ONTARIO

MINISTRY OF
TRANSPORTATION AND
COMMUNICATIONS

PLANNING AND DESIGN
SECTION

HIGHWAY 89

HIGHWAY 400 TO HIGHWAY 12
ROUTE LOCATION STUDY
W.P. 40-77-00
DISTRICTS 5 & 6

ENVIRONMENTAL ASSESSMENT REPORT TYPE I

W.P. 40-77-00

HIGHWAY 89

HIGHWAY 400 TO HIGHWAY 12
NEW HIGHWAY - 30.5 Mi. (50 km)

ENVIRONMENTAL ASSESSMENT REPORT - TYPE I

COUNTY OF SIMCOE
TOWNSHIP OF WEST GWILLIMBURY
REGIONAL MUNICIPALITY OF YORK
TOWNSHIP OF GEORGINA
TOWN OF EAST GWILLIMBURY
REGIONAL MUNICIPALITY OF DURHAM
TOWNSHIP OF UXBRIDGE
TOWNSHIP OF BROCK
DISTRICTS 5&6

PREPARED BY:

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MANAGER, CONSTRUCTION

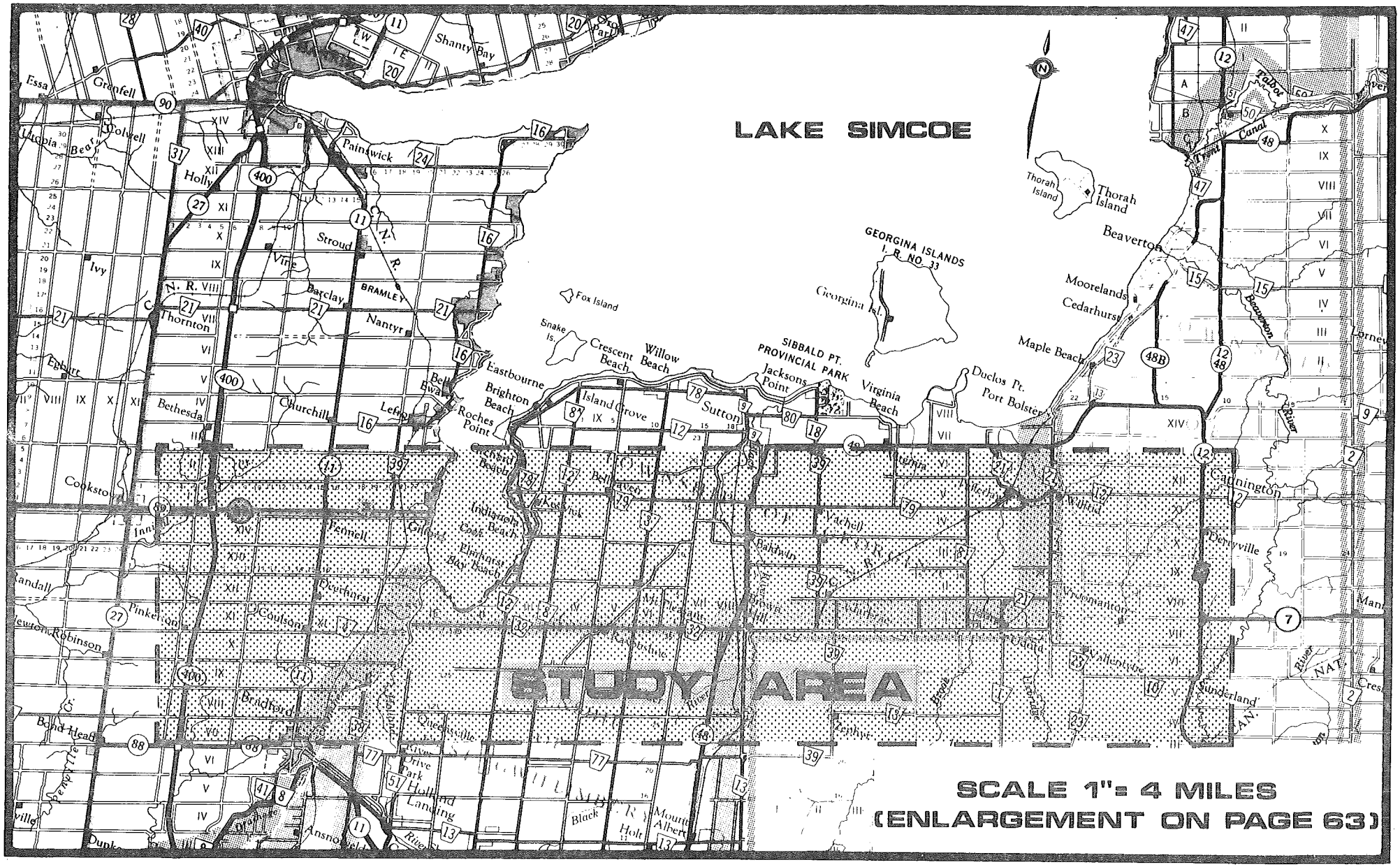
JANUARY 1979

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF FIGURES



KEY MAP

FIGURE 1

1. INTRODUCTION AND BACKGROUND

1. INTRODUCTION AND BACKGROUND

1.1 ENVIRONMENTAL ASSESSMENT REPORT-TYPE I

This report documents a route planning study for a new highway between Highway 400 and Highway 12, just south of Lake Simcoe. The proposed highway, which will be an extension of Highway 89, was previously referred to as M.O.T.H.

This 'Environmental Assessment Report-Type I' serves as the first of a two part Environmental Assessment of the proposed project and is submitted to the Ministry of Environment as required by the Environmental Assessment Act, 1975.

It documents the route planning phase of the Ministry of Transportation and Communications' preconstruction process and includes a discussion of the need and justification for the project, the various planning alternatives and the environmental concerns associated with the selected alternative. Ministry of the Environment approval of this submission will allow the Ministry of Transportation and Communications to proceed with property acquisition leading towards the ultimate completion of the project.

At a later date, the second part of the Environmental Assessment for this project, will be submitted. This will be in the form of a series of Type II or Type III Reports, one for each design section of the project. These Reports will document the design and construction phases, and Ministry of Environment approval of them will allow the Ministry of Transportation and Communications to proceed with construction of the project.

1.2 STUDY AREA

The study area is indicated on the Key Map (figure 1, page vii).

The shaded area shown on the map encompasses parts of the County of Simcoe, the Regional Municipalities of York and Durham, the Town of East Gwillimbury and the Townships of Innisfil, West Gwillimbury, Georgina, Uxbridge and Brock.

The land use in the area is predominantly agricultural, interspersed with some residential and recreational uses. Agricultural soil capability classifications, in the area, are high.

The specific population within the outlined study area has not been identified but a mailing of brochures to all households within the study area, required approximately 2,500 brochures.

1.3 STUDY PURPOSE

The distance between Highway 7, north of Toronto, and Cook Bay, the southern most point of Lake Simcoe, is 25 miles (40 km). In this area, there is no continuous east-west highway linking Highway 400 to Highway 12. This results in major out of way traffic movements for both local and long distance traffic.

In order to improve this situation, the Minister of Transportation and Communications, in consultation with the County of Simcoe and the Regional Municipalities of York and Durham, agreed to proceed with the implementation of a program leading to the construction of a continuous highway south of Lake Simcoe that would link Highway 400 in the west and Highway 12 in the east.

This report documents the study that was carried out to determine the best means and location for this desired transportation improvement.

1.4 GENERAL DESCRIPTION OF THE STUDY

The study was carried out by the Ministry of Transportation and Communications over a period of fourteen months between May 1977 and June 1978.

Consideration was given to a number of alternative planning options, but the main study component was the determination of the best route for a proposed 2 lane, east-west highway, south of Lake Simcoe. The proposed highway will be approximately 30 miles (50 km) in length and will make use of existing roadways wherever feasible. In those locations where it will be necessary to acquire new right-of-way for the proposed highway, the basic width will be 120 ft. (36.5 m).

In determining the best route, the study was carried out with a number of considerations in mind:

- Extensive participation by all affected or interested parties was actively encouraged. See Chapter 2, Study Approach.
- Considerable background data was gathered in order to be able to analyse the alternatives. See Chapter 3, Existing Conditions.
- An extensive analysis and detailed evaluation of all relevant information and alternatives was carried out. See Chapter 4, Alternatives and Evaluation.
- Means of minimizing the adverse affects and maximizing the beneficial affects of the recommended alternative were identified. See Chapter 5, Selected Planning Alternative.

1.5 RATIONALE FOR THE UNDERTAKING

Cook Bay, at the south end of Lake Simcoe, is fed by a number of sources including the Holland and Schomberg Rivers. The lower reaches of both of these rivers are very flat and marshy. In addition, the area to the east of the Holland River, is characterized by extensive poorly drained swampy areas, interspersed with

drumlins (50' - 100' (15 m - 30m) high hills) that are oriented in a north-east, south-west direction. This type of terrain does not easily lend itself to the construction of east-west ground transportation links.

Historically the predominant traffic demand south of Lake Simcoe has had a north-south orientation, towards Metropolitan Toronto. This traffic flow has been accommodated by highways such as Highways 27, 400, 11, 48 and 12 as well as Regional Roads such as York Regional Road 8 and Durham Regional Road 1.

A combination of the difficult terrain problems, in an east-west direction, and the greater traffic demand to construct highways with a north-south orientation, has resulted in little emphasis being given to the construction of an east-west connection south of Lake Simcoe.

As a result, there is presently no continuous east-west transportation service or facility north of Highway 7 and south of Lake Simcoe that links Highway 400 in the west to Highway 12 in the east. The distance between the southern tip of Cook Bay and Highway 7 is 25 miles (40 km).

It is possible for a driver who is familiar with the roadway system to drive from Highway 400 to Highway 12 by using a combination of east-west and north-south Provincial, Regional, County and Township roads. In this regard, the most northerly crossing of the Schomberg River is at Highway 11 south of Bradford and of the Holland River is at the Queensville Side Road. This Holland River crossing was reconstructed in 1977.

Unfortunately, even with these crossings, the journey is circuitous and not all of the roads are paved. As a result, trips on the existing network are costly in terms of time, fuel and wear and tear on vehicles.

The lack of a good east-west roadway system, south of Lake Simcoe, has been recognized as a problem at the local level for a number of years. It is for this reason that the Counties of Simcoe, York and Ontario identified, in the mid 1960's, the need to construct a new crossing of the Holland River as part of a continuous east-west roadway south of Lake Simcoe.

The construction of this new crossing had not occurred by the mid 1970's although the populations of the municipalities in the area had continued to grow. The population of the Township of West Gwillimbury grew by over 50% between 1965 and 1975 and the Township of Georgina (formerly Georgina and North Gwillimbury) grew by over 100% in the same period.

The problem created by the lack of a continuous east-west connection south of Lake Simcoe became more obvious at the provincial level during the mid 1970's. At this time many highway users started to become more aware of the time and energy costs associated with unnecessary out of way travel.

It was in order to resolve the problem of both local and long distance roadway users having to take time and energy consuming circuitous journeys that the Ministry, following discussions with the affected municipalities, agreed to proceed with the implementation of a program leading to the construction of a continuous transportation facility south of Lake Simcoe.

The rationale for proposing a new connection south of Lake Simcoe is directly linked to the problem as described previously.

The present roadway system south of Cook Bay has many discontinuities and therefore many drivers are forced to make circuitous journeys. The reason for proposing a new connection is to provide a continuous facility that would reduce the extent of out of way travel at both the local and provincial level. Examples of the travel distance savings that will be obtained by constructing a continuous facility are as follows:

- West to east side of Cook Bay
  - travel distance saving of 10-12 miles (16-19 km)
- Peterborough to Barrie
  - travel distance saving of 8 miles (13 km)
  - present most direct route is via Orillia

1.6 RELATED STUDIES

There are few documented studies that relate directly to this project. Previous reference to a new crossing of the Holland River, close to Cook Bay, can, however, be found in the following reports:

- County of Simcoe, Road Needs Study, 1969-1979. This study identified the County roadway needs within the County of Simcoe for the period between 1969 and 1979. The study included the identification of the need for a new Holland River crossing immediately south of Cook Bay.

- Toronto and York Roads Commission, County Needs Study 1965-1975. This study identified the County roadway needs within the then County of York, for the period between 1965 and 1975. As with the County of Simcoe study, this study identified the need for a new Holland River crossing immediately south of Cook Bay.

- Functional Planning Report - Holland River Crossing, 1968. This report documented a study that was carried out for the County of Simcoe and the Toronto and York Roads Commission. The study investigated alternative means of providing a new roadway link, just south of Cook Bay, linking Highway 11 and York Road 12.

1.7 STUDY OUTCOME

The outcome of this study is the recommendation to construct a new highway south of Lake Simcoe.

The selected route for the proposed highway is illustrated in figure 11 (page 63). This route is 30.5 miles (50 km) long and follows existing road allowances over 80% of its length. The west limit of the proposed highway is at a new interchange on the 11th Line of West Gwillimbury, at Highway 400. The route then swings to the north and follows the 12th Line of West Gwillimbury to a new crossing of the Holland River. To the east of the Holland River, the route follows the existing Ravenshoe Road (York Regional Road 32) easterly to Udora. A southerly bypass of Udora is provided and the route then swings to the north to follow the 8th Line of Brock to the intersection of Highways 7 and 12.

The recommended design criteria for the proposed highway calls for the development of a 2 lane highway within a basic right-of-way of 120 ft. (36.5 m) and with a posted speed limit of 50 mph (80 km/h).

At the time of preparation of this report, it was recommended that the construction of the highway be staged as indicated in figure 11 (page 63).

1st Stage - Highway 11 to York Reg. Rd. 12 (including Holland River crossing)

2nd Stage - Highway 48 to Highway 12 (including Udora bypass)

3rd Stage - Highway 400 to Highway 11 (including new interchange at Hwy. 400)

The section of roadway between York Regional Road 12 and Highway 48 will be resurfaced as required.

These recommendations were announced publicly through a Minister's statement on June 30, 1978. In addition, brochures illustrating the recommended route, were mailed to interest groups and to approximately 2,500 households in the study area on July 13, 1978. Copies of the Minister's statement and the brochures are included in Appendix B.

2. STUDY APPROACH

2. STUDY APPROACH

The study was organized to ensure that:

- all technical aspects of the study were properly addressed
- all interest groups and area residents had ample opportunity to become involved in the study

This was accomplished by carrying out the study in a number of stages with full technical and public involvement at each stage.

2.1 ENVIRONMENTAL ASSESSMENT PROCESS

The environmental assessment process entailed the acquisition of an extensive amount of data. This information was obtained from a variety of sources with the main emphasis being placed on the use of previously documented data. This data was supplemented by discussions with agencies, interest groups and area residents and also by field review where no readily identifiable documentation was available.

Specific sources of information are documented throughout this report and within the Appendix. Examples, however, of the methodology used to obtain data, are as follows:

- Data on water quality and quantity was obtained from reports prepared by Environment Canada, the South Lake Simcoe Conservation Authority and the Ministry of Environment. This data was supplemented by a brief field observation of the individual streams in September 1977. Water samples were not taken as part of this field review.
- Data on vegetation was obtained by carrying out an office mapping of vegetation units through the use of aerial photography (minimum unit size of 20-25 acres) and then subsequently carrying out a field assessment of each identified unit. The field review was carried out in September 1977 and provided a brief sampling of all identified units.
- Wildlife and fisheries data was obtained through contact with the Ministry of Natural Resources and a number of specific interest groups as identified in Appendix C. This data was supplemented by a restricted number of field observations.
- Agricultural data was obtained from a variety of sources. The Canada Land Inventory was used to obtain a mapping of soil capability. Existing usage, however, was gathered from representatives of the Ministry of Agriculture and Food, representatives of the Federation of Agriculture and from questionnaires completed by individual farm owners.

- Property information was obtained from the appropriate Assessment Office within each municipality and this data was updated by individual property owners in attendance at the public information centres.

- Extensive engineering and socio-economic data relating to items such as traffic, soils, railways, land use, utilities, municipal structure and topography was obtained from municipal offices, agency offices and various branches within the Ministry of Transportation and Communications.

The analysis and evaluation of this data was carried out quantitatively wherever feasible and subjectively where this was not possible.

The evaluation process entailed the comparison of the analyzed data in terms of eight factors, specifically:

- Traffic
- Agriculture
- Noise
- Cost
- Property
- Environment
- Staging
- Aesthetics

The detailed analysis and evaluation is documented in Chapter 4 (page 37).

2.2 STUDY STAGES

Figure 2 (page 9) is identical with a display that was available for review at the public information centres that were held during the course of the study. It illustrates a number of overall study stages.

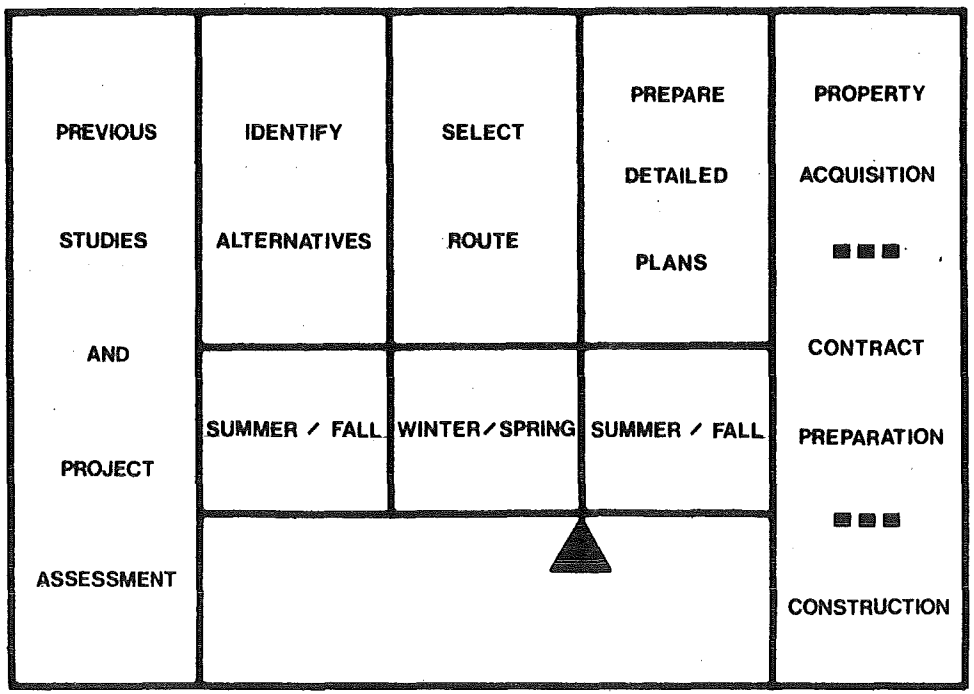
This report deals with the work carried out during the stages that are shown as:

- Identify Alternatives
- Select Route

Environmental Assessment approval is necessary prior to the Ministry of Transportation and Communications proceeding with the next stage, specifically:

- Prepare Detailed Plans

Following completion of these three study stages the Ministry of Transportation and Communications will proceed towards property acquisition, contract preparation and construction.



STUDY STAGES

FIGURE 2

The three basic study stages include the following activities:

Identify Alternatives

- gathering all relevant background information
- identifying alternative routes
- meeting with technical and public groups to supplement and refine the background data and alternative routes

Select Alternative

- analyzing alternatives in terms of traffic, agriculture, noise, cost, property, environment, staging and aesthetics
- evaluating alternatives with technical groups
- reviewing analysis and evaluation with public groups
- summarizing technical and public comments and preparing recommendations
- Ministry of Transportation and Communications' selection of preferred route
- preparing environmental assessment document

Prepare Detailed Plans

- preparing detailed plans in consultation with technical and public groups (detailed plans will show specific alignment, grades and property requirements)

The Identifying Alternatives and Select Route stages were carried out between May 1977 and June 1978. The Ministry of Transportation and Communications intends to proceed with the preparation of detailed plans following the Province of Ontario's review and approval of this Environmental Assessment document.

Both technical and public groups were involved in each of the main study stages. For the purpose of the report, the technical and public groups have been identified in three categories, specifically, internal, external and public. The external group includes technical representatives of all other Ministries and agencies that had an interest in the project, the technical representatives of the County of Simcoe and the Regions of York and Durham and all of the affected municipal councils. The public group includes area residents and organized interest groups.

2.3 INTERNAL PARTICIPATION

Participation in the study by technical representatives of the Ministry of Transportation and Communications was at either the level of the Project Team or the Internal Team

2.3.1 Project Team

A working group known as the Project Team, which included representatives from the Ministry of Transportation and Communications' Consultant, was responsible for the day to day activities associated with carrying out the study. This group was comprized as follows:

Mr. George Norman Sr. Project Manager	- Planning & Design Section Central Region
Mr. Harry Vander Kooij Project Manager	- Planning & Design Section Central Region
Mr. John Hughes Sr. Environmental Planner	- Environmental Unit Central Region
Mrs. Vera Hugel Environmental Planner	- Environmental Unit Central Region
Mr. Neil Goldsmith Traffic Analyst	- Traffic Section Central Region
Mr. Ken Pilgrim Sr. Structural Engineer	- Structural Section Central Region
Mr. Charley Meyers Head	- Special Projects Section Provincial Roads Planning Office

Mr. Bob Nairn Sr. Project Manager	- McCormick, Rankin & Associates Limited (Consultants)
Mr. John Sutherns Project Manager	- McCormick, Rankin & Associates Limited (Consultants)
Mr. Ray Smith Env. Project Manager	- Ecoplans Limited (Consultants)

This group met formally on 8 occasions during the study but maintained a daily dialogue as questions or concerns arose.

2.3.2 Internal Team

In addition to the Project Team, an Internal Team was formed. This Internal Team was comprised of representatives of the various specialist offices within the Ministry of Transportation and Communications. The Internal Team was comprised of representatives of the following offices:

Mr. H. Bird Project Management Officer	- Priority Development Branch
Mr. H. S. Elston Sr. Soils Supervisor	- Geotechnical Section Central Region
Mr. Z. Byblow Head	- Surveys & Plans Section Central Region
Mr. N. Close Sr. Landscape Planner	- Landscape Planning Operations Maintenance Branch
Mr. R. Carney District Engineer	- District #5 Owen Sound
Mr. W. H. Venn District Municipal Engineer	- District #5 Owen Sound
Mr. D. P. Collins District Engineer	- District #6 Toronto
Mr. R. Dawson District Municipal Engineer	- District #6 Toronto
Mr. S. Dhanani Transportation Planner	- Urban & Regional Transportation Planning Office
Mr. J. Neilson Area Manager	- Property Section Central Region
Mr. A. Wittenberg Head	- Planning & Design Section South Western Region
Mr. B. Darch Manager	- Financial Analysis Assessment Office

The Internal Team only met formally on two occasions during the study, but representatives of this team provided the necessary data and assessments as required during the course of the study.

2.4 EXTERNAL PARTICIPATION

External participants within the study were identified as falling within three categories. These categories were External Team, Municipal Technical and Municipal Councils.

2.4.1 External Team

Representatives of a number of Ministries and agencies were involved in the study.

The following representatives participated as an External Team at various stages throughout the study:

Mr. J. Morley District Lands Planner	- Ministry of Natural Resources Central Region
Mr. D. Hogg Fish & Wildlife Supervisor	- Ministry of Natural Resources Central Region
Mr. D. Pirie Chief of Planning & Approvals	- Ministry of Environment Central Region
Mr. P. Shervill Environmental Planner	- Ministry of Environment Environmental Assessment Section
Ms. J. Roulet Project Officer	- Ministry of Agriculture & Food Food Land Development Branch
Mr. J. K. McRuer Agricultural Representative	- Ministry of Agriculture & Food Simcoe County
Mr. R. Gregg Agricultural Engineer	- Ministry of Agriculture & Food York Region
Mr. H. E. Bell Agricultural Representative	- Ministry of Agriculture & Food Durham Region
Mr. B. Murray Tourism & Industry Consultant	- Ministry of Industry & Tourism Orillia
Ms. R. M. O'Brien Regional Archaeologist	- Ministry of Culture & Recreation
Mr. G. Price Supervisor of Planning	- South Lake Simcoe Conserva- tion Authority
Mr. C. Hennum Member of Task Force	- Simcoe Georgian Area Task Force

In addition, the following agencies were kept advised of the study as it progressed:

- Nottawasaga Valley Conservation Authority
- Canadian National
- Muck Research Station

Representatives of the various Ministries and agencies that were involved in the study, participated in terms of either providing background data, opinions and comments or assisting in the identification and evaluation of the alternative routes. One exception to this was Mr. P. Shervill of the Ministry of Environment, who restricted his involvement in the study to advising the Project Team as to the requirements associated with the Environmental Assessment Act rather than addressing the specifics of any alternative highway considerations.

The External Team met formally on two occasions, once at each main study stage. In addition three separate meetings were held with representatives of the Ministry of Natural Resources, two with representatives of the Ministry of Agriculture and Food and two with representatives of the Ministry of Environment.

2.4.2 Municipal Technical Involvement

A further external input to the study, was obtained by meeting with technical representatives of the affected municipalities. In this regard, meetings were held with the following representatives:

- Mr. L. Clark — Simcoe County Engineer
- Mr. W. R. Hodgson — Commissioner of Engineering Region of York
- Mr. K. J. Schipper — Manager of Transportation Region of Durham

2.4.3 Municipal Councils Involvement

Municipal council meetings were held at two stages of the study. These preceded public information centres that were held in December 1977 and April 1978. News media coverage of these meetings assisted in advertising the project to the area residents. Meetings were held with either full or partial councils as follows:

- County of Simcoe
- Township of Innisfil
- Township of West Gwillimbury
- Regional Municipality of York
- Township of Georgina
- Town of East Gwillimbury
- Regional Municipality of Durham
- Township of Uxbridge
- Township of Brock

Specific municipal comments are included in Chapter 4 (page 51).

2.5 PUBLIC PARTICIPATION

Two aspects of public participation were identified. These were related to the desirability of involving the following:

- Area Residents
- Interest Groups

Area residents were involved through two series of public information centres. The first series was held on the 13th, 14th and 15th of December 1977 to review alternatives and the second was held on the 25th, 26th and 27th of April 1978 to review the analysis and evaluation. The information centres were held in The Honourable Earl Rowe School north of Bradford, St. Paul's Anglican Church in Keswick and in the Udora Community Centre. On each occasion the centres were advertised as being open between the hours of 2:00 p.m. and 5:00 p.m. in the afternoon and between 7:00 p.m. and 9:00 p.m. in the evening. On several occasions, however, the evening session extended well beyond 9:00 p.m.

For the first series of information centres, paid advertisements were placed in the following papers:

- Bradford Witness
- Mount Albert Communicator
- Newmarket Era
- Alliston Herald
- Barrie Banner
- Uxbridge Times Journal
- Newmarket Topic
- Toronto Star

For the second series of information centres, paid advertisements were placed in all of the above newspapers as well as in the following:

- South Lake Simcoe Advocate
- Alliston & Cookstown Reporter
- The Innisville Advocate

The advertisements were placed during the week preceding the information centres. Typical advertisements are included in Appendix B.

In addition to the newspaper advertisements, the centres were further advertised by a general mailing of approximately 2,500 brochures to households in the study corridor. This general mailing required using rural routes based on the following post offices:

- Cookstown
- Gilford
- Bradford
- Queensville
- Keswick
- Sutton
- Zephyr
- Pefferlaw
- Udora
- Sunderland

50 copies of the brochure were also mailed to each of the nine affected municipalities, for general availability to the public.

These mailings were supplemented by individual mailings to approximately 150 members of the Estonian Summer Homes Association, whose mailing list was provided by the Association's executive. In addition, individual mailings went to approximately 60 people who either wrote to the Ministry concerning the project or who requested that their names be placed on the mailing list.

In addition to mailing out brochures to advertise the information centres, two further general mailings took place. One mailing took place approximately two months before the first series of information centres. This was to ensure good public awareness of the project before the study proper was started. The other mailing took place following the selection of a specific route for the highway. This latter mailing supplemented a public release by the Minister of Transportation and Communications on June 30th, 1978.

Copies of all brochures and the public release are included in Appendix B.

The first series of information centres was attended by approximately 500 people and the second series by approximately 350 people. The information centres were staffed by representatives of the Ministry of Transportation and Communications and the Consultant. Both oral and written comments were obtained from the public at these centres. Fifty-five people completed written comment sheets during the second round of information centres. Selected comments are included in Chapter 4 (page 56).

A number of interest groups were identified as potentially having an interest in the study. All of these groups, that are listed below, received copies of the public mailings and were invited either to attend the information centres or to meet with representatives of the Ministry of Transportation and Communications. Those groups with whom meetings were held to discuss specific aspects of the study, are indicated with an asterisk (*).

- Federation of Ontario Naturalists *
- Toronto Field Naturalists Club
- Richmond Hill Naturalists Club
- Brereton Field Naturalists Club of Barrie
- Estonian Summer Homes Association *
- Estonian Women's Society of Toronto Incorporated*
- KIVIOJA * (Estonian Association)
- Cedar Club * (Finnish Association)
- Ontario Federation of Agriculture
- Simcoe County Federation of Agriculture *
- York Region Federation of Agriculture *
- Durham Region Federation of Agriculture *
- Ontario Federation of Anglers & Hunters
- Ducks Unlimited *
- Georgina Chamber of Commerce
- Canada Ontario Rideau Trent Severn Secretariat
- Gilford Beach Association
- Bell Cedar Ratepayers Association
- Bradford & District Chamber of Commerce *
- Simcoe County Board of Education *
- Bradford Rotary *

3. EXISTING CONDITIONS

3. EXISTING CONDITIONS

The following chapter is separated into three sections, specifically, Natural Environment, Socio-Economic Environment and Transportation and Engineering Data. Within each of these sections, there are a number of subsections dealing with specific aspects of each area of interest.

3.1 NATURAL ENVIRONMENT

3.1.1 Topography

The study area is predominantly within a drumlinized till plain, being part of the Peterborough drumlin field (see Appendix C). Physiographically the corridor can however be summarized within three basic sections:

- Western Section - West of Keswick Marsh
- Central Section - Keswick Marsh to Udora
- Eastern Section - Udora easterly

Western Section

Within this section, the relief is generally more gentle than to the east of the Keswick Marsh. The topography slopes down toward the east and an old Lake Algonquin shorecliff. This results in the small streams of the area that flow into Cook Bay and the Holland River, creating incised valleys in the plain above the shorecliff.

The scenic "Hollows" area, located in the vicinity of Highway 400 and 12th line West Gwillimbury is a steep rolling kame moraine composed of mixed outwash sand and glacial till. This prominent landform feature is the source area for fast flowing cold water streams that flow into the Innisfil Creek.

Central Section

Topographic characteristics within the central section of the study area are those of drumlinized till plains. This central portion is penetrated, however, by flat sand plains that are associated with glacial Lake Algonquin. While some of these sands are well drained, their position below the till plains often create poor drainage. This situation occurs around the communities of Brown Hill and Udora and on the western edge of the Keswick Marsh and results in extensive accumulations of organic soils. Due to the level topography, surface streams have minimal gradients causing sluggish, warm water flow.

The flat sand plain influences a large area, with the Holland, Maskinonge, Black, Zephyr and Pefferlaw streams all located within this plain. Some interfaces between the sand plains and till plains provide evidence of Lake Algonquin beaches and shorecliffs with a prominent example of the shorecliff feature on the west side of the Keswick Marsh.

The Queensville Flats, which is an extensive flat, poorly drained silt and clay plain associated with Lake Algonquin, borders and underlies the east side of the Keswick Marsh south of Cook Bay.

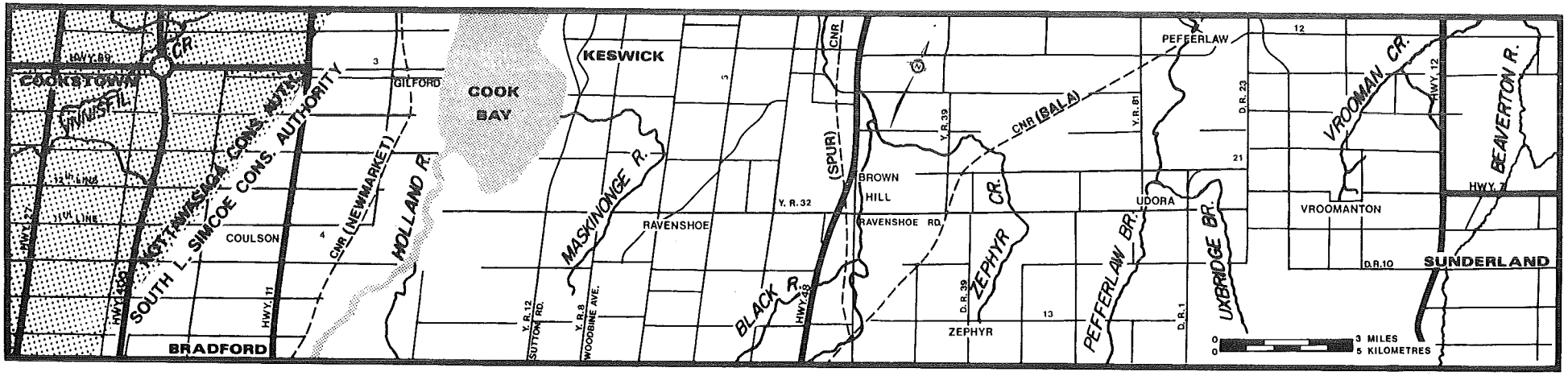
An esker crosses the corridor approximately two miles east of the community of Ravenshoe.

Eastern Section

The eastern section has moderately rolling topography with well drained sandy to silty sand till. However, there are some poorly drained areas and occasional shallow organic soil deposits occurring in the depressions between the drumlins. The area is drained by the Uxbridge Brook, Vrooman and Beaverton Creeks as well as by other creeks associated with the lowland fingers of the glacial Lake Algonquin sand plain.

3.1.2 Watercourses

The topographic features of the corridor, as discussed in the previous section 3.1.1, result in watercourses that fall into one of two basic categories. The "Hollows" area, located in the western section of the corridor, is the source of a number of fast flowing cold water streams which feed into the Innisfil Creek. All other rivers and creeks in the corridor, can be categorized as sluggish warm water streams. These include the Holland River, Maskinonge River, Black River, Zephyr Creek, Pefferlaw Brook, Uxbridge Brook and the Vrooman Creek. See figure 3 (page 18).



WATERCOURSES

FIGURE 3

Only limited water quality and quantity information is available for the streams in the study area. The information that is available is briefly listed below. Further details will be found in Appendix C.

Innisfil Creek Tributaries

The tributaries of the Innisfil Creek, located in the vicinity of 12th line West Gwillimbury/Highway 400, are fed by the groundwater discharge in the "Hollows" area and surrounding wetlands. These cold clear water streams flow from a relatively undisturbed area into an area of modification to the natural drainage and flow patterns. As these streams flow through open agricultural lands, they are influenced by warming and siltation. The headwater streams likely support a small self-sustaining trout population and have a high quality fish habitat rating.

Holland River Tributaries

There are three Holland River tributaries within the corridor that are categorized as small cold water feeder creeks flowing easterly into the marsh and providing essential spring water run-off to the lower marsh spawning areas. The two most northerly tributaries are rated as high quality fish habitat. The southern tributary is rated as low quality fish habitat although its spring run-off is essential to downstream marsh spawning areas. All three stream's lower reaches, within the marsh, are rated as high quality fish habitat, since they provide important spawning grounds for the fish population of the Holland River.

Holland River

Since the initiation of the Holland Marsh muck soil farming during the 1930's, the Holland River's water quality has become significantly polluted. High levels of coliform bacteria and turbidity make this river unsuitable for swimming. High siltation levels and nutrient enrichment from organic muck soil farming, combined with municipal waste contribute to the polluted condition of the Holland River. Improvements with this situation are anticipated following the connection of upstream municipalities to the York-Durham sanitary sewer scheme.

The river has high recreational usage, in particular boating and fishing.

The Holland River and its adjacent marshlands has been known in the past for its spawning grounds for muskellunge, largemouth bass, pike and possibly pickerel. With the development of organic "muck" farming, spawning and nursery areas have been greatly modified and reduced. This factor has placed increased importance on the remaining tributaries and estuaries adjacent to the marshlands and the Holland River's main channel to sustain the existing fish population.

The river channel provides a considerable number of pike, perch, bullhead carp, largemouth bass, sunfish and rock bass for sport fishing. All species are likely self-sustaining in the Holland River surroundings. Due to these factors, the Holland River is rated medium quality fish habitat and high quality sport fishery.

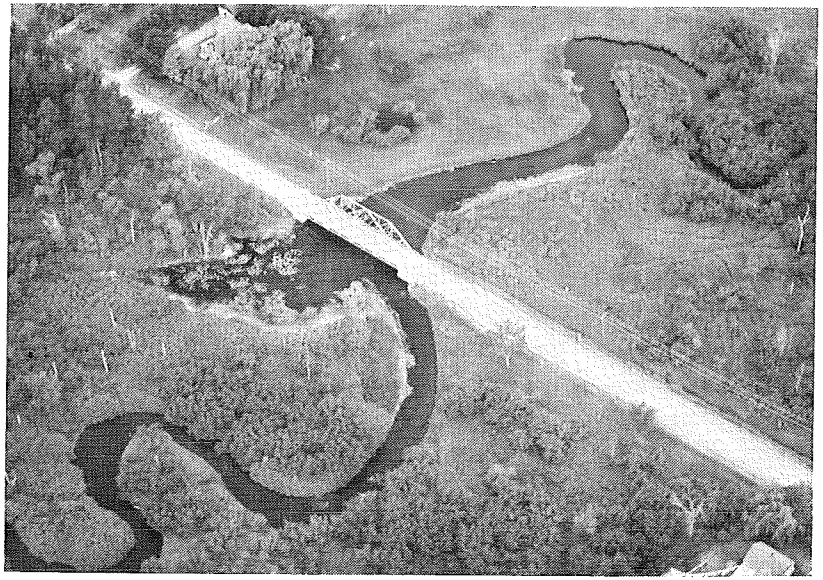
Maskinonge River

Measurements taken three miles downstream from Ravenshoe Road indicate that the Maskinonge River is moderately polluted. Bacteria levels exceed the acceptable limit for swimming. The pollution is likely from agricultural sources. High turbidity levels and sediment loads also contribute to the reduction in water quality.

The Maskinonge River fish characteristics are somewhat limited, with a rating of low quality fish habitat and low quality sport fishery in the study area. A cursory assessment undertaken in September 1977 found that the river supports small warmwater forage and some coarse fish species with no evidence of migratory lake species. The lower reaches of the river are spawning grounds for pike, largemouth bass and other warmwater fishes.

Black River

The Black River, situated just east of Brown Hill illustrates a similar water quality to that of the Maskinonge River. The river is moderately polluted and has a slow rate of flow. The river is considered to be of low quality for swimming.



BLACK RIVER AT RAVENSHOE ROAD

The location of a dam at Sutton eliminates fish migration upstream from Lake Simcoe to the vicinity of the river crossing at Brown Hill. However, in the region between Sutton and Baldwin, the Black River likely is a fishery for pike, largemouth bass and panfish. The Black River in the study area is rated medium quality sport fishery and medium quality fish habitat.

Zephyr Creek

The Zephyr Creek, as it flows through the study area, has no significant warmwater sport fisheries, although largemouth bass may be significant downstream around the Baldwin Pond. This watercourse is rated low quality fish habitat and sport fishery.

Pefferlaw Brook

Pefferlaw Brook water quality measurements recorded 4.5 miles downstream of Ravenshoe Rd., indicate a low pollution level (1976). This brook flows through a swimming and cottage development within Udora.

PEFFERLAW BROOK AT UDORA

A cursory examination of the Pefferlaw Brook in September 1977 found the water slow moving, dark in nature and probably high in humic acids. This water quality is a suitable habitat for largemouth bass, yellow perch, suckers and warmwater forage species behind the dam at Udora. The dam at Pefferlaw stops any migration of fish species from Lake Simcoe. Pefferlaw Brook, within the study area, is rated medium quality fish habitat and medium quality sport fishery.

Uxbridge Brook

No Uxbridge Brook water quality measurements are available. However, during a cursory examination on September 28, 1977, it was found to be slow moving, relatively turbid, fairly deep and highly modified with small dams and ponds as it flows through the community of Udora.

The Uxbridge Brook is probably a good habitat for warmwater species such as largemouth bass, panfish and warmwater forage species. During a 1971 stream survey (Rimmer & Rainey 1971), white sucker, smallmouth bass, brown bullhead, yellow perch, pumpkinseed and rock bass were found in this watercourse. The Uxbridge Brook, within the study area, is rated medium quality for fish habitat and low quality sport fishery.

Vrooman Creek

Findings of a cursory study of the Vrooman Creek and Vroomanton Pond indicate that habitat is suitable for a reasonable number of largemouth bass, while warmwater panfish and forage species in limited numbers could also be present. The pond itself may have some limited value as a warmwater fishery. Both the Vrooman Creek and Vroomanton Pond are rated low quality sport fishery. Vrooman Creek is rated low quality fish habitat.

The Ministry of Natural Resources has identified the Vroomanton Pond and associated wetlands for consideration to be designated as a Wildlife Management and Protection Area.

3.1.3 Vegetation

One of the main components in the highway corridor that creates the very scenic rural setting is that of the woodland vegetation. Dominant sugar maple and beech with some eastern hemlock, basswood, white ash, black cherry and ironwood, with a variety of other less frequent species, make up the mature woodlots on the upland well drained sands. The majority of these woodlots have witnessed logging or grazing within the past 20 years, resulting in the low density tree regeneration, tree sapling and woody shrub characteristics. Herbaceous ground flora are also of low diversity and low quality.

White cedar, trembling aspen, and balsam poplar are dominant with a variety of other less frequent species within the majority of the woodland vegetation locations. Most of these woodlands occur on imperfectly, to poorly drained sandy loams and are comprised of these young to semi-mature pioneer wetland hardwoods mixed with softwoods.

Scattered throughout the area are high quality, mature single tree groupings and hedgerows of sugar maples, basswood and white ash. These features contribute highly to the pleasant aesthetic nature of this region. These tree groupings and hedgerows also function as corridors for wildlife moving between the large woodlots.

There are two Simcoe County reforestration zones within the immediate corridor. Both are owned and operated by Simcoe County authorities and are situated on Concession IX, Lot 7 (approximately 100 acres) and Concession XI, Lots 9 and 10 (approximately 200 acres) West Gwillimbury Township. These woodlots contain the dominant species of Sugar Maple, Hemlock, Apple, Basswood, Red Oak, White Cedar, White Birch, Hawthorn, Balsam Poplar and areas of coniferous planting.

In the central to eastern area between Brown Hill and Udora where wet woodlands are situated, woody vegetation consists of very wet tolerant shrubs dominated by green alder. Sapling size black ash, silver maple and white elm may also be present.

Generally, most woodlots and units west of the Holland River are medium and high quality, whereas most woodland units east of the Holland River are low and medium quality.

A field inventory of all vegetation units within the corridor, was carried out during the study. See Appendix C.

3.1.4 Wildlife

Deer populations for the study area vary depending on location. A moderate to low deer population is reported for the Town of East Gwillimbury and the Townships of Uxbridge, Brock and Georgina. In contrast to this, West Gwillimbury Township is reported to have a high deer concentration, in particular in the vicinity of Concession 10 to 14 along the west edge of the Holland Marsh. It is generally considered that the deer population along the Holland Marsh-Cook Bay area is increasing in numbers due to the availability of food.

In an area that represents a good environment of marsh and wetlands for a duck population, there is little evidence of ducks in large numbers. There is a great diversity, as listed by hunting records (see Appendix C), however, the duck population is not large. The Holland Marsh has been the traditional area for duck hunting activity but waterfowl production is low. Waterfowl is also hunted at Vroomanton Pond.

Small game such as ruffed grouse, woodcock, European hare, varying hare, cottontail rabbit, coyote and porcupine are found throughout the study area. Hunting surveys indicate that harvests are low, which may be an indicator of population size. West Gwillimbury contains some of the best grouse habitat in the Huronia District.

Fur bearing animals such as beaver, muskrat, fox, racoon, mink and coyote are present throughout the study area. With the increased number of man-made ponds, some fur bearer populations are on the increase. (For further information, see Appendix C).

No endangered species or their habitats are identified within the study area, although some habitats are suitable for some declining species of birds, such as red-shouldered hawk and loggerhead shrike.

3.1.5 Wildlife Management Area

The Holland Marsh Wildlife Management Area is located on the west shore of the Holland River near its mouth at Cook Bay. The area is 1,265 acres in size and is owned and operated by the Ministry of Natural Resources. This environmentally sensitive area provides a natural setting of a flat marshland environment of sedges and cattails.

No overall master plan is available for the Management Area, however, the existing and anticipated future usage of this property is for waterfowl nesting, migratory stop over area, wildlife observation and other low density recreation such as hunting and naturalist usage. Some development projects have been carried out to examine the present and potential use of the area. These include the digging of pot holes, dredging of ponds and canals to attract migratory birds, nesting possibilities and construction of an observation tower and boardwalk system.

At the time of the study, investigations were being carried out by Ducks Unlimited, in consultation with the Ministry of Natural Resources, to examine the potential for increased waterfowl usage.

The significance, size, and location of the area was a major consideration during the selection process for the most favourable route throughout the study corridor.

The location of the Holland Marsh Wildlife Management Area is indicated in figure 4 (page 26).

In addition to the lands on the west side of the Holland River, the Ministry of Natural Resources owns lands at the mouth of the River on the east side. Specifically Concession 1, Part of Lots 4 and 5 in Georgina Township.

3.2 SOCIO-ECONOMIC ENVIRONMENT

3.2.1 Municipalities

The study area encompasses a number of regional, county and area jurisdictions. The jurisdictions involved are the County of Simcoe, the Regional Municipalities of York and Durham, the Town of East Gwillimbury and the Townships of Innisfil, West Gwillimbury, Georgina, Uxbridge and Brock.

The populations within the study corridor vary with the size and population density of each particular jurisdiction. The overall population figures (1976) within each jurisdiction, as recorded in the 1977-1978 Municipal Directory, are as follows:

County of Simcoe	208,063
Region of York	202,232
Region of Durham	243,839
Town of East Gwillimbury	10,670
Township of Innisfil	15,158
Township of West Gwillimbury	3,901
Township of Georgina	17,625
Township of Uxbridge	10,674
Township of Brock	8,375

3.2.2 Land Use

Agriculture forms the major land use within the study area. As this usage is so extensive, it is dealt with in a separate chapter, 3.2.3, Agriculture (page 27).

Residential land uses within the study area can be considered as falling within three categories.

One form of residential usage is that of the home located on an active farm property and often situated several hundred feet from an existing roadway. Recently, however, increasing numbers of single family homes have been built on one quarter to one acre lots with direct access to rural roadways such as the 10th, 11th and 12th Lines in West Gwillimbury, the Ravenshoe Road and the 2nd Concession north of Udora. This pattern of residential land use has arisen due to the desire of people to move into the rural farm community atmosphere, seeking a quiet natural life-style while continuing to travel to employment in urban centres within reasonable driving distance. The third type of residential land use is that of the community and village resident, living in small rural communities such as Ravenshoe, Brown Hill, Udora and Vroomanton.

Recreational uses form a growing land use within the study area, due to its natural scenic setting.

Sources of recreation are mostly aquatic based as the many rivers, creeks, ponds and brooks attract people for the pleasures of boating, fishing and swimming. Hiking, nature walks and hunting also take place in the study area. Seasonal cottages are found in the vicinity of natural watercourses and wooded areas. A growing number of these cottages are becoming full-time permanent (winterized) homes, as people move from the city upon retirement.

A major private recreational area is located north of the community of Udora, in Concessions I and II, Township of Georgina. This area includes both Estonian and Finnish camps.

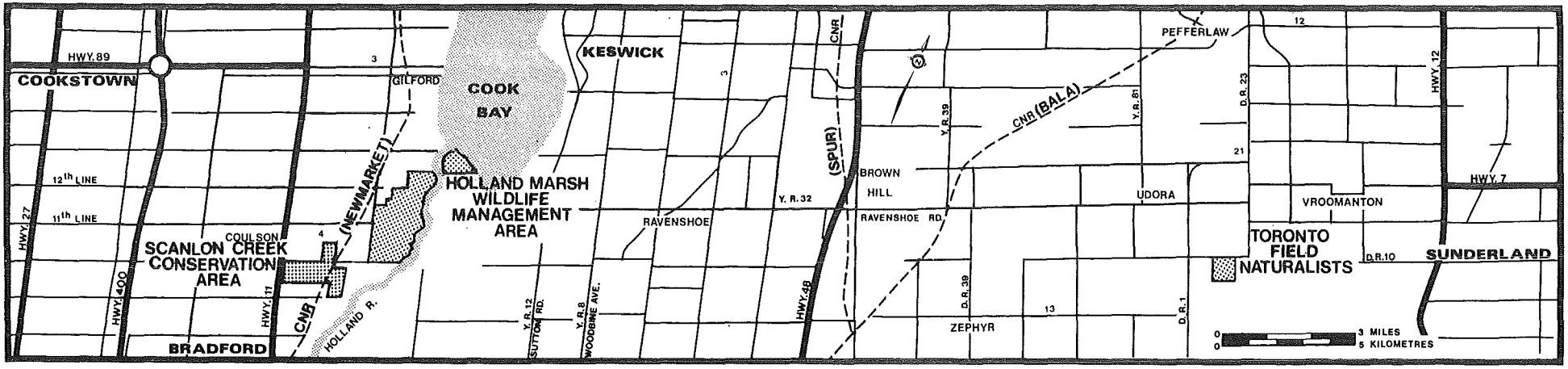
The Scanlon Creek Conservation Area is 600 acres (243 ha) in size and is located in Concessions IX and X West Gwillimbury Township, immediately west of the Keswick Marsh. The South Lake Simcoe Conservation Authority which administers this area also owns property north of Concession X. The area provides stocked fishing (rainbow trout) and swimming as well as a number of interpretive nature programs. The location of the Conservation Area is illustrated in figure 4 (page 26).

Immediately to the northeast of the Scanlon Creek Conservation Area and on the west shore of the Holland River is the "Holland Marsh Wildlife Management Area". This area is 1,265 acres (512 ha) in size and is owned and operated by the Ministry of Natural Resources. The area has retained its natural flat, river marshland environment of sedge and cattails, and is presently under consideration as a recreational/preserved area. The present and potential use considered for this property is for a low density recreational (potential hunting, naturalists and hikers usage) location, while a waterfowl nesting and migratory stopover facility is also planned. This wildlife area was discussed in detail in Chapter 3.1.5 (page 23).

Institutional uses within the study area, include the Honourable Earl Rowe School which is located on the north side of 12th line, west of Highway 11. This school provides classes from kindergarten to Grade 5 with a 1977-78 enrolment of 193 children who are all bused to school, (12 trips in/out per day). There are no plans for expansion of this facility.

There are two north-south hydro corridors that cross the study area.

Commercial activity within the study area, is found mainly within the communities of Ravenshoe, Brown Hill and Udora. These operations are small privately owned and operated enterprises including a general store/post office, lumber yard, gas stations and a mill. Located on the 11th line West Gwillimbury is the "Enchanted Forest Camping Grounds" which provides facilities for trailer and tent camping. There are a number of small gravel pit operations scattered throughout the study area. The majority of these pits are in an inactive state.



CONSERVATION AREAS

FIGURE 4

3.2.3 Agriculture

Agriculture is the major land use within the study area and is therefore of prime economic importance to the local community.

There are three basic types of farming within the area:

- cash crop farming on mineral soils
- livestock farming, (beef and dairy cattle and hogs)
- organic "muck" soil farming within the Keswick Marsh

These farming activities can be considered within five distinct areas:

- Highway 400 to Keswick Marsh
- Keswick Marsh
- Keswick Marsh to Udora
- Udora area
- Udora to Highway 12

Highway 400 to Keswick Marsh

The majority of the west end of the study area from Highway 400 to the 20th Sideroad is of Class 1 and 2 agricultural capability. An exception is the area from Highway 400 to the 10th Sideroad which is of Class 3 and 4 with Class 5, 6 and 7 soils in the area surrounding the present overpass of 11th line West Gwillimbury and Highway 400. There is a strip of land paralleling the Holland River in the vicinity of the 20th Sideroad West Gwillimbury with a capability of Class 5, 6 and 7. This area is limited agriculturally due to its sandy soil composition and prominent hilly terrain, being the remaining beaches and shorecliffs of Lake Algonquin.

Farming activity within the area west of the Holland River is of high quality and very productive. Cash and mixed crops are grown in mineral soils with pasture land for beef and dairy livestock.

Keswick Marsh

The Keswick Marsh lies in a lowland of organic soil near the mouth of the Holland River at Cook Bay. This floodplain of the Holland River has proven to be a most important area for market gardening.

This intensely farmed area has a low capability for the long term production of vegetables. Even though soil texture and quality is suitable, the major limitation for continuous vegetable production is soil depth. Productivity and duration of farming is highest in the deepest organics. However, as farm cultivation continues, the soils are being depleted (rates of soil loss of up to 1.5 ft. (0.5 m) in 10 years have been indicated) and are not being replenished, presenting a major limitation to the future of the area. On the average, soil depth suitable for farming within the highway corridor is in the range of 2 ft. (0.6 m) to 6 ft. (1.8 m). To enable this area to be suitable for farming, extensive drainage operations have been carried out, due to the land being equal to or even below the water level of the Holland River and Cook Bay. For additional information see Appendix C.

Keswick Marsh to Udora

Farming activity adjacent to Ravenshoe Road varies greatly. Though there are areas of high agricultural capability (Classes 1 and 2) most of the section is made up of sandy or shallow organic soils, unacceptable terrain (drumlin fields) and low lying areas of poor drainage.

Beef and dairy livestock, cash and mixed crops are produced, although on a smaller scale than in other sections of the study area.

Udora

West and south of Udora there is limited farm activity. Poorly drained sands and some steeply sloped sands present low and moderate capability areas. Organic soils and poor drainage also reduce farming potential. Class 2 capability and organic soil classifications are dominant south of Udora. Farming in this area produces dairy, hogs and poultry with minor emphasis on cash and mixed crops.

Udora to Highway 12

East of the community of Udora, the agricultural capability is predominantly Class 1 although there are a few locations of shallow organic soil deposits, indicating poorly drained valleys.

Agriculture in this area is of high quality and very productive. Farm operations include beef and dairy livestock, mixed and cash crops.

During the course of the study, farm owners were requested to complete a questionnaire indicating the usage of their lands and the routing of farm equipment between different parcels of property. A composite plan of the responses was prepared.

For additional discussion of agricultural background data see Appendix C.

3.3 TRANSPORTATION AND ENGINEERING DATA

3.3.1 Road Network

The road network is illustrated in figure 5 (page 31). Roadways in the area fall within three areas of jurisdiction:

- Provincial Highways
- Regional/County Roads
- Area Municipality Roads

The provincial highways are predominantly in a north-south direction including Highways 27, 400, 11, 48 and 12. Provincial highways with an east-west orientation include Highways 9, 88, 89 and 7. None of these highways are continuous across the study area, however, with Highways 9, 88 and 89 extending no further east than Highway 11 and with Highway 7 not extending west of Highway 12, until well south of the study area.

There are two regional jurisdictions within the study area, York and Durham.

Regional paved roads are as follows:

- York Regional Road 12 (The Queensway or Sutton Road) crosses the study area in a north-south direction.
- York Regional Road 8 (Woodbine Avenue or Don Mills Road) crosses the study area in a north-south direction.
- York Regional Road 21 runs north from the Ravenshoe Road in Udora.
- York Regional Road 32 (Ravenshoe Road) runs east from the Holland River to Highway 48.
- York Regional Road 39 (Egypt Sideroad) runs north from the Ravenshoe Road to Highway 48.
- Durham Regional Road 39 (Zephyr Road) runs south from the Ravenshoe Road.
- Durham Regional Road 1 runs south from the Ravenshoe Road to Uxbridge.
- Durham Regional Road 23 crosses the study area on the York/Durham boundary.

Regional gravel roads are as follows:

- York Regional Road 3 runs north from the Ravenshoe Road, just east of Ravenshoe.
- York Regional Road 81 runs north from the Ravenshoe Road, just west of Udora.
- York Regional Road 32 (Ravenshoe Road) runs east from Highway 48 to Udora.

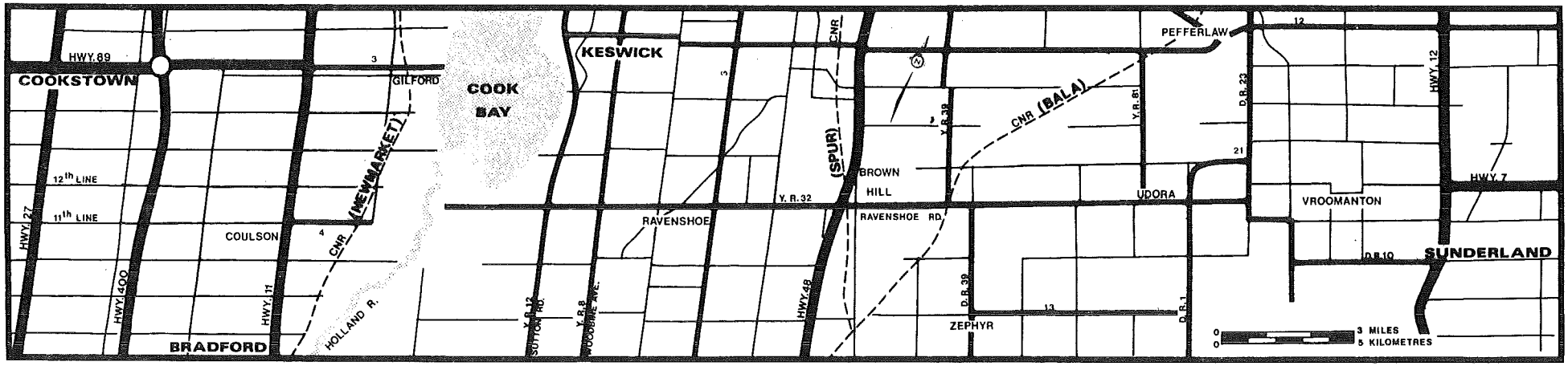
There are two county roads within the study area:

- Simcoe County Road 3 (paved) runs east from Highway 11 to Gilford on the West Gwillimbury/ Innisfil town line.
- Simcoe County Road 4 (gravel) runs east from Highway 11 to the 20th Sideroad on the 11th Line of West Gwillimbury.

All other roadways within the study area fall under the jurisdiction of the respective area municipalities. These roadways are mostly gravel and provide a local access function.

The existing road network provides a good north-south service, but does not provide continuous service in an east-west direction.

Proposed improvements to the existing roadway network include a new continuous east-west highway (the subject of this report) and a new north-south highway known as Highway 404. The location of proposed Highway 404 has not yet been determined, but for the purpose of traffic analysis, as documented in Chapter 3.3.2 Traffic (page 32), it has been assumed that the proposed highway would cross the Ravenshoe Road at a point east of York Regional Road 8 (Woodbine Avenue) and west of Highway 48.



ROAD NETWORK

FIGURE 5

PROVINCIAL HIGHWAY
REGIONAL / COUNTY
LOCAL

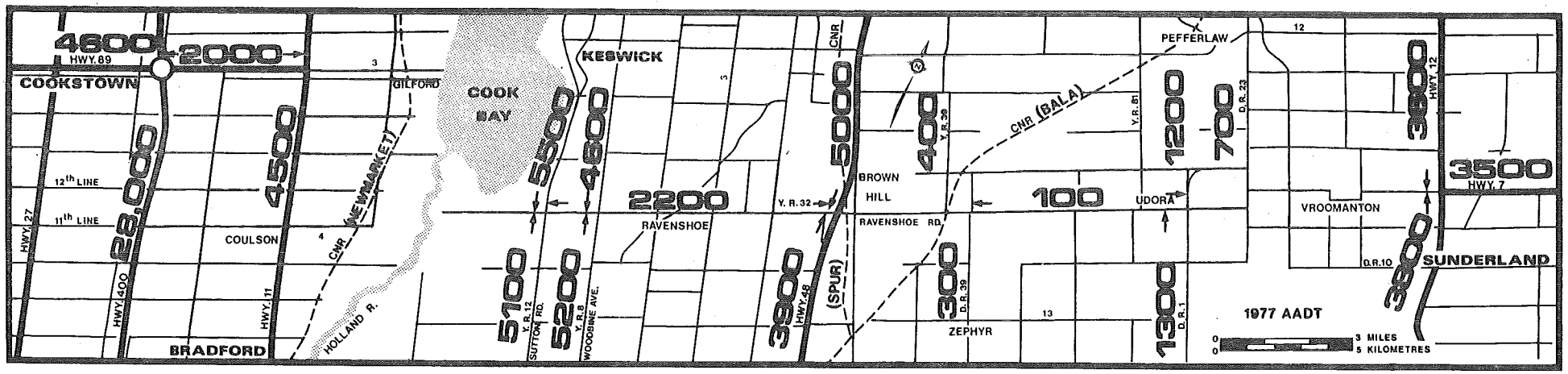
3.3.2 Traffic

Figure 6 (page 32) illustrates the existing traffic volumes on roadways within the study area. These figures are Annual Average Daily Traffic volumes commonly designated as A.A.D.T. and represent the average, twenty-four hour, two way traffic for the period January 1st to December 31st. More specific volumes, including intersection turning volumes, are available within the Ministry of Transportation and Communications.

The existing traffic figures indicate major north-south moves and minor east-west moves, reflecting the lack of roadway continuity in this direction.

Assignments to the proposed Highway 89 Extension are illustrated in figure 7 (page 33). These assignments reflect anticipated 1990 traffic volumes and, as with the existing traffic figures, are given as Annual Average Daily Traffic volumes (A.A.D.T.).

Two sets of traffic assignments are shown on figure 7. These figures relate to two different assumptions as to the terminal of Highway 404. The figures not in brackets assume that Highway 404 will end, either temporarily or permanently, at the proposed Highway 89 Extension and the figures in brackets assume that Highway 404 is constructed north of proposed Highway 89.



EXISTING TRAFFIC

FIGURE 6

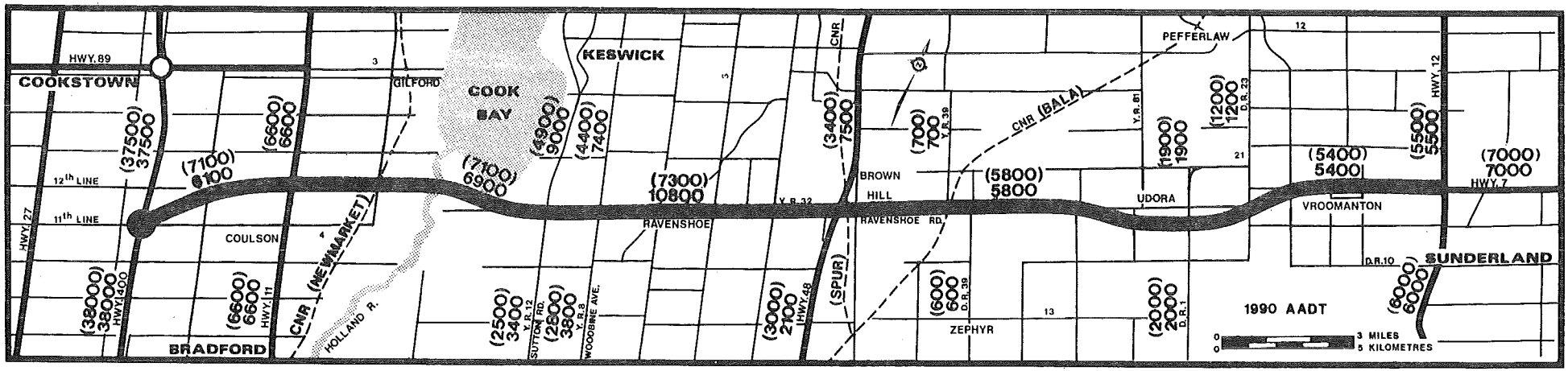
No specific location has been determined for the intersection of proposed Highways 89 and 404 but the traffic assignments shown in figure 7 indicate that the proposed Highway 89 Extension would handle volumes of 6,900 (7,100) between Highway 11 and proposed Highway 404 and volumes of 10,800 (7,300) between proposed Highway 404 and Highway 48.

The future traffic assignments are comprised of a number of basic traffic movements which in turn are generated by a combination of local, regional and provincial traffic demands. The basic movements assigned to the proposed highway, are depicted in figure 8 (page 34) and are as follows:

- Traffic between the west side of Lake Simcoe including existing Highway 89, and either the east side of the Lake or the Lindsay/Peterborough area. This traffic will benefit by a reduction of 11 miles (18 km) in travel distance.

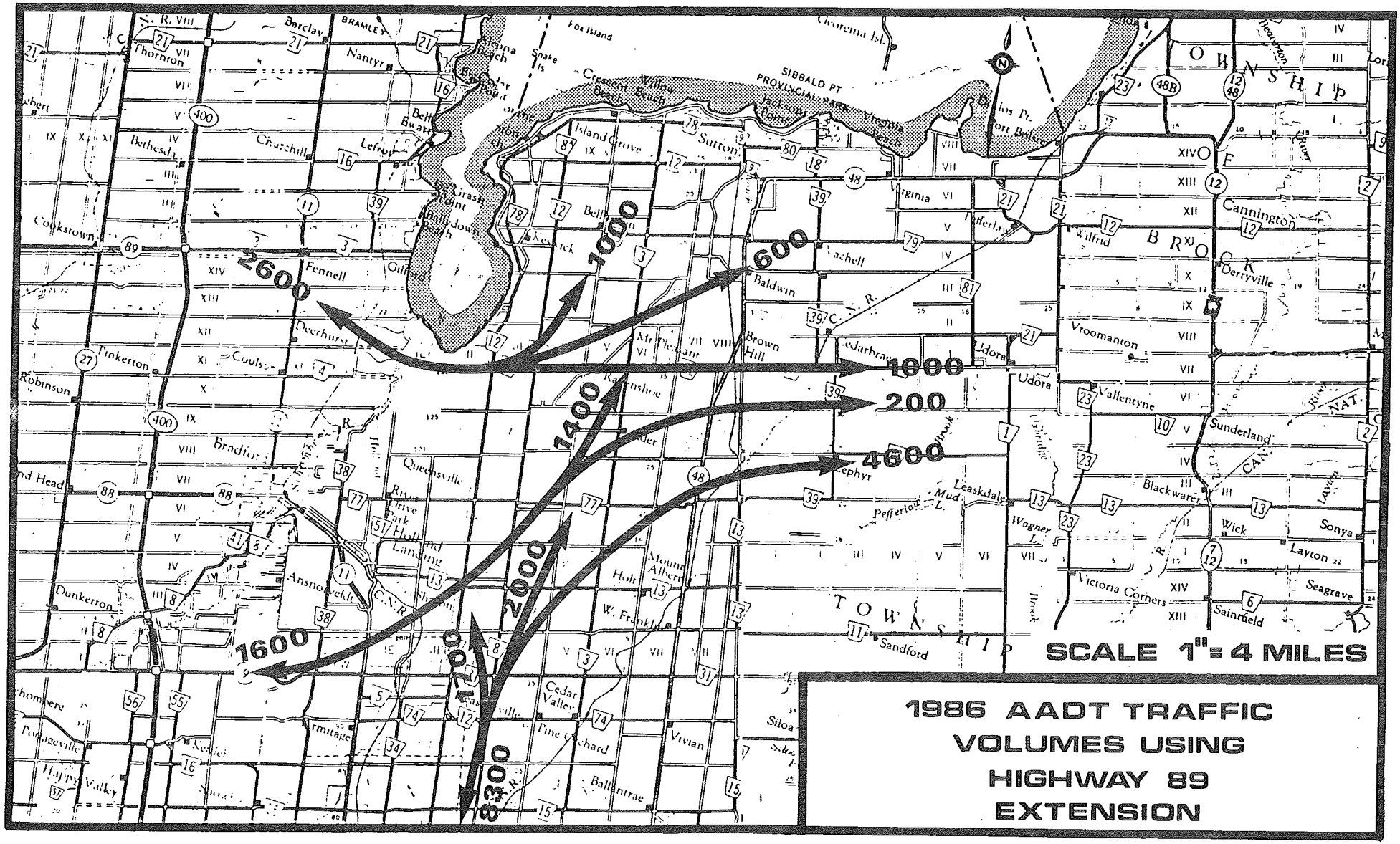
- Traffic between Highway 9, west of Highway 400, and either the east side of Lake Simcoe or the Lindsay/Peterborough area. This traffic will benefit by being able to avoid the congested section of Highway 9 through Newmarket.

- Traffic between the Toronto area and either the east or west side of Lake Simcoe and the Lindsay/Peterborough area. This traffic will be diverted from north-south roadways such as Highway 12.



FUTURE TRAFFIC ASSIGNMENTS

FIGURE 7



TRAFFIC ORIGINS & DESTINATIONS

FIGURE 8

3.3.3 Railways

Three railway lines cross the study corridor. These three lines, which are indicated in figure 5 (page 31), are as follows:

- CNR Newmarket subdivision
- CNR Spur track
- CNR Bala subdivision

CNR Newmarket Subdivision

This single track line is located to the west of the Holland River and crosses the 10th, 11th and 12th Lines of West Gwillimbury in the vicinity of 20th Sideroad. These existing crossings are indicated by signs only.

The 1977 volume of rail traffic was 14 trains per day at speeds up to 75 m.p.h. (120 km/h).

A grade separation will be required at the crossing of the proposed Highway 89 Extension and the CNR Newmarket subdivision.

CNR Spur Track

A single track spur line crosses the Ravenshoe Road at Brown Hill. This crossing is indicated by signs only.

There are no scheduled train movements on the spur track and no grade separation will be required at the crossing of this track and the proposed Highway 89 Extension.

CNR Bala Subdivision

This single track line crosses the Ravenshoe Road just west of York Regional Road 39. The crossing is protected by signs, lights and bells.

The 1977 volume of rail traffic was 24 trains per day, at speeds up to 70 m.p.h. (110 km/h).

A grade separation will be required at the crossing of the proposed Highway 89 Extension and the CNR Bala subdivision.

The grade separations at the Newmarket and Bala subdivisions are identified as being required due to the anticipated high "exposure index".

The exposure index is defined as the number of trains per day multiplied by the number of roadway vehicles per day. This index provides an indication of the potential for conflict between a train and a roadway vehicle. Grade separations are normally considered to be warranted when the exposure index, in a rural setting, is greater than 75,000. Projections are not available for the volume of rail traffic, but the use of the 1977 rail volumes and the projected 1990 roadway volumes (see figure 7, page 33) indicates the following exposure indices:

- CNR Newmarket - 100,000±
- CNR Bala - 140,000±

The topography at both railway crossings, will dictate an overhead type of structure (road over rail).

3.3.4 Foundation Conditions

Foundation data within the corridor was obtained from a number of sources. Specific foundation investigations included the following:

- bore hole investigations at Holland River William Trow Associates Limited - 1968
- auger hole investigations within the Keswick Marsh, Soil Mechanics Section of the Ministry of Transportation and Communications - 1978
- assessment of entire corridor, Materials and Testing Office of the Ministry of Transportation and Communications - 1976

The only area where unusual foundation conditions were identified was in the Keswick Marsh.

Within the area of the Keswick Marsh and the mouth of the Holland River, the underlying bedrock is thought to be from 200 ft. (60 m) to 350 ft. (105 m) below the present water level of Lake Simcoe. The bedrock is overlaid by glacio-lacustrine sediments of stratified sand, silt and clay deposited by glacial Lake Algonquin. The organic peat composition which covers the major portion of the present flat valley floor was created by the encroachment of decaying vegetation on the previous shoreline of Lake Simcoe.

Within the Marsh, the organic soil depths vary significantly with depths generally being greater to the west of the Holland River. These greater depths are attributed to the river following a more westerly course in the past and its eroded valley becoming subsequently filled with organic soil deposits.

Investigations carried out by the Ministry of Transportation and Communications' Soil Mechanics Section indicate that the predominant surficial deposit is a stratum of soft peat generally extending to a depth of 10 ft. (3 m) to 15 ft. (5 m) below the ground surface, but extending to a depth of over 40 ft. (13 m) west of and adjacent to the Holland River. Underlying this organic deposit, is a firm layer of silty clay which extends to a thickness of up to 25 ft. (8 m).

The groundwater level in the area is equal to or slightly below the existing ground level.

4. ALTERNATIVES AND EVALUATION

4. ALTERNATIVES AND EVALUATION

4.1 PLANNING ALTERNATIVES

Alternative planning concepts were reviewed at three levels. These related to the consideration of the following:

- alternatives other than the construction of a new highway
- the development of a highway in other than the Highway 89 Corridor
- the development of alternative highway routes within the Highway 89 Corridor

4.1.1 Alternatives to a New Highway

A number of basic alternatives to the construction of a new highway were reviewed. These alternatives included: doing nothing, providing transit, and improving existing roadways.

The 'do nothing' alternative was not pursued because it would not resolve the problem identified in Chapter 1.5, Rationale for the Undertaking, (page 2).

The provision of transit was also not pursued because the origins and destinations of the trips that are predicted to use the proposed highway, are so diverse. See Chapter 3.3.2, Traffic, (page 32).

The possibility of improving the existing roadways without providing any new links was reviewed. This alternative would provide some limited improvement in local service, but the desired, continuous, east-west service could not be provided without a continuous highway alignment including a new Holland River crossing.

It was concluded that the existing problem could only be resolved by the development of a continuous east-west highway. It was considered, however, that this highway should make as much use of existing roadways as was feasible.

4.1.2 Alternative Highway Corridors

During the latter part of 1976 the Ministry of Transportation and Communications assessed the possibility of developing a new highway within one of two basic corridors approximately 14 miles (22 km) apart. These corridors were identified as the Highway 89 Corridor and the Highway 9 Corridor.

The Highway 89 Corridor provided for continuity from Highway 89 at Highway 11 in the west to Highway 7 at Highway 12 in the east.

The Highway 9 Corridor provided for continuity from Highway 9 at Highway 11 in the west to Highway 7/12 at Highway 47 in the east.

The two alternative corridors are illustrated in figure 9 (page 38).

An assessment of these two corridors was carried out by the Ministry of Transportation and Communications in discussion with the County of Simcoe and the Regions of York and Durham. This assessment indicated that although both corridors would provide a continuous east-west highway, the Highway 89 Corridor had two major benefits in comparison to the Highway 9 Corridor. These were as follows:

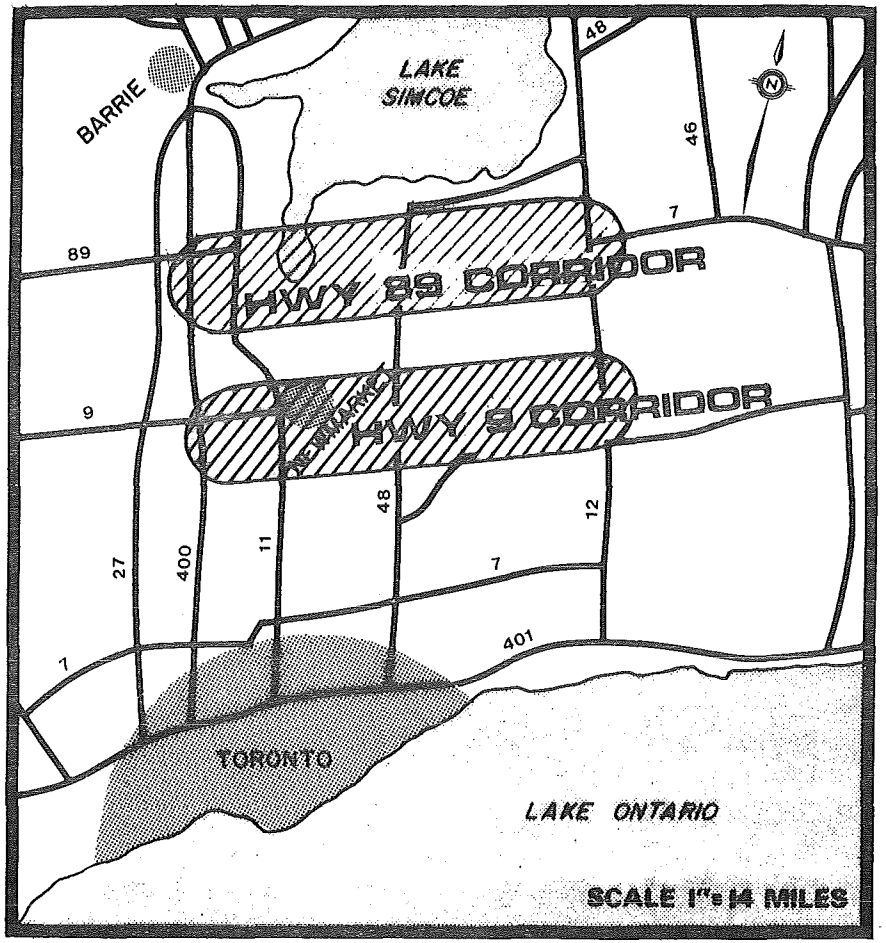
- The Highway 89 Corridor would offer improved local service by reducing the out of way travel presently associated with a roadway trip from one side of Cook Bay to the other. In this regard the Highway 89 Corridor would provide the local benefits that would have been associated with the Holland River crossing that was proposed by the Counties of Simcoe and York in 1968.

  The Highway 9 Corridor would not offer this improvement in local traffic service.

- The Highway 89 Corridor could be developed using roadways that have a significant residual capacity to handle additional traffic.

  The Highway 9 Corridor, by comparison, would compound the existing capacity restrictions in the Newmarket area.

Because of the ability of the Highway 89 Corridor to handle significantly more additional traffic than the Highway 9 Corridor and also because of the difference in providing improved local service, the Highway 9 Corridor was abandoned at the conceptual stage.



ALTERNATIVE HIGHWAY CORRIDORS

FIGURE 9

The possibility of considering alternatives located between the Highway 89 Corridor and the Highway 9 Corridor was briefly reviewed as part of the assessment carried out by the Ministry of Transportation and Communications. This possibility was not pursued, however, as no route could offer either the improved local service or the desired highway continuity, nor could any route make use of the existing roadways to the same extent as the Highway 89 Corridor.

The study that is documented in this report was therefore initiated, in spring 1977, on the basis of determining the best route for a new east-west highway from Highway 400 in the west to Highway 12 in the east. The proposed highway was defined as being required to:

(i) provide continuity from Highway 89 in the west to Highway 7 in the east,

(ii) make maximum use of existing roadways wherever feasible.

4.1.3 Alternative Highway 89 Routes

A number of alternative routes were identified for the proposed Highway 89 Extension. These are shown in figure 10 (page 40).

These routes were all developed on the basis of a two lane rural highway with an anticipated posted speed limit of 50 m.p.h. (80 km/h) and a basic right-of-way of 120 feet (36.5 m).

For ease in defining the specific routes the project was split into three sections, Western, Central and Eastern. The Western section extended from Highway 400 to Highway 11, the Central section from Highway 11 to Highway 48 and the Eastern section from Highway 48 to Highway 12.

In the Western section of the project, the alternatives were further split on the basis of whether they were to be connected to a new interchange with Highway 400 or the existing interchange at Highway 89 and Highway 400.

All of the alternatives that would provide for a new interchange were developed from three basic concepts within the Township of West Gwillimbury. These three concepts were as follows:

- Use of 12th Line.
- New roadway in the middle of the 11th Concession.
- Use of 11th Line.

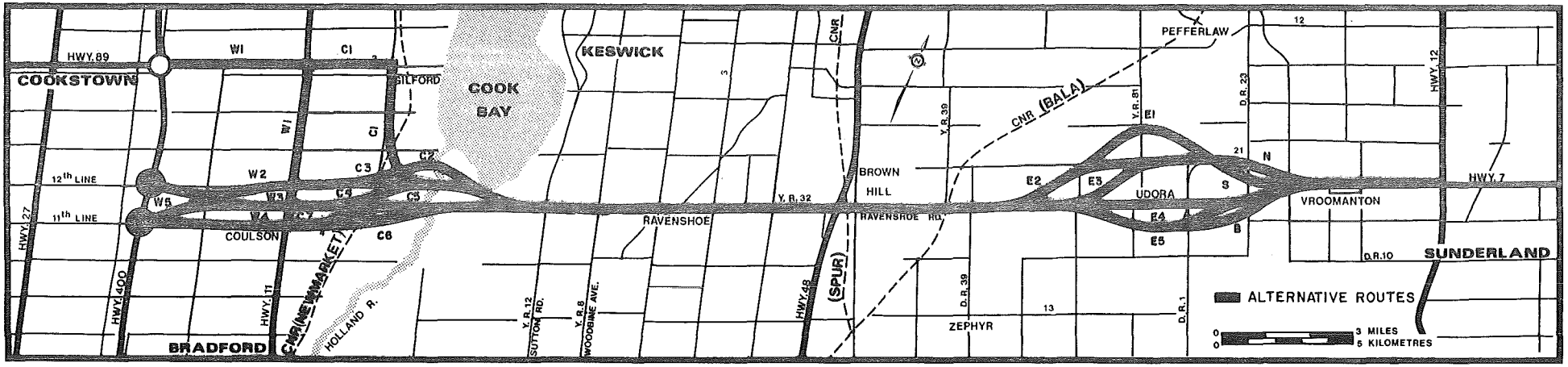
In the Central section of the project, all routes would make use of York Regional Road 32 (Ravenshoe Road) between York Regional Road 12 (Sutton Road) and Highway 48. The alternatives developed for the section from Highway 11 to York Regional Road 12 (Sutton Road) are extensions of the alternatives developed for the Western section of the project.

In the Eastern section of the project all of the alternatives in the vicinity of Udora, were developed from three basic concepts as follows:

- Bypass Udora to the north.
- Use of York Regional Road 32 through Udora.
- Bypass Udora to the south.

For the purpose of route description and subsequent analysis and evaluation, the many routes that were identified were grouped as follows:

- Western and Central sections that would use the existing Highway 89 interchange with Highway 400. The limits of this section were Highway 400 in the west and Highway 48 in the east.
- Western and Central sections that would provide a new interchange with Highway 400. The limits of this section were Highway 400 in the west and Highway 48 in the east.
- Eastern section. The limits of this section were Highway 48 in the west and Highway 12 in the east.



ALTERNATIVE HIGHWAY 89 ROUTES

FIGURE 10

Western and Central Section, Existing Interchange

Seven specific routes were identified within this section:

- W1-C1 would make use of existing Highway 89 from Highway 400 easterly to Highway 11 and Simcoe County Road 3 from Highway 11 to 20th Sideroad. The route would then follow 20th Sideroad south to 12th Line. At this point it would swing east to cross the Holland River on an easterly extension of 12th Line and then tie into the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W1-C2 would make use of existing Highway 89 from Highway 400 easterly to Highway 11. The route would then follow Highway 11 south to 12th Line, at which point it would follow 12th Line easterly to 20th Sideroad and would then swing north of the Holland Marsh Wildlife Management Area before connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W1-C3 would be similar to W1-C2 except in the vicinity of the Holland Marsh Wildlife Management Area, where W1-C3 would follow an easterly extension of the 12th Line rather than swinging to the north of the Wildlife Management Area.

- W1-C4 would be similar to W1-C3 except in the section between Highway 11 and 20th Sideroad where W1-C4 would be located in the middle of the 11th Concession rather than on 12th Line.

- W1-C5 would make use of existing Highway 89 from Highway 400 easterly to Highway 11 and Highway 11 south to the middle of the 11th Concession. At this point the route would continue easterly on a new alignment in the middle of the 11th Concession to the existing Ravenshoe Road at the Holland River.

- W1-C6 would make use of existing Highway 89 from Highway 400 to Highway 11 and Highway 11 south to 11th Line. At this point the route would continue easterly on 11th Line to 20th Sideroad and would then swing north to connect to the existing Ravenshoe Road at the Holland River.

- W1-C7 would be similar to W1-C6 between Highway 400 and 20th Sideroad and would then swing north to cross the Holland River on an easterly extension of the 12th Line prior to connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

Western and Central Section, New Interchange

Eight specific routes were identified within this section:

- W2-C2 would provide a new interchange at 12th Line and Highway 400 and then make use of 12th Line easterly to 20th Sideroad. A shift from the 12th Line would be required in the vicinity of the 10th Sideroad because of the severe topography. East of 20th Sideroad, the route would swing north of the Holland Marsh Wildlife Management Area before connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W2-C3 would be similar to W2-C2 except in the vicinity of the Holland Marsh Wildlife Management Area, where W2-C3 would follow an easterly extension of the 12th Line rather than swinging to the north of the Wildlife Management Area.

- W3-C4 would provide a new interchange at 11th Line and Highway 400 and a new roadway swinging to the middle of Concession 11 and proceeding easterly to 20th Sideroad on the mid concession line. East of 20th Sideroad the route would swing north to cross the Holland River on an easterly extension of the 12th Line, prior to connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W3-C5 would be similar to W3-C4 between Highway 400 and 20th Sideroad. East of 20th Sideroad the route would continue in the mid concession location, to the existing Ravenshoe Road at the Holland River.

- W4-C6 would provide a new interchange at 11th Line and Highway 400 and would than make use of 11th Line easterly to 20th Sideroad. East of 20th Sideroad the route would swing north to connect to the existing Ravenshoe Road at the Holland River.

- W4-C7 would be similar to W4-C6 between Highway 400 and 20th Sideroad and would then swing north to cross the Holland River on an easterly extension of the 12th Line prior to connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W5-C2 would provide a new interchange at 11th Line and Highway 400 and a new roadway swinging to the north to connect to 12th Line at a point east of 10th Sideroad. From this point it would make use of 12th Line easterly to 20th Sideroad. East of 20th Sideroad, the route would swing north of the Holland Marsh Wildlife Management Area before connecting to the Ravenshoe Road at the eastern limit of the Keswick Marsh.

- W5-C3 would be similar to W5-C2 between Highway 400 and 20th Sideroad. East of 20th Sideroad the route would follow an easterly extension of the 12th Line rather than swinging to the north of the Wildlife Management Area.

Eastern Section

Five specific routes were identified within this section of the project, i.e. in the vicinity of Udora. In addition, some of the five routes included localized variations:

- E1 would bypass Udora, two concessions to the north.

- E2 would bypass Udora, one concession to the north.

  The west end of the bypass route would cut across the 1st Concession approximately 3 miles west of Udora.

At the eastern end of the bypass two options were identified. Alternative N would stay on the concession road as far east as Durham Regional Road 23 and then swing south to the 8th Line in Brock Township, whereas alternative S would swing south from the concession road to meet the 8th Line at Durham Regional Road 23.

- E3 would be identical to E2 with the exception that the west end of the bypass would cut across the 1st Concession approximately 2 miles west of Udora.

- E4 would make use of the existing Ravenshoe Road through Udora swinging north at Durham Regional Road 23 to connect to the 8th Line in Brock Township.

- E5 would bypass Udora to the south following the lot line between lots 33 & 34. At the eastern end of the bypass, two variations were identified. One variation would provide a right angle crossing of Durham Regional Road 23 (alternative A) and the other would provide a skew crossing (alternative B).

4.2 ANALYSIS AND EVALUATION PROCEDURE

4.2.1 Analysis

The analysis of the alternative routes was carried out for eight different factors. These factors were determined during the course of the study and reflected those aspects of the alternative routes where differences were discernible within the accuracy of the data that was gathered. Where there were no discernible differences amongst the alternatives, for example in the area of archaeological impacts, no factor was identified for analysis. The eight factors were:

Traffic	Property
Agriculture	Environment
Noise	Staging
Cost	Aesthetics

Within each of these factors, a number of specific areas of potential interest were identified and where possible quantified. In certain cases it was necessary to make a qualitative assessment.

A summary of the analysis of all routes was documented in a booklet "Analysis of Alternatives" which is included in Appendix D.

This summary of the analysis was structured to allow for its use in the evaluation of the alternatives.

The following analysis was carried out for all of the evaluated routes:

TRAFFIC

Specific traffic assignments were discussed in section 3.3.2. The analysis of the alternatives was carried out on the basis of assessing the differences in service that would be provided by the alternative routes.

- LENGTH - The length of each route was measured in miles. The shorter routes would be preferred in this regard because they would provide the most direct routing.

- LOCAL SERVICE - A subjective assessment of the desirability of each route, from the viewpoint of local traffic, was made and each route was rated good, fair or poor.

  This indicator reflected improved access for local traffic, roadway network continuity and the interruption to existing local traffic patterns.

- REGIONAL SERVICE - A subjective assessment was made of the desirability of each route from the viewpoint of regional or long distance traffic and each route was rated good, fair or poor.

- OUT OF WAY TRAVEL - This indicator provided a subjective assessment of the total additional travel for local, regional and provincial traffic that would be associated with a particular route in relationship to all the other routes.

- NO. OF ACCESSES - In order to minimize the disruption to traffic on the highway, it is desirable to have as few access points as possible. In this regard a count was made of the number of existing access points that would be retained on each of the routes.

  Some access points would be used less frequently than others and as such would not be as significant in terms of impeding traffic flows. Access points were therefore identified as being used on a frequent basis (i.e. daily), or less frequent basis.

- SAFETY - All routes would be developed to provide standards at or above those considered as minimum criteria for this type of highway, consequently, none of the routes could be considered as not being safe. Some routes would require the construction of curves to effect changes in the direction of the highway. The probability of an accident occuring on a curve is greater than on a straight section and consequently the number of curves on each route, was taken as an indicator of safety.

AGRICULTURE

Agricultural impacts were assessed for a number of indicators.

- CLEARED LANDS REQUIRED - The acreage of land that has been cleared for agricultural purposes and would be required for construction of the highway was identified. This acreage was subdivided into lands classified as either mineral or organic soils.

- LAND CAPABILITY - In addition to assessing those lands actually in agricultural production, the acreage requirements were measured independent of whether the land was in agricultural usage or not. This assessment made use of the Canada Land Inventory of Soil Capability for Agriculture and grouped both mineral and organic soils together. Classes 1 & 2 were considered as being high capability lands, Classes 3 & 4 as medium capability and Classes 5, 6 & 7 as low capability.

- DISRUPTION OF FARM OPERATIONS - This indicator was a subjective assessment based on ownership patterns and established movement patterns of farm equipment as obtained by completion of a questionnaire at the first round of public information centres.

- DRAINAGE IMPACTS - This indicator reflected the extensive drainage systems that have been developed within the Keswick Marsh. The assessment of the comparative impacts on these systems was made subjectively, following discussions with the farmers in the Marsh.

- SEVERANCES - A number of routes passes diagonally across existing farm properties. In these cases, the acreage of land that would be severed from the main farm property was measured in acres.

NOISE

Existing noise levels were not established within the corridor, but calculations were carried out to determine the anticipated noise levels resulting from vehicles on the alternative routes.

- NOISE LEVELS - Two figures were considered significant in this regard. The number of houses with an outdoor daytime L_{eq} of more than 65 dBA was calculated and also the number of houses with an outdoor daytime L_{eq} between 55 dBA and 65 dBA.

COST

Two aspects of cost were identified and calculated:

- CONSTRUCTION - These costs included all materials and labour and allowed for contingencies and design costs. The figures reflect 1978 prices.

- PROPERTY - These costs reflect "windshield" appraisals of the affected properties, i.e. they are not detailed appraisals but rather an estimate based on what can be seen of the property, from the road. These appraisals were carried out by the Ministry of Transportation and Communications' Property Office during 1978

PROPERTY

This factor quantified some of the physical property requirements. It did not include the cost of acquisition of property.

- TOTAL ACREAGE REQUIRED - This indicator identified the total acreage of land that it would be necessary to acquire to construct the highway. In addition a bracketed figure identified the additional land that would have to be acquired if it were necessary to acquire those lands severed from main farm parcels.

- HOUSES REQUIRED - This indicator identified the number of houses that would be required for each alternative route. This figure could be modified downwards, during the next, more detailed planning stage of the study, as consideration is given to refinements in the selected route.

- PROPERTIES AFFECTED - This indicator identifies the number of individual parcels of property that would be physically affected by the alternative routes. Properties were counted if it would be necessary to acquire any property from an individual parcel.

ENVIRONMENT

An environmental inventory was carried out for the study and a report documenting this inventory is included in Appendix C.

The analysis of the alternatives was summarized for five separate indicators.

- HIGH QUALITY VEGETATION UNITS - Vegetation units within the corridor were rated as being high, medium or low quality based on a number of considerations. This indicator provided a count of the number of high quality woodlots that would be affected either in part or in whole, by the alternative routes.

- ACREAGE OF VEGETATION - This indicator included all wooded areas independent of quality.

- CREEK CROSSINGS - This indicator identified the number of rivers or creeks that would be crossed by each route. Small stream crossings were not included in this indicator.

- SEVERITY OF CROSSINGS - This indicator provided a subjective assessment of potential severity of the crossings in terms of the impact on the water course. This indicator reflected such items as the skew of the crossing and the potential erodability of the banks during construction.

- WILDLIFE - No major concentrations of wildlife or unusual species of wildlife were identified in the corridor. The main wildlife impact was anticipated to be in the vicinity of the Holland Marsh Wildlife Management Area. In this location it was assessed that the greater the severance of the Wildlife Management Area, the greater would be the impact because of any limitations that could occur to the development of the area.

STAGING

Under this factor, an assessment was made of the ability to stage construction of the highway. In this regard the routes that would most readily lend themselves to stage construction would be the preferred routes.

AESTHETICS

Three aspects of this factor were identified:

- USER - This indicator provided for a qualitative assessment of the view from the road by the driver.

- OBSERVER - This indicator provided for a qualitative assessment of the view of the road by people living in the community.

- RECREATIONAL IMPACT - This indicator provided for an assessment of the impact of the proposed highway, on the recreational facilities of the Holland Marsh Wildlife Management Area and the Estonian & Finnish Camps in Udora.

The summary of the analysis of each of the alternative routes is documented in Appendix D.

4.2.2 Evaluation

The evaluation process permitted the participation of all interested parties at one of two levels of involvement.

The more extensive involvement required a review of the complete analysis of the alternatives. Following this review, the participants carried out a detailed numerical evaluation and were also requested to state their preference for a particular route, independent of the results of the numerical evaluation.

A less extensive involvement provided for interested parties to review the analysis and the results of the detailed evaluation prior to stating a preference for a particular route.

A detailed evaluation was carried out by the Project Team and the External Team. The results of these evaluations were reviewed with the Internal Team, Municipal Councils and the public. Stated preferences and comments were received at this stage.

The numerical evaluation had three basic steps:

- Factor weighting

- Unweighted route comparison

- Weighted route comparison

The factor weighting provided for the distribution of 100 points amongst the eight factors that were identified in section 4.2.1, Analysis, (page 43). The distribution was carried out by assigning more points to the factors considered to be of greater importance and fewer points to those of lesser importance. (See Appendix E for example evaluation.)

The unweighted route comparison provided for the assignment of points to a particular route for a specific factor. The best route with regard to a particular factor would receive 10 points and all other routes would receive points from 0 to 10 depending on the individual's assessment of how much worse the other schemes were in comparison to the best one.

The weighted route comparison was obtained by multiplying the factor weighting by the unweighted route comparison and by adding the resulting weighted route comparisons for all factors. The route with the highest number (potential maximum of 1,000) would be the best route as determined by the numerical evaluation.

The purpose of the detailed numerical evaluation was primarily intended to provide for an orderly and systematic review of the analysis rather than as a means of making a final decision. Consequently, every person carrying out the detailed evaluation, was requested to state a preference for a particular route before completing the weighted route comparison step of the numerical evaluation.

The results of the individual team members evaluations were summarized to obtain an overall team preference.

4.3 EVALUATION OF ROUTE ALTERNATIVES

Before the detailed evaluation was carried out a coarse screening of the alternatives was made to determine whether it was necessary to evaluate every single alternative in detail.

The Project Team identified a number of alternatives that it considered need not be included in the detailed evaluation.

Western and Central Section - Preliminary Screening

The primary purpose of the proposed highway is to provide for east-west traffic movement, consequently it was determined that only those routes that provided east-west continuity to Highway 400, without the use of a north-south roadway, should be considered. It was recognized that it could be possible to consider Highway 11 as the western limit of the project on a temporary basis, but that the option to extend the roadway to Highway 400 should not be precluded. On this basis it was determined that only those routes that would provide a new interchange with Highway 400 should be evaluated in detail. It was also determined that the question of construction between Highway 400 and Highway 11 should be addressed as part of the staging of the highway.

This assessment precluded the need to evaluate any of the W1 routes.

As a result, the routes that were evaluated in detail, at the west end of the project, were:

W2 - C2	W4 - C6
W2 - C3	W4 - C7
W3 - C4	W5 - C2
W3 - C5	W5 - C3

These routes were evaluated in terms of all of the factors described in Chapter 4.2.1, Analysis, (page 43) Western and Central Sections Summary of Evaluations. For the purpose of summarizing this evaluation three particular aspects of the routes were reviewed. Specifically the location of the new interchange, the route between the interchange and the Holland River and the crossing of the Holland River/Keswick Marsh were reviewed and summarized.

Two locations were identified for a possible new interchange at Highway 400, these were 11th Line and 12th Line.

Routes W2-C2 and W2-C3 would have an interchange at 12th Line and routes W3-C4, W3-C5, W4-C6, W4-C7, W5-C2 and W5-C3 would have an interchange at 11th Line.

- The 11th Line location would provide continuity with a major township road to the west. There would be no continuity with an interchange at 12th Line.
- Because of the topography, the 12th Line interchange would require limiting grades for both 12th Line and Highway 400.
- The 12th Line interchange would require the enclosure of a stream feeding the Innisfil Creek.
- The severe topography at the 12th Line would result in the cost of an interchange in this location, being in the order of $1 million more to construct than one at 11th Line.

Three alternative routes were considered between Highway 400 and 20th Sideroad. Routes W2-C2, W2-C3, W5-C2 and W5-C3 would use the existing 12th Line, route W3-C4 and C3-C5 would follow a mid concession location and routes W4-C6 and W4-C7 would use the existing 11th Line.

- The use of the mid concession location would have a greater agricultural impact, but less of an impact on properties abutting existing township roadways, than the use of 11th or 12th Line.
- The use of 12th Line would affect less abutting property owners than the use of 11th Line, although there is a public school located on 12th Line.
- The use of 12th Line would result in a slightly preferable intersection with Highway 11 than with the use of the mid concession route and a significantly preferable intersection than with the use of 11th Line.

Three alternative crossings of the Holland River and the Keswick Marsh were reviewed. Routes W2-C2 and W5-C2 would cross the Holland River north of the Holland Marsh Wildlife Management Area. Routes W2-C3, W3-C4, W4-C7 and W5-C3 would cross the Holland River on an easterly extension of the 12th Line and routes W3-C5 and W4-C6 would cross the Holland River on a westerly extension of the Ravenshoe Road.

- The most northerly route, (i. e. north of the Holland Marsh Wildlife Management Area) would have the least impact on the Wildlife Management Area but would have severe impacts on agricultural and natural environmental features and would cost approximately $0. 25 million more to construct than the other crossings.

- The middle route (i. e. the easterly extension of 12th Line) would separate approximately 165 acres (67 ha) of the Holland Marsh Wildlife Management Area to the north from the remaining 1, 100 acres (445 ha) to the south. The middle route would, however, have significantly less agricultural impact than routes to the north or south.

- The southern route (i. e. the westerly extension of the Ravenshoe Road) would separate the Holland Marsh Wildlife Management Area into two approximately equal parcels. In addition, this route was considered to have the most significant impact on the agricultural operations in the Keswick Marsh.

From the east limit of the Keswick Marsh to west of Udora, the only route considered was the use of the existing roadway.

Eastern Section - Preliminary Screening

At the east end of the project (i. e. in the vicinity of Udora) the Project Team considered that route E1 would result in such a significant out of way movement that it could not be considered as a candidate scheme for a highway that was primarily required to provide a good east-west continuity of service. On this basis route E1 was not evaluated in detail.

As a result, the routes that were evaluated in detail, at the east end of the project , were:

E2N
E2S
E3N
E3S
E4
E5A
E5B

Eastern Section - Summary of Evaluations

Routes E2N, E2S, E3N and E3S would bypass Udora to the north. The main features of these northerly routes were:

- Major impacts on recreational community.

- Major impacts on residential properties.

- Significant impacts on agricultural operations both west and east of Udora.

Route E4 would follow the existing Ravenshoe Road through Udora. The main features of this route were:

- Unacceptable impact on community of Udora (six homes removed).
- High construction costs to limit property acquisition to six homes.
- Major impacts on recreational communities.

Routes E5A and E5B would bypass Udora to the south. The main features of these southerly routes were:

- No impact on recreational communities.
- Limited impact on residential properties.
- Significant impact on agricultural operations east of Udora.

4.4 REVIEW OF IDENTIFIED CONCERNS

4.4.1 Internal

The Ministry of Transportation and Communications' internal review of the evaluation reflected the fact that it was not possible to avoid all undesirable impacts associated with the proposed highway construction. A number of concerns that were expressed within the Ministry, are as follows:

- Operational aspects of the Highway 400 interchange, should play a major role in the selection.
- Any cross country routes should be developed with consideration of how to minimize agricultural severances.
- The use of existing roadways would not allow for the same degree of access control as the development of a new route.
- Severance of the Holland Marsh Wildlife Management Area should be kept to the minimum compatible with the consideration of other factors.
- Construction within the Keswick Marsh will result in loss of agricultural land and will require careful consideration of the impact on existing drainage patterns.
- Routes within the Udora area should reflect the best possible trade off of impacts on the village community, the agricultural community and the recreational community.

4.4.2 External

External Team comments on the evaluation, largely reflected the specific area of interest of the Ministry or agency represented. The two main areas of concern were expressed by the representatives of the Ministry of Agriculture and Food and by the Ministry of Natural Resources.

The Ministry of Agriculture and Food representatives stressed the need to minimize the impact on the agricultural activities within the study area.

The Ministry of Natural Resources representatives indicated that from the viewpoint of that Ministry, the road should either circumvent the Wildlife Management Area or the Ministry of Transportation and Communications should provide replacement lands elsewhere.

Municipal Council presentations were made to representatives of County, Region and Township Councils. All Councils indicated their endorsement of the project. Specific comments were as follows:

County of Simcoe

The results of the evaluation were not presented to the County Council as the Ministry was advised that the identification of a preferred route would be more appropriately addressed by the affected Townships.

Township of West Gwillimbury

A summary of the evaluation was presented to the West Gwillimbury Council on April 4, 1978. The Council indicated:

- Strong opposition to the construction of a mid concession route.
- That with the exception of the development of a mid concession route, it concurred with the results of the evaluations that were carried out.
- A desire to see the section of roadway between Highway 400 and Highway 11 constructed as soon after the Holland River crossing as possible.
- Possible reservations as to the impact of the roadway on the Honourable Earl Rowe Public School located on 12th Line west of Highway 11. These reservations were subsequently dispelled following a meeting of representatives of the Ministry of Transportation and Communications and of the Simcoe County Board of Education. See page 53.

Township of Innisfil

A summary of the evaluation was presented to the Innisfil Planning Committee on April 6, 1978. Planning Committee indicated a desire to see the proposed roadway connect to either existing Highway 89 or Simcoe County Road 3 which form the southern boundary of the Township.

Regional Municipality of York

A summary of the evaluation was presented to York Regional Council on April 13, 1978.

At a subsequent meeting, Council adopted a staff report which indicated a preference for route W3 - C4 or route W5 - C3, with route W3 - C4 being preferred 'slightly' more than W5 - C3.

At the east end of the project, the report indicated a preference for a southern bypass of Udora, specifically route E5A.

Township of Georgina

A summary of the evaluation was presented to Georgina Council on April 10, 1978.

Council indicated no preference at the west end of the project but passed a resolution favouring a southerly bypass around Udora.

Town of East Gwillimbury

A summary of the evaluation was presented to the East Gwillimbury Council on April 3, 1978.

Council did not indicate a route preference but did express a strong desire to see construction proceed.

Regional Municipality of Durham

A summary of the evaluation was presented to the Durham Planning and Works Committees on April 11, 1978.

The Committees did not express a preference for one route versus another.

Township of Uxbridge

A summary of the evaluations was presented to the Uxbridge Council on March 30, 1978.

Council passed a resolution favouring a northerly bypass of Udora. Council also stated its desire to see the roadway constructed as soon as possible.

Township of Brock

A summary of the evaluation was presented to the Brock Council on April 3, 1978.

Council did not indicate a route preference.

4.4.3 Public

A number of groups and agencies other than Provincial Ministries and Agencies were contacted during the course of the study, these are indicated in Chapter 2.5, Public Participation, (page 14).

Meetings were held with any of the interest groups that had specific concerns that they wished to discuss. Meetings were held as follows:

Simcoe County Board of Education

A meeting was held on May 17, 1978, with the Superintendent of Plant of the Simcoe Board of Education and with the Principal of the Honourable Earl Rowe School to discuss the potential impact of the proposed highway on the Honourable Earl Rowe School. The meeting was arranged to discuss concerns of safety, access and noise as voiced by some Board members, local residents and Township Councillors.

The Board representatives requested that if a route in front of the school were selected, that the following be considered:

- Provide a security fence in front of the school.
- Lower the existing roadway grade by 3' - 4' (1 m).
- Avoid the acquisition of property from the school.

It was indicated that all of these matters appeared to be feasible and would be investigated in detail during subsequent stages of the study.

Federation of Ontario Naturalists

A meeting was held with the General Manager of the Federation of Ontario Naturalists on March 22, 1978. At that meeting a number of the Federation's concerns were discussed:

- Justification for highway
- Route selection
- Screening of highway
- Land use control

Considerable discussion took place on the justification for the highway. The discussion concluded with the Federation's representative indicating that the roadway was, in his opinion, politically motivated rather than being a major need within the overall transportation system.

In terms of route selection the Federation's representative was of the opinion that if a roadway was to be built that it should be at the Holland River crossing which had been identified as the preferred route in the evaluation carried out by both the Project Team and the External Team. (Easterly extension of 12th Line.)

It was stated that the question of screening the highway was a matter that would be addressed in detail during the preliminary design and detailed design stages of the project.

The Federation expressed concern that the highway could trigger pressures for changes in land use that could in time change the existing character of the corridor and particularly the Holland Marsh area. It was stated that land use controls fall under the jurisdiction of the local municipality and that the Province could provide no guarantees in this regard.

Estonian Summer Homes Association
Estonian Women's Society of Toronto Inc.
KIVIOJA (Estonian Association)
Cedar Club (Finnish Association)

A meeting was held on February 9, 1978, with approximately 150 representatives of three Estonian and one Finnish Community Associations.

The four Associations represented the interests of a number of property owners in the vicinity of Udora.

Concern was expressed by the Association members that any route other than a southerly bypass of Udora, would significantly change the character of their properties, citing noise, air pollution, loss of trees and safety as being the areas of prime concern.

The Associations circulated a questionnaire which requested its members to identify a preferred route. Over 200 questionnaires were completed and the response was unanimous in identifying the southerly bypass of Udora as being the preferred route.

Simcoe, York & Durham Federations of Agriculture

A joint meeting was held with the three Federations on February 20, 1978. In addition meetings were held with representatives of the individual Federations on three other occasions, specifically March 22, 1978, April 11, 1978 and May 4, 1978.

The Federation's concerns related to two specific areas.

At the west end of the project the Federation representatives stressed that the route should follow an existing road rather than be developed as a new road on a mid concession line. This concern related not only to loss of land and severance of existing operations, but also reflected the fact that a mid concession route would work against the present trend of consolidation of farms into larger units.

To the east of Udora there are a number of large intensive farming operations that would be affected by the proposed highway. The Federation's representatives initial response to the alternative routes was that they would strongly favour a northern bypass of Udora.

A detailed review of the alternatives and a discussion of the refinements that could be considered during the preliminary design phase of the study resulted in the preference for a northerly bypass being tempered. Discussions were concluded on the basis that a southerly bypass for the highway could be developed in a fashion that would not seriously affect the existing farming operations.

Ducks Unlimited

A meeting was held on March 22, 1978, with the Ontario provincial manager of Ducks Unlimited whose interest in the area is to improve the Holland Marsh area as a duck breeding habitat.

The representative of Ducks Unlimited indicated that his organization could work around any highway scheme, but that a route completely skirting the Holland Marsh Wildlife Management Area would be preferred.

Area Residents

The results of the evaluations were reviewed with the public, at a series of public information centres held in April 1978. A total of approximately 350 people attended at least one of three centres.

In addition to making verbal comments to the people staffing the information centres, 55 people completed a written comment sheet to formalize their verbal comments. These comment sheets can be examined at the Ministry of Transportation and Communications' offices.

Numerous individual comments were made to the people staffing the centres. Of these comments the vast majority were in favour of the construction of the highway as early as possible.

Following the information centres, minutes were prepared that identified the comments of either significantly affected property owners or groups of people with a common concern. The following are extractions from the prepared minutes:

- One person in attendance at the Honourable Earl Rowe School attempted to gather signatures for a petition to oppose construction of the highway. The petition was not well received by the majority of people in attendance, with only three people signing during the information centre. Subsequently the petition was not forwarded to the Ministry of Transportation and Communications.

- Several people questioned the need to construct the proposed Highway west of Highway 11. The main reasons given for this opposition were those related to lack of traffic benefit for the associated environmental impacts and construction costs. The majority of people in opposition to construction of the highway west of Highway 11 were residents of either 11th or 12th Line between Highways 400 and 11.

- Preferences with respect to a choice between the use of 11th or 12th Lines or a mid concession route were split fairly evenly.

- A number of residents were concerned that the highway would benefit non-residents of the area, more than it would the people whose properties would be physically affected.

- Mr. & Mrs. Bosomworth owners of a farm property on the north side of 11th Line, east of Highway 400, expressed concern over the change in character of the existing 11th Line from being a quiet township road to being a provincial highway. They also expressed concern over the fact that the recommended route would:

  - Result in the acquisition of property in the southeast section of their farm.

  - Result in the highway being closer to the house than the existing roadway (500 ft. (150 m) versus 600 ft. (180 m)).

- Mr. Andrews, the owner of the parcel abutting the Bosomworth property to the east, indicated that he rents his land to the farm located to the southeast. Mr. Andrews indicated that the impact on his farm property could be reduced by shifting the alignment of either W3 - C4 or W5 - C3 as far north as possible.

- Mr. Reid, the owner of a parcel of property on the south side of 11th Line east of Highway 400, indicated strong opposition to the development of a highway in front of his property.

- Mr. Wright, the owner of a parcel of property on the south side of 12th Line east of Highway 11 indicated his strong opposition to construction of the highway in front of his property and the Honourable Earl Rowe School.

- Mr. & Mrs. Trotter, the owners of property on the Innisfil/West Gwillimbury Townline, indicated that they would like to see a causeway/skyway across Cook Bay from Gilford to Keswick.

- Mr. Hines, the owner of a farm property south of 12th Line and west of Highway 11, indicated his opposition to the proposed highway.

- Mrs. Moule, the owner of a parcel of property on the south side of 12th Line, east of 10th Sideroad, expressed concern over the construction of a highway in the vicinity of her property, citing the vegetation and wildlife in the area of her property as being irreplaceable.

- The Keswick Marsh farmers were generally in favour of the 12th Line crossing of the Holland River, particularly if the present access between Ravenshoe Road and the P. Vander Kooij property were to be retained as a public road allowance between the existing Ravenshoe Road and the proposed highway.

Specific impacts on three marsh farms were discussed, namely the McGuire, Federal Diversiplex and P. Vander Kooij properties.

- Mr. McGuire indicated that he would consider the possibility of acquiring adjacent muck lands to replace the lands that he would lose if the 12th Line route were chosen.

- Solicitors for Federal Diversiplex were present at the information centre to gather information on the project. It was indicated that the major stock holder of Federal Diversiplex was of the opinion that he had not been fairly treated in a number of previous land dealings with the Province, and that for this reason he had requested his solicitors to ensure that his interests are adequately protected on this project.

- Mr. P. Vander Kooij indicated his intention to construct a new barn on his property during spring 1978. The barn was to be located approximately 220 ft. (67 m) north of the southern property limit.

In the absence of a route selection and recognizing that other buildings on the farm were further south than the proposed barn, it was indicated that the Ministry could not identify an alternative location for the barn at that time.

- Residents of Canal/Bruce Street expressed their desire to see a connection from the Marsh farms, to the 12th Line route, in the vicinity of the Holland River. This would result in the truck traffic from the Marsh not all being funneled through a stop sign in the vicinity of the residential area.

- Ravenshoe Road residents located between the Marsh and York Regional Road 12 expressed the opinion that they wished to see the roadway widened on the side away from their properties.

- One resident of Ravenshoe was extremely vocal against the need for the proposed highway, on the basis that the Queensville Sideroad has just been reconstructed.

- There was a strong preference evident at Udora, for the southerly route although there were some stated preferences for either the northerly or "through Udora" routes.

Following the information centres a number of individuals contacted the Ministry of Transportation and Communications with comments. In addition, one previously unidentified interest group forwarded a petition to the Ministry. This group represented the residents of an area approximately 2 miles northwest of Udora. The area is known as Shiloh. The petition indicated a preference for a southern bypass of Udora.

4.5 ROUTE SELECTION

The evaluation process was structured to provide participants in the study with as extensive an understanding of the advantages and disadvantages of each alternative as possible. From this base it was possible to formulate recommendations leading to the selection of a preferred route for the highway.

Detailed evaluations of the alternatives were carried out by both the Project Team and the External Team. This evaluation included both numerical and stated preference methods. The summary of both of these methods, for both of the teams is included in Appendix E. The preferred alternative as indicated by the numerical and the stated preference methods are not identical. The purpose of the detailed numerical evaluation was, however, primarily intended to provide for an orderly and systematic review of the analysis rather than as a means of making the final decision. Having achieved this, the results of the numerical evaluation became secondary to the logical trade off of the advantages and disadvantages of the various alternatives.

The preferred route was identified as W5-C3 in the Western section and E5B in the Eastern section. This route is illustrated in figure 11, (page 63).

As indicated in Section 4. 3, (page 48), three sub-sections were assessed in identifying the preferred route within the western section of the project, these were:

- Interchange location at Highway 400.
- Route between Highway 400 and Holland River.
- Holland River crossing location.

For the preferred interchange location at Highway 400, both of the detailed evaluations identified 11th Line as preferable for the following reasons:

- The 11th Line location would provide continuity with a major township road to the west, whereas, there would be no continuity with an interchange at 12th Line.
- The topography in the vicinity of 11th Line would not result in the interchange having to incorporate steep grades, whereas this would be the case if the interchange were to be located at 12th Line.
- The 11th Line location would not have the environmental impacts associated with the enclosure of the stream feeding the Innisfil Creek.
- The cost of construction at the 11th Line location, would be in the order of $1 million less than at 12th Line.

The routes that would incorporate an interchange at 11th Line were W3-C4, W3-C5, W4-C6, W4-C7, W5-C2 and W5-C3.

For the preferred route between Highway 400 and the Holland River, the detailed evaluations identified the preferred route as being the use of 12th Line, for the following reasons:

- The use of an existing township roadway would have far less of an agricultural impact than the use of a mid concession location even though it would result in a greater impact on properties abutting the roadway.
- The use of 12th Line would affect less abutting properties than the use of 11th Line, although there is a public school located on 12th Line.
- The use of 12th Line would result in a significantly more preferable (safer) intersection with Highway 11 than would the use of 11th Line.

The routes that would incorporate the use of 12th Line were W2-C2, W2-C3, W5-C2 and W5-C3.

For the preferred crossing of the Holland River, the detailed evaluations identified an extension of 12th Line as being preferable, for the following reasons:

- The 12th Line extension crossing would result in significantly less of an impact to farming operations within the Keswick Marsh than either of the other two alternatives.

- The 12th Line extension would have far less of an impact on the Holland Marsh Wildlife Management Area than the alternatives to the south.

- The 12th Line extension would have a greater impact on the Holland Marsh Wildlife Management Area than the alternatives to the north, but less of an impact on the natural environmental features of the area.

The routes that would incorporate a 12th Line extension crossing of the Holland River were W2-C3, W3-C4, W4-C7 and W5-C3.

Only one route provided continuity through the preferred locations within each of the three sub-sections, this was route W5-C3.

Within the vicinity of Udora, the technical evaluations identified different preferred routes. It was agreed, however, that:

- The community impacts and costs associated with the reconstruction of the existing York Regional Road 32 through Udora, were so great as to rule this alternative out of consideration.

- The southerly bypass routes had far less of a recreational and residential impact than the northern bypass routes.

The difference in the evaluation by the two technical teams related to the extent of agricultural impact associated with the northern and southern bypass routes.

In reviewing the results of the evaluation it appeared that both teams would have identified the southern bypass as being preferable except for the potential impact on major farm operations to the east of Udora.

When it became apparent that these impacts could be largely alleviated through the consideration of appropriate design techniques such as the inclusion of culverts for the movement of cattle and equipment, the decision was made to identify the southern bypass of Udora as the preferred route. In this regard route E5B was identified on the understanding that refinements to the alignment would be necessary during the next stage of planning.

4.5.1 Internal

The Project Team's detailed evaluation identified either route W5-C3 or W3-C4 in the western section and route E5A or B in the eastern section, as being preferred. The Internal Team's review of the project endorsed these preferences.

4.5.2 External

External Team involvement in the route selection process included carrying out a detailed evaluation. This evaluation identified route W5-C3 as being preferred at the western end. In this regard the Ministry of Natural Resources representatives did not concur with the Team evaluation and indicated that from the viewpoint of that Ministry, the road should either circumvent the Holland Marsh Wildlife Management Area or the Ministry of Transportation and Communications should provide replacement lands elsewhere.

At the eastern end of the project, the External Team evaluation identified a northern bypass of Udora as being preferable. In reviewing the results of the evaluation, it appeared that the External Team might well have identified the southern bypass as being preferable, except for the potential impact on major farm operations to the east of Udora.

It subsequently became apparent that these impacts could be largely alleviated through consideration of appropriate design techniques such as the inclusion of culverts for the movement of cattle and equipment. A second evaluation, with the benefit of this information, was not carried out by the External Team.

Municipal Council involvement in the route selection process was on the basis of a review of the evaluation. The municipal comments and preferences that were stated, were indicated in chapter 4.4.2 (page 51). The preferences are summarized in chapter 4.6 (page 62).

4.5.3 Public

Public involvement in the route selection process was on the basis of a review of the analysis and detailed evaluation. The individual and group comments and preferences were summarized in chapter 4.4.3 (page 53).

4.6 EVALUATION SUMMARY

The detailed evaluation and the technical, municipal and public comments on this evaluation, were reviewed in detail prior to a recommendation being formulated. A summary of the individual and team participants who indicated preferences are as follows:

	West End	East End
Project Team	W5-C3 or W3-C4	E5A
Internal Team	W5-C3 or W3-C4	E5A
External Team	W5-C3	E2N
Township of Innisfil	W1	--
Township of West Gwillimbury	W5-C3	--
Region of York	W5-C3 or W3-C4	E5A
Township of Georgina	--	E5A or E5B
Township of Uxbridge	--	E2 or E3
Federation of Ontario Naturalists	12th Line @ Holland River	--
Estonian & Finnish Recreational Groups	--	E5A or E5B
Federations of Agriculture	W5-C3	E2N or E5B
Ducks Unlimited	C3	--
Area Residents	Various	E5A or E5B

In addition to the identification of route preferences, the municipal councils gave a strong indication of their desire to see construction of a new east-west highway, proceed as soon as possible.

The evaluation and the comments received from all study participants were reviewed with the executive of the Ministry of Transportation and Communications during May and June 1978.

This review was carried out initially with the Regional Director, then with members of the Provincial Roads Program Planning Committee and finally with the Minister, the Honourable J. Snow at a meeting of the Strategic Policy Secretariat.

The review of the project was followed by an announcement,of the selected route, by the Honourable J. Snow on June 30th, 1978. A copy of this announcement is included in Appendix B.

Following this announcement, copies of a brochure, summarizing the selected route, were distributed to area residents. The selected route is shown in figure 11 (page 63).

SELECTED ROUTE
FIGURE 11

5. SELECTED PLANNING ALTERNATIVE

5.1 DESCRIPTION OF SELECTED PLANNING ALTERNATIVE

The selected planning alternative will provide for the development of a new 30 mile (50 km) long east-west highway between Highway 400 in the west and Highway 12 in the east.

The selected route for the highway is shown in figure 11 (page 63). The highway will incorporate 2 lanes within a 120 ft. (36.5 m) right-of-way over the majority of its length. The posted speed limit will be 80 km/h (50 mph) except in areas of development where consideration will be given to posting a lower speed limit. In the areas of development, consideration will also be given to reducing the basic 120 ft. (36.5 m) right-of-way.

The following is a description of the proposed highway from west to east.

The 11th Line of West Gwillimbury presently overpasses Highway 400. An interchange will be provided at this location, to connect the proposed highway to Highway 400.

The highway will then follow 11th Line easterly to approximately Lot 8. The existing private entrances along this section of 11th Line, will be retained.

The proposed highway will then curve to the northeast cutting across country to align with the 12th Line east of 10th Sideroad. The highway will intersect with 10th Sideroad close to the existing intersection of 10th Sideroad and 12th Line.

The highway will follow the alignment of 12th Line easterly to the crossing of the Holland River. Over this section of the roadway, the existing private entrances will be retained, as will the access to the Honourable Earl Rowe School. The intersection with Highway 11 will require channelization and signalization and the existing staggered intersection at 20th Sideroad will require redevelopment in conjunction with a grade separation of the CNR Newmarket subdivision crossing.

Between 20th Sideroad and the Holland River, the highway will separate approximately 165 acres (67 ha) of the Holland Marsh Wildlife Management Area to the north from the remaining 1,100 acres (445 ha) to the south.

A new bridge will be required at the Holland River. The bridge will be several hundred feet long and will have a vertical clearance of 22' to provide for the passage of boats on the river. The length of the bridge will be determined following extensive foundation investigations at the crossing site.

The proposed highway will continue east of the Holland River for approximately two-thirds of a mile (1 km) before curving to the southeast to align with York Regional Road 32 (Ravenshoe Road) at the east limit of the Keswick Marsh. From the Holland River to the east limit of the Marsh, the proposed highway will affect a number of active 'muck' farms.

Between the east limit of the Keswick Marsh and the bypass of Udora, the proposed highway will follow the alignment of the existing York Regional Road 32 (Ravenshoe Road). Over this section of highway, the existing entrances will be retained wherever possible. Intersection channelization and signalization will be required at York Regional Road 12 (Sutton Road), York Regional Road 8 (Woodbine Avenue) and Highway 48. Signals are presently installed at the intersection of York Regional Roads 32 and 8. The intersection with York Regional Road 39 will require redevelopment in conjunction with a grade separation of the CNR Bala subdivision crossing.

The existing right-of-way of York Regional Road 32 (Ravenshoe Road) between York Regional Road 12 (Sutton Road) and Highway 48 is 85' (26 m). Major reconstruction will not be required along this section of the highway and consequently it is not anticipated that additional right-of-way will be acquired. Future building setbacks, as with all other locations where less than 120 ft (36.5 m) will be acquired, will, however, be based on a 120 ft. (36.5 m) right-of-way.

Between Highway 48 and the bypass of Udora, a 120 ft. (36.5 m) right-of-way will be acquired except in the communities of Brown Hill and Ravenshoe where consideration will be given to acquiring less than 120 ft. (36.5 m) in order to minimize the acquisition of homes. Within this section, new river crossing structures will be required over the Black River and the Zephyr Creek.

Approximately 2 miles (3 km) west of Durham Regional Road 1, the proposed highway will curve to the southeast to bypass Udora on the line between Lots 33 and 34 in the Township of Uxbridge. Approximately half a mile (0.8 km) east of Durham Regional Road 1, the proposed highway will swing towards the northeast, intersecting Durham Regional Road 23 just south of York Regional Road 32 and aligning with the 8th Line in the Township of Brock approximately two-thirds of a mile (1 km) east of Durham Regional Road 23. The proposed highway route will affect a number of extensive farming operations to the south and east of Udora.

Channelization and possibly signalization will be required at the intersection of the highway with Durham Regional Roads 1 and 23.

South of Udora, new river crossing structures will be required at the Pefferlaw Brook and the Uxbridge Brook.

East of Udora, the highway will follow 8th Line, including the unopened section north of Vroomanton, to a signalized intersection at the junction with Highways 7 and 12.

The existing entrances onto 8th Line will be retained. A new structure will be required over the Vrooman Creek.

As traffic volumes increase, signalization will be added at intersections when warranted.

The route of the proposed highway will be subject to minor modifications during the next stage of the study.

Due to the size of the project, construction will be staged. At the time of preparing this report it appeared that there would be three stages of implementation, as follows:

(i) From Highway 11 to York Regional Road 12 (Sutton Road) including the Holland River crossing.

(ii) From Highway 48 to the junction of Highways 7 and 12.

(iii) From Highway 400 to Highway 11.

The section from York Regional Road 12 (Sutton Road) to Highway 48 will be resurfaced when required. See figure 11, page 62.

5.2 POTENTIAL ENVIRONMENTAL IMPACTS OF SELECTED PLANNING ALTERNATIVE

Both negative and positive impacts were of major concern during the course of this study. Due to the location, land use and environmental characteristics of the area, environmental impacts were one of the major governing factors during the analysis and evaluation that was carried out to select the most appropriate route. Unfortunately the mere presence of a highway results in a number of environmental impacts on the surrounding area.

In order to be able to identify both the negative and positive impacts associated with the development of the proposed highway, the eight factors that were used during the analysis (see chapter 4.2.1 (page 43) and Appendix D) have been used to provide the basis for discussion in the following sections.

5.2.1 Adverse Impacts

TRAFFIC

The impacts associated with this factor are beneficial.

AGRICULTURE

The implementation of the highway will require the acquisition of approximately 250 acres (101 ha) of land of which approximately 120 acres (49 ha) is identified as being of Class 1 or 2 agricultural capability. 150 acres (61 ha) of the 250 acres (101 ha) of land are cleared. Of these 150 acres (61 ha), 21 acres (9 ha) are organic soils and 129 acres (52 ha) are mineral soils.

The major adverse impacts on the agricultural operations within the study corridor relate to three main areas:

(i) Highway 400 to 10th Sideroad

(ii) Keswick Marsh

(iii) South and east of Udora

Between Highway 400 and the 10th Sideroad, the cross country route of the proposed highway causes a severance of the Andrews' farm.

Within the Keswick Marsh, three 'muck' farms will be significantly affected; specifically those of P. Vander Kooij, Federal Diversiplex and McGuire.

South and east of Udora, two properties in particular will have severances; specifically the Graham's and the Miller's farms.

NOISE

Approximately 120 homes, within the study area, will be subject to outdoor noise levels of L_{eq} 55 dBA. Twenty of these homes will be subject to noise levels of L_{eq} 65 dBA. All of these homes are adjacent to existing County, Regional or Township roadways and consequently are presently subject to varying levels of traffic noise.

The Honourable Earl Rowe School, just west of Highway 11, will be subject to increased noise levels. These levels will, however, be below the 'acceptable' indoor noise levels for a school as indicated in the 'Model Municipal Noise Control Bylaw - Ministry of Environment'. The peak traffic volumes will not occur during normal school hours.

COST

The cost of the new highway was estimated as $17 million in 1977 dollars.

PROPERTY

The acquisition of approximately 250 acres (101 ha) of property will be necessary for the construction of the proposed highway.

80% of the length of the highway will be on existing roadways. Over this 80% of the project there is a potential for roadway widening to be taken from up to 190 individual parcels. This number will be significantly reduced during the detailed design stage of the study. Over the 20% of the project where new alignment will be required, there is a potential for up to 30 individual properties to be affected.

There is also a potential for four homes to be required for construction of the proposed highway; three in the community of Brown Hill and one south of Udora. It may be possible to reduce this number during the next stage of the study by refining the specific right-of-way requirements.

The proposed highway will pass through the northern section of the Holland Marsh Wildlife Management Area, separating approximately 165 acres (67 ha) from the total 1,265 acre (512 ha) area.

ENVIRONMENT

The proposed highway will affect twelve high quality vegetation units as defined in Appendix C. Two of these units are in the vicinity of the 10th Sideroad in West Gwillimbury and the remaining ten are located south of Udora. The size of these units range from a few trees to a maximum of approximately 2.5 acres (1 ha). The total acreage of high quality vegetation removed, will be 10 acres (4 ha).

In addition to the removal of the high quality vegetation units, a further 72 acres (29 ha) of vegetation will be required for construction of the proposed highway.

One unit of botanical significance will be affected, south of Udora. This unit does not include any rare or endangered species.

The proposed highway will require seven major watercourse crossings. New crossings will be required at the Holland River, the Pefferlaw Brook, the Uxbridge Brook and the Vrooman Creek. Existing structures will require replacement at the Black River and Zephyr Creek. The existing structure at the Maskinonge River will be retained. Only minimal impacts on water quality and fishlife are anticipated with construction of the highway.

Minimal impact on wildlife is anticipated.

STAGING

This factor does not reflect an impact.

AESTHETICS

Minimal aesthetic impacts are anticipated. During the course of the study, it was indicated, however, that construction within the Holland Marsh Wildlife Management Area could represent a visual intrusion within that area.

5.2.2 Beneficial Impacts

The primary benefit associated with the proposed highway relates to traffic. There are some secondary benefits such as reduced noise levels for properties adjacent to roadways from which traffic will be diverted and such as reducing or delaying future construction costs on other roadway links within the network. These benefits are spread over such an extensive area, however, that no attempt has been made to quantify them.

The traffic benefits associated with the highway construction were discussed in detail in chapter 1.5 (page 2) and chapter 3.3.2 (page 32) and are not repeated here other than to summarize the benefits as follows:

- Major improvement in local accessibility from one side of Cook Bay to the other. Travel distance savings of 10-12 miles (16-19 km) associated with proposed highway.

- Major improvements for 'mid' Ontario east-west traffic as there presently is no east-west highway between Highway 7 and Cook Bay.

Due to the diversity of the origins and destinations associated with the traffic that is predicted to use the proposed highway, no attempt has been made to summarize the associated total travel time and energy savings.

5.3 IDENTIFIED ENVIRONMENTAL CONCERNS AND FOLLOW UP RECOMMENDATIONS OF SELECTED PLANNING ALTERNATIVE

The identified concerns and associated recommendations are summarized from west to east as follows:

Change in Character of Existing Roadways

A number of area residents expressed concern over the fact that the character of the Township roadways, that would be used for the proposed highway, would be radically changed.

It is recognized that there will be significant changes, but it is recommended that in the subsequent stages of the study, consideration be given to developing the alignment and grade so as to minimize the number of properties affected and the number of hedgerow trees removed so as to retain as much of the existing rural character as possible.

Farm Severance West of 10th Sideroad

The recommended route will sever a 100 acre (40 ha) farm parcel owned by a Mr. Andrews.

It is recommended that alternative alignments be investigated, to minimize the extent and impact of the severance.

Honourable Earl Rowe School

Noise, safety and visual aspects of the roadway were identified as potential concerns in terms of the impact on the school.

It is recommended that consideration be given to:

- installing fencing between the roadway and the school
- lowering the existing roadway grade and landscaping in front of school to form a visual barrier
- developing the alignment on an offset to the south

Holland Marsh Wildlife Management Area

Representatives of the Ministry of Natural Resources expressed concern over the severance of the Holland Marsh Wildlife Management Area, identifying one of the prime assets of the Area as being its extensive nature, 1,265 acres (512 ha). In this regard the Ministry of Natural Resources requested that the Ministry of Transportation and Communications replace any severed lands with an equal acreage contiguous with the Management Area.

The Ministry of Transportation and Communications does not operate under legislation that would enable it to acquire property for non-roadway purposes.

Concern was expressed during the course of the study, over the visual impact that the highway would have on the Management Area.

It is recommended that consideration be given to preparing landscaping proposals during the next stage of the study.

Initial concerns over the impact of the highway on wildlife in the Area, were not borne out during the study.

The possibility of pressure for land use changes in the vicinity of the Management Area, as a direct result of the development of the highway, were identified.

It is recommended that this concern be communicated to the affected municipalities who have control over land usage.

Holland River Crossing

There is little likelihood of significant impacts on the water quality or fisheries within the Holland River. It is thought to be possible, however, that there could be toxic sediments in the river bed that could be disturbed during construction.

It is recommended that sampling of the river bed precede construction at the river crossing.

In order to provide adequate clearance for recreational craft on the Holland River a vertical clearance of 22' (6.7 m) will be provided.

Keswick Marsh Farms

Farms within the Keswick Marsh will be affected by the proposed highway. It is recommended that careful consideration be given to minimizing severances and changes to drainage patterns, during the next stage of the study.

Black River, Zephyr Creek, Pefferlaw Brook and Uxbridge Brook

The soils in the vicinity of all of these four rivers are such that care will be necessary during construction, so as to minimize the potential for siltation in the streams. In particular the months of May, June and July should be avoided, if possible, at the crossings of the Pefferlaw Brook and the Uxbridge Brook, in order to minimize the impact on downstream smallmouth bass spawning grounds.

Farm Severances Southeast of Udora

Two major farming operations to the south and east of Udora, will be affected by the proposed highway.

It is recommended that alternative alignments be considered and that cross highway access be considered in the form of large culverts for the movement of cattle and equipment.

Public Involvement

Extensive public involvement was incorporated into the study. It is recommended that this involvement be extended into subsequent stages of the study.

APPENDIX A

LISTING OF AVAILABLE MATERIAL

The following material pertaining to this planning study is available for examination at the offices of the Ministry of Transportation and Communications by contacting:

Mr. H. Vander Kooij
Project Manager
Planning and Design Office
Central Region
Ministry of Transportation and Communications
3501 Dufferin Street
Downsview, Ontario
M3K 1N6 Tel. 248-3415

or

Mrs. V. Hugel
Environmental Planner
Planning and Design Office
Central Region
Ministry of Transportation and Communications
3501 Dufferin Street
Downsview, Ontario
M3K 1N6 Tel. 248-3415

- Subsoil Conditions Preliminary Route Appraisal, Schomberg River Crossing of York County Road 32 at York-Simcoe County Line, Ontario. William Trow Associates Ltd., September 1968.
- Highway 89 Extension From Highway 400 to Highways 7 and 12. Materials and Testing Office, Central Region, M. T. C., September 1976.
- Preliminary Soils Investigation for Alternative Route C2. Regional Geotechnical Section, Central Region, M. T. C. , March 1978.
- Feasibility Study of Alignment C2, Mid Ontario Tourist Highway From Highway 400 to Junction 7 and 12, Foundation Report. Engineering Materials Office, Soil Mechanics Section, May 1978.
- Functional Planning Report; Holland River Crossing, Toronto and York Roads Commission and County of Simcoe. November 1968.
- Highway 89 Extension, Highway 400 to Highway 12, Background Report 1977, Central Region, M. T. C.
- Mid Ontario Tourist Highway, Highway 89 Extension from Highway 400 to The North Junction of Highways 7 and 12; Assessment Report. Provincial Roads Planning Office, M. T. C., January 1977.
- Highway 89 Extension (Mid Ontario Tourist Highway) From Highway 400 Easterly to The Junction of Highways 7 and 12. Project Appraisal Report. Planning and Design Office, Central Region, M. T. C. March 1977.
- Environmental Inventory and Analysis For Highway 89 Extension. Preliminary Design Study Phase 1. Ecoplans Ltd., December 1977 (See Appendix C).

- Environmental Inventory and Analysis For The Highway 89 Extension, Preliminary Design Study Phase 1; Botanical Addendum. Ecoplans Ltd., July 1978 (See Appendix C).
- Appendices to the above reports.
- County of Simcoe, Road Needs Study, 1969-1979.
- Toronto and York Roads Commission, County Needs Study 1965-1975.
- Information Centre Questionnaire, December 1977.
- Information Centre Comment Sheet, April 1978.
- Traffic volumes and intersection movements, Urban and Regional Planning Office, M. T. C.
- Land Use and Environmental Mosaic Panels 1" = 1,320' (Used for Display Purposes).
- Public Mailing Brochures (4) (See Appendix B).
- Mosaic 1" = 400' photographic coverage.
- Aerial Photographs 1" = $\frac{1}{4}$ mile, May 1977.

APPENDIX B

FOR IMMEDIATE RELEASE

Route selected to link
Highways 400 and 12
south of Lake Simcoe

TORONTO -- Transportation and Communications Minister James Snow announced today the route has been selected to connect Highway 400 north of Bradford to Highway 12 at Highway 7 north of Sunderland.

"The new two-lane facility, incorporating the existing Ravenshoe Rd., will provide an important link in the provincial highway network south of Lake Simcoe," said Snow. "And it was selected from a number of alternatives by a team of consultants and ministry staff, following meetings with other government and private agencies and area public information meetings."

Main factors considered were engineering, safety, community disruption and the impact on agriculture and natural environment.

Snow added that the project is subject to the province's Environmental Assessment Act. "It must be approved by the provincial government before construction drawings are finalized and right-of-way purchased."

Construction, expected to cost about $20 million, will be carried out in three stages, beginning with the section between Highway 11 and York Rd. 12 (Sutton Rd.).

The second stage will involve the section between Highway 48 and Highway 12. The final stage, between Highway 11 and Highway 400, will include a new interchange at Highway 400.

The section between York Rd. 12 and Highway 48 is paved and will be resurfaced when required.

Snow said he hopes construction can start late in 1980 or early 1981, providing the environmental assessment is approved without further public hearings.

From: Public and Safety
Information Branch
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8
Telephone: (416) 248-3501

the york regional topic

Vol. 6 No. 37 November 29, 1977 Circulation 30,509

Plans are to be unveiled for new east-west highway route

KESWICK — Plans to extend the Ravenshoe Road in York Region west to Highway 400 in West Gwillimbury Township will be unveiled at public meetings in December, the Ministry of Transportation announced last week.

The project would establish the only east-west route north of Bradford and south of Lake Simcoe.

The Ministry announced drop-in centres from 2 to 5 p.m. and 7 to 9 p.m. in the following schedule:

Tuesday, December 13, at Earl Rowe school, Highway 88 in West Gwillimbury;

Wednesday, December 14, St. Paul's Anglican Church, Keswick; and

Thursday, December 15, Udora Community Centre.

Several alternate routes will be on display, according to project manager Harry VanderKooij. One route is to be chosen by mid-1978 but the construction schedule will depend on budget constraints, and speed of ministry approvals, and land acquisition.

Mr. VanderKooij said the environmental impact will have to be considered because the route will require a bridge over the Holland River and construction over a wildlife preserve maintained by the Ministry of Natural Resources.

The bridge is to be built somewhere in the 11th and 12 concessions of West Gwillimbury, according to township Reeve John Fennell.

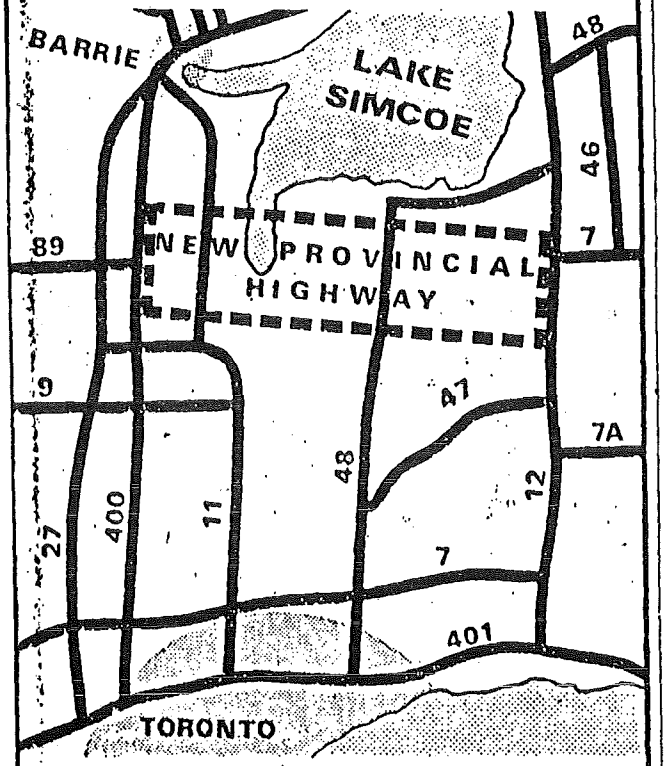
Preparation of construction plans is about three years away.

ONTARIO GOVERNMENT NOTICE

INFORMATION CENTRES
PROPOSED HIGHWAY 89 EXTENSION

In the County of Simcoe and the Regional municipalities of York and of Durham

From Highway 400 easterly to the northerly intersection of Highways 7 and 12



During 1976 the Ministry of Transportation and Communications investigated the feasibility of providing a continuous east-west highway south of Lake Simcoe. Following the investigation, the Ministry met with the Councils of Simcoe and the Regions of York and Durham. All three municipalities endorsed the concept of the proposed new highway.

Since that time, the Ministry has investigated the proposed highway in more detail.

This proposed two lane highway would basically follow Ravenshoe Road (York Road 32) with alternative routes in two areas. These are in the area between Highway 400 and Sutton Road (York Road 12) and the area around Udora.

The Ministry intends to review the alternatives with all interested people before any detailed analysis is carried out.

You are invited to attend an information centre where the identified alternatives will be displayed on large plans. Ministry representatives will be on hand to review and discuss the proposals.

The INFORMATION CENTRES will be held at the following dates and places:

Tuesday, December 13, 1977 2:00 - 5:00 and 7:00 - 9:00 p.m.	**HONOURABLE EARL ROWE SCHOOL 12th Line west of Highway 11**
Wednesday, December 14, 1977 2:00 - 5:00 and 7:00 - 9:00 p.m.	**ST. PAUL'S ANGLICAN CHURCH York Road #12 north of York Rd. #32**
Thursday, December 15, 1977 2:00 - 5:00 and 7:00 - 9:00 p.m.	**UDORA COMMUNITY CENTRE York Rd. #21 in Udora**

If you cannot attend any of the Information Centres please send your comments to:

Mr. Harry Vander Kooij
Project Manager,
Ministry of Transportation
and Communications
3501 Dufferin Street
Downsview, Ontario
M3K 1N6

OR

Mr. John Sutherns, P. Eng.,
McCormick Rankin &
Associates Ltd.
Consulting Engineers
60 Briarwood Avenue
Mississauga, Ontario
L5G 3N6

Ministry of Transportation and Communications

Highway 89

Official finds public support for road plan

OSHAWA — An official of the Ontario Ministry of Transportation and Communications says extension of Highway 89 south of Lake Simcoe seems to be favored by residents of the area.

Harry Vander Kooij, project manager with the ministry, said in a telephone interview from Toronto that most of the 500 people who attended three information centres on the proposal last week came out strongly in favor of the highway project. He said the ministry has also sent brochures on the project to about 2,500 homes in the area that might be affected.

Vander Kooij said the highway extension is proposed to fill in a missing link across the Holland River south of Cook Bay, connecting Highway 400 with the junction of Highways 7 and 12 near Sunderland.

He pointed out there is now no provincial highway in the area north of Highway 7 and most regional roads in the district do not line up properly to provide a satisfactory route for traffic.

Vander Kooij said that although the construction project could take between five and 10 years, the first priority will be the section across the Holland River from Highway 11 to Sutton Rd. He added that section will also be the most costly, since the marsh is 35 feet deep.

He estimated total cost of the project as high as $20 million and added that the ministry must determine the best route for the highway to minimize adverse effects on farms, homes and wildlife.

The proposed extension would partially follow Ravenshoe Rd. and a bypass of Udora would be necessary to avoid a dangerous intersection in the village. The ministry has been studying the feasibility of building the highway since last year.

Serving Canada's Vegetable Garden

THE BRADFORD witness

April 12, 1978 Bradford, Ontario, Canada Serving South Simcoe since 186

12th Line is favored for extension

A decision on the route of the Highway 89 extension has not yet been made, but indications are that the 12th Line route of West Gwillimbury is being favored over other possible routes.

Project manager Harry Vanderkooij said Monday that several government ministeries and West Gwillimbury council were in favor of the 12th Line because of environmental impact of the highway and the bridge crossing the Holland River, and the alignment with the future interchange with Highway 400.

A public meeting will be held at the Honorable Earl Rowe School on Tuesday, April 25 to present the latest studies done on the highway extension which would link eastern Ontario highways with those in the west.

One possible route has the Highway 89 extension following the 12th line to Highway 11, then cutting a diagonal swath south-west to link up with the 11th line at Highway 400.

One alternative that had been proposed, the 20th sideroad route, "is not being considered," Vanderkooij said, citing costs in upgrading the road, and its north-south direction.

Residents along the 11th Line of West Gwillimbury have strongly opposed any move to have the extension follow that road, a part of which is County Road 10.

Vanderkooij said Ministry of Transportation and Communications officials are now meeting with the councils of the municipalities involved, and all information on the extension should be ready for review by the middle of May.

A final decision will be made in June.

THE TORONTO STAR, Fri., April 14, 1978

Ministry alters extension plans for Highway 89

By WENDY HERMAN
Star staff writer

NEWMARKET — Plans to extend Highway 89 will be presented to the public for the final time at the end of this month.

Representatives of the Ministry of Transportation and Communications have described the alternate routings being considered for the 30-mile stretch of highway, which will provide an east-west link between Highway 400 and Highway 12.

Consultant John Sutherns told York Regional Council yesterday that 500 people attended three public information meetings last year and the ministry has considered their comments as well as those of organizations and other ministries.

Municipal comments were favorable, Sutherns said, and they generally indicated the road "should have been built yesterday rather than tomorrow."

The ministry has ruled out running the highway through the main street in Udora, Sutherns said, because of technical problems and the effect on the community.

But he said there is some disagreement on whether the highway should go north or south of the village.

Provincial ministries such as agriculture and food, environment, and natural resources prefer the northern bypass, Sutherns said, while the transportation ministry favors the southern route.

Routing decisions will be made after the public information centres are set up, he said.

The information centres will be at Earl Rowe School in West Gwillimbury April 25, Udora community centre on April 26 and St. Paul's Anglican church in Keswick on April 27.

The centres will be open during each of the days from 2 to 5 p.m. and 7 to 9 p.m.

TORONTO STAR MAY 29, 1978

Highway 89

Route still undecided of highway extension

UXBRIDGE — Opinion is divided on the route of a proposed Highway 89 extension south of Lake Simcoe, an Ontario government official says.

However, a decision is likely by the end of June to align the 30-mile highway extension and to link Highway 400 near Cookstown with Highway 12 at Sunderland.

Harry Vander Kooij, a project manager with the Ministry of Transportation and Communications, said in an interview close to 400 residents attended three public information centres held in the area late last month.

The ministry will continue its analysis of the project's impact on residents and farms, as well as all traffic and safety considerations before making a recommendation on the exact route, he said.

In addition to homeowners and farmers in the area affected, the ministry must also consult with other branches of government, the South Lake Simcoe Conservation Authority and local municipalities, Vander Kooij said.

No consensus has been reached on what route should be followed at the village of Udora, he added.

The majority of residents appeared to agree with the ministry's project team that the highway extension should pass Udora to the south, a position also supported by Georgina Township. Fewer property owners would be affected if that route is followed, Vander Kooij said.

However, agriculture authorities and Uxbridge Township believe the village should be bypassed to the north. The project team is also split on the route to be chosen at the west end of the extension.

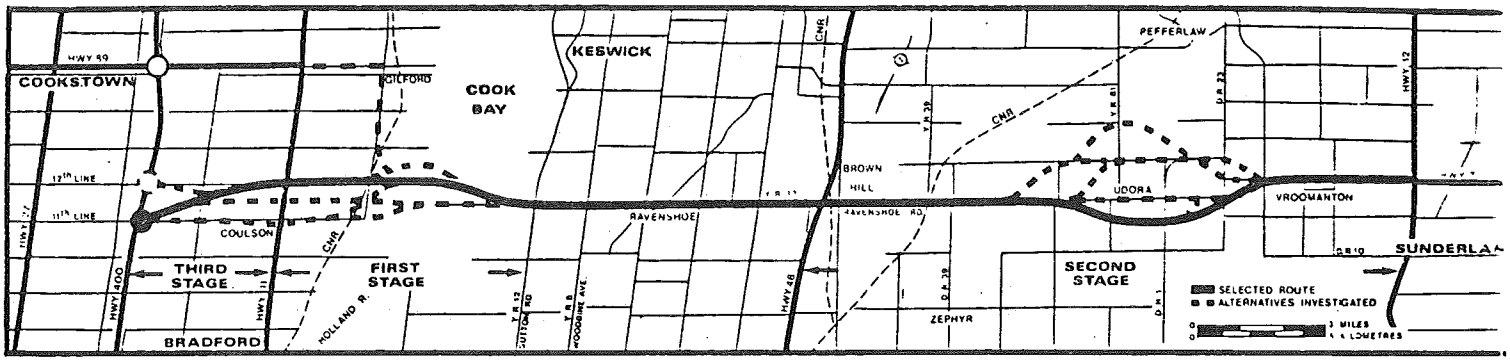
Whichever route is followed, construction of the $15 million to $20 million extension is still several years away, Vander Kooij pointed out, adding that an environmental assessment report must be completed before preliminary design and property purchases are undertaken and funds approved.

New highway route is announced

TORONTO — The route for a new provincial highway which will connect Highway 400 at the 11th line of West Gwillimbury to Highway 12 at Highway 7 north of Sunderland was announced Friday by Transportation and Communications Minister James Snow.

In West Gwillimbury the highway will follow the 12th Line to a point about a mile west of Highway 11 and then cut across farmland to connect with the new interchange at the 11th line.

The highway will cut a swath through a farm owned by Norm and Patsy Bosomworth.



New highway

The new provincial highway route announced by the Ontario government will connect Highway 400 at the 11th line of West Gwillimbury with Highways 7 and 12. The $20 million project is expected to get underway in late 1980 or early 1981. First stage, along the 12th line, will include a bridge across the Holland River. Government officials and West Gwillimbury council consider the route the least disruptive.

HEARTSICK

"I'm heartsick about it," Mrs. Bosomworth said. "They're just destroying all the reasons why we're here...it spoils the whole lifestyle, it's utterly ridiculous."

The new route will nudge just south of a county reforestration area on the 12th Line, and directly through an environmental protection zone on the Holland River across which a bridge will be constructed.

Snow said the new two-lane route will incorporate the existing Ravenshoe Road north of Queensville and "provide an important link in the provincial highway network south of Lake Simcoe."

LEAST DISRUPTIVE

West Gwillimbury Reeve John Fennell said council agreed with the route choice because, "We felt it was the least disruptive."

Main factors considered, according to the ministry, were safety, community disruption, engineering, and the impact on agriculture and natural environment.

POSE A THREAT

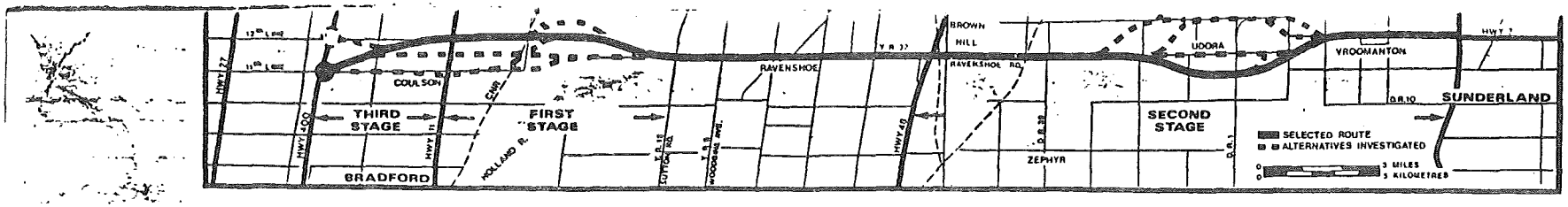
The MTC met with Simcoe County Board of Education officials to discuss safety for students at the Honorable Earl Rowe school on the 12th Line and Highway 11.

Board officials were satisfied that the highway which will pass the school would not disrupt activities or pose a threat to students.

province's Environmental Assessment Act and must be approved by the provincial government before construction drawings are finalized and right-of-way purchases.

Construction will be carried out in three stages: the first along the section between Highway 11 and the Sutton Road; the second between Highway 48 and Highway 12; and the final stage between Highway 11 and Highway 400, including the new interchange.

The $20 million project should begin in late 1980 or early 1981, Snow said.



SOUTHERN ROUTE CHOSEN FOR HWY. 89

THE GEORGINA Advocate

vol. 18, no. 51 wed., july 5, 1978 sutton west, ontario 20 cents

Highway 89 extension south of Udora

Transportation and Communications Minister James Snow announced last week the route has been selected to connect Highway 400 north of Bradford to Highway 12 at Highway 7 north of Sunderland.

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The section between York Rd. 12 and Highway 48 is paved and will be resurfaced when required.

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PUBLIC BROCHURES

APPENDIX C

ENVIRONMENTAL INVENTORY AND ANALYSIS

FOR

THE HIGHWAY 89 EXTENSION

PRELIMINARY DESIGN STUDY
Phase 1

by

Ecoplans Ltd.
Waterloo, Ontario

December 1977

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Bell, H.I., Agricultural Representative, Ontario County (Durham Region), O.M.A.F.

Close, N., Landscape Planner, M.T.C.

Corbridge, D., Ducks Unlimited, Aurora.

Evans, K., Conservation Officer, Huronia District, M.N.R.

Green, W., Planner, Huronia District, M.N.R.

Gregg, R., Agricultural Engineer Ontario County (Durham Region) and York Region, O.M.A.F.

Hogg, D., Fish and Wildlife Supervisor, Maple District, M.N.R.

McClure, R., South Lake Simcoe Conservation Authority

McRuer, J.K., Agricultural Representative, Simcoe County

Morley, J., Planner, Maple District, M.N.R.

Norman, A., Biologist, Maple District, M.N.R.

Roulet, J., Project Officer, Food Land Development Branch, O.M.A.F.

Stevenson, K., Director, Ontario Federation of Agriculture, York North.

Sutherns, J., McCormick, Rankin and Associates Ltd.

Valk, M., Director, Muck Research Station, Bradford

Wall, A.A., Agricultural Representative, York Region

Wellman, A.A., Director, Ontario Federation of Agriculture, York North

1.0 INTRODUCTION

1.1 Authorization

This study was authorized by Mr. R.D. Nairn, McCormick, Rankin and Associates Limited in a letter dated May 20, 1977. The terms of reference for the study are contained in Appendix 1.

1.2 Purpose

The Highway 89 Extension Preliminary Design Study is being carried out in three phases consisting of identification of route alternatives, selection of a specific route, and preliminary design. The purpose of this report is to provide an inventory and analysis of significant environmental constraints within the study area (see Section 1.3) as input to the identification of route alternatives.

The following environmental features were inventoried: physical setting, agricultural soils, vegetation including woodlands and herbaceous resourses, surface water resources, fisheries, wildlife, and special feature areas. Once inventoried, these environmental features were evaluated for the degree to which they present constraints to highway development.

Subsequent study stages will address the impact of specific routes on these environmental constraints and the necessary mitigation measures to reduce unavoidable environmental impacts of the selected route.

1.3 Study Area

The location of the study area is outlined in Figure 1. Basically, the study area may be divided into three sections. The

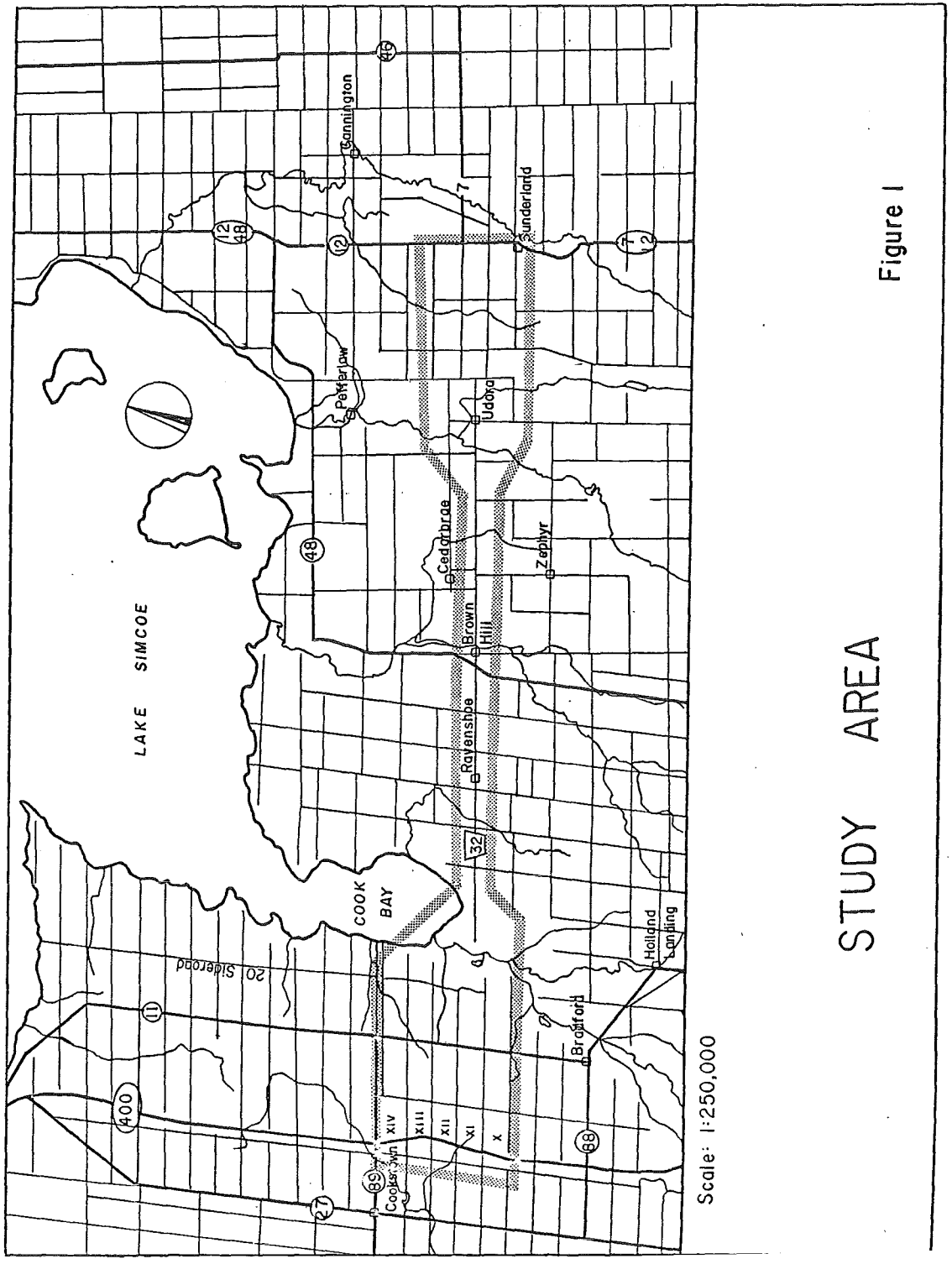

Figure 1

STUDY AREA

western section extends east-west from Cook Bay to Highway 400 and north-south from Highway 89 to West Gwillimbury Concession Road X. The central section consists of the existing alignment of York Regional Road 32 (Ravenshoe Road). The eastern section extends east-west from Highway 12 to Udora and north-south two concessions north of Udora and one concession south.

2.0 METHODOLOGY

2.1 Physical Setting

Several sources were used to describe briefly the physical setting of the study corridor. Government geological maps were consulted to provide an understanding of geological features (Deane, 1948, 1950; Gwyn and DiLabio, 1973; Gwyn and White, 1973; Turner, 1977). Physiographic information was obtained from Chapman and Putnam's map (Chapman and Putnam, 1966). Additionally, soils maps for Simcoe, York and Ontario (now Durham Region) Counties were reviewed.

2.2 Agriculture

The agricultural study was comprised of two aspects.

The first aspect dealt with agricultural capability which was mapped at a scale of 1:15,840 for both mineral and organic soils. Using the existing Simcoe, York and Ontario County soils maps (1:63,360) the study area was briefly field checked. Detail to approach the 1:15,840 study mapping scale was added by aerial photographic interpretation.

Mineral soils were ranked for agricultural capability according to the Canada Land Inventory system. For mapping purposes, Classes 1 and 2 were grouped as high agricultural capability for common field crops, Classes 3 and 4 as moderate capability and Classes 5 and 6 as low capability, capable of producing only perennial forage crops.

The organic soils also were ranked for agricultural capability according to Hoffman's system (Hoffman, 1973) using Organic Soils Maps (1:50,000) prepared by the University of Guelph. For

mapping purposes, Classes 1 and 2 were grouped as high, long term capability for vegetable crops, Classes 3 and 4 as moderate capability, and Classes 5 and 6 as low, short term capability.

The second aspect of the agricultural study addressed the identification of localized operational constraints not specifically related to land capability. In order to identify these operational constraints, various farm representatives within the study area were contacted by phone and/or by letter. These included: the agricultural representatives and agricultural engineers of Simcoe County, York and Durham Regions; Ministry of Agriculture and Food, Food Land Development Branch personnel; local members of the Ontario Federation of Agriculture in each district; the County or Regional Soils and Crop Improvement Association; some individual farmers within the study area; and the Muck Research Station, Bradford (see Appendix 2 for details).

2.3 Vegetation

For purposes of inventory and analysis, vegetation has been sub-divided into two sections - woodlands and botanical resources.

2.3.1 Woodlands

Designation of woodland units for Ecoplans' field investigation was previously established with Mr. Nick Close, Landscape Development Planner of M.T.C. Field survey work was undertaken during early September, 1977 by Ecoplans' vegetation appraisal staff. The mappable areas of woody vegetation associations were established on the basis of observed differences in the structural composition of vegetation,

and differences in site characteristics related to soil texture, drainage, and topography. Vegetation units were mapped in the office using standard stereographic aerial photo analysis and then field checked. Mapping scale for the vegetation analysis was established at one inch to 1,320 feet. Generally, the minimum mapping unit for natural woodlands was 20-25 acres. At this time, only a preliminary botanical check was made on identified high quality woodland units (see Section 2.3.2).

The classification of each vegetation unit was done using four sets of criteria: first, a description and analysis of the existing woody vegetation of each woodland unit was conducted; secondly, the capability of these vegetation units to sustain man-made impacts arising from right-of-way clearing and construction was identified; thirdly, a description of the environmental functions that each unit provides was noted; and fourthly, a summary assessment of the values and problems associated with the vegetation unit was described.

A complete explanation of each set of criteria appears in Appendix 3A.

2.3.2 Botanical Resources

Following the initial forestry survey, a small number of high quality woodland units were selected for a brief (one-day) botanical survey. The units were chosen on the basis of canopy type, lack of recent disturbances by man, and apparent diversity of herbaceous plants at the time of survey. These units were then evaluated for the quality, density and diversity of existing ground cover and shrubs, and an assessment was made of the botanical potential of each area to facilitate the location of key areas for future study.

In addition to the field survey, the Sensitive Area files of the Ministry of Natural Resources (Maple District, and Central Region Officer) were examined to determine if any rare or unusual plant species had been documented near or within the study area. Also, the Toronto Field Naturalists Club was contacted for information on botanical resources in the Jim Baillie Nature Reserve, which is located just south of the study area on Uxbridge Brook.

2.4 Surface Water Resources*

The surface water resources section has been divided into separate sections dealing with water quantity and water quality.

2.4.1 Water Quantity

Existing streamflow information was obtained from Environment Canada, Inland Waters Directorate, Water Resources Branch, Water Survey of Canada (W.S.C.) for Holland River, Black River, Pefferlaw Brook, and Beaverton River for 1972-1976. Some of the gaps in coverage were supplemented by the South Lake Simcoe Conservation Report 1973, and the Ontario Ministry of Environment (OME) streamflow gauging stations for Beaverton River, Black River, Maskinonge River, Uxbridge Brook and Vrooman Creek.

No water quantity measurements were undertaken by Ecoplans Ltd.

2.4.2 Water Quality

Existing water quality information was obtained from the Water Resources Branch, Ontario Ministry of the Environment (O.M.E.) for Holland River, Schomberg River, Maskinonge River, Black River, Pefferlaw Brook, Uxbridge Brook, and Beaverton River. Gaps

* See Map 3 for Stream Locations

in coverage were partially supplemented by the South Lake Simcoe Conservation Report, 1973. Holland River water quality information was also obtained from reports by Nichols and MacCrimmon (Nichols and MacCrimmon, 1974, 1975).

If appropriate documentation was available, each stream in the study area was rated for its ability to provide total body contact recreation based on provincial water quality standards for coliform bacteria levels. To be acceptable for body contact recreation*, the annual geometric mean must be less than 1000 total coliforms/100 ml, less than 100 fecal coliforms/100ml, and less than 20 enterococcus coliforms/100 ml. A rating of "High Quality" for body contact recreation was applied to acceptable waters. A rating of "Low Quality" for body contact recreation was applied to unacceptable waters.

A comprehensive inventory of body contact recreation areas was not undertaken by Ecoplans Ltd. nor were water quality measurements undertaken.

2.5 Fisheries

Existing stream survey reports were collected from the Maple District Office, Ministry of Natural Resources (M.N.R.) for Holland River, Black River, Pefferlaw Brook, Uxbridge Brook and Beaverton River. The latest fishery concerns of M.N.R. were expressed in a letter from Mr. I.B. Earl, District Manager, Maple District, September 14, 1977 (see Appendix 5). These reports provided data on the presence of fish species and angling opportunities.

* i.e. swimming and wading.

Water quality data supplied by O.M.E. as reported in Section 2.4.2 was applied where possible to streams to rate fish habitat quality.

Cold water fish habitat (for salmonids)[1] should be below 20°C all year, have a minimum dissolved oxygen concentration of 7 mg/l, and a maximum five day biochemical oxygen demand of less than 5 mg/l throughout the year.

Warm water fish habitat (i.e. Esocidae, Centrarchidae, Cyprinidae, Percidae)[1] generally has water temperatures exceeding 20°C during the summer months, a dissolved oxygen level occasionally lower than 7 mg/l, and a five day biochemical oxygen demand frequently higher than 5 mg/l.

To supplement gaps in data, a one-day cursory field study was carried out by Dr. H. MacCrimmon, Fisheries Biologist. The study was delayed until September 28th, 1977 by high precipitation levels and freshet conditions which prevailed in August and September 1977. The streams were in modest freshet conditions on September 28, 1977 after a comparatively long span of 3 days without precipitation.

The subjective aquatic habitat assessment was based on the estimated volume of flow, turbidity of water, gradient, ground water discharge, stream bottom materials, overhead vegetation cover, soil material of the drainage area, wetland discharge area, stream size and generalized land use.

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[1] Common fish names are given in Appendix 5.

Where possible, each stream habitat was rated as being of High, Medium or Low quality for fish and High, Medium or Low quality for angling. Significant downstream fisheries concerns were addressed.

2.6 Wildlife

Existing reports and data from the Ministry of Natural Resources (M.N.R.), Maple and Huronia Districts, were obtained regarding endangered species, deer population and mortality, small game hunting, trapping, waterfowl hunting and the Holland Marsh Provincial Wildlife Area. Recent wildlife information was obtained from interviews with MNR Biologists, Wildlife Supervisors, Conservation Officers and Ducks Unlimited. The South Lake Simcoe Conservation Authority and the Nottawasaga Valley Conservation Authority could not supply specific information. Field observations on August 18, 1977 of the Holland Marsh Provincial Wildlife Area and a fly-over of the study corridor in a light plane, and woodland field survey, provided a general overview of wildlife resources.

2.7 Special Feature Areas

Existing information regarding environmentally sensitive areas was collected from the Ministry of Natural Resources (MNR), Maple and Huronia Districts, and Central Region Offices, the Regional Municipality of York (RMY), International Biological Programme (IBP), Toronto Field Naturalists, Nottawasaga Valley Conservation Authority (NVCA), South Lake Simcoe Conservation Authority (SLSCA), Innisfil Township, West Gwillimbury Township, and the Regional Municipality of Durham.

3.0 FINDINGS

3.1 Physical Setting

The bedrock throughout the study area is covered by a substantial depth of overburden. This overburden varies in depth from 400-500 feet in the western section of the study area to 50-100 feet in the eastern section.

The study area crosses a number of physiographic units. (Figure 2).

Both the eastern and western sectors are predominantly drumlinized till plains known as the Peterborough Drumlin Field.

The eastern sector is characterized by moderately rolling topography with well drained sandy to silty sand till. Some poor drainage and occasional shallow organic soils occur in depressions between drumlins. This area is drained by Uxbridge Brook, Vrooman Creek and Beaverton Creek as well as by other creeks associated with lowland fingers of the glacial Lake Algonquin sand plain. The western sector (West Gwillimbury) is generally of more gentle relief than the eastern sector. The topography slopes down toward an Algonquin shorecliff to the east so that small streams flowing to Cook Bay and the Holland River have incised valleys into the plain above the shorecliff.

Small areas of gently rolling glaciolacustrine deposits of silt and clay associated with the Schomberg Ponds, dammed by the retreating glacier, extend into the Simcoe till plains.

Rising out of this till plain in the northwest corner of the study area is the prominent and scenic Hollows Area.* This

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* See Map 4.

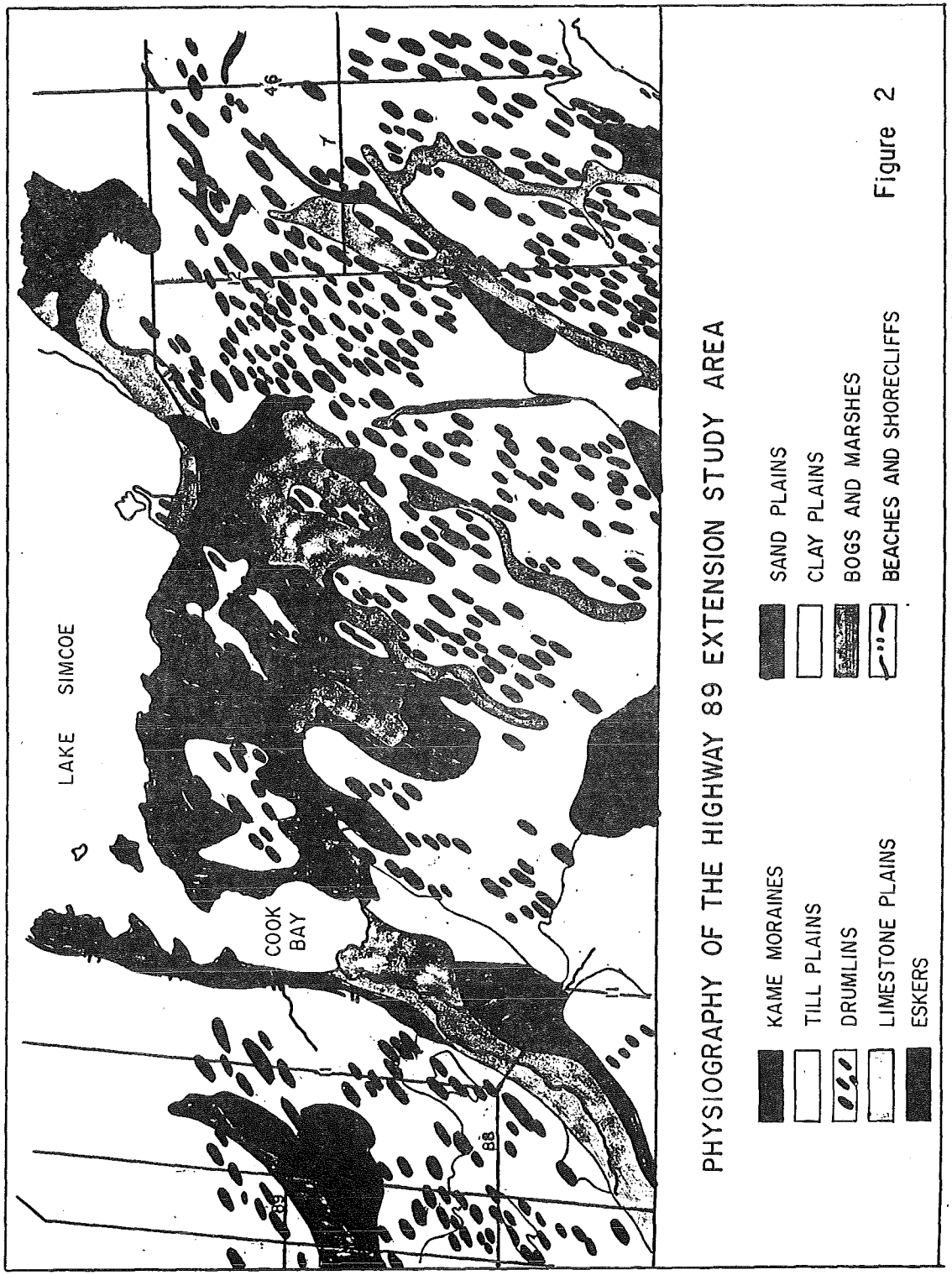

Figure 2

physiographic unit is a steeply rolling kame moraine of mixed outwash sand and glacial till. It is the source area for fast flowing cold water streams, unique in the study area (see Section 3.5.1).

Flat sand plains associated with glacial Lake Algonquin intrude into the central part of the drumlinized till plains of the study area around Udora, Brown Hill and on the western edge of the Cook Bay marsh area as well as in the vicinity of the Highway 400 and Highway 89 interchange. Some of these sands are well drained but their level topography and position below the till plains often produce conditions of poor drainage. As a result, extensive accumulations of organic soils are associated with these sand plains. Because of this level topography, surface streams have minimal gradients resulting in sluggish, warm flow.

The Holland River is the largest river within the flat sand plain. It crosses the broad Keswick Marsh between its convergence with the Schomberg River and its mouth at Cook Bay. Other streams within the flat sand plains include the Maskinonge, Black, Zephyr and Pefferlaw.

Some interfaces between the sand plains and till plains are marked by Lake Algonquin beaches and shorecliffs. On the western side of the Keswick Marsh these shorecliffs are quite prominent.

The Queensville Flats, a more extensive flat, poorly drained silt and clay plain associated with Lake Algonquin, borders and underlies the east side of the Keswick Marsh south of Cook Bay.

An esker is crossed about 2 miles east of Ravenshoe.

With the exception of the Hollows Area, all physiographic units within the study area drain into Lake Simcoe. The Hollows Area drains to Georgian Bay via Innisfil Creek.

3.2 Agriculture

Two types of potential agricultural constraints to route location were recognized within the study area. First, soils of good agricultural capability should be avoided as much as possible. Secondly, specific operational constraints created mainly by property severance should be kept to a minimum.

3.2.1 Soil Capability for Agriculture

The results of the soil capability for agriculture analysis are presented on Map 1, Soil Capability for Agriculture, accompanying this report. The following sections discuss details of the results of this analysis.

3.2.1.1 Simcoe County Section

This area can be split into two parts. The east half above the marsh is good farmland, practically all Classes 1 and 2 capability. By contrast the west half has very little good farmland with low capability Classes 5 and 6 in the north, and moderate capability Classes 3 and 4 in the south. The limitations are due mainly to steep slopes, low fertility and low moisture holding capacity.

3.2.1.2 Keswick Marsh

Generally, this area has low capability for long term vegetable production. Although soil texture is suitable, organic soil depth presents a major limitation to continuous vegetable production. On the east side of the Holland River, organic depths appear to vary from 3 to 4 feet in the recently developed Vander Kooij property to less than 3 feet in the southern section (pers. comm. P. Vander Kooij, September 8, 1977; P. Smith, October 5, 1977; M. Valk, September 8, 1977). University of Guelph maps (1:50,000 unpublished) indicate that some organic soil depths on the west side are greater than 3 feet but much of it is less than 3 feet. Organic soils may deepen immediately adjacent to the Holland River.

Soil depth is fundamental to long term agricultural production on organic soils because these soils gradually disappear with cultivation. According to researchers (pers. comm., M. Valk, September 8, 1977), cultivated soil is commonly lost at a rate of approximately 1.5 feet per 10 years in this area. Further, since undeveloped lands require costly improvements to set up drainage systems, development of organic soils less than 3 to 4 feet deep is considered unlikely to be economically feasible. It should be noted that this depth limitation applies to much of the area.

3.2.1.3 Ravenshoe-Cedarbrae Strip

The soil capability varies greatly along the Ravenshoe road. Most of the length is sandy with drought and fertility limitations. Additional constraints of poor drainage, steep slopes or shallow organic soils also occur.

3.2.1.4 Eastern Block

West of Udora poorly drained sands and some steeply sloped sands present low and moderate capability areas. However, east of Udora in the rolling till unit, the capability is predominantly high, broken only by a few poorly drained valleys, some with shallow organic soils, and a few moderately steep slopes.

3.2.2 Operational Constraints to Road Location

A major impact of new highways on agriculture is the reduction in farm viability caused by property severance. This reduces farm size, increases costs of farming severed land, and can interfere with drainage.

Adherence to existing road alignments or if necessary, to property boundaries, will greatly reduce long term agricultural impact. However, use of existing alignments may interfere with livestock or farm machinery movement.

3.2.2.1 Simcoe Block

Within this section, farms in the eastern portion present several constraints. Located on high capability soil, these farms have a high proportion of tiled fields (pers. comm. J. Hambley, September 6, 1977). Additionally, some farms (e.g. Lot 19, Concession XI) extend from concession to concession across the back lot line creating severance difficulties with back lot line route alternatives(Ibid, September 6, 1977).

An orchard south-west of the intersection of Gilford Raod and the 20th sideroad should be avoided if possible (pers. comm. J. McRuer, September 13, 1977). Heavy farm traffic occurs around the intersection of the XIV Concession Road and the 20th sideroad (ibid., September 13, 1977).

From an agricultural viewpoint, the use of either Concession Road XI or XII is preferred (ibid., September 13, 1977).

3.2.2.2 Developed Keswick Marsh Area

This is an area of specialized vegetable farming taking advantage of the well established associated services in Bradford. Most of the land capable of supporting viable operations is under cultivation. This includes two recent additions not shown on the base aerial mosaic map. One strip is being developed along the east side of the river south toward the Holland-Schomberg River confluence. A block of about 200 acres has been opened up about half a mile north of the Ravenshoe Road adjacent to the previously developed areas. This operation includes buildings on its southern boundary.

This area is highly dependent on the proper functioning of the installed drainage system which consists of tiled fieldsbordered by ditches. Dikes must be maintained to keep out high bay and river water levels. The water level is maintained by pumping with several pump houses occurring in the marsh where ditches approach the bay or river.

The highway presents a definite benefit to the farmers of the Keswick Marsh by providing much faster access than currently exists to Bradford, the marketing and processing terminal. However, this farming area presents constraints to route locations.

The best route from an agricultural viewpoint would avoid developed areas. Due to the recent expansions, to the north and south, this is difficult.

If the alignment follows the existing road, many structures will be threatened and the heavy harvest truck traffic may be impeded. However, farm land loss would be low and drainage disruption would be minor requiring only the rebuilding of roadside ditches and tile outlets.

An old creek bed which crosses the current road about 1-1/8 miles east of the Holland River has very deep unstable soils.

Crossing developed lands will cause major impacts. Since this type of farming is carried out intensively on a small acreage, the area potentially removed by a highway would likely be a substantial proportion of a farm and would greatly reduce annual income. Restoration of damaged ditches, dikes, pump houses, access lanes and tile systems would be requisite.

3.2.2.3 Other Organic Soil Areas

Several other organic soil areas are crossed by the route along Ravenshoe Road. In most cases the soil is too shallow to justify the investment in land and drainage installation. Even in deeper soils areas, these wetlands have a thick forest cover which would involve substantial costs for clearing. Further, forest

soils often tend to be of a more decomposed texture than the marsh soils. Thus, they are not as good for drainage control and are more susceptible to wind erosion. In any case, with an adequate number of culverts, the road should not greatly influence future development.

The west side of the Holland River is largely owned by MNR and, except for one property in the north, is undeveloped for agriculture. This side has some potential for agriculture, varying with organic soil depth but the surface irregularities attributed to fires would require levelling. The creeks flowing off the Algonquin beach to the west may present problems to agricultural development as well as to road building, especially if they possess the excessively deep unstable soils characteristic of the old creek bed on the east side.

3.2.2.4 Udora By-Pass

If departures from existing roads are necessary, routing through the wetlands west of Udora should cause little impact to agricultural operations (see Section 3.3 for vegetation impacts).

Large, highly productive farms occur east of Udora. The properties south of the village tend to be smaller. In both areas routing along existing roads would present the least impacts.

Generally, farmers in the vicinity try to avoid existing paved roads for moving machinery so that construction on these roads may minimize this potential conflict (pers. comm., Mustard, October 3, 1977). The road west from Sunderland was identified as having very heavy agricultural traffic (pers. comm. Stevenson, September 23, 1977).

3.2.2.5 Other Agricultural Constraints

Additional agricultural constraints exist at the local farm scale which is beyond the level of detail of this preliminary survey. Consequently, the nature of these constraints will be briefly discussed but the specific locational problems associated with them will be addressed in phase 2 when alternative route locations have been fixed.

One major concern is the necessity to minimize disruption of drainage structures. Municipal drains can be readily located. However, tile location data are scattered and incomplete although some districts are currently being mapped under a Rural Incentives Programme grant (pers. comm. J. Roulet, September 12, 1977). It is suggested that those farmers affected by route alternatives will be the best source for field tile information.

The high capability soils of the eastern part of West Gwillimbury Township (see Map 1) have a considerable amount of tile (pers. comm., Hambley, September 6, 1977). The cultivated section of Keswick Marsh is completely tiled and ditched. From Keswick Marsh to Brown Hill there is very little tile. Most of Udora eastward is naturally drained although there are some scattered tiled areas.

Although not a major concern, the Agricultural Code of Practice guidelines regarding separation distances between existing operations and highway alternatives should be considered (pers. comm., G. Garland, September 13, 1977). The specific separation distance will vary depending on the type and size of operation.

3.3 Vegetation

3.3.1 Woodland Vegetation Structure

The detailed inventory descriptions of 106 woody vegetation units are documented in Appendix 3B.

The mature woodlots on upland well drained sands are dominated by sugar maple and beech frequently associated with eastern hemlock, basswood, white ash, black cherry, and ironwood, and less frequently with bitternut hickory, red oak, red maple, white pine, butternut, yellow birch, white elm, white birch and shagbark hickory. Most of these woodland areas have been logged or grazed within the past 20 years as evidenced by the low density tree regeneration, tree saplings and woody shrubs. Herbaceous ground flora is also of low diversity and low quality. The least disturbed of these woodlots include vegetation unit numbers B5, C8, E1, part of F13, G4, K18, K20 and K22. From a botanical point of view, these woodlots have the highest environmental value of any visited in the study area.

The majority of woodland vegetation occurs on imperfectly to poorly drained sandy loams, and is comprised of young to semi-mature pioneer wetland hardwoods mixed with softwoods. White cedar, trembling aspen, and balsam poplar dominate these associations along with less frequently occurring balsam fir, black ash, white elm, and white birch. Occasionally these woodlands will have scattered individuals of red maple, tamarack, white spruce, white pine and Manitoba maple. The most highly undisturbed of all the wetland associations found in the study area are units F13 and K8. The maturity and high diversity of both woody shrubs and herbaceous ground flora in these units contribute to their high environmental value.

High quality, mature single tree groupings and hedgerows of sugar maple, basswood and white ash occur throughout the study area. These units provide a high degree of landscape aesthetics to the site in addition to their role as wildlife corridors between large woodlots.

Previous road construction in the eastern portion of the study area has blocked drainage creating flooded conditions in the wet woodlands. Where this condition occurs, the woody vegetation consists of very wet-site tolerant shrubs dominated by green alder with much less frequently occurring red osier dogwood and spiraea. Sapling size black ash, silver maple and white elm may also occur in the woody shrub thickets.

The environmental analysis of each unit relating to its aesthetic quality, capability to sustain road development impacts, its functions, and its values/problems is described in Appendix 3C.

Aesthetic quality rating is illustrated on Map 2. Most woodlots and units west of Holland River are of medium and high quality, whereas, most woodland units east of Holland River are low and medium quality.

Woody vegetation has also been rated for its sensitivity to physiological stresses resulting from road construction operations and secondary impacts within its unit boundary area. High sensitivity of wooded vegetation to construction impacts can result from such factors as advanced tree maturity, greater density of trees per acre, higher species diversity, and the physiological characteristics of sensitive individual species. The impacts arising from construction development may result in physiological stresses leading to degradation and premature mortality of the woodland species within a 100 foot area either side of the clearing for the road right-of-way.

Imperfectly drained and poorly drained soil conditions will increase the sensitivity of woodland vegetation complexes which would otherwise be of lesser sensitivity growing on a well drained soil environment. About 50% of all woodland units have medium-high to extreme sensitivity; that is, 50 to 100% of the residual trees near the new right-of-way will experience degradation leading to premature mortality following construction. In terms of land area, approximately 75% of the natural woodland area west of Holland River would be rated medium-high to extreme sensitivity; whereas, east of Holland River, only 10% of the natural woodland area would be rated as such. Almost

all of the remaining numbered woodland units either side of the Holland River have been rated medium sensitivity.

Many of the woodland units also comprise part of a larger ecosystem in which fisheries and wildlife habitat and hydrological resources are very important environmental factors. The stresses which might occur to these factors can be more environmentally important than the physiological stresses created to a 100 foot strip of woodland either side of a newly cut road right-of-way. On the basis of existing sensitive areas data as well as field observations, each woodland unit was rated to its environmental sensitivity to broader ecosystem stresses.* The evaluation of this variable is difficult to quantify for the entire study area owing to the potential environmental impacts which might occur outside of the study area. However, the greatest ecosystem sensitivity would occur in the vicinity of the major river swamps and marshes extending from the Holland River marsh and woodlands to the Vrooman Creek.

3.3.2 Botanical Resources

The following woodland units were field-checked for existing and potential botanical resources (refer to Map 2 and Appendix 3A for locations and descriptions of units):

Vegetation	Unit B5	Maple-Hemlock-Beech Woodland
	Unit C8	Sugar Maple-Beech Woodland
	Unit E1	Sugar Maple-Hemlock Woodland
	Unit K8	Cedar-Birch-Fir Woodland
	Unit K15	Red Maple-White Birch Woodland
	Unit K18	Ironwood-Basswood-Sugar Maple-Buckthorn Woodland
	Unit K20	Yellow Birch-Sugar Maple-Red Maple Woodland
	Unit K22	Mature Sugar Maple Woodland

* See Appendix 3C

A list of herbaceous plants, shrubs and woody vines observed in these areas is presented in Appendix 3D. The lateness of the season and time constraints on the study resulted in only a minor sampling of the actual flora in the units surveyed.

The results of the botanical check are interpreted as follows:

Unit B5 - This unit is located on moderate to steep west-facing slopes. The herbaceous cover is typical for Maple-Beech-Hemlock woodlands and contains few weedy invaders, an indication that the area has been only minimally disturbed. A broad spectrum of habitat is presented by the varying slopes and by seepage zones and small streams which occur at frequent intervals. The area is rated as high-quality botanically, with high diversity of non-weedy species, at groundcover densities varying from 5 to 50% cover.

Unit C8 - This unit occupies south-sloping to level terrain and is traversed by a series of streams. The flora is consistently free of weedy invaders even in openings. Shrub cover is somewhat scattered. The area is rated as high quality botanically, with high plant diversity, and groundcover ranging from 5 to 50%.

Unit E1 - This unit is divided into two pieces, of which the more northerly is of lower quality due to its smaller size and encroachments along its edges. The more southerly section is located on attractive slopes with creek valleys dissecting the area. The quality of this section has been reduced due to timber management, which has caused weedy openings to develop. The area is of high botanical quality, with medium to high diversity, and cover ranging from 5 to 80%

Unit K8 - This unit is predominantly of a lowland type with wet pockets scattered throughout. It contains some native remnant botanical resources but weedy invaders have displaced many of the more sensitive components. It is rated as medium to high quality, with medium diversity, and cover ranging from 5 to 100%.

Unit K15 - This unit is unique within the study area, but it represents a typical lowland association. It has been disturbed by local development but retains a high quality botanical status. The diversity is rated medium to high and groundcover density is 10 to 50%.

Unit K18 - This unit has been disturbed by periodic logging and minor grazing. The canopy composition and groundcover is quite variable throughout the unit. There is a diverse selection of ferns, and considerable potential for orchids. The quality is rated as high to medium, with medium to high diversity and groundcover density from 5 to 50%.

Unit K20 - This unit is unique within the study area. Disturbance has been minimal, and a healthy groundcover and shrub canopy occurs through much of the area. There is potential for orchids because of the high organic content of the humus. The quality is rated high, with diversity high to medium and groundcover density from 25 to 75%.

Unit K22 - This unit of upland mature maple is surrounded by lowland-affiliated associations. The groundcover is virtually undisturbed and includes attractive ferns and woodland grasses and sedges. The shrub canopy is poorly developed. The botanical quality is rated as high with high to medium diversity, and groundcover density at about 50%.

There were no reports of rare or unusual plant species in the Sensitive Area files of the Ministry of Natural Resources, either within or adjacent to the study area. In the International Biological Programme Area (IBP) located on Pefferlaw Brook just south of the study area, several orchids have been reported including the uncommon Loesel's Bog-Twayblade (Liparis loeselii) and the Yellow Lady's Slipper (Cypripedium calceolus). These two orchids are also described as occurring in the Jim Baillie Nature Reserve, in addition to the uncommon White Adder's-Mouth orchid (Malaxis brachypoda).

3.4 Surface Water Resources

The location of the streams discussed below are illustrated on Map 3.

3.4.1 Water Quantity

3.4.1.1 Innisfil Creek Headwaters, Tributaries A,B,C,D

No streamflow information was available from government sources for these tributaries.

3.4.1.2 Scanlon Creek

No streamflow data were available from government sources for Scanlon Creek. Streamflow may vary from peaks which reach 1000 cfs during spring runoff to no flow for extended periods in the summer months (MNR, 1973).

3.4.1.3 Gilford Creek

No streamflow data were available from government sources for Gilford Creek.

3.4.1.4 Holland River Tributaries A,B,C

No streamflow information was available for these tributaries in the study area.

3.4.1.5 Holland River

No streamflow information was available for this river within the study area. However, streamflow was determined by the Water Survey of Canada (W.S.C.) 1972-1976 for the Holland River at Holland Landing 5 miles upstream of the study area. The lowest flows generally occurred in July,

August, September and October, with occasional lowflow in January, February and December, the daily mean being approximately 17 cfs. The maximum flows occurred in February, March, April and May, the daily mean being approximately 130 cfs. The maximum daily discharge determined was 1360 cfs on February 24, 1975. The minimum daily discharge was 2.8 cfs on September 29, 1973.

3.4.1.6 Maskinonge River

The O.M.E. summer gauging station 1.5 miles downstream of Ravenshoe Road provided flow data for 15 samples in May, June, July, August 1973, and 5 samples in June, July, August 1974. Maximum recorded flow of 8.7 cfs was determined on May 31, 1973. No streamflow was recorded from June 20 to August 30, 1973, and June 13 to August 6, 1974.

3.4.1.7 Black River

Streamflow was measured by the W.S.C. for the Black River at Sutton, 5 miles downstream of Ravenshoe Road for the period 1972-1976. Generally, the maximum flows occurred in March and April, the mean being 338 cfs. The maximum daily discharge on any one day was 2170 cfs on April 14, 1972. The lowest flows may occur in any other month but mostly in July, August and September, the mean being 25 cfs. The minimum daily discharge was 7.9 cfs on July 17, 1974.

Streamflow data provided by the O.M.E. summer gauging station 1 mile south of Ravenshoe Road on the Black River above the confluence of Mount Albert Creek for 111 samples in June to October 1972 indicated a maximum daily flow of 30 cfs on

October 25, and low flows in June to September. Streamflow at the same location with 15 samples in May to August 1973 indicate a maximum daily flow of 41 cfs on May 31, and low flows of about 6 cfs in June, July and August. Streamflow below the confluence of Mount Albert Creek, 1 mile south of Ravenshoe Road, was available for May to August 1973. Out of 15 samples, a maximum flow of 73.2 cfs was recorded on May 31, 1973. Low flows of approximately 18 cfs were determined in June to August.

3.4.1.8 Zephyr Creek

Flow data were not available from government sources. Maximum flows likely occur in March. Minimum flows likely occur in July, August and September.

3.4.1.9 Pefferlaw Brook

Streamflow was measured by WSC for Pefferlaw Brook below the confluence of Pefferlaw Brook and Uxbridge Brook, at a point 0.5 miles downstream of Udora in the study area. Generally, the maximum flows occurred in February, March and April the mean being 292 cfs. The maximum daily discharge on any one day was 1900 cfs on April 14, 1972. The lowest flows occur in July, August and September the mean being 33 cfs. The minimum daily discharge was 23.6 cfs on July 19, 1974.

3.4.1.10 Uxbridge Brook

The OME summer gauging station at Udora provided flow data for 8 samples in May, June, July, August and September in each of 1972, 1973, and 1974. Maximum flow recorded was 73.6 cfs

on May 10, 1973. Minimum flow was 12 cfs on August 3, 1972. Generally, June, July and August were low flow periods.

3.4.1.11 Vrooman Creek and Vroomanton Pond

The OME summer gauging station west of Cannington, 4 miles downstream of Vroomanton Pond provided flow data for 6-8 samples in May, June, July, August and September in each of 1972, 1973 and 1974. Maximum flow recorded was 86.3 cfs on May 15, 1974. No flow was evident on August 20, 1973. Generally June, July and August were low flow periods.

Vroomanton pond likely contains water all year.

3.4.1.12 Beaverton River

Streamflow station data from OME were available for the Beaverton River, 4 miles downstream of the study area. A total of fifty samples during April to December in 1972, 1973 and 1974 were recorded. The highest flow recorded was 214 cfs on May 15, 1974. No flow was evident on August 30, 1972. June, July, August, September and October appear to be low flow months.

A WSC flow station, 6 miles downstream of the study area provided data for the years 1972 to 1976. Generally the lowest flows occurred in January, June, July, August, September, October and November, the daily mean being 16 cfs. Generally maximum flows occurred in March and April, the daily mean being 464 cfs. The maximum daily discharge was 2000 cfs on March 5, 1974 and the minimum 4 cfs on July 18, 1975.

3.4.2 Water Quality

The locations of the streams discussed below are illustrated on Map 3.

3.4.2.1 Innisfil Creek Headwaters, Tributaries A,B,C,D

No water quality information was available from government sources for these streams in the study area.

3.4.2.2 Scanlon Creek

Water sampling results for the middle reaches of Scanlon Creek during 1971 indicated evidence of bacterial pollution at Highway 11 and at the Conservation Authority reservoir (MNR, 1973). This pollution likely resulted from agricultural sources. No other water quality information is available for Scanlon Creek from government sources.

Water quality in the middle reaches of Scanlon Creek is rated Low for body contact recreation.

3.4.2.3 Gilford Creek

No water quality information was available from government sources for Gilford Creek.

3.4.2.4 Holland River Tributaries, A,B,C

No water quality information was available for these streams in the study area.

3.4.2.5 Holland River

Upstream muck farming and altered drainage have resulted in significant pollution of the Holland River. Ministry of

the Environment water quality data for the Holland River at Holland Landing for 1976 revealed high levels of coliform bacteria, turbidity and five day biochemical oxygen demand, making the stream unsuitable for body contact recreation. Heavy silt loads and nutrient enrichment from muck farming and municipalities contribute to the polluted conditions in the study area (Nichols and MacCrimmon, 1974, 1975). However, water quality improvements are anticipated after upstream communities are hooked to the York-Durham sanitary sewer scheme.

Bridge and roadway construction will probably not add significantly to the pollution as high organic, inorganic, nutrient loading and perpetually high suspended solid loading is occurring.

However, large scale disturbances to bottom sediments may release excessive amounts of toxic materials such as ammonia and decomposition gases and chemicals, into the stream course. Excessive organic loading causing oxygen deficiencies could be of consequence locally downstream. Benthic sampling would be necessary to assess impacts caused by disturbing the stream bottom.

Holland River is rated low quality for body contact recreation.

3.4.2.6 Maskinonge River

Water quality data were available from O.M.E., 1976 for the mouth of the Maskinonge River, 3 miles downstream of Ravenshoe Road. Moderate pollution has resulted, likely from agricultural

sources. Enterococci baterial levels in 1976 exceeded the acceptable limit for body contact recreation. Unacceptably high total coliform and fecal coliform levels were infrequently recorded. High turbidity levels and sediment loads contributed to the pollution. At Ravenshoe Road on September 28, 1977, flow was sluggish and highly turbid.

Maskinonge River in the study area is rated low quality for body contact recreation.

3.4.2.7 Black River

Ministry of the Environment water quality data collected at Brown Hill in 1976 indicate a moderately polluted flow, likely caused by agricultural sources. The annual geometric mean for 1976 enterococcus bacteria levels was unacceptably high for body contact recreation. Occasionally, high total coliform levels were recorded. A sluggish flow characterized the river on September 28, 1977 at Brown Hill.

The annual geometric means for bacterial levels measured by OME at Baldwin in 1976, 2 miles downstream of Brown Hill were acceptable for body contact recreation. Recreation quality in Baldwin Pond may be affected by increased sediment loads due to road construction unless erosion control measures are practiced.

Annual geometric mean enterococci bacterial levels measured by OME at the Black River mouth in 1976, 5 miles downstream of Brown Hill, were unacceptably high for body contact recreation. Black River within the study area is rated low quality for body contact recreation.

3.4.2.8 Zephyr Creek

Water quality information was not available from government sources. Sluggish black water characterized the stream during a cursory habitat assessment on September 28, 1977.

3.4.2.9 Pefferlaw Brook

Water quality data were not available for Pefferlaw Brook within the study area. Data collected at the OME stream sampling station, 4.5 miles downstream of Udora indicate low pollution levels for 1976.

Pefferlaw Brook in the study area passes through a developed cottage area. A swimming area has been developed on the stream course. Sediment loading by road construction could be of concern in this area.

3.4.2.10 Uxbridge Brook

No water quality information is available from government sources for Uxbridge Brook in the study area. This branch of Pefferlaw Brook was slow flowing, relatively turbid and fairly deep during the cursory September 28, 1977 field study. The stream course through Udora is highly modified with small dams and ponds. Sediment loading during road construction could be of concern in this area. Water quality measured by OME, 1976, 6 to 7 miles upstream near Uxbridge is rated low quality for body contact recreation because of both high total coliform and enterococci bacteria levels.

3.4.2.11 Vrooman Creek and Vroomanton Pond

No water quality information for Vrooman Creek and Vroomanton Pond is available from government agencies.

3.4.2.12 Beaverton River

Water quality measurements taken by OME, 1 mile downstream of Cannington for 1976 indicate high levels of enterococci bacteria and some high levels of total coliform bacteria making the stream unacceptable for body contact recreation at that point. Water quality data for Beaverton River near the study corridor was not available from government sources.

3.5 Fisheries

The locations of the streams discussed below are illustrated on Map 3.

3.5.1 Innisfil Creek Headwaters, Tributaries A,B,C,D

Four source tributaries of Innisfil Creek are located in West Gwillimbury Township, Lots 5-15 Concession XI-XIV.

No limnological data were available for these streams. A cursory aquatic habitat assessment was carried out on September 28, 1977 at road crossings of the streams. Groundwater discharge in the Hollows area and surrounding wetlands contributes to a clear flow. These headwater collection areas are generally undisturbed. However, a number of farm and/or fish ponds along the main stream course channels have modified natural drainage and flow patterns. Downstream reaches of

these stream course channels within the study area pass through open agricultural lands and are subject to warming and increased silt loads. The headwater streams likely support self-sustaining trout populations, but because of their small size, provide a limited sport fishery.

Preserving these streams for discharge and wetland retention characteristics is vital to streamflow in lower Innisfil Creek. Road construction through Concessions XI-XIV would impact the creeks. More detailed limnological and fisheries survey would be necessary to assess impacts to discharge and wetland water regime. Use of existing road allowances on Concession Road X and Highway 89 would cause minimal impact. Crossing of the streams should be avoided during the period from September to April when brook trout are spawning and eggs are hatched. Siltation of the streams should be minimized.

Innisfil Creek Tributaries A, B, C, D are rated high quality fish habitat, and medium quality sport fishery, although their small size limits angling potential.

3.5.2 Scanlon Creek

The upper reaches of Scanlon Creek in Lots 11-15 Concessions IX-XII, West Gwillimbury Township are groundwater and swamp discharge areas. No fisheries data were available from government sources. A cursory aquatic habitat assessment was carried out on September 28, 1977. Numerous headwater feeder streams likely support modest trout populations. The small size of these feeder streams limits the sports fishery. Nonetheless, this headwater flow is necessary to sustain flow in middle and lower reaches. Siltation during construction could significantly impact this stream and the Conservation Authority Reservoir area in the middle reaches.

Lower reaches of Scanlon Creek within the marsh provide breeding and nursery areas or access to inundated marsh areas for pike and maskinonge and possibly pickerel. This section has essentially warmwater fisheries value. Flow is essential in spring and summer to sustain populations of largemouth bass minnows and other warmwater forage species. Marsh breeding areas would be sensitive to siltation and turbidity especially in March, April and May.

The upper reaches of Scanlon Creek are rated medium quality for trout habitat and low quality sports fishery.

The middle reaches of Scanlon Creek are rated medium quality trout habitat, and medium quality sports fishery although angling potential is limited by the small size. The lower reaches of Scanlon Creek through the marsh are rated medium quality fish habitat.

3.5.3 Gilford Creek

No limnological or fisheries data were available from government agencies.

Upper reaches in Lots 12-20, Concession Road XIII-XIV of West Gwillimbury are heavily influenced by agriculture and have limited value as wetland retention. Low flows were evident during a cursory field study on September 28, 1977. Summer flows are likely negligible and unsuitable for fisheries. Spring freshet flow would be essential to any pike spawning areas at the creek mouth. Construction would be least disruptive in mid-summer.

The lower reaches of Gilford Creek seemingly support a very limited Salmonidae population.

The creek estuary likely has some value as a warmwater fishery where marsh areas are intact.

The use of existing road allowances would cause little impact to the stream course. However, unless controlled, siltation could be detrimental to downstream fisheries resources.

Gilford Creek in the study area is rated low quality for fish habitat and sport fishery.

3.5.4 Holland River Tributaries, A, B, C

No limnological or fisheries data were available from government sources. A cursory field study of tributaries A, B, C which flow east to the Holland Marsh Provincial Wildlife Area, was carried out September 28, 1977 in lots 15-24 Concessions XI-XIII, West Gwillimbury Township. Upper reaches of tributaries A and B are small, coldwater feeder creeks which provide a negligible sport fishery. Tributary C is likely dry in summer. However, all three tributaries provide essential spring water discharge to the lower marsh spawning areas.

The lower reaches provide access to spawning and nursery areas within the inundated parts of the marsh for Esocidae and perhaps Percidae. Flow is required throughout the spring months to allow adult fish passage to and from the Holland River, and to provide nursery areas for young-of-the-year progeny. Turbidity and siltation would be detrimental to spawning areas. Stream crossings should be avoided in March, April and May. Marsh management in the Holland Marsh Provincial Wildlife Area could improve yields of juvenile pike, maskinonge, largemouth bass and other species. In the event of road crossings stream channels within the marsh should be maintained by use of large diameter culverts.

The Holland Marsh Tributaries A and B above the marsh are rated high quality fish habitat and low quality sport fishery. Although Tributary C is rated low quality fish habitat the spring flows are essential to downstream marsh spawning areas. The lower reaches of all tributaries within the marsh are rated high quality fish habitat since these lower reaches are important spawning areas for the Holland River sport fishery.

3.5.5 Holland River

The Holland River and adjacent Cook Bay marshland was traditionally a spawning ground for large numbers of maskinonge and largemouth bass, and possibly pickerel. Pike became common after 1928 and used the same spawning areas as the maskinonge (MacCrimmon, 1956). Since the beginnings of muck soils farming about 1930, natural spawning and nursery areas for warmwater fishes have been greatly modified and reduced in the area. Thus, remaining tributaries, estuaries adjacent to marshlands, and the main river channel are particularly significant for sustaining existing fisheries.

The river channel provides a substantial sport fishery for pike, perch, bullhead carp, largemouth bass, and warmwater pan fish such as sunfish and rock bass (Steward and Boyd, 1976). All species are likely self-sustaining in the Holland River environs. A marsh management programme in the Holland Marsh Provincial Wildlife Area could improve yields of juvenile pike, maskinonge, largemouth bass and other species.

Tributaries of the Holland River flowing through marsh lands provide important spawning and nursery areas (see Section 3.5.4).

The potential exists to develop a marsh management programme which would increase warmwater fish production and also improve waterfowl production.

The Holland River is rated medium quality fish habitat, and high quality sport fishery.

3.5.6 Maskinonge River

Based on a cursory habitat assessment on September 28, 1977, at Ravenshoe Road the river supports small warmwater forage and coarse fish species. There is an insignificant sport fishery above the lower reaches of this river. Migratory lake species do not use the stretch of the river within the study area. Lower reaches of the river are spawning grounds for pike, largemouth bass and other warmwater fishes (pers. comm., Dr. H. MacCrimmon, October 1977). Road construction could release excessive silt loads which could impact downstream spawning areas. Therefore, construction should not be done in March to June to avoid disruption of spawning downstream.

Maskinonge River in the study area is rated low quality fish habitat and low quality sport fishery.

3.5.7 Black River

The Black River estuary at Lake Simcoe is a spawning and nursery area for largemouth bass, perch, suckers, panfish, minnows and other forage fish (pers. comm., Dr. H. MacCrimmon, October 1977). The dam at Sutton blocks any fish migration between Lake Simcoe and the study corridor. Consequently, game fish in the Black River were mainly restricted to the lower reaches of the stream in 1973 (Stewart and Boyd, 1973). From Sutton upstream through the Baldwin area to Brown Hill

the river likely supports a modest fishery for pike, largemouth bass and panfish. Sport fishing in Sutton and Baldwin mill ponds for largemouth bass is important. Suspended solids input from road construction could be deposited in Baldwin pond causing concern to swimmers and to the bass fishery.

Black River in the study area is rated medium quality sport fishery and medium quality fish habitat.

3.5.8 Zephyr Creek

The cursory habitat assessment on September 28, 1977 indicates that Zephyr Creek in the study area contains no significant warmwater sport fisheries. Largemouth bass may be significant downstream near Baldwin pond. Suspended solids from road construction could be deposited in Baldwin pond causing concern to swimmers and to the bass fishery.

Wetland areas associated with Zephyr Creek likely have some water retention function. The maintenance of surface flows is essential to downstream resources. Roadside drainage schemes should be sensitive to the existing drainage conditions and provide improvements where necessary near built up areas.

Zephyr Creek in the study area is rated low quality fish habitat and low quality sport fishery.

3.5.9 Pefferlaw Brook

During the cursory field survey on September 28, 1977, streamflow was characterized by slow-moving "dark" water likely high in humic acids. Habitat is suitable for

largemouth bass, yellow perch, suckers and warmwater forage species behind the dam in Udora. One mile downstream of the Udora dam, common shinner, minnows, white sucker, creek chub and longnose dace were recorded on August 3, 1973 (Stewart and Portt, 1973).

A dam at Pefferlaw halts migration of lake species. The area below this dam is a major spawning ground for smallmouth bass (pers. comm. Dr. H. MacCrimmon, October 1977). Changes in flow, temperature, turbidity and siltation could adversely affect the spawning grounds in May, June and July.

Pefferlaw Brook in the study area is rated medium quality fish habitat and medium quality sport fishery.

3.5.10 Uxbridge Brook

A cursory habitat assessment on September 28, 1977 indicates that habitat is probably good for warmwater species such as largemouth bass, panfish and warmwater forage species.

This branch of Pefferlaw Brook is important for downstream fisheries. Changes in flow, temperature, turbidity and siltation could adversely affect the smallmouth bass spawning grounds located below the Pefferlaw dam in May, June and July.

Fish collected during the Uxbridge Brook stream survey in the study area were white sucker, largemouth bass, smallmouth bass, brown bullhead, yellow perch, pumkinseed, and rock bass (Rimmer and Rainey, 1971).

Uxbridge Brook in the study area is rated medium quality for fish habitat and low quality sport fishery.

3.5.11 Vrooman Creek and Vroomanton Pond

No fisheries data were available from government sources.

However, a cursory habitat assessment on September 28, 1977 indicates that habitat is suitable for a modest largemouth bass fishery. Other warmwater panfish and forage species could also be present in limited numbers.

Vroomanton Pond may have some limited warmwater fishery value. Siltation due to road construction could be a concern in the pond and downstream reaches.

Vrooman Creek and Vroomanton Pond are rated low quality sport fishery. Vrooman Creek is rated low quality fish habitat.

3.5.12 Beaverton River

Warmwater forage species were collected during the Beaverton River stream survey near the study area (Stewart, Portt and Cameron, 1973). This stretch of the river is marginally suitable for warmwater panfish and largemouth bass, based on a cursory habitat assessment on September 28, 1977. Siltation may affect fish species downriver to the Cannington Dam.

Beaverton River near the study area is rated low quality fish habitat and low quality sport fishery.

3.6 Wildlife

3.6.1 Deer

Deer populations in 1974 were generally estimated to range from 0.37 to 0.68/sq. mile for each of Scott, Brock, Georgian and East Gwillimbury Townships. These moderate to low population densities are contrasted with an estimated 3.7 deer/sq/ mile in Caledon Township to the southwest of the study area (A. Wainio and G. Haarmeyer, 1974). West Gwillimbury Township is reported to support a high deer concentration especially in Concessions X to XIV along Holland Marsh - Cook Bay and in the Cookstown Swamp near Highways 400 and 89 (locations are shown on Map 4). Populations are generally considered to be increasing in the Holland Marsh - Cook Bay area due to the availability of food (pers. comm. Mr. K. Evans, Conservation Officer, Huronia District, August 19, 1977). However, no population density figures were available for West Gwillimbury Township. A short archery-hunting season in West Gwillimbury Township returned few deer in 1975-76. Deer hunting does not provide major recreation in the study area.

Reported deer kills by vehicles have generally increased in East Gwillimbury Township from 1 in 1970 to 4 in 1975; increased in Georgian Township from 1 in 1970 to 5 in 1975; remained stable in Scott Township at 1 in 1970, 0 in 1971, 1 in 1972 and 0 in 1973; decreased in Brock Township from 6 in 1970 to 4 in 1974 (A. Wainio and G. Haarmeyer,1974; Maple District, 1974; G.J. Haarmeyer, 1975).

Figures for 1976-77 are not available for the study area. In West Gwillimbury Township, collisions were most prevalent

along Highways 400 and 89 near Cookstown Swamp, and along concession roads within 3 miles of Highway 400. However, collision figures are not available from M.N.R. (pers. comm., Mr. K. Evans, Conservation Officer, Huronia District, August 19, 1977).

Disruption to deer habitat can be minimized by using existing road allowances. The creation of edge by a cross-country route will encourage deer populations to feed on the seeded shoulders of the road. Deer and vehicle collisions will likely increase. However, it is judged that once the highway has been in service for a few years, populations will not be significantly affected in the highway corridor east and west of Holland Marsh.

However, significant disruption to deer movement, habitat and populations may occur in the Holland Marsh - Cook Bay area depending on the alignment chosen. Cross-country alignments across the Holland Marsh are least disruptive to habitat near the limits of the wooded areas. An alignment cutting large wooded tracts adjacent to the Holland Marsh Provincial Wildlife Area and Scanlon Creek Conservation Area into equal pieces would be the most disruptive; the best approach would be to leave as large a block of forest - marsh edge as possible.

Snowmobiles by harassing wintering deer may be more troublesome where the highway improves access.

3.6.2 Waterfowl

A variety of waterfowl are hunted each year in the wetlands and marshes surrounding the study area (a list of species is included in Appendix 6). The Cook Bay - Holland Marsh area

traditionally has been popular with hunters from the Toronto-Centred Region. Statistics collected by M.N.R. in 1971 for this large marsh including the Holland Marsh Provincial Wildlife Area reveal that 535 hunters, from September 25 to November 20, spent 2,261 man hours to harvest 323 birds, i.e. 7 hrs/bird or 0.6 birds/hunter.

Opening day statistics for 1966, 1968-72, 1974, 1975 and 1977 in the Holland Marsh Provincial Wildlife Area reflect a decline in hunter success from a high of 0.90 birds/hunter in 1975 to a low of 0.25 birds/hunter in 1977. Opening day hunter numbers have declined from a high of 447 in 1966 to a low of 97 in 1977. Declines in success and hunter numbers can be partially attributed to the heavy growth of cattails which has reduced the amount of huntable area in recent years (pers. comm., Mr. D. Hogg, Fish and Wildlife Supervisor, Maple District, October 20, 1977).

In the Cook Bay area excluding the Holland Marsh Provincial Wildlife Area, opening day statistics from M.N.R. in 1977 were: 25 hunters spent 85 hours to harvest 26 birds, or 3.3 hours/bird and 1 bird/hunter.

In Georgian and Brock Townships, opening day statistics from M.N.R. in 1977 were: 51 hunters spent 126 hours to harvest 26 birds, or 4.8 hours/bird and 0.5 birds/hunter.

No further waterfowl harvest and hunter data are available from government sources for the study area.

Waterfowl production is low in the Holland Marsh Provincial Wildlife Area (pers. comm., Mr. D. Hogg, August 1977). A marsh management plan which would increase the amount of water-cattail edge could improve production.

Waterfowl are also hunted at Vroomanton Pond, east of Udora, but hunter success figures and species lists are not available.

Waterfowl production along the south shore of Cook Bay will decrease where breeding habitat is removed by road construction. An alignment further inland through the Holland Marsh Provincial Wildlife Area will have less overall effect on waterfowl production. However, any route through the Marsh Wildlife Area will seriously disrupt the hunting experience in the marsh. Future waterfowl production management programmes of dredging or pothole blasting suggested by the M.N.R. and Ducks Unlimited could become impractical if the marsh were cut midway through its length.

If ponds and open water were visible from the road, viewing of waterfowl and shorebirds in spring and autumn would be an increased use generated by the road in addition to the viewing platform in the Provincial Wildlife Area.

As to future options, assuming the funds become available to dredge, dike or dynamite potholes in the Provincial Wildlife Area, a road allowance on the northerly boundary of the Provincial Wildlife Area would be preferable.

The use of existing road allowances would minimize impacts to waterfowl hunting in the remainder of the study area.

3.6.3 Small Game

Ruffed grouse, woodcock, European hare, varying hare, cottontail rabbit, coyote, porcupine and squirrels are hunted

throughout the study area. Hunter surveys by M.N.R. in 1973-1976 for most of the area, indicate a preference for cottontail rabbit over European hare and varying hare. Harvests were low. West Gwillimbury Township contains some of the best grouse habitat in Huronia District. Hunter success is considered good (pers. comm., K. Evans, Conservation Officer, August 19, 1977), although hunter success figures specific to the study area are not available.

Most small game populations will not be significantly affected. However, ruffed grouse populations will likely decrease in the Provincial Wildlife Area as brood movement along the north-south aspen-wetland interface will be made hazardous. Hunting will become less attractive as the highway breaks into this habitat unit.

3.6.4 Fur Bearers

Beaver, muskrat, raccoon, fox, mink and coyote are trapped throughout the study corridor. Numerous recent dug-out ponds have increased habitat for some fur bearers. Returns are generally increasing. This may be due to increased market demands and attendant increases in the number of trappers (MNR trapping records for West Gwillimbury, Scott, Brock, Georgina and East Gwillimbury Townships, 1972 to 1977 - indicated in Appendix 6). All trapping in the area is done as a part-time endeavour. Records specific to the study area are not available.

Production of fur bearers is not likely to be affected by roadway construction. Species displaced will likely find

suitable habitat in nearby extensive areas. Exploitation of this resource is largely dependent upon fur markets. If open water-cattail edge were provided by dredging from the road, more muskrat habitat would be provided.

3.6.5 Endangered Species

No endangered species or habitats were identified in the study corridor (The Endangered Species Act, 1971, O. Reg. 581/77). However, certain habitat within the study corridor is suitable for some declining species of orchids (see Section 3.3.2) and birds such as the red-shouldered hawk and the loggerhead shrike.

3.7 Special Feature Areas

3.7.1 Sensitive Biological Areas

The Ministry of Natural Resources has identified several sensitive biological areas within the study corridor which contain natural features such as surface water, forest cover, plant and animal communities and habitats. These sensitive biological areas are Cookstown Swamp, The Hollows, Holland Marsh (Keswick Marsh) - Cook Bay, Brown Hill Swamp, Georgina Swamp including Pefferlaw Brook West (Zephyr Creek), Pefferlaw Brook, Pefferlaw Brook East (Uxbridge Brook) and Vroomanton Pond (see Map 4).

Several of these sensitive biological areas have been affected previously by highway or road construction (Cookstown Swamp, Brown Hill Swamp, Georgina Swamp) or agricultural clearing (Holland Marsh). Consequently, it is felt that if existing road

alignments are followed as much as possible and if construction practices are carefully planned and implemented, environmental disruption of these areas will be minimal. The one exception is the western side of the Holland Marsh (Keswick Marsh) - Cook Bay area where an important wildlife and fish habitat and recreational area may be affected (see Sections 3.5 and 3.6).

It should be noted that these sensitive biological areas currently have no legal status (letter from I.B. Earl, District Manager Maple District, July 12, 1977; Sensitive Areas Files Central Region, September 1977; letter from Wes Green, Plan Review Officer, Huronia District, September 16, 1977). However, the Region of York has proposed using them as one criterion for their draft Areas of Environmental Sensitivity policy.

The Regional Municipality of York (R.M.Y.), in a draft report and map has also identified areas of environmental sensitivity within the study corridor. Natural environment sensitivity was comprised of five categories including surface water, rivers, lakes, streams, swamps, marshes and water-logged soils; subsurface water, recharge areas, groundwater aquifers; soils sensitive to wind and water erosion; forest and woodland vegetation; and MNR biologically sensitive areas. (The sensitivity of several areas identified by R.M.Y. is dealt with in the soils, vegetation, fisheries and wildlife sections of this report.)

No International Biological Programme (IBP) sites have been identified in the study area (pers. comm. J. Morley, August 1977; letter from W. Green, September 16, 1977). The Pefferlaw Brook Swamp IBP site is upstream of the study area.

The Toronto Field Naturalists' park (Jim Baillie Nature Reserve) on Uxbridge Brook noted for its botanical resources is immediately upstream of the southern boundary of the study area (see Section 3.3.2). It will not be affected by highway construction.

The two conservation authorities within the study area were contacted for sensitive biological information. The Nottawasaga Valley Conservation Authority referred to MNR Sensitive Area Reports (see above) and identified the source areas of Innisfil Creek, or Cookstown Swamp as sensitive (pers. comm., H. Van Weesenbeck, Resources Manager, NVCA, August 1977).

The South Lake Simcoe Conservation Authority identified the Scanlon Creek Conservation Area and referred to MNR Sensitive Area Reports (pers. comm. R. McClure, SLSCA, August, 1977).

When contacted, Innisfil Township Planning Board identified fisheries of Innisfil Creek, organic soils, floodplains and market gardening associated with Innisfil Creek or Cookstown Swamp and floodplains of all stream courses as sensitive areas, and referred to areas identified by MNR, SLSCA and NVCA (pers. comm. and letters from R.J. Lemon, Planning Co-ordinator, Township of Innisfil, August 1977).

West Gwillimbury Township referred to areas identified by MNR, SLSCA and NVCA (pers. comm. D. Wood, Clerk, West Gwillimbury Township, August 4, 1977).

The Regional Municipality of Durham referred to areas identified by MNR and incorporated into the Official Plan (pers. comm. J. Blair, Planner, RMD, August 10, 1977).

3.7.2 Recreational Areas

There are three major recreational areas within the study area. The Scanlon Creek Conservation Area is located between Concessions IX and X West Gwillimbury Township, immediately west of the Keswick Marsh. The South Lake Simcoe Conservation Authority which administers this area also owns property north of Concession X and has long term plans to acquire a continuous strip of land to the south boundary of the Holland Marsh Provincial Wildlife Area. Consequently, a road alignment in the Concession X-XI corridor would directly sever the Scanlon Creek Conservation Area from the Holland Marsh Wildlife Management Area. An alignment along Concession X would reduce the aesthetic nature of the attractive setting.

Recreational use of this area may also be affected if highway construction within the Scanlon Creek watershed impairs water quality in the 9 acre reservoir. This waterbody, which is fed by Scanlon Creek, provides stocked fishing (rainbow trout) and beach swimming. It will be essential, therefore, to practise strict erosion control measures if a highway route is selected in this watershed (see Section 3.4.2).

Immediately to the northeast of the Scanlon Creek Conservation Area is the Holland Marsh Provincial Wildlife Area. As indicated in Sections 3.6 and 3.7.1, this area provides habitat and hunting potential for deer, grouse and waterfowl. Given the desirability of avoiding interference with S.L.S.C.A. plans to the south, a route alignment on the northern boundary of this area also would reduce waterfowl hunting disruption and could provide increased waterfowl viewing opportunities (see Section 3.6.2).

The third major recreational area is the Estonian and Finnish camps located along the Pefferlaw Brook at Udora. Route alignments within the recreational communities would have severe effects on recreational useage as well as affecting high quality vegetation units (see Section 3.3.1). Crossings of the Pefferlaw Brook south of Ravenshoe Road may create sediment problems in the Pefferlaw Brook pond if erosion is not controlled.

Although not part of this study design, it was noted that numerous small ponds have been developed throughout the study area. When a final route has been selected, erosion control and flow maintenance procedures will be desirable to minimize interference with these recreational facilities.

Several important sports fishery areas and/or swimming areas are located downstream of the study area (see Section 3.5 for locations). Consequently, erosion control is especially important at road crossings of the affected streams.

4.0 SUMMARY AND CONCLUSIONS

Environmental features within the study area have been identified. Analysis of these features has resulted in preparation of a composite map illustrating their location (see Map 4).

The significance of these features as constraints is discussed in the following sections.

4.1 Physical Setting

(a) Crossings of the Hollows Area will disturb erosion susceptible soils on steep slopes (see also Sections 4.3.1, 4.3.2, 4.4.2, 4.5 for additional impacts).

(b) Adequate drainage should be provided at the numerous crossings of shallow, poorly drained organic soils areas east of Keswick Marsh.

(c) Steep slopes associated with the Algonquin shoreline west of Keswick Marsh will require erosion control, particularly in proximity to coldwater surface streams which drain this area (see Section 4.4 and 4.5).

4.2 Agriculture

(a) Route alternatives should avoid High and Moderate capability land wherever possible within the overall project constraints. This can be achieved by using existing road easements. If divergence is necessary, property boundaries should be followed to avoid severances and drainage disruptions. In cases where high constraint woodlands may be affected, the route should follow a woodlot edge (see Section 4.3 also).

(b) In the Keswick Marsh, current operations should be avoided wherever possible within the overall project constraints.

4.3 Vegetation

4.3.1 Woodlands

(a) Route alternatives should avoid high quality - high sensitivity woodland areas wherever possible (see Map 4). This can be achieved by utilizing existing road rights-of-way and low quality woodland areas and abandoned pastures currently undergoing woody colonization.

(b) Route alternatives which pass large woodland swamp areas should be located, wherever possible, along abandoned pasture edges rather than through the middle of the swamp areas.

4.3.2 Botanical Resources

(a) Alternative route locations through or adjacent to Units B5, C8, E1, K15, K20 or K22 (see Map 4) would seriously disrupt or destroy the existing high quality botanical resources.

(b) When a final route is selected, consideration should be given to conducting a comprehensive botanical survey to ensure that significant botanical resources are located and removed to suitable alternative sites.

4.4 Surface Water Resources

4.4.1 Water Quantity

(a) Generally, streamflows throughout the area fluctuate in seasonal extremes. Maximum flow periods and extremely high flows generally occur in March-April.

4.4.2 Water Quality

(a) The high quality water sources and wetland retention of Innisfil Creek Tributaries and Holland Marsh Tributaries should be protected.

(b) Erosion control measures will be necessary at all stream crossings during construction.

(c) Benthic sediment sampling should be carried out prior to Holland River crossings to assess potential impacts to water quality and fisheries resources.

(d) Special care should be taken at the Black River and Pefferlaw Brook crossings to insure that downstream water-related recreational uses are not unduly affected.

4.5 Fisheries

(a) The high quality fish habitat of the Innisfil Creek Tributaries and Holland Marsh Tributaries should be protected (see also Section 4.4.2). If it is necessary to cross the Holland Marsh Tributaries, oversize culverts are recommended to promote passage of spawning fish.

(b) Erosion control measures will be necessary at all stream crossings (see also Section 4.4.2).

(c) Construction timing constraints must be recognized on certain cold and warmwater streams in the study area.

Crossings of Innisfil Creek Tributaries should be avoided in September to April to protect trout spawning and hatching.

Crossings of Gilford Creek, Holland River Tributaries and Scanlon Creek should be avoided in March, April and May to protect pike and maskinonge spawning.

Crossings of Maskinonge River, Black River and Zephyr Creek should be avoided in Marsh, April, May and June to protect pike and largemouth bass spawning.

Crossings of Pefferlaw Brook and Uxbridge Brook should be avoided in May, June and July to protect downstream smallmouth bass spawning.

It would be desirable to avoid crossing Beaverton River and Vrooman Creek in March, April, May and June to protect down-river bass spawning although this fishery is not so important as other streams in the study area.

4.6 Wildlife

(a) The major wildlife constraint in the study area is the Holland Marsh Provincial Wildlife Area. It would be desirable to avoid crossing this area. However, if a crossing is necessary because of agricultural trade-off (see Section 4.2) or engineering concerns, a northern crossing is suggested. Such a location would optimize future options for wildlife management, fish management and recreational expansion (see Section 4.7).

(b) There are no other major wildlife constraints within the study area.

4.7 Special Feature Areas

(a) On the assumption that the environmental planning concerns in the previous sub-sections are recognized in the location of route alternatives, it is anticipated that effects on sensitive biological areas will be minimal.

The one exception is the Holland Marsh - Cook Bay area which will require special study to minimize negative impacts on fisheries, wildlife and recreation.

(b) Route locations may affect three major recreational areas.

A route location between Concession X and XI would inhibit future expansion of the Scanlon Creek Conservation Area to join the Holland Marsh Provincial Wildlife Area. Severing the two recreational areas would limit future recreational value.

As noted above, a route location within the Holland Marsh Provincial Wildlife Area would severely limit wildlife management options.

Therefore, it is suggested that a route alignment be investigated to the north of the Holland Marsh Wildlife Area.

Route locations should avoid the Estonian and Finnish recreational communities at Udora.

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ENVIRONMENTAL INVENTORY AND ANALYSIS
FOR
THE HIGHWAY 89 EXTENSION
PRELIMINARY DESIGN STUDY
PHASE 1
BOTANICAL ADDENDUM

by

Ecoplans Ltd.
Waterloo, Ontario

July, 1978

TABLE OF CONTENTS

INTRODUCTION

This survey was conducted on June 15, 1978 by Mr. Jim Dougan, botanist, under authorization from Mr. John Sutherns of McCormick, Rankin and Associates Ltd. The recommendation for this additional botanical work was contained in the report entitled "Environmental Inventory and Analysis for Highway 89 Extension. Preliminary Design Study - Phase I". (Ecoplans, Ltd., December 1977).

High sensitivity vegetation units which would be directly or peripherally affected by the proposed route "E5b" (see McCormick, Rankin Map "Highway 89 Extension" WP.40.77.00 - Route Alternatives) were examined. These included units K4, K15, K16, K18 and K20 (see Map 4 and Section 3.3.2 of Ecoplans' 1977 report). Units K4 and K16 were examined due to their location in the direct path of the proposed route, even though they were not identified in our original report as having significant botanical potential.

METHODOLOGY

Units were assessed for the quality, density and diversity of spring-summer ground flora and shrubs. An evaluation was made of the potential impact of the proposed route "E5b" on existing botanical resources.

RESULTS AND DISCUSSION

The following woodland units were re-checked for existing and potential botanical resources: (refer to Map 2 and Appendix 3D- of Ecoplans 1977 report)

Vegetation Unit

- K4 - Pure White Cedar Upland Woods
- K15 - Red Maple-White Birch Woodland
- K16 - White Birch-White Ash-Aspen Woodland
- K18 - Ironwood, Basswood-Sugar Maple-Buckthorn Woodland
- K20 - Yellow Birch-Sugar Maple-Red Maple Woodland

A complete list of plants, shrubs and woody vines observed in these areas is presented in revised Appendix 3D of this addendum.

The results of the botanical check are interpreted as follows:

Unit K-4: This white cedar dominant unit is located on a moderate west-facing slope. Herbaceous cover is practically non-existent due to the combined effects of deep shading and cattle grazing. A few shrubs such as staghorn sumac (Rhus typhina), red raspberry (Rubus sp.) and common buckthorn (Rhamnus cathartica) are located in small openings in the cedar, with the groundcover consisting of weedy grasses. Towards the bottom of the slope, there is some seepage under the cedar canopy, and shrubs such as red osier dogwood (Cornus stolonifera) and pussy willow (Salix discolor) occur along the edge of the unit. This unit is of low botanical quality, with poor diversity and under 5% groundcover density. From a botanical standpoint, this unit does not warrant special preservation efforts.

Unit K-15: As noted in our original report, this unit is unique to the study area although it is a typical lowland association. The forest canopy is of a rather "patchy" composition and maturity, reflecting a history of intermittent logging. The moist streamside location, combined perhaps with some intermittent flooding, has created an ideal habitat for ferns and wildflowers, such as some orchids. The unit contains an abundant growth of rattlesnake fern (Botrychium virginianum) and oak fern (Dryopteris disjuncta) plus seven other fern species and four species of clubmoss (Lycopodium sp.). Wildflowers include bunchberry (Cornus canadensis), rose twisted-stalk (Stoeptopus roseus), starflower (Trientalis borealis), goldthread (Coptis groenlandica), mitreworts (Mitella sp.), and two species of Pyrola (Pyrola sp.). A woodland fescue grass (Festuca obtusa) and a number of sedges (Carex sp.) occur throughout the unit. The shrub component includes alternate and round-leaved dogwoods (Cornus alternifolia and C. racemosa) as well as dogberry (Ribes cynosbati) and northern bush-honeysuckle (Diervilla lonicera). Although at least two orchid genera were represented, only one, the common helleborine (Epipactis helleborine) could be identified due to immaturity of the observed specimens.

Botanically, Unit K-15 is a high quality area, with high diversity and groundcover density up to 100%. Road construction through this sensitive area would destroy these characteristics as a result of cutting and disruption of the local moisture regime. The unit is not sufficiently large for residual areas to be protected.

Unit K-16: This unit, like Unit K-4, has been seriously affected by cattle grazing; in fact, cattle were in the unit at the time of this survey. As a result, most of the sensitive herbaceous species have been eliminated, and weedy species are rapidly invading. The unit has only a low to moderate botanical quality, with moderate diversity and groundcover density of 60% to 80%.

Unit K-18: This unit is an attractive upland woods which has been intermittently logged. Although most of the area is well drained, there are damp depressions scattered throughout the unit. The herbaceous flora is fairly typical of upland deciduous woodlands, with ferns including Christmas fern (Polystichum acrostichoides), lady fern (Athyrium felix-femina) and maidenhair fern (Adiantum pedatum). Of particular interest is the prolific growth of the broad-leaf woodland sedge (Carex plantaginea).

This unit has a high quality herbaceous flora, with moderate diversity and groundcover density varying between 5% and 50%. Road construction which is not directly adjacent to the unit should not cause significant deterioration.

Unit K-20: Because of the moist-to-wet nature of the soils in this unit, many of the groundflora species are moisture-loving. These include such plants as the cinnamon fern (Osmunda cinnamomea) and bulblet fern (Cystopteris bulbifera), orange jewelweed (Impatiens capensis) and skunk cabbage (Symplocarpus foetidus). At least one orchid species occurs in the unit, belonging to the genus Habeneria. Unfortunately, the plants were too immature to

to make a precise identification.

This unit is of high botanical quality, with high diversity and groundcover density from 25% to 75%. Road construction as proposed, which is not directly adjacent to the unit, should not have serious detrimental effects on the botanical resources. Precautions should be taken to ensure that local drainage patterns are maintained, as the vegetation in this unit is strongly moisture-dependent.

SUMMARY AND CONCLUSIONS

The reevaluation of high-quality vegetation units along the proposed route "E5b" has identified some key areas of concern from a botanical standpoint. No species were observed which are currently considered "rare of endangered". *

Units K-4 and K-16 (see Map 4, Ecoplans 1977 report) do not contain significant herbaceous or shrub resources. Unit K-15 is a locally-unique vegetation association which contains a high-quality, highly diverse ground flora. The unit is of insufficient size to ensure preservation of residual areas, and construction along the proposed route would eliminate the majority of this unit. The only alternative would be to bypass the unit.

Units K-18 and K-20 are both high-quality botanical units; Unit K-18 has moderate diversity and K-20 has high diversity. Construction along the proposed route should not have a detrimental effect on the vegetation in the units. Extreme care should be taken to ensure that drainage patterns in the vicinity of Unit K-20 are not altered in any way.

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* Argus, G.W., and D. J. White, 1977. The Rare Vascular Plants of Ontario. Syllogeus No. 14. National Museums of Canada, Ottawa.

APPENDIX 3D - Revised*

PART 1 HERBACEOUS PLANTS

PART 2 SHRUBS AND WOODY VINES

* This revised Appendix contains plants observed during June, 1978 in addition to the species presented in Appendix 3D of Ecoplans December 1977 Report.

PART I Herbaceous Plants

English Name		Unit No. K4	K15	K16	K18	K20
Shade Horsetail	Equisetum pratense Ehrh.		X	X	X	
Wood Horsetail	E. sylvaticum L.		X			
Running Clubmoss	Lycopodium clavatum L.		X			
Shining Clubmoss	L. lucidulum Michx.		X			X
Tree Clubmoss	L. obscurum L.		X			
Ground Cedar	L. tristachyum Pursh.		X			
Rattlesnake Fern	Botrychium virginianum (L.) Sw.		X			
Cinnamon Fern	Osmunda cinnamomea L.					X
Bulblet Fern	Cystopteris bulbifera (L.) Bernh.		X	X	X	
Ostrich Fern	Pteretis pensylvanica (Willd.) Fern.		X	X		
Sensitive Fern	Onoclea sensibilis L.		X	X	X	X
Oak Fern	Dryopteris disjuncta (Ledeb.) C.V. Mart.		X			X
Marginal Woodfern	D. marginalis (L.) Gray		X			X
Spinulose Woodfern	D. spinulosa (O.F. Muell.) Watt.		X	X	X	X
Marsh Fern	D. thelypteris (L.) Gray					X
Christmas Fern	Polystichum acrostichoides (Michx.) Schott.				X	
Lady Fern	Athyrium Felix-femina (L.) Roth		X		X	
Maidenhair Fern	Adiantum pedatum L.				X	
Bracken Fern	Pteridium aquilinum (L.) Kuhn.		X	X		X
Woodland Grass	Schizachne purpurescens (Torr.) S.W.					X
Woodland Fescue	Festuca obtusa Biehler		X			
Reed Meadow Grass	Glyceria grandis S. Wats.			X		
Rice Grass	Oryzopsis asperifolia Michx.		X			X
Bluegrass	Poa Sp.			X		
Sedge	Carex sp.				X	
Sedge	Carex arctata Boott.		X		X	X
Sedge	C. deweyana Schwein.		X			
Sedge	C. hirtifolia Mack.				X	
Sedge	C. hystericina Muhl.			X		X
Sedge	C. intumescens Rudge		X			
Sedge	C. laxiflora Lam.				X	
Sedge	C. leptonervia Fern.					X

PART I (cont'd.)

English Name	Latin Name	Unit No. K4	K15	K16	K18	K20
Sedge	C. plantaginea Lam.				X	
Sedge	C. rosea Schk.		X		X	
Sedge	C. vulpinoidea Michx.			X		
Jack-in-the-Pulpit	Arisaema atrorubens (Ait.) Blume		X	X	X	X
Skunk Cabbage	Symplocarpus foetidus (L.) Nutt.					X
Wild Leek	Allium tricoccum Ait.				X	
Trout Lily	Erythronium americanum Ker.				X	
Corn Lily	Clintonia borealis (Ait.) Raf.		X	X		X
False Spikenard	Smilacina racemosa (L.) Desf.		X			
Starry False Solomon's Seal	S. stellata (L.) Desf.				X	
Canada Mayflower	Maianthemum canadense Desf.		X	X		X
Rose Mandarin	Streptopus roseus Michx.		X			X
Solomon's Seal	Polygonatum pubescens (Willd.) Pursh.				X	
Indian Cucumber Root	Medeola virginiana L.					X
Purple Trillium	Trillium erectum L.		X			X
White Trillium	T. grandiflorum (Michx.) Salisb.		X		X	
Rein Orchis	Habenaria sp.					X
Helleborine	Epipactis helleborine (L.) Crantz.		X		X	X
Wood-Nettle	Laportea canadensis (L.) Wedd.		X			X
False Nettle	Boehmeria cylindrica (L.) Sw.		X	X		X
Wild Ginger	Asarum canadense L.		X		X	X
Kidney-Leaf Buttercup	Ranunculus abortivus L.		X			
Common Buttercup	R. acris L.		X	X		X
Early Meadow Rue	Thalictrum dioicum L.		X		X	
Tall Meadow Rue	T. polygamum Muhl.		X		X	
Pointed-Leaf Hepatica	Hepatica acutiloba D.C.				X	
Canada Anemone	Anemone canadensis L.		X	X		
Wood Anemone	A. quinquefolia L.		X			
Thimbleweed	A. virginiana L.					X
Virgin's Bower	Clematis virginiana L.					X
Cowslip	Caltha palustris L.		X			
Goldthread	Coptis groenlandica (Oeder.) Fern.		X			X

PART I (cont'd.)

English Name	Latin Name	Unit No. K4	K15	K16	K18	K20
Columbine	Aquilegia canadensis L.					X
White Baneberry	Actaea pachypoda Ell.				X	
Red Baneberry	A. rubra (Ait.) Willd.		X		X	X
May-apple	Podophyllum peltatum L.		X			
Toothwort	Dentaria diphylla Michx.				X	X
Blue Cohosh	Caulophyllum thalictroides (L.) Michx.				X	X
False Miterwort	Tiarella cordifolia L.		X		X	X
Coolwort	Mitella diphylla L.		X			
Naked Miterwort	M. nuda L.		X			
Wild Strawberry	Fragaria virginiana Duch.	X	X	X	X	X
Norwegian Cinquefoil	Potentilla norvegica L.			X		X
Yellow Avens	Geum aleppicum	X	X			
Purple Avens	G. rivale L.		X			X
Dwarf Raspberry	Rubus pubescens Raf.		X		X	X
Agrimony	Agrimonia gryposepala Wallr.				X	
Hog Peanut	Amphicarpa bracteata (L.) Fern.				X	
Herb-Robert.	Geranium robertianum L.		X	X	X	X
Orange Jewelweed	Impatiens capensis Meerb.		X	X		X
Blue Violet	Viola cucullata Ait.		X		X	X
Smooth Yellow Violet	V. pensylvanica Michx.		X			
Downy Yellow Violet	V. pubescens Ait.		X		X	X
Small Enchanter's Nightshade	Circaea alpina L.		X			X
Enchanter's Nightshade	C. quadrisulcata (Maxim.) Fr. & Sav.			X	X	
Wild Sarsparilla	Aralia nudicaulis L.		X			X
Sweet Cicely	Osmorrhiza claytoni (Michx.) C.B. Clarke		X			X
Bunchberry	Cornus canadensis L.		X			
Pink Pyrola	Pyrola asarifolia Michx.		X			
Shinleaf Pyrola	P. elliptica Nutt.		X			
Starflower	Trientalis borealis Raf.		X			X
Spreading Dogbane	Apocynum androsaemifolium L.		X	X		

PART I (cont'd.)

English Name	Latin Name	Unit No. K4	K15	K16	K18	K20
John's Cabbage	Hydrophyllum virginianum L.				X	
White Vervain	Verbena urticifolia L.				X	X
Catnip	Nepeta cataria L.			X		
Bugleweed	Lycopus americanus Muhl.		X	X		X
Nightshade	Solanum dulcamara L.		X			X
Speedwell	Veronica sp.		X			X
Sweet-Scented Bedstraw	Galium triflorum Michx.		X		X	X
Blue-Stem Goldenrod	Solidago caesia L.			X	X	X
Zig-Zag Goldenrod	S. flexicaulis L.			X	X	
Heart-leaved Aster	Aster cordifolius L.		X			
New England Aster	Aster novae-angliae L.					X
Sow Thistle	Sonchus arvensis L.		X			
White Lettuce	Prenanthes alba L.		X			
Philadelphia Fleabane	Erigeron philadelphicus L.		X	X		X

PART 2 Shrubs and Woody Vines

English Name	Latin Name	Unit No. K4	K15	K16	K18	K20
Yew	Taxus canadensis Marsh.					X
Pussy Willow	Salix discolor L.	X		X		
Beaked Hazelnut	Corylus cornuta Marsh.					X
Common Barberry	Berberis vulgaris L.					X
Dog-berry	Ribes cynosbati L.		X		X	X
Flowering Raspberry	Rubus odoratus L.					X
Raspberry	R. idaeus L.	X	X	X	X	X
Blackberry	R. allegheniensis Porter	X	X			
Hawthorn	Crataegus sp.					X
Staghorn Sumac	Rhus typhina L.	X				X
Manitoba Maple	Acer negundo L.		X			
Mountain Maple	A. spicatum Lam.		X			X
Common Buckthorn	Rhamnus cathartica L.	X	X	X	X	X
Riverbank Grape	Vitis riparia Michx.		X		X	
Virginia Creeper	Parthenocissus quinquefolia (L.)	X	X	X	X	X
Alternate-leaved Dogwood	Cornus alternifolia L.		X		X	X
Round-leaved Dogwood	C. racemosa Lam.		X			
Red Osier Dogwood	C. stolonifera Michx.	X	X	X		X
Bush-Honeysuckle	Diervilla lonicera Mill.		X			
Mountain Honeysuckle	Lonicera dioicum		X			
Tartarian Honeysuckle	L. tatarica		X			
Maple-leaf Viburnum	Viburnum acerifolium L.		X		X	
Hobble-bush	V. alnifolium Marsh.					X
Common Elderberry	Sambucus canadensis L.	X		X	X	X

APPENDIX D

HIGHWAY 89 EXTENSION
HWY·400 TO HWY·12

ANALYSIS
OF
ALTERNATIVES

McCORMICK RANKIN
CONSULTING ENGINEERS

Ontario
Ministry of
Transportation and
Communications

HIGHWAY 89 EXTENSION
ANALYSIS OF ALTERNATIVES

CONTENTS

HIGHWAY 89 EXTENSION
FACTORS ANALYSED

TRAFFIC

AGRICULTURE

NOISE

COST

PROPERTY

ENVIRONMENT

STAGING

AESTHETICS

HIGHWAY 89 EXTENSION

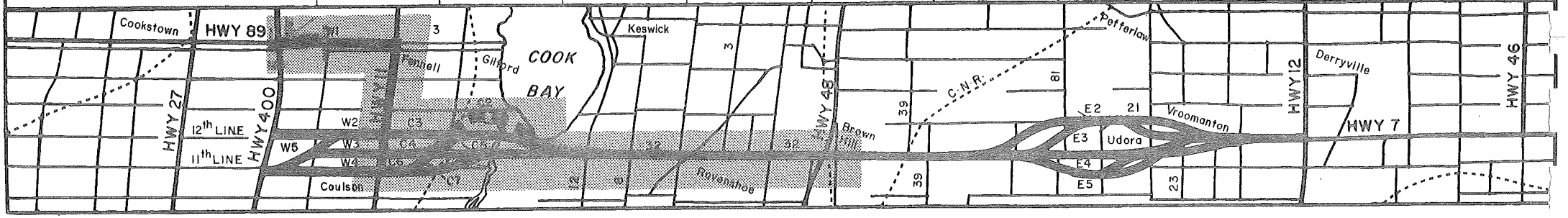
A2

ANALYSIS OF ALTERNATIVES

HWY·400 TO HWY·48

HWY· 89 INTERCHANGE

TRAFFIC	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
LENGTH	Miles	19.0	19.6	19.1	19.9	20.4	19.3			
LOCAL SERVICE	—	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD			
REGIONAL SERVICE	—	FAIR	FAIR	FAIR	FAIR	FAIR	FAIR			
OUT OF WAY TRAVEL	—	MIN.	MOD.	MIN.	MIN.	MOD.	MOD.			
No· OF ACCESSES	Frequent use / Less Frequent	134 / 41	122 / 37	132 / 50	152 / 56	141 / 43	134 / 40			
SAFETY	No·of curves	4	6	2	4	6	6			



HIGHWAY 89 EXTENSION

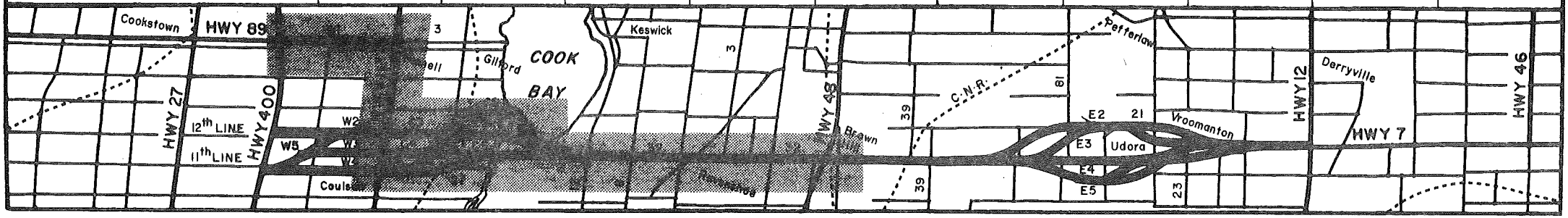
A3

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY-89 INTERCHANGE

AGRICULTURE	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
CLEARED LANDS REQ.	Organic Acs. / Acs. Mineral	21 / 34	27 / 47	11 / 45	11 / 33	27 / 32	19 / 35			
HIGH CAP. LANDS	Acres	29	42	41	27	28	30			
MEDIUM CAP. LANDS	Acres	21	22	21	22	21	25			
LOW CAP. LANDS	Acres	34	46	25	23	41	35			
DISRUPTION OF FARM OPER.	—	MOD.	MAJ.	MAJ.	MAJ.	MOD.	MAJ.			
DRAINAGE IMPACTS	—	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.			
SEVERANCES	Acres	32	76	35	1	57	124			



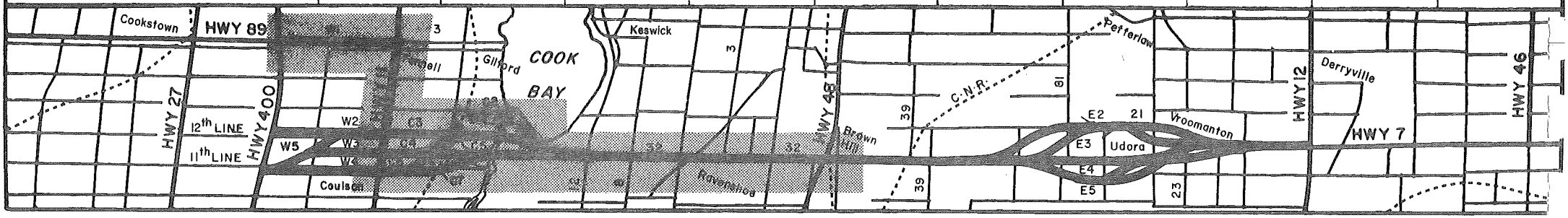
HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

NOISE	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
HOUSE LEQ·> 55 dBA	No·	111	102	112	132	122	111			
HOUSE LEQ·> 65 dBA	No·	27	27	27	32	32	27			



HIGHWAY 89 EXTENSION

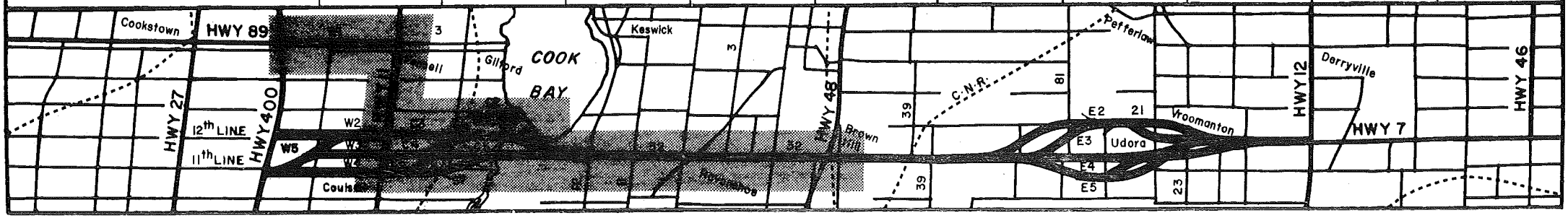
A5

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

COST	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
CONSTRUCTION	$ mill.	7.30	7.35	7.35	7.40	7.65	7.55			
PROPERTY	$ mill.	0.39	0.48	0.35	0.30	0.47	0.46			



HIGHWAY 89 EXTENSION

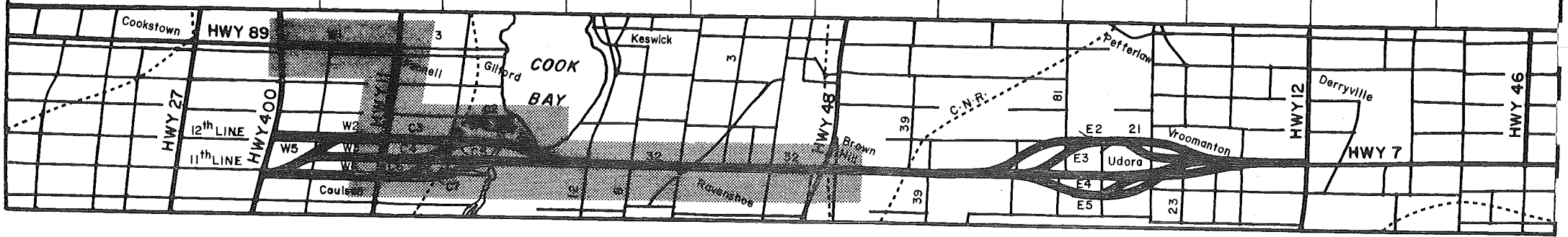
A6

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

PROPERTY	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
TOTAL ACREAGE REQ·	Acres	85 + (32)	110 + (76)	87 + (35)	73 + (1)	90 + (57)	89 + (124)			
HOUSES REQ·	No·	0	0	0	0	0	0			
PROPERTIES AFFECTED	No·	56	49	51	60	60	55			



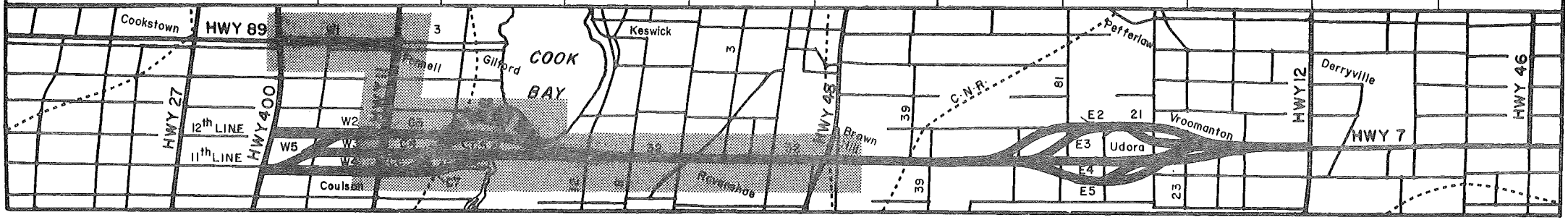
HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

ENVIRONMENT	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
HIGH QUALITY VEG· UNITS	No·	1	2	3	1	1	1			
ACREAGE OF VEG·	Acres	14	16	18	13	17	19			
CREEK CROSSINGS	No·	4	4	3	3	4	5			
SEVERITY OF CROSSINGS	—	MOD.	MIN.	MIN.	MIN.	MIN.	MAJ.			
WILDLIFE	—	MOD.	MOD.	MAJ.	MAJ.	MOD.	MIN.			



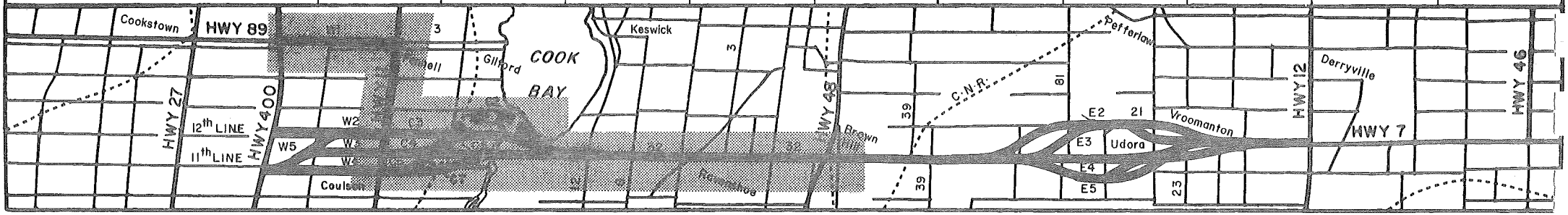
HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

STAGING	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
ABILITY TO STAGE	—	FAIR	GOOD	FAIR	FAIR	FAIR	FAIR			



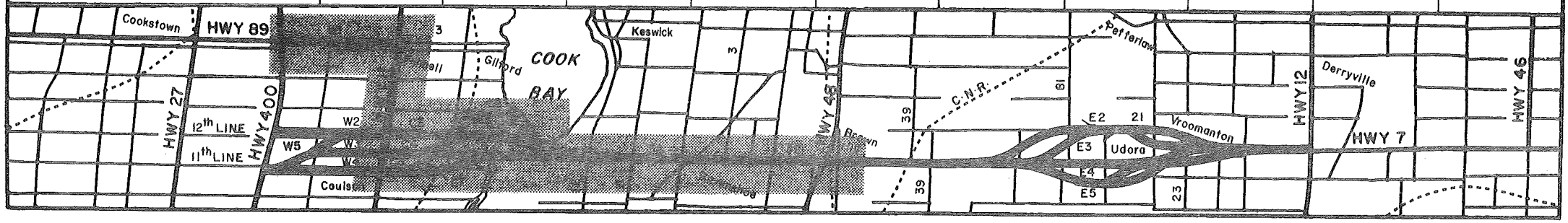
HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

HWY- 89 INTERCHANGE

AESTHETICS	Unit	W1 C3	W1 C4	W1 C5	W1 C6	W1 C7	W1 C2			
USER	—	FAIR	GOOD	FAIR	FAIR	FAIR	GOOD			
OBSERVER	—	FAIR	GOOD	FAIR	POOR	FAIR	FAIR			
RECREATIONAL IMPACT	—	MOD.	MOD.	MAJ.	MAJ.	MOD.	MIN.			



HIGHWAY 89 EXTENSION

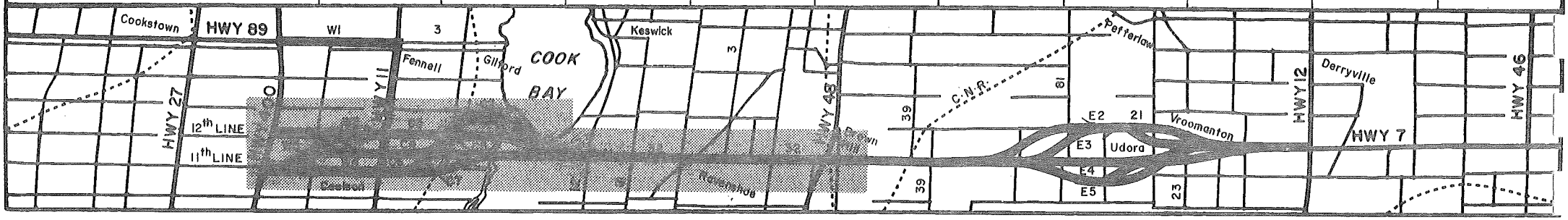
A10

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

TRAFFIC	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
LENGTH	Miles	16.2	16.6	16.3	16.3	16.8	16.6	16.5	16.9	
LOCAL SERVICE	—	FAIR	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	GOOD	
REGIONAL SERVICE	—	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	
OUT OF WAY TRAVEL	—	MIN.	MOD.	MIN.	MIN.	MAJ.	MOD.	MOD.	MAJ.	
No. OF ACCESSES	Frequent use / Less Frequent	84 / 24	59 / 18	69 / 31	111 / 37	101 / 24	86 / 27	84 / 23	86 / 26	
SAFETY	No. of curves	2	6	2	2	4	4	4	6	



HIGHWAY 89 EXTENSION

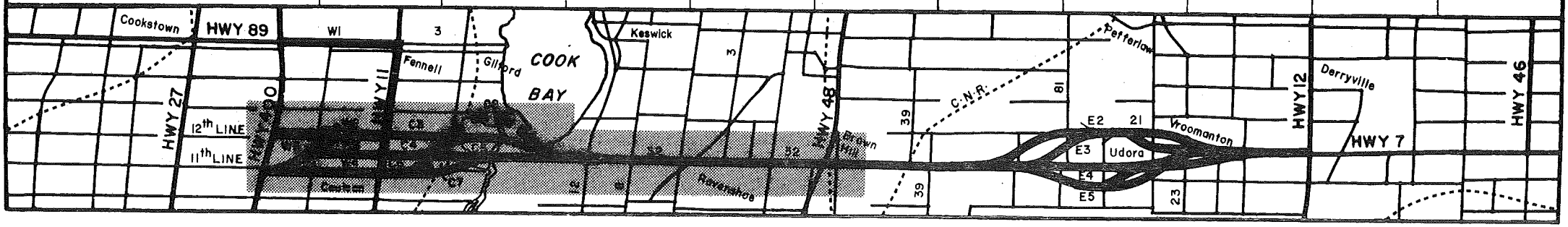
A11

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

AGRICULTURE	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
CLEARED LANDS REQ·	Organic Acs· / Acs· Mineral	21 / 52	27 / 77	11 / 74	11 / 56	27 / 55	21 / 65	19 / 52	19 / 65	
HIGH CAP· LANDS	Acres	35	62	61	39	39	35	35	35	
MEDIUM CAP· LANDS	Acres	43	48	47	35	34	52	47	56	
LOW CAP· LANDS	Acres	41	48	27	26	44	37	41	37	
DISRUPTION OF FARM OPER·	—	MOD.	MAJ.	MAJ.	MAJ.	MOD.	MAJ.	MAJ.	MAJ.	
DRAINAGE IMPACTS	—	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.	MAJ.	
SEVERANCES	Acres	44	136	95	12	69	101	136	194	



HIGHWAY 89 EXTENSION

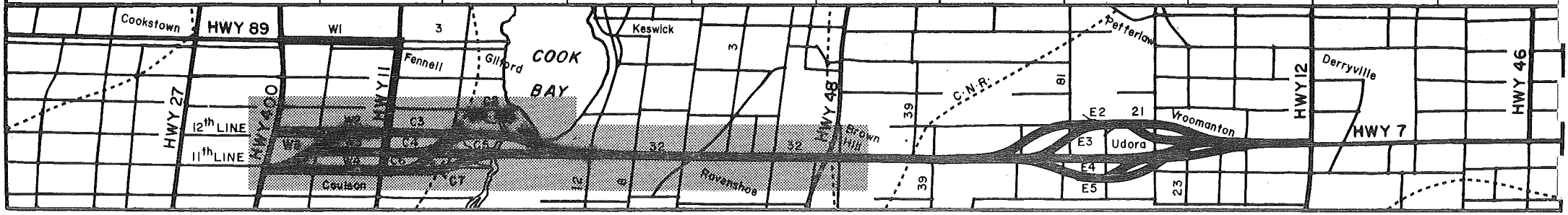
A12

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

NOISE	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
HOUSE LEQ. > 55 dBA	No.	63	46	56	94	84	66	63	66	
HOUSE LEQ. > 65 dBA	No.	21	21	21	21	21	21	21	21	



HIGHWAY 89 EXTENSION

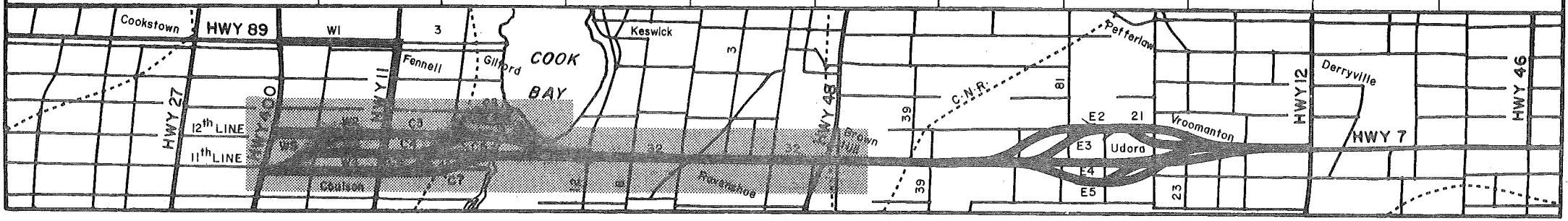
A13

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

COST	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
CONSTRUCTION	$ mill.	10.10	9.35	9.35	9.30	9.55	9.35	10.35	9.60	
PROPERTY	$ mill.	0.49	0.61	0.48	0.41	0.58	0.51	0.55	0.58	



HIGHWAY 89 EXTENSION

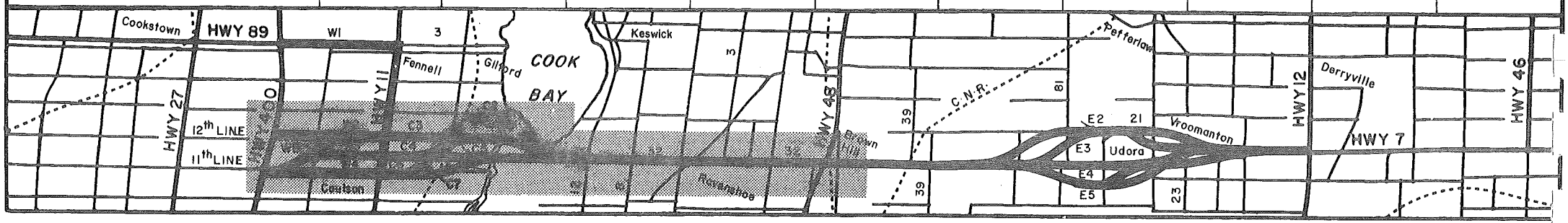
A14

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

PROPERTY	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
TOTAL ACREAGE REQ.	Acres	119 +(44)	159 +(136)	136 +(95)	100 +(12)	117 +(69)	124 +(101)	123 +(136)	128 +(194)	
HOUSES REQ.	No.	0	0	0	0	0	0	0	0	
PROPERTIES AFFECTED	No.	81	67	69	95	95	84	80	81	



HIGHWAY 89 EXTENSION

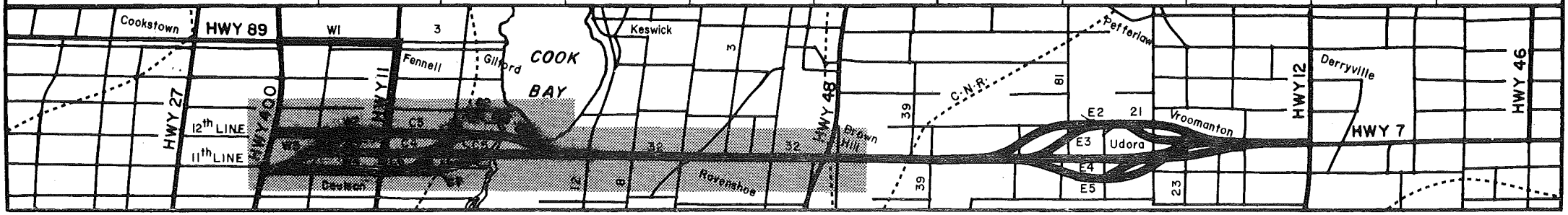
A15

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

ENVIRONMENT	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
HIGH QUALITY VEG. UNITS	No.	1	4	5	1	1	2	1	2	
ACREAGE OF VEG.	Acres	30	33	36	15	19	21	35	26	
CREEK CROSSINGS	No.	4	4	3	3	4	4	6	5	
SEVERITY OF CROSSINGS	—	MAJ.	MIN.	MIN.	MIN.	MIN.	MOD.	MAJ.	MAJ.	
WILDLIFE	—	MOD.	MOD.	MAJ.	MAJ.	MOD.	MOD.	MIN.	MIN.	



HIGHWAY 89 EXTENSION

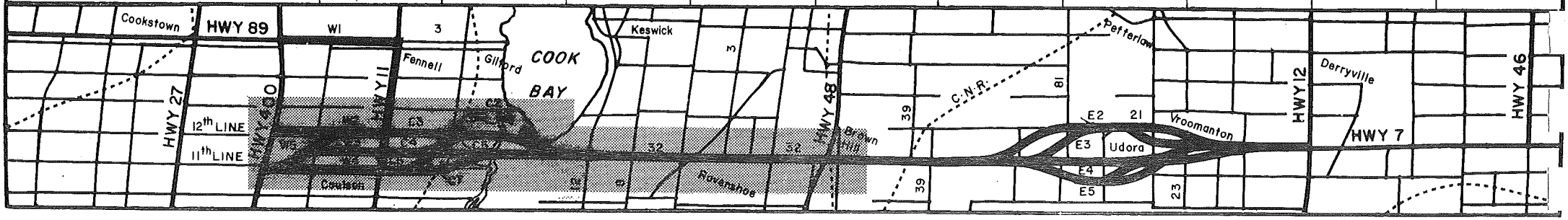
A16

ANALYSIS OF ALTERNATIVES

HWY·400 TO HWY·48

NEW INTERCHANGE

STAGING	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
ABILITY TO STAGE	—	POOR	GOOD	FAIR	FAIR	FAIR	FAIR	POOR	FAIR	



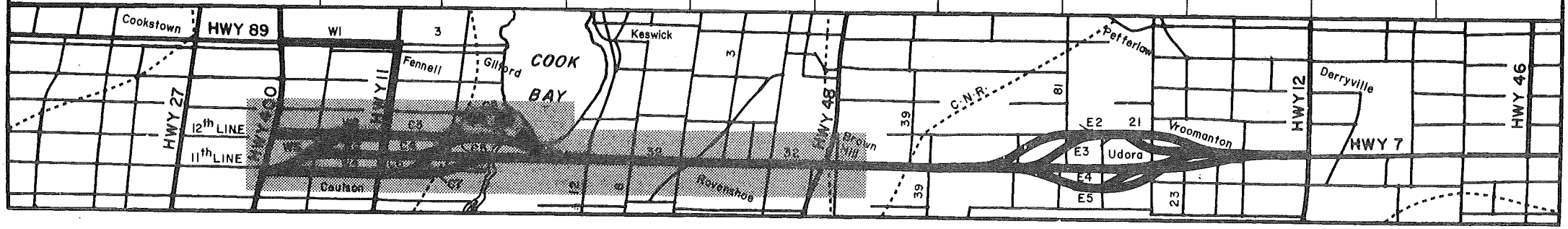
HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY-400 TO HWY-48

NEW INTERCHANGE

AESTHETICS	Unit	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
USER	—	FAIR	GOOD	FAIR	FAIR	FAIR	FAIR	GOOD	GOOD	
OBSERVER	—	FAIR	GOOD	FAIR	POOR	FAIR	FAIR	FAIR	FAIR	
RECREATIONAL IMPACT	—	MOD.	MOD.	MAJ.	MAJ.	MOD.	MOD.	MIN.	MIN.	



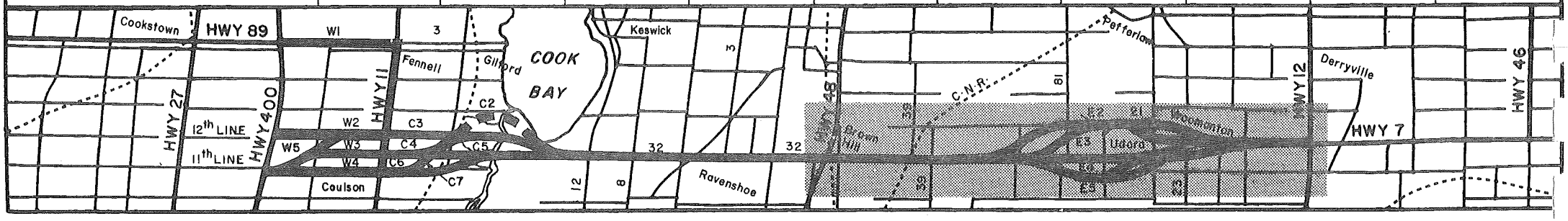
HIGHWAY 89 EXTENSION

A2E

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

TRAFFIC	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
LENGTH	Miles	14·5	14·4	14·4	14·4	14·0	14·3	14·2		
LOCAL SERVICE	—	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD		
REGIONAL SERVICE	—	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD		
OUT OF WAY TRAVEL	—	MOD·	MOD·	MOD·	MOD·	MIN·	MOD·	MOD·		
No· OF ACCESSES	Frequent use / Less Frequent	72 / 31	72 / 31	70 / 31	70 / 31	85 / 28	50 / 22	47 / 21		
SAFETY	No·of curves	4	4	4	4	2	6	4		

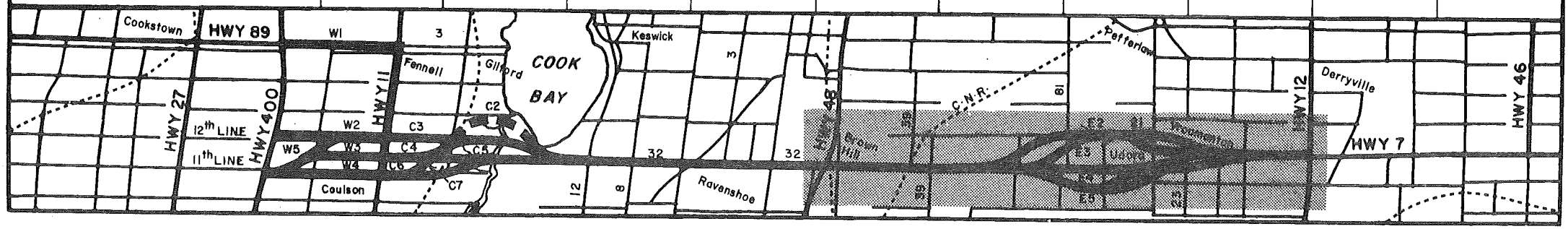


HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

AGRICULTURE	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
CLEARED LANDS REQ·	Organic Acs· / Acs· Mineral	0 / 49	0 / 51	0 / 50	0 / 52	0 / 50	0 / 66	0 / 64		
HIGH CAP· LANDS	Acres	71	77	52	58	56	84	83		
MEDIUM CAP· LANDS	Acres	23	19	26	23	22	20	22		
LOW CAP· LANDS	Acres	14	12	29	27	14	16	19		
DISRUPTION OF FARM OPER·	—	MOD·	MAJ·	MOD·	MAJ·	MIN·	MOD·	MAJ·		
DRAINAGE IMPACTS	—	—	—	—	—	—	—	—		
SEVERANCES	Acres	169	170	248	248	21	77	104		



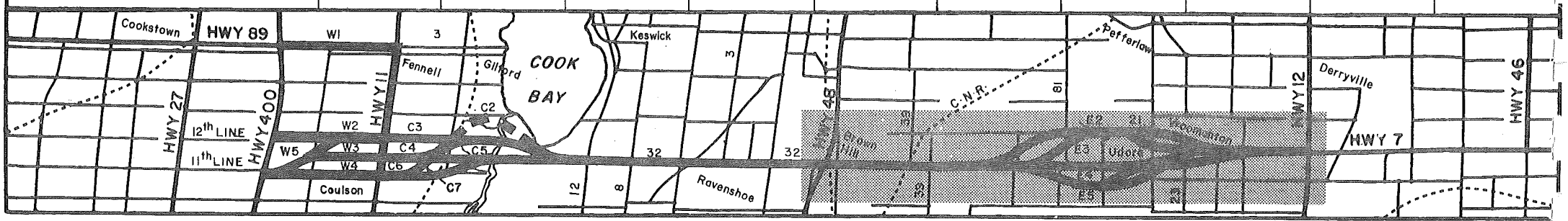
HIGHWAY 89 EXTENSION

A2E

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

NOISE	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
HOUSE LEQ·> 55 dBA	No·	55	58	53	56	70	38	35		
HOUSE LEQ·> 65 dBA	No·	9	9	9	9	31	9	9		



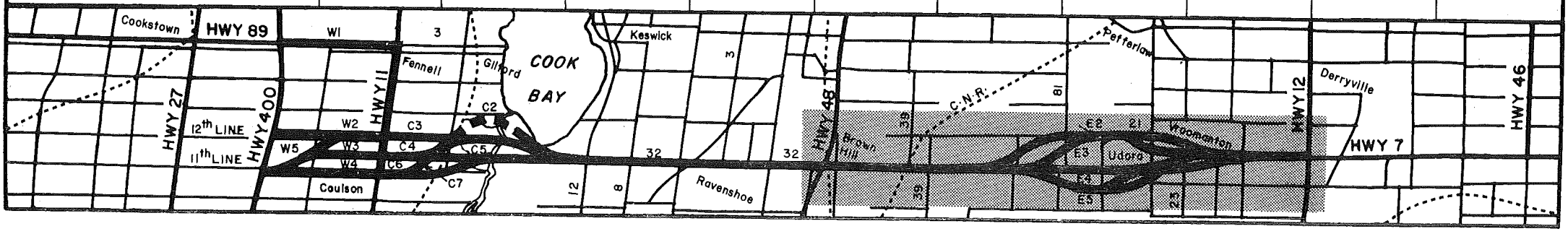
HIGHWAY 89 EXTENSION

A29

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

COST	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
CONSTRUCTION	$ mill·	6·50	6·70	6·40	6·60	6·90	6·80	6·95		
PROPERTY	$ mill·	0·48	0·64	0·55	0·70	0·86	0·49	0·51		



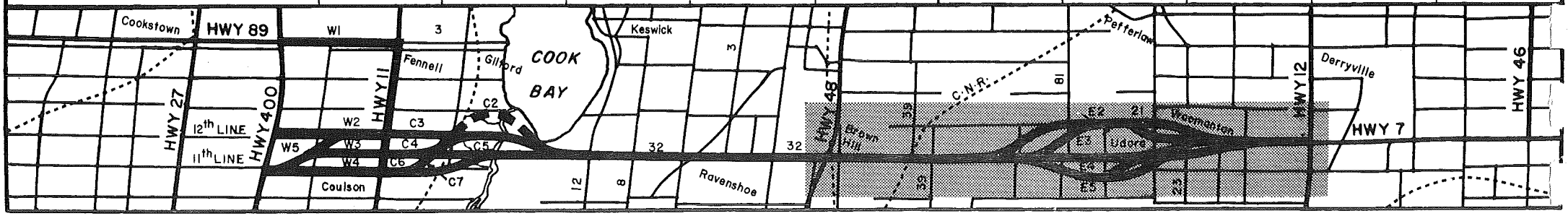
HIGHWAY 89 EXTENSION

A30

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

PROPERTY	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
TOTAL ACREAGE REQ·	Acres	112 +(169)	112 +(170)	112 +(248)	112 +(248)	99 +(21)	123 +(77)	127 +(104)		
HOUSES REQ·	No·	3	3	3	3	9	4	4		
PROPERTIES AFFECTED	No·	163	160	161	158	220	142	137		

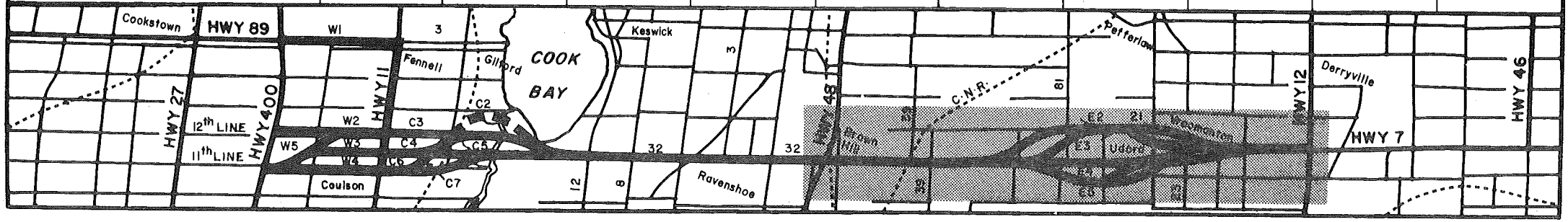


HIGHWAY 89 EXTENSION

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

ENVIRONMENT	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
HIGH QUALITY VEG· UNITS	No·	6	9	5	8	5	9	10		
ACREAGE OF VEG·	Acres	63	60	57	54	43	58	61		
CREEK CROSSINGS	No·	4	4	4	4	5	5	5		
SEVERITY OF CROSSINGS	—	MIN·	MIN·	MIN·	MIN·	MIN·	MIN·	MIN·		
WILDLIFE	—	MIN·	MIN·	MIN·	MIN·	MIN·	MIN·	MIN·		



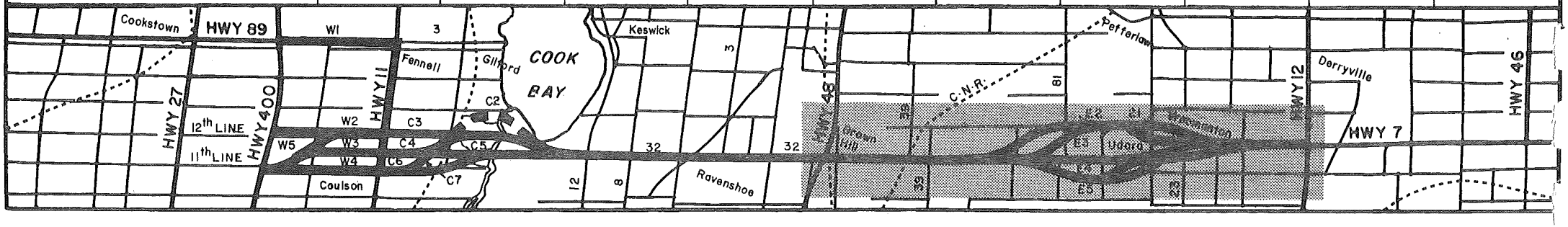
HIGHWAY 89 EXTENSION

A32

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

STAGING	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
ABILITY TO STAGE	—	FAIR	FAIR	FAIR	FAIR	POOR	GOOD	GOOD		



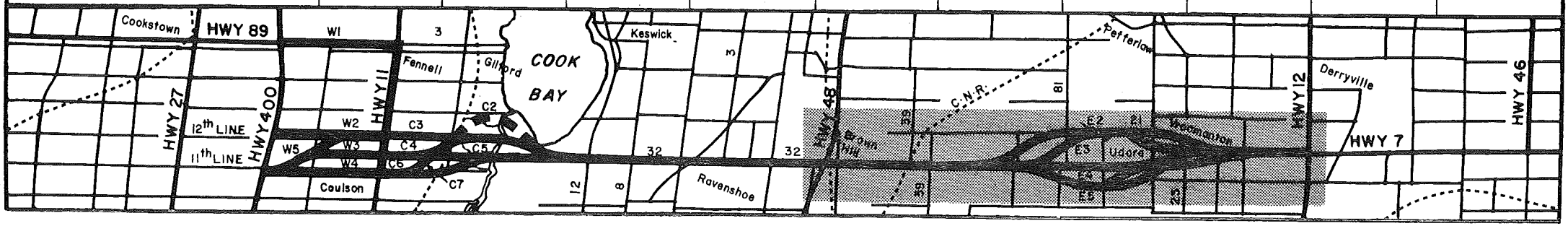
HIGHWAY 89 EXTENSION

A33

ANALYSIS OF ALTERNATIVES

HWY·48 TO HWY·12

AESTHETICS	Unit	E2N	E2S	E3N	E3S	E4	E5A	E5B		
USER	—	FAIR	FAIR	FAIR	FAIR	FAIR	GOOD	GOOD		
OBSERVER	—	FAIR	FAIR	FAIR	FAIR	POOR	GOOD	GOOD		
RECREATIONAL IMPACT	—	MOD·	MOD·	MOD·	MOD·	MOD·	MIN·	MIN·		



APPENDIX E

HIGHWAY 89 EXTENSION
HWY-400 TO HWY-12

EVALUATION
OF
ALTERNATIVES

Name _ _ _ _ _ _ _ _

McCORMICK RANKIN
CONSULTING ENGINEERS

Ontario
Ministry of
Transportation and
Communications

HIGHWAY 89 EXTENSION
EVALUATION OF ALTERNATIVES

CONTENTS

HIGHWAY 89 EXTENSION
FACTOR WEIGHTING

E1

TRAFFIC	20
AGRICULTURE	25
NOISE	10
COST	10
PROPERTY	15
ENVIRONMENT	15
STAGING	5
AESTHETICS	0
TOTAL	**100**

EXAMPLE

HIGHWAY 89 EXTENSION

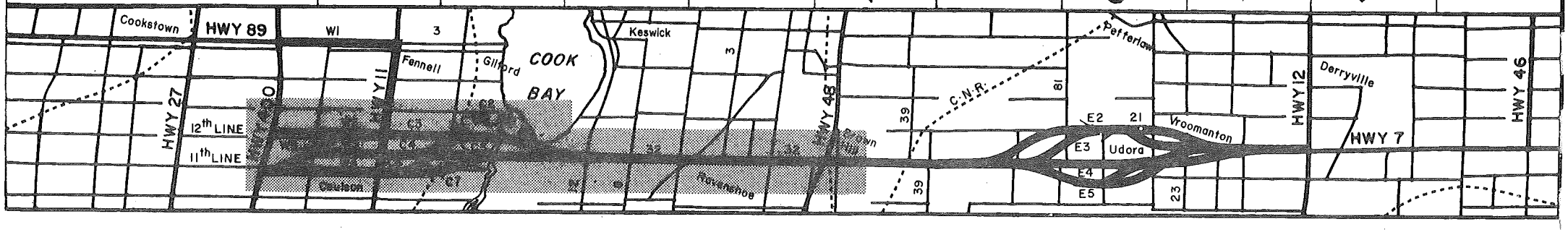
E10

UNWEIGHTED ROUTE COMPARISONS

HWY·400 TO HWY·48

NEW INTERCHANGE

TRAFFIC		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
LENGTH		10	8	10	10	8	8	8	7	
LOCAL SERVICE		10	10	10	10	10	10	5	10	
REGIONAL SERVICE		–	–	–	–	–	–	–	–	
OUT OF WAY TRAVEL		10	9	10	EXAMPLE	8	9	9	8	
No· OF ACCESSES		8	10	9	6	6	8	8	8	
SAFETY		0	6	10	10	8	8	0	6	
SUMMARY		4	7	10	9	8	8	4	7	



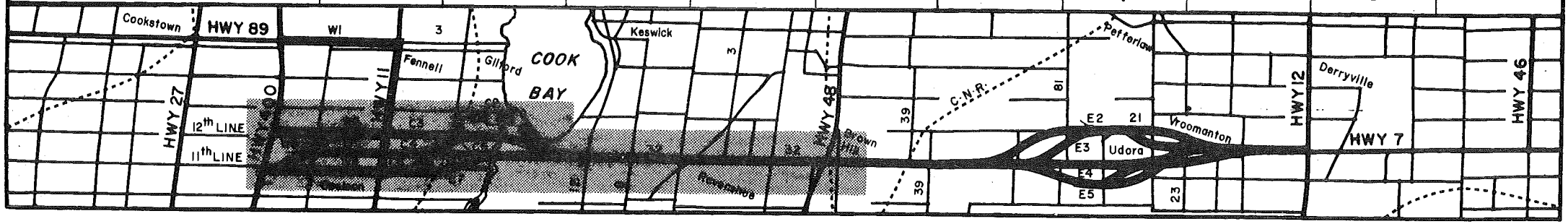
HIGHWAY 89 EXTENSION

UNWEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

AGRICULTURE		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
CLEARED LANDS REQ		8	6	9	10	7	7	8	7	
HIGH CAP. LANDS		10	6	6	10	10	10	10	10	
MEDIUM CAP. LANDS		9	9	9	10	EXAMPLE	9	9	9	
LOW CAP. LANDS		8	8	10		8	9	8	9	
DISRUPTION OF FARM OPER.		10	7	4	4	5	6	5	4	
DRAINAGE IMPACTS		–	–	–	–	–	–	–	–	
SEVERANCES		8	5	6	10	7	6	5	3	
SUMMARY		10	8	4	6	10	9	6	5	



HIGHWAY 89 EXTENSION

E12

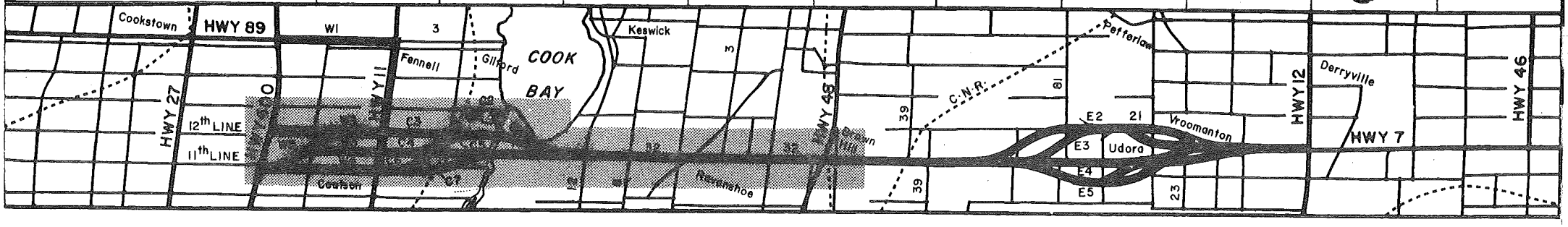
UNWEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

NOISE		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
HOUSE LEQ·> 55 dBA		8	10	8	6	7	8	8	8	
HOUSE LEQ·>65 dBA		–	–	–	–	–	–	–	–	
SUMMARY		8	10	8	6	7	8	8	8	

EXAMPLE



HIGHWAY 89 EXTENSION

E13

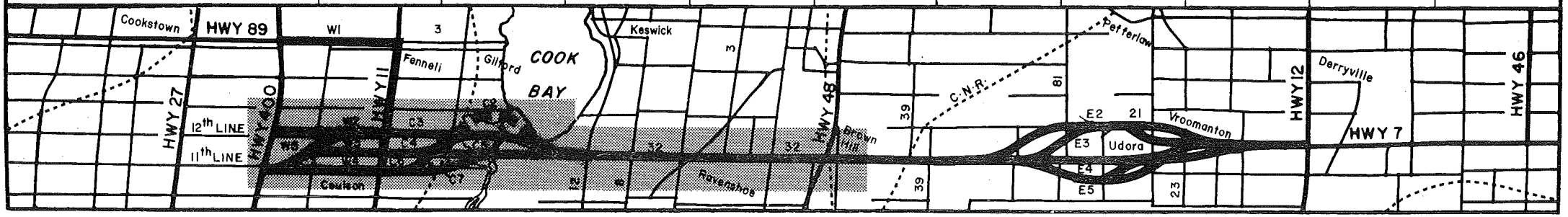
UNWEIGHTED ROUTE COMPARISONS

HWY·400 TO HWY·48

NEW INTERCHANGE

COST		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
CONSTRUCTION		6	10	10	10	9	10	6	9	
PROPERTY		9	6	9	10	7	9	8	7	
SUMMARY		7	9	10	10	9	10	6	9	

EXAMPLE



HIGHWAY 89 EXTENSION

E14

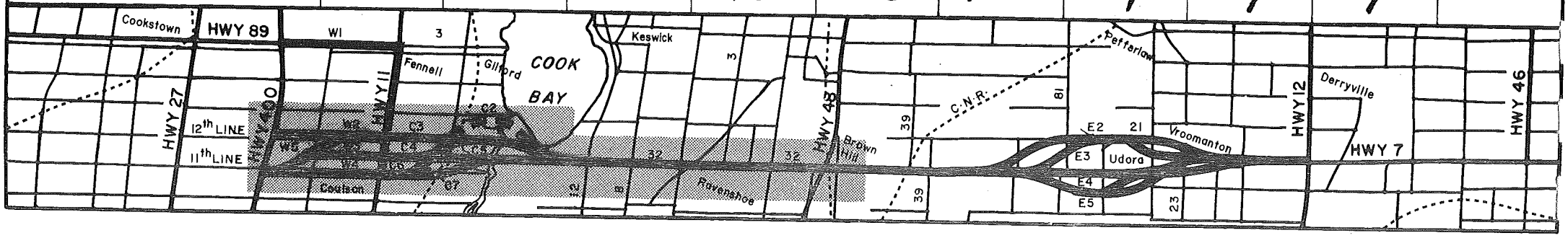
UNWEIGHTED ROUTE COMPARISONS

HWY·400 TO HWY·48

NEW INTERCHANGE

PROPERTY		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
TOTAL ACREAGE REQ·		9	6	7	10	9	8	8	8	
HOUSES REQ·		–	–	–	–	–	–	–	–	
PROPERTIES AFFECTED		8	10	10	6	6	8	8	8	
SUMMARY		10	10	10	10	10	9	9	9	

EXAMPLE



HIGHWAY 89 EXTENSION

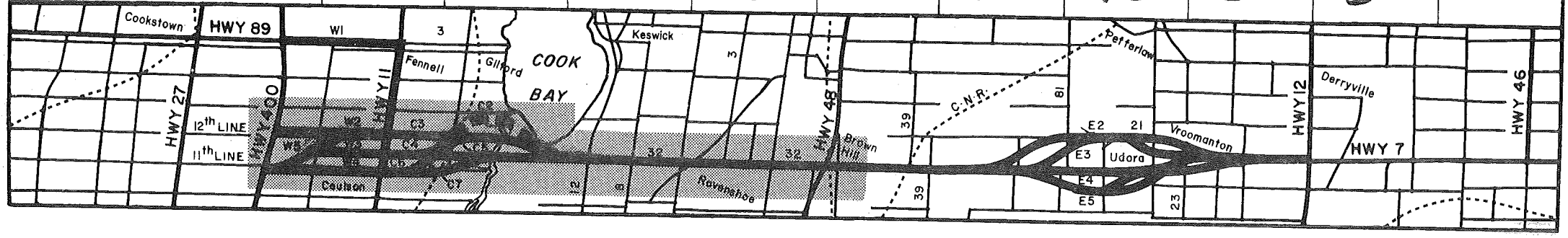
E15

UNWEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

ENVIRONMENT		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
HIGH QUALITY VEG. UNITS		10	6	5	10	10	9	10	9	
ACREAGE OF VEG.		7	6	5	10	9	9	5	8	
CREEK CROSSINGS		9	9	10	10	9	9	7	8	
SEVERITY OF CROSSINGS		4	10	10	10	10	8	4	4	
WILDLIFE		8	8	4		8	8	10	10	
				EXAMPLE						
SUMMARY		4	6	6	8	10	10	5	5	



HIGHWAY 89 EXTENSION

E16

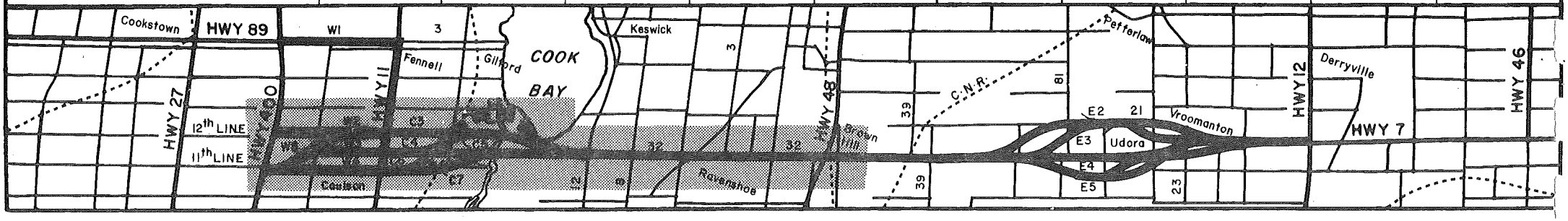
UNWEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

STAGING		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
ABILITY TO STAGE		8	10	9	9	9	9	8	9	
SUMMARY		8	10	9	9	9	9	8	9	

EXAMPLE



HIGHWAY 89 EXTENSION

E17

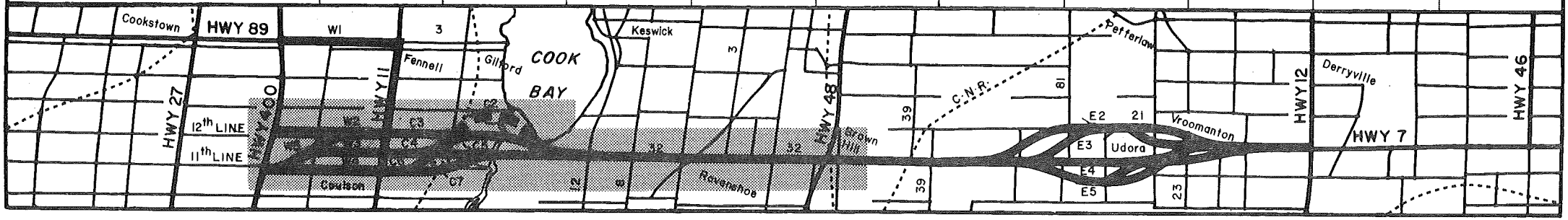
UNWEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

AESTHETICS		W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2	
USER		9	10	9	9	9	9	10	10	
OBSERVER		9	10	9	8	9	9	9	9	
RECREATIONAL IMPACT		9	9	8	8	9	9	10	10	
SUMMARY		9	10	9	8	9	9	10	10	

EXAMPLE



HIGHWAY 89 EXTENSION

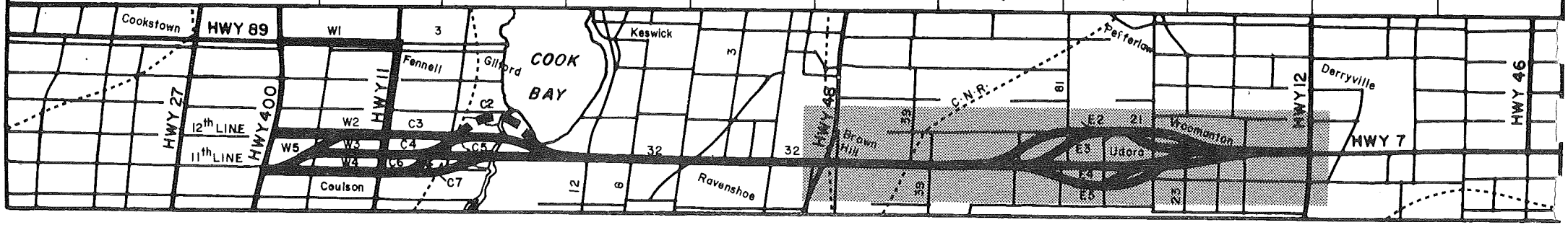
E2E

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

TRAFFIC		E2N	E2S	E3N	E3S	E4	E5A	E5B		
LENGTH		8	8	8	8	10	9	9		
LOCAL SERVICE		–	–	–	–	–	–	–		
REGIONAL SERVICE		–	–	–	–	–	–	–		
OUT OF WAY TRAVEL		–	–	–	–	–	–	–		
No· OF ACCESSES		7	7	7	7	5	10	10		
SAFETY		8	8	8	8	10	6	8		
SUMMARY		8	8	8	8	7	9	10		

EXAMPLE



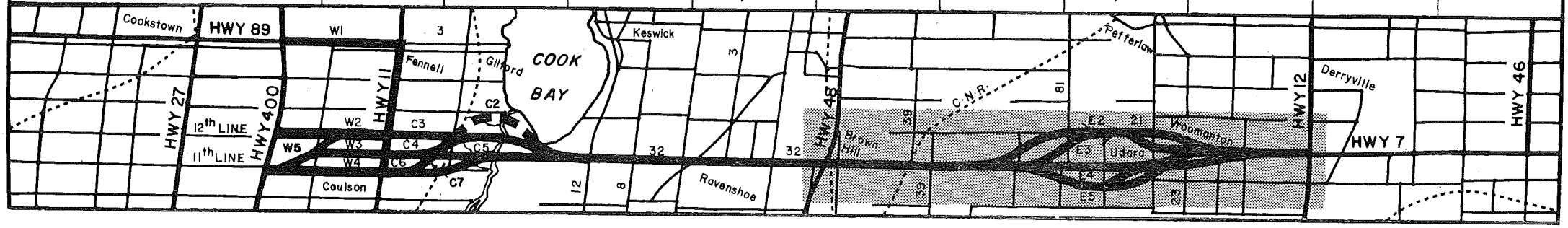
HIGHWAY 89 EXTENSION

E27

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

AGRICULTURE		E2N	E2S	E3N	E3S	E4	E5A	E5B		
CLEARED LANDS REQ·		10	10	10	10	10	8	8		
HIGH CAP· LANDS		6	6	10	10	10	6	6		
MEDIUM CAP· LANDS		–	–	–	–	–	–	–		
LOW CAP· LANDS		–	–	–	–	–	–	–		
DISRUPTION OF FARM OPER·		8	5	EXAMPLE 5		10	8	7		
DRAINAGE IMPACTS		–	–		–	–	–	–		
SEVERANCES		6	6	5	5	10	9	8		
SUMMARY		8	5	9	5	10	9	7		



HIGHWAY 89 EXTENSION

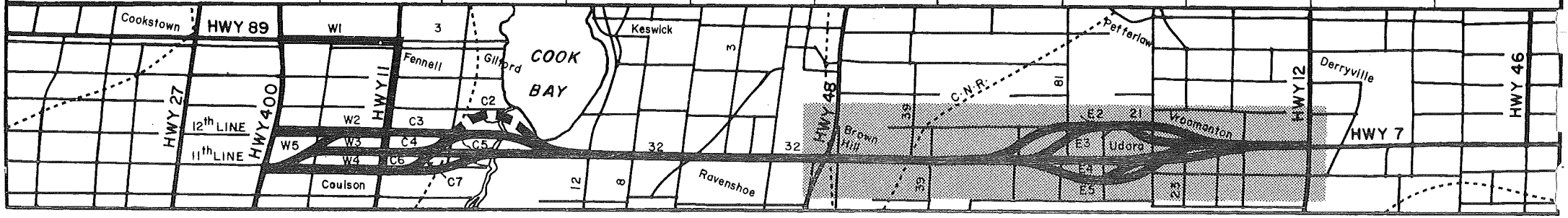
E2E

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

NOISE		E2N	E2S	E3N	E3S	E4	E5A	E5B		
HOUSE LEQ· > 55 dBA		8	8	8	8	4	10	10		
HOUSE LEQ· > 65 dBA		10	10	10	10	4	10	10		
SUMMARY		8	8	8	8	4	10	10		

EXAMPLE



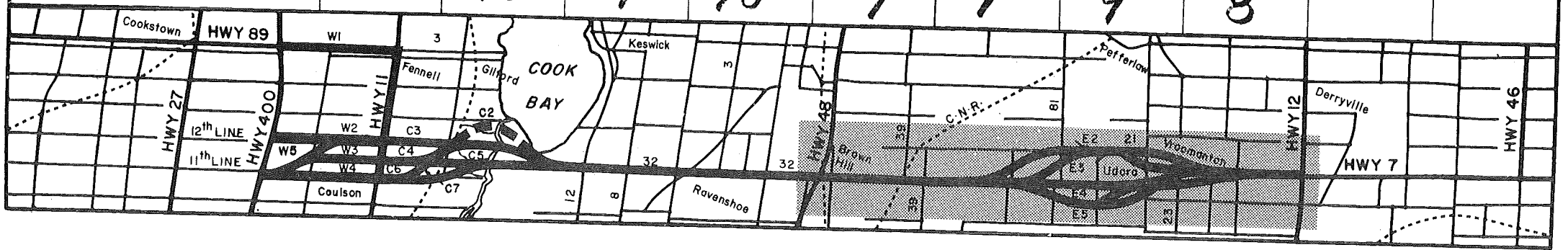
HIGHWAY 89 EXTENSION

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

COST		E2N	E2S	E3N	E3S	E4	E5A	E5B		
CONSTRUCTION		9	7	10	8	5	6	5		
PROPERTY		10	8	9	8	7	10	10		
SUMMARY		10	9	10	9	7	9	8		

EXAMPLE



HIGHWAY 89 EXTENSION

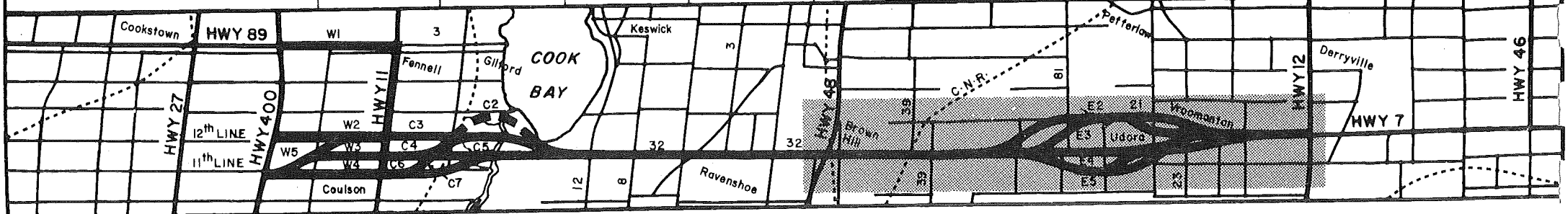
E3C

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

PROPERTY		E2N	E2S	E3N	E3S	E4	E5A	E5B		
TOTAL ACREAGE REQ·		9	9	9	9	10	8	8		
HOUSES REQ·		10	10	10	10	2	7	7		
PROPERTIES AFFECTED		8	8	8	8	4	10	10		
SUMMARY		8	8	8	3	4	10	10		

EXAMPLE



HIGHWAY 89 EXTENSION

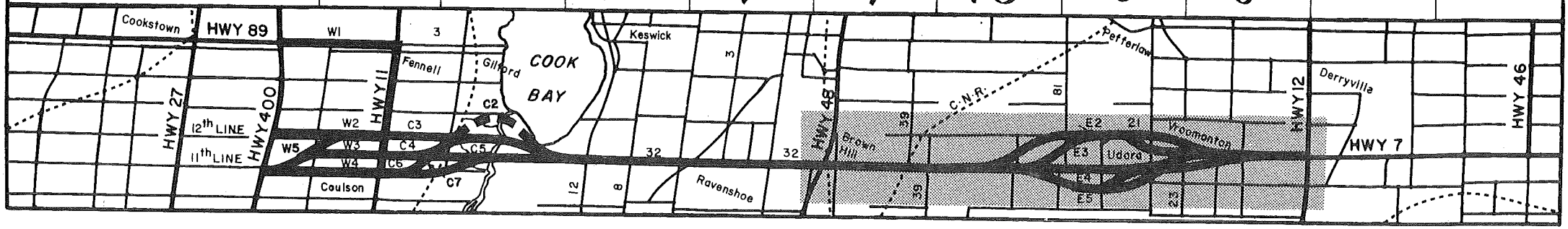
E31

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

ENVIRONMENT		E2N	E2S	E3N	E3S	E4	E5A	E5B		
HIGH QUALITY VEG· UNITS		9	8	10	8	10	8	8		
ACREAGE OF VEG·		8	8	8	9	10	8	8		
CREEK CROSSINGS		10	10	10	10	9	9	9		
SEVERITY OF CROSSINGS		–	–	–	–	–	–	–		
WILDLIFE		–	–	–	–	–	–	–		
SUMMARY		9	9	9	9	10	8	8		

EXAMPLE



HIGHWAY 89 EXTENSION

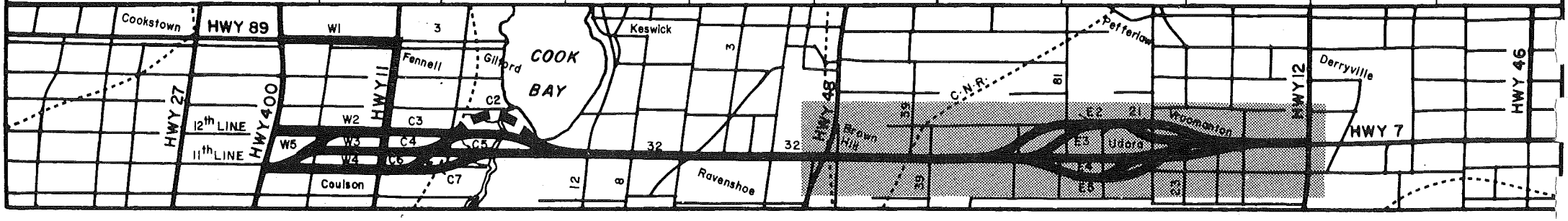
E32

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

STAGING		E2N	E2S	E3N	E3S	E4	E5A	E5B		
ABILITY TO STAGE		9	9	9	9	9	10	10		
SUMMARY		9	9	9	9	9	10	10		

EXAMPLE



HIGHWAY 89 EXTENSION

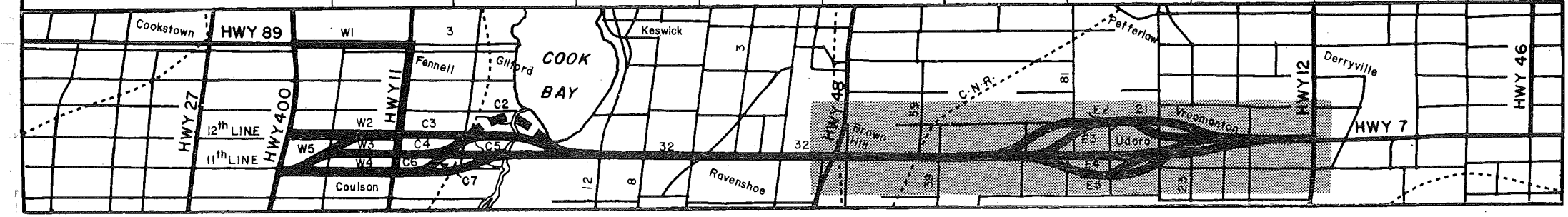
E33

UNWEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

AESTHETICS		E2N	E2S	E3N	E3S	E4	E5A	E5B		
USER		9	9	9	9	9	10	10		
OBSERVER		9	9	9	9	8	10	10		
RECREATIONAL IMPACT		9	9	9	9	9	10	10		
SUMMARY		9	9	9	9	8	10	10		

EXAMPLE



HIGHWAY 89 EXTENSION

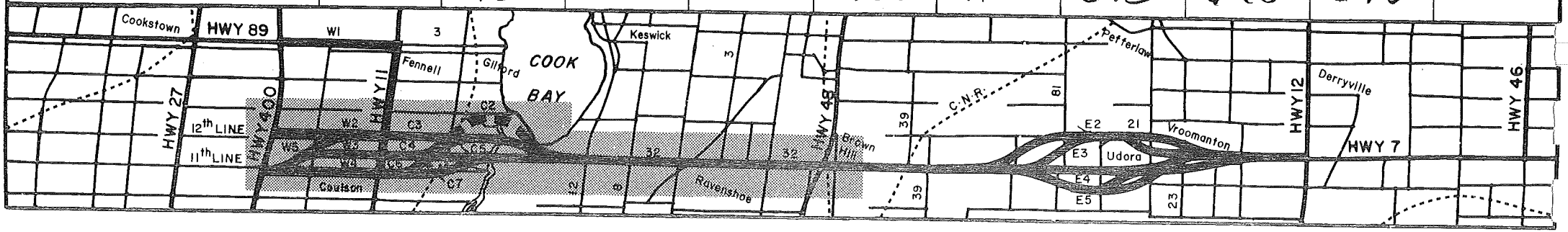
E35

WEIGHTED ROUTE COMPARISONS

HWY-400 TO HWY-48

NEW INTERCHANGE

	FACTOR WEIGHT	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2
TRAFFIC	20	80	140	200	180	160	160	80	140
AGRICULTURE	25	250	200	100	150	250	225	150	125
NOISE	10	80	100	80	60	20	80	80	80
COST	10	70	90	100	EXAMPLE	90	100	60	90
PROPERTY	15	150	150	150	150	150	135	135	135
ENVIRONMENT	15	60	90	90	120	150	150	75	75
STAGING	5	40	50	45	45	45	45	40	45
AESTHETICS	—	—	—	—	—	—	—	—	—
TOTAL		730	820	765	805	915	895	620	690



HIGHWAY 89 EXTENSION

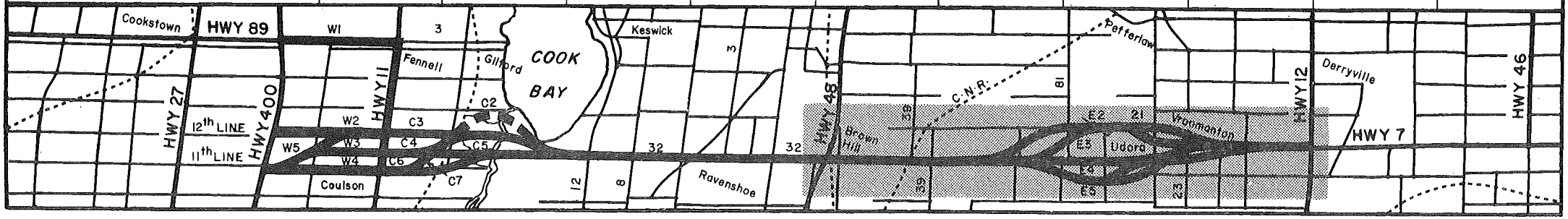
E37

WEIGHTED ROUTE COMPARISONS

HWY·48 TO HWY·12

	FACTOR WEIGHT	E2N	E2S	E3N	E3S	E4	E5A	E5B		
TRAFFIC	20	160	160	160	160	140	180	200		
AGRICULTURE	25	200	125	225	125	250	225	175		
NOISE	10	80	80	80	80	40	100	100		
COST	10	100	90	100	100	70	90	80		
PROPERTY	15	120	120	120	120	60	150	150		
ENVIRONMENT	15	135	135	135	135	150	120	120		
STAGING	5	45	45	45	45	45	50	50		
AESTHETICS	—	—	—	—	—	—	—	—		
TOTAL		840	755	865	755	755	915	875		

EXAMPLE



HIGHWAY 89 EXTENSION

E39

SUMMARY OF EVALUATION

HWY-400 TO HWY-48

NEW INTERCHANGE

PROJECT TEAM	NUMERICAL EVALUATION										STATED PREFERENCE									
	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2			W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2		
RAY SMITH	750	600	720	900	730	720	565	580			X									
NEIL GOLDSMITH	860	815	755	945	850	830	795	810				X								
CHARLEY MEYERS	830	880	890	885	795	830	705	735								X				
VERA HUGEL	830	770	755	735	680	720	685	670				X								
HARRY VANDER KOOIJ	775	735	810	795	690	770	570	520				X								
MARK WILLIAMS	855	755	665	800	740	835	665	675								X				
JOHN SUTHERNS	730	820	765	805	915	895	620	690								X				
SUMMARY	2	1	2	3	1						1	3				3				

TEAM CONSENSUS W3 C4 & W5 C3

HIGHWAY 89 EXTENSION E41

SUMMARY OF EVALUATION

HWY· 48 TO HWY· 12

PROJECT TEAM	NUMERICAL EVALUATION										STATED PREFERENCE									
	E2 N	E2 S	E3 N	E3 S	E4	E5 A	E5 B				E2 N	E2 S	E3 N	E3 S	E4	E5 A	E5 B			
RAY SMITH	685	655	705	655	810	800	805									X				
NEIL GOLDSMITH	810	810	840	775	855	840	810									X				
CHARLEY MEYERS	885	815	855	805	815	900	870									X				
VERA HUGEL	770	720	790	740	765	780	770									X				
HARRY VANDER KOOIJ	820	820	805	665	695	880	875									X				
MARK WILLIAMS	890	800	865	800	860	890	815									X				
JOHN SUTHERNS	840	755	865	755	755	915	875									X				
SUMMARY	1		1		2	6	2									7				

TEAM CONSENSUS E5 A

HIGHWAY 89 EXTENSION E39

SUMMARY OF EVALUATION

HWY-400 TO HWY-48

NEW INTERCHANGE

EXTERNAL TEAM	NUMERICAL EVALUATION										STATED PREFERENCE									
	W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2			W2 C3	W3 C4	W3 C5	W4 C6	W4 C7	W5 C3	W2 C2	W5 C2		
MINISTRY OF CULTURE AND RECREATION	635	460	395	690	700	610	520	480						X						
MINISTRY OF AGRICULTURE AND FOOD	930	725	695	740	800	750	725	640			X									
MINISTRY OF INDUSTRY AND TOURISM	802	882	792	854	789	737	669	705				X								
SOUTH LAKE SIMCOE CONSERVATION AUTHORITY	770	550	645	800	595	555	625	515									X			
SIMCOE GEORGIAN AREA TASK FORCE	755	731	862	963	786	832	686	639								X				
MINISTRY OF AG. AND FOOD SIMCOE COUNTY	890	750	840	860	870	840	840	880							X					
MINISTRY OF AG. AND FOOD YORK REGION	916	797	759	742	787	837	819	794			X									
MINISTRY OF AG. AND FOOD DURHAM REGION	790	765	745	795	695	755	745	710			X									
MINISTRY OF ENVIRONMENT	570	605	445	510	640	540	480	460				X								
MINISTRY OF NATURAL RESOURCES	608	423	385	394	452	527	837	821										X		
SUMMARY	4	1		4	1		1	1			3	2		1	1	1	1	1		

TEAM CONSENSUS W5 C3

HIGHWAY 89 EXTENSION

E41

SUMMARY OF EVALUATION

HWY. 48 TO HWY. 12

EXTERNAL TEAM	NUMERICAL EVALUATION										STATED PREFERENCE									
	E2 N	E2 S	E3 N	E3 S	E4	E5 A	E5 B				E2 N	E2 S	E3 N	E3 S	E4	E5 A	E5 B			
MINISTRY OF CULTURE AND RECREATION	945	905	895	830	495	810	760				X									
MINISTRY OF AGRICULTURE AND FOOD	870	770	920	840	830	760	750				X									
MINISTRY OF INDUSTRY AND TOURISM																				
SOUTH LAKE SIMCOE CONSERVATION AUTHORITY	785	580	815	575	615	770	680				X									
SIMCOE GEORGIAN AREA TASK FORCE	744	689	744	689	659	724	665										X			
MINISTRY OF AG. AND FOOD SIMCOE COUNTY	920	815	875	815	775	830	830				X									
MINISTRY OF AG. AND FOOD YORK REGION	971	914	893	852	756	939	899				X									
MINISTRY OF AG. AND FOOD DURHAM REGION	910	755	900	785	705	820	810				X									
MINISTRY OF ENVIRONMENT	640	585	690	680	595	590	530									X				
MINISTRY OF NATURAL RESOURCES	685	668	725	639	792	742	635									X				
SUMMARY	5		5	1	1						6					2	1			

TEAM CONSENSUS E2N

APPENDIX F

PHOTOGRAPHS OF MAIN DISPLAY BOARD

(NOT TO SCALE)

APPENDIX F