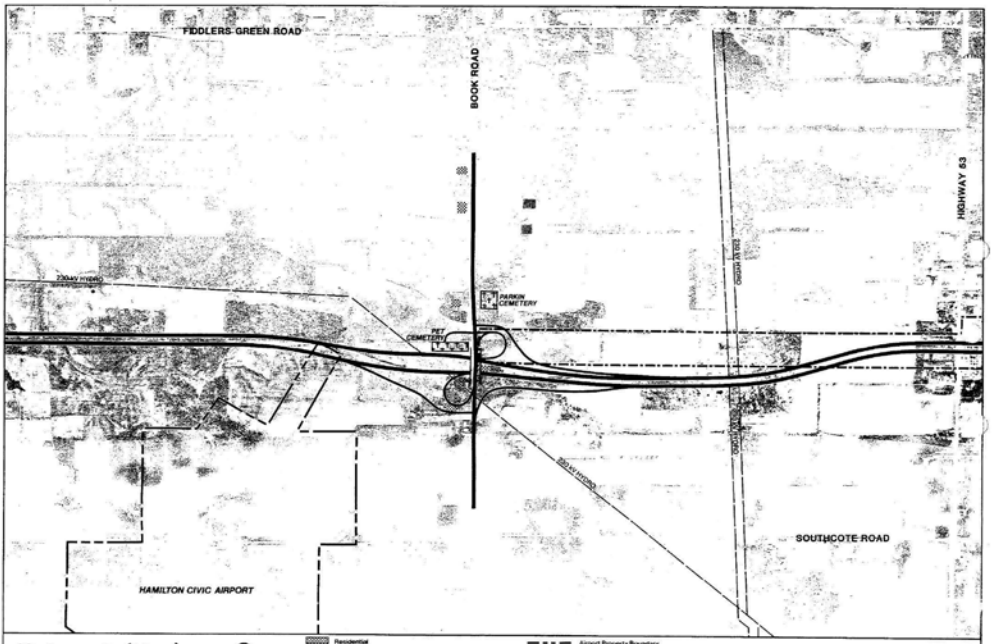
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.3(a)

Book Road Crossing. Alternative Alignment A1



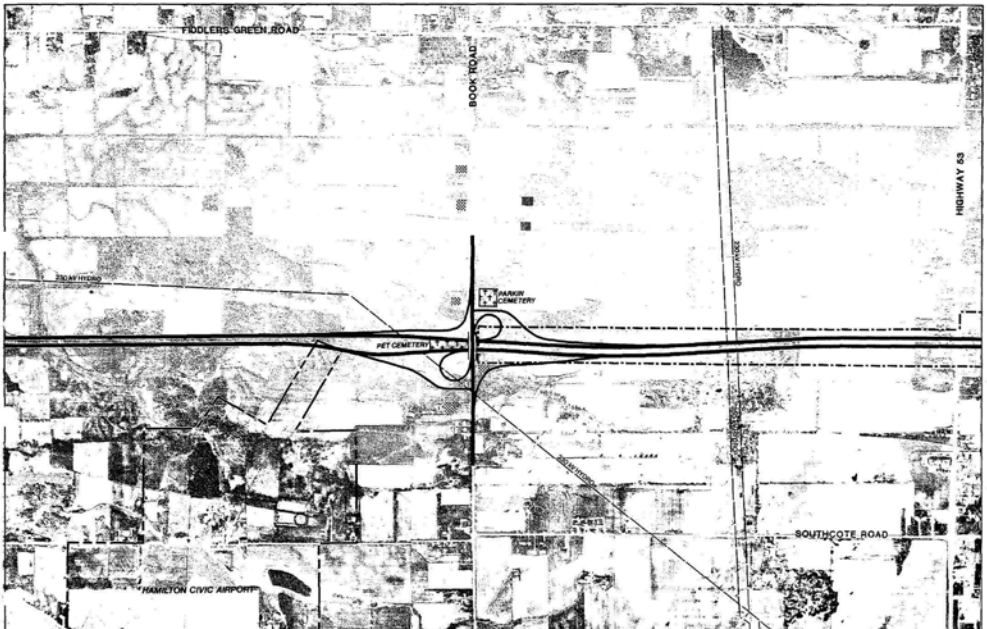
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.3 (b)

Book Road Crossing. Alternative Alignment A 2



Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.3(c)

Book Road Crossing. Alternative Alignment A3

TABLE 5.5

COMPARISON BETWEEN ALTERNATIVES A1, A2 AND A3 AT BOOK ROAD

		ALTERNATIVE ALIGNMENTS from midway between Highway 53 and Book Road to midway between Book Road and Butter Road		
		A1	A2	A3
PROPERTY				
Number of Residences Taken		1	2	1
Number of Residential Properties Affected		0	0	2
Pet Cemetery		unaffected	access road required	removed
Parkin Cemetery		within interchange lands	unaffected	proximity impacts
HERITAGE				
Other Heritage Features Affected		Barn on farmstead 116a removed	none	none
AGRICULTURE				
Area of Class 1 to 3 Land by Class:	1	3.4 ha	1.8 ha	2.2 ha
	2	3.6 ha	7.2 ha	4.8 ha
	3	20.1 ha	16.1 ha	20.1 ha
Number of Farm Severances		4	4	4
Area of Landlocked Parcels		8.0 ha	10.0 ha	0 ha
Area of Active Farmland Removed from Production		5.6 ha	5.1 ha	6.7 ha
Area of Specialty Crop Land Removed		2.6 ha	0 ha	0 ha
NATURAL ENVIRONMENTAL FEATURES				
Area of all Forest, Plantations and other Woodlots Affected		12.6 ha	12.6 ha	8.4 ha
Area of Highest Quality and Maturing Representative Woodlots Affected		10.4 ha	9.9 ha	7.6 ha
NOISE				
Number of Residences experiencing over 5 dBA increase		4	2	2
COST		---	additional cost of one residence	additional cost of acquiring Pet Cemetery
HIGHWAY GEOMETRICS		best	acceptable	acceptable
FLEXIBILITY		provides greatest flexibility for meeting long-term requirements of Transport Canada and Ontario Hydro	little flexibility	little flexibility

Table 5. 6

Detailed Assessment of Alternative Alignments A, B and C

Factor	Criteria	Alternative Alignment A	Alternative Alignment B	Alternative Alignment C
Property	• Number of residential properties taken	• 3	• 3	• 2
	• Number of commercial properties taken	• 0	• 0	• 0
	• Number of industrial properties taken	• 0	• 0	• 0
	• Number of institutional properties taken	• 0	• 0	• 0
	• Number of properties from which land is required but which are not eliminated (by type) — Residential	• 0	• 0	• 0
	— Commercial	• 0	• 1 (Nursery)	• 1 (Nursery)
	— Industrial	• 0	• 0	• 0
Agriculture	• Area of class 1, 2, and 3 lands removed (by class) — 1	• 35 ha	• 37 ha	• 46 ha
	— 2	• 9 ha	• 12 ha	• 10 ha
	— 3	• 24 ha	• 19 ha	• 15 ha
	— TOTAL	• 66 ha	• 68 ha	• 71 ha
	• Area of specialty crop lands affected	• 3 ha	• 7 ha	• 6 ha
	• Number of farmsteads removed	• 0	• 1	• 1
	• Number of farms affected	• 10	• 12	• 17
	• Number of farm severances — landlocked parcels	• 1	• 1	• 6
	— new units	• 2	• 2	• 1
	• Area of landlocked parcels	• 7 ha	• 4 ha	• 19 ha
Heritage	• Number of heritage features affected (by type) — Direct	• Barn in Farmstead 116a	• None	• Historic Neutral Hamlet
	— Indirect	• Parrin Cemetery 116b • Stump fence	• Farmstead 114 & 116 • Stump fence	• Stump fence
Noise	• Number of residences experiencing over 5 dBA increase	• 11	• 12	• 14
Natural Environmental Features	• Area of all forests, plantations and other woodlots affected	• 12 ha	• 4 ha	• 9 ha
	• Area of highest quality and maturing representative woodlots affected	• 10 ha	• 4 ha	• 7 ha
	• Number of stream crossings — Primary	• 1	• 1	• 1
	— Secondary	• 2	• 2	• 2
Planning Policies	• Effects on development proposals	• None	• Creates awkward parcels on Highway 53	• Creates awkward parcels on Highway 53
Visual	• Compatibility with landscape character	• Generally compatible with landscape character; facility follows lot lines and travels parallel to existing roads	• Not compatible with landscape character; facility does not generally follow road pattern or lot lines	• Same as B
	• Effects on views	• Interchange at Book Road is partially screened by existing vegetation, that together with distance from the ridge reduces effects of vista at that location	• Interchange at Book Road disrupts vista from ridge	
		• Facility is partially screened by existing woodlots	• Difficult to screen (mitigate) view of interchange without blocking view from the ridge	• Same as B
Cost	• Construction (cost assumed to be proportional to length) • Property • Total	• Shortest in length, thus lowest cost	• 6% higher than A, falls between A and C in cost	• 12% higher than A, thus highest cost
Traffic Service	• Access to the airport	• Closest to the airport, thus offers best access to the airport	• Falls between A and C in traffic service for the airport	• Furthest from the airport, thus has poorest access to the airport
	• Staging	• Easily staged to the airport	• In order to stage to the airport, would require further upgrading of Dutter Road	• In order to stage to the airport, would require upgrading of Dutter Road

Highway 6 (New)

HAMILTON TO CALEDONIA

ROUTE LOCATION & PRELIMINARY DESIGN STUDY

Table 5. 7

Detailed Assessment of Alternative Alignments 1, 2, 3 and 4

Factor	Criteria	Alternative Alignment 1	Alternative Alignment 2	Alternative Alignment 3	Alternative Alignment 4
Property	• Number of residential properties taken	• 2	• 1	• 2	• 0
	• Number of commercial properties taken	• 0	• 0	• 0	• 0
	• Number of industrial properties taken	• 2	• 2	• 2	• 2
	• Number of institutional properties taken	• 0	• 0	• 0	• 0
	• Number of properties from which land is required but which are not eliminated (by type) — Residential	• 1	• 1	• 5	• 1
	— Commercial	• 0	• 0	• 0	• 1
	— Industrial	• 2	• 2	• 2	• 2
	— Institutional	• 2	• 2	• 1	• 1
Agriculture	• Area of class 1 and 2 lands removed (by class) — 1	• 88 ha	• 89 ha	• 76 ha	• 77 ha
	— 2	• 8 ha	• 3 ha	• 12 ha	• 9 ha
	— TOTAL	• 96 ha	• 92 ha	• 88 ha	• 86 ha
	• Number of farmsteads removed	• 0	• 1	• 0	• 0
	• Number of farms affected	• 32	• 31	• 26 ha	• 18
	• Number of farm severances — landlocked parcels	• 6	• 5	• 4	• 4
	— new units	• 4	• 4	• 5	• 3
	• Area of landlocked parcels	• 45 ha	• 56 ha	• 25 ha	• 74 ha
Community	• Effects (division, disruption) to Unity Side Road Hamlet	• Divides community • Disrupts Seneca Unity School and community	• Divides community • Disrupts community and Seneca Unity School	• Divides community • Disrupts community	• Does not divide community • Disrupts community at Mines Road to some extent
Heritage	• Number of heritage features affected (by type) — Direct	• None	• None	• None	• None
	— Indirect	• Unity Road Church site (12) • Farmstead (76) and Cemetery (74) on White Church Road	• Farmstead (76) and Cemetery (74) on White Church Road	• Farmstead (76) and Cemetery (74) on White Church Road • Farmstoads (76) and (78a) on White Church Road	• Farmstead (76) and Cemetery (74) on White Church Road
Noise	• Number of residences experiencing over 5 dBA increase	• 30 + school	• 45 + school	• 40	• 19
Natural Environmental Features	• Area of all forests, plantations and other woodlots affected	• 16 ha	• 25 ha	• 21 ha	• 2 ha
	• Area of highest quality and maturing representative woodlots affected	• 14 ha	• 22 ha	• 20 ha	• 0 ha
	• Area of Woodland Improvement Act agreement Areas affected	• 0 ha	• 0.8 ha	• 0 ha	• 0 ha
	• Area of identified Waterfowl Area affected	• 5.5 ha	• 7.2 ha	• 0 ha	• 0 ha
	• Number of stream crossings — Primary	• 1	• 1	• 1	• 1
	— Secondary	• 1	• 0	• 0	• 0
Planning Policies	• Effects on future land use	• Prevents some infilling and agriculturally related residential development	• Prevents some infilling and agriculturally related residential development	• Prevents some infilling and agriculturally related residential development	• Prevents some additional agriculturally related residential development
	• Effects on development proposals	• May inhibit further hamlet development	• May inhibit further hamlet development	• May inhibit further hamlet development	• May affect some additional hamlet development
Visual	• Compatibility with landscape character	• Follows lot lines and road layout; generally compatible with landscape character	• Follows lot lines and road layout; generally compatible with landscape character	• Follows lot lines and road layout; generally compatible with landscape character	• Alignment cuts across lots south of Townline Road; not compatible with landscape character
	• Effects on views	• Facility is visible from Seneca Unity school on Unity Road	• Facility is visible from houses on Unity Road; existing woodlots will partially screen view	• Facility is visible from houses on on Unity Road	• Facility is visible from houses on Mines Road
		• Also visible from houses east of alignment with open view across field			• View could be partially screened with landscape planting
Cost	• Construction (cost assumed to be proportional to length) • Property • Total	• Longest length (141 longer than 4) thus highest cost • Deep cut through Unity Road will add to cost	• Second longest (9% longer than 4) thus second highest cost	• Third longest (4% longer than 4) thus third highest cost	• Shortest, thus lowest cost
Traffic Service	• Proximity to existing Highway 6	• Provides an excellent connection to Highway 6 and thus best serves the major traffic movement into Hamilton.	• Provides a good connection to Highway 6 and would adequately serve the major traffic movement into Hamilton	• Provides a fair connection to Highway 6 and would serve the major traffic movement into Hamilton to a limited extent.	• Provides a poor connection to Highway 6 and would not serve the major traffic movement into Hamilton

Alternative 4 to Alternative 1, Alternative 4 provided significantly inferior traffic service with greater impacts, especially with respect to agriculture and the severity of the disruption to viable, large-scale agricultural operations in the south part of the Study Area. However, Alternative 4 would be less expensive (±10%) to build than Alternative 1. Then in comparison to Alternative 2, Alternative 4 provided inferior traffic service but had a fairly similar number of unacceptable impacts--those to the agricultural operations by Alternative 4 versus the impacts to the community and the natural environment by Alternative 2. However, Alternative 4 would be somewhat less expensive (10%) to build than Alternative 2. Similarly when Alternative 4 was compared to Alternative 3, it offered poorer traffic service with a corresponding amount of unacceptable impacts. Alternative 4 would, however, be slightly less expensive to construct than Alternative 3. Therefore based primarily on its poorer traffic service and its unacceptable agricultural impacts, Alternative 4 was rejected in favour of the other three alternative alignments.

Then, Alternative 3 was successively compared to Alternatives 1 and 2. In comparing Alternative 3 to Alternative 1, Alternative 3 provided much poorer traffic service with far greater impacts, particularly with respect to the Unity Road Hamlet and the natural environmental. However, Alternative 3 would be less expensive (10%) to build than Alternative 1. In comparison to Alternative 2, Alternative 3 provided poorer traffic service with fairly similar impacts albeit at slightly less cost. Therefore, based on its poorer traffic service and its similar or greater impacts, Alternative 3 was eliminated in favour of the remaining two alternatives.

Finally, Alternative 2 was evaluated in comparison to Alternative 1. Although it would be somewhat less expensive, Alternative 2 offered poorer traffic service and had greater impacts than Alternative 1, especially with respect to the Unity Road Hamlet and the natural environment. Therefore, its poorer service and greater impacts led to the elimination of Alternative 2 in favour of Alternative 1.

Alternative 1 provides the best service with the fewest impacts.

5.9.4 Airport Road Alignment

Following the first series of Public Information Centres, a local resident suggested an alignment for Highway 6 (New) using a portion of Airport Road west of Mount Hope. This alternative is shown on Exhibit 5.2. Generally, alignments along existing roadways are not feasible as they require the removal of numerous private accesses and therefore create significant property damage. However, Airport Road has only a few access points in this area and thus warranted further study.

The following documents the comparative evaluation of Alignment A1 including the east-west portion along the mid-lot line between Airport Road and White Church Road and Alternative A1A with its east-west portion along Airport Road.

The evaluation considered those portions of the alignments from Highway 53 to Greens Road. Most factors and criteria were used in the evaluation, with the exception of those factors that would not apply to the east-west portion and/or would be the same for both alternatives. The criteria that were not used were:

- effects to the Unity Road community;
- planning policies;
- visual analysis.

Table 5.8 documents the assessment of the two alternatives.

In comparison to Alignment A1, Alignment A1A provided similar service to the airport with similar construction costs. However, Alignment A1A requires the removal of four additional residences including a farmstead and has substantially greater noise effects to nearby residents, although it requires about half as much high quality forest. Therefore, based on the nature of its greater impacts; i.e., the number of properties required, Alternative Alignment A1A was rejected in favour of Alignment A1.

5.10 Modifications to the Recommended Alignment

5.10.1 Book Road to Butter Road

South of Book Road Alignment A swings to the southeast. This swing creates some landlocked parcels, removes a farmstead at Butter Road and fragments a woodlot.

In order to avoid the farmstead and minimize both farm severances and the fragmentation of a woodlot as requested by the Ministry of Agriculture and Food and the Ministry of Natural Resources, respectively, the alignment was shifted to the southwest (see Exhibit 1.1). This shift results in an alignment adjacent to the property line. Thus the

TABLE 5.8

DETAILED ASSESSMENT OF ALTERNATIVE A1 AND ALTERNATIVE A1A

		A1	A1A
PROPERTY			
Number of Residences Taken		3	6
Commercial Properties Taken		0	0
Industrial Properties Taken		2	2
Institutional Properties Taken		0	0
Residential Properties Affected		1	1
Commercial Properties Affected		0	0
Industrial Properties Affected		2	2
Institutional Properties Affected		1	1
AGRICULTURE			
Areas of Class 1, 2, and 3 Lands Removed by Class:	Class 1	121 ha	121 ha
	Class 2	17 ha	17 ha
	Class 3	24 ha	24 ha
	TOTAL	162 ha	162 ha
Number of Farmsteads Removed		0	1
Area of Specialty Crop Lands Affected		3 ha	3 ha
Number of Farms Affected		42	38
Number of Farm Severances:	Landlocked	7	6
	New Units	6	6
Area of Landlocked Parcels		57	44
HERITAGE			
Number of Heritage Features Affected (by type):	Direct	Farmstead 116A	Farmstead 116A Farmstead 87
	Indirect	Parkin Cemetery 1168 Stump Fence Unity Road Church 12 Farmstead 76 Cemetery 74	Parkin Cemetery 1168 Stump Fence Unity Road Church 12 Farmstead 76 Cemetery 74
NOISE			
Number of Residences Experiencing Increase of Over 5dBA		30 plus school	34 plus school
NATURAL ENVIRONMENTAL FEATURES			
All forests & Woodlots		29 ha	14 ha
Highest Quality Woodlots & Forests		24 ha	9 ha
Stream Crossings:	Primary	2	2
	Secondary	3	3
COST			
Construction		Same length, thus same cost	Same length, thus same cost
TRAFFIC SERVICE			
Airport Connection		Provides direct connection to the airport	Provides direct connection to the airport

recommended alignment parallels the existing lot lines for most of the distance between Book and Butter Roads.

To provide direct service to the existing airport terminal an interchange is provided to Airport Road immediately south of the recently expanded Hamilton Civic Airport (see Section 5.10.3). Thus no interchange is proposed at Butter Road with the recommended alignment and no residences are required at Butter Road.

In summary, the modifications to the recommended alignment between Book Road and Butter Road have lessened the agricultural impacts by parallelling the lot line, avoided fragmenting a woodlot, and in conjunction with the decision that no interchange is required at Butter Road has avoided the taking of any residences or farmsteads on Butter Road. Environmental impacts were thereby mitigated through design.

5.10.2 White Church Road Area

Following the Second Series of Public Information Centres, concerns were raised by the Township of Glanbrook Council and local residents about the interchange at and realignment of White Church Road. In addition, Transport Canada requested that the interchange servicing the south side of the Hamilton Civic Airport be aligned directly opposite the existing terminal access road. The White Church Road area is considered Environmentally Significant for the purposes of this Study.

The Township of Glanbrook Council requested that the interchange at White Church Road be provided in an area south of White Church Road to allow for uninterrupted east-west travel on White Church Road and to allow the potential for development in Mount Hope to extend southward to White Church Road.

In order to respond to these requests, four alternative configurations were evaluated for the White Church Road interchange area. These alternatives are shown on Exhibit 5.4.

Scheme 1 provides direct ramps to and from the south only from Highway 6 (New) to existing Highway 6 local access would be provided by the interchange from Airport Road. A link road is required between Highway 6 (New) and existing Highway 6.

Scheme 2 is a modification of the full Parclo 'A' interchange at White Church Road with diamond ramps on the east side of Highway 6 (New) to reduce proximity impacts to residents along White Church Road.

Scheme 3 is the interchange configuration presented to the public and Council at the October 1985 series of Public Information Centres. This scheme provides a full Parclo 'A' interchange at White Church Road.

Scheme 4 provides a Trumpet 'B' interchange at Highway 6 (New) with a link road to existing Highway 6.

Table 5.9 outlines the factors taken into consideration in the evaluation of these four schemes. Cost was considered to be relatively the same for all four alternatives.

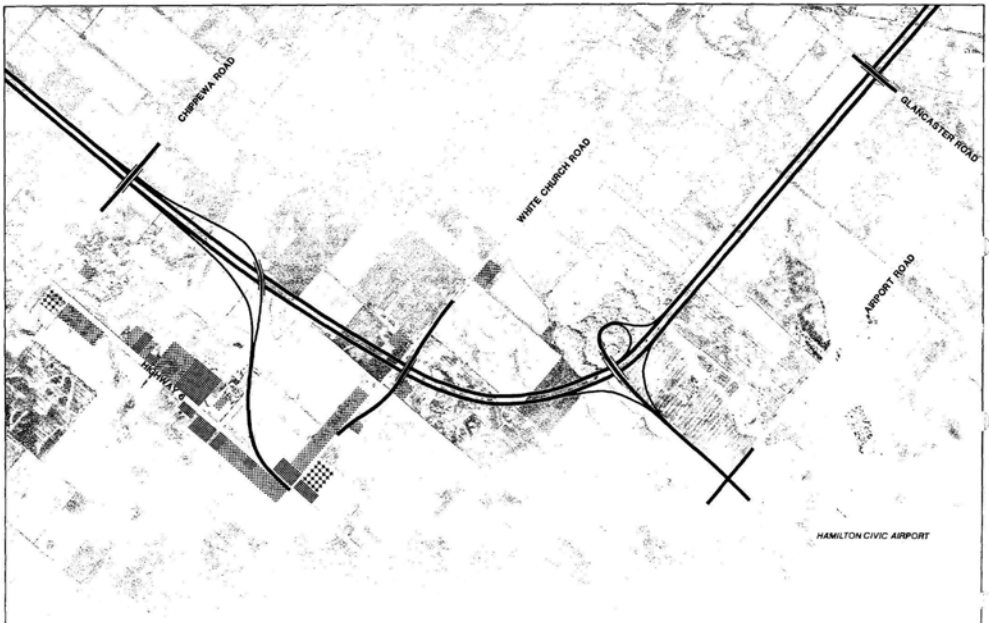
Scheme 4, the Trumpet 'B' interchange south of White Church Road, was selected because it best met the concerns of the Township of Glanbrook and the local residents. Scheme 4 allows for uninterrupted east-west travel on White Church Road and development in Mount Hope can extend southerly to White Church Road. The interchange and link road is located approximately 350 m from the residents on White Church Road and thus significantly reduces concerns over proximity effects. Scheme 4 also provides the best traffic service as it serves both the major traffic movement to and from the south between Highway 6 (New) and existing Highway 6, and local traffic to and from the north.

In comparison to Schemes 1 and 4, Schemes 2 and 3 offered poorer traffic service, greater proximity impacts to residents on White Church Road, prohibited continuous east-west travel along White Church Road, and prohibited the extension of development southerly from Mount Hope to White Church Road. Therefore, Schemes 2 and 3 were rejected in favour of either Scheme 1 or Scheme 4.

In comparing Scheme 4 and Scheme 1, Scheme 4 provides slightly improved flexibility in traffic services as there are ramps provided to and from the north on Highway 6 (New). Both schemes offer through east-west travel on White Church Road and allow development to extend southerly from Mount Hope to the White Church Road area. Therefore on the basis of somewhat better traffic service, Scheme 4 was selected over Scheme 1.

5.10.3 Airport Road Interchange

The selection of Scheme 4, the Trumpet 'B' interchange south of White Church Road, provides sufficient spacing to allow the Airport Road interchange be aligned directly opposite the existing Airport passenger terminal road. This direct connection was requested by Transport Canada.



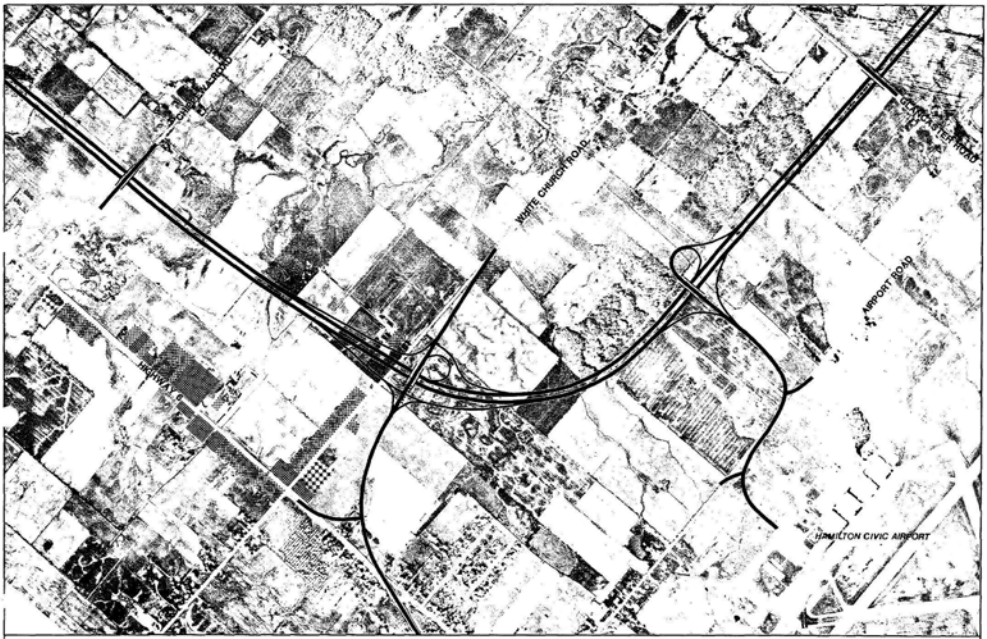
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.4 (a)

White Church Road.
Interchange Alternative. Scheme 1



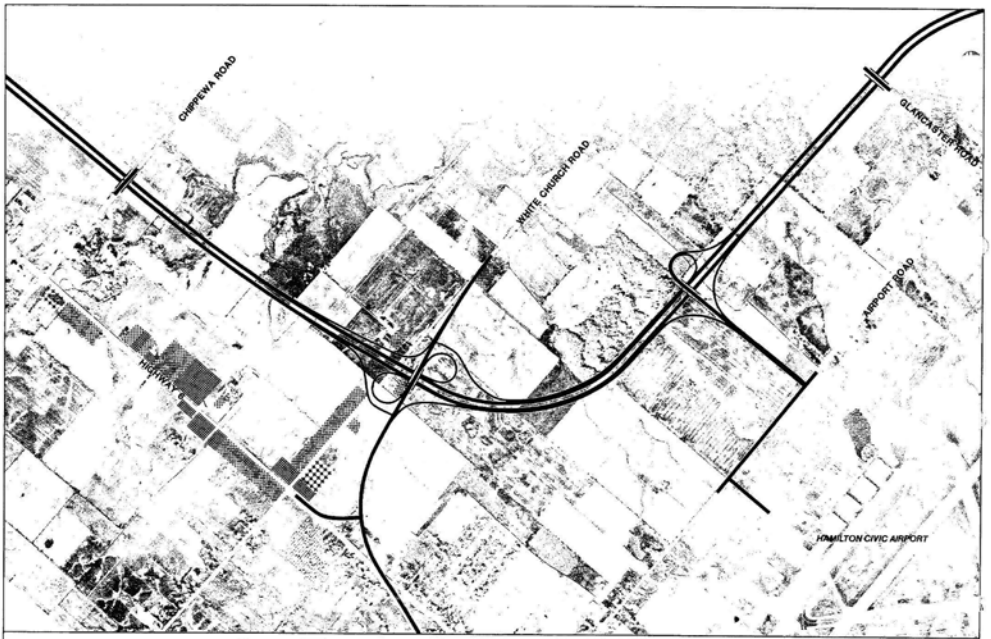
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.4(b)

White Church Road.
Interchange Alternative. Scheme 2



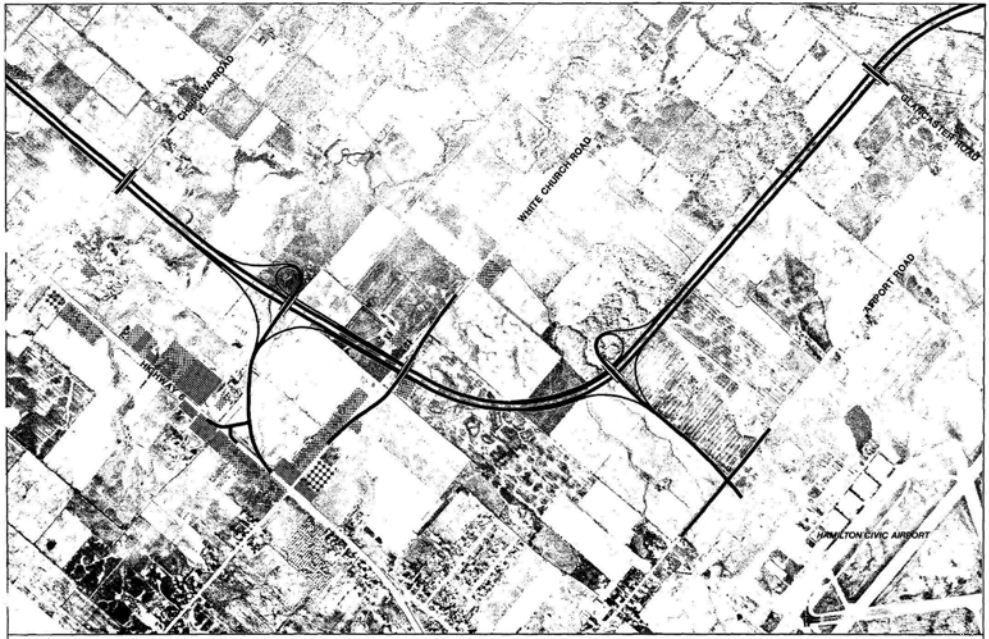
Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.4(c)

White Church Road. Interchange Alternative. Scheme 3



Highway 6 (New)

HAMILTON TO CALEDONIA

Environmental Assessment & Preliminary Design Report

Exhibit 5.4(d)

White Church Road.
Interchange Alternative. Scheme 4

TABLE 5.9

COMPARISON OF INTERCHANGE ALTERNATIVES - WHITE CHURCH ROAD AREA
CHIPPEWA ROAD TO LANCASTER ROAD

		Scheme 1 Direct Ramps	Scheme 2 Partial Diamond	Scheme 3 Parclo 'A' at White Church Road	Scheme 4 Trumpet 'B'
PROPERTY					
Number of residential properties taken		1	1	1	1
Number of commercial properties taken		0	0	0	0
Number of industrial properties taken		0	0	0	0
Number of institutional properties taken		0	0	0	0
Number of properties for which land is required but which are not eliminated (by type)	- Residential	1	1	1	1
	- Commercial	3	0	0	3
	- Industrial	0	0	0	0
	- Institutional	0	1	1	0
AGRICULTURE					
Area of Class 1 and 2 lands removed (by Class)					
	- 1	48	48	48	48
	- 2	2	2	2	2
	- Total	50	50	50	50
Number of farmsteads removed		0	0	0	0
Number of farms affected		12	13	13	12
Number of farm severances	- landlocked	5	3	3	5
	- new units	3	1	1	3
Area of landlocked parcels		20 ha	16 ha	16 ha	21 ha
HERITAGE					
Number of heritage features affected (by type)					
	- direct	None	None	None	None
	- indirect	Farmstead (76) on White Church Road	Farmstead (76) on White Church Road and Cemetery (74) on White Church Road	Farmstead (76) on White Church Road and Cemetery (74) on White Church Road	Farmstead (76) on White Church Road.
COMMUNITY					
Effects on Mount Hope and White Church Road Development		Some disruption to White Church Road residents; some increase in traffic on Airport Road and in Mount Hope	Some disruption and perceived negative impacts to White Church residents	Some disruption and perceived negative impacts to White Church Road residents	Some disruption to White Church Road residents

TABLE 5.9

COMPARISON OF INTERCHANGE ALTERNATIVES - WHITE CHURCH ROAD AREA

CHIPPEWA ROAD TO GLANCASTER ROAD

(continued)

	Scheme 1 Direct Ramps	Scheme 2 Partial Diamond	Scheme 3 Parcle 'A' at White Church Road	Scheme 4 Trumpet 'B'
NOISE				
Number of residences experiencing over 5 dBA increase	3	3	3	3
NATURAL ENVIRONMENT				
Area of all forests, plantations and other woodlots affected	6	5	5	6
Area of highest quality and maturing representative woodlots affected	6	5	5	6
Area of Woodland Improvement Act areas affected	0	0	0	0
Area of Identified Waterfowl Area affected	9	6	6	11
Number of stream crossings - primary - secondary	1 0	1 0	1 0	1 0
PLANNING POLICIES				
Effects on future land use	Preserves open space and eventual link between Mount Hope and White Church Road settlement	Precludes future expansion of residential area of Mount Hope to include White Church Road settlement	Precludes future expansion of residential area of Mount Hope to include White Church Road settlement	Preserves open space and eventual link between Mount Hope and White Church Road settlement
TRAFFIC SERVICE	Movement to/from existing Hwy. 6 served directly by ramps south of White Church Road Ramps serve local traffic to/from the south Local traffic to/from the north on Hwy. 6 (New) must reroute to Airport Road interchange	Serves movement to/from existing Hwy. 6 indirectly via White Church Road interchange; White Church Road interchange provides full movement to/from Hwy. 6 (New) for local traffic Restricts E-W travel on White Church Road	Serves movement to/from existing Hwy. 6 indirectly via White Church Road interchange; White Church Road interchange provides full movement to/from Hwy. 6 (New) for local traffic Restricts E-W travel on White Church Road	Movement to/from existing Hwy. 6 served by ramps south of White Church Road. Local traffic also served by ramps to/from the north

The previous access configuration provided to Airport Road was a Trumpet 'B' interchange with a connection to Airport Road approximately 150 m to the east.

The interchange configuration allowing for direct access to the airport access road provides better traffic service by avoiding a jog connection between Highway 6 (New) and the airport. The direct connection creates a new farm unit on the [redacted] farm. However, the severance follows the existing fence line and the two parcels severed are currently farmed separately. Access will be provided to the new unit from Airport Road.

5.11 Summary

Based on a detailed evaluation of the foregoing factors Alternative A1, subsequently modified, was selected as it provides the best combination of cost, service and impacts. The recommended alignment is presented in detail in Chapter 6.

6. Description of the Recommended Alignment, Identified Environmental Effects, Mitigation and Commitments to Future Work

6.1 General

The recommended alignment for the undertaking is described in this Chapter.

In this Environmental Assessment Report, the following procedures have been documented in terms of dealing with mitigating measures:

1. For potential effects not identified as being related to "environmentally significant areas and issues" (as defined in Chapter 2); the effects and basic mitigating measures are discussed in the report sections below, describing the recommended plan.

2. For potential impacts that are related to "environmentally significant areas and issues", appropriate mitigating measures are discussed in more detail in report Section 6.3. Further, more information on mitigation will be provided during detailed design, where appropriate (see Section 6.4) in the Design and Construction Reports.

This Chapter is divided as follows:

- Section 6.2 The Recommended Highway 6 (New) Alignment and Profile

- Section 6.3 Identified Environmentally Significant Areas/ Issues and Commitment to Mitigation

- Section 6.4 Commitment to Future Work

Exhibit 1.1 shows the recommended alignment for Highway 6 (New). Details of the recommended plan are shown in Part II, Preliminary Design Report. A detailed assessment of the recommended alignment is shown in Table 6.1.

TABLE 6.1

DETAILED ASSESSMENT OF RECOMMENDED ALIGNMENT

Criteria		Recommended Alignment Hwy. 403 to Glancaster Rd.	Recommended Alignment Glancaster to Greens Rd.	TOTAL Hwy. 403 to Greens Rd.
PROPERTY				
Number of residential properties taken		2	2	4
Number of commercial properties taken		0	0	0
Number of industrial properties taken		0	2	2
Number of institutional properties taken		0	0	0
Number of properties from which land is required but which are not eliminated (by type)	- Residential	2	1	3
	- Commercial	1 (Nursery)	2	3
	- Industrial	0	1	1
	- Institutional	0	1	1
AGRICULTURE				
Area of Class 1, 2 and 3 lands removed (by Class)	- 1	26 ha	98 ha	124 ha
	- 2	10 ha	10 ha	20 ha
	- 3	22 ha	0 ha	22 ha
		58 ha	108 ha	166 ha
Area of specialty crop lands affected		3 ha	0 ha	3 ha
Number of farmsteads removed		0	0	0
Number of farms affected		11	31	42
Number of farm severances - landlocked parcels		3	3	6
	- new units	0	5	5
Area of landlocked parcels		22 ha	43 ha	65 ha
COMMUNITY				
Effects (division, disruption) to Unity Side Road Hamlet			Divides Unity Road Hamlet Disrupts Seneca Unity School and Community	
HERITAGE				
Number of heritage features affected (by type)	- Direct	Barn in Farmstead 11ba	None	
	- Indirect	Parkin Cemetery 116B Stump Fence	Unity Road Church Site (12) Farmstead (76) at White Church Road	
NOISE*				
Number of residences experiencing over 5 dBA increase		11 plus school	10	21 plus school

TABLE 6.1
DETAILED ASSESSMENT OF RECOMMENDED ALIGNMENT
(continued)

Criteria	Recommended Alignment Hwy. 403 to Glancaster Rd.	Recommended Alignment Glancaster to Greens Rd.	TOTAL Hwy. 403 to Greens Rd.
NATURAL ENVIRONMENTAL FEATURES			
Area of all forests, plantations and other woodlots affected	20 ha	14 ha	34 ha
Area of highest quality and maturing representative woodlots affected	19 ha	11 ha	30 ha
Area of Woodland Improvement Act agreement areas affected	0 ha	0 ha	0 ha
Area of identified Waterfowl area affected	0 ha	11 ha	11 ha
Number of stream crossings - Primary	0	1	1
- Secondary	3	2	5
PLANNING POLICIES			
Effects on future land use	None	Prevents some infilling in Unity Road Hamlet and agriculturally-related residential development	
Effects on development proposals	None	May inhibit further development of Unity Road Hamlet	
VISUAL			
Compatibility with landscape character	Facility does not always follow road pattern or lot lines	Follows lot lines and road layout; generally compatible with landscape character	
Effects on views	Interchange at Book Road will be visible from the ridge but existing vegetation will partially screen view of it	Facility is visible from Seneca Unity School on Unity Road	
COST	[redacted]	[redacted]	
TRAFFIC SERVICE			
Access to the airport	Provides good traffic service to the airport (north side)	Provides an excellent connection to the airport (south side)	
Staging	Easily staged to the airport utilizing ~~Dublin~~ Book Road (see Section 6.2.13)		
Proximity to existing Highway 6		Provides an excellent connection to Highway 6 and thus serves the major traffic movement into Hamilton	

* NOTE: Route planning level of detail identified 29 residences and one school as experiencing over 5 dBA increase. Preliminary design level of detail reduced this to 21 residences and one school.

6.2 General Description of the Project

Table 6.2 summarizes the recommended Highway 6 (New) alignment and profile, together with the design control, potential effects and appropriate mitigating measures.

Preliminary design plans and profiles are shown in Part II, Appendix A of this report.

The following sections briefly describe the recommended alignment, in sections from the Caledonia By-pass northerly to Highway 403.

6.2.1 Greens Road to Unity Road (Station 9+50, 12+150)

Highway 6 (New) connects to the north end of the existing Caledonia By-pass at Greens Road. There will be a Parclo A interchange provided between Highway 6 (New) and Greens Road.

The ultimate plans for the Caledonia By-pass call for a four-lane cross section provided by a widening on the west side. Highway 6 (New) is being designed as an ultimate six-lane facility; thus, two lanes must be dropped at the Greens Road interchange.

One residence will experience noise increases of more than 5 dBA.

Proceeding northerly from Greens Road, the alignment for Highway 6 (New) swings to the northeast off the existing lot line. This swing from the alignment is necessitated by the preferred crossing point at Unity Road (see Section 2.2.2).

Several farms are severed when the alignment swings from the existing lot line. However, two of the units are within continuous ownership ([redacted] between Mines Road to the west and existing Highway 6 to the east. Therefore, no landlocked parcels are created on the [redacted] parcels.

The [redacted] property is severed creating a large landlocked parcel. However, considerable portion of these lands are in designated hazard lands.

The [redacted] farm on Unity Road is severed creating a new unit. Access is provided from Unity Road to the new unit. A portion of the [redacted] farm is within the urban designation of the Unity Road Hamlet.

6.2.2 Unity Road to Townline Road (Stations 12+150 to 13+030)

Highway 6 (New) crosses Unity Road between the Seneca Unity School and the United Church. The removal of one residence is required ([redacted]). The crossing is in an area of deep cut which reduces the noise and visual impacts on the adjacent community.

The deep cut at Unity Road mitigates the noise effects to the extent that all residences experience noise increases less than 5 dBA. The school will experience an increase of more than 5 dBA.

The profile of Unity Road is not changed, therefore, there is no change in travel patterns, or driveway access on Unity Road. Fencing will be provided along the right-of-way to protect pedestrians and school children.

The United Church will be adjacent to the right-of-way but it is not actively used by the Community as services are offered only once per year.

Northerly from Unity Road, the alignment proceeds towards Townline Road.

Between Unity Road and Townline Road two farms are severed. No landlocked parcels are created as access is provided to either Unity Road or Townline Road. One farm, [redacted], on Unity Road, has a considerable portion within the designated urban area of the Unity Road Hamlet.

6.2.3 Townline Road to Leeming Road (Stations 13+030 to 13+910)

The alignment proceeds northerly, parallelling the existing lot lines. No landlocked parcels or new units are created. The right-of-way required is from the rear of lots only.

A structure is provided at Townline Road over Highway 6 (New). No driveway access is affected. One residence on Townline Road will experience an increase in noise levels of more than 5 dBA.

6.2.4 Leeming Road to Chippewa Road
(Station 13+910 to 15+250)

Northerly from Leeming Road toward Chippewa Road the alignment parallels the existing lot line. No landlocked parcels or new units are created. The right-of-way is required only from the rear of lots.

A structure is provided at Leeming Road over Highway 6 (New). No driveway access is affected. A service road from Townline Road was investigated as an alternative to the structure at Leeming Road as Leeming Road terminates west of the alignment. However, the service road was more expensive, provided poorer service and required more agricultural land. Thus, a structure was selected to provide access to the residences along Leeming Road.

Two residences at Leeming Road will experience noise level increases greater than 5 dBA.

6.2.5 Chippewa Road to White Church Road
(Station 15+250 to 16+590)

The alignment for Highway 6 (New) swings slightly to the northwest north of Chippewa Road deviating from lot lines to avoid the Airport.

Four residences at Chippewa Road will experience noise level increases of more than 5 dBA. Two residences in the Link Road-White Church Road area will experience noise level increases of more than 5 dBA.

[redacted]. However, a significant portion of the landlocked area is within designated hazard lands. Property will be purchased by the Ministry of Transportation and Communications.

A structure will be provided at Chippewa Road over Highway 6 (New). No driveway access is affected.

A crossing of a 230 KV hydro line is required. This has been investigated with the assistance of Ontario Hydro and is judged to be feasible. Some relocation of the existing plant may be required.

A structure is required over the Welland River. The final design of this crossing is to be reviewed with the local Conservation Authority and the Ministry of Natural Resources during detail design.

An interchange is provided with a new link road to Highway 6 (Existing). The interchange is required to provide local access and to service the major traffic movement between Highway 6 (New) and Highway 6 (Existing). The traffic analyses undertaken identified a major demand from Caledonia and areas to the south, along Highway 6 (New), back to existing Highway 6 into Hamilton. This interchange facilitates this movement.

Some waterfowl nesting area land is required. The alignment impacts the easterly extremity only of the waterfowl area. The majority of the nesting area is not affected.

6.2.6 White Church Road to Airport Road Connection
(Station 16+590 to 17+570)

A structure is provided over Highway 6 (New) at White Church Road. In order to provide driveway access to residences along White Church Road, a minor realignment of White Church Road is required.

One residence is removed at White Church Road ([redacted]).

North of White Church Road the alignment swings to avoid the airport and then parallels the mid-lot line between Airport Road and White Church Road.

6.2.7 Airport Road Connection to Glancaster Road
(Station 17+570 to 19+150)

A Trumpet 'A' interchange is provided to service the terminal on the south side of the Airport. The connection to Airport Road from the interchange is along an existing fence line on the [redacted] lands. A new farm unit is created with access to Airport Road. The connection to Airport Road is directly opposite the existing terminal access, as requested by Transport Canada.

The interchange requires the removal of some woodlot area.

The alignment for Highway 6 (New) proceeds westerly from the Airport Road connection, parallelling the existing lot lines. The alignment is slightly north of the mid-lot line between Airport Road and White Church Road to avoid an existing high pressure petroleum pipeline right-of-way. This alignment shift also minimizes impacts to several significant woodlots.

6.2.8 Glancaster Road to Butter Road
(Station 19+150 to 20+530)

A structure is provided on Glancaster Road over Highway 6 (New). No driveway access is affected.

Proceeding from Glancaster Road, the alignment swings to the northeast towards Highway 403 and to parallel lot lines north of Butter Road. Lands recently acquired by [redacted] are severed. However, access is provided to Glancaster Road and there are no landlocked parcels.

There is a hydro crossing of the 230 KV line immediately south of Butter Road. This crossing has been investigated with the assistance of Ontario Hydro and is judged to be feasible, requiring some relocation of the existing hydro plant.

6.2.9 Butter Road to Book Road
(Station 20+530 to 22+570)

A structure is provided over Highway 6 (New) at Butter Road. In order to maintain access to private driveways, a realignment of Butter Road is required. In order to avoid drainage problems in the area, the profile of Butter Road and Highway 6 (New) is elevated.

The alignment proceeds northerly from Butter Road toward Book Road, parallelling existing lot lines north of Book Road. There are no landlocked or new units created, as lands are required primarily along the rear of the lot lines. South of Book Road the alignment swings to the northeast and an interchange is provided at Book Road.

Some high quality woodlot is removed between Book and Butter Roads. The alignment was modified to remove only the westerly portions of woodlots to avoid fragmentation.

Four residences at Butter Road will experience noise level increases of more than 5 dBA.

One residence is removed at Book Road ([redacted]).

6.2.10 Book Road to Highway 53
(Station 22+570 to 24+590)

The location of the interchange of Book Road was determined through the consideration of the following:

- Transport Canada's requirements for zoning, navigation and lighting associated with the Hamilton Airport;
- Ontario Hydro 230 KV line which had recently been lowered to accommodate the extension of Runway 12L;
- the Ancaster Animal Cemetery;
- the Parkin Cemetery;
- the historic Book House;
- several residences in the area;
- several viable large farms, some with specialty crop lands.

The detailed analysis of various alternative interchanges in terms of the above factors is documented in Section 5.9 of the Report.

At the crossing of Book Road the alignment swings to the northeast toward the existing Highway 6 (New) designation. This swing in the alignment severs the [redacted] farm. However, the severed lands are farmed in conjunction with the lands immediately to the east. Access will be provided for these lands from Book Road.

The severance of the [redacted] land cannot be avoided due to the design controls and constraints in place at Book Road.

A Parclo 'A' interchange is provided at Book Road. The interchange is required to service the long-term plans of Transport Canada to provide a new terminal on the north side of the Airport. The interchange also provides for local and regional access.

Three residences at Book Road will experience noise level increases of 5 dBA or more.

The Parkin (Book) Cemetery is located within the interchange but does not require closure or relocation. The operation and maintenance of this cemetery is subject to the Cemeteries Act and negotiations will be undertaken with the Town of Ancaster for the Town to maintain its current responsibilities for maintenance.

Northerly from Book Road, the alignment returns to the existing designation and parallels existing lot lines to Highway 53.

There are two woodlots affected by the alignment. One immediately north of Book Road is slightly fragmented. However, the design controls/constraints of Book Road make this fragmentation unavoidable.

North of the hydro crossing another woodlot is slightly fragmented. A shift in the alignment was considered; however, the highway geometrics and conflicts with the hydro crossing made this shift infeasible.

Highway 6 (New) crosses three 230 KV hydro lines. This crossing was examined in cooperation with Ontario Hydro and judged to be feasible with some minor relocation of the existing plant being required.

6.2.11 Highway 53 to Highway 403
(Station 24+590 to 25+280)

The alignment for Highway 6 (New) follows the existing designation north of Highway 53. The profile of Highway 6 (New) is elevated over Highway 53 in order to avoid drainage problems to allow Highway 53 to remain at its current elevation, thus eliminating potential driveway problems.

One house is removed on the south side of Highway 53 ([redacted]. This property has been purchased by the MTC.

Two residences at Highway 53 will experience noise level increases of more than 5 dBA. Mitigation in the form of barrier walls on the structure of Highway 53 is being provided.

6.2.12 Highway 403 Interchange (Station 25+280)

The existing designation is the only location along Highway 403 that provides for sufficient land for an interchange between Highway 403 and Highway 6 (New) (see Section 4.1.1).

A trumpet 'A' interchange will provide for all movements between Highway 6 (New) and Highway 403.

All Highway 6 (New)/Highway 403 interchange ramps are provided for within the designated lands.

Ramps to Highway 53, to and from the east on Highway 403, are being provided to offload the Fiddler's Green/Highway 403 interchange and to service the Scenic Woods development on Highway 53 east of Southcote Road. Additional lands are required for those connections.

6.2.13 Staging

Highway 6 (New) will be stage constructed. The exact nature of the staging will be based on demand for the facility and resources available, in keeping with provincial highway priorities. Exact staging descriptions will be documented in the Design and Construction reports; the proposed stages for Highway 6 (New) are as follows:

Stage 1

The first stage of Highway 6 (New) will likely be an undivided two-lane arterial roadway. This will form part of the ultimate northbound lanes. Access will be provided by at-grade intersections at Book Road, Airport Road and Greens Road, and an interchange connecting to existing Highway 6. All other roadway crossings will be grade separated.

An at-grade intersection may be provided at Book Road in the event that interim access to the airport is required. In recognition of the high volume of trucks and the safety considerations of at-grade intersections the number of at-grade crossings has been minimized.

Stage 2

Under Stage 2 the two southbound lanes would be constructed to form a four-lane divided highway with a 22 m median and rural open drainage. Intersections at Book Road, Airport Road and Greens Road would be upgraded to full interchanges. This will result in a four-lane grade

separated freeway with access by interchange only, from Highway 403 to the Caledonia Bypass at Greens Road.

Stage 3

When traffic demand warrants, widening to six-lanes can be accommodated by reducing the median to 15 m and maintaining rural drainage. This results in the ultimate six-lane facility.

Further information on staging is presented in Part II, Section 5, Design Criteria.

6.3 Environmentally Significant Areas and Issues

Section 3.3 of this report provided a definition of "environmentally significant areas and issues". Based upon that definition and all comments and concerns raised and analyzed during the route location study, "environmentally significant areas and issues" affected by the recommended plan have been identified. These areas/issues are discussed in the following subsections.

These significant areas and issues were identified in Chapter 4 and used in the comparative evaluation outlined in Chapter 5.

Several of the issues identified in Chapter 4 are combined by geographical area as some issues on their own would not be considered significant but when combined with others create a significant area/issue.

A large portion of the mitigation of these identified areas/issues was undertaken through the design of the recommended alignment. Additional mitigation will be outlined in Section 6.4, Commitments to Future Work.

6.3.1 Noise

This issue is considered to be environmentally significant for the purposes of this Study based upon:

- comments raised by members of the public, local elected representatives, and the Ministry of the Environment;
- analyses carried out by the Study Team.

In the route planning phase of this Study, noise impacts were analyzed based on criteria outlined in the MOE-MTC noise protocol. This included the comparison of numbers of noise sensitive locations (i.e. known and assumed residential outdoor amenity areas and the Unity School school yard) affected by the various alternative alignments. Topographic features or intervening obstructions were not taken into consideration at this level of detail, although the cut at Unity Road on Alternative 1 was incorporated into the overall decision-making process. Some 29 residential receivers and the Unity School school yard were identified in this phase as being expected to experience more than 5 dBA increase over ambient conditions, ten years after construction, as a result of the recommended alignment.

During the preliminary design phase of the Study, further investigations were conducted using refined horizontal and vertical alignment information, and incorporating major topographic details and screening by major intervening obstacles such as buildings or embankments. It was determined that only 21 residential receivers and the Unity School school yard would be expected to experience more than 5 dBA increase over future ambient conditions, ten years after construction of the ultimate undertaking. (Appendix H, Part I indicates the nature of the ten-years-after construction predictions used.)

The MOE-MTC noise protocol calls for the investigation of mitigation measures within the right-of-way where noise level increases are greater than 5 dBA in the post-construction scenario. The protocol indicates that, in such cases, if project costs are not significantly affected and where a minimum attentuation of 5 dBA can be achieved, as averaged over first row receivers, the selected measures will be introduced within the right-of-way. Additionally, any mitigation measures adopted will attempt to achieve levels as close to, or lower than the objective level (i.e. 55 dBA or ambient) as is technically, economically and administratively feasible. In practice, noise mitigation would be installed where it is cost effective.

Mitigation measures considered within the right-of-way included noise barriers, noise berms, changes to vertical and horizontal alignment, and the use of specific pavement surfaces. Further investigation of appropriate measures was then carried out to determine whether they were technically feasible. Finally, the cost effectiveness was considered in terms of the number of first row receivers which would receive the required benefit. General barrier costs were compared to the benefits to the adjacent properties. In practice, a barrier is not normally constructed where it is not cost effective. To be cost

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(see Appendix A, Part II for Plan and Profile)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
Greens Road to Unity Road	9+50 to 12+150	Connects to north end of Caledonia Bypass with a Parclo 'A' interchange at Greens Road.	Meets centre line of Greens Road at existing grade.	Initial stage intersection to be at-grade.	Profile meets existing grade of Caledonia Bypass/Greens Road intersection.		
				Northbound lanes (currently two-way) of Caledonia Bypass have been constructed. Widening to ultimate 4 lanes south of Greens Road to be accomplished by constructing 2 lanes southbound.	In initial Stage, two northbound lanes to be constructed to match existing Caledonia Bypass.		Highway 6 (New) is six lanes ultimate, Bypass is four lanes ultimate. Therefore, two lanes dropped at Greens Road.
					Two industrial parcels required at Greens Road.	Properties will be purchased.	
					One residence experiences noise level increases of more than 5 dBA.	No mitigation proposed, not cost effective.	
		Proceeds northeasterly off lot line toward Unity Road.	Terrain varies considerably. In fill averaging 2 to 3 m.	Alignment must cross Unity Road between Church and School to minimize impacts to Unity Road Hamlet (see Section 6.2.2).			
			Structure required over Seneca Creek.			Design of structure over Seneca Creek to be undertaken at time of final design and reviewed with Conservation Authority and MNR.	Seneca Creek crossing will be subject to Conservation Authority review under O.Reg. 154/86 (Fill, Construction and Alteration to Waterways Regulations).

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
					Farms severed due to swing from lot line.	[redacted] farms are severed but no landlocked parcels created as ownership is continuous from Mines Road to Hwy. 6 (Existing). [redacted] farm is severed. Some of landlocked parcel is within designated hazard lands. [redacted] farm severed but no landlocked parcel as access is possible from Unity Road. Part of farm is within the Urban designation of the Unity Road Hamlet.	
Unity Road to Townline Road	12+150 to 13+030	Through Unity Road Hamlet, alignment is between the Seneca Unity School and the Church.	Through Unity Road profile is depressed 7 to 9 m.	Only location along Unity Road where crossing can be in deep cut and remove only one residence.	One house is removed. Alignment crosses through designated Rural Hamlet.	Property will be purchased. Deep cut at Unity Road mitigates noise and visual impacts. Profile of Unity Road is not changed. Therefore, no change to travel patterns, or driveway access along Unity Road. Unity Road will be grade separated during both initial and ultimate stage. Therefore, traffic is separated from the community.	

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
						Fencing along R-O-W will protect pedestrian and school children.	
					Church is adjacent to the alignment.	None required.	Church only used once a year for services.
					School will experience noise increases of more than 5 dBA.	Deep cut at Unity Road mitigates noise level increases.	No residences at Unity Road will experience noise level increases of more than 5 dBA.
		Alignment proceeds northerly toward Townline Road.	In cut to station 12+500, then slightly above existing grade following generally level land to Townline Road.	Parallels existing lot lines north of Townline Road.	[redacted] farm severed but no landlocked lands created. Access is available from Unity Road. Part of farm is within the urban designation of the Unity Road Hamlet.	New access road from Unity Road will be constructed to new farm unit created.	
					[redacted] farm severed, no landlocked parcel as access is provided from Townline Road.		
Townline Road to Leeming Road	13+030 to 13+910	Proceeds northerly along existing lot lines	Slightly above existing grade.	Alignment parallels existing lot lines.	No landlocked parcels or new units created.		
					R-O-W required from rear of lot lines.		
					Structure provided at Townline Road over Highway 6 (New).		No driveway access affected.
					One residence at Townline Road will experience noise level increases of more than 5 dBA.	None proposed, not cost effective.	

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
Leeming Road to Chippewa Road	13+910 to 15+250	Proceeds northerly along existing lot lines.	Above grade in approximately 4 m of fill.	Alignment parallels existing lot lines.	No landlocked parcel or new units created.		
					Structure provided at Leeming Road over Highway 6 (New).		No driveway access affected.
					R-O-W required from rear of lot lines.		
					Two residences at Leeming Road will experience noise level increases of more than 5 dBA.	None proposed, not cost effective.	
Chippewa Road to White Church Road	15+250 to 16+590.	Proceeds northerly, begins swing to the west to avoid the Airport.	Slightly above grade to provide drainage for crossing of Welland River. Beyond Welland River, slightly below grade.	Alignment parallels lot lines where possible.	Landlocked parcel created on [redacted]	Landlocked parcel will be purchased by MTC.	Significant portion of this farm unit lies within designated hazard lands.
					Four residences at Chippewa Road will experience noise level increases of more than 5 dBA.	None proposed, not cost effective.	
					Two residences south of White Church Road will experience noise level increases of more than 5 dBA.		
					Structure provided at Chippewa Road over Highway 6 (New).		No driveway access affected.
					Structure required over Welland River.	Final design of Welland River crossing to be reviewed with local Conservation Authorities and MNR.	

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
				Trumpet 'B' interchange provided to Highway 6 (Existing).	Link road required to Highway 6 (Existing).		Interchange and link road required to serve major traffic movement to Hamilton.
					Changes traffic volumes and patterns along Highway 6.		Some commercial establishments may experience decreased exposure to traffic.
				Alignment swings to the west to avoid the Airport.	Alignment can no longer parallel lot lines.		
					Crossing of 230 KV Hydro line.		Some relocation of existing plant may be required.
					Some waterfowl nesting area to be removed.	Construction activities will be restricted and appropriate techniques undertaken to minimize impact on waterfowl.	Alignment impacts easterly extremity only. Majority of nesting area unaffected.
White Church Road to Airport Road Connection	16+590 to 17+570	Swings to northwest to avoid the Airport.	Slightly above grade.	Profile set to provide drainage over numerous watercourses.			
					One house removed at White Church Road.	Property will be purchased.	
					Structure provided on White Church Road over Highway 6 (New).	White Church Road realigned to maintain access to residences and farms along White Church Road and maintain continuous E-W travel.	

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
					Two residences at White Church Road will experience noise level increases of more than 5 dBA.	None proposed, not cost effective.	
Airport Road Connection to Glancaster Road	17+570 to 19+150	Parallels lot lines.	Above grade in approximately 1 m of fill over undulating terrain.	Terrain undulates significantly. Profile set to provide drainage to numerous watercourses.			
				Trumpet 'A' interchange provided directly opposite existing terminal facilities.	Connection to Airport Road required.	Airport connection along existing fence line. New farm unit created, access provided via Airport Road.	Interchange and connection to Airport Road is required to service the terminal on the south side of the Airport. 'Direct' connection requested by Transport Canada.
				High pressure petroleum pipeline R-O-W parallels mid-lot line between Airport and White Church Roads.	Alignment shifted to the north of mid-lot line to avoid pipeline R-O-W.	Alignment shift due to pipeline R-O-W, minimizes impacts to several significant woodlots.	
Glancaster Road to Butter Road	19+150 to 20+530	Swings to northeast toward Highway 403.	Above grade approximately 1 m of fill.	Alignment must swing to northeast toward Highway 403 and to parallel lot lines north of Butter Road.	Structure provided on Glancaster Road over Highway 6 (New)	No private driveways affected.	
					[redacted] lands are severed.	Structure provided over Highway 6 (New) at Glancaster Road will provide access between two properties.	Lands recently purchased by [redacted]

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
					Hydro crossing of 230 KV line south of Butter Road.		Crossing is feasible, some relocation of existing Hydro plant required.
Butter Road to Book Road	20+530 to 22+570	Proceeds northerly parallel to lot lines.	In fill approximately 2 to 3 m above grade.	Alignment parallels lot lines.	No landlocked or new units created. Land required primarily along lot lines.		
					Structure provided over Highway 6 (New) at Butter Road.	Butter Road realigned to maintain access to private residences.	Due to drainage requirements, elevation of Highway 6 (New) and Butter Road has been raised in the vicinity of Butter Road.
					Four residences at Butter Road will experience noise increases of more than 5 dBA.	None proposed, not cost effective.	
					Possible removal of sections of stump fence.	Relocation/ replacement will be discussed with owner at time of construction.	
					Area of high quality woodlot removed.	Alignment parallels lot line thus woodlot is not fragmented.	
Book Road to Highway 53	22+570 to 24+590	Shifts to northeast toward existing designation.	Deep cut approximately 8 m at Book Road to Station 23+300 then approximately 2 m of fill to Highway 53.	Factors affecting location of interchange at Book Road include: - Transport Canada's requirements for zoning, navigation, and lighting	Detailed evaluation of Book Road crossing led to decision to swing off designated lands.		See Section 6.8.1 for a detailed evaluation of Book Road crossing.

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
				- Ontario Hydro 230 KV line - Ancaster Animal Cemetery - Parkin Human Cemetery - Historic Book House - several residences - several farms.			
					[redacted] farm severed.	Access will be provided from Book Road.	Lands are farmed in conjunction with those immediately to the east.
					Three residences at Book Road will experience noise level increases of more than 5 dBA.	None proposed, not cost effective.	
					One house is removed at Book Road.	Property will be purchased.	
					Barn is removed.	Relocation will be negotiated with the owner.	Barn constructed in the 1950s and is not associated with an active farm unit.
					Parclo 'A' interchange provided at Book Road.		Interchange required to service Transport Canada's long-term requirements to provide a terminal on the north side of the Airport and to provide local access.
					Some woodlot removed immediately north of Book Road.		Removal of woodlot unavoidable due to design controls at Book Road.
					Woodlot fragmented north of Hydro crossing.		Shift in alignment considered to avoid fragmentation. However, highway geometrics and conflicts with hydro made shift infeasible.

TABLE 6.2
SUMMARY OF RECOMMENDED ALIGNMENT
(continued)

LOCATION	STATION	RECOMMENDED DESIGN ALIGNMENT	RECOMMENDED DESIGN PROFILE	DESIGN CONTROLS	EFFECTS OR CONDITION CHANGES (Actual or Potential)	MITIGATING MEASURES	COMMENTS
					Highway 6 (New) crosses three 230 KV hydro lines.		Crossing is feasible, some relocation of existing plant may be required.
Highway 53 to Highway 403	24+590 to 25+280	Follows existing designation to Highway 53.	Elevated over Highway 53. In 5 to 6 m of fill.	Drainage requirements and access to private residences required that Highway 6 (New) go over Highway 53.	Alignment elevated over Highway 53.		
					Two residences will experience noise level increases of more than 5 dBA.	Barrier walls are being provided to mitigate noise effects.	
					One house is removed at Highway 53.		Property purchased by MTC.
					Affects licenced sand and gravel pit.	None.	Investigate aggregate source for construction of Highway 6 (New).
Highway 403	25+280	Trumpet "A" interchange provided.	Highway 6 (New) over Highway 403.	All movements provided between Highway 6 (New) and Highway 403.		All Highway 6 (New)/ Highway 403 interchange ramps are provided for within designated lands.	
				Ramps to Highway 53 to and from the east on Highway 403 are being provided to offload the Fiddler's Green interchange and service the Scenic Woods development on Highway 53.		Additional land beyond that already designated will be required for connection to Highway 53 to and from the east on Highway 403.	
				Existing designation is the only location along Highway 403 that provides sufficient room for an interchange.			

effective, a large number of residences must benefit from a noise attenuation measure.

At a preliminary design level of detail, the attenuation provided by either noise barriers or noise berms may be considered to be equivalent. Because of berm space requirements, they may not be applied where limited areas occur between the alignment and adjacent residences. As well, berms may require additional property beyond the normal right-of-way. In the Highway 6 (New) Study Area, the use of berms in many locations would require the acquisition, and loss from production, of additional prime agricultural land; the minimization of such acquisition is a major objective of the Study.

At the preliminary design phase, horizontal and vertical alignments are largely determined by technical and physical constraints, and only minor alterations are possible. In this Study, these constraints included the location of the recommended alignment between adjacent residences, interchange and over/underpass requirements, drainage restrictions, crossing of hydro electric lines and the objective of minimizing property acquisition or disruption by following or paralelling survey lot lines where possible. Route planning and preliminary design decisions, such as the shift of alternative Alignment I slightly westerly at White Church Road, or the final location of the recommended alignment at the Butter Road crossing, are examples of where a variety of factors, including a general consideration of noise, determined the preliminary design level of detail alignments. Vertical alignment refinements can occur during detail design and no further preliminary design level of detail changes were determined to be appropriate for mitigation purposes.

The use of open friction course pavement (OFC) is often considered in an attempt to reduce the amount of tire-generated noise. A decision to use OFC in selected locations is normally made during detail design and the use of specific pavement surfaces for attenuation purposes will be considered during this phase.

Finally, the use of broad-leaf vegetative plantings to serve as a screen for highway noise is frequently raised by members of the public. Such plantings do not produce an audible reduction in highway-generated noise, and have not been considered as an effective form of noise mitigation for this Study.

Table 6.3 contains a summary of considerations made for noise mitigation at each noise sensitive location adjacent to the recommended alignment, at a preliminary design level of detail. Re-evaluation of noise impacts and possible mitigation will be made during detail design, to incorporate detailed information current at that time. These investigations will be documented in the Design and Construction Reports.

At Highway 53 noise mitigation will be provided. Noise mitigation was determined to be either cost ineffective or technically infeasible at other crossroads. At Highway 53 the construction of barrier walls, in association with the structure's parapet walls, is expected to achieve acceptable levels of attenuation for the immediately adjacent residential noise receivers, at a relatively minor cost as part of the over-pass construction. A re-evaluation of appropriate mitigation at this location will be carried out as part of the detail design for this crossing, and will be documented in the Design and Construction Reports.

During construction, the provisions for construction noise outlined in the MOE-MTC noise protocol will be followed. The specific terms of this compliance will be documented in the Design and Construction Reports. Although no blasting is anticipated, should any be identified during detail design, monitoring for noise and vibration impacts, including pre-blast surveys, will be considered and documented in the Design and Construction reports.

6.3.2 Agriculture

This issue is judged to be environmentally significant based upon:

- comments made by members of the public, elected representatives and External Team members;
- analysis undertaken by the Study Team.

Agricultural effects and their mitigation were considered for both farm operations and removal of farm lands.

A detailed assessment of the effect of Highway 6 (New) on farm operations was undertaken as part of the route location study. The results of this analysis are included in Appendix G. Effects to agricultural operations consist primarily of farm severances and restrictions to farm machinery movement.

In order to mitigate against farm severances, existing lot lines were followed wherever possible. To mitigate against restriction of farm

TABLE 6.3
SUMMARY OF NOISE MITIGATION CONSIDERATIONS
(Preliminary Design Level-Of-Detail)

Receiver of over 5 dBA Increase				Ambient	Increase	Horizontal & Vertical			Minimum 5 dBA Attenuation				
		Plan		(Future)	Over Ambient	Alignment	Berm	Barrier		Barrier			
Crossroad	Quadrant	(Pt.2, App.2)	Name	(dBA)	(dBA)	Controls	Feasible?	Feasible?	Achievable	Height (m)	Length (m)	Barrier/Berm Cost Effective?	Comments
Greens	NW	A2	[redacted]	45*	7	b	Yes+	Yes	Yes	2.5	515	No - 1 residence/quad.	
Unity	NW	A4		45*	6	a,b,d	No	n/a	Yes	-	-	Cut provides attenuation	
Townline	NW	A6		47	6	b	Yes+	Yes	Yes	1.9	300	No - 1 residence	
Leeming	SW	A6		45*	10	a,b	Yes+	Yes	Yes	2.2	440	No - 1 residence/quad.	
	NW	A6		45*	9	a,b	Yes+	Yes	Yes	2.2	430	No - 1 residence/quad.	
Chippewa	SE	A8		46	6	a,b	Yes+	Yes	Yes	2.2	415	No - 2 residences/quad.	
	SE	A8		45*	7	a,b	Yes+	Yes	Yes	2.2	415	No - 2 residences/quad.	
	SW	A8		45*	7	a,b	Yes+	Yes	Yes	2.6	430	No - 1 residence/quad.	
	SW	A8		45*	10	a,b	Yes+	Yes	Yes	1.6	365	No - 1 residence/quad.	
	NW	A8		45*	9	a,b	Yes+	Yes	Yes	2.3	415	No - 1 residence/quad.	
White Church	SE	A10		47	9	b,d	Yes	Yes	Yes	2.0	280 (link)	No - 1 residence/quad.	Berm/barrier obstructs view of Okimi Nursery from 6 (New), Link
										2.9	490 (6 New)	No - 1 residence/quad.	
	SW	A10		53	6	b,d	Yes+	Yes	Yes	3.8	320	No - 1 residence/quad.	
Butter	NE	A16		45*	7	a,b,c	Yes+	Yes	Yes	2.2	425	No - 1 residence/quad.	
	SE	A16		45*	12	a,b,c	Yes	Yes	Yes	2.2	540	No - 1 residence/quad.	Loss of trees with berm
	SW	A16		45*	11	a,b,c	Yes	Yes	Yes	1.9	520	No - 1 residence/quad.	
	NW	A16		45*	13	a,b,c	No	Yes	Yes	1.3	410	No - 1 residence/quad.	
Book	NE	A18		46	6	b,c,d	No	Yes	Yes	2.8	435	No - 1 residence/quad.	
	SE	A18		45*	n/a	-	n/a	n/a	-	-	-	n/a	Removed for R-O-W
	NW	A18		45*	10	b,c,d	Yes	Yes	Yes	4.6	505	No - 2 residences/quad.	Possible technical problems with Ridge location
	NW	A18		45*	6	b,c,d	Yes	Yes	Yes	3.7	505	No - 2 residences/quad.	
Highway 53	SW	A20		54	6	a,b,d	No	Yes	Yes	0.9	160	Yes	Minimal barrier cost in conjunction with bridge parapet design expected
	SE	A20		53	7	a,b,d	No	Yes	Yes	1.8	260	Yes	

NOTES:

* Assumed Ambient

\+ Berm requires agricultural land beyond minimum R-O-W.

a Adjacent alignment considerations (follow/parallel lot lines, avoid other residential impacts).

b Interchange, over/underpass requirements, connections with adjacent roads.

c Hydro crossing.

d Drainage, topographical features.

machinery movement within the Study Area, grade separations are provided at all crossing roadways of Highway 6 (New). There are no OMB road closures proposed as part of Highway 6 (New) within the Study Area. Where severances are unavoidable, access roads will be constructed to new units created where feasible. Any landlocked parcels will be purchased by the MTC and will likely be offered for resale to the adjacent owners.

In order to mitigate against the loss of agricultural land, a basic 80 m right-of-way is proposed. The Ministry of Transportation and Communications usually employs a standard right-of-way of 100 m for rural freeways. However, due to the significance of farm lands in this area, the less than standard right-of-way was employed.

6.3.3 Unity Road

This area is judged to be environmentally significant based upon:

- comments received by members of the public;
- analysis carried out by the Study Team.

Unity Road is a designated rural hamlet within the Haldimand-Norfolk Official Plan. The recommended alignment crosses Unity Road in an area which has little residential development. Only one house will be removed. The alignment crosses between the Seneca Unity School and the United Church. The Church is not actively used; services are held only once a year.

The crossing is in an area of deep cut, approximately 7-8 m. This significantly mitigates the noise and visual impacts of Highway 6 (New). Only the school experiences a noise level increase of 5 dBA or more. A structure is provided on Unity Road over Highway 6 (New) but due to the deep cut, the profile of Unity Road is not changed. As the profile of Unity Road is not changed, driveway access, pedestrian movements and traffic patterns are not affected.

Concerns were expressed over effects to wells in the vicinity of the cut. Well records were reviewed for the area, and significant impacts are not expected. Some wells may require deepening. A well monitoring program is proposed as a commitment to future work.

During the second and third series of Public Information Centres, special displays were prepared (see Appendices D and F) to illustrate the crossing and outline its effects and the proposed mitigation. These displays were also presented to the elected representatives at the formal Council presentations. Comments received from the public and the elected representatives were generally favourable. Most people felt that, if there was to be a crossing of the hamlet, it was in the best location and the proposed mitigation measures considerably reduced the impacts to their community.

6.3.4 White Church Road Area

This area is judged to be environmentally significant based upon:

- comments received by members of the public, elected representatives and External Team members;
- analysis carried out by the Study Team.

The Township of Glanbrook Council requested continuous east-west travel on White Church Road and that development be allowed to extend southerly to White Church Road from the Town of Mount Hope.

Transport Canada requested that the Airport Road interchange line up directly opposite the existing access to Airport Road.

Local residents were concerned over proximity impacts of Highway 6 (New) and its interchange at White Church Road.

To respond to these concerns, four options for an interchange in the vicinity of White Church Road were developed and presented to the public at a special property owners meeting and to the elected representatives at a Council presentation in March of 1986.

Based on comments received at the Council meeting and the special property owners meeting, the Study Team selected one of the interchange configurations and incorporated it into the recommended alignment. The selected interchange configuration met the concerns outlined above by:

- allowing through east-west travel on White Church Road;
- allowing development in Mount Hope to continue southerly to White Church Road;
- allowing the Airport Road interchange to line up directly opposite the existing Airport access on Airport Road;

- reducing proximity impacts to residents along White Church Road.

In addition, the interchange south of White Church Road allows for all traffic movements between existing Highway 6 and Highway 6 (New). This reduces the potential for increased traffic within the residential area of Mount Hope as local traffic will not need to use the interchange at Airport Road to travel to and from the north on Highway 6 (New).

6.3.5 Book Road

This area is judged to be environmentally significant based upon:

- comments raised by members of the public (including plot owners in the Ancaster Pet Cemetery), External Team members, and elected representatives;

- analysis carried out by the Study Team.

In Section 5 of this report, the numerous controls and constraints to the alignment of Highway 6 (New) in the vicinity of Book Road are outlined. In summary, the major factors governing the alignment of Highway 6 (New) in the vicinity of Book Road are:

i) navigation, lighting and zoning requirements of the recently expanded Hamilton Civic Airport;

ii) a 230 KV Hydro line which has recently been lowered at the end of Runway 12L to accommodate the Airport Zoning requirements;

iii) the Ancaster Animal Cemetery;

iv) an abandoned historic human cemetery (Parkin Cemetery);

v) two historically significant houses;

vi) several residences in the area;

vii) several large viable farms.

Numerous meetings were held with representatives of Transport Canada and field investigations were undertaken, to determine the immediate and long-term requirements for the navigation, zoning and lighting requirements for Runway 12L. Transport Canada required flexibility to provide for a 2,000 ft. extension of Runway 12L.

Transport Canada also requested that access be provided to a future passenger terminal to be located on the north side of the Airport on Dickenson Road. To provide access to the future terminal buildings an interchange is required on Book Road.

Meetings were held with representatives of Ontario Hydro to determine the feasibility of a crossing of the existing 230 KV line immediately south of Book Road at the end of Runway 12L. As this 230 KV line had recently been lowered to accommodate Airport zoning requirements, such a crossing was judged to be infeasible.

As part of the evaluation of alternatives to the Book Road Crossing, comments were requested from plot owners of the Ancaster Animal Cemetery. Over 200 telephone calls, telegrammes and letters were received from the plot owners regarding the importance of the Cemetery. The owners were only concerned with direct impact requiring the re-location and removal of the Cemetery. Very few concerns were expressed over Highway 6 (New) being in close proximity to the Cemetery.

Based upon information provided by members of the public at the first series of Public Information Centres, field investigations were under-taken and an abandoned human cemetery was located immediately north of Book Road just west of the existing MTC designation. Subsequent analyses by the Study Team determined that the cemetery had been abandoned for some period of time and been used primarily by the Book and Parkin families.

The heritage analyses undertaken as part of the study identified two homes in the vicinity of Book Road as being of particularly historical significance as they are among the oldest residences in the area.

Meetings were held with [redacted], the owner of the farm bordering the existing MTC designation, to determine the type and extent of operation and the possible impacts of Highway 6 (New). There are some specialty crop lands used for the growing of potatoes. Lands on either side of the recommended alignment are farmed together and machinery movement between the two operations will be required.

Well records in the area were studied and although no significant impacts are expected, some wells may required deepening. A well monitoring program is proposed as a commitment to future work.

To address the concerns and constraints outlined above, three alternative alignments for the Highway 6 (New) crossing of Book Road for Alignment A were prepared and a comparative evaluation undertaken. This evaluation is documented in Section 5 of this report.

The major controls governing the selection of the recommended alignment were the requirements of Transport Canada and Ontario Hydro. The recommended alignment provides for the greatest amount of flexibility to meet the long-term requirements of both Transport Canada and Ontario Hydro while still providing for good highway geometrics.

Mitigation was incorporated into the design wherever possible. The following points are pertinent to the recommended alignment in the vicinity of Book Road:

i) The Ancaster Animal cemetery is unaffected.

ii) The abandoned human cemetery will be located within the ultimate interchange area but will not be relocated. Maintenance will be in accordance with the Cemeteries Act. Responsibility for maintenance will be negotiated with the Town of Ancaster. Access will be provided from Book Road and the Cemetery will be fenced.

iii) The two historical homes are unaffected; a barn as part of one farmstead requires removal. However, the barn was built in the 1950s and has no special historical significance.

vi) One residence is required. The owner will be compensated.

v) Some specialty crop land is required for Highway 6 (New) and its interchange. A severance is created, however, the severed portion can be farmed in conjunction with the adjacent parcel. Machinery movements will be possible along Book Road and an access road to the severed lands will be provided from Book Road.

vi) Transport Canada long-term requirements for the Airport are observed.

vii) The Highway geometrics are adequate and safe.

viii) A well monitoring program will be undertaken at the time of construction.

6.3.6 Property

This issue is divided into two subsections:

i) Acquisitions
ii) Proximity Impacts.

These issues were judged to be environmentally significant based upon:

- comments received by members of the public and elected representatives;
- analyses undertaken by the Study Team.

i) Acquisitions

Highway 6 (New) from Highway 403 to Caledonia is approximately 15 km in length. In total four residences are required. None of these are farmsteads or in any way agriculturally related. One lies within the urban designation of the Unity Road Hamlet, the other three are in agricultural lands. These three do not conform to existing agricultural policies regarding residential uses within agricultural areas.

The avoidance of residences was a primary objective of the route location component of this study and was a key factor in the comparative evaluation of alternatives. The recommended alignment required the least number of residences of the three alternatives crossing the Unity Road Hamlet.

[redacted]. The remaining three residences will be obtained, preferably by negotiation on a willing seller-willing buyer basis at a fair market value prior to construction.

ii) Proximity Impacts

Concern was expressed by owners of residences whose lands would not be required for Highway 6 (New) but would remain close to the highway right-of-way.

The effects to persons in close proximity to Highway 6 (New) are difficult to quantify. Concerns usually expressed related to noise,

visual intrusion, changes to the rural environment, and increases in traffic volumes.

A detailed noise investigation was undertaken. Noise was identified as an environmentally significant issue and mitigation is addressed in Section 6.3.1.

To mitigate the visual impacts of Highway 6 (New), a visual analysis was undertaken, and existing lot lines were followed wherever possible to conform to development patterns and to avoid segmenting landscape units. The profile for Highway 6 (New) was kept as low as possible to reduce its visibility. In addition, landscaping at interchange and intersection locations will be investigated at the time of final design.

Highway 6 (New) should not significantly increase traffic volumes on most crossing roadways within the Study Area. Highway 6 (New) should, in fact, reduce traffic volumes on some municipal roadways. In particular, Airport related traffic, currently using the Fiddler's and Butter Roads should switch to Highway 6 (New). Increases in traffic will be experienced in the vicinity of interchanges.

There are no road closures proposed and thus local traffic patterns are not affected.

The Study Area is largely agricultural. Discussions held with representatives from local planning departments, regional planning departments, the Ministry of Agriculture and Food and the Ministry of Housing have indicated that the Study Area is expected to remain largely rural in nature and operation. Highway 6 (New) is not expected to significantly affect the rural nature of the area.

In addition, Highway 6 (New) generally skirts the existing urban development. The recommended alignment is in close proximity to the recently expanded Hamilton Civic Airport and to development along existing Highway 6. Therefore, although Highway 6 (New) runs through a largely rural area, it is on the fringe of existing development.

6.3.7 Vegetation (Woodlot and Forested Areas)

This issue was judged to be environmentally significant based on a request by the Ministry of Natural Resources.

Approximately 34 ha of forest, plantation and woodlot will be removed for the construction of Highway 6 (New). Of this, some 30 ha is considered to be highest quality and maturing representative woodlots. No Woodland Improvement Act agreement areas are affected. Most impacts to woodlot areas results from the location of the selected alternative along or adjacent to lot and mid-concession lines (to minimize impacts to property, agricultural areas and residences).

The selected alternative was modified to avoid fragmentation of woodlot areas where possible. During detail design, investigation will be carried out to minimize impacts of the selected alternative to wooded areas where possible. These will include consideration of:

- investigation of tree removal strategy (gradual, pre-stressed clearance);
- a survey of rare or significant plants along the right-of-way;
- construction measures to minimize impacts as a result of major cut or fill operations for significant stands of trees.

Consultation with MNR during detail design on the impacts to woodlot and forested areas will be undertaken.

6.4 Commitment to Future Work

6.4.1 Future Investigations to be Carried Out and Involved Agencies

As a result of the issues and concerns analyzed during the Study, the proponent has agreed that additional analysis during detailed design will be required.

A summary of these issues and the related future work commitments is shown on Table 6.4. The table also shows the agencies or groups who will be contacted during the course of these additional investigations.

6.4.2 Design and Construction Reports

Design and construction reports provide contract-specific design and construction information for compliance and monitoring purposes. They include commitments for environmental protection and monitoring at a

TABLE 6.4
SUMMARY OF COMMITMENTS TO FUTURE WORK

Issue/Concern	Identified as Environmentally Significant	Report Section	Future Work Proposed	Agencies/Groups Involved in Future Work	Comments
NOISE	Yes	6.3.2	Detail design noise impact evaluations to re-evaluate mitigation required, including barrier at Highway 53	Ministry of the Environment	Mitigation to be provided based upon MTC/MOE noise protocol.
AGRICULTURE	Yes	6.3.3	Access to be provided to new farm units created where feasible	Property Owners	Standard MTC practice.
			Landlocked parcels to be purchased by MTC and may be offered for sale to adjacent owners		
UNITY ROAD	Yes	6.3.4	Investigate advanced tree planting	Haldimand/Norfolk Board of Education	To reduce visual impacts associated with the crossing, advanced tree planting will be investigated at the time of final design.
WHITE CHURCH ROAD	Yes	6.3.5	None required	N/A	Mitigation incorporated in design.
BOOK ROAD	Yes	6.3.6	Provide access to and fence historic abandoned human cemetery (Parkin); negotiations with Town to continue responsibility for maintenance	Town of Ancaster	Cemetery Act requirements for maintenance apply.
PROPERTY	Yes	6.3.7	Obtain residences prior to construction	Property Owners	Residences preferably obtained on a willing seller, willing buyer basis at fair market value.
VEGETATION	Yes	4.2.4 6.3.7	Vegetation specialists walk the centre line of proposed R-O-W at detailed design stage to locate any significant specimens	Grand River C.A. Ministry of Natural Resources	Protection of regionally rare plant species.
			Investigate tree removal strategy		Minimize impacts to woodlots/ forested areas where possible.
ARCHAEOLOGY	No	4.3.4	Additional field surveys, documentation and appropriate mitigation of impacts to be carried out prior to construction	Ministry of Citizenship and Culture	Preliminary survey already undertaken.

TABLE 6.4

SUMMARY OF COMMITMENTS TO FUTURE WORK

(continued)

Issue/Concern	Identified as Environmentally Significant	Report Section	Future Work Proposed	Agencies/Groups involved in Future Work	Comments
LANDSCAPING	No	4.3.3	Landscaping at intersections and interchanges to be investigated at the time of final design	No further contact needed	
DRAINAGE/STREAM CROSSINGS	No	Appendix B	Undertake a detailed drainage study prior to construction, including extent of increase to volume and frequency of flow from storm events; appropriate mitigation to be determined Review stream crossings, fill permits and structures designs with MNR and Conservation Authority prior to to construction	Ministry of Natural Resources Grand River C.A. Hamilton Region C.A. Niagara Peninsula C.A.	Preliminary drainage study undertaken.
WELL MONITORING	No	6.3.3 6.3.5	Well monitoring program to be investigated at the time of final design	Ministry of the Environment Property Owners Regional Health Unit	Preliminary review of effect to wells was undertaken. No significant impacts expected.
PRIVATE SEWAGE SYSTEM	No	Appendix B	Effects, if any, to individual tile beds will be dealt with in final design	Ministry of the Environment Regional Health Unit	Will be addressed, if necessary, in the Design and Construction Report.
WATERFOWL HABITATS	No	4.2.5	Measures to minimize disruption on waterfowl habitats during construction	Ministry of Natural Resources	Will be addressed in Design and Construction Report.
SOILS INVESTIGATIONS	No	Appendix B	Detailed soil investigation to be undertaken at time of final design	Ministry of Natural Resources	Preliminary soils investigation was undertaken.
SIGNING	No	Appendix B	Signing requirements to be determined at time of final design	Ministry of Tourism and Recreation	Standard MTC signing practice regarding tourism facilities will be employed.

level of detail that is either inappropriate for, or not available in, a one-stage Environmental Assessment Report.

Design and construction reports will be submitted to the Ministry of the Environment a minimum of 30 days prior to construction. These reports will deal with concerns raised throughout the study process by External Team contacts, Internal Team meetings, and the organized public participation program.

These reports will address the commitments to further work made in this Environmental Assessment, normal environmental design practice, and any new issues identified during design.

To ensure that commitments are carried out during construction, the Ministry of Transportation and Communications has a program of environmental inspection which is undertaken throughout construction.

6.4.3 Compliance Monitoring

To facilitate compliance monitoring of the various commitments for future work and mitigating measures referenced in this assessment, compliance monitoring forms titled "Summary of Environmental Concerns and Commitments" are provided in Appendix K. Commitments and concerns arising during detail design will be documented in the Design and Construction Reports.