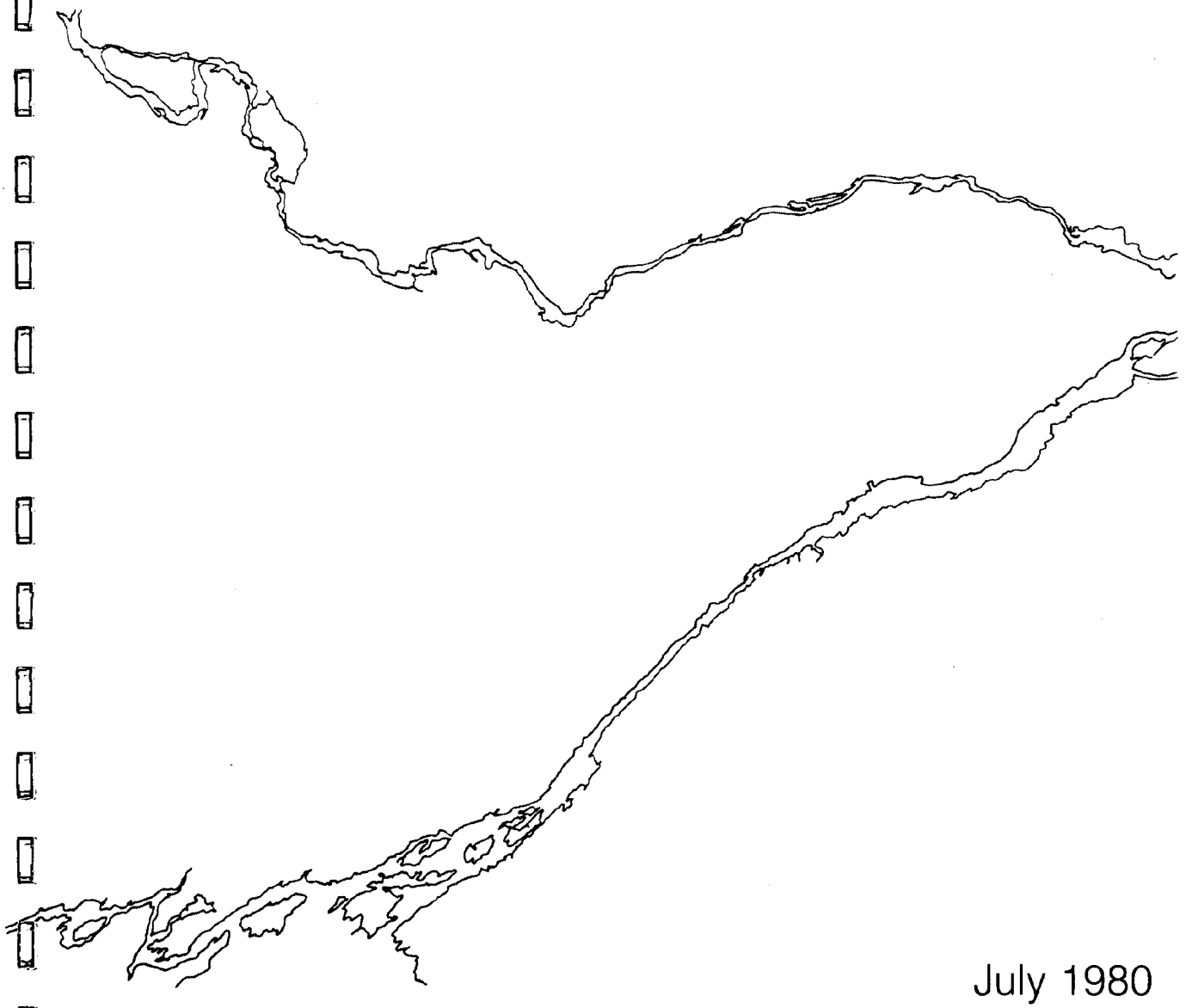
65.

ontario hydro

Environmental Assessment Summary for Eastern Ontario Plan Stage Environmental Assessment.



July 1980

Environmental Assessment Summary

for: Ontario Hydro's Eastern Ontario
Plan Stage Environmental Assessment

Environmental Assessment Number 1-77-0007-000

Des exemplaires de ce résumé sont disponibles
en langue francaise. Veuillez vous adresser à:

Ontario Hydro
Community Relations
700 University Avenue
Toronto, M5G 1X6

July 1980

A NOTE TO THE READER

This summary provides an overview of the environmental assessment document detailing Ontario Hydro's proposed program for improving the bulk power transmission system in eastern Ontario. That document, entitled "Eastern Ontario Plan Stage Environmental Assessment", outlines the studies and public participation activities carried out in planning for additions to the existing transmission grid.

Given the time required for the overall planning and approval process, and for construction, it is unlikely that new facilities could be placed in service before 1987.

Ontario Hydro has requested that hearings to review the program be held under the Environmental Assessment Act. It is anticipated that hearings before the Environment Assessment Board will begin early in 1981. Meanwhile, the main environmental assessment document is undergoing Government review. The results of the review will be publicly available before the hearings are commenced.

Ontario Hydro will also be initiating an information program prior to the hearings to ensure that the public in eastern Ontario is aware of the proposed program and to answer questions about the program.

Copies of the main report are on display in Ontario Hydro offices in Eastern Ontario. As well, copies are being sent to public, university and community college libraries and municipal offices in eastern Ontario. Anyone wishing to obtain a copy of the main report, or who wishes to discuss the planning and review process, should contact:

Mr. P.H. (Philip) Wong
Route & Site Selection Division
Ontario Hydro
700 University Avenue
Toronto, Ontario M5G 1X6
Telephone: 416-592-3953

or

Mr. G.B. (Bev) Pearson
System Planning Division
Ontario Hydro
700 University Avenue
Toronto, Ontario M5G 1X6
Telephone: 416-592-4712

TABLE OF CONTENTS

APPENDICES

MAIN REPORT REFERENCE

1.0 Introduction: The Program being Submitted for Review

Section 2.1

Ontario Hydro's "Eastern Ontario Plan Stage Environmental Assessment" has been submitted for review under The Environmental Assessment Act, 1975, (the "Act") and in support of an application for approval of an electrical transmission system expansion program for eastern Ontario (the "Program").

The Plan Stage is the first phase of a two phase approval process for additional facilities. The Program submitted for review in the Plan Stage comprises a system plan, identification of the general study area in eastern Ontario within which the precise location of the new bulk power facilities would be determined, and a general outline of the activities planned for the second phase of the approval process.

During the second phase, referred to as the Route Stage, a detailed study will be carried out to identify and compare alternative transmission line routes for the plan approved in the Plan Stage. This study will provide extensive opportunities for public participation and will culminate in a recommendation for approval, under the Act, of specific facilities and their locations.

2.0 The Purposes of the Program

Section 3.1
3.2

The Program is being proposed to overcome the inability of the existing bulk power transmission facilities in eastern Ontario to supply the future load reliably, and to meet the need to expand Ontario Hydro's interconnection capacity with Hydro-Quebec.

Chapter 7.0

Section 2.2

The adequacy of the existing transmission system in eastern Ontario was the subject of public hearings conducted in the area during April, 1979, by the Royal Commission on Electric Power Planning. The Commission's report on those hearings, issued in July of 1979, was endorsed by the Ontario government, which in turn requested Hydro to continue the planning process so that the required additional bulk power facilities could be provided as soon as possible.

Section 6.2

The Royal Commission's report, and the Ontario government's request to Ontario Hydro, recognized that the critical load supply problem in eastern Ontario is for the Ottawa area, including Arnprior and Hawkesbury. Most of the power supplying the area is delivered by three 230 kilovolt (kV) circuits. Certain stopgap measures are being taken to increase the load supply capability of these circuits. However, even after these stopgap measures are in place, the circuits will still be inadequate to reliably supply the forecast load beyond the early 1980's.

3.0 The Alternative Types of Facilities Considered

Section 10.2

The objective of the Plan Stage study process was to identify, evaluate and compare a number of alternatives for meeting the requirements for additional bulk power facilities in eastern Ontario and to recommend one of these alternatives.

Section 10.3

The starting point was to identify, based on knowledge of the existing facilities, the type and nature of additional facilities which could meet regional and interconnection needs. Consideration was given to installing additional

71

MAIN REPORT REFERENCE

generation resources, including local and co-generation alternatives and firm power purchases. *Section 10.3*

The possibility of locating a large thermal generating station in eastern Ontario before the year 2000 is remote, and therefore it does not affect the design of the bulk power system. Projections of the development of local generation and co-generation indicate that these alternatives would not be sufficient. Because of considerable uncertainties about the availability and cost of firm power purchases from neighbouring utilities, this alternative for the supply to eastern Ontario is not feasible.

It was therefore concluded that new bulk power transmission facilities were the most appropriate alternative. A number of existing sites at which new transmission lines could terminate were then identified. The use of existing transformer and switching station sites, even if those sites need some expansion, avoids the extra cost and environmental impact which would be incurred by the development of new station sites. *Section 10.5* *Section 10.6.2*

4.0 Development of Alternative Transmission System Plans *Section 10.6*

In developing the alternative plans for new bulk power transmission facilities, only 500 kV or 230 kV overhead alternating current transmission lines were considered. This is consistent with Recommendation 6.5 in the final report of the Royal Commission on Electric Power Planning, which stated that "Ontario Hydro should continue to plan the integrated electric power system on the basis of 500 kV and 230 kV transmission lines". The voltage level and type of transmission for the proposed connection between St. Lawrence Transformer Station (TS) and Hydro-Quebec will depend on the outcome of joint studies by Hydro-Quebec and Ontario Hydro. *Section 10.6.1* *Section 10.4.2*

The principal concept in developing alternative transmission system plans was to integrate the existing 230/115 kV network in eastern Ontario with new 500/230 kV transmission connecting Lennox Generating Station (GS) with the Ottawa and St. Lawrence areas. These plans were developed taking into account the following ranges of annual load growth: *Section 10.6.3*

Scenario L: 2.2% to 3.2%
Scenario M: 3.2% to 4.7%
Scenario H: 4.7% to 6.4%

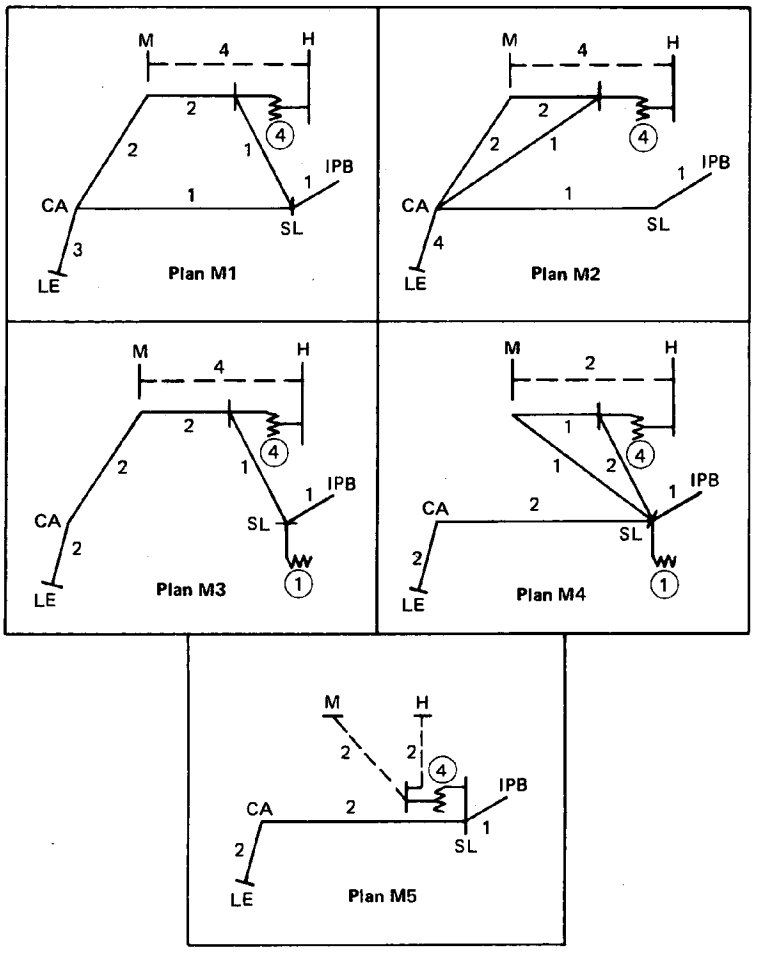
Ontario Hydro's 1980 load forecast of the average annual load growth for eastern Ontario to the year 2000 is about 3.8%. Therefore, scenario M was selected as the basis for deciding which plan to recommend. Scenarios L and H were used to evaluate the effects of growth rates outside the range of scenario M.

Five alternative system plans were selected, each of which meets technical power system criteria. These plans are shown schematically on page 3, and the terminal points are shown on the maps in Appendix A.

5.0 Method of Evaluating Alternative Transmission System Plans *Chapter 9.0*

Ontario Hydro assessed the relative merits of the five alternative system plans on the basis of: *Section 9.3*

a) land use and environmental studies, and
b) technical and economic studies.



Scenario M – New Facilities Required for Alternative Plans

73

MAIN REPORT REFERENCE
Section 9.2.3

5.1 Land Use and Environmental Study

It is recognized that high voltage transmission facilities, wherever located, will cause some changes in the existing environment. However, all aspects of the environment are not altered in the same manner. The nature and significance of the change will vary according to the location, the type of facilities installed, and the method of construction.

The purpose of the environmental study was to evaluate and compare alternative transmission system plans. The study also provided information for the selection of approximate route-stage study areas.

The study approach was designed to identify the officially stated and approved land use restrictions or policies that would be contravened by the location of transmission facilities (for example, Ottawa International Airport restricted areas), and to recognize the various environmental components that would be susceptible to change by the location, construction, presence and maintenance of bulk power transmission facilities.

Citizen participation in the environmental study was initiated in 1976 by the formation of a Transmission Working Committee, comprised of public officials, residents and representatives of organizations in eastern Ontario. The committee worked with Hydro staff to define the relative environmental constraints for the different areas within the eastern Ontario study area.

Eleven steps were employed in the study. These were:

1. Define the Regional Study Area.
2. Develop the Public Involvement Program.
3. Inventory the Regional Study Area.
4. Identify the Environmental Factors and Objectives. The nine environmental factors identified were:
   - Human Settlement
   - Agricultural Production
   - Timber Production
   - Mineral Resources
   - Recreation
   - Appearance of the Landscape
   - Terrestrial Communities
   - Aquatic Communities
   - Wildlife Resources

   Within the nine factors, a total of forty-six specific concerns (called objectives) were identified and defined by the Working Committee in conjunction with Ontario Hydro staff.
5. Rank the Objectives within each Factor. This ranking was developed by the Working Committee.
6. Rank the Overall List of Objectives. The Working Committee developed the overall ranking of the objectives which had previously been ranked within each factor (Step 5). This ranking, which was the culmination of the activities of the committee, provided a basis for the subsequent steps in the land use and environmental study.

MAIN REPORT REFERENCE

7. Prepare Environmental Constraint Maps. Using the rankings provided by the Working Committee, Ontario Hydro prepared constraint maps. *Section 9.2.3*

8. Identify Bands. Bands were drawn to accommodate the various links of the alternative plans while avoiding areas with relatively high constraint wherever possible.

9. Evaluate and Compare Bands. The result of this step was the selection of the best overall band for each link for use in the plan comparison.

10. Evaluate and Compare Plans. Using the preferred band for each link, alternative plans were evaluated and compared on the basis of probable environmental implications.

11. Identify Approximate Route-Stage Study Areas. Approximate route-stage study areas were identified for each of the alternative plans. The areas were defined according to the environmental constraints, physical constraints such as lakes, county boundaries and existing linear facilities.

5.2 Technical and Economic Studies

Sections 9.2.1 9.2.2

In developing the alternative plans, detailed studies were undertaken to ensure that each plan met technical power system criteria.

The economic comparison of the alternate plans took into account the capital costs, power losses and operation and maintenance costs associated with each of the plans. These were then expressed in present worth dollars in order to allow the relative costs to be compared. These costs as well as line lengths and right-of-way areas for the plans are shown on the table on page 6.

6.0 Evaluation of Alternative Plans and Selection of the Recommended Plan

Chapter 12.0

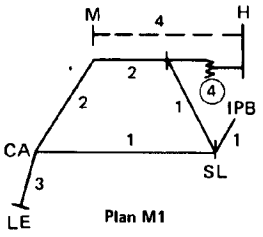
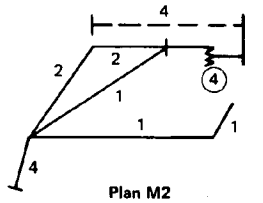
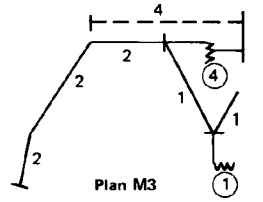
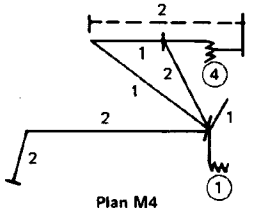
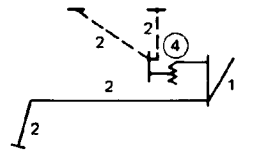
Section 12.3

The environmental evaluation showed that Alternative Plans M2 and M4 were the least preferred alternatives. In addition, the estimated 1980 present worth of total costs for Alternative Plan M2 and M4 were at least 73 and 49 million dollars, respectively, more than the lowest cost alternative. Therefore, on the basis of both environmental concerns and cost, Alternative Plans M2 and M4 are not being recommended by Ontario Hydro.

A further reduction in the number of alternative plans was made by comparing M1 and M3. These two plans have several common links. The only uncommon link is a 500 kV single-circuit line in M1 from the vicinity of Cataraqui TS to St. Lawrence TS. The addition of this link resulted in M1 having a higher overall potential environmental effect than M3 and much more transmission line length and right-of-way area. Also, the estimated total present worth cost for M1 is from 38 to 40 million dollars higher than for M3. Therefore, although Plan M1 has operating advantages compared to M3, the final comparison was made between Plans M3 and M5.

From the table on page 6, it can be seen that the estimated 1980 present worth of the total costs for Alternative Plan M3 is from 9 to 36 million dollars less than for M5. However, the results of the initial environmental evaluation

Summary of Evaluation of Alternative Plans for Scenario M

Alternative Plan Number and Simplified Diagram	Present Worth of Total Costs (1980 $ '000,000)		Line Length		Right of Way	
	3.2% ALG	4.7% ALG	500 kV (km)	230 kV (km)	Length (km)	Area (ha)
 Plan M1	385	477	710	13	484	3861
 Plan M2	420	511	762	13	569	4413
 Plan M3	347	437	507	13	314	2640
 Plan M4	396	503	701	13	421	3736
 Plan M5	356	473	451	160	408	2764

Legend:

- 2 — No. of 230 kV CCTS
- 2 — No. of 500 kV CCTS
- 4 — No. of Autotransformers

LE – Lennox GS
CA – Vicinity of Cataraqui TS
M – Merivale TS
H – Hawthorne TS
SL – St. Lawrence TS
IPB – Interprovincial Boundary

ALG–Average Load Growth

were too close to allow a preference to be determined between the two plans. Consequently, a more detailed overall comparison was undertaken to determine any differences between them, including the significance of the relative differences in overall potential environmental effects. To do this, consideration was given to the following:

- the geographic pattern of environmental concerns potentially affected;
- the sensitivity of environmental concerns potentially affected;
- the relative transmission line lengths and right-of-way areas required;
- the ability to meet system design criteria; and
- the ability to accommodate changes in load growth.

Several bands are common to alternative Plans M3 and M5. However, the bands between Cataraqui TS and Merivale TS and between Merivale TS and Hawthorne TS are unique to M3, while the bands between Cataraqui TS and St. Lawrence TS and between St. Lawrence TS and Merivale TS are unique to M5. Differences in potential environmental effects were found to be principally related to these geographic areas, although some were found to be related to differences in the right-of-way area within common bands (for example, the right-of-way required for 500 kV lines is wider than for 230 kV lines).

In M3, the band between Cataraqui TS and Merivale TS is strongly dominated in the south by the rugged, heavily forested Canadian Shield, and in the north by the Ottawa Valley. There are numerous lakes throughout the Shield with good recreational opportunities and aquatic communities. Agricultural land uses predominate in the Ottawa Valley. Mineral resources are abundant near Ottawa. Sensitive biological areas and large wetlands occur between Perth and Richmond. Also,in M3,the system link between Merivale TS and Hawthorne TS would use the existing Hydro-owned right-of-way. Potential impacts on the urban area would be minimized by the use of this existing transmission right-of-way.

In M5, the band between Cataraqui TS and St. Lawrence TS would have a high potential effect on the recreational and visual quality in the vicinity of the crossing of the Rideau River and Canal. There would also be potential effects on wetlands, primarily east of Leeds County. Much of the soil in the eastern half of the band has high capability for agricultural use. The band between St. Lawrence TS and Merivale TS is almost entirely agricultural in nature, reflecting the dominant land use in the Ottawa Valley and St. Lawrence Lowlands. Approximately 67% of the band has arable soils capable of sustaining common field crops. There are good aggregate resources in the vicinity of Ottawa which could be affected.

This second comparison of Plans M3 and M5, based on the detailed environmental evaluation, indicated that Plan M3 has lower relative potential effects on all agricultural situations, on human settlements with populations less than 500, on the visual, recreational and historic character of the Rideau River and Canal, and on wildlife management areas. Plan M5, on the other hand, has slightly lower potential effects on sensitive biological areas and wetlands.

Alternative Plan M3 would require approximately 15% less transmission line length and 5% less right-of-way area than Plan M5. M3 would also require fewer transmission towers across the agricultural land in the St. Lawrence Lowlands.

77

MAIN REPORT REFERENCE

Other aspects favouring Alternative Plan M3, when compared to M5, are: *Section 12.3*

1. The estimated power losses are much lower for Alternative Plan M3 than for M5. This is an advantage from the point of view of conservation of resources even though the power losses are included in the economic comparison.

2. Alternative Plan M3, with 500 kV transmission directly from Lennox GS to the Ottawa area would provide slightly better voltage control for emergency conditions.

3. Although all alternative plans meet the criteria for loss of all circuits on a right-of-way, M3 provides slightly more reserve for such a contingency.

4. If the load continues to grow beyond the year 2000, the cost and environmental impact of the required expansion of M3 would be less than for M5.

On the basis of the results of the detailed environmental, economic and technical evaluations of these two alternative plans, M3 is preferred, and is a good choice even if the future load growth is different than now forecast.

Therefore, Plan M3 is recommended for approval, although each of the alternative plans meets the purposes of the Program.

Plan M3, and its associated route stage study area, is shown in Appendix A. Similar drawings are provided for Plans M1, M2, M4 and M5, also in Appendix A. *Chapters 5.0 14.0*

7.0 Future Activities at the Route-Selection Stage *Section 14.3*

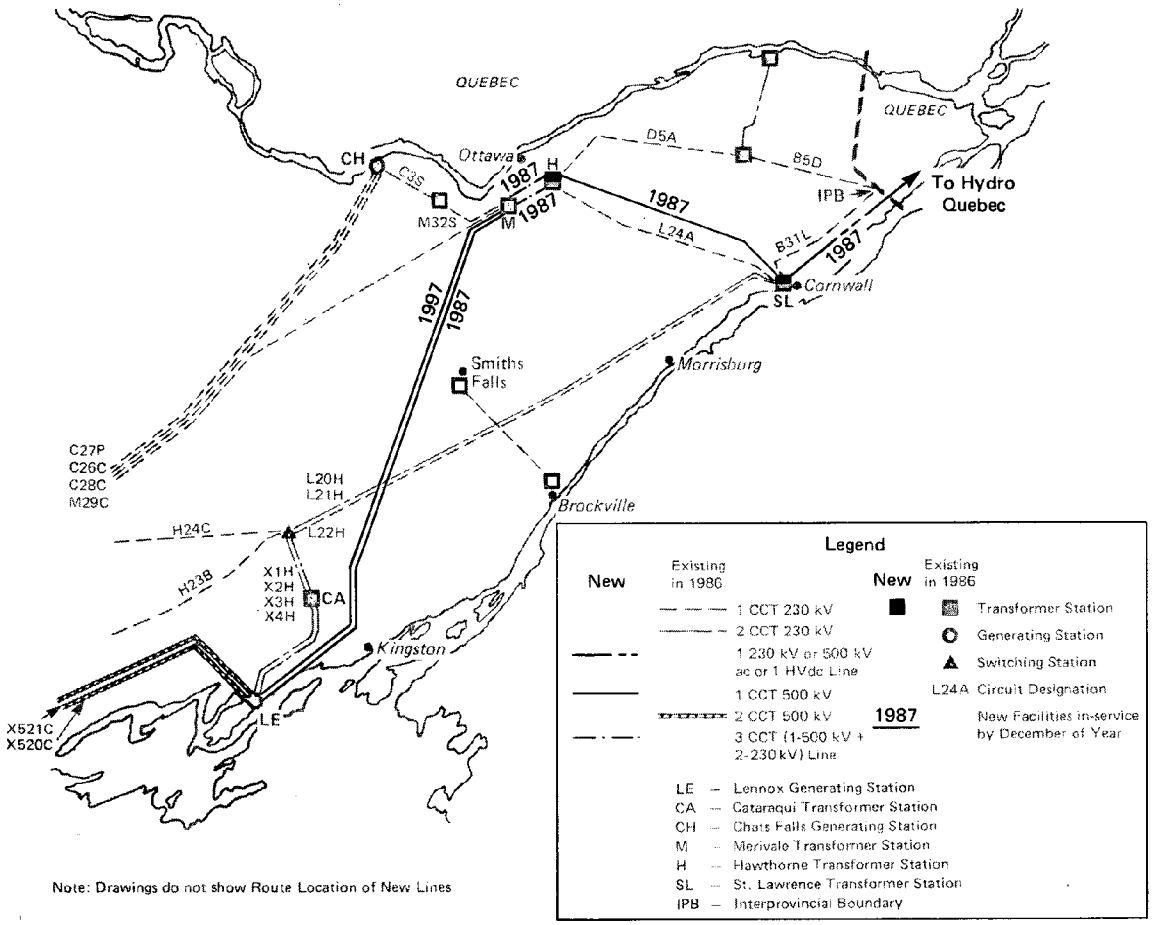
Assuming that approval is granted for a transmission system plan for eastern Ontario, and for the associated approximate route-stage study areas, Ontario Hydro will commence a study to identify alternative transmission routes for the transmission links called for by that plan. This study will provide extensive opportunities for public participation and will identify, evaluate and compare the alternative routes. Specific facilities, and their locations, would then be recommended for approval under the environmental assessment process.

APPENDICES

APPENDIX A

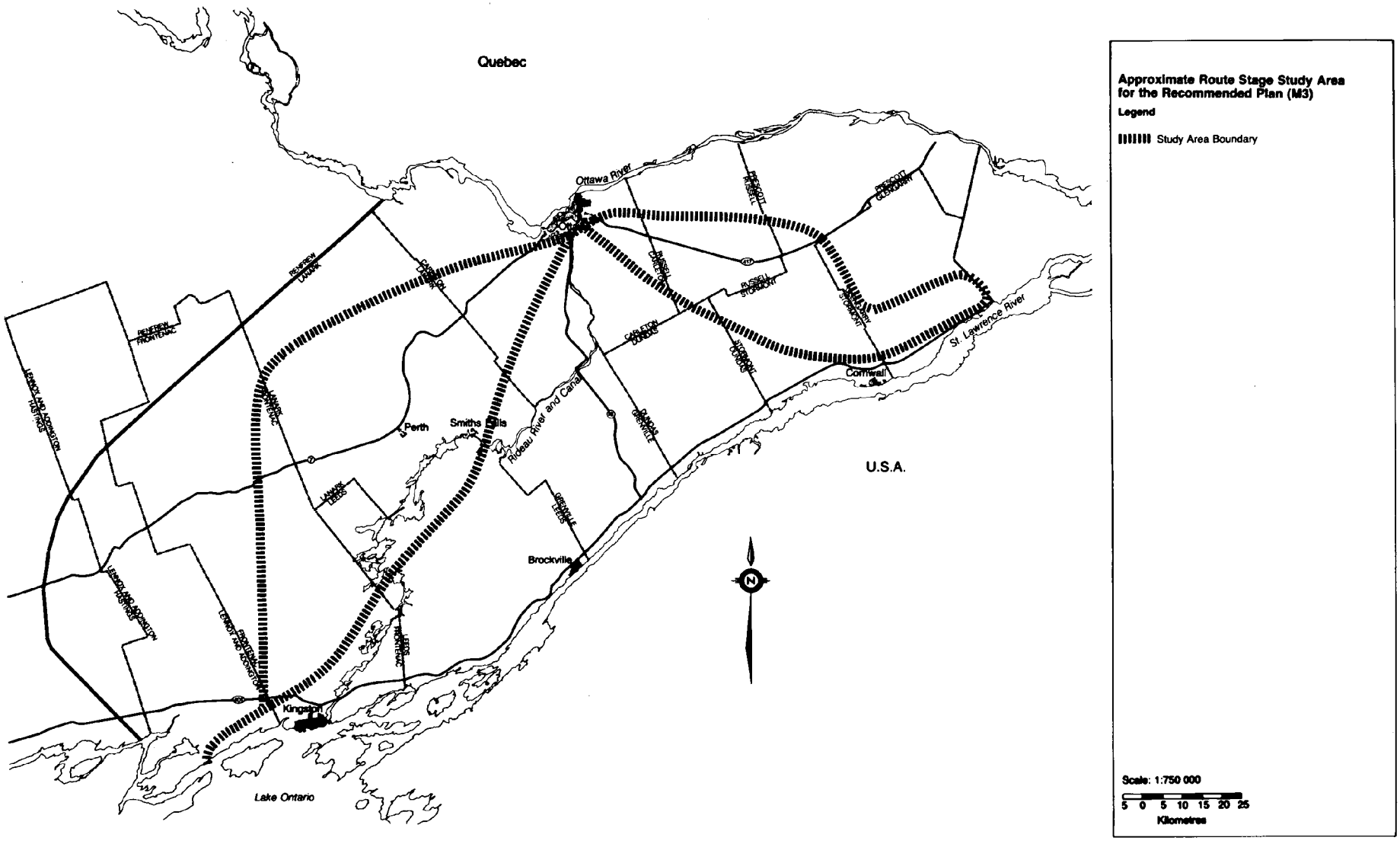
Maps of Alternative Plans and Associated Route Stage Study Areas

80

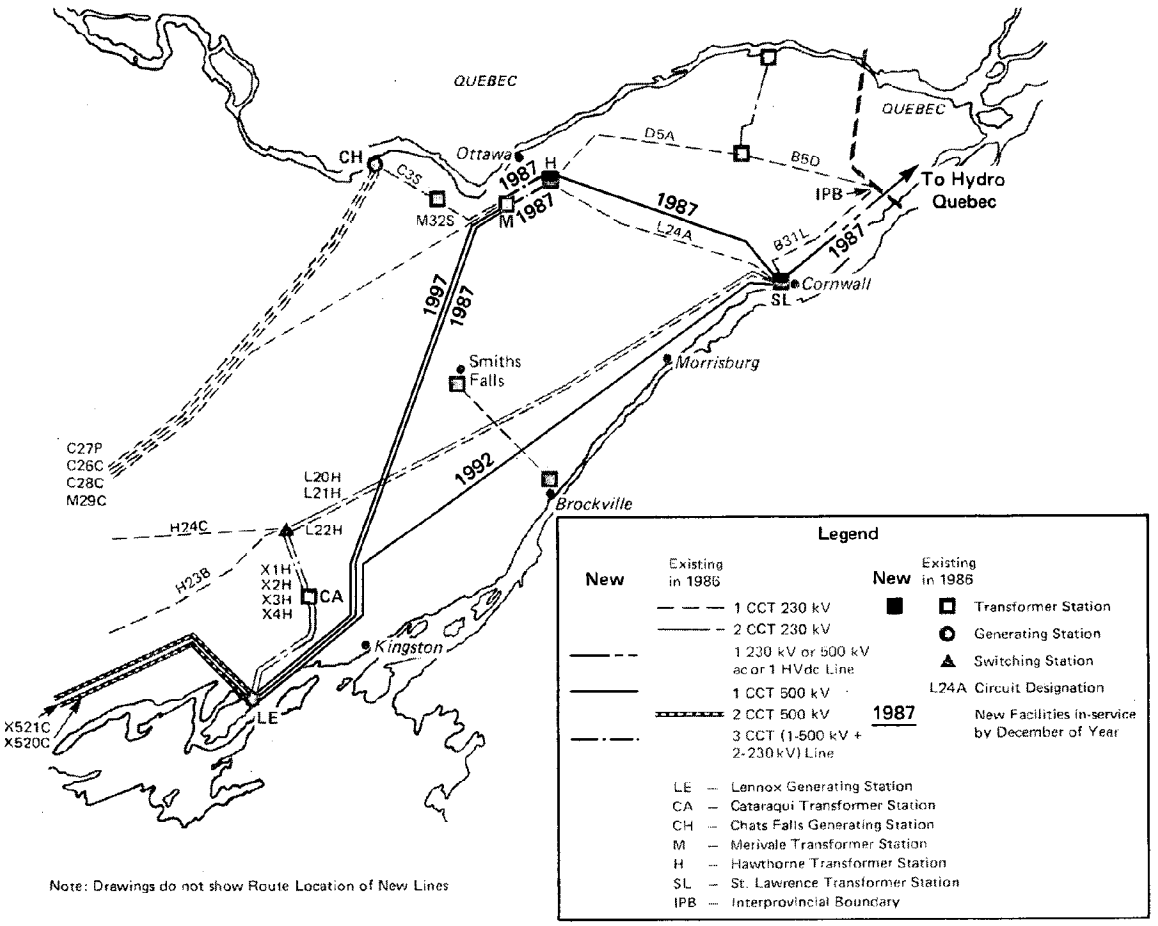


Note: Drawings do not show Route Location of New Lines

Recommended Plan M3 consists primarily of two 500 kV circuits from Lennox GS to the Ottawa area and one 500 kV circuit from there to St. Lawrence TS. There are 500 - 230 kV autotransformers installed at Hawthorne TS to supply the area load and also at St. Lawrence TS. The St. Lawrence TS autotransformer avoids the need for one more 500 kV circuit between Lennox GS and the Ottawa area. There is also a high voltage transmission line from St. Lawrence TS to the interprovincial boundary with Quebec.

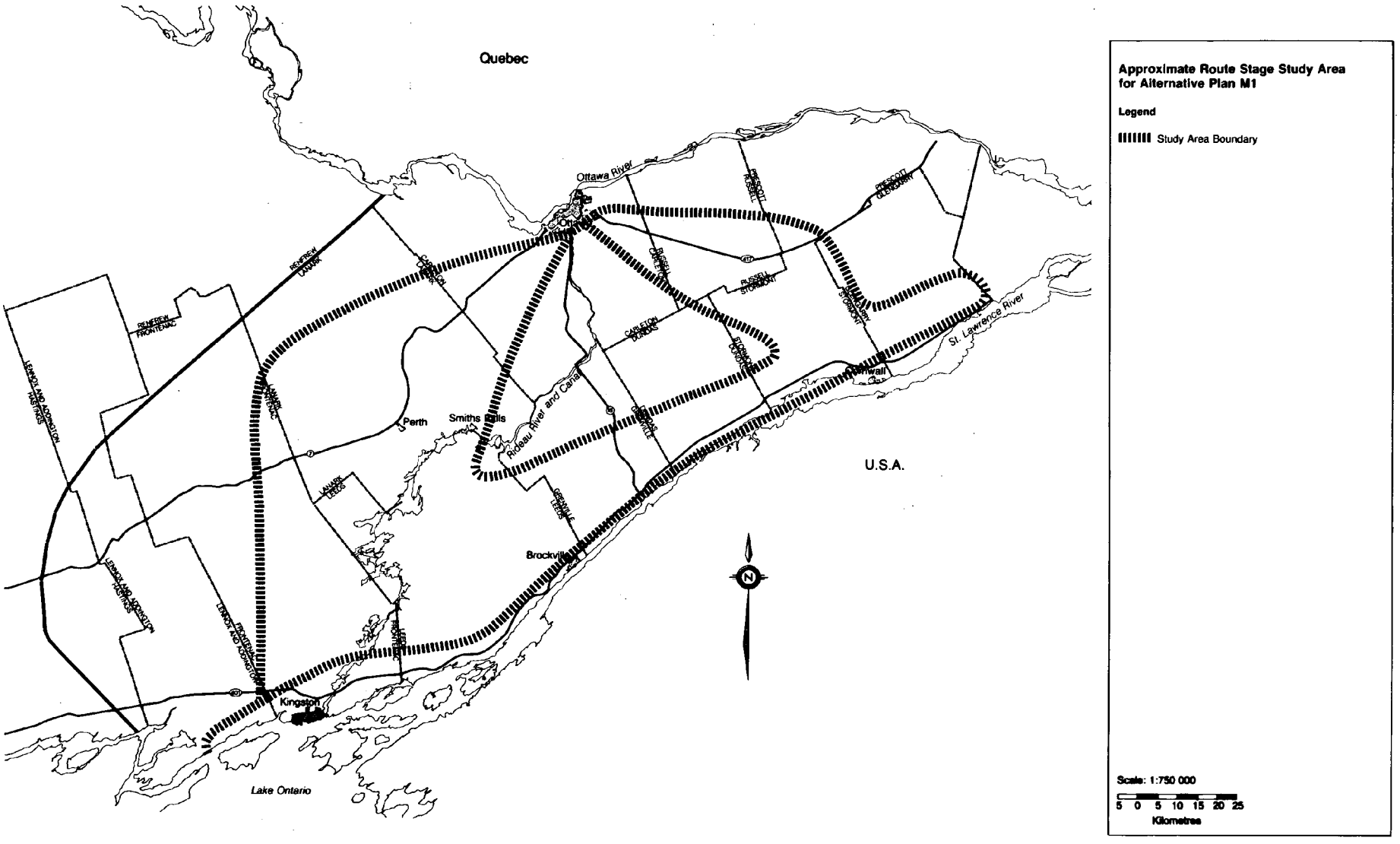

Approximate Route Stage Study Area for the Recommended Plan (M3)
Legend
Study Area Boundary
Quebec
Ottawa River
Perth
Smiths Falls
Rideau River and Canal
Brockville
Kingston
Lake Ontario
Cornwall
St. Lawrence River
U.S.A.
Scale: 1:750 000
5 0 5 10 15 20 25
Kilometres

82

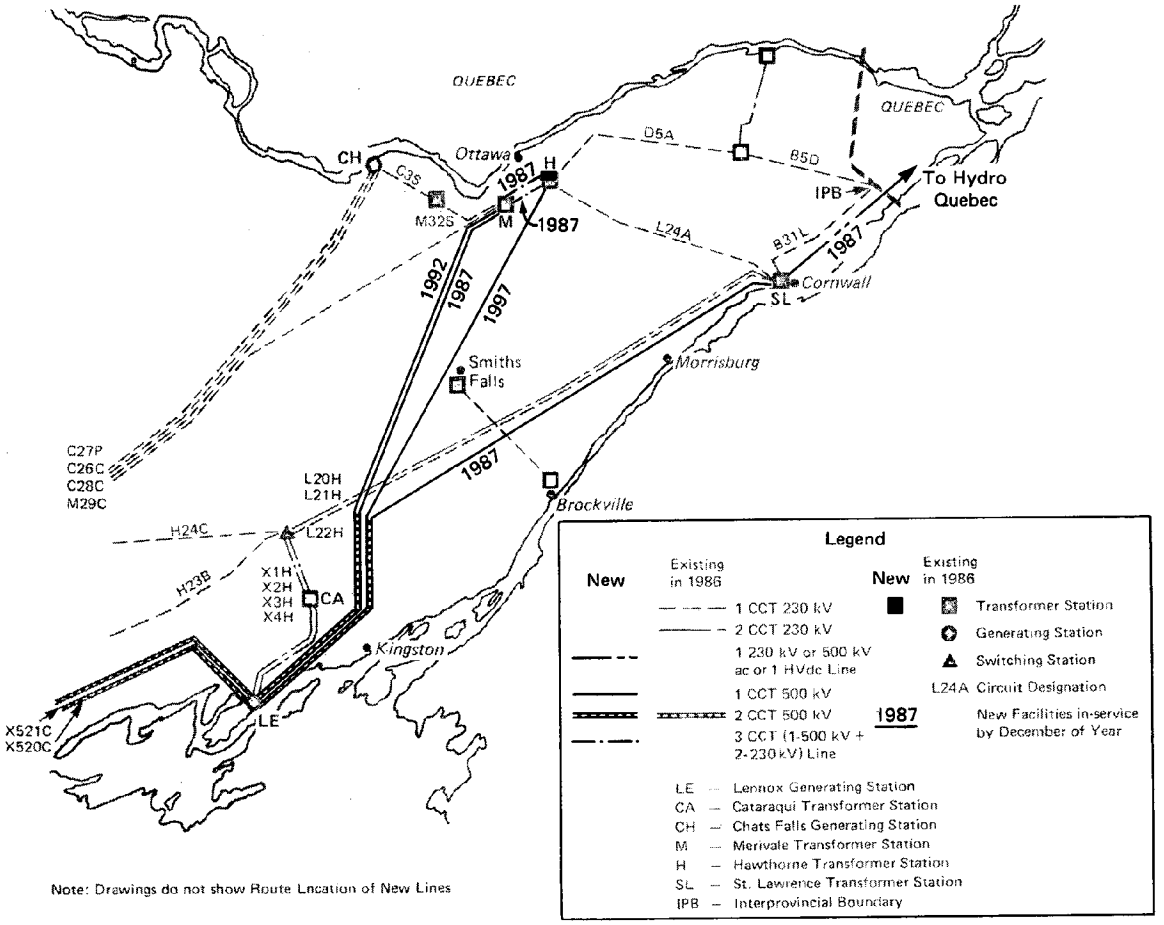


Note: Drawings do not show Route Location of New Lines

Alternative Plan M1 consists primarily of a 500 kV loop connecting Lennox GS to the Ottawa area and to St. Lawrence TS with 500-230 kV transformation at Hawthorne TS to supply the area load. The 500 kV loop provides a total of three 500 kV supply lines into the Ottawa area, with two 500 kV circuits from Lennox GS to Hawthorne TS and one from Lennox GS to St. Lawrence TS to Hawthorne TS. There is also a high voltage transmission line from St. Lawrence TS to the interprovincial boundary with Quebec.

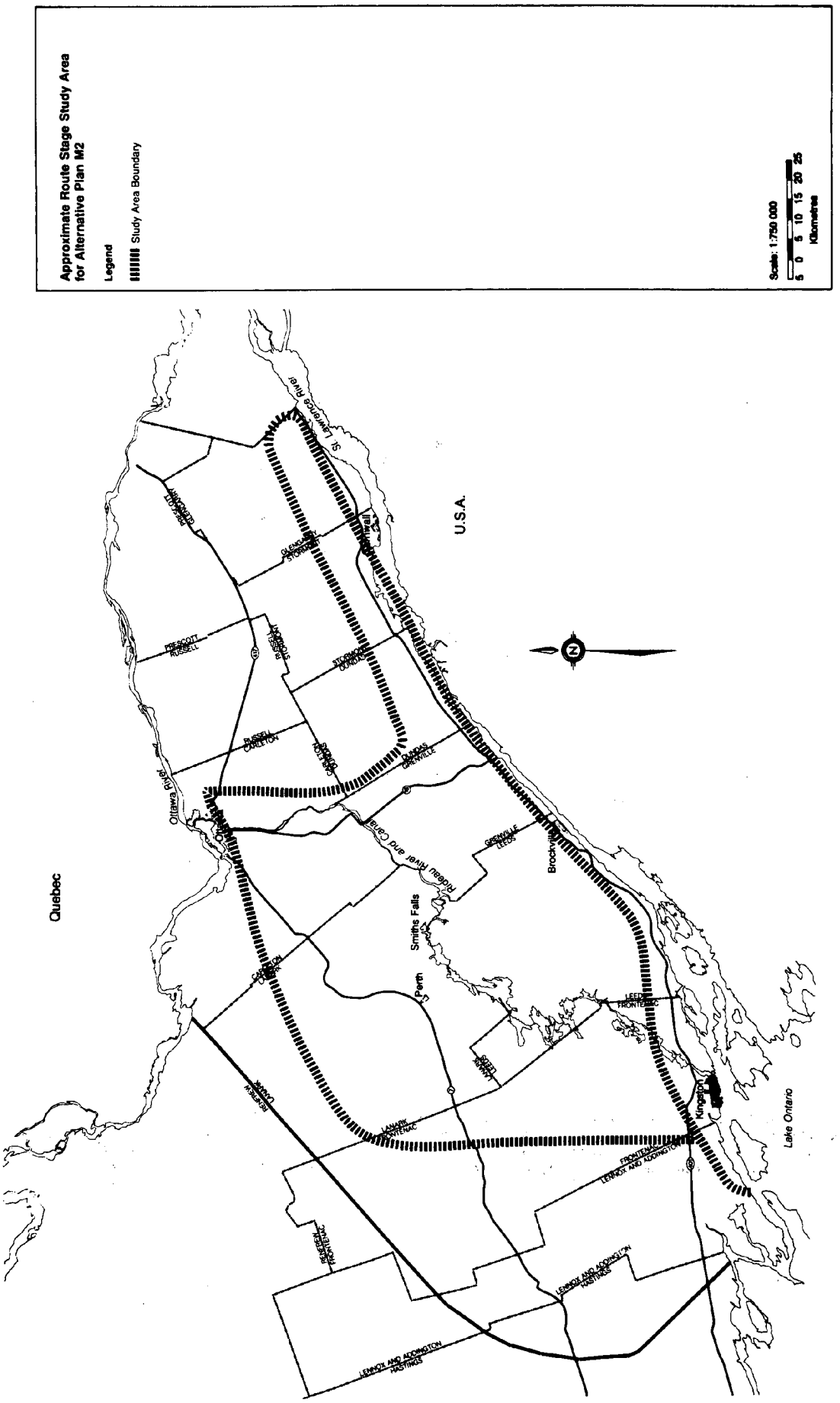

Approximate Route Stage Study Area for Alternative Plan M1
Legend
Study Area Boundary
Quebec
Ottawa River
Ottawa
Perth
Smiths Falls
Rideau River and Canal
Brockville
Kingston
Lake Ontario
St. Lawrence River
U.S.A.
Scale: 1:750 000
5 0 5 10 15 20 25
Kilometres

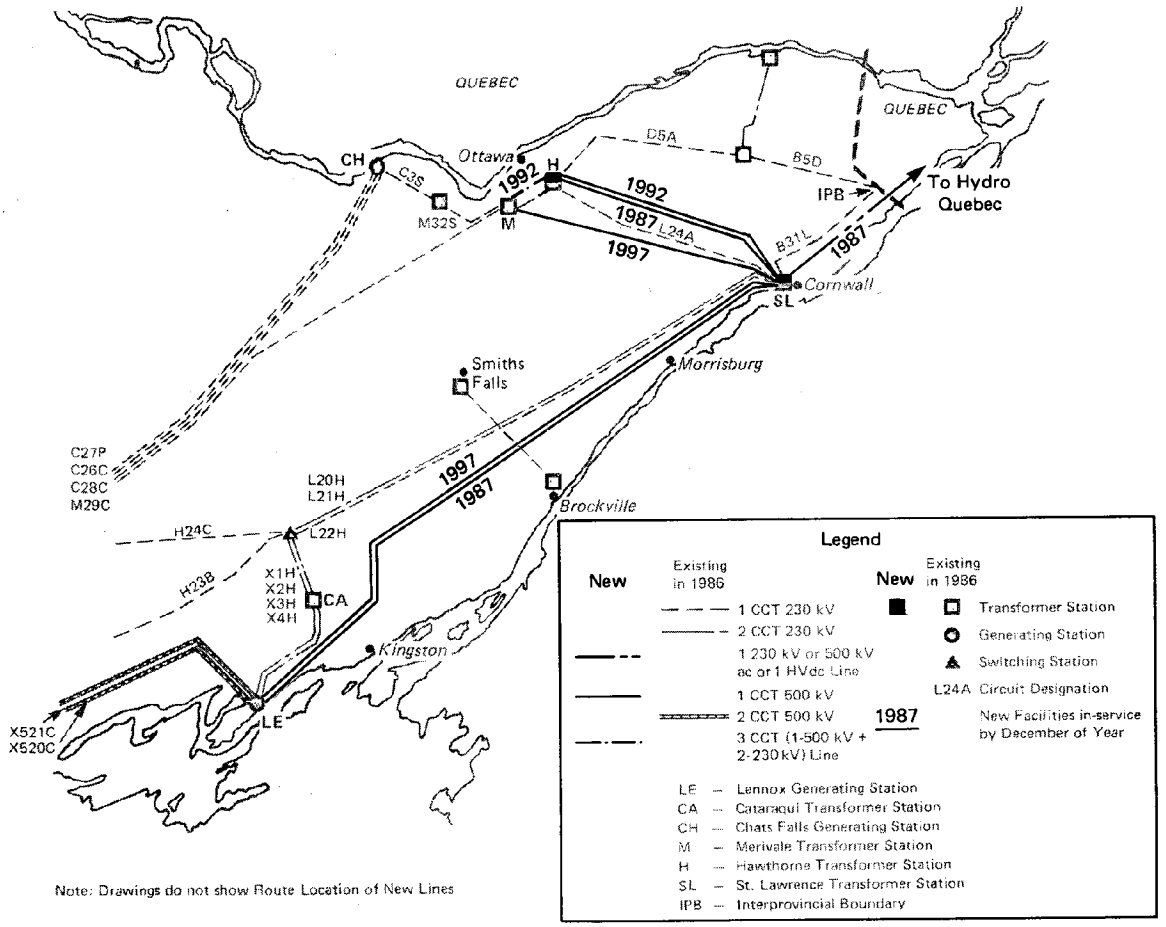
84



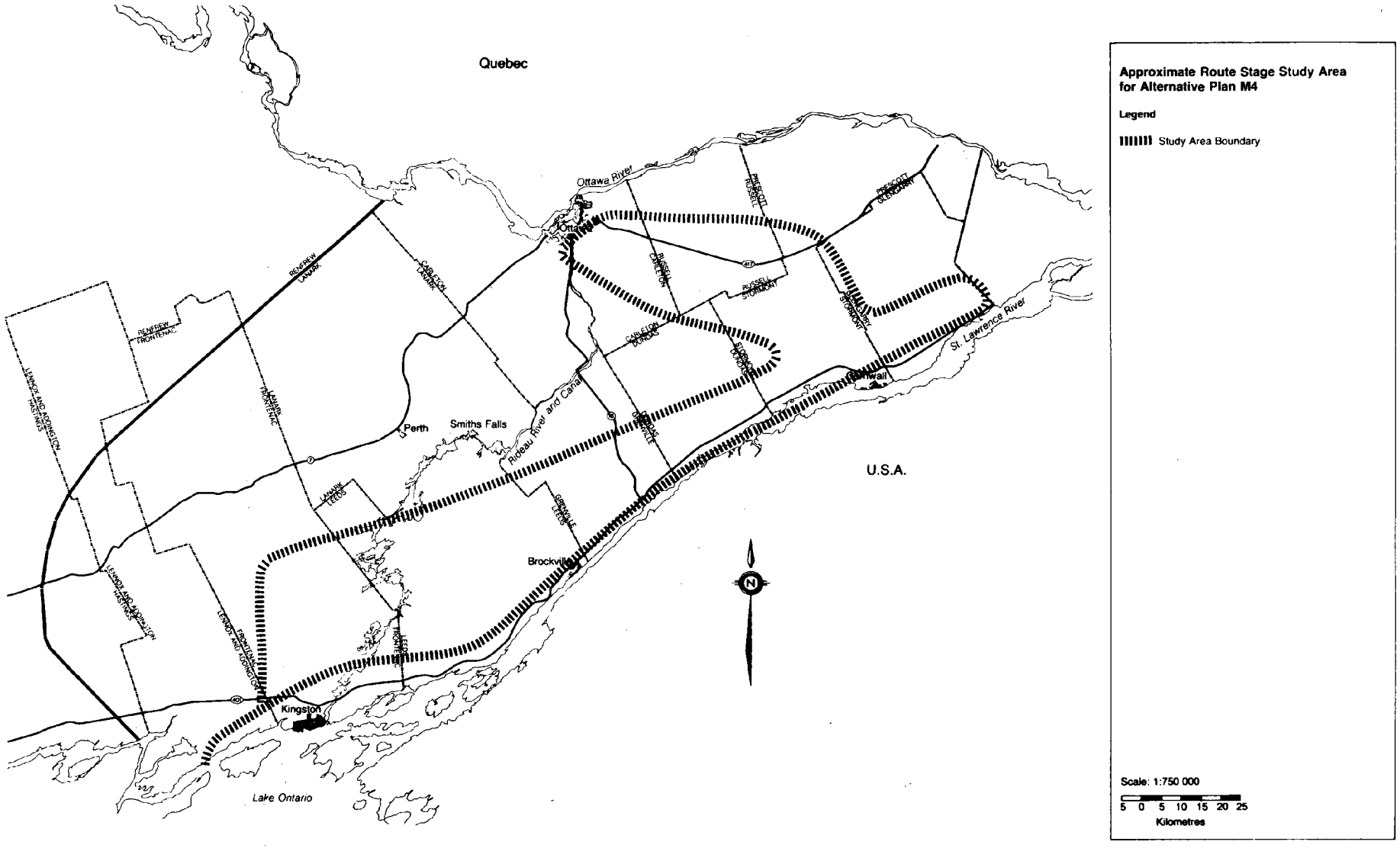
Note: Drawings do not show Route Location of New Lines

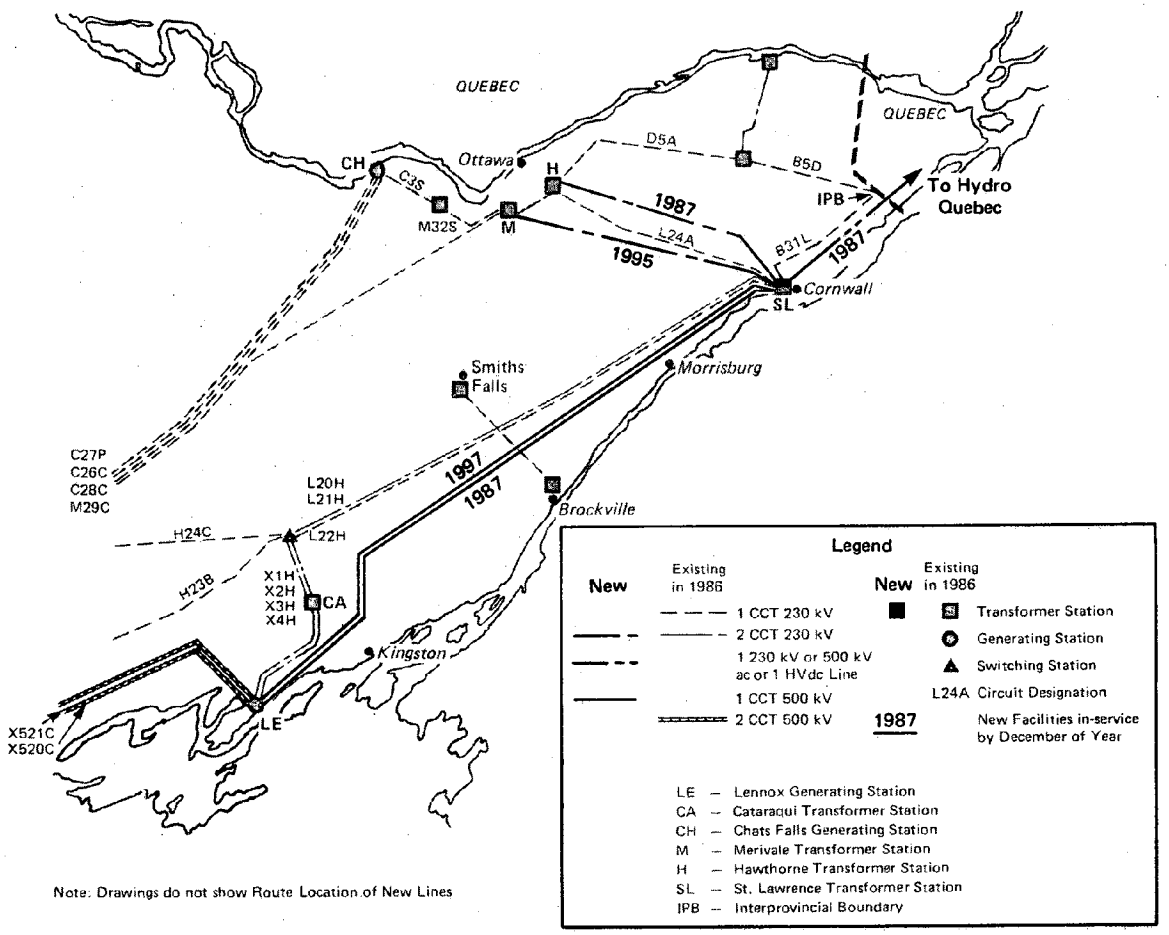
Alternative Plan M2 consists primarily of three 500 kV circuits from Lennox GS to the Ottawa area. Except close to Lennox these are on two separate rights of way. There are 500 - 230 kV autotransformers at Hawthorne TS to supply the area load. There is also a 500 kV circuit from Lennox GS to St. Lawrence TS. From St. Lawrence TS to the interprovincial boundary with Quebec there is a high voltage transmission line.


Approximate Route Stage Study Area
for Alternative Plan M2
Legend
Study Area Boundary
Scale: 1:750 000
5 0 5 10 15 20 25
Kilometres
U.S.A.
Quebec
Lake Ontario
St. Lawrence River
Ottawa River
Rideau River and Canal
Smiths Falls
Perth
Brockville
Kingston
N



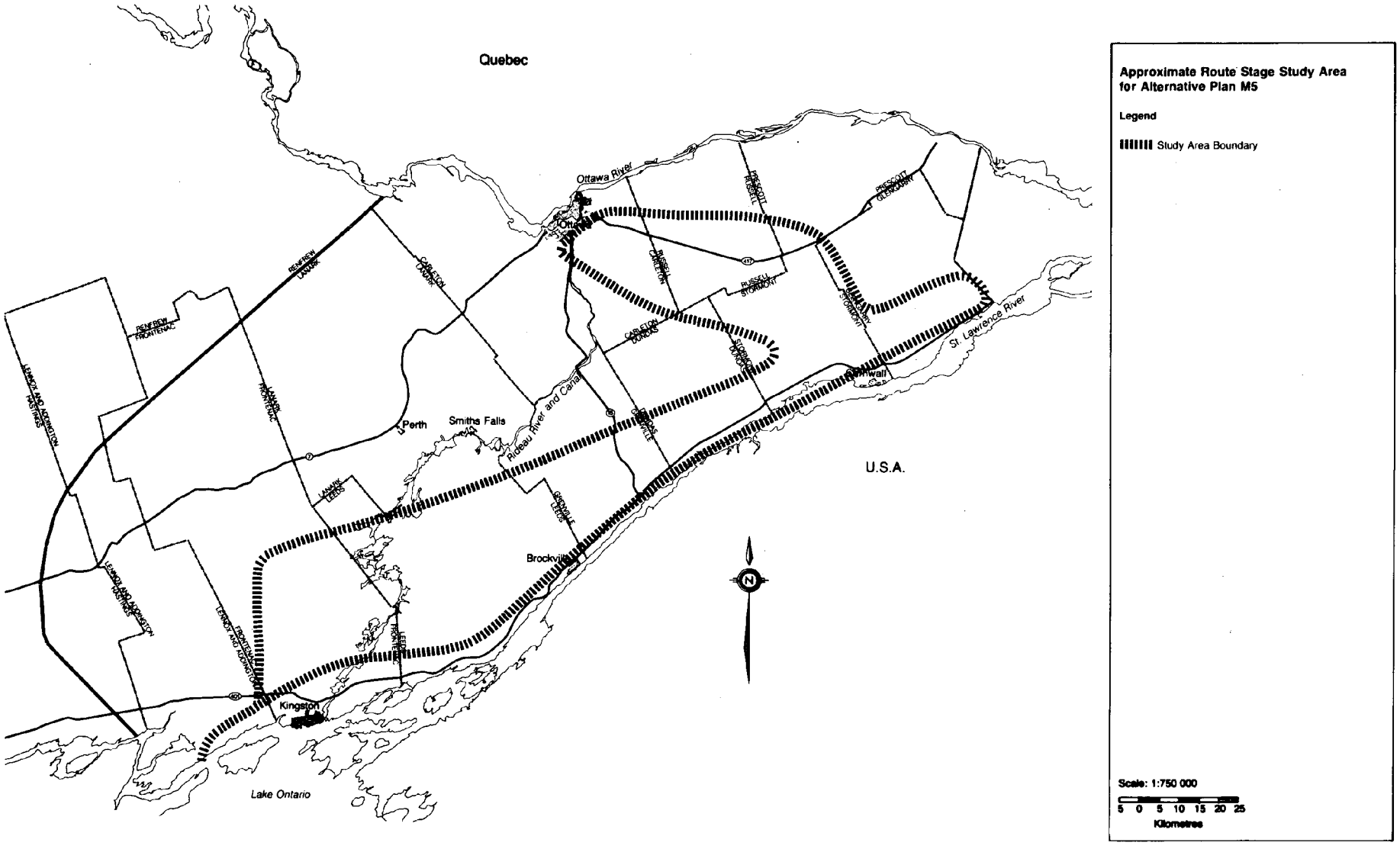
Alternative Plan M4 consists primarily of two 500 kV circuits on one right of way from Lennox GS to St. Lawrence TS, and three 500 kV circuits on two separate rights of way from St. Lawrence TS to the Ottawa area. There are 500 - 230 kV autotransformers at Hawthorne TS and at St. Lawrence TS. The St. Lawrence TS autotransformer avoids the need for one more 500 kV circuit from Lennox GS to St. Lawrence TS. There is also a high voltage transmission line from St. Lawrence TS to the interprovincial boundary with Quebec.


Quebec
Ottawa River
Ottawa
RENFREW CAUNTY
RENFREW FRONTENAC
LANARK AND ADDINGTON HIGHLANDS
LANARK FRONTENAC
LENNOX AND ADDINGTON HIGHLANDS
FRONTENAC LENNOX AND ADDINGTON
CARLETON PUNOG
PRESCOTT RUSSELL
RUSSELL CARLETON
RUSSELL STORMONT
PRESCOTT STORMONT
CARLETON DUNDAS
STORMONT DUNDAS
GLENGARRY PRESCOTT RUSSELL
St. Lawrence River
Cornwall
Perth
Smiths Falls
Rideau River and Canal
LANARK LEEDS
GRENVILLE LEEDS
Brockville
LEEDS FRONTENAC
Kingston
Lake Ontario
U.S.A.
N
Approximate Route Stage Study Area for Alternative Plan M4
Legend
Study Area Boundary
Scale: 1:750 000
5 0 5 10 15 20 25
Kilometres



Note: Drawings do not show Route Location of New Lines

Alternative Plan M5 consists primarily of two 500 kV circuits on one right of way from Lennox GS to St. Lawrence TS, 500-230 kV autotransformers at St. Lawrence TS and new 230 kV circuits on separate rights of way from there to Merivale TS and Hawthorne TS to supply the Ottawa area load. There is also a high voltage transmission line from St. Lawrence TS to the interprovincial boundary with Quebec.


Quebec
Ottawa River
Ont.
RENFREW LANARK
RENFREW FRONTENAC
LANARK AND LEEDS GRENVILLE TOWNSHIPS
LANARK FRONTENAC
LANARK LEEDS
LEEDS AND GRENVILLE TOWNSHIPS
FRONTENAC LENNOX AND ADDINGTON TOWNSHIPS
LEEDS FRONTENAC
GRENVILLE LEEDS
CARLETON DUNDAS
CARLETON GRENVILLE
RUSSELL STORMONT
PRESCOTT RUSSELL
PRESCOTT GLENGARRY
GLENGARRY STORMONT
DUNDAS STORMONT
Perth
Smiths Falls
Rideau River and Canal
Brockville
Cornwall
St. Lawrence River
U.S.A.
Kingston
Lake Ontario
N
Approximate Route Stage Study Area for Alternative Plan M5
Legend
Study Area Boundary
Scale: 1:750 000
5 0 5 10 15 20 25
Kilometres

90

APPENDIX B

Additional Reports and References

1. "Requirement for Additional Bulk Power Facilities to Supply Eastern Ontario", Ontario Hydro Report, December 1978 (RCEPP Exhibit SE2).
2. "Bulk Power Facilities – Eastern Ontario, Supplementary Information", Ontario Hydro, March, 1979 (RCEPP Exhibit SE3).
3. "Report on the Need for Additional Bulk Power Facilities in Eastern Ontario", RCEPP, July 13, 1979.
4. "Quebec-Ontario Interconnection Study", Hydro-Quebec and Ontario Hydro Joint Report, July 1980
5. "Transmission-Technical", Ontario Hydro submission to the Royal Commission on Electric Power Planning (RCEPP) with respect to the Public Information Hearings, March 1976.
6. "Transmission Planning Processes", Ontario Hydro submission to RCEPP with respect to the Public Information Hearings, June, 1976.
7. "Transmission-Environmental", Ontario Hydro Submission to the Royal Commission on Electric Power Planning (RCEPP), with respect to the Public Information Hearings, March 1976.
8. "Transmission and Land Use", Ontario Hydro submission to RCEPP with respect to the Final Hearings, July, 1977.
9. "Report of the Royal Commission on Electric Power Planning", February 1980.
10. "Eastern Ontario Transmission Study – Public Involvement and Environmental Process Support Document", Ontario Hydro, July 1980.

GLOSSARY OF TERMS

Autotransformer – a power transformer with a single main winding per phase with both primary and secondary connections made to the single winding.

Band – a linear, irregularly shaped, geographic area, of a defined minimum width, within which the probability of finding acceptable locations for transmission facilities appears greatest in light of the identified constraints.

Bulk Power Transmission Network – this comprises the transmission, switching, transformation and other terminal station facilities which interconnect the principal sources of power generation and the main load centres. At present Ontario Hydro's bulk power transmission network primarily uses voltage levels of 500 kV and 230 kV.

Circuit – a set of conductors, insulated from each other, three for a three phase system, two for a single phase system, through which electric current is intended to flow. All the conductors of each circuit are generally controlled by circuit breakers or switches.

Co-generation Plant – a plant designed for the simultaneous production of electricity and steam for use in industrial processes or district heating.

Constraint Map – a map which displays the geographic distribution of areas of differing limitations to the location of transmission facilities.

Environmental Effect – a measurable change in the present or future environment expected to be brought about either directly or indirectly by transmission facilities.

Factor – a class of concerns represented by a group of related objectives (e.g. Agricultural Production, Recreation, etc.).

Firm Power – power available for use by the purchaser on a commercially continuous basis.

Integrated Power System – a system in which all sources and all loads are physically interconnected in such a way that power can flow from any source to any load.

Link – a line joining two terminal points of a system diagram (which is always illustrated by a straight line). It can be described verbally or illustrated on a sketch, but it does not have a geographic location.

Load – the amount of power or energy used by customers. It is measured in watts or megawatts where the prefix mega indicates one million units.

Local Generation – typically small electric generators designated for the supply of local area loads.

Losses – the power used by the system itself due to the inefficiency of transmission lines, transformers, etc.

Present Worth – the equivalent value at a time designated as the "present" of a particular payment or receipt, or of all payments and receipts associated with a given course of action, taking into account the time-related value of resources.

92

Rank – to establish an order of priority among a set of objectives

Situation – a characteristic of the environment which is expected to be affected by transmission facilities and is described by using specific data contained within the inventory.

Transformer Station – a group of electrical components or elements arranged to transfer power from one voltage level to another to terminate transmission circuits at the various voltage levels and to provide for an interchange or redistribution of power among the circuits at each voltage level.